HPOIL GAS PRIVATE LIMITED

(HOGPL)

TENDER FOR

LAST MILE CONNECTIVITY WORK INCLUDING PE LAYING & ASSOCIATED WORKS FOR DIMAPUR DISTRICT OF NAGALAND GA

OPEN DOMESTIC COMPETITIVE BIDDING

TENDER NO. - HOGPL/VCS/25-26/C&P-NL/WC/LMC-PE/018

DATED: 17/07/2026

VOLUME II OF II: TECHNICAL

ENERGISING QUALITY

PREPARED AND ISSUED BY
VCS QUALITY SERVICES PVT. LTD.
NOIDA, INDIA

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

INDEX

S.NO.	DESCRIPTION	PAGE NO.
1.	SCOPE OF WORK-MDPE LAYING & ASSOCIATED WORKS	003-019
2.	AGGREGATE OF STANDARD SPECIFICATION	020-380
3.	PIPING MATERIAL SPECIFICATION	381-409
4.	DATA SHEET	410-419
5.	AGGREGATE OF QUALITY ASSURANCE PLAN	420-470
6.	APPROVED VENDOR LIST	471-533
7.	AGGREGATE OF STANDARD DRAWINGS	534-587

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

	PROJECT NUMBER: C261162	

SCOPE OF WORK - LAST MILE CONNECTIVITY WORK INCLUDING PE LAING & ASSOCIATED WORKS		**CLIENT JOB NO.**			C261162
		TOTAL SHEETS			17
DOCUMENT NO.	C261162	CGD	PL	SOW	2002

M/s HPOIL GAS PRIVATE LIMITED

TENDER FOR

LAST MILE CONNECTIVITY WORK INCLUDING PE LAYING & ASSOCIATED WORKS FOR DIMAPUR DISTRICT OF NAGALAND GA

REV	DATE	DESCRIPTION	PREP	CHK	APPR
	06.04.2026	ISSUED FOR CLIENT REVIEW	AS	PA	DK

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

TABLE OF CONTENTS

1.0 INTRODUCTION 3
2.0 PURPOSE 3
3.0 DEFINITIONS 3
4.0 DOCUMENT PRECEDENCE 3
5.0 SCOPE OF WORK 4
6.0 CONDITIONS FOR ISSUE OF MATERIALS 14
7.0 RECONCILIATION OF OWNER SUPPLIED MATERIALS 15

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 INTRODUCTION

M/s. HPOIL Gas Private Limited (HOGPL) is in the process of starting to setup City Gas Distribution (CGD) Network for the Geographical area of Nagaland state.

VCS Quality Services Pvt. Ltd. has been appointed as the Engineering Project Management Consultant by M/s HPOIL to provide engineering consultancy services for setting up CITY GAS DISTRUBUTION FACILITIES PURPOSE

2.0 PURPOSE

This document is for the scope of hiring contactor for Laying of PE Pipeline Network & Above ground installation for PNG Connections for domestic in the Dimapur GA, Nagaland.

3.0 DEFINITIONS

Where used in this document, the following terms shall have the meanings indicated below, unless clearly indicated by the context to this order

PROJECT	LAST MILE CONNECTIVITY WORK INCLUDING PE LAYING & ASSOCIATED WORKS FOR DIMAPUR DISTRICT OF NAGALAND GA
OWNER	HPOIL GAS PRIVATE LIMITED (HOGPL)
CONSULTANT	VCS QUALITY SERVICES PRIVATE LIMITED (VCSQSPL) the party to act for and on behalf of OWNER for the Engineering Services and construction supervision
MANUFACTURER	The party, which manufactures and supplies equipment and services to the OWNER or to Contractor (for supply materials required for execution of work as per SOR).
CONTRACTOR / BIDDER	The party, which has awarded the tender for the execution of work at site including supply, installation and commissioning (if any) of materials required for completion of Work.

4.0 DOCUMENT PRECEDENCE

It shall be the responsibility of the Contractor/ Bidder to inform the OWNER of any errors, ambiguities, inconsistencies, discrepancies, or conflict of information that may be found to exist in any document, specification or drawing provided in the tender by the OWNER.

In case of conflict, the order of precedence shall be as follows:

a) Scope of Work (SOW)
b) Schedule of Rates (SOR)
c) QAP
d) Standard Specifications
e) Codes and Standards

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

As a general rule in the event of any discrepancy between technical matter and local laws/ regulations (and documents above listed) the most stringent shall be applied.

CONTRACTOR/ BIDDER shall notify OWNER of any apparent conflicts between SOW, Technical specifications, related datasheets, any code and standards and any other specifications noted herein. (Resolution and/ or interpretation precedence shall be obtained from OWNER in writing before proceeding with the design/ manufacturer or completion of services.)

5.0 SCOPE OF WORK

The main scope of work comprises laying, testing, and commissioning of underground Polyethylene (PE) service pipelines network of sizes ranging from 20mm up to 125mm Dia., along with above ground GI pipe installation (LMC) for PNG Connections to Domestic & Commercial consumers for City Gas Distribution project including installation of DRS/DCU /SR / Meters / Regulators etc., as per SOR. The scope also covers all the activities associated with the supply of materials (except free issue items).

The scope of work for Last Mile Connectivity Work including PE Laing & Associated Works are as follows.:

GA Description	Domestic Connections (Nos.)	Commercial Connections
Dimapur district of Nagaland GA	12000	35

NOTE:- It is mandated that the contractor shall provide tap-off provisions for all households where service lines are being laid.

OWNER's SCOPE OF SUPPLY (FREE ISSUE ITEM):

- PE Pipes of sizes from 20mm up to 125mm Dia. along with Meters, Regulators, DRS, , SR, Strainer.

CONTRACTOR'S SCOPE OF WORK

Material to be supplied by the contractor;

- Supply of PE valves & fittings & Half Concrete Sleeves and transition fittings of sizes from 125 mm to 20 mm.
- Powder coated GI Pipes size from ½", ¾" and its associated fittings.
- Isolation & Appliance Valves.
- Supply of Brass fittings & Suraksha Rubber hose and all materials required for natural gas conversion.
- Supply of Warning Mat.
- Supply of HDPE duct and its associated accessories.
- Supply of CS pipe for Commercial connection.
- Supply of Ball, Glove, NRV valves.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Supply of CS fittings.
- All PPE materials required for safe execution of projects.
- Carrying out subsurface utility survey along the proposed pipeline route and/ or as specified by Engineer-In-Charge for 5 m corridor using Ground Penetrating Radar (GPR) for depth up to 5m below the existing ground level to locate and identify all existing underground utilities/buried objects including but not limited to pipelines, sewers, conduits, cables, drains, manholes, appurtenances etc., in the proposed corridor along with location, DGPS coordinates, depth, shape and dimensional details of utilities.

Backfilling Material: The contractor shall be responsible to arrange the supply of approved coarse sand (Size 0.6-2 mm as per IS: 383) free from any impurities like clay, mica and soft flaky pieces, as per the instruction of EIC/ Owner's representative. For supply of sand and trench for rocky terrain, no separate charges are payable and is included in rates-excavation of hard rock / moron.

In case specified trench depths are not achieved & if directed by Engineer-In Charge Contractor has to provide concrete casing pipes/ slabs or cement concrete, without any cost implication to Owner.

Other Materials: The Contractor shall supply the following items wherever required: -

- All materials required for framework, trench support and temporary trench crossing.
- All sign boards, barricades, tin sheets, lighting arrangement and protective equipment.
- All minor item not mentioned in the Contract but necessary for the satisfactory completion and performance of the work under this Contract.
- Material required for installation of valve chambers.
- Permanent Marker
- All material required for PNG commercial connections (as per SOR) except Strainer, meter & regulator.
- All other materials required for smooth execution of project over and above as mentioned.

All above supply quantity as per relevant SOR item and shall be procured from owner's approved vendors only after approval from Client/ VCS & as per instruction of Engineer-in-charge (EIC).

Generally, the following shall constitute the Contractor's scope of work but not limited to:

1. Contractor to provide Work Implementation & Execution plan along with a schedule for execution and work implementation as per QA/QC plans to be issued by Owner/Owner's representative. Contractor has to submit the Construction/ Execution procedures before commencement of work to Owner/ Owner's representative for approval.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

2. Prior to start of construction activity, contractor shall carry out the route survey and prepare the approval for construction (APC) drawings marked for proposed gas pipe line laying and submit to OWNER/ PMC for approval. The standard templates and color coding as per Owners standard.

3. Co-ordination/ Liaison from respective land-owning agencies such as Municipal Corporation, CPWD, ADA/ LDA, Nagar Nigam, PWD-NH, NHAI, Indian Railway, Forest & Environment Department, Irrigation department and other land owing agencies for road cutting for laying of the pipelines, Liaison with the concerned authorities during execution of the job, obtaining NOC from concerned authorities once the work is completed. Getting back/refund of bank guarantee/ security deposits made to the agencies for laying of the pipelines.

4. Obtaining clearances and coordination with concerned RWA of the allotted area for internal network laying and obtaining NOC from RWA after completion of work.

5. Transportation of Free Issue material from OWNER stores to contractor stores and proper storing, stacking, providing security, insurance cover during transportation and storage, laying, commissioning, and handing over pipelines to owner.

6. Obtaining the approval for optimum route and ROU from the concerned authority and EIC.

7. Intimation to the parallel utilities (Electrical/ Communication/ Water) owners and making trial pits to determine the underground utilities/services such as existing pipelines, cables (electrical/ communication), conduits, U/G drainage, Sewers, tunnels, subways foundations etc. for deciding optimum feasible route and depths for laying the pipelines based on the route plans indicated by owner.

8. Contractor must arrange road cutter machine for all areas where road cut need to be done.

9. Wherever required the grass/ turfing, pavement, linings, drains, roads and other such 'pucca' area shall be locally removed to facilitate trenching and pipe laying works. The same is to be reinstated as original.

10. Installation of safety/warning signs and barricading of the entire route to be trenched. Pits to be similarly barricaded along with warning signs and caution boards. Photograph of each trench with geostamp and timestamp required after laying, placing warning mat and restoration respectively.

11. To make trenches with stable slopes but restricting minimum disturbance to above ground/underground services/installation as per specifications and approved route plans keeping the trenches free from water and soil till placement of pipes.

12. Uncoiling/stringing the PE pipes of required sizes (i.e. 125,90, 63, 32 & 20 mm) pipes into trenches as per approved procedure.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

13. Supply and Installation of PE pipe Rest material and fittings like Elbow, Tees, Reducers, Couplers, tapping saddles, Transition fittings, End cap and Sleeves etc. including construction of supports, Valves pits, Inspection chambers etc. as per specification, drawing & satisfaction of the Engineer in charge (EIC).

14. Joining the pipe ends with fittings of valves by approved automated electro-fusion techniques only as per tender specification.

- EF welding machine should be one having GPS coordinate future nowadays available in market like GF++ MSA 340.
- EF operator to be deployed for EF welding must be certified from approved vendors of EF fittings manufacturer like GF/ Kimplas/ Section IX of ASME BPV.
- Contractor obtains latest welder I-Card by getting training from approved agencies with practical knowledge of welding on highest dia. on which work is intended.
- Contractor arranges to have reports of destructive testing of GI fittings for a lot every six months at its own cost to ensure the quality of GI fittings as per instructions of EIC.

15. Laying pipelines by any methodology including trench less technology methods with or without casing pipes (HDPE pipes) as per specifications and as directed by EIC.

16. Photos and videos with accurate geo reference and time stamp during lowering need to be captured by contractor and GPS Coordinates/ points to be mentioned in lowering report for each EF joint. Site Photographs for before and after scenarios showing trenching, its barricades and restoration to be captured with geo co-ordinates and time stamp.

17. Contractor must take geostamped and time stamped photo of each EF welded joint and submit for Project in charge records on daily basis. Only hydraulic squeezers are allowed and re-rounding tools are required.

18. Installation of pipes (by open cut/ Moling/ HDD) assembly, including supply of all materials (excluding free issue material if any) viz. as per the drawings/ specifications enclosed with bid package. HDD methodology and its profile submission prior to execution of HDD should be in contractor scope. Also, route marker installation at 100m should be integral part of laying.

19. In case specified trench depths are not achieved & if directed by Engineer-In Charge Contractor has to provide concrete casing pipes/ slabs or cement concrete, without any cost implication to Owner

20. Moling should be done with Teflon coated crow bar extension only and with proper ventilation in Moling pit. Electrical utility to be identified prior to attempting manual boring.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

21. Moiling Equipment (for all sizes)- 1 for each size up to 90mm and 1 for 125mm and above in place.

22. Squeeze Tools (Manual) up to 63 mm - Should be hydraulic

23. Gas Detection Unit and Cable locator -1 each in place of work.

24. Pipe Straightness and re-rounding tool -1 each

25. GI Pipe cutter- 1 per 4 connections. Preferable pipe cutter machine.

26. HDD profile & Utility coordination report to be submitted before HDD approval to EIC. Any HDD performed beyond the intended /approved length will be paid as per SOR.

27. Contractor should submit following set of daily reports (Planning, Manpower, Material Inventory, DPR) and monthly reports (QC, Meter reconciliation, material reconciliation, DPR, etc.) Contractor should submit daily site wise activity geostamped and timestamped photos to Engineer in Charge.

28. Contractor must also have to arrange his own equipment like water tanker for Water showering on construction site (trench valves pit areas).

29. Contractor to depute Store keeper and draftsmen for each GA. 1 supervisor required for each site area. 1 HSE person required for GA.

30. Fabrication, supply and inspection of approved quality GI sleeve, HDPE duct and half concrete sleeves and other material, fittings to be supplied by the contractors as per the provisions of tender.

31. Back filling and compaction by jumping jack compactor wherever required, using approved 'good' soil or using excavated earth or borrow earth as per requirement and specifications and replacement of the tiles, slabs removed during the excavation. Cleaning all unserviceable materials, debris, excess earth trenches etc. to designated disposal area.

32. The contractor shall be responsible to arrange the supply of approved coarse sand (size 0.6 - 2 mm as per IS 383) free from any impurities like clay, mica, and soft flaky pieces, as per the instructions of EIC /Owner's representative.

33. Sand / soft soil padding around pipe wherever required in areas where trenching has been done in hard soil area / rocky area including supply of sand/ soft soil. The thickness of sand/ soft soil padding at the top of coated pipe shall be minimum 150 mm and bottom of coasted pipe shall be minimum 150 mm or as per standard drawing.

34. Carrying out pneumatic testing and purging as per specifications and approved procedures, providing all tools & tackles, instruments, manpower and other related accessories for carrying out the testing of pipes.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

35. Supply, fabrication & installation of Plate markers, valve chamber etc. as per the directions of the EIC/Owner's representative.

36. Purging should be done to point till Oxygen percentage is less than 2%. Contractor must arrange Purity certificate of N2 used for purging. It is compulsory to use Nitrogen cylinder trolley while using Nitrogen for purging/ testing. It must be necessary to qualify welder/ manpower for Procedure Qualification Record for performing testing by pressure testing the PE pipe coil.

37. Restoration of existing ground features such as grass/ turfing, paving, roads, drains, concrete, floral beds, fencing, tiles, marbles, flooring masonry etc. to original condition and to match with adjoining conditions, functionally and aesthetically up to the entire satisfaction of Owner / Owner's representative /any other third-party agency designated by owner and local authorities, failing which, it will be done at the risk and cost of the contractor. Obtaining No Objection Certificates for the restoration work done from the concerned authorities.

38. Restoration should be done to satisfaction of EIC and Authority. Contractor must arrange joint restoration report.

39. Returning surplus material to Owner stores after obtaining clearance from TPIA/Consultant/ Owner, reconciliation of free issue material/ consumables.

40. Handing over the completed works to owner along with detailed as built drawing showing pipeline route, fittings provided in the pipelines, for their operation purposes. Handing over 3 sets of completed as Built drawings which are GIS compliant. Also required handing over of GI/CU work of above ground drawings (including Riser drawings and domestic PNG connections drawings) in editable Auto-Cad as well as PDF format.

41. Maintaining the completed pipelines/installation for any failure and defect arising due to poor workmanship during defect liability period.

42. Preparation and submission of all documents like Pit Wise as graph, As-built drawings, details of crossings, utility graphs, measurement sheet, PE cards for service line and deviation statements on completion/commissioning of work by way of drawing, sketches and tables in soft & hard copy.

43. Providing adequate manpower, tools, tackles, equipment for achieving the target of pipeline laying, data logging for pipeline, valves and fittings inventory status, attending complaints, day to day interaction with customers and residents so that work can be executed within defined time period.

44. Contractors' responsibility to provide details as follows (if required): collection of industry details, its current fuel and its consumption and product they manufacture. Identify and locate the collector rate applicable in the particular road in case of NHAI, Forest and Railway. Indicate pipeline route for EIC approval and indicate line sizing after network hydraulics check/ confirmation by EIC. Identify and indicate the name

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

of local authority maintaining the road or drainage/ canal Should provide hard copy of final survey drawing after incorporating all comments from owner's representative.

45. Contractor should identify the name of local authority maintaining the road or drainage/canal & provide hard copy of final survey drawing after incorporating all comments from owner's representative.

- Survey drawing should mention suggested pipeline route in a separate layer for EIC approval before commencing laying.
- EIC to approve line sizing after network hydraulics check /confirmation in a format and linked to annual budget.

46. Following activities are also in contractor's scope:

- Receive Customer's complaints logged during PE Laying.
- Attend and carry out joint technical feasibility survey for requests and resolve the
- complaint.
- Maintain and update the complaint status.

47. All skilled personnel like jointers, conversion technicians will be approved and certified by EIC based on the test conducted by approved trainers.

48. Contractor shall visit and survey all areas where PE laying is planned or in progress to carry out LMC work in all such areas.

Part I: Marketing of PNG

1. Contractor shall coordinate with Resident Welfare Associations/Managing committee of the Societies/areas/House owners for various types of permissions/assistance required for conducting the survey, completing the registration process, and other activities related to laying of pipeline network & project execution.

2. Surveys of household population in the colony/society allocated by owner/owner's representative for collection of registration for creating a database with respect to potential domestic customers and then submit a report in the format prescribed by owner.

3. Contractor shall collect the refundable security deposit and other applicable charges as informed by EIC for providing domestic connections within the customer's premises from all individual households as per the areas released by EIC on prevailing terms and conditions as decided by Client from time to time.

4. Contractor shall collect filled registration forms along with Cheques/Drafts and submit the listing with details of registration form and corresponding payment details in the prescribed formats. The listing of cheques/DD's being deposited to be provided in the prescribed formats along with duly stamped bank deposit slip on a weekly basis.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5. Contractor shall seek information from Client/EPMC regarding the approximate time period in which connection will be given to the customers and inform them accordingly through a formal communication.

6. Contractor shall attend meeting the RWA or any other public forum as per day and time specified by the EIC.

7. For marketing of the PNG connections, contractor shall use an intelligent combination of the following techniques. Marketing and advertisement shall be in consultation with EIC after obtaining the necessary permissions from all concerned authorities/RWA's etc. All promotional items stated below shall be in scope of contractor.

a. Leaflets

b. Posters

c. Frequently asked questions (FAQ)

d. Banners

e. Awareness cum Registrations Camps

f. Inserts in Cable TV's

g. Audio/ Visual Presentations

h. Demonstrations of Meter/Regulators

i. Tele Marketing

j. Door to Door Marketing

k. Mailers

l. Any other marketing activities, as advised by EIC.

8. Depending on need EIC may instruct DMA to undertake special campaign for registration of domestic connections by combination of one or more than one activity in specified/all areas.

9. Contractor shall generate MIS for all visits, Payment collected, progress/action plan of sales team regarding the status of registrations, market penetration and submission of the cheques to Client on day to day basis. These records will be maintained in the prescribed formats specified by EIC and copies (Soft copy in USB/Pen drives/CDs and hard copy in printouts) will be submitted to EIC/Authorized representatives on weekly basis.

10. Contractor shall mobilize the marketing team of sufficient size for carrying out marketing activities. The number of personnel to be mobilized will be as per the requirements as advised by EIC depending on the number of households targeted from time to time.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

11. Contractor shall ensure that its marketing executives/office staff should communicate the correct information to consumers and conduct them in a dignified manner when representing Client. On receipt of any complaint regarding misbehaviour/any other conduct by the persons employed by the contractor, the same shall be immediately bought to the knowledge of EIC. The contractor shall be completely responsible for consequences including any legal or financial implication for any act misbehaviour on the part of persons employed/Contracted by him/her with prospective customer of Client.

12. Contractor shall ensure that their marketing executives/office staffs have proper police verification(s) and should carry the photo identity card (P-ID), issued by the contractor, while making visits on behalf of Client.

13. Registrations from unassigned areas will not qualify as successful & complete registration.

Part II: PE Service Line

1. Obtaining the approval for optimum route and permission for work from society management, RWA, individual residents and any other concerned authority, if required, for completion of the work.

2. Selection of route with the EIC/Consultant/TPIA and marking the same on walls/floors from PE network, transition fittings to stove/cooking oven/appliance, making openings and making provisions for fixing clamps. Making temporary but stable platforms/scaffolding/rope/ladder etc., required for installation of pipes/fittings at all heights/multi storied flats and locations.

3. Uncoiling/stringing the PE pipes of required sizes (20mm, 32mm & 63mm) pipes into trenches as per approved procedure.

4. Joining the pipe ends with fittings of valves by approved automated electro-fusion techniques only as per tender specification.

5. Supply and Installation of PE pipe fittings like Elbow, Tees, Reducers, Couplers, tapping saddles, Transition fittings, Valves and Sleeves etc. including construction of supports, Valves pits, Inspection chambers etc. as per specification, drawing & satisfaction of the Engineer in charge (EIC).

6. Laying pipelines by any methodology including open cut, trench less technology methods like Moling, HDD, etc.

7. Fabrication, supply and inspection of approved quality GI sleeve, HDPE duct and half concrete sleeves and other material, fittings to be supplied by the contractors as per the provisions of tender.

8. Back filling and compaction by jumping jack compactor wherever required, using approved 'good' soil or using excavated earth or borrow earth as per requirement and specifications and replacement of the tiles, slabs removed during the excavation.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Cleaning all unserviceable materials, debris, excess earth trenches etc. to designated disposal area.

9. Carrying out pneumatic testing and purging as per specifications and approved procedures, providing all tools & tackles, instruments, manpower and other related accessories for carrying out the testing of pipes.

10. Restoration of existing ground features such as grass/turfing, paving, roads, drains, concrete, floral beds, fencing, tiles, marbles, flooring masonry etc. to original condition and to match with adjoining conditions, functionally and aesthetically up to the entire satisfaction of Owner / Owner's representative /any other third party agency designated by owner and local authorities, failing which, it will be done at the risk and cost of the contractor. Obtaining No Objection Certificates for the restoration work done from the concerned authorities

11. Handing over the completed works to owner along with detailed as built drawing showing pipeline route, fittings provided in the pipelines, for their operation purposes.

Part III: GI Installation

1. Installation of powder coated GI pipes of ½'', ¾''dia. Between transition fittings to customer's kitchen appliances including NPT threading of GI pipes, supply proper seal outs for threads to join fittings such as elbows, tees, connectors, regulators, meters, appliance & isolation valve etc., as per laid procedures and specification including clamping and sealing etc. The scratched powder coated GI pipe and fittings shall be painted after the testing of the GI installation.

2. Supply and Installation of GI fittings such as elbows, tees, connectors, etc., complete as per procedures and specifications including clamping and sealing etc.

3. Supply of clamps for fixing pipes, meters, valves wherever required. Providing consumable grout material, repair/restoration of walls/floors changes for the pipes including the materials required for conversions and tools and tackles etc. shall be complete as per specification.

4. Installation of Isolation Valve, Appliance Valve including supply of SS 316 Corrugated Flexible metal Hose (Anaconda if required), etc., to complete the connection to the customer's appliance/stove.

5. Cleaning, flushing, pneumatic testing and commissioning to the GI pipe and fittings, meters, valves etc., as per specification and hand over the same to Owner/customer to the entire satisfaction of EIC.

6. Conversion of all types of LPG kitchen appliance to NG based appliance along with supply and installation of Steel Reinforced Flexible Rubber Hose as per IS 9573.

7. Preparation and submission of Ready for Conversion (RFC) card for each house indicating the laid GI pipe including fittings, mentioned the reasons, if connection is not

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

provided to the customers and deviation statements on completion/commissioning of work.

8. Approval of customer on RFC card & recording Joint Meter Reading (JMR) of customer.

9. Details for commercial connection

10. To Demonstrate the Customer regarding use, safety and maintenance related aspects of NG based appliances and installations.

11. Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.

12. Restoration of walls, flooring and other damages while executing the above ground installation.

13. All risers and lateral pipe shall be clamped to the building at intervals not exceeding 1 m Two clamps to be installed at each bend fittings or Tee fittings. Clamps should be 150mm away from each joint.

Contractor has to supply different types/sizes of approved clamps.

14. Pneumatic testing of Riser at 2 bar (g) for 2 hours shall be done.

15. Only pretested riser shall be erected using pulley. Pretesting shall be done with compressed air @ 2 bar (g) for minimum duration of 30 minutes.

All the painting work must be done after completion of testing activity only

Testing of GI Installation * Arrangement for pressurizing the installation should be shown with diagram. The testing of Gl riser pipe up to regulator inlet point shall be done with isolation valve in open condition at TF side and closed condition at regulator side. PPT/Riser Testing and MMT/RFC must be certified by TPIA.

16. If tapping exceeds more than 15meters, will be chargeable from customer." It should be aware to customer at the time of either route survey or AFC drawing and shall be communicated to Client/VCS.

17. All GI fittings must be Powder coated.

18. Inspection: It is responsibility of contractor to get Job Card / RCF check drawing certified at site only by TPIA/Owner's Representatives. Each meter geo tagged location and time stamped photo required at the time of commissioning

19. Certified copies of RFC card in form of editable Auto-Cad drawings, PDF and hard copy to be submitted along with geo co-ordinates of Riser to be submitted. JMR to mention geo co-ordinates stamped and time stamped meter reading photo WAH ropes must be certified by PETZL and all WAH accessories must be of PETZL make, only Printable material i.e. RFC book and sticker as per owner design for each connection must be in contractor's scope in place of Client's scope as per their format.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

20. The contractor shall supply the Calibrated Go-No Go Gauge and BSPT/ NPT (as decided) Gauges 1 set each of 1/2" and 3/4".

21. Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/ safety/ statutory/ maintenance of the works shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner.

Part IV: Services related to Commercial and Industrial Connection

Installation of Commercial and Industrial connection which includes taking tap off from PE network, laying of PE pipeline along with associated fittings, installation of CS pipes with associated fittings, installation of meter & regulator,Strainer etc.

Variation in pressure and meter running fast issue shall be check by contractor time to time for smooth execution of projects

6.0 CONDITIONS FOR ISSUE OF MATERIALS

Whenever any material is issued by Owner, following conditions for issue of material in addition to other conditions specified in the contract shall be applicable.

1. Necessary indents will have to be raised by the Contractor as per procedure laid down by the Engineer-in-charge from time to time, when he requires the above material for incorporation in permanent works.

2. Materials will be issued only for permanent works and not for temporary works, enabling works etc. unless specifically approved by the Engineer-in-charge and the same shall not be taken into account for the purpose of materials reconciliation.

3. The contractor shall beer all other cost including lifting, carting from issue points to work site/ contractor's store, custody and handling etc. and return of surplus/ serviceable scrap materials to Owner's storage points to be designated by the Engineer in-charge etc. No separate payment for such expenditure will be made.

4. No material shall be allowed to be taken outside the plant without a gate pass.

5. The contractor shall be responsible for proper storage, preservation and watch & ward of the materials.

7.0 SAFETY

7.1 The contractor shall confirm to the safety requirements outlined elsewhere in the tender document. In addition, the contractor shall observe safe working practices in the storage and handling of cleaning fluids, flammable fluids, etc. and ensure smoking or naked flames are not permitted in the vicinity when these materials are being used.

7.2 Trench walls shall be battered with sufficient slope in order to minimize a trench collapse. Where there is a danger of an earth slide or collapse, the trench shall remain open for the minimum time possible with proper barricading. The Contractor is to ensure

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

that no person enters a trench, which is of a depth of 1 meters or greater, unless trench has adequate or the sides are battered to such an extent as to prevent a trench collapse.

7.3 The Contractor shall also protect all work sites with warning signs, barricades and night lighting. The Contractor shall inspect all fenced excavation daily, and maintain them in good order.

7.4 The trenches/ pits shall not be kept open in night times. However, in case the same is essential the same shall be properly barricaded with proper lighting arrangement & manned.

7.5 The contractor shall provide PPEs like helmets, safety shoes, etc. to the labor which are necessary for safe working practice.

7.6 Any accident-causing injury to any person or damage to property or equipment shall be reported to the EIC and the cost of repair/ replacement of the damage equipment shall be borne by the contractor. Where the EIC determines that the work is being performed by the Contractor in an unsafe manner, he may suspend the work until corrective action is taken by the Contractor.

8.0 RECONCILIATION OF OWNER SUPPLIED MATERIALS

Every month, the contractor shall submit an account for all materials issued by Owner in the Performa prescribed by the Engineer-in-charge. On completion of the work the contractor shall submit "Material Appropriation Statement" for all materials issued by the Owner in the Performa prescribed by the Engineer-in-charge.

Waste materials like part lengths of pipes and other partly used items are the property of Client and must be returned to the store with the appreciate documentation so that they can be considered as part of the material reconciliation.

ITEM	UNACCOUNTABLE	SCRAP
SR, Regulators, meters, Strainer	0%	0%
PE pipes	2%	2% (less than 2.0 mtrs)
Consumables	Discretionary	-

* In case supplied by Owner

Unaccountable wastage/ scrap shall be at actual as per site assessment subject to maximum as stated above.

The percentage allowance shall be accounted on the basis of final measurement book.

1. All unused, scrap materials and salvageable materials shall be the property of the Owner and shall be returned by the Contractor category-wise at his cost to the Owner's designated store yard(s). In case the Contractor fails to do so/ or exceeds the limits of allowances specified above for scrap/ serviceable materials, then recovery for such

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

quantities not returned as well as returned in excess of permitted limit by the Contractor will be done at the penal rate i.e. 125% of landed cost at the time of final bill/ closing of contract by Engineer-in-charge shall be effected from the Contractor's bill(s) or from any other dues of the Contractor to the Owner. Contractor shall be responsible for the adjustment/ weighment/ measurement of the surplus materials to be returned to the store. Contractor shall also be responsible for suitable segregation of returned materials into separate stacks of serviceable and scrap materials.

2. Scratched PE pipe line acceptable allowance should not more than 10 % of the O.D.

3. Wherever certain material is covered under Contractor's scope of supply whether part or in full for any item of work covered under SOR, no allowance towards wastage /scrap etc. shall be accounted for during execution stage.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

JOB SPECIFICATION
INSTALLATION OF MLC PIPE AND PRESS FITTINGS (PNG/CGD)

Table of Contents

1. Purpose 2
2. Scope 2
3. Reference Documents 2
4. Materials 2
5. Equipment 2
6. Installation Procedure 3
7. Hold Points 7
8. Safety Requirements 7

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

JOB SPECIFICATION
INSTALLATION OF MLC PIPE AND PRESS FITTINGS (PNG/CGD)

1. Purpose

To define the procedure for installation, jointing, inspection, testing, and commissioning of MLC (Multilayer Composite) pipe with press fittings for domestic and commercial PNG installations in accordance with project specifications, manufacturer's recommendations, and applicable standards.

2. Scope

- Receipt and storage of materials
- Installation of MLC pipe
- Press fitting joints
- Pressure testing
- Leak testing
- Documentation
- Inspection and acceptance

3. Reference Documents

- ISO 21003 - Multilayer piping systems for hot and cold water installations inside buildings
- Petroleum and Natural Gas Regulatory Board (PNGRB) CGD Technical Standards
- Manufacturer's Installation Manual
- Approved Good for Construction (GFC) Drawings
- Project Specifications
- Approved Inspection & Test Plan (ITP)

4. Materials

- MLC Pipe
- Brass Press Fittings
- Press Sleeves
- Approved O-rings
- Pipe Clamps
- Isolation Valve
- Gas Meter
- Transition Fittings

5. Equipment

- Pipe Cutter
- Calibration Tool
- Deburring Tool
- Hydraulic/Electric Press Machine
- Correct Press Jaw

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Measuring Tape
- Marker Pen
- Pressure Gauge (Calibrated)
- Air Compressor/Nitrogen Cylinder
- Soap Solution/Leak Detection Fluid

6. Installation Procedure

Step 1 – Material Inspection

- Verification of the manufacturer, material specifications, size, pressure rating, and compliance certificates as per approved project specifications.
- Visual inspection of MLC pipes, press fittings, and accessories for any damage, deformation, cracks, dents, contamination, or other manufacturing defects.
- Verification that all installation tools, including press machines and pressing jaws, are in good working condition and have valid calibration certificates.
- Confirmation that only approved and defect-free materials and calibrated tools are used for installation.

Step 2 – Cutting Pipe

- Cutting the MLC pipe using only the manufacturer's approved dedicated MLC pipe cutter.
- The use of hacksaws or other unapproved cutting tools shall not be permitted.
- Ensuring the pipe is cut square (90°) to its axis to achieve proper engagement with the press fitting.
- Restoring the pipe's circular shape (re-rounding) and removing all internal and external burrs after cutting using the recommended calibration/deburring tool.
- Verifying that the cut pipe end is smooth, clean, free from cracks, deformation, burrs, and other defects before assembly.

INSPECTION REQUIREMENT

Visual inspection shall be carried out to confirm the cut quality, squareness, roundness, and cleanliness of the pipe end prior to installation.

Step 3 – Marking

- Measuring the required insertion depth of the pipe into the press fitting in accordance with the manufacturer's recommendations.
- Marking the insertion depth clearly on the pipe using a suitable marker to ensure correct insertion during assembly.
- Verifying that the insertion mark remains visible until the press joint is completed.

INSPECTION REQUIREMENT

Visual inspection shall be carried out to confirm that the insertion depth has been accurately measured and clearly marked before pressing.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Step 4 – Insert Fitting

- Inspecting the press fitting to ensure the O-ring is correctly seated, clean, undamaged, and free from contamination before assembly.
- Inserting the pipe fully into the fitting up to the marked insertion depth without twisting or forcing the pipe.
- Ensuring the fitting and pipe are properly aligned to prevent stress or misalignment during the pressing operation.

INSPECTION REQUIREMENT

Visual inspection shall be carried out to verify the condition of the O-ring, correct insertion up to the marked depth, and proper alignment of the pipe and fitting before pressing.

Step 5 – Press Joint/Crimped Joint

- Selecting the correct press jaw profile and size as recommended by the pipe and fitting manufacturer.
- Positioning the press jaw accurately on the press sleeve to ensure proper engagement before pressing.
- Operating the press tool to complete one full press cycle without interruption, in accordance with the manufacturer's instructions.
- Ensuring that a completed press joint/Crimped Joint is not re-pressed, as re-pressing may affect the integrity of the joint. The method of jointing of MLC pipe i.e., Press Joint/ Crimped Joint shall be decided by the Engineer-in-Charge (EIC).

INSPECTION REQUIREMENT

Visual inspection shall be carried out to verify that the press indicator has been activated/removed (where applicable), the press sleeve is uniformly and fully compressed, and the joint is free from visible defects or misalignment.

Step 6 – Pipe Support

- Installing pipe supports in accordance with the manufacturer's recommendations to ensure adequate support and prevent excessive deflection or movement.
- Maintaining the maximum support spacing as follows:
- 16 mm pipe: 1.0 m maximum spacing
- 20 mm pipe: 1.2 m maximum spacing
- 25 mm pipe: 1.5 m maximum spacing
- 32 mm pipe: 1.8 m maximum spacing
- Providing additional supports adjacent to bends, valves, meters, tees, and other locations where additional loads or stresses may occur. Ensuring all supports are securely fixed and do not damage or deform the MLC pipe.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

JOB SPECIFICATION
INSTALLATION OF MLC PIPE AND PRESS FITTINGS (PNG/CGD)

INSPECTION REQUIREMENT

Visual inspection shall be carried out to verify the support type, spacing, location, secure fixing, and overall alignment of the installed piping system.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Step 7 – Pressure Test

- Conducting the pressure test using clean, dry air or nitrogen as the test medium.
- Applying the test pressure in accordance with the approved project specifications, applicable standards, or the manufacturer's recommendations.
- Maintaining the specified test pressure for the required holding period of 30 to 60 minutes, or as specified in the project requirements.

Monitoring the pressure gauge and inspecting all joints, fittings, and connections throughout the test duration.

ACCEPTANCE CRITERIA

The system shall be considered acceptable if there is no pressure drop (after temperature stabilization, where applicable) and no evidence of leakage throughout the test period.

Inspection: Pressure test records shall be reviewed, and visual inspection shall be carried out to verify that the system remains leak-free and maintains the required test pressure for the specified duration.

Step 8 – Leak Test

- Applying an approved soap solution or leak detection fluid to every press joint, fitting, valve, and threaded connection after completion of the pressure test, as applicable.
- Inspecting all joints and connections for any signs of leakage.
- Ensuring that no bubbles or evidence of leakage are observed at any joint or connection.

Rectifying any identified leaks and repeating the leak test until a leak-free system is achieved.

INSPECTION REQUIREMENT

Visual inspection shall be carried out to confirm that all joints are leak-free and no bubbles are observed during the leak test.

Step 9 – Documentation

- Preparing and maintaining a Joint Register containing details of all press joints executed during the installation.
- Maintaining valid Tool Calibration Certificates for all press tools and associated equipment used during the work.
- Recording and submitting Pressure Test Reports with details of the test medium, test pressure, holding time, test results, and approvals.
- Collecting and maintaining Material Test Certificates (MTCs), manufacturer's compliance certificates, and other relevant material documentation.
- Maintaining Inspection Records, including material inspection, installation inspections, press joint inspections, and leak test records.
- Preparing and submitting As-built Drawings ensuring all documentation is complete, traceable, and submitted to the Client/Consultant as part of the project handover dossier..

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

7. Hold Points

The following hold points shall be observed during the installation and testing of the MLC piping system.
Work shall not proceed beyond these stages without the required inspection and approval, where applicable:

- Approval of MLC pipes, press fittings, accessories, and installation tools before commencement of installation.
- Inspection and acceptance of the first press joint as a demonstration to verify the installation procedure and workmanship.
- Verification that all press joints and piping installation have been completed and inspected before commencement of pressure testing.
- Witnessing and acceptance of the pressure test by the Client/Consultant/EIC (where specified in the contract or Inspection & Test Plan).
- Final inspection and acceptance of the complete installation before gas charging and commissioning.

8. Safety Requirements

- Ensure the pipeline is isolated before work.
- Use calibrated press tools only.
- Wear appropriate PPE (helmet, gloves, safety shoes, eye protection).
- Use only approved fittings and accessories.
- Do not use damaged pipes or fittings.
- Do not expose O-rings to oil, grease, or contaminants.
- Purge air safely before introducing natural gas.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION

FOR

LAYING OF POLYETHYLENE MAIN PIPELINES AND SERVICE PIPELINE FOR DOMESTIC CONNECTIONS

VPC – SS – PE - 0001

REV.	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 DEFINITIONS 3
2.0 SCOPE OF WORK 3
3.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY 6
4.0 PROGRESS OF WORK 9
5.0 APPROVALS & PERMISSIONS FOR PIPELINE LAYING 9
6.0 REFERENCE SPECIFICATION, CODES AND STANDARD 10
7.0 QUALITY OF WORK 10
8.0 SAFETY 10
9.0 ROUTE SURVEY 11
10.0 ORGANISATION STRUCTURE 12
11.0 STRUCTURES, SERVICES AND OTHER PROPERTY 13
12.0 TRENCHING 14
13.0 LAYING 18
14.0 JOINTING OF POLYETHYLENE PIPE 21
15.0 BACKFILLING 22
16.0 MOLING 24
17.0 HORIZONTAL DIRECTIONAL DRILLING (HDD) 25
18.0 CASING PIPE 25
19.0 RESTORATION 26
20.0 TESTING 27
21.0 PURGING 28
22.0 VALVE PITS 28
23.0 CONSTRUCTION OF TRENCHES AND OTHER SCOPE OF WORK IN BUILDER SEGMENT- 29
24.0 ROUTE MARKERS 30
25.0 GUIDELINES: 30
26.0 ASSISTANCE IN COMMISSIONING 31
27.0 STANDARD OF WORK 31
28.0 RECORDING (AS-BUILT DRAWINGS) 31
29.0 CIVIL WORKS 32
31.0 TESTING OF CONSTRUCTION MATERIALS 38
33.0 INSPECTION BY THIRD PARTY INSPECTION (TPI) AGENCIES NOMINATED BY LAND OWNING AGENCIES 39

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

GENERAL INFORMATION

The main scope of this Specification comprises of laying of underground Medium Density Polyethylene (MDPE) main pipelines and service pipeline. The scope covers all the activities associated with the purchasing (specified items only), laying, testing and commissioning of MDPE main pipelines and service pipelines in new & existing gas charged areas of sizes ranging from 20mm up to 180mm OD, which includes PE/GI transition fitting above ground level and above ground laying and commissioning of powder coated GI/ CU pipe line, meter regulator etc. including burner conversion and commissioning.

This technical specification defines the basic guidelines to develop an acceptable design and suitable construction methodology for carrying out different activities listed out in the schedule of rates of this tender.

Compliance with these specifications and/ or approval of any of the Contractor's documents shall in no case relieve the Contractor of his contractual obligations.

1.0 DEFINITIONS

PMC	VCS QUALITY SERVICES PVT. LTD. (VCSQSPL)
SS	STANDARD SPECIFICATION
TPIA	THIRD PARTY INSPECTION AGENCY (TO BE APPOINTED BY CLIENT)
EIC	ENGINEER-IN–CHARGE

2.0 SCOPE OF WORK

Generally, the following shall constitute the contractor's scope of work but not limited to:

Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Owner/Owner's representative. Contractor has to submit the Construction/Execution procedures before commencement of work to Owner/ Owner's representative for approval.

Prior to start of construction activity, contractor shall prepare route survey drawing marked for proposed gas pipe line laying and submit to CLIENT/PMC for approval

Obtaining permissions from respective land-owning agencies such as Municipal Corporation of State, PWD, Development Authority of State, NHAI, Railway Irrigation department etc. road cutting for laying of the pipelines, liaison with the concerned authorities during execution of the job, obtaining NOC from concerned authorities once the work is completed. Getting back/refund of bank guarantee/security deposits made to the agencies for laying of the pipelines.

Obtaining clearances and coordination with concerned RWA of the allotted area

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

for internal network laying and obtaining NOC from RWA after completion of work.

Transportation of Free Issue Material from CLIENT stores to contractor stores, proper storing, and stacking, providing security, transit insurance cover during storage, laying, commissioning and handling over pipelines to owner.

Obtaining the approval for optimum route and ROU from the concerned authority.

Making trial pits to determine the underground utilities/services such as existing pipelines, cables (electrical/communication), conduits, U/G drainage, sewers, tunnels, subways foundations etc. for deciding optimum feasible route and depths for laying the pipelines based on the route plans indicated by Owner.

Wherever required the grass/turfing, pavement, linings, drains, roads and other such 'pucca' area shall be locally removed to facilitate trenching and pipe laying works. The same is to be reinstated as original.

Installation of safety/warning signs and barricading of the entire route to be trenched. Pits to be similarly barricaded along with warning signs and caution boards.

To make trenches with stable slopes but restricting minimum disturbance to above ground/underground services/installation as per specifications and approved route plans keeping the trenches free from water and soil till placement of pipes.

Uncoiling/stringing the MDPE pipes of required sizes (i.e. 180, 125, 63, 32 & 20 mm) pipes into trenches as per approved procedure.

Joining the pipe ends with fittings of valves by approved automated electro-fusion techniques only as per tender specification.

Installation of pipe fittings like elbow, tees, reducers, couplers, tapping saddles, transition fittings, valves etc., including construction of supports, valves pits, inspection chambers etc. as per specification & satisfaction of the EIC.

Laying pipelines by any methodology including trenchless technology methods with or without casing pipes (HDPE pipes) as per specifications and as directed by EIC.

Fabrication, supply and inspection of approved quality GI sleeve and half concrete sleeves and other materials, fittings to be supplied by the contractors as per the provisions of tender.

Back filling and compaction by jumping jack compactor wherever required, using approved 'good' soil or using excavated earth or borrow earth as per requirement

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

and specifications and replacement of the tiles, slabs removed during the excavation. Cleaning all unserviceable materials, debris, excess earth trenches etc. to designated disposal area.

Carrying out pneumatic testing and purging as per specifications and approved procedures, providing all tools & tackles, instruments, manpower and other related accessories for carrying out the testing of pipes.

Supply, fabrication & installation of Stone route marker, Pole marker with foundations, Plate markers, valve chamber etc. as per the directions of the EIC/Owner's representative.

Commissioning of gas in the tested PE line shall be done as per the approved procedure.

Restoration of existing ground features such as grass/turfing, paving, roads, drains, concrete, floral beds, fencing, tiles, marbles, flooring masonry etc. to original condition and to match with adjoining conditions, functionally and aesthetically up to the entire satisfaction of Owner/ Owner's representative /any other third party agency designated by owner and local authorities, failing which, it will be done at the risk and cost of the contractor. Obtaining No Objection Certificates for the restoration work done from the concerned authorities.

Returning surplus material to Owner stores after obtaining clearance from TPIA/Consultant/ Owner, reconciliation of free issue material/consumables.

Handing over the completed works to owner for their operation/use purposes.

Rectification of defects arising due to poor workmanship during defect liability period of pipelines/installations handed over to Owner.

Preparation and submission of all documents like Pit wise As graph, As-built drawings, details of crossings, utility graphs, PE cards for service line and deviation statements on completion/commissioning of work by way of drawing, sketches and tables in soft & hard copy.

Providing adequate manpower, minimum 2 no’s each such as data entry operator, customer care executive etc. for data logging like new connection request, NG conversion request & GI tracking, attending complaints, day to day interaction with customers and residents so that work can be executed within defined time period (TAT) Turnaround Time. At present TAT period is 90 days which may vary time to time as per guidelines of PNGRB and CLIENT policy. Data entry operator & customer care executive should be minimum 12th pass (intermediate) with minimum experience of 2 years in relevant field.

Providing adequate manpower for carrying out laying for PNG installation for emergency cases as and when required. Providing adequate manpower for

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

material for carrying out laying for PNG installation for emergency cases as and when required, as per instruction of EIC.

Following activities are also in contractor's scope:

- Receive Customer's request and complaints logged on CLIENT's CRM/ Offline.
- Carry out joint technical feasibility survey for requests received.
- Attend and resolve customer complaints.
- Maintain and update the request and complaint status in CLIENT's CRM.
- Maintain new connection tracking on CLIENT's CRM.

The warehousing of bulk supply items should be in laying contractor scope. Vendor to mobilize yard/ covers immediately on award, and takeover after checking, on arrival of materials from MDPE supplier.

Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/ safety/ statutory/ maintenance of the works shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner.

3.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY

Material to be supplied by Owner as Free Issue.

Unless otherwise specified, owner will supply following material such as MDPE - pipes, fittings, valves, transition fittings, HDPE pipe as casing material to contractor (of all sizes) and all materials other than mentioned above shall be supplied by contractor as per technical specification to complete the laying of gas main pipelines and service pipelines.

The free issue material shall not be procured from any other source by contractor. Material reconciliation statement of free issue material duly certified by Owner and PMC shall be submitted to CLIENT on monthly basis.

Material to be supplied by the contractor:

The supply of items as indicated in SOR but not limited to shall be strictly as per relevant technical specifications enclosed with the Tender and as per guidelines of various clauses of SCC and SOR.

All materials shall be handled safely and stored in a permanent, covered, lockable store/ ware house preferably near site in such a manner as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals. The MDPE pipes and fittings shall be stored in covered storage to protect material from sunshine, rain etc. Pipe should be stacked with clearance from ground level.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

3.1 Backfilling Material

The contractor shall be responsible to arrange the supply of approved coarse sand (size 0.6 - 2 mm as per IS-383) free from any impurities like clay, mica, and soft flaky pieces, as per the instructions of EIC/ Owner's representative. For supply of sand in trench for rocky terrain, no separate charges are payable and is included in rates. Also supply of sand in valve chambers, Normal surface & built up surface, if required, as per the instructions of EIC is not separately payable.

In case specified trench depths are not achieved or if directed by Engineer-In-Charge Contractor has to provide concrete casing pipes/ slabs, extra rate of PCC may be payable with prior approval of EIC/ PMC.

Other materials: The contractor shall supply the following items wherever required:

- All materials required for framework, trench support and temporary trench Crossings.
- All sign boards, barricades, tin sheets, lighting arrangement and protective equipment.
- All minor items not mentioned in the specification but necessary for the satisfactory completion and performance of the work.
- Material required for installation of valve chambers.
- GI, Half Round Concrete Sleeves.(Refer Annexure-A-List of Standard Drawings)
- Permanent markers (Refer Annexure-A-List of Standard Drawings)
- Warning Mat

3.2 Manpower

The contractor shall provide the skilled labour, tools, material and equipment necessary for the proper execution of the work.

3.3 Equipment, Machinery & Tools

This will include but is not limited to the list of specialized items included in Annexure# I

All vehicular type machinery shall be in good working order and shall not cause spillage of oil or grease. To avoid damage to paved surfaces, the Contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

Contractor must also have to arrange his own equipment for restoration work like water tanker and jumping jack compactor for compaction of backfilled trenches and roller and other required equipment/ machinery for asphalting/ road works.

In case there is non-availability of approved equipment’s, tools and tackles during the work at site, suitable penalties, as per special terms and conditions of the contract, will be

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

levied and deducted from the running bills.

3.4 Acquisition, Receipt & Storage of Materials

The Contractor shall collect all materials from CLIENT during stores working hours following all documentation procedures laid down and as directed by the EIC. The Contractor shall carry pipe in such a manner as to preclude damage during transportation and handling. PE pipes supplied in straight lengths may be carried in straight pipe racks.

The contractor shall at the time of receipt of material physically examine all materials and notify the EIC immediately of any damage or defect noticed by the contractor. Any damage not so recorded will be deemed not to have existed at the time of receipt of material by the contractor and the cost of repair or replacement or rectification shall be borne by the contractor. Any material once issued from CLIENT store, if found in non-working condition at site shall be brought to the notice of EIC with PO reference in written within 15 days and after subsequent approval shall return defective material in CLIENT stores within 30 days.

If delay is more than 30 days and material is under warranty, the material will be accepted with a penalty, else the material will not be reconciled and amount of the same will be deducted from bills. Penalty shall be levied as per SCC. The contractor shall ensure that no defective material shall be returned to store at the time of closure of contract. The format for defective materials returning to stores will be made available by EIC.

The contractor shall maintain locked store preferably near at site so that all the materials are stored in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals. The PE pipes and fittings shall be stored in covered storage to protect material from sunshine, rain, water logging etc. The contractor shall make adequate security arrangements for the stacked material & any loss to the material on account of theft on improper storage is attributable to the contractor.

The Contractor shall maintain log book at their respective stores stating issue and availability of free issue material at a given day. Further, it is mandatory that the contractor is required to undertake and submit inventory details of free issue and purchased materials on monthly basis to Owner/ Owner's representative as per the approved format of the owner. The inventory details shall be in correlation with the Daily progress chart and material reconciliation sheet.

In case of non-submission of material reconciliation on first week of every month, applicable penalties shall be levied as per SCC from the running bills. In case if shortage in free issue material is observed at the time of quarterly physical verification by CLIENT, equivalent value of material found short shall be withheld from running bills, same shall be released after settlement of free issue material.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.0 PROGRESS OF WORK

The contractor shall proceed with the work under the contract with due expedition and without delay. The EIC may direct in what order and at what time, the various stages or parts of the work under the contract shall be performed. Contractor has to regularly submit daily progress reports, weekly progress reports, graphs with utilities, testing reports, material consumption and inventory reports, deviation statements, completion schedule etc.

5.0 APPROVALS & PERMISSIONS FOR PIPELINE LAYING

Contractor has to obtain permissions from statutory bodies for laying of pipelines. Statutory bodies in this case are Municipal Corporation of State, PWD, NHAI, CPWD, AAI, Indian railways and any other government agencies who maintain the public lands and accord permissions for laying of the utilities. The contractor shall obtain demand note (road restoration charges) from these statutory bodies. Contractor shall ensure that the road restoration charges are to the minimum against the work to be carried out. CLIENT may return back the demand note, if the charges are not found reasonable and contractor shall not be liable for any liaison charges against the same.

However, CLIENT will pay the road restoration / Departmental charges / security deposit/ Bank guarantees for getting the clearances from statutory bodies. It is the contractor's responsibility to inform and co-ordinate the concerned local authorities and also other utility agencies before and after the commencement of work at site. To ensure smooth execution of the work on a day-do-day basis, the contractor has to liaison with respective authorities. The contractor shall plan and ensure that work taken up under a single permission shall be completed within the stipulated time period and revalidation process is avoided. No separate liaison charges are liable to CLIENT for revalidation cases.

It is the responsibility of the contractor to obtain "No Objection Certificate" (NOC) from land owing agencies/ Statutory bodies after completion of the restoration to their satisfaction and getting released the security deposit/ bank guarantees submitted by CLIENT for obtaining permissions on production of documentary evidence. Separate payment in running meters will be made on account of approvals/permissions as per the SOR based on total applied length, where the rates are inclusive of liaison rates. In case of any deviation/ change in the route/ additional laying, CLIENT shall pay the additional Road Restoration Charges only after receiving of revised estimate and further to written confirmation from the concerned Owner site-in-charge.

On behalf of the Owner, contractor shall prepare in advance and submit the proposed route plan complete in all respect and well ahead of time so that the actual construction work is not delayed because of approval/inspection/permission by concerned authorities. Further, the contractor shall also coordinate with the relevant authorities for necessary approvals of these proposed pipeline route drawings/certificates. The inspection of work by statutory authorities shall be the responsibility of the contractor without any extra cost to CLIENT.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

In case contractor delays laying of pipeline work under a single permission, the work or part of work may be offloaded to some other contractor on his risk and cost. Any change / addition required to made to meet the requirements of the statutory authorities shall be carried out by the contractor without any extra cost to CLIENT. The inspection and acceptance of the work by statutory authorities shall however, not absolve the contract from any of his responsibilities under this contract.

6.0 REFERENCE SPECIFICATION, CODES AND STANDARD

The contractor shall carry out the work in accordance with the requirement of latest relevant applicable standards, this specification, Owner's Engineering Standards; relevant Oil Indian Safety Directorate (OISD) norms, PNGRB Regulations, ASME B31.8-Gas Transmission and Distribution Piping Systems; Australian Standard 3723-Installation and Maintenance of Plastics Pipe Systems for Gas; and the American Gas Association Document - Purging Principles and Practice. IS0-4437/JS: 14885 for underground polyethylene pipes and OWNER’s approved procedures.

Should the contractor find any discrepancy, ambiguity or conflict in or between any of the standards and the contract documents, then this should be promptly referred to the Engineer-In-Charge (EIC) for his decision, which shall be considered binding on the contractor.

7.0 QUALITY OF WORK

All works carried out under this contract shall confirm to applicable standards, codes of practice, construction procedures and other technical requirements as defined in the technical specifications.

The manpower deployed on the respective activities shall be adequately trained & shall have necessary skills to execute / supervise the work. However, the assessment on the qualification of the personnel shall be at the discretion of EIC.

Fusion operators and other skilled personnel shall be approved by Owner/ Owner’s representative and identification cards duly signed by EIC shall be issued to them. Only those personnel who are approved by shall be allowed to execute the critical activities like electro fusion jointing of MDPE pipes & fittings. CLIENT may provide training and certification on chargeable basis where the cost shall be borne by
contractor.

8.0 SAFETY

The Contractor shall conform to the safety requirements outlined elsewhere in the tender document. In addition, the Contractor shall observe safe working practices in the storage and handling of cleaning fluids, flammable fluids, etc., and ensure smoking or naked flames are not permitted in the vicinity when these materials are being used.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Trench walls shall be battered with sufficient slope in order to minimize a trench collapse. Where there is a danger of an earth slide or collapse, the trench shall remain open for the minimum time possible with proper barricading. The Contractor is to ensure that no person enters a trench, which is of a depth of 1.5 meters of greater, unless the trench has adequate shoring or the sides are battered to such an extent as to prevent a trench collapse.

The Contractor shall also protect all work sites with warning signs, barricades and night lighting. The Contractor shall inspect all fenced excavations daily, and maintain them in good order.

The trenches/ pits shall not be kept open in night times. However in case the same is essential the same shall be properly barricaded with proper lighting arrangements &manned.

The Contractor shall provide PPE's like helmets, safety shoes, etc. to the labour which are necessary for safe working practice.

Any accident causing injury to any person or damage to property or equipment shall be reported to the EIC and the cost of repair / replacement of the damage equipment shall be borne by the contractor. Where the EIC determines that the work is being performed by the Contractor in an unsafe manner, he may suspend the Work until corrective action is taken by the Contractor.

PPE, Continuous Barricades and caution tapes along the trenches as per approved drawing in tender, Use of Safety Boots, Hand gloves, Reflective jackets, Hard hats(helmets), Safety shoes, eye and ear safety equipment, Fire extinguishers and as per the detailed scope of work in tender specifications. Contractor shall be paid as per SOR, measurement sheet of laying should also include length of barricading. (Refer Annexure-A-List of Standard Drawings) . For further details Refer "Special Terms and conditions of Contract" & SOR.

9.0 ROUTE SURVEY

Planning, detailing the size, route survey drawings, identification of underground utilities, foreign pipelines, crossings, and location of valve chamber, FRS, DRS, MRS as well as service line location is in scope of contractor.

9.1 Mainlines

The final alignment of mainlines will be worked out at site in consultations with the Owner/Owner's representatives after route survey and trial pits, at contractor cost. Any change in routing from the issued drawings due to site constraint will be notified to EIC & his specific written approval shall be obtained before carrying out the job.

9.2 Service lines

Consultant/Third Party Inspection Agency and the contractor will conduct a joint survey at each probable premise/ housing colony/pockets/area to be supplied with gas. The survey

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

record will note customer's detailed potential gas supply points, proposed regulator positions and estimates of material quantities. The contractor's representatives will make sketch of the agreed pipe routes.

The contractor will be responsible for contacting the customer and making the necessary arrangements for access and appointments to carry out the work. Contractor shall maintain job card and complaint books at site. Owner will not be responsible for time lost due to failed appointments or disputes with customers.

10.0 ORGANISATION STRUCTURE

Contractor shall designate Project Manager / Coordinator who will be responsible to interact with EIC/Consultant/TPIA and authorized to attend review meetings, receive material, authorized to sign documents, claims and receive payments etc. Contractor shall employ a Project Manager Coordinator on company roll. Project manager / coordinator & Site Engineers on company roll. The Project Manager/ Coordinator must have qualification of BE Mech. /Diploma in Mech. Engg. with min. 2-5 years & Site Engineer must have minimum Diploma in Mechanical Engineering with 3 years of work experience in gas pipe line job. He shall be single point of contact for all the works and must represent company in the review meetings.

All construction work will be carried out as per direction of EIC, and this will be the primary point of contact between the contractor and Owner on site. All work will be issued and sanctioned through the EIC and site control exercised by Site Engineers. The contractor shall ensure that technical quality standards are maintained, that construction is carried out cost effectively and that a good customer and public image is maintained for Owner.

The contractor will deploy his own supervisors as directed by site engineers/EIC. These personnel will be reporting to the Site Engineer for monitoring construction standards and for ensuring that all technical requirements are met for the job being carried out. The contractor's supervisor(s) will have day-to-day liaison with the Site Engineer, and will provide the Site Engineer with technical reports and audits, and other management information as is required on work progress and construction quality standards.

The contractor's supervisor shall have mobile telephones to ensure that they can be contacted at all times. The contractor will also nominate one person who can be contacted if necessary in odd hours, for the duration of the works. The contractor's supervisor will have access to transport at all times to allow them to visit sites and attend meetings with Owner. Supervisor shall attend to normal day-to-day issue of work instructions, communication between Owner and the contractor's supervisor and the Site Engineer.

Contractor shall maintain a Customer Care Centre, Project Site Office, and Material Store in their allotted site with following facilities:

- Telephone, Mobile Phones, Fax machines, Printers/Scanning/Xerox machines, Computers with internet facility.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- One Nos. - Four wheeler with driver, he shall be well equipped with tools and tackles for attending any emergency complaints and ongoing execution work.
- On award of the contract, the contractor shall establish and submit documentary evidence for above, which will be verified by the owner before award of the work order.

11.0 STRUCTURES, SERVICES AND OTHER PROPERTY

11.1 Location of Underground Utilities

The contractor shall locate all buried utility pipes, underground cables, water mains and other obstructions intersecting or adjacent to the Works, and shall make available the necessary labour to expose and record the depth of cover over all obstructions in advance of excavation. This shall be done far enough in advance of excavation to facilitate gradual change in grade or position found necessary to clear any obstructions.

In addition, the contractor shall excavate trial pits as necessary to determine the pipe route. The number of trial pits will be agreed with the Site Engineer in advance of any excavation. In any event, trial pits shall be made at intervals of a maximum of 30 meters. Restoration of the abandoned trial pits and trenches shall be the contractor's responsibility. No payments shall be made for such type of jobs. The trial pits shall be excavated to minimum depth of 1.5 meters so as to locate any utilities present in the trench.

It is contractor's responsibility to interact with other utility agencies regarding their existing utilities and finalize the route along with these agencies and Owner/ Owner's representative.

There will be no additional payments in respect of abandoned trenches incurred because of insufficient or inadequate trial pits, or any associated loss of time or delays.

Contractor must ensure that before starting the execution of lying of pipeline, the intimation/information must cascade to all utilities agencies seeking the information about the existing utility in the proposed route.

11.2 Protection of Structures and Utilities

The Contractor shall at his own cost support and protect all buildings, walls, fences or other structures and all utilities e.g. Electrical cables, Telephone Cables, Water pipelines, Sewer pipelines etc., and property which may be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work. Special care shall be taken while laying of pipelines near the trees.

11.3 Interference with Traffic, Street Drainage and General Public

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The Work shall be executed in such a manner so as to cause a minimum inconvenience to persons using public or private roads, lanes, thoroughfares, walkways, rights-of use or passages through which the Works are to be executed. The trench shall be back filled; compacted, leveled and extra soil shall be removed immediately after laying of pipeline to avoid public inconvenience. Closure of roads, etc., shall not be permitted without the approval of the EIC.

The Contractor shall comply with all local Authorities requirements to traffic and keep roads open to traffic and maintain access to and within any private property.

Wherever the pipe route crosses driveways, access tracks or entrances to private properties the Contractor shall give the owner, occupier or relevant authority at least 24 hours prior notice of intended commencement of excavation and shall be restricted to pass through.

The Contractor shall not use a private driveway, access track or entrance without the prior approval of the EIC in any circumstance.

The Contractor shall provide suitable access wherever necessary in the form of temporary bridges, culverts, flumes, etc., of a size and type approved by the EIC.

The Contractor shall comply with all relevant road Laws. Where limits and/or speed limits have been placed in the vicinity of the Works, the Contractor shall provide for the necessary movement of plant and equipment in accordance with the requirements of the relevant authority.

The Contractor shall not obstruct any drainage pipes or channels in any road but shall divert them wherever necessary and use all proper measures to provide for the free passage of water.

The Contractor shall handover the completed works after proper cleaning of the site.
The contractor shall conduct his operation at all times, with a view to minimize as far as practicable noise and other objectionable nuisances (e.g. oil leakage, spillage, debris etc.)

12.0 TRENCHING

The schematic drawing with the details of trench is enclosed in the tender as per drawing No. (Refer Annexure-A-List of Standard Drawings)

The Contractor shall perform the excavation works so as to enable the pipe to be laid in conformity with the levels, depths, slopes, curves, dimensions and instructions shown in the Drawings, Specifications or as otherwise directed by the EIC.

Contractor shall excavate and maintain the pipeline trench on staked center line as per approved drawing taking into account the horizontal curves of the pipelines.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

While trenching, care shall be taken to ensure that all underground structures and utilities are disturbed to the minimum. Suitable crossing shall be provided and maintained over the ROU wherever necessary to permit general public, property owners or his tenants to cross or move stock or equipment from side of the trench or another.

Trenching shall be made with sufficient slopes on sides in order to minimize collapsing of the trench. On slopes wherever there is danger of landslides, the pipeline trench shall be maintained open only for the time strictly necessary. Owner may require excavation by hand, local route and detouring and limiting the period of executing of the works. Before trench cuts through water table, proper drainage shall be ensured, both near the ditch and ROU in order to guarantee the soil stability.

The Contractor shall ensure that trench bottom is maintained in the square form as far as possible, with equipment, so as to avoid/minimize the hand grading at the bottom of the trench. The Contractor shall do all such handwork in the trench as required to free the bottom of trench from loose rock, pebbles and to trim protruding roots the bottom and sidewalls of the trench.

12.1 Depth of Trench

The minimum depth of cover shall be measured from top of pipe to the top of undisturbed surface of the soil or top of the graded working strip or top of road or top of rail, whichever is lower.

In case of crossing of water bodies the minimum depth shall be measured from the top of the pipe to the bottom of Scour level.
The depth of the trench will be such as to provide minimum cover as stipulated below:

For Distribution and service lines:

Minor Water Crossing/Canal	1.5 Meter
Uncased/Cased Road Crossing	1.2 Meter
Rail/Road Cased Crossing	1.7 Meter
Normal Areas	1.0 Meter

The minimum depth may be greater than as mentioned above as may be required by Government/Public authorities under jurisdictions. The Contractor shall perform such work without extra compensation, according to the requirement of concerned authorities.

Also, in case of Drains/Culverts/Utilities crossing through open cut where excavation cut is more than 1.5m, the extra excavation is inclusive in the laying rates. No separate payment is chargeable for extra excavation and includes backfilling as well.

In case, the depth could not be achieved due to practical problems and the same is demonstrated, EIC after examining thoroughly and considering the codes and standards

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

may allow the contractor to provide suitable protection by way of concrete casing pipes or slabs.

12.2 Width of Trench

The width of the trench shall be wide enough to provide bedding around the pipe as specified and to prevent damage to the pipe inside the trench. Unless otherwise directed by the EIC and where ground conditions permit, the minimum distance from the inside edge of the trench wall to the outside of the pipe shall be as per the Drawing no.(Refer Annexure-A-List of Standard Drawings)

12.3 Trench Base

The trench bottom shall be cut or trimmed to provide a uniform bedding for the pipe and shall be free from stones, metal, wood, vegetation, clods of earth or other debris before placement of the pipe.

In case trenching is done in rocky terrain, a bedding of soft soil or sand shall be provided in the trench base at no extra cost to the satisfaction of EIC.

12.4 Hard Rock:

Hard rock is defined as trench material with a single piece of rock, dimension exceeding 1.0 m in any direction, which requires cutting only by use of chisel/pneumatic chisel/drill or sledge hammer or removal of the same by additional excavation technique approved by EIC. Additional rates shall be payable for hard rock excavation as per the item SOR over and above the pipeline laying rates. Excavation through soil mixed with small boulders that have been used for a road base will not be considered as hard rock for the purpose of payment.

12.5 Morrum

Morrum shall be defined as the type of soil, whose excavation is not possible manually, but it can be excavated mechanical means such as sludge hammer, excavator, pneumatic breaker hammer etc. The SOR shall be applicable only after recommendation from PMC and prior approval from EIC. These rates will be over and above pipeline rates.

12.6 Boulder

It is a rock with grain size of usually not less than 300mm (12 inches) diameter. Additional rates shall be payable for Boulders excavation as per the SOR over and above the pipeline laying rates.

12.7 Clearances

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Unless otherwise approved, the following clearances shall be maintained between the external wall of the gas pipe and the external surface of other underground assets/utilities in the vicinity of the Works.

- 150 - 300 mm where the gas pipe crosses other assets/utilities, etc., for electric cables, the clearance shall be 300mm minimum or special protection shall be provided as per approval of EIC.
- 300mm where the gas pipe is on a similar alignment to the other assets/utilities.

Where the above clearances cannot be achieved, or in other special circumstances, the EIC may approve/specify protection with concrete/ MS coated pipe, etc. The protective material shall be supplied and installed by the Contractor at his cost subject to discretion of EIC.

12.8 Under Ground Interferences

The Contractor shall locate and expose manually all underground facilities if any during trenching. Safety barriers shall be erected along the trench to prevent any damages or accident. On locations where pipeline is laid under the existing facilities and near the approaches of the crossing, the trench shall be gradually deepened to avoid sharp bends.

All sewers, drains, ditches and other natural waterways encountered while trenching shall be maintained open and functional by providing proper temporary installations if required. Suitable dewatering pumps shall be deployed to dewater, if required.

Whenever it is permitted by Authorities and/or Owner to open cut paved road crossing, or where the line is routed within the road pavement, the Contractor shall remove the paving in accordance with the restrictions and requirements of the authorities having jurisdiction thereof as directed by Owner. After laying the pipeline, backfilling shall be immediately performed and all the areas affected connected with the excavation works shall be temporarily restored.

In case of damage to any of above referred structures/utilities the Contractor shall be responsible for repairs/replacement at his own cost, which shall be carried out to the satisfaction of concerned authorities, resident and Owner.

12.9 Others

Throughout the period of execution of such work, the Contractor shall provide and use warning signs, traffic lights or lanterns, barricades, fencing, watchman etc. As required by the local authorities' jurisdiction and/or Owner.

For all roads, paths, walkways etc. which are open-cut, the Contractor shall provide temporary diversions properly constructed to allow the passage of normal traffic with the minimum inconvenience and interruptions.

The paving shall be resorted to its original condition after the pipeline is installed.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The Contractor shall excavate to additional depth at all the points where the contour of the earth may require extra depth, or where deep trench is required at the approaches to crossings of roadways, railroads, rivers, streams, drainage and ditches without any extra cost implication to Owner.

The Contractor shall excavate all such aforesaid depths as may be required at no extra cost to Owner. The trench shall be cut to a grade that will provide a firm, uniform and continuous support for the pipe.

The Contractor shall take conducive measures to ensure the protection of underground utilities as per the instructions of Owner or relevant authorities.

Where the pipeline crosses underground utilities/structures, Contractor shall first manually excavate to a depth and in such a manner that the utilities/structures are located, then proceed with the conventional methods.

The locations, where the pipeline has to be laid more or less parallel to an existing pipeline cable and/or other utilities in the Right-of-way the Contractor shall perform the work to the satisfaction of the Owner of the existing pipeline/cable/utility. In such locations, the Contractor shall perform work in such a way that even under the worst weather and flooding conditions, the existing pipeline/utilities remain stable and shall neither become undermined nor have the tendency to slide towards the trench.

12.10 Bedding

The Contractor shall ensure that the pipe when placed in the trench is supported and surrounded by a bed of screened excavated soil, which shall be stone free and have a maximum grit size of 5mm, in order to ensure no damage occurs to the pipe. However, in case of rocky soil the bedding shall be done with approved good quality packing sand subject to the approval of the Site Engineer. The packing sand shall be placed to a minimum thickness of 150mm around the pipe in case of rocky terrain.

Unless directed by the EIC the quantity of bedding and surrounding sand shall confirm specifications. There shall be no void space in the packing sand around the pipe.

13.0 LAYING

13.1 Main line

Laying of MDPE pipelines shall be commenced only after ensuring proper dimensions and clean surface of the trench. The trench bottom shall be free from the presence of cuts, stones, roots, debris, stakes, rock projections up to 150mm below underside of pipe and any other material, which could lead of perforation/tearing of the pipe wall. After ensuring above, the MDPE pipe coil shall be uncoiled smoothly through proper equipment's/care before laying pipe inside the trench ensuring no damage to pipe.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The contractor must ensure that Pipe caps are provided before lowering of Pipeline. The trench after this can be released for back filling leaving adequate lengths open at the ends for jointing.

Contractors shall ensure open ends of pipe placed in the trench shall be securely capped or plugged to prevent the ingress of water or other matter. The Contractor is to ensure that nothing enters inside the pipe during the laying process as this could cause a future blockage or regulator malfunction due to dust, etc.

In case of open cuts and moiling, where two pipes are to be laid parallel in same trench or same pits, 30% of the respective SOR of the lower size pipe for the laid length shall be paid extra.

Valves shall be installed at locations shown in the Design Plan or as directed by the EIC and joined with PE pipes by electro fusion techniques. The valves shall be placed on a concrete square block at the bottom to achieve equivalent support of the incoming and outgoing pipe.

Laying graphs/As-graphs with details of depth, length, offsets from minimum three (03) fixed different references, other utility crossings, fittings, sizes of the casing pipe used for the pipeline shall be prepared on daily basis and to be submitted to CLIENT representative/ EIC for approval. These details will further be incorporated in to As-Built Drawings.

Pipe may pass through an open drain or nallah with prior approval from EIC. Where this is permitted, the PE pipe shall be installed inside a concrete or steel sleeve for protection with no cost implications to the owner. The sleeve material shall be procured and laid by the Contractor with prior inspection and approval of the EIC for the quality of material. In general, the GI Sleeve material specification shall be confirming to IS 1239 (Heavy Duty) specification of reputed make; cost of GI sleeve shall be paid to contractor as extra item.

In case of service line laying, where the excavated pit for mainline is used for laying of service line, the length of service pipe laid in the same pit and vertical pipe which rises out of the ground with transition fittings shall be paid as per SOR. The contractor shall excavate a minimum pit of size 0.5 meter x 0.5 meter (L X W) on any kind of surface along the wall at the customer premises for the service pipe which rises out of the ground with transition fittings through GI pipe sleeve/Half Round Concrete sleeve. This excavation along with other work necessary to break through the walls of the obstruction, insertion of MDPE pipe, sealing of the annulus between the pipe and the sleeve, sleeve and the wall, installation of sleeve, making of pedestal as per Drawing No.(Refer Annexure-A-List of Standard Drawings) min. Size 300 x 150 x 150 mm for GI Sleeve, min. Size 550 x 230 x 150 mm for Half Round Concrete Sleeve Drawing No.(Refer Annexure-A-List of Standard Drawings) and simultaneous restoration of these pits shall be deemed included in the laying rates of pipes respectively. No separate payment of GI Sleeve / Half round concrete sleeve shall be charged to the owner. The material shall be inspected by TPIA / Consultant before installation. Also, the material test certificates, inspection reports approved by TPI/Consultant shall be

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

submitted at the time of submission of bill. Any installation without inspection & approval may lead to penalties as per Special Conditions of Contract.

In case of service lines, EIC shall decide either half round concrete sleeve or GI pipe sleeve shall be installed at any particular site depending upon site condition. The half round concrete sleeve shall be preferred over GI Sleeve, however in case where the installation of half round Concrete Sleeve is not possible due to technical feasibility and site conditions, GI sleeves shall be installed only after written approval from EIC. The rate of GI Sleeve / half round concrete sleeve shall be included in laying of 20/32 mm dia. As per respective SOR, depending upon surface conditions.

13.2 GI Sleeve

The contractor shall supply the minimum dia. Size of 2.5" & 3", 300 mm in length, GI sleeves (Heavy Duty reputed make) respectively for domestic & commercial / industrial installations. The material shall be inspected by TPIA / Consultant before installation. The material test certificates/ inspection reports shall be submitted at the time of submission of bill.

The installation of GI sleeve for service lines shall be done by sealing the annulus between pipe and sleeve, firm fixing of the GI sleeves by concrete mix pedestal, clamping, sand filling, etc.

The vertical portion of the sleeves shall be fixed to the wall of the premises in a secure manner. The Service lines shall be installed in accordance with the drawing enclosed in the tender.

13.3 Half Round Concrete Sleeve

The installation of Half Round Concrete sleeve for service lines shall be done by sealing the annulus between pipe and sleeve, firm fixing of the Concrete sleeves by concrete mix pedestal, clamping, sand filling, etc. Half round concrete sleeve shall be made as per attached drawing no.(Refer Annexure-A-List of Standard Drawings) as per instruction of EIC. The dimensions shown are tentative and may vary depending upon the site conditions. The material shall be inspected by TPIA / Consultant at the fabrication stage & prior to final dispatch at site for installation. The material test certificates/ inspection reports shall be submitted at the time of submission of bill.

13.4 Crush Guard/ half Round Concrete Sleeve: - (For O&M and Project)

The installation of pre-cast RCC crush guard over Half Round Concrete Sleeve/ Pedestal shall be done by installing it resting on wall of building by fixing it with grouting nut and bolts in wall that may be detached during the event of leakage/testing. The material shall be inspected by TPIA / Consultant at the fabrication stage & prior to final dispatch at site

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

for installation. The material test certificates/ inspection reports shall be submitted at the time of submission of bill.

The Crush Guard shall be installed in accordance with the standard drawing, enclosed in the tender as per instruction of EIC.

13.5 LAYING OF SERVICE LINE IN PROJECT AND O&M AREA:

O&M area shall be defined as those areas where PE line is already charged and handed over to owner.

Laying of pipeline (for 20 & 32mm) in all type of surface i.e. all kinds including Kutcha, metal, concrete (PCC/RCC), bituminous, tiled, brick lined etc. after racking up of hard surface of any type by any methodology. Roads, Pavement, Footpaths etc. shall be made motor able once the pipeline is laid. Supply & installation of GI Sleeve / Half round Concrete sleeve shall be included in laying rates. The rate includes liasoning with statutory bodies and no separate rates are payable. Wherever service lines are to be laid after dismantling nallah / drain, additional cost for dismantling and repairing shall be payable under respective SOR.

All service lines left out initially during mainline laying and laid by same contractor within six months of gas charging of that particular area shall be paid as per respective SOR item no.

All service lines left out initially during mainline laying and laid by same contractor after six months of gas charging of that particular area shall be paid as per respective SOR

All service lines left out initially during mainline laying and laid by other contractor after gas charging shall be paid as per respective SOR item no.

13.6 MDPE PIPE LINE LAYING (20MM / 32 MM / 63MM) IN ALREADY EXCAVATED TRENCH IN BUILDER SEGMENT

Scope includes laying of MDPE pipeline in already excavated trench with or without casing ; insertion of the carrier pipe in casing pipe (on case to case basis) laying of warning mat electro-fusion of joints and re-installation of pre-cast slabs as per specification after instruction of EIC / Site Engineer of Owner.

14.0 JOINTING OF POLYETHYLENE PIPE

The procedure for jointing of PE pipe and fittings machines is attached as Annexure #2 and as per Specification for ELECTROFUSION FOR PE PIPES AND FITTINGS. Only Bar coded into electro-fusion machine (Automatically Readable) that can read the bar code of the fittings automatically shall be used for joining of the MDPE pipes/fittings. Manual feeding Electro-fusion machines are not acceptable for jointing purpose. The contractor has to submit the certificate of calibration of Fusion machine at the time of start of work and at fixed intervals as per the instructions of Owner. Contractor shall ensure that the machines are always available at site. No stoppage of work due to the non-availability of machines shall be allowed.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The contractor shall flush the Pipeline with air to remove dust, water, mud etc. before fusing the joints. Before jointing, the Contractor shall place packing sand under the pipes on both sides of the joint to keep the pipes in line and at the correct alignment during the jointing process. The jointing process shall start only after Alignment clamps with the correct size are aligned with the pipe and coupler during the electro-fusion cycle.

The Contractor shall ensure that polyethylene pipe is only cut with an approved plastic pipe-cutting tool (Rotary Cutter up to 63mm/Guillotine Cutter for 63mm and above). Before fusion is attempted, the contractor shall remove the oxidized surface of the pipe using Universal Scrapper up to 63mm/Rotary Peeler for 63 mm and above before inserting into the electro-fusion coupler. The tool must remove a layer of 0.1mm to 0.4mm from the outer surface of the polyethylene pipe. No fusion will be allowed without clamping device and the approved cutting tools (Hack saw shall not be allowed for cutting the pipe).

The contractor has to supply all the consumables required for carrying fusion of the joints (like tissue paper, napkin, acetone etc.).

If, upon inspection, the EIC determines a joint is defective, Contractor shall remove the joint by an approved method. The cost of replacing joint shall be borne by the Contractor including the cost of pipe and fittings removed.

For electro-fusion joining, the contractor must bring own tools, tackles and equipment's. Only, approved Jointers shall carry out fusion of all joints. Contractors shall provide the list of jointers to be used on the job and make arrangements for Qualification Testing of the jointers in presence of Owner / Owner's representative as per the standard procedures. All approved Jointers shall bear identity cards signed by Owner / Owner's representative during fusion job and shall furnish the same on demand by Owner / Owner's representative. Applicable penalties shall be levied, in case; it is found that fusion is being carried by non-qualified jointers as per the provisions made in Special Conditions of the Contract.

Contractor shall arrange generator along with voltage stabilizer for power supply to fusion machine. Taking power connection form electric poles, connections without written permission from the concerned authorities or residential premises is strictly not permitted.

15.0 BACKFILLING

Backfilling shall be done after ensuring that appurtenance have been properly fitted and the pipe is following the trench profile at the required depth that will provide the required cover and has a bed which is free of extraneous material and which allows the pipe to rest smoothly and evenly. Dewatering shall be carried out prior to backfilling. No backfilling shall be allowed if the trench is not completely dewatered.

Prior to backfilling it should be ensured that the post padding of compacted thickness 150 mm is put over and around the pipe immediately after lowering where required.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Backfilling shall be carried out immediately after the post padding where required has been completed in the trench, inspected and approved by Owner/ Owner's representative, so as to provide a natural anchorage for the pipe avoiding sliding down of trench sides and pipe moment in the trench. If immediate backfilling is not possible, a padding of at least 300mm of earth, free of rock and hard lumps shall be placed over and around the pipe and coating.

The backfill material shall contain no extraneous material and/or hard lumps of soil, which could damage the pipe and/or coating or leave voids in the backfilled trench. In case, it is required and directed by EIC screening of the backfill material shall be carried out with specified equipment before backfilling the trench.

The surplus material shall be neatly crowned directly over the trench and the adjacent excavated areas on both sides of the trench to such a height which will, in Owner/Owner's representative opinion of provide adequately for future settlement of the trench backfill during the maintenance period and thereafter. The down shall be high enough to prevent the formation of the depression in the soil when backfill has settled into its permanent position should depression occur after backfill, Contractor shall be responsible for remedial work at no extra cost to Company. Surplus material, including rock left from this operation shall be disposed off to the satisfaction of landowner or authority having jurisdiction at no extra cost to Owner.

Where rock, gravel, lumps of hard soil or like materials are encountered at the time of trench excavation, sufficient earth, sand or select backfill materials shall be placed around and over the pipe to form a protective cushion extending at least to a height of 150 mm above the top of the pipe. Select backfill materials for padding that area acceptable shall be soil, sand, clay or other material containing no gravel, required selected backfill material has been placed, provided the rock or lumps of hard soil. The padding earth shall not contain any stones, i.e. the earth shall be screened for sand padding of the Pipeline in order to avoid damage to the pipeline. Contractor shall carry out all these works at no extra cost to Owner. Loose rock may be returned to the trench after the required selected backfill material has been placed, provided the rock placed in the ditch will not interfere with the use of the land by landowner, or tenant.

In case where hard rock is encountered or as desired by EIC / site engineer sand padding is to be provided up to height of 150 mm around the pipe.

When the trench has been dug through driveways or roads, all backfilling shall be executed with sand/suitable material in layers as approved by Owner /Owner's representative and shall be thoroughly compacted. Special compaction methods as specified may be adopted. All costs incurred there upon shall be borne by the Contractor. Trenches excavated in dikes which are the properties of railways or which are parts of main roads shall be graded and backfilled in their original profile and condition. If necessary, new and/or special backfill materials shall be supplied and worked-up to.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

PE Warning Grid/Mat shall be placed on distribution main and service line inside premises, after backfill of the trench up to a height of 300mm on the top of the carrier pipes. The warning grid is to be unrolled centrally over the pipe section and thereafter further backfilling will commence.

Backfilling activity shall include proper compaction by jumping jack compactor, wherever required and as per instruction of EIC, and watering in layers of 150mm above the warning mat. Proper crowning of not more than 150mm shall be done. All the excavated material that could be used during the Restoration process shall be stacked and kept separately and properly. Wherever Road cutting/Tiles removal/PCC cutting has been done during excavation for laying, the area shall be back filled and compacted immediately so that no inconvenience is caused to the general public.

Electro-fusion of joints is to be undertaken immediately after lowering and the activity shall not be kept pending for lack of Electro-fusion jointing. The backfilling shall be considered complete only after the jointing of pipes.

Debris and other surplus material shall be removed immediately after the back filling.

The contractor shall not be entitled for payment as defined in commercial on laying and backfilling till the above activities are completed.

16.0 MOLING

The Manual Moling shall be carried out as per the requirement specified by Owner / Owner's representative and approved procedures. The contractor has to carry out survey of the underground utilities before going for the Moling to avoid any damage to other utilities. No extra payment will be made for any trial/abandoned pits made during the survey. The supply of all equipment required for carrying out moling work is in contractor's scope. The type of moling to be carried out i.e. with or without casing shall be at the discretion of Owner and prior approval is to be taken before starting the Moling.

For Moling the contractor shall ensure that the size of the hole shall not be more than 20% of the size of the casing/carrier pipes whichever is applicable. After completion of Moling the hole shall be properly compacted / filled with soil by watering and by approved procedures.

The moling rates are payable as per the SOR and the moling rates are
common for MDPE pipe laying with or without casing pipe through the hole. The length of the Hole (excluding the sizes of the pits on both ends) shall be considered for the measurement of Moling length. However, the extra length of casing shall be considered for material consumption purpose only. In case of moling, where partial laying is carried out in casing and rest without casing, the SOR item no. 3. Shall be applicable for both. Further, the payment for the pipeline laying in the excavated pits for Moling purpose will be made as per the SOR for normal laying.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Any damage occurred to other utilities during the moling operation shall be immediately, notified and rectified by the contractor without any cost implication to owner.

17.0 HORIZONTAL DIRECTIONAL DRILLING (HDD)

HDD is required to be carried out by the Contractor where conventional Trenching/Moling is not possible viz. Railways, major waterways, highways, roads, congested areas etc. The Contractor shall obtain details of such crossings and the Contractor in consultation with Owner shall prepare construction drawings. Execution of the work shall be based on the Owner / Owner's representative approved drawings. The contractor has to do the thorough survey of the underground utilities before commencement of HDD to avoid the damage to the other utilities. No other extra payment will be made for any trail/abandoned pits made during the survey. The supply of all equipment required for carrying out the HDD is in contractor's scope. The HDD operation shall be carried out in accordance with API-1102. The type and availability of machines is sole responsibility of the contractor and as per the site conditions & requirements to entire satisfaction of EIC.

Once the work is allotted, any delay in mobilizing / non-availability of HDD machines as per site requirement and conditions shall result in levying of penalties on daily basis as per SCC. However, in such cases, owner shall mobilize HDD machines and carry out execution of work on the contractor's risk and cost and as per SCC.

The type of HDD to be carried out with or without casing shall be at the discretion of Owner and prior approval is to be taken before starting the HDD.

The rates for HDD, as indicated in SOR, as applicable on the site conditions, are payable as per the size of the carrier pipe and inclusive of excavation of pits, jointing, pilot boring, bentonite cleaning, reaming, insertion of carrier pipe, backfilling, compaction, etc.

As per the specification, HDD to be carried out with or without casing pipe depends on the type of crossing as per instruction of Owner/ Consultant.

Any damages occurred to other utilities during the HDD operation shall be immediately notified and rectified by the contractor without any cost implication to OWNER.

The measurement for the payment shall be measured as per the span for which the beacon/sensing source which is attached to the reamer at the time of pulling carrier pipe for HDD. HDD profiles should be properly marked in the as built drawing in scale.

18.0 CASING PIPE

The tentative sizes of the HDPE casing pipe for Moling/ Horizontal Directional Drilling shall be as follows:

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

S.No.	MDPE Carrier Pipe Dia. size (mm)	Min. Dia. of HDPE Casing Pipe (mm)	Max. Dia. of HDPE Casing Pipe (mm)
1	20	40	80
2	32	50	90
3	63	125	160
4	125	200	250
5	180	250	315

However, the size of the casing pipe may vary according to the length of the carrier pipe and requirement of laying of HDPE duct & OFC cable, if required. Also, the higher size of HDPE casing pipe shall be preferred over lower size casing pipe without any extra cost to the Owner.

19.0 RESTORATION

Wherever the restoration to the original surface condition is in the scope of Owner or as directed by EIC, all roads, footpaths (including roads and footpaths inside colonies) shall be restored to its original condition and the same shall be done as per CPWD/IRC norms and to the satisfaction of the concerned local Authority/Third Party Agencies designated by Owner. To retard curing of the installed concrete, wet sackcloth is to be placed on the finished surface and kept damp for a period of 7 days.

Where slabs and blocks are to be restored, the level of the compacted sub-base is to be adjusted according to the slab/block thickness. The slabs or blocks should be laid on moist bedding material, which should be graded sand, mortar or mortar mix. The slabs or blocks should be tapped into position to ensure they do not rock after lying.

The restored slabs or blocks should match the surrounding surface levels. Joint widths should match the existing conditions, and be filled with a dry or wet mix of mortar.

The procedure for restoration of Road/Footpath is just indicative. However, the restoration shall be done in accordance with the norms of the concerned Land owning agencies.

Turf shall be replaced in highly developed grassed area. In lesser-developed grassed areas top soil should be replaced during the restoration process.

Where permanent surface restoration cannot be completed immediately, the Contractor shall provide and maintain a suitable temporary running surface for vehicular traffic and pedestrians. The Contractor will be responsible for the maintenance of all restoration carried out, for the duration of the Contract guarantee period.

The Contractor is to ensure the restoration work is properly supervised and that the material used is suitable for the purpose and properly compacted. Where the required standards are not achieved, the Contractor will be required to restore the defective work.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Payment to the restoration shall be paid as per SOR. Further, the rate of restoration includes WBM, Asphalted /Bituminous, concrete pavement, Agra Stone/ Kota stone/ Tiles (Chequered/ any other type of tiles), interlocking paver blocks, Dry brick pavements etc. and payable under one SOR.

Note that payment for restoration will be released only after satisfactory completion and certification by Third party/Consultant.

Contractor has to obtain the No Objection Certificate (NOC) from the concerned local authorities/RWA after completion of the restoration work. The restoration specification specified in the tender is only a typical specification and the contractor has to carry out restoration as per the latest version CPWD/IRC/ MUNICIPAL CORPORATION OF STATE specification to its original condition and also to the entire satisfaction of landowner (Private/Public).

The expenditure incurred towards testing of the material used for restoration, as per the applicable standards, shall be borne by contractor.

20.0 TESTING

Pressure testing will be carried out with compressed air (free from oil and greases). Compressed air will be provided by Contractor for testing purposes and is to be included in the laying rates.

For main pipeline laying, the Contractor shall perform progressive pressure testing to ensure no leaks in long lengths of pipe. The test pressure shall be 6.0 bar (g), and there shall be no unaccountable pressure loss during the test period.

Overall scheme drawing for pressure testing shall be prepared by the contractor and get approval from Owner/Owner representative.

For main line the test duration shall be 24 Hrs. with these tests, the pressure should be allowed to stabilize for a period of 30 minutes after pressurization. The holding period may then commence and continue for 24 hours. Measuring instruments shall have been calibrated and their accuracy and sensitivity confirmed. For testing of Network, calibrated pressure gauges of suitable range shall be supplied by the contractor. The pressure gauges shall be calibrated from time to time as desired by EIC. All testing shall be witnessed and approved by the EIC or his delegated representative. Tie-in joints may be tested at working pressure following commissioning. In special cases, where the mainline length is less than 500 mtrs, holding period for testing may be reduced to 4 hrs.

For service lines up to a length of 15 mtrs testing will be carried out independently of the testing of the mains (if service line is laid separately after commissioning of mainline) for which the test duration may be reduced to 30 minutes at 6 bar (g) pressure. The service line testing in this case will be performed after the service line installation is complete but

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

before the service line tee has been tapped. Also in some cases the tapping of the service tee will be delayed pending the completion and purging of the main pipelines.

21.0 PURGING

Purging shall be carried out in accordance with the principles defined in the American Gas Association publication "Purging Principles and Practice".

The Contractor shall also provide nitrogen required for purging as per the direction of Site In-charge. Nitrogen shall be supplied in labeled, tested and certified cylinders and completed with all necessary regulators, hoses and connections, which will be in good and working condition. No separate payment shall be paid for supplying Nitrogen cylinders for purging and is included in the laying rates. Before purging cylinder should be checked for containing Nitrogen only.

In addition, the Contractor shall submit purging plan and get approval from Owner / Owner representative before commencing any purging work. The Plan shall include, but not be limited to the provision of the following materials and equipment: Personal Safety Equipment, Fire Extinguisher, Purging Adaptor, Purge stack with flame trap and gas sampling point, Gas sampling equipment (may be gas leak detector), squash-off tool, Polyethylene connecting pipe.

The Plan shall also include the purging process along with detail on the sequence of events. The process is to also specifically mention the need to lay a wet cloth over the PE main and in contact with the ground, to disperse static electricity during the purging work.

A purge stack with flame trap shall be used when purging services. Care shall be taken to ensure that the purge outlet is so located that vent gas cannot drift into buildings.

22.0 VALVE PITS

Valve pits (RCC/ Brick Wall) shall be constructed as per enclosed drawing no. (Refer Annexure-A-List of Standard Drawings) in the document.

Payment for the valve pit construction shall be paid as per SOR. The construction of the valve chambers shall be taken up immediately after installation of valve.

22.1 Material for Valve Pit

RCC Pre-cast Slab shall conform to IS: 456. Heavy Duty RCC Manhole Cover shall be used. It shall be with raised with Lifting hooks. The RCC manhole cover shall have a clear opening as per the Construction Drawings issued to the contractor.

22.2 Workmanship

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The excavation work shall be done at a location given by Engineer-in-Charge. All care shall be taken not to damage existing facilities and surface of construction shall be restored to its original state.

Sand bags to be placed below pipeline without disturbing the laid pipe. Gunny bags and Sand should be of approved quality.

PCC to be placed below the pipe as indicated. Once PCC is set sand is to be filled and properly rammed so that pipe and pre-cast concrete blocks are firmly place.

Valve will be supplied without the operating stem. Approved quality sand is to be placed in between area. The supply of sand is included in the rates.

Surrounding area to be properly cleared and PCC to be placed around the location where pre-cast slab with RCC Manhole cover is placed. The RCC pre-cast slab to be laid in level and finished smooth.

23.0 CONSTRUCTION OF TRENCHES AND OTHER SCOPE OF WORK IN BUILDER SEGMENT-

23.1 Construction of dedicated trench (as per approved drawing)

Trench Dimension- 0.6m x 0.66m x 1.0m (d x w x l)

Scope includes excavation of trench in any type of surface, construction of brick wall, waterproofing of trench(If required), removal of surplus malba, plastering of walls, watering and curing including supply & installation of precast RCC slab covers Site cleaning and restoration of all damaged surfaces during construction activity. Contractor should submit NOC through concerned RWA/Builder/Authority. For other details please refer drawing no.(Refer Annexure-A-List of Standard Drawings)

23.2 Construction of dedicated trench (as per approved drawing)

Trench Dimension- 0.375m x 0.66m x 1.0m (d x w x l)

Scope includes excavation of trench in any type of surface, construction of brick wall, waterproofing of trench(If required), removal of surplus malba, plastering of walls, watering and curing including supply & installation of precast RCC slab covers Site cleaning and restoration of all damaged surfaces during construction activity. Contractor should submit NOC through concerned RWA/Builder/Authority. For other details please refer drawing no.- (Refer Annexure-A-List of Standard Drawings)

23.3 Excavation of trench and installation of casing pipe by any method (Open /Moling)

Scope includes excavation of trench/moiling in any type of surface and installation of 6" GI Pipe C Class as casing pipe, restoration for road crossing up-to 7.0 m inside society and obtaining NOC through concerned RWA/Builder/Authority.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

23.4 Sand Filling in any type of trenches in builder segment only;

Scope includes supply and filling of coarse sand (Size 0.6 To 2.0mm) as per IS 383 free from impurity like clay, mica and soft flaky pieces in the trench as per instruction of EIC/Owners representatives.

Note- In all of the above items 10% amount shall be withheld till availability of NOC from concerned authority.

24.0 ROUTE MARKERS

Route Markers shall be fabricated, supplied and installed on the ROU at regular intervals as per the instructions of the EIC immediately after laying of the Pipeline. The installation of the type of the Permanent Marker shall be decided by the EIC depending on the site condition. The contractor shall also ensure that a sample of all type of markers shall be inspected and approved by Owner / Owner representative before shipment of the lot at site and prior to installation at the site. The inspection of all types of markers shall be carried out lot wise.

The Stone Markers shall be painted before installation as per the approved procedure. Whereas the Pole marker (Markers with foundation) and plate marker are to be supplied with powder coated Golden Yellow paint the supply of the paint as per drawing no. (Refer Annexure-A-List of Standard Drawings) and application. The supply of paint and application as per the specification is in contractor's scope. Payment shall be paid as per relevant SOR. Contractor shall obtain the approval lot wise & before installation at site from the Consultant / TPIA.

25.0 GUIDELINES:

- The installation of these markers shall be such that in between two pole markers two Stone markers are installed with spacing of 50 mtrs on either side. However, Pole markers shall be installed at all the Tapping /Branching points in the mainline.
- Interval between any two Stone Route markers for mainline (180mm to 63mm) shall not be more than 50m.
- A Pole marker shall be installed near to valve chambers on Mainline & inside the pockets respectively for indication.
- Pole markers with foundations (As per the Drawings in Tender document) shall be installed after two Stone markers.
- The entry and exit pits for laying of pipeline by HDD / Moling for Road crossings shall be marked by Pole markers or Stone markers depending upon the site conditions.

In addition to above, Pole markers with foundation (As per drawings in Tender document) shall be installed outside of individual societies/areas as per the instructions of the Owner

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

representative.

- For the distribution network 32mm & 20mm pipe, Stone / plate markers shall be installed as per the site conditions and directions of the Site-in-Charge.
- The artwork is typical for all the markers, with Owner's logo on it. The contractor must take prior approval for the artwork from EIC before installation of Markers. The lot wise approval shall be attached with bills.

26.0 ASSISTANCE IN COMMISSIONING

Contractor shall provide the required personnel, Vehicles, labour, supervision, tools, equipment, instruments and technical assistance for performance tests and commissioning activities as per requirement/ satisfaction of Owner /Owner's representative.

27.0 STANDARD OF WORK

All work carried out under this contract shall be to standards, codes of practice construction procedures and other technical requirements as defined in the technical specifications. The manpower deployed on the respective work shall be adequately trained and shall have necessary skills to execute/supervise the work. However, the assessment on the qualification of the personal shall be at the discretion of EIC.

Fusion Operators and other skilled personnel like plumbers, conversion techniques shall be approved by Consultant/ Owner. Simultaneously Identification Cards duly signed by Consultant/ Owner shall be issued to them. The contractor shall maintain proper record for the identification cards issued to their workers.

28.0 RECORDING (AS-BUILT DRAWINGS)

- The following points shall be taken care to the preparation of as built drawings.
- The as built drawings should be in the scale of 1:200 and shall be submitted in an A-0 sheet. The drawings shall be in layers according the AUTOCAD features category.
- Pipeline feature shall be shown as a continuous line, breaks only at joints, fittings, valves, tee point, etc. Diameter, Pipe material, length, and location of pipeline whether on the road or footpath, should be clearly indicated.
- Minimum three (03) offsets of every joint, from permanent structure shall be recorded on As Built.
- Distance of pipeline from permanent property/structure should be provided at least every 20 mtrs. If there is any change in alignment / orientation and offset distances etc. Of the pipeline in between the above said 20 mtrs, the same shall be dearly mentioned in the as laid. Gas objects (off valves, tees, elbows, couplers, transition

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

fittings etc.,) shall be shown as block objects (which form a single node to connect) with respect to Owner symbols / legend. The As laid drawings shall be as per the approved legends provided by EIC.

- Details & offset distances from other utilities present (e.g. MTNL, Electricity Board of State, Water/ Sewage Board of State, etc.) should be given in as laid drawing. If there is any change in depth of the pipeline, the same shall be clearly marked with details in the as laid drawings. The details (material, size & Length) of additional protection provided to pipeline shall also be clearly indicated.
- Details of the PE stop off valves &. Other fittings used (i.e. tees, elbows, couplers, transition fittings, etc.) should be shown with adequate information orientation &. Offsets from permanent structures in the immediate vicinity.
- Technical deviations (if any) should be provided with reference to the buildings permanent structures around, and the same should be cited clearly with all the relevant details, including separate sketches/Blowups / sectioned drawings / exploded view.
- Total as laid-length (size wise), bill of materials should be mentioned in each sheet.
- Complete details of nallah crossings should be shown in a separate sketch.
- Names of roads, major landmarks and buildings should be mentioned appropriately for reference.
- Proper chainage shall be mentioned on all the drawings to be referred with continuation reference.
- Direction of gas flow shall be indicated in each of the drawings.
- Text on the as laid drawing should be clearly visible.
- Land base features shown on the drawing shall match the exact distance as they were on real ground with respect to scale (1:200).
- As built drawings shall be duly signed & stamped by area TPIA / Consultant.
- The details shall be prepared in standard format using MAP INFO/ AUTOCAD MAP and submitted CD RAM. Contractor shall also make the item wise material consumption report for the respective areas in a soft copy and to be submitted along with the as-built drawings.

29.0 CIVIL WORKS

The contractor has to supply the adequate materials and skilled manpower for the completion of all the civil works. The contractor shall also ensure that the work is carried out as per the details mentioned in the Schedule of rates.

Special cares shall be taken at the time of labours working in depths/lifting of the skids by

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

hydras/ cranes considering all the safety guidelines.

The contractor has to ensure that sample of the all the materials shall be inspected and approved by EIC before carrying out installation or erection work. The contractor has to submit the test certificates for all the materials to be used at the site. The construction shall be carried out strictly as per the drawings provided by the CLIENT/Consultant. The contractor shall ensure extra / surplus materials/ malba shall be immediately removed from the site after completion of the job. Separate payments shall be made as per the SOR.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ANNEXURE # 1

TOOLS & EQUIPMENTS TO BE PROVIDED BY THE CONTRACTOR FOR PRE LAYING

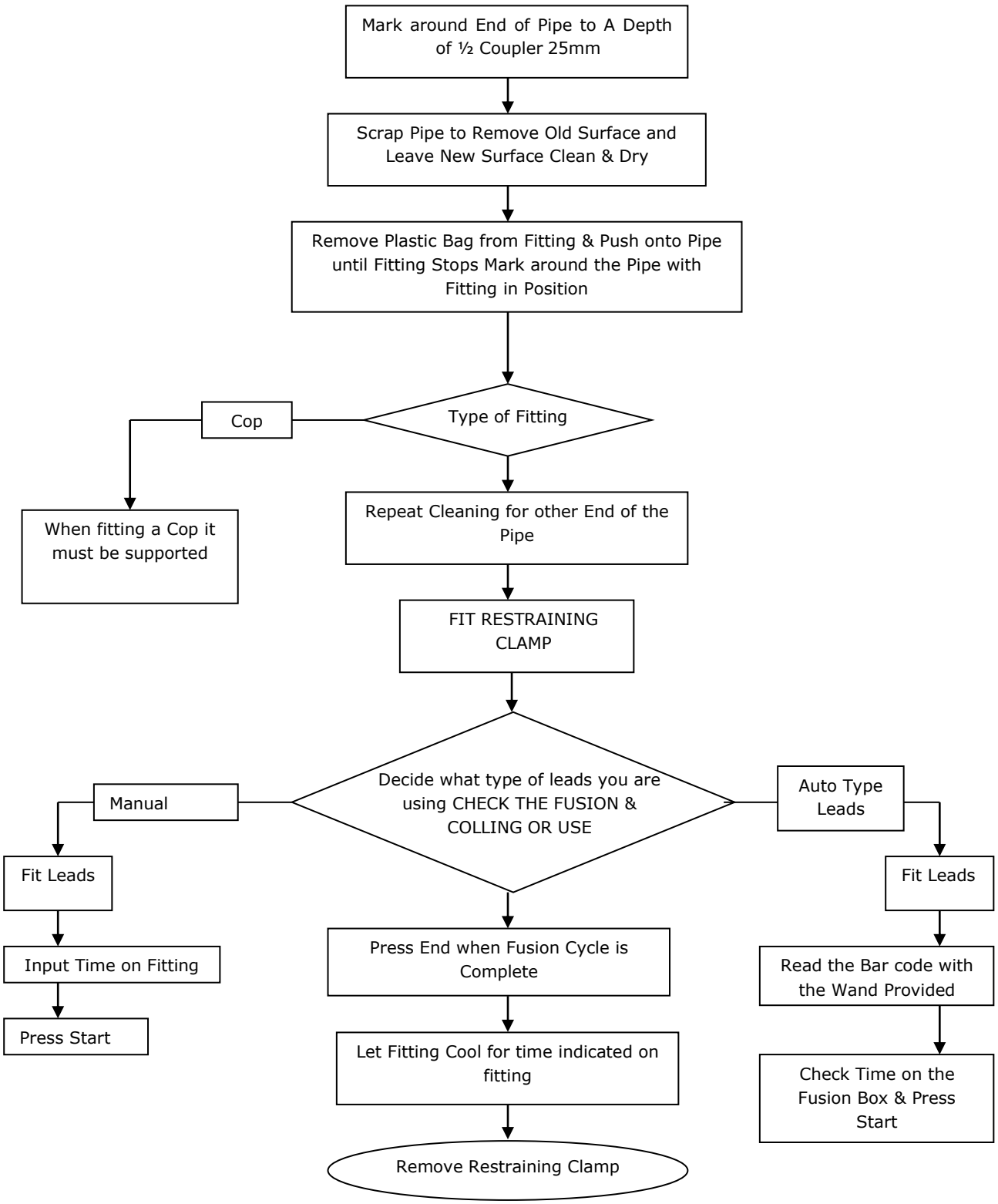
Sl. No.	Equipment Details	Minimum Requirement (In Nos.)
1	Electro Fusion Box (Automatically readable)	2
2	Voltage Stabilizer	1
3	Generator (5.5 KVA)	2
4	Moiling Equipment (for all sizes)	As and when required
5	HDD Machines & Equipment (for all types & sizes)	As and when required
6	Squeeze Tools (Manual) up to 63 mm	2
7	Squeeze Tools (Hydraulic) from 63 mm up to 180 mm	2
8	Rotary Peelers	2
9	Universal Scrapers	3
10	Tapping Tools/Allen Keys	Two sets of all sizes
11	Pipe Cutter (Round)	2
12	Pipe Cutter (Guillotine)	1
13	Pipe Cutter (ratchet type)	2
14	Gas Detection Unit	As and when required
15	Cable and Pipe Locator	As and when required
16	Test Ends	One set of all sizes
17	Pipe Alignment Clamps	As and when required
18	Joining Clamps for Coupler (All sizes)	2
19	Joining Clamps for Saddle (All sizes)	2
20	Pipe Straightness	As and when required
21	Re-rounding Tools (All sizes)	As and when required
22	Jumping Jack Compactor	As and when required
23	Roller for Asphalting	As and when required
24	Calibrated Pressure Gauges (0-6 Bar)	6
25	Water Tankers	As and when required
26	Automatic Thread cutting machine	As and when required
27	GI Pipe cutter	As and when required
28	Heating Element for HDPE Butt joint along with clamping, roller and other accessories	As and when required

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ANNEXURE # 2

FUSION COUPLERS FROM 20MM TO 180MM



Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ANNEXURE # 3

RESTORATION PROCEDURE/GUIDELINES FOR ROAD CUTS OF MUNICIPAL CORPORATION OF STATE AND OTHER LANDOWNING AGENCIES

PURPOSE AND OBJECTIVE

The main purpose and objective of this document is to ensure that all the work are carried out with proper specifications and standards with high quality and timely accomplishment, and the restoration of infrastructure is according to standards Aimed at achieving the original condition of the road infrastructure.

DOCUMENTS/FILES TO BE MAINTAINED:

The following documents shall be maintained during execution of the job and shall be handed over to OWNER/ Consultant/ TPI after completion of the job;

- Copy of permission letter obtained from Municipal Corporation of State.
- Drawing/ Sketch showing the details of stretch to be cut, highlighting the type of surfaces and its chainage/ length (area)
- Stage wise Photographs of the stretch.
- Test Certificates of the Construction materials to be used.
- Routine Test Certificates for construction materials during progress of job.

30.0 RESTORATION OF TRENCHES/PITS:

After laying pipeline, backfill material without containing extraneous material or hard lumps of soil or stones shall be filled and watered in layers of 150mm. Warning mats shall be placed as per specification. Earth shall be filled watered and compacted in layers with the help of earth compactor (Jumping jack compactor where ever space is available). After backfilling, the crown of the earth shall be between 50mm and 100mm above road surface and shall be free from sharp-edge stone and boulders.

After consolidation of backfill, the surplus earth shall be removed and disposed at place directed by OWNER (at suitable locations, as per direction of Municipal Corporation of State)

Further, depending upon the Surface types of following specification shall be adopted:

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Sl. No.	Surface Types	Specification Recommended
1	Cement Concrete Surface	Top Surface – PCC 1:2:4, 100 mm Thick Compacted with Plate Vibrator shall be laid over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
2	Brick Soiling	Top Surface – Brick Soiling (as per original type) shall be laid over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
3	Interlocking CC Paver Block	Top Surface – Interlocking CC Paver Blocks (as per original type) shall be laid over compacted fine sand 50 mm Thick over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
4	Chequered Cement Concrete Tiles/Pre-cast CC Tiles/Kota Stone Floor/Red Stone Floor	Top Surface – Tiles/Floor (as per original type) shall be laid over Cement Sand Mortar 1:6, 20mm Thick over base course, Joints shall be pointed/finished to match colour. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
5	Bituminous Surface (for Category D Roads i.e.; Roads less than 13.70 M width)	Top Surface – 40mm Thick Bituminous Concrete (as per original type) shall be laid over PCC 1:2:4, 100 mm Thick over base course. Base Course – PCC 1:5:10, 75 mm Thick laid over compacted backfilled earth.
6	Bituminous Surface (for Category C Roads i.e.; Roads less than 18 M width but greater than 13.70 M width.)	Top Surface – 40mm Thick Bituminous Concrete (as per original type) shall be laid over PCC 1:2:4, 150mm Thick over base course. Base Course – PCC 1:5:10, 150 mm Thick laid over compacted backfilled earth.

The specification mentioned above may be modified in line with relevant Municipal Corporation of State/ CPWD/ IRC specifications. Contractor has to follow the changes as informed to them time and again.

NOTE:

Wherever the Bituminous portion is cut in small patches or isolated location where area of Bituminous portion is very less due to constraints like other utilities, the

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

surface shall be restored, same as specified for the cement concrete surface, with prior approval of EIC/TPI.

31.0 TESTING OF CONSTRUCTION MATERIALS

For the different construction materials proposed to be used the following tests are required to be carried out for approval:

Sl.No.	Material	Test	Method of Testing	Frequency of Test
1	Cement	Setting time, soundness, compressive strength and fineness	As per IS: 4031	Once for each consignment or as and when required/directed
2	Bricks	Compressive strength, water absorption and efflorescence	As per IS: 3495	Minimum five samples or as per IS: 5454
3	Coarse Aggregates	Sieve analysis, flakiness index, estimation of deleterious materials, organic impurities, moisture contents and specific gravity	As per IS: 2386	One test per source of supply and routine test regularly as directed
4	Fine Aggregates	Sieve analysis, clay silt and moisture contents and specific gravity	As per IS: 2386	One test per source of supply and routine test regularly as directed

In addition to the above construction materials such as inter locking paver blocks, chequered cement concrete tiles, Pre-cast CC tiles, Kota/Red Stones Flooring samples shall be arranged for approval before use and if required testing shall be arranged.

For Cement concrete works the minimum frequency of sampling of concrete (CC cubes) shall be as follows:

Sl.No.	Quantity of concrete in Cu.M	No. of Samples
1	1 – 5	1
2	6 – 15	2
3	16 – 30	3
4	31 – 50	4
5	51 and above	4 + 1 additional sample for each additional 50 Cu. M and part thereof.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The cement concrete cubes shall be tested for 7 & 28 days as per relevant IS code.

33.0 INSPECTION BY THIRD PARTY INSPECTION (TPI) AGENCIES NOMINATED BY LAND OWNING AGENCIES

It is the responsibility of the contractor to give inspection call, at least one week in advance to OWNER, to arrange for inspection by TPI nominated by land owning agencies along with the file containing all documents mentioned in Clause No. 2 of this document. Before inspection by TPI nominated by land owning agencies, contractor has to arrange for the inspection of the restored area by OWNER/Consultant/TPI and get the work certified. Contractor has to arrange for all necessary equipment, tools & tackles, labour for carrying out the inspection of the restored area. It is the responsibility of the contractor to obtain "No Objection Certificate" (NOC) from the TPI nominated by the land owning agencies and further NOC from Land Owning Agencies and to get the securities/Bank Guarantees paid to them, for obtaining the permissions.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION - INSTALLATION OF ABOVE GROUD GI/COPPER PIPING & FITTINGS IN LOW RISE DOMESTIC CONNECTIONS

VPC – SS – PE - 0003

REV	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 GENERAL INFORMATION 3

2.0 DEFINITIONS 3

3.0 SCOPE OF WORK 4

4.0 MATERIAL, MANPOWER EQUIPMENT AND MACHINERY 6

5.0 ISSUE OF WORK INSTRUCTIONS 9

1.0 PROGRESS OF WORK 10

2.0 WORK SHEETS 10

8.0 PERMISSIONS / APPROVALS 10

9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS 11

10.0 RIGHT-OF-USE SERVEY AND MARKING 12

11.0 PROTECTION OF STRUCTURES AND UTILITIES 12

12.0 POWDER COATED GI AND COPPER ABOVE GROUND SERVICE PIPE 13

14.0 INSPECTION 18

15.0 PURGING & COMMISSIONING 18

16.0 CONVERSION OF DOMESTIC APPLIANCES 19

17.0 RESTORATION 20

18.0 SUBMISSION OF FINAL RECORDS 21

19.0 COMPLIANCE TO HEALTH, SAFETY & ENVIRONMENT (HSE) FOR LOW RISE GI: 21

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 GENERAL INFORMATION

Indraprastha Gas Limited (OWNER) is a Joint Venture Company of Gas Authority of India Ltd (GAIL), Bharat Petroleum Corporation Limited (BPCL) and Govt. of NCT of Delhi. Owner plants to install an underground Natural Gas Distribution Network throughout the National Capital Territory of Delhi. The objective is to supply Natural gas to both domestic and commercial consumers and to provide compressed gas as a fuel for Automobiles. Owner is seeking Contractors to assist in meeting the above objective.

The main scope of this contract comprises the installation of above ground pipes from the outlet of 'PE/GI transition fitting' up to the domestic/commercial Customers 'Appliance/stove/oven valve' as per the Distribution schedule placed in enclosed drawing No:14588-20-05-01 in New was well as in Existing Gas charged areas.

The scope includes installation & procurement of above ground GI/Cu pipes and associated fittings for commercial/domestic consumers. However, the piping may have to be carried out up to Appliance Valve, in case of some commercial/domestic customers required.

Except domestic meter, regulator, Isolation and appliance valve, Contractor shall procure the each material (GI fittings, GI Pipes, Cu Pipes, Cu/Brass fittings, etc.) which is required from the out of PE/GI transition fitting up to the Domestic/Commercial Customers "Appliance/stove/oven valve".

This technical specification defines the basic guidelines to develop an acceptable design and suitable construction methodology for carrying out different activities listed out in the schedule of rates of this tender.

Compliance with these specifications and/or approval of any of the Contractor's documents shall in no case relive the contractor of his contractual obligations.

2.0 DEFINITIONS

PMC	VCS Quality Services Pvt. Ltd. (VCSQSPL)
SS	Present <<Standard Specification>> and its entire appendix, if any
TPIA	Third Party Inspection Agency
EIC	Engineer-in-charge
CUMULATIVE LENGTH	The riser length (excluding lateral tapping) shall be considered and averaged out among all the households, whereas the lateral piping shall be included only for one particular connection
REGULATOR PIECE	The GI pipe from transition fittings to Regulator

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

3.0 SCOPE OF WORK

Generally the following shall constitute the Contractor's scope of work but not limited to:

- Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Owner/Owner's representative. Contractor has to submit the Construction/Execution procedures before commencement of work to Owner / Owner's representative for approval.
- Contractor shall submit the QCT/procedure/drawing etc. of all the material to be procured by him for approval before procuring the items. If, QCT/procedure/drawing etc. are not approved from client/consultant then owner has the authority to refuse /reject the same lot material.
- Receipt of regulators, domestic meters, Isolation and Appliance Valve as a free issue items from Owner's stores, loading, transportation, unloads at project site. Proper storing, stacking, identification, providing security and insurance during and before installation and commissioning of pipelines. Obtaining the approval for optimum route and permission for work from the concerned authority and EIC.
- Selection of route with the EIC/Consultant and marking the same on walls/floors between 'transition fitting' to 'cooking oven/stove/appliance', making openings and making provisions for fixing clamps. Making temporary but stable platforms/scaffolding /rope ladder etc., required for installation of pipes/fittings at all heights/multi storied flats and locations.
- Contractor shall procure all material except free issue items for installation at the outlet of PE/ GI transition fitting up to the Domestic customers "Appliance /stove / oven for satisfactory completion to the owner/owner's representative.
- Supply and Installation of powder coated GI pipes of ½", ¾" dia. between transition fittings to customers kitchen appliances including NPT threading of GI pipes, supply of proper seal outs for threads to join fittings such as elbows, tees, connectors, regulators, meters, appliances & isolation valves etc., as per laid procedures and specifications including clamping and sealing etc. The powder coated GI pipe shall be painted after the testing of the GI installation wherever touching is required to eliminate any coating defects during installation. Where all GI fittings shall be fully painted after testing as per defined Specification.
- Supply & Installation of Copper pipes including supply of lead free solder wire and flux to join fittings such as elbows, tees, connectors, meters, valves etc., complete as per

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

procedures and specifications including clamping and sealing etc.

- Supply of clamps for fixing pipes, Meters wherever required, painting of pipes and fittings. Providing consumables grout material, repair/restoration of walls/floors changes for the pipes including the materials required for conversions and tools and tackles etc. shall be completed as per specification.
- Conversion of all types of LPG kitchen appliances to NG based appliances & to take Sign on RFC card& Joint Meter Records (JMRs) of customer.
- To demonstrate the Customer regarding use, safety and maintenance related aspects to NG based appliances and installations.
- Cleaning, flushing, pneumatic testing and commissioning to the GI/Cu pipe & fittings, meters, valves etc. as per specification and hand over the same to Owner/Customer to the entire satisfaction of EIC/CONSULTANT.
- Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.
- Restoration of walls, flooring and other damages while executing the above ground installation up to satisfaction of properly owner.
- Preparation and submission of above ground installation card for each house indicating the laid GI/Cu pipe including fittings, mentioned the reasons, if connecting, testing, etc. is not provided to the customers and deviation statements on completion /commissioning of work.
- Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works in new & existing gas charged areas shall also be covered under the Scope of work and has to be completed by the Contractor within specified schedule at no extra cost to Owner.
- Following activities are also in Contractor's Scope:
  - Receive Customer’s request and complaints logged on portal/Offline.
  - Carry out joint technical feasibility survey for requests received.
  - Attend and resolve customer complaints within defined TAT.
  - Maintain and update the request and complaint status in portal.
- Maintain new connection tracking on portal. Providing adequate manpower, minimum 2 no’s each such as data entry operator, customer care executive etc. for data logging like new connection request & GI tracking, attending complaints, day to day interaction with customers and residents so that work can be executed within defined time period (TAT) Turn Around Time.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Providing adequate manpower for carrying out laying for PNG installation for emergency cases as and when required. The TAT period for carrying out such emergency cases are defined in tender document.
- Printable material i.e. RFC book, sticker & safety Guidelines shall be provided by owner. All other printable materials like feasibility report etc. shall be in contractor's scope.
- All size of GI pipes shall be powder coated before installation and it is in the scope of contractors. Contractor shall submit powder coating procedure to EIC/ Consultants before powder coating of pipes.

4.0 MATERIAL, MANPOWER EQUIPMENT AND MACHINERY

4.1 Material to be supplied as a free issue material

Domestic meter, Regulator, Isolation and Appliance valve shall be supplied as a free issue material to the contractor. The contractor shall not use any other material from any other source of supply other than owner's supplied material without any written approval from EIC.

4.2 Material/Equipment & machinery to be supplied by contractor

Contractor shall procure/ purchase GI Pipe & fittings, Brass fittings, Cu pipe & fittings, and Reinforced rubber hose with other material which is required to satisfactory completion/safety/statutory of the works as per tender at no extra cost to Owner. The logo shall be marked on the material supplied by contractor. The contractor shall take approval from owner/owner representative for marking on the material to be procured by contractor before placement of order.
The Contractor shall provide labour, tools (such as Hammer Drill, Piston Drill, Pipe Cutters, Dies for threading, Pipe wrenches, spanners, conversion kits, solder torch, copper tube Cutters, tube benders, lacquering, thinner etc.) in specified numbers, all types of clamps, Plant and equipment necessary for the proper execution of the work. This will include but not limited to list of specialized tools and tackles indicated in Annexure #1.

Special tools shall be required at site for carrying out drilling work in walls other than Brick or RCC (Ex. Granite, Marble, Wooden, Glass Cutting etc.)

The contractor has to ensure the availability of DG sets for continuous power supply. In case the power supply is availed at the site from societies, individual residents, contractor shall settle the claims raised by the electricity providers without any cost implication to OWNER. In case contractor doesn't settle the claims for using the electricity

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

from societies/individual residents, on demand by the providers, OWNER will settle the claims and the same will be deducted from the contractor's bills. The progress of work shall not hamper due to non-availability of power supply.

The contractor has to submit the valid calibration certificate for Pressure gauges.

Contractor shall submit the manufacturer test certificate slab test certificate for all items procured by him for approval before commencing the execution.

No hiring of equipment's, tools and tackles by the contractors is allowed at the site. In case any contractor is found not in possession of enlisted required tools and tackles, penalty will be levied as per the SCC which shall be deducted from the running bills.

4.3 Plant and Equipment

All vehicular type machinery shall be in good working condition and shall not cause spillage of oil or grease. To avoid damage to paved surfaces, the contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

4.4 Sealant, Grout

The contractor shall be responsible to arrange the supply of any consumable sealant or ready mix grout material required for restoration of holes. The sealant/grout supplied by the contractor shall be compatible with the area to be restored/ rectified. No separate payment for the supply of sealant and grout shall be made to the contractor.

4.5 Clamps, Rawal Plugs, Screws and Nozzles etc.

The Clamps, Brackets for meter, Rawal Plugs, SS-304 Screws (2" length), Nozzles, etc. shall be approved lot wise by EIC prior to installation. Re-drilling of existing appliance (burners) nozzles is strictly not permitted. The quality of materials procured will be got approved and will be as directed by EIC.

The indicative sketch of the Brackets for Meter, and GI/Copper Pipe Clamps is enclosed with the tender. No separate payment for the supply of Meter Brackets and GI/Copper clamps shall be made to the contractor.

4.6 Consumable Items

- Special Consumables such as Teflon Tapes, solder wire, flux, lacquer, thinner shall be supplied by the contractor and are included in installation rates.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- These consumables shall be of reputed make companies and required grades/class

4.7 Other Materials

The contractor shall supply the following items where required:

4.7.1 All materials required for work, NPT threading, copper pipe jointing, testing etc.

4.7.2 All signs, barricades, lights and protective equipment.

4.7.3 All material required for working at higher floor levels (i.e., scaffolding, Ladder, Safety Belts, Self-Locking Safety Harness Belts etc.).

4.7.4 Special consumable such as grease for maintenance of domestic appliances, all paints for painting of GI Pipes, Consumables such as Teflon Tapes, Solder-wire, Flux, Lacquer, Thinner, Petrol, Diesel, Fuels and Oils required are to be supplied by the contractor and are included for within the rates.

4.7.5 All minor items not expressly mentioned in the contract but which are necessary for the satisfactory completion and performance of the work under this contract.

4.8 Acquisition, Receipt and Storage of Materials

The Contractor shall collect Domestic meter, Regulators, Isolation and Appliance Valve from Owner’s designated stores in between the hours to be advised by the EIC.

The contractor shall carry out assessment of material required for GI/Copper installation in allocated area. After approval from Owner, contractor shall place order for purchasing of GI Pipes & fittings, Copper pipes & fittings, Brass Fittings, and Reinforced Rubber hose (Technical specifications attached in the tender document) to anyone of approved vendors as per the list attached in the tender document. The contractor shall also ensure that the QCT for these materials shall be approved before the start of production activity. Once QCT is approved, contractor shall forward inspection call to the Owner depending upon the material requirement at the site. The inspection of these materials shall be carried out by Owner appointed third party inspection agency. It is contractor's responsibility for document submission, arranging dispatch clearance, handling, loading, transportation and unloading of these materials at their own respective store.

Any other activity not mentioned/covered, explicitly, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of works shall also be covered under scope of work and has to be completed by

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

contractor within specified schedule at no extra cost to Owner. The Contractor shall carry free issue material in such a manner as to preclude damage using transportation and handling.

The Contractor shall physically examine all materials at the time of acceptance the material in store and notify the EIC immediately of any damage or defect noticed by the Contractor. The representative shall duly note any damage or defect in a site instruction book and both parties shall counter sign the entry.

Any damage not so recorded will be deemed not to have existed at the time of acceptance of material in store by the Contractor and the cost of repair or replacement or rectification shall be borne by the Contractor.

All materials shall be stored in contractor's stores near site in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals.

The Contractor shall be required to submit inventory details of materials every month.

The Contractor shall maintain log book at their respective stores stating issue and availability of free issue material at a given day. Further, it is mandatory that the contractor is required to undertake and submit inventory details of free issue and purchased materials on monthly basis to Owner/ Owner's representative as per the approved format of the owner. The inventory details shall be in correlation with the Daily progress chart and material reconciliation sheet.

Material reconciliation indicating issue of material, consumptions and defective material shall be submitted on every three months basis.

5.0 ISSUE OF WORK INSTRUCTIONS

- The contractor will be required to carry out GI installation in the areas where MDPE laying is under progress. However, testing of GI installation shall be done in conjunction with laying of MDPE Service Lines to respective premises. A general scheme of distribution to domestic consumer is indicated in enclosed drawing No: 14588-20-05-09 for reference. It may vary in case of individual and multi storied flats.

- All skilled personnel like jointers, conversion technicians will be approved and certified by EIC. The technicians who will carry out joining of copper material

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

and conversions will undergo a test by Owner. Those who clear the test will be issued identity cards duly signed by EIC. These technicians shall be only authorized to take up respective jobs. In case it is found that contractor personnel other than authorized are carrying out these works, applicable penalty will be levied to the contractor as per contract.

- The rates to be quoted by contractor shall be inclusive of all preparatory/bye works, platform materials, labour, supervision, tools, taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.

- The schedule of items of GI/Cu installations have been described in brief and shall be held to be completed in all respect including safety requirements as per Standard Specification of HSE, tests, inspection, QA/QC works, enabling and sundry works. The payment shall be made against completed and measured works only. No extra works whatsoever shall be considered in execution of these items.

6.0 PROGRESS OF WORK

The contractor shall proceed with the work under the contract with due expedition and without delay. Contractor shall assess the material requirement of the allotted area and submit the schedule plan for execution & purchasing before start of actual work.

The EIC may direct in what order and at what time the various stages or parts of the work under the contract shall be performed. Weekly progress reports shall be submitted in the formats approved by Owner, indicating broadly the laying, testing, RFC, conversions and extra piping.

7.0 WORK SHEETS

- The quantities of GI/Cu pipe and other details will be checked by Owner's site engineer and the same shall be incorporated in RFC cards, signed & dated as certified, on site. The cards will then be approved by the EIC.

- Measurement sheets shall be prepared based on the RFC cards and checked and certified by the site engineers for billing purpose.

- If measurement sheets submitted are illegible, incomplete or incorrectly booked they will be returned to the contractor.

8.0 PERMISSIONS / APPROVALS

- Contractor shall be responsible for obtaining permissions from society management, RWA, individual residents and any other concerned authority, if required, for

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

completion of the work. Contractor must take the prior appointment from the residents for carrying out the work.

- The prospective bidder shall work in close consultation/coordination with the ElC.
- The prospective bidder shall not sign/execute any agreement and/or undertaking on any such documents which amounts to be under taken by Owner. The same shall only be signed and executed by Owner; however, the prospective bidder shall also liaison and coordinates for the same.
- The necessary coordination, liaison and arrangements for inspection and approval shall be the contractor's responsibility. Inspection and acceptance of the work by authority shall not relieve the contractor from any of these responsibilities under this contract. The contractor shall plan the execution of work in such a manner so that all the registered customers are attended in phased manner. However, it is the contractor's responsibility to fix a firm appointment with the consumer for carrying out the work.
- A log book/job card for such appointments with Consumer/any other agencies shall be maintained and the schedule/appointment once taken shall be adhered to by the contractor. PMC/ElC shall review the records every week. The contractor shall submit the detailed list of RFC/Conversions and balance work on Registrations at least once a week as per approved format.
- The contractor is also required to obtain a "Labour License" from the Assistant Labour Commissioner of respective Administration/Central Govt.
- It will be the contractor's responsibility to familiarize himself and comply with, any other local rules, regulations or statutory requirements applicable to the work.
- The contractor has to take responsibility of the action of supervisors, plumbers and helpers provided by him.

9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS

The contractor shall carry out the work in accordance with this specification, Owner's Engineering Standards: ASME B31.8 - Gas Transmission and Distribution Piping Systems; Oil Indian Safety Directorate Norms (OISD), the American Gas Association Document - Purging Principles and Practice and PNGRB Guidelines.

If the contractor find any discrepancy, ambiguity or conflict in between any of the Standards and the contract documents, then this should be promptly

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

referred to the Engineer -in-Charge (EIC) for his decision, which shall be considered binding on the contractor.

10.0 RIGHT-OF-USE SERVEY AND MARKING

The route of the pipeline to be installed shall be decided with consent of the consumer and Site Engineer/EIC. Contractor must ensure that the persons/workers/supervisors/ working at site shall have proper identity cards prior to entering the premises of the consumer.

No temporary or permanent deposit of any kind of material resulting from the work shall be permitted in the approach or any other position, which might hinder the passage and/ or natural water drainage, or any area where there is objection from consumer.

The contractor shall obtain necessary permissions from land Owners and tenants and shall be responsible for all damages caused by the construction and use of such approaches, pavements, gardens, rooms, walls, roof etc., at no extra cost to Owner.

Owner/Consultant and the contractor at each premises or housing colony to be supplied with gas will conduct a joint survey. The survey record will note Customer details, the potential gas supply points and proposed meter positions and estimates of material quantities. The contractor's representatives will make as sketch of the agreed pipe routes, if necessary.

The contractor will be responsible for contacting the Customer and making the necessary arrangements for access and appointments to carry out the work. Owner will not be responsible for any time lost due to failed appointments or disputes with Customer.

The contractor shall confine its operations within limits of the Right in use. The contractor shall restore any damage to property outside ROU.

The contractor shall also carry-out all necessary preparatory work if needed to permit the passage of men and equipment. Lights, Curbs, signs shall be provided wherever and/or required by the Owner necessary to protect the public.

11.0 PROTECTION OF STRUCTURES AND UTILITIES

The contractor shall at his own cost, support and protect all buildings, walls, fences or other structures and all utilities and property which may, unless so protected, be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work.

While painting, contractor must take care of the consumer premises while carrying out the job such as spillage on floor, walls, ceilings, sun shades etc. If the same does occur,

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

the contractor has to immediately make things to original.

12.0 POWDER COATED GI AND COPPER ABOVE GROUND SERVICE PIPE

The powder coated GI service pipe installation work includes all work necessary to connect from the PE/GI transition fitting on the down-stream of the PE service, to the Customers appliance, including the installation of regulator, valves, fittings, meters, clamps etc. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with ladders, scaffolding pipe, dies, tripods, vices, fittings and Teflon tape, drills for concrete and other masonry, drills for timber, Granite, Marble Stones and laminated surfaces inside Customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, paint for marking etc.

All powder coated GI risers at the outside of buildings shall be fully supported to carry the weight of piping. A flanged foot or similar device, capable of supporting the total weight of the riser, shall support risers. The riser shall be installed in a vertical line from its point of support to its highest point with a minimum of changes in direction. The threading of GI pipe shall be NPT and conforming to ANSI B l 20.1

Contractor has to supply different types/sizes of approved powder coated clamps (Mild Steel) for fixing GI pipes suiting to the site conditions. The contractor shall get approval from EIC for every fresh lot of the clamps, brackets, regulator boxes and other consumables, prior to start of installation. The detailed cross sectional of Gl Pipe Clamps/Meter brackets are as per Drawing No. 14588-20-05-05;

All riser and lateral pipe shall be clamped to the building at intervals not exceeding 1.5 mtrs. Maximum distance between clamps shall be 1.0 - 1.5m when pipe goes to the straight, if any tee or fittings lies in between the pipe then clamp shall be placed 150 mm far away from center line of fittings at every sides. However, the same may be changed as per site conditions/as directed by EIC. Minimum gap between pipe & wall shall be 25 mm. The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation.

Where pipe passes through the balcony and the surface is slightly elevated around the service pipe or its surrounding sleeve to prevent the accumulation of water at that point. Where a short piece of sleeve is used around the gas pipe, the sleeve should be embedded in the concrete with a mix of mortar and the void between the pipe and sleeve filled with a suitable sealant. The sealant should be beveled such as to prevent an accumulation of water. Supply of clamps for all sizes of the GI pipes is in contractor's scope. Contractor has to take prior approval for design/types of clamps, paintings etc. Pipe shall preferably be entered into building above ground and remain in a ventilated location. The location for entry shall be such that it can be easily routed to the usage points by the shortest practicable route.

12.1 NON LMC

Non LMC GI Pipe shall be defined as the GI pipe installed from transition fitting to lateral isolation valves.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Regulator piece: Regulator Piece: Powder coated GI pipe of 1/2'' dia installed of length 1.5m from transition fitting up to inlet of regulator. Its length may very as per site situation subject to prior approval from Site In-Charge or as per instruction of EIC. The Laying of GI Pipe from the transition fittings to regulators shall be payable in the numbers

- **Riser for Bungalow /Apartments having floors up to G+3:** Powder coated GI riser pipe of ½'' dia shall be installed from regulator isolation valve to lateral isolation valve for G+3 Apt and Individual kothi /Bungalow. Refer Drawing No. 14588-20-05-02.
- **Riser for Bunglow/Apartments having floors more than G+3:** Powder coated GI riser pipe of ¾'' dia shall be installed from regular isolation valve to lateral isolation valve for Apt and Individual Kothi/Bungalow having floors more than G+3. Drawing No. 14588-20-05-03

12.2 LMC

LMC GI/CU pipe shall be defined as the GI pipe installed from lateral isolation valve to appliance valve. The cumulative length of ½'' dia powder coated GI pipe with in 2m & Cu pipe within 2m or (GI+CU) within 4m after

- **PNG CONNECTIONS IN PROJECT AREA**

Supply and installations from riser (lateral isolation valve)-.The cumulative length of ½'' dia powder coated GI pipe with in 2m & Cu pipe within 2m or (GI+CU) within 4m after lateral isolation valve up to appliance valve up to appliance valve along with installation of meter, supply of steel reinforced rubber hose with clamps and conversion of burner. Additional quantity above 4 meter (GI+CU) shall be payable only in case, if cumulative length exceeds 4 m .payment against additional length of (GI/Cu) shall be against as per SOR

- **PNG CONNECTIONS IN O&M AREA (ON EXISTING RISER)**

Supply and installations from existing riser- The cumulative length of ½'' dia. powder coated GI Pipe within 2 m & Cu pipe within 2m or (GI+CU) within 4 m after lateral isolation valve up to appliance along with installation of meter , supply of steel reinforced rubber hose with clamps and conversion of burner. Additional quantity above 4 meter (GI+CU) shall be payable only in case if cumulative length exceeds 4 m. Payment against additional length of (GI/CU) shall be against item 12b of SOR. This SOR is applicable only if the riser is commissioned by other contractor or riser is commissioned by same contractor six month ago.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The GI/Cu/brass fittings shall not be counted separately & shall be measured along with GI & Cu pipe.

Except Meter, Regulator, Isolation and appliance valve, Contractor shall procure all other materials (i.e. Pipe, fittings, clamps etc.) as per attached specification for installation and to the entire satisfaction of EIC/consultant.

The contractor shall also ensure that gas supply shall not be provided to the customer in any Concealed Piping

The Copper service pipe installation work includes all work necessary to connect downstream of the meter to the Customers appliances. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with these, he will be required to provide ladders, scaffolding pipe, drills for concrete and other masonry, special drills for timber, Granite, Marble Stones and laminated surfaces inside Customers property, bending tools, sleeves to facilitate the pipe passing through floors and walls, etc. Copper pipes & fittings shall be provided by Contractor.

During installation the Copper pipe is to be cut to proper length with tube Cutter, the burrs removed with a file, cleaning of outside surface of pipe & inside surface of fitting, applying flux to the tube and fitting around the outer/inner ends, inserting the tube in to the fitting, applying heat to the assembled joints using conventional blow torch to melt solder wire. Contractor shall submit the joining procedure of Cu pipe & Fitting to the approval or as per the instructions of EIC.

Contractor has to supply different types/sizes of approved clamps (PE 80/PVC) for fixing Copper pipes suiting to the site conditions Contractor has to take prior approval of EIC for quality of the clamps, solder, flux, lacquer, thinner etc. The approval shall be taken for every fresh lot of clamps from EIC before installation at site.

All copper piping shall be clamped to the walls at intervals not exceeding 500 mm. The solder wire shall be of reputed company of diameter size 3.25mm, Lead free as per BS 29453:1994 (Soft solder alloys) and supplied in coils. The detail specification is attached in tender for reference. Solders for use with copper tube & fittings generally melt within the temperature range 180°C- 250°C. The contractor has to furnish the certificate of confirmation of standards before start of work.

- **Installation of Meter**
  Installation of domestic meters with associated inlet and outlet connections (GI/Brass fittings), on the wall with approved powder coated meter brackets and angles in new & existing gas charged areas ensure a clear gap between meter

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

and wall.

The contractor shall supply approved powder coated meter brackets and angle brackets. A sketch of the brackets is referred from the enclosed drawing for reference. It is required that one sample of each type of bracket is approved before the work is started.

Firmly secure the meters on the wall with good quality Rawal Plugs, screws etc. In case the Rawal Plugs are not holding then wooden blocks or other fixing arrangements like cement etc. to be used for proper grouting.

The Meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage of gas. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

The Contractor shall ensure that GI installations and rubber hoses shall not be exposed to direct heat of Gas burners. The installation should have minimum clearance of about 1 meter from electric point mains& switches. Minimum distance between Appliance Valve & Gas Burners shall be 0.3 Meters. The isolation valve shall be installed after entering the customer premises/kitchen but before the meter installation.

The above activities along with restoration of the area to original shall be carried out to the complete satisfaction of consumer and EIC.

Powder Coating /Painting of GI Pipes

The entire lengths of the pipeline along with fittings are to be painted / powder coated after proper surface preparation as follows:

(a) **Painted (for scratched powder coated pipes and fitting only)**:

- One coat of Primer Application (Appropriate Zinc based primer)
- Two coats of synthetic enamel paint- canary yellow of minimum of 30 microns per coat of reputed make like Asian, Berger, and Nerolac. (No other make shall be used for painting).

All painting materials including primers and thinners brought to site by contractor for application shall be procured directly from manufacturers/dealers as per specifications and shall be accompanied by manufacturer's test certificates. The contractor shall ensure that smooth finish is attained after carrying out painting.

Engineer-in-Charge at his discretion may call for test for paint formulations. Contractor shall arrange to have such tests performed including batch wise test of

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

wet paints for physical and chemical analysis. All costs there shall be borne by the contractor.

The painting work shall be subject to inspection and certification by Engineer-in-Charge at all times. Painting of GI pipe shall be paid with installation of GI pipes.

(b) Powder coating (refer attached Specification for powder coating)

Contractor will be required to install powder coated GI pipes shall submit detailed procedure of powder coating for approval to Consultant prior to supply of Gl pipes. After installation of the entire piping system, final touching shall be done to the satisfaction of EIC.

13.0 TESTING OF GI / COPPER INSTALLATION

A. Gl Installation for Meter Regulator Case (100 mbar inlet to 21 mbar outlet)

i) The installation from Ground Connection MDPE pipe up to Riser Isolation Valve including TF shall be tested at the pressure of 6.0 bar (g). Duration of testing shall be 4 hours in case of charged network and 24 Hours in case being tested with main network.

ii) The testing of GI riser pipe from Riser Isolation Valve to Meter Isolation Valve shall be tested at a pressure of 2.0 bar (g) for a holding period of 2 hours with no pressure drop. All the joints in the installation shall be checked with soap solution. Isolation valve shall be in open condition and open end plugged while carrying out the testing

iii) The GI/Copper installation from Meter Isolation Valve to appliance valve (including Meter &Regulator) shall be tested at a pressure of 100 mbar for a holding period of 15 Minutes with no pressure drop. All the joints in the installation shall be checked with soap solution.

iv) The joints shall be painted only after carrying out testing of the installation. Powder coating to GI pipes shall be carried out in factory/shop, and repair / touching shall be carried out at site

B. GI Installation for Domestic Regulator Case (4 bar inlet to 21 mbar outlet)

i) The installation from Ground Connection MDPE pipe up to Riser Isolation Valve including TF shall be tested at the pressure of 6.0 bar (g). Duration of testing shall be 4 hours in case of charged network and 24 Hours in case being tested with main network.

ii) The testing of GI riser pipe from Riser Isolation Valve to Meter Isolation Valve shall be tested at a pressure of 2.0 bar (g) for a holding period of 2 hours with no pressure drop. All the joints in the installation shall be checked with soap solution. Isolation valve shall be in open condition and open end plugged while carrying out the testing

iii) The GI/Copper installation from Meter Isolation Valve to appliance valve (including Meter &Regulator) shall be tested at a pressure of 100 mbar for a holding period of 15 Minutes with no pressure drop. All the joints in the installation shall be checked with soap solution.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

iv) The joints shall be painted only after carrying out testing of the installation. Powder coating to GI pipes shall be carried out in factory/shop, and repair / touching shall be carried out at site

- The installation from PE/GI transition fitting up to regulator shall be tested at the pressure of 6.0bar (g).
- The testing of Gl riser pipe up to regulator shall be done with the isolation valve in open condition and open end plugged.
- The GI/Copper installation from regulator outlet to appliance valve (except meter) shall be tested at a pressure of 2.0 bar (g) for a holding period of 2 hour with no pressure drop. All the joints in the installation shall be checked with soap solution.
- The meter shall be removed while carrying out the testing at 2 bar (g) and joints of the meter shall be tested on line with soap solution after completion of the work. For testing proper test ends shall be made along with gauges and subsequently approved by EIC. For the installation to be tested by manometer or diaphragm gauge the meter shall not be dismantled/removed and testing shall be carried out at 100 m bar with holding period of 15 min with no pressure drop.
- The contractor shall supply the Calibrated Pressure Gauges/ Manometer/Diaphragm Gauges of suitable range for testing of GI/Copper Installations ranging from 0-4 bars/0-150 m bar/0-250 m bar respectively. The calibration certificate shall be submitted before the start of the execution work.
- The pressure gauges shall be calibrated from time-to-time as desired by EIC but positively once in every six months.
- The details of testing shall be properly recorded in the GI/Copper cards.
- The ends/joints shall be painted only after carrying out testing of the installation. Powder coating to GI pipes shall be carried out in factory/ shop, and repair/ touching shall be carried out at site.

14.0 INSPECTION

The contractor to the entire satisfaction of EIC before proceeding further shall rectify any defect noticed during the various stages of inspection. Irrespective of the inspection, repair and approval at intermediate stages of work, contractor shall be responsible for making good any defects found during final inspection/guarantee period/defect liability period as defined in general condition of contract.

15.0 PURGING & COMMISSIONING

The rate for purging & commissioning shall be included in the GI/Cu installations.

Care shall be taken to ensure that the outlet is so located that vent gas cannot drift into buildings.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The commissioning of the Gl installation should be performed as follows:

- Ensure the method of purging is such that no pockets of air are left in any part of the Customer's piping.
- Ensure that all appliance connections are gas tight, all appliance gas valves are turned off and there are no open ends.
- Where possible, select an appliance with an open burner at which to commence the purge i.e., a hotplate burner.
- Ensure the area is well ventilated, and free from ignition sources.
- Ensure branches that do not have an appliance connected are fitted with a plug or cap.
- Turn on one burner control valve until the presence of gas is detected. A change in the audible tone and smell is a good indication that gas is at the burner. Let the gas flow for a few seconds longer, then turn off and allow sufficient time for any accumulated gas to disperse.
- Tum on one gas control valve again and keep a continuous flame at the burner until the gas is a light and the flame is stable.
- Continue to purge until gas is available at other appliances.

16.0 CONVERSION OF DOMESTIC APPLIANCES

The work in this section includes:

- The changing of nozzles and associated controls in accordance with manufacturer’s instructions for both domestic and imported burners/ovens/grills/hotplate.
- The changing of old appliance connection Reinforced rubber hoses and nozzles and re-greasing taps as necessary.
- ThecontractorshallsupplytheReinforcedrubberhosesatthetimeofconversions.
- The contractor has to supply all types of nozzles/jets required for all types of appliances including imported burners, Grills, Ovens.
- Cleaning and performing minor maintenance of appliances.
- Testing for gas escapes, soundness and performance of appliances.
- Instructing the Customer for safe use of natural gas and for fixing of safety and conversion labels.
- Contractor must attend the complaints regarding appliances, leakage, fire etc. till the total area is handed over to Owner's operation and maintenance.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- All consumables (Nozzles, greases etc.) Are in contractor's scope.
- Changing or repairing of any items damaged during conversion.

It may be noted that the rates as per SOR will apply to conversion of all type of domestic appliances under the rates, the contractor will have to provide both Pin gauges and standard sized nozzles. The payment shall be released only after submission of necessary documents (i.e. JMR Card and its updation in online portal) of the individual house to owner.

NG of the connection is mandatory after RFC of the installation. However in case of reasons not attributable to the contractor, a minimum amount of 10% of connection rates will be withheld in RA bill against all such non covered cases. This amount shall be released once the contractor converts the connection on NG.

If the connection is not converted till closure of purchase order, due to reason not attributable to contractor, the withheld amount will be released after deduction of 5% amount of respective connection rates.

17.0 RESTORATION

Contractor has to restore the area wherever he has carried out drilling, clamping etc. to its original condition to the satisfaction of the consumer and to ensure no passage to the premises and seepage. If the work was carried out in Govt. Flats (CPWD/NDMC/Institutional areas), contractor has to restore the area according to CPWD specifications and obtain a NOC/Clearance certificate from the concerned authorities maintaining the flats, after completion of the work.

The restored slabs or brickwork should match the surrounding surface levels. Joint widths should match the existing conditions and be filled with a dry or wet mix of mortar.

Wherever any items of the consumer is damaged/broken during working, the same will be made good or replace to the total satisfaction of the consumer.

The contractor will be responsible for the maintenance of all restoration carried out, for the duration of the contract guarantee period.

The contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose. Wherever the required standards are not achieved the contractor will be required to replace the defective reinstatement work.

Note that Payment for GI/Copper installation will be released only after satisfactory restoration and clearing of the sites of all surplus materials etc.

Restoration of existing ground features such as grass/turfing, paving, roads, drains, concrete, floral beds, fencing, tiles, marbles, flooring masonry etc. to original condition and to match with adjoining conditions, functionally and aesthetically up to the entire satisfaction of Owner / Owner's representative, failing which, it will be done at the risk

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

and cost of the contractor.

18.0 SUBMISSION OF FINAL RECORDS

Contractor shall submit three sets each of the following documents in hard & soft copy:

- Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given completed.
- The details recorded in RFC cards of every domestic house.
- Details of houses where piping done along with materials used.
- Total material consumption report.
- Material reconciliation with respect to the materials issued.
- Test reports & calibration certificates of gauges etc.
- Any other documents/records required.
- Extra Piping details

19.0 COMPLIANCE TO HEALTH, SAFETY & ENVIRONMENT (HSE) FOR LOW RISE GI:

Scope include use of Fall arrestor, Ascenders / descenders, PPE, Barricades/ Warning Boards (03 No's) connected with warning board & Caution tapes (Refer drawing no. 14588-20-05-32, 26) in areas where piping work is in progress, Use of Safety shoes, Walky talky, Hand gloves, Reflective jackets, Hard hats (helmets), eye and ear safety equipment, Fire extinguishers and as per the detailed scope of work in tender specifications. Contractor shall also prepare and submit duly certified Safety check list signed by TPIA/PMC. In case of non-compliance, penalty shall be applicable as per SCC clause.

This set-up is applicable up to 4th (G+4) floor and full body safety harness with accessories shall be of KARAM or equivalent make.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

20.0 ANNEXURE 1
TOOLS & EQUIPMENT TO BE PROVIDED BY CONTRACTOR FOR GI/COPPER WORK

S. No.	Hand Tools Description	Per Technician	Per Team
1	Pipe Wrench 250 mm	1	4
2	Pipe Wrench 350 mm	1	4
3	Pipe Wrench 450 mm	-	2
4	Adjustable Spanner 50 mm	-	4
5	Adjustable Spanner 150 mm	1	2
6	Adjustable Spanner 250 mm	1	2
7	Set of combination spanner 3/16”- 11/4”AF	1	1
8	Set of combination spanners 5mm-30mm	1	1
9	Large tool boxes	1	2
10	Set flat – headed screw drivers	1	2
11	Set Philips screw drivers	1	2
12	Small hammer	1	2
13	Combination pliers/mole grips	1	2
14	Set of files	1	2
15	Drill bits for 1”pipe	-	2
16	Stocks and dies for NPT threading ½”, ¾”, GI pipe	-	3
17	Blowtorch	-	1
18	Soldering Iron	-	2
19	Copper Pipe Bending Machine	-	2
20	Hand drill 3/8”chuck	-	2
21	Portable electric drill 240v, heavy duty	-	2
22	Spare blades	4	4
23	Batter Powered torches	2	2
24	Measuring Tape 30m	1	2
25	Wire Brush	1	2
26	Portable Pipe vice & tripod	-	2
27	Set steel twist drills 0.5-2.0mm (for appliance conversion)	-	1
28	Set steel twist drill 1mm-10mm	-	2
29	Set masonry drills 1mm-10mm	1	2
30	Graphite based grease	As required	As
31	Lubricating Oil	As required	As
32	Hand Cleaner	As required	As
33	Copper pipe cutter 12mm	-	4
34	GI Pipe Cutters ½” Gas Detection Equipment Power Generator 2.5 KVA Pressure Gauge (0-10 bar) Pressure Gauge (0-4 bar) Diaphragm Gauge (0-400m bar) Manometer (0-150m bar)	- As required As required 2 2 1 1	2 - - 4 8 2 1
35	Automatic Thread Cutting Machine	-	As required
36	GI Pipe Cutter	-	2

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION FOR WELDED RISER & GI/COPPER INSTALLATIONS FOR PNG CONNECTIONS IN HIGN RISE BUILDINGS

VPC-SS-PE-0004

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 INTRODUCTION 3
2.0 DEFINITIONS 3
3.0 SCOPE OF WORK 3
4.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY 7
5.0 ISSUE OF WORK INSTRUCTIONS 10
6.0 PROGRESS OF WORK 11
7.0 WORK SHEETS 11
8.0 PERMISSIONS / APPROVALS 11
9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS 12
10.0 RIGHT-OF-USE SURVEY AND MARKING 12
11.0 PROTECTION OF STRUCTURES AND UTILITIES: 13
12.0 GI AND COPPER ABOVE GROUND SERVICE PIPE 13
13.0 TESTING OF GI/ COPPER INSTALLATION 21
14.0 INSPECTION 21
15.0 PURGING & COMMISSIONING 21
16.0 CONVERSION OF DOMESTIC APPLIANCES 22
17.0 RESTORATION 23
18.0 SUBMISSION OF FINAL RECORDS 23
19.0 COMPLIANCE TO HEALTH, SAFETY & ENVIRONMENT (HSE) HIGH RISE: 24
20.0 ANNEXURE # 1 25

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 INTRODUCTION

The main scope of this contract comprises the installation of above ground pipes from the outlet of 'PE/ GI transition fitting' up to the domestic/commercial Customers 'Appliance/stove/oven valve' as per the Distribution schedule placed in enclosed drawing no. 1007-20-05-41.

The scope includes installation & procurement of above ground GI/Cu pipes and associated fittings for Domestic Customers in High Rise Buildings above fourteen floors.

Except service regulator, domestic meter, meter regulator, Isolation and appliance valve, Contractor shall procure each material (GI fittings, GI pipes, Wrought steel fittings (forged fittings), Cu pipe, Cu/Brass fittings, MS/PVC clamps using SS304/brass screws, super hold nylon raw plug anchor etc.) which is required from the outlet of PE / GI transition fitting up to the Domestic customers "Appliance / stove /oven").

This technical specification defines the basic guidelines to develop an acceptable design and suitable construction methodology for carrying out different activities listed out in the schedule of rates of this tender.

Compliance with these specifications and/or approval of any of the Contractor's documents shall in no case relieve the Contractor of his contractual obligations.

2.0 DEFINITIONS

PMC	VCS QUALITY SERVICES PVT. LTD. (VCSQSPL)
TPIA	Third Party Inspection Agency to be appointed by Client.
EIC	Engineer–In–Charge
CUMULATIVE LENGTH	The riser length (excluding lateral tapping) shall be considered and averaged out among all the households, whereas the lateral piping shall be included only for one particular connection

3.0 SCOPE OF WORK

Generally the following shall constitute the Contractor's scope of work but not limited to:

- Plan and prepare a schedule for execution and work implementation as per QA/QC plans to be issued by Owner / Owner's representative. Contractor has to submit the Construction/Execution procedures before commencement of work to Owner / Owner's representative for approval.

- Contractor shall submit the ITP/procedure/drawing etc. of all the material to be

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

procured by him for approval before procuring the items. If, ITP/procedure/drawing etc are not approved from client/consultant then owner has the authority to refuse /reject the material.

- Receipt of Service Regulators, Domestic Meters, Meter Regulators, Isolation and Appliance Valve as a free issue items from Owner's stores, loading, transportation, unloading at project site. Proper storing, stacking, identification, providing security and insurance during and before installation and commissioning of pipelines. Obtaining the approval for optimum route and permission for work from the concerned authority and EIC.

- Selection of route with the EIC /Consultant and marking the same on walls/floors between 'transition fitting' to 'cooking oven/stove/appliance' with preparation of isometric drawings, making openings and making provisions for fixing clamps. Making temporary but stable platforms/scaffolding/rope ladder etc., required for installation of pipes / fittings at all heights / multi storied flats and locations.

- Contractor shall procure all material except free issue items for installation at the outlet of PE/ GI transition fitting up to the Domestic customers "Appliance /stove / oven for satisfactory completion to the owner/owner's representative.

- Installation of Service Regulators as per attached drawing no.: (Refer Annexure-A-List of Standard Drawings) .
- Supply and Installation of Regulator Box including fabrication as per drawing no. (Refer Annexure-A-List of Standard Drawings)

- Supply and Installation of ¾" to 2" Welded Riser from Transition Fittings (installed by PE Contractor) to last floor : Assessment of material requirement for installation of riser & header at site, Procurement of GI Pipes (heavy duty) as per IS-1239 Part-I duly powder coated & wrought steel fittings(forged fittings) conforming to IS-1239 Part-II from any of the approved vendors of Client.

Scheduling, Planning of material & forwarding inspection call, Getting Dispatch clearance from Client/PMC, Handling, loading, transportation and unloading of these materials at contractor's store / site.

Preparation and approval of sketches, schedules, execution procedures & WPS as per technical specification. All consumables e.g. electrodes, flux etc. for welding pipes and fittings are under contractor's scope. Finalizing optimum route in consent to Client

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

representative from transition fitting to last floor of building including lateral piece with isolation valve as per Drawing No. (Refer Annexure-A-List of Standard Drawings).

Erection, Fabrication, Socket Welding, Testing & Installation of welded GI Pipes & Fittings etc., including NPT threading as per technical specification.

Supply & fixing of MS angle clamps, Ceiling clamps & dowel plugs with screws, grout material, suitable thread sealant i.e. Teflon Tape / lock tight, Supply and fixing of studs & bolts of various sizes ranging from ½" to 2" and 3/4" to 2", Jointing of transition fittings to above ground GI pipes, purging, testing and commissioning of the complete installation.

Welded riser shall be installed after successful testing at ground level. Riser shall be then pulled with pulley for vertical installation. Pneumatic testing shall be carried out for entire riser length after installation of riser as per technical specification. All the safety equipment's, tools and tackles required for satisfactory execution of welding/installation work are under contractor's scope.

Any other material & activities not mentioned/covered above, but otherwise required for satisfactory completion/safety of work as defined in tender has to be supplied / done by contractor within specified schedule at no extra cost to owner.

Supply and Installation of Powder Coated GI pipes of ½" to 2" dia. from welded riser tapping TEE (Isolation Valve) to customer's kitchen appliances including NPT threading of GI pipes, supply of proper seal outs for threads to join fittings such as elbows, tees, connectors, regulators, meters, appliance & isolation valves etc., as per laid procedures and specification including clamping and sealing etc. The Powder Coated GI pipe shall be finally touched up (painted) where the powder coating vanished and fitting joints after the testing of the GI installation.

- Supply & Installation of Copper pipes including supply of solder wire and flux to join fittings such as elbows, tees, connectors, meters, valves etc., complete as per procedures and specifications including clamping and sealing etc.

- Supply of clamps for fixing pipes, Meters wherever required, painting of pipes and fittings. Providing consumables grout material, repair/restoration of walls/floors changes for the pipes including the materials required for conversions and tools and tackles etc. shall be completed as per specification.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Cleaning, flushing, pneumatic testing and commissioning to the GI/Cu pipe & fittings, meters, valves etc as per specification and hand over the same to Owner/Customer to the entire satisfaction of EIC/ CONSULTANT.

- Conversion of all types of LPG kitchen appliances to NG based appliances. & to take Sign on RFC card & Joint Meter Records (JMRs) of customer.

- To demonstrate the Customer regarding use, safety and maintenance related aspects of NG based appliances and installations.

- Dismantling of scaffolding/temporary structures and cleaning of site & restore the site as per its original condition.

- Restoration of walls, flooring and other damages while executing the above ground installation.

- Preparation and submission of above ground installation card for each house indicating the laid GI/Cu pipe including fittings. Reason for not providing the connection to the customers and deviation statements/ consent form on completion/ commissioning of work in a particular society/ block.

- Any other activities not mentioned/covered explicitly above, but otherwise required for satisfactory completion/operation/safety/statutory/maintenance of the works shall also be covered under the Scope of work and has to be completed by the Contractor with in specified schedule at no extra cost to Owner.

- Following activities are also in Contractor's Scope:
  a. Receive Customer's request and complaints logged on Client's portal / Offline.
  b. Carry out joint technical feasibility survey for requests received.
  c. Attend and resolve customer complaints.
  d. Maintain and update the request and complaint status in Client's portal.
  e. Maintain new connection tracking on Client's portal.
- Providing adequate manpower, minimum 2 nos. such as data entry operator, customer care executive etc. for data logging like new connection request & GI tracking, attending complaints, day to day interaction with customers and residents so that work can be executed within defined time period (TAT) Turn Around Time.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Providing adequate manpower for carrying out laying for PNG installation for emergency cases as and when required. The TAT period for carrying out such emergency cases are defined in tender document.

4.0 MATERIAL, MANPOWER, EQUIPMENT AND MACHINERY

- **Material to be supplied as a free issue material**

Service Regulators, Domestic Meters, Meter Regulators, Isolation and Appliance valves shall be supplied as a free issue material to the contractor. The contractor shall not use any other material from any other source of supply other than owner's supplied material without any written approval from EIC.

- **Material / Equipment & machinery to be supplied by contractor**

Contractor shall procure / purchase GI Pipe & fittings, Wrought Steel Fittings (Forged Fittings), Brass fittings, Cu pipe & fittings and Reinforced rubber hose with other material which is required for satisfactory completion / safety / statutory of the works as per tender at no extra cost to Owner. Client shall be marked on the material supplied by contractor. The contractor shall take approval from owner / owner representative for marking on the material to be procured by contractor before placement of order.

The Contractor shall provide labour, tools (such as Hammer Drill, Piston Drill, Pipe Cutters, Dies for threading, Pipe wrenches, spanners, conversion kits, solder torch, copper tube Cutters, tube benders, lacquering, thinner etc.) in specified numbers, all types of clamps, Plant and equipment necessary for the proper execution of the work. This will include but not limited to list of specialized tools and tackles indicated in Annexure # 1.

Special tools shall be required at site for carrying out drilling work in walls other than Brick or RCC (Ex. Granite, Marble, Wooden, Glass Cutting etc.)

The contractor has to ensure the availability of DG sets for continuous power supply. In case the power supply is availed at the site from societies, individual residents, contractor shall settle the claims raised by the electricity providers without any cost implication to OWNER. In case contractor doesn't settle the claims for using the electricity from societies/individual residents, on demand by the providers, OWNER will

settle the claims and the same will be deducted from the contractor's bills. The progress of work shall not hamper due to non-availability of power supply.
The contractor has to submit the valid calibration certificate for Pressure gauges.

Contractor shall submit the manufacturer test certificate / lab test certificate for all items procured by him for approval before commencing the execution.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

No hiring of equipments, tools and tackles by the contractors is allowed at the site. In case, any contractor is found not in possession of enlisted required tools and tackles, penalty will be levied as per SCC which shall be deducted from the running bill.

- **Plant and Equipment**

  All vehicular type machinery shall be in good working condition and shall not cause spillage of oil or grease. To avoid damage to paved surfaces, the contractor will provide pads of timber or thick rubber under the hydraulic feet or outriggers of machinery.

- **Sealant, Grout**

  The contractor shall be responsible to arrange the supply of any consumable sealant or ready mix grout material required for restoration of holes. The sealant/grout supplied by the contractor shall be compatible with the area to be restored / rectified. No separate payment for the supply of sealant and grout shall be made to the contractor.

- **Clamps, Rawal Plugs, Screws and Nozzles etc.**

  The Clamps, Brackets for meter, Nylon Rawal Plugs, SS/Brass Screws, Nozzles, etc. shall be approved lot wise by EIC prior to installation. Re-drilling of existing appliance (burners) nozzles is strictly not permitted. The quality of materials procured will be approved by Owner/Owner's representative or as directed by EIC.

  The indicative sketch of the Brackets for Meter, Regulator Boxes and GI/Copper Pipe Clamps is enclosed with the tender. No separate payment for the supply of Meter Brackets and GI/Copper clamps shall be made to the contractor.

- **Consumables Items**

  - Consumables such as Electrodes, Teflon Tapes, solder wire, flux, lacquer; thinner shall be supplied by the contractor and are included in installation rates.
  - These consumables shall be of reputed make companies and required grades/ class.

- **Other Materials**

  The contractor shall supply the following items wherever required:

  - All materials required for work, NPT threading, copper pipe jointing, testing etc.
  - All signs, barricades, lights and protective equipment.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- All material required for working at height (i.e. scaffolding, Ladder, Safety Belts).
- Self-Locking Safety Harness Belts PETZL make as mentioned in safety procedure are mandatory.). Contractor shall provide but not limited to ascender, descended and pulley system essentially to carry out work at height.
- Motorized suspended platform with skilled operator shall be preferred for installation above 25th storey building.
- Special consumable such as grease for maintenance of domestic appliances, all paints for painting of GI Pipes, Regulator Boxes, Consumables such as Teflon Tapes, Solder-wire, Flux, Lacquer, Thinner, Petrol, Diesel, Fuels and Oils required are to be supplied by the contractor and are included within the rates.
- All minor items not expressly mentioned in the contract but which are necessary for the satisfactory completion and performance of the work under this contract.

- **Acquisition, Receipt and Storage of Materials**

The Contractor shall collect Service Regulators, Domestic Meter, Meter Regulators, Isolation and Appliance Valve estimated for maximum one month from Owner's designated stores in between the hours to be advised by the EIC.

The Contractor shall carry out assessment of material required for GI/Copper installation in allocated area. After approval from Owner, contractor shall place order for purchasing of GI Pipes & fittings, Wrought Steel Fittings (Forged Fittings), Copper pipes & fittings, Brass Fittings and Reinforced Rubber hose (Technical specifications attached in the tender document), MS/PVC clamps using SS304/brass screws, super hold nylon rawl plug anchor to any of the approved vendors as per the list attached in the tender document. The contractor shall also ensure that the ITP for these materials shall be approved before the start of production activity. Once ITP is approved, contractor shall forward inspection call to the Owner depending upon the material requirement at the site. The inspection of these materials shall be carried out by Owner appointed third party inspection agency. It is contractor's responsibility to submit documents, arranging dispatch clearance, handling, loading, transportation and unloading of these materials at their own respective stores. In case of any defective material found shall be returned to Client store within one month of issue.

Any other activity not mentioned / covered, explicitly, but otherwise required for satisfactory completion / operation / safety / statutory / maintenance of works shall also be covered under scope of work and has to be completed by contractor within

specified schedule at no extra cost to Owner. The Contractor shall carry free issue material in such a manner as to preclude damage during transportation and handling.

The Contractor shall physically examine all free issue materials at the time of acceptance of the material in Client' store.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Any damage not so recorded will be deemed not to have existed at the time of acceptance of material in store by the Contractor and the cost of repair or replacement or rectification shall be borne by the Contractor.
All materials shall be stored in contractor's stores near site in such a manner so as to prevent any damage to the materials from scratching, gouging, indentation, excessive heat or by contact with any sharp objects or chemicals.

The Contractor shall be required to submit material reconciliation statement every month/ before issuing any free issue material from Clients tore duly certified by Client representative.

The Contractor shall maintain stock register at their respective stores stating issue and availability of free issue material at a given day. Further, it is mandatory that the contractor is required to undertake and submit inventory details of free issue and purchased materials on monthly basis to Owner/ Owner's representative as per the approved format of the owner. The inventory details shall be in correlation with the Daily progress chart and material reconciliation sheet.

Material reconciliation indicating issue of material, consumptions and defective material shall be submitted on monthly basis.

5.0 ISSUE OF WORK INSTRUCTIONS

- The contractor will be required to carry out GI installation as per instructions of EIC.

- All skilled personnel like welders, jointers, conversion technicians will be approved and certified by Owner/Owner's Representative. The technicians who will carry out welding of Risers, joining of copper material and conversions will undergo a test by Owner. Those who clear the test will be issued identity cards duly signed by Owner/Owner's representative. Approved technicians shall be only authorized to take up respective jobs. In case it is found that contractor personnel other than authorized are carrying out these works, applicable penalty will be levied to the contractor as per contract.

- The rates to be quoted by contractor shall be inclusive of all preparatory/bye works, platform materials, labour , supervision, tools, taxes, duties, levies, salaries, wages, overheads, profits, escalations, fluctuations in exchange rates and no change in the rates shall be admissible during tenancy of the contract.

- The schedule of items of GI/Cu installations have been described in brief and shall be

  held to be completed in all respect including safety requirements as per Technical specification of HSE, tests, inspection, QA/QC works, enabling and sundry works. The payment shall be made against completed and measured works only. No extra works

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

whatsoever shall be considered in execution of these items.

6.0 PROGRESS OF WORK

The contractor shall proceed with the work under the contract with due expedition and without delay.

Contractor shall assess the material requirement of the allotted area and submit the schedule plan for execution & purchasing before start of actual work.

The EIC may direct in what order and at what time the various stages or parts of the work under the contract shall be performed. Daily and Weekly progress reports shall be submitted in the formats approved by Owner, indicating broadly the laying, testing, RFC, conversions and extra piping.

The penalty and incentives will be calculated and applied on basis of monthly target as per SCC of Tender.

7.0 WORK SHEETS

- The quantities of GI/Cu pipe and other details will be checked by Owner's site engineer and the same shall be incorporated in RFC cards, signed & dated as certified, on site. The cards will then be approved by the Owner/Owner's Representative.

- Measurement sheets shall be prepared based on the RFC cards and checked and certified by the site engineers for billing purpose.

- If measurement sheets submitted are illegible, incomplete or incorrectly booked, it will be returned to the contractor.

8.0 PERMISSIONS / APPROVALS

- Contractor shall be responsible for obtaining permissions from society management, RWA, individual residents and any other concerned authority, if required, for completion of the work. Contractor must take the prior appointment from the residents for carrying out the work.

- The Contractor shall work in close consultation/ co-ordination with the Owner/ Owner's Representative.

- The Contractor shall not sign/execute any agreement and/or undertaking on any such

  documents which amounts to be undertaken by Owner. The same shall only be signed and executed by Owner; however, the prospective bidders shall also liaison and

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

coordinate for the same.

- The necessary coordination, liaison and arrangements for inspection and approval shall be the contractor's responsibility. Inspection and acceptance of the work by authority shall not relieve the contractor from any of these responsibilities under this contract. The contractor shall plan the execution of work in such a manner so that all the registered customers are attended in phased manner. However, it is the contractor's responsibility to fix a firm appointment with the consumer for carrying out the work.

A log book/job card for such appointments with Consumer/any other agencies shall be maintained and the schedule/appointment once taken shall be adhered to by the contractor. Owner/Owner's Representative shall review the records every week. The contractor shall submit the detailed list of RFC/Conversions and balance work on Registrations at least once a week as per approved format.

- The contractor is also required to obtain a "Labour License" and BOCW registration from the Assistant Labour Commissioner of respective Administration/Central Govt.

- It will be the contractor's responsibility to familiarise himself and comply with, any other local rules, regulations or statutory requirements applicable to the work.

- The contractor has to take responsibility of the actions of supervisors, plumbers and helpers provided by him.

9.0 REFERENCE SPECIFICATION, CODES AND STANDARDS

The contractor shall carry out the work in accordance with this specification, Owner's Engineering Standards: ASME B31.8 – Gas Transmission and Distribution Piping Systems; Oil Indian Safety Directorate Norms (OISD), the American Gas Association Document – Purging Principles and Practice and PNGRB Guidelines.

If the contractor find any discrepancy, ambiguity or conflict in between any of the Standards and the contract documents, then this should be promptly referred to the Engineer-in-Charge (EIC) for his decision, which shall be considered binding on the contractor.

10.0 RIGHT-OF-USE SURVEY AND MARKING

The route of the pipeline to be installed shall be decided with consent of the consumer and Owner/Owner's Representative. Contractor must ensure that the persons/workers/supervisors/ working at site shall have proper identity cards prior to entering the premises of the consumer.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

No temporary or permanent deposit of any kind of material resulting from the work shall be permitted in the approach or any other position, which might hinder the passage and / or natural water drainage, or any area where there is objection from consumer.

The contractor shall obtain necessary permissions from land Owners and tenants and shall be responsible for all damages caused by the construction and use of such approaches, pavements, gardens, rooms, walls, roof etc., at no extra cost to Owner.

Owner/Owner's Representative and the contractor will conduct a joint survey at each premises or housing colony to be supplied with gas. The survey record will note Customer details, the potential gas supply points and proposed meter positions and estimates of material quantities. The Contractor will make a sketch of the agreed pipe routes.

The Contractor will be responsible for contacting the Customer and making the necessary arrangements for access and appointments to carry out the work. Owner will not be responsible for any time lost due to failed appointments or disputes with Customer.

The Contractor shall confine its operations within limits of the Right in use. The contractor shall restore any damage to property.

The Contractor shall also carry out all necessary preparatory work if needed to permit the passage of men and equipment. Lights, Curbs, signs shall be provided wherever and/or required by the Owner necessary to protect the public.

11.0 PROTECTION OF STRUCTURES AND UTILITIES:

The contractor shall at his own cost, support and protect all buildings, walls, fences or other structures and all utilities and property which may, unless so protected, be damaged as a result of the execution of the works. He shall also comply with the requirements in the specification relating to protective measures applicable to particular operations or kind of work.
During painting, contractor must take care of the consumer premises while carrying out the job such as spillage on floor, walls, ceilings, such shades etc. If the same does occur, the contractor has to immediately make things to original.

12.0 GI AND COPPER ABOVE GROUND SERVICE PIPE

- **Definitions:**

  a. High Rise Buildings – A building having fourteen or more storey's above ground level. (i.e. of G + 14 orientation)

  b. Riser - A riser is the vertical section of a service pipe laid up a building which supplies a number of laterals.

  c. Lateral-A lateral is a horizontal off-take from a riser, which supplies a single

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

customer/dwelling.

d. Service Regulator (SR) – Service Regulator is a regulator installed on a gas service line to control the pressure from 4 bar to100 mbar that, in an emergency automatically assumes control of the pressure downstream of the station, in case that pressure exceeds a set maximum.

e. Meter Regulator (MR) – Meter regulator is a pressure regulator installed in series with another pressure regulator which reduces the pressure from 100 mbar to 21mbar.

f. Riser Isolation Valve (RIV) - Riser Isolation valve is fitted at the bottom of the riser to isolate the riser from the underground gas supply network.

g. Lateral Isolation Valve (LIV) – Lateral Isolation Valve is fitted on horizontal riser (lateral) after TEE to facilitate online Tapping's and other maintenance works.

h. Meter Control Valve (MCV) - A Meter Control Valve is fitted immediately upstream of the meter to enable the internal pipe work inside the property to be isolated from the upstream gas supply network. It must be fitted in a manner that the consumer can easily operate the valve handle.

- **Specification For Welding**

The requirements stated herein shall be followed for the fabrication of fillet type of welded joints of GI (IS 1239 heavy class) piping systems connected with pipe line and related facilities.
The welded pipe joints shall include the followings:

a. All line pipe joints of the Circumferential fillet welded type
b. Attachments of fitting and other supports pipes

Welding Consumables:

The Welding electrodes shall confirm to the class AWS E 6013. All electrodes shall be purchased in sealed containers stored properly to prevent deterioration. The electrodes shall be handled with care to avoid damage.

Welding Process:

Welding of GI material under this specification shall be carried out using Shielded Metal Arc Welding Process (SMAW).

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Welding

Root pass and final pass shall be done with 2.5 mm dia. Electrode. Welding to be carried out in line with PQR / WPS approved by Client/PMC .Welding to be done by qualified welders only.

- **Planning and Design of GI Welded Riser**

a. Risers and laterals must be designed to run through the optimal possible route approved by Client representatives, taking into consideration potential meter positions, design regulations and access for future maintenance.

b. The riser and associated laterals must be constructed in the most economical manner using the minimum no. of fittings, minimum pipe and considering future maintenance requirements.

c. For buildings above 14 floors - for ease in construction and maintenance the preferred method will be welded pipe –work laid in a purpose designed and built ventilated utilities shaft.

d. Risers and laterals must be laid a minimum of 300 mm from any electrical equipment or installations. On occasions where the pipe has to cross over a cable, this has to be done at right angles and a minimum gap of 25 mm must be maintained between the pipe and cable. Consideration may be given to wrapping the pipe with electrical insulation tape for protection against electrical short circuiting.

e. Provision for access to the riser for future maintenance must be made at the design stage & involved undertaking a risk assessment for undertaking future maintenance work.

f. The GI service pipe installation work includes all work necessary to connect from the PE/GI transition fitting on the down-stream of the PE service, to the Customers appliance, including the installation of service regulator, meter regulator, valves, fittings, meters, clamps etc. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with ladders, scaffolding pipe, dies, tripods, vices, fittings and Teflon tape, drills for concrete and other masonry, drills for timber, Granite, Marble Stones and laminated surfaces inside Customers property, bending tools, clamps, sleeves to facilitate the pipe passing through floors and walls, paint for marking etc.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

g. All Welded GI risers at the outside of buildings shall be fully supported to carry the weight of piping. A flanged foot or similar device, capable of supporting the total weight of the riser, shall support risers. The riser shall be installed in a vertical line from its point of support to its highest point with a minimum of changes in direction. The threading of GI pipe shall be NPT and conforming to ANSI B1 20.1

h. Contractor has to supply different types/sizes of approved powder coated clamps (Mild Steel) for fixing GI pipes suiting to the site conditions. The contractor shall get approval from Owner/Owner's Representative for every fresh lot of the clamps, brackets, regulator boxes and other consumables, prior to start of installation.

i. All riser and lateral pipe shall be clamped to the building at intervals not exceeding 1.5 mtrs. Maximum distance between clamps shall be 1.0 - 1.5 m when pipe goes to the straight, if any tee or fittings lies in between the pipe then clamp shall be placed 150 mm far away from center line of fittings at every sides. However, the same may be changed as per site conditions/as directed by EIC. Minimum gap between pipe & wall shall be 25 mm. The joints/ fittings of the GI installation shall be painted only after carrying out testing of the installation.

j. Where pipe passes through the balcony and the surface is slightly elevated around the service pipe or its surrounding, sleeves to be provided to prevent the accumulation of water at that point. Where a short piece of sleeve is used around the gas pipe, the sleeve should be embedded in the concrete with a mix of mortar and the void between the pipe and sleeve filled with a suitable sealant. The sealant should be beveled such as to prevent an accumulation of water. Supply of clamps for all sizes of the GI pipes is in contractor's scope. Contractor has to take prior approval for design/types of clamps, paintings etc.

k. Pipe shall preferably be entered into building above ground and remain in a ventilated location. The location for entry shall be such that it can be easily routed to the usage points by the shortest practicable route.

l. For welded riser, riser length (excluding lateral tapping) shall be considered and averaged out among all the households, whereas the lateral piping shall be included only for one particular connection. The payment shall be done through running meter rates as per SOR.

m. The rates of GI Pipe and Copper pipe including installation of valves and fitting etc. from Lateral isolation valve till home appliances are payable as per SOR Item No. 23a & 23b.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

n. Installation of Meter and Meter Regulators with associated inlet and outlet connections/fittings shall be connected with meter and the payment shall be done as per SOR. The rate also includes testing of joints till commissioning.

o. Installation of Service Regulator with support and supply and installation of regulator boxes having locking arrangement with base frame, including fabrication as per attached drawing no. (Refer Annexure-A-List of Standard Drawings) and the payment shall be done as per SOR.

p. Foundation works for service regulators includes providing and laying of Plain Cement Concrete (PCC– 1:2:4) as per attached drawing no. (Refer Annexure-A-List of Standard Drawings) and the payment shall be done as per SOR Item No. 26.

q. Except Service Regulator, Meter, Meter Regulator, Isolation and appliance valve, Contractor shall procure all other materials (i.e. Pipe, fittings, clamps, SS screws etc.) as per attached specification for installation and to the entire satisfaction of Owner/ Owner's Representative.

r. The contractor shall also ensure that gas supply shall not be provided to the customer in any Concealed Piping.

s. The Copper service pipe installation work includes all work necessary to connect downstream of the meter (inside the kitchen) to the Customers appliances. The contractor shall be required to provide all equipment, tools and materials necessary to execute the work in an efficient and effective manner. Along with these, he will be required to provide ladders, scaffolding pipe, drills for concrete and other masonry, special drills for timber, Granite, Marble Stones and laminated surfaces, provisions for cutting glass of window inside Customers property, bending tools, sleeves to facilitate the pipe passing through floors and walls, etc. Copper pipes & fittings shall be provided by Contractor.

t. During installation the Copper pipe is to be cut to proper length with tube Cutter, the burrs removed with a file, cleaning of outside surface of pipe & inside surface of fitting, applying flux to the tube and fitting around the outer/inner ends, inserting the tube in to the fitting, applying heat to the assembled joints using conventional blow torch to melt solder wire. Contractor shall submit the joining procedure of Cu pipe & Fitting for approval or as per the instructions of EIC.

u. Contractor has to supply different types/sizes of approved clamps (PE 80/PVC) for fixing Copper pipes suiting to the site conditions. Contractor has to take prior approval of EIC for quality of the clamps, solder, flux, lacquer, thinner etc. The

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

approval shall be taken for every fresh lot of clamps from EIC before installation at site.

v. All copper piping shall be clamped to the walls at intervals not exceeding 500 mm. The solder wire shall be of reputed company of diameter size 3.25mm, Lead free as per BS 29453:1994 (Soft solder alloys) and supplied in coils. The detail

specification is attached in tender for reference. Solders for use with copper tube & fittings generally melt within the temperature range 180°C - 250°C. The contractor has to furnish the certificate of confirmation of standards before start of work.

- **Riser and Laterals Fabrication, Installation and Testing:-**

Heavy class Galvanized Iron (GI) pipes, conforming to IS 1239- Part 1 duly Polyester powder Coated with 70 microns thickness and Wrought Steel fittings(Forged fittings) conforming to IS-1239 Part 2 shall be used for welded riser.

Powder and Galvanized (Zinc) coating shall be removed by light duty grinder or by any other suitable tool at both ends of riser pipe at about 25mm in length where welding is to be performed.

Pipe and required fittings shall be first coupled with threaded (NPT) joints. The threaded joints to be made using male tapered thread and female parallel thread fittings. Teflon/ PTFE Tape or any other joining compound shall not be used in threaded joints for welded riser. Alternatively plain ended pipes and fitting can also be used for welding in welded riser.

The entire riser assembly shall be fabricated with socket welds both for threaded riser assembly and plain ended pipes. Threaded joints are permitted after first isolation valve on laterals where riser is not approachable from balcony and in case if riser is in approach of balcony within 300 mm gap from balcony laterals may be threaded with tee of welded riser on account of workability and future maintenance considerations.

The Welding electrodes shall confirm to the class AWS E 6013 of reputed make such as Advani, Lincoln, ESAB or equivalent.

Welding to be carried out in line with PQR / WPS approved by Client/PMC. Welding to be done by qualified welders approved by Client / PMC only.

A riser must not be constructed so that the laterals face directly into the wall from the riser. All laterals must extend a minimum of 400 mm from the riser.

Ventilation is provided to prevent gas leaks from causing the atmosphere to become unsafe. Ventilation shall be natural. It is not permitted to use mechanical ventilation to achieve the required ventilation levels. Special Safety Harness and Protective

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

equipment's of PETZL make are mandatory for riser installation. Details would be as per approved Safety Job Procedure. Ensure that all equipment's and safety devices used are inspected, certified by competent authority valid & suitable for use. Plumber deployed for riser installation for high rise buildings shall be certified and prequalified with medical tests as per Safety Job Procedure.

- **Meter & Meter Regulator Positions**

  Meters will normally be located inside the property at approachable location. The kitchen / utility balcony is the preferred place to install the meter – thereby minimizing the length of the outlet pipe work.

  The Meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage of gas. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

  Meter Regulators will be installed as per enclosed drawing no.: (Refer Annexure-A-List of Standard Drawings) .
  Only pretested riser shall be erected using pulley. Pretesting shall be done with compressed air @ 2 bar (g) for minimum duration of 30 minutes.

  Risers and laterals up to Isolation Valves shall be Leak tested with compressed air @ 2 bar (g) for minimum 2 hrs after vertical installation.

  Once testing is satisfactorily completed, uncoated portion (weldment) of risers and laterals shall be painted as per painting procedure.

  For the laterals beyond eighth floor, shall be used in compliance to the material specification of SS316, fittings shall be used with brass connections conforming to IS 319, in order to account for the temperature induced stresses.

- **Installation of Meter**

  Installation of domestic meters with associated inlet and outlet connections (GI/Brass fittings), on the wall with approved powder coated meter brackets and angles in new & existing gas charged areas.

  The contractor shall supply approved powder coated meter brackets and angle brackets. A sketch of the brackets is referred from the enclosed drawing for reference. It is required that one sample of each type of bracket is approved before the work is started.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Firmly secure the meters on the wall with good quality super hold nylon anchor Rawl Plugs, SS 304/brass screws etc. In case the Rawl Plugs are not holding then wooden blocks or other fixing arrangements like cement etc. to be used for proper grouting.

The Meter installation will be preferred in open/ventilated space so as to prevent Gas accumulation and easy dispensation of gas to atmosphere in case of any smell/leakage of gas. The Meter installations will not be provided in any fixed enclosures, cabinets (below or above the slab) or confined space in the customer premises.

The contractor shall ensure that GI installations and rubber hoses shall not be exposed to direct heat of Gas burners & chimney vents. The installation should have minimum clearance of about 1 meter from electric point mains & switches. Minimum distance between Appliance Valve & Gas Burners shall be 0.3 Meters. The isolation valves shall be installed after entering the customer premises/kitchen but before the meter installation.

The above activities along with restoration of the area to original shall be carried out to the complete satisfaction of consumer and EIC.

- **Laterals**

The lateral extending from the riser at right- angles must extend a minimum of 400 mm from the riser before passing through a wall.

- **Ventilation**

Ventilation is provided to prevent gas leaks from causing the atmosphere to become unsafe. Ventilation shall be natural. It is not permitted to use mechanical ventilation to achieve the required ventilation levels.

- **Pipes Passing Through Walls**

Where risers or laterals pass through walls the following requirements must be observed:

a. The pipe must be sleeved in a continuous non corrosive sleeve. Joints or any other part of a joint shall not be enclosed within the sleeve.

b. Pre-sleeved wall pieces are the preferred method for passing through walls and floors.

- **Painting of GI Pipes**

Contractor shall install powder coated GI pipes in consultation with EIC. Contractor

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

shall submit detailed procedure of powder coating for approval to PMC prior to supply of GI pipes.

.

13.0 TESTING OF GI/ COPPER INSTALLATION

- Only pretested riser shall be erected using pulley arrangement. Pretesting shall be done with compressed air at 2 bar (g) for minimum duration of 30minutes.
- Risers and laterals shall be Leak tested with compressed air at 2bar (g) for minimum 2hrs after vertical installation.

- Once testing is satisfactorily completed, uncoated portion (welded) of risers and laterals shall be painted as per painting procedure.
- The GI/Copper installation from lateral valve to appliance valve shall be tested at a pressure of 200 mbar (g) for a holding period of 30 minutes with no pressure drop. All the joints in the installation shall be checked with soap solution.
- The contractor shall supply the Calibrated Pressure Gauges / Manometer / Diaphragm Gauges of suitable range for testing of GI/Copper Installations ranging from 0-4bars / 0-500mbar respectively. The calibration certificate shall be submitted before the start of the execution work.
- The pressure gauges shall be calibrated from time-to-time as desired by EIC but positively once in every six months.
- The details of testing shall be properly recorded in the GI/Copper cards.

14.0 INSPECTION

The contractor to the entire satisfaction of EIC before proceeding further shall rectify any defect noticed during the various stages of inspection. Irrespective of the inspection, repair and approval at intermediate stages of work, contractor shall be responsible for making good any defects found during final inspection/guarantee period/defect liability period as defined in general condition of contract.

15.0 PURGING & COMMISSIONING

The rate for purging & commissioning shall be included in the GI/Cu installations.

Care shall be taken to ensure that the outlet is so located that vent gas cannot drift into buildings. The commissioning of the GI installation should be performed as follows:

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Ensure the method of purging is such that no pockets of air are left in any part of the Customer's piping.
- Ensure that all appliance connections are gas tight, all appliance gas valves are turned off and there are no open ends.
- Where possible, select an appliance with an open burner at which to commence the purge i.e., a hotplate burner.
- Ensure the area is well ventilated and free from ignition sources.
- Ensure branches that do not have an appliance connected are fitted with a plug or cap.

- Turn on one burner control valve until the presence of gas is detected. A change in the audible tone and smell is a good indication that gas is at the burner. Let the gas flow for a few seconds longer, then turn off and allow sufficient time for any accumulated gas to disperse.
- Turn on one gas control valve again and keep a continuous flame at the burner until the gas is a light and the flame is stable.
- Continue to purge until gas is available at other appliances.

16.0 CONVERSION OF DOMESTIC APPLIANCES

The work in this section includes:

- The changing of nozzles and associated controls in accordance with manufactures instructions for both domestic and imported burners/ovens/grills/hotplate.
- The changing and handing over old appliance connection Reinforced rubber hoses and nozzles to Customers and re-greasing taps as necessary.
- The contractor shall supply the Reinforced rubber hoses at the time of conversions.
- The contractor has to supply all types of nozzles/jets required for all types of appliances including imported burners, Grills, Ovens.
- Cleaning and performing minor maintenance of appliances.
- Testing for gas escapes, soundness and performance of appliances.
- Instructing the Customer for safe use of natural gas and for fixing of safety and conversion labels.
- Contractor must attend the complaints regarding appliances, leakage, fire etc. till the

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

total area is handed over to Owner's operation and maintenance.

- All consumables (Nozzles, greases etc.) are in contractor's scope.
- Changing or repairing of any items damaged during conversion are in Contractor's scope.
- In case at the time of RFC if the customer is not getting the NG conversion done then the contractor shall obtain written consent about the same from customer and submit the same to Client.

17.0 RESTORATION

Contractor has to restore the area wherever he has carried out drilling, clamping etc. to its original condition to the satisfaction of the consumer and to ensure no passage to the

premises and seepage. If the work was carried out in Govt. Flats (CPWD/ Municipal Corporation of State/ Institutional areas), contractor has to restore the area according to CPWD specifications and obtain a NOC/ Clearance certificate from the concerned authorities/RWA maintaining the flats, after completion of the work.

The restored slabs or brickwork should match the surrounding surface levels. Joint widths should match the existing conditions and be filled with a dry or wet mix of mortar.

Wherever any items of the consumer is damaged/ broken during working, the same will be made good or replace to the total satisfaction of the consumer.

The contractor will be responsible for the maintenance of all restoration carried out, for the duration of the contract guarantee period.

The contractor is to ensure the restoration work is properly supervised, and that the material used is suitable for the purpose. Wherever the required standards are not achieved the contractor will be required to replace the defective reinstatement work.

Note that Payment for GI/Copper installation will be released only after satisfactory restoration and clearing of the sites of all surplus materials etc.

18.0 SUBMISSION OF FINAL RECORDS

Contractor shall submit three sets each of the following documents in hard & soft copy:

- Total list of houses in the area allotted to him giving details of connections provided & reasons where connection could not be given /completed.
- The details recorded in RFC cards of every domestic house.
- Details of houses where piping done along with materials used.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Total material consumption report.
- Material reconciliation with respect to the materials issued.
- Test reports & calibration certificates of gauges etc.
- Any other documents/records required.
- Extra Piping details

19.0 Compliance to Health, Safety & Environment (HSE) High Rise:

Scope includes use of fall arrestor, Ascenders / descended, PPE, Barricades/ Warning Boards (03 No's) connected with warning board/Caution tapes (Refer Annexure-A-List of Standard Drawings) in areas where piping work is in progress, Use of Safety shoes, Wacky talky, Hand gloves, Reflective jackets, Hard hats (helmets), eye and ear safety equipment, Fire extinguishers and as per the detailed scope of work in tender specifications. Contractor shall also prepare and submit duly certified Safety

check list signed by TPIA/PMC. In case of non-compliance, penalty shall be applicable as per SCC clause.

This set-up is applicable for more than 5^{th} (G+5) and above including high rise. Above 4th floor full body safety harness & accessories of PETZL make is compulsory.

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

20.0 ANNEXURE # 1

TOOLS & EQUIPMENT TO BE PROVIDED BY CONTRACTOR FOR GI/COPPER WORK

S.N0.	HAND TOOLS DESCRIPTION	PER TECHNICIAN	PER TEAM
1	Pipe wrench 250 mm	1	4
2	Pipe wrench 350 mm	1	4
3	Pipe wrench 450 mm	-	2
4	Adjustable spanner 50 mm	-	4
5	Adjustable spanner 150 mm	1	2
6	Adjustable spanner 250 mm	1	2
7	Set of combination spanner 3/16”-11/4” AF	1	1
8	Set of combination spanners 5mm - 30mm	1	1
9	Large tool boxes	1	2
10	Set flat-headed screw drivers	1	2
11	Set Philips screw drivers	1	2
12	Small hammer	1	2
13	Combination pliers/mole grips	1	2
14	Set of files	1	2
15	Drill bits for 1” pipe	-	2
16	Stocks and dies for NPT threading ½”, ¾”, GI Pipe	-	3
17	Blowtorch	-	1
18	Soldering iron	-	2
19	Copper Pipe Bending Machine	-	2
20	Hand drill 3/8” chuck	-	2
21	Portable electric drill 240V, heavy duty	-	2
22	Spare blades	4	4
23	Battery powered torches	2	2
24	Measuring tape 30 m	1	2
25	Wire brush	1	2
26	Portable pipe vice & tripod	-	2
27	Set steel twist drills 0.5-2.0 mm (for appliance conversion)	-	1
28	Set steel twist drills 1mm-10mm	-	2
29	Set masonry drills 1mm-10mm	1	2
30	Graphite based grease	As required	As required

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

31	Lubricating oil	As required	As required
32	Hand cleaner	As required	As required
33	Copper pipe Cutter 12mm	-	4
34	GI Pipe Cutters ½" Gas Detection Equipment Power Generator 2.5 KVA Pressure Gauge (0-10 bar) Pressure Gauge (0-4 bar) Diaphragm Gauge (0-400 m bar) Manometer (0-150 m bar)	- As required 1 2 2 1 1	2 - - 4 8 2 1
35	Automatic Thread cutting machine	-	2
36	GI Pipe Cutter	-	2
37	Welding Equipment	01 set per site	01 set per site
38	Full Body Safety Harness like PETZL or Equivalent	03 set per site	03 set per site
39	Motorized Suspended Platform	As required	As required

Copyright VCS Project – All rights

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT.LTD.

STANDARD SPECIFICATION ELECTRO FUSION FOR PE PIPES & FITTINGS

VPC – SS – PE - 0002

REV.	DATE	Purpose	Prepared By	Checked By	Approved By
00	19.06.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 ELECTRO FUSION FOR PE PIPE 3
1.1 ELECTRO FUSION FITTING JOINTING 3
1.2 ELECTRO FUSION JOINTING METHOD / PROCEDURE 4
1.3 RECORDS 5
1.4 TRAINING 5
1.5 ELECTRO FUSION SADDLE JOINTING 6
1.6 ELECTRO FUSION SADDLE JOINTING METHOD/ PROCEDURE 6
1.7 RECORDS 8
1.8 TRAINING 8
1.9 STOPPING THE GAS FLOW 8
1.10 SQUEEZE-OFF 8
1.11 BENDING-BACK 9

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

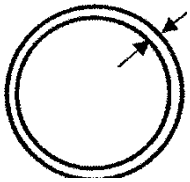
1.0 ELECTRO FUSION FOR PE PIPE

1.1 ELECTRO FUSION FITTING JOINTING

1.1.1 For electro fusion fitting jointing, an electrical resistance element is incorporated in the socket of the fitting which, when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

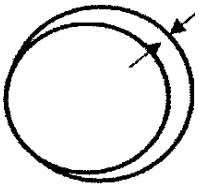
1.1.2 The effectiveness of this technique depends on attention to the preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surfaces area clean. Also, the pipe should be checked for ovality. If ovality causes a gap between concentrically located pipe and the fitting to exceed l% of the pipe OD, the pipe must be re-rounded to ensure correct welding. If the gap still exceeds 1% of the pipe OD after re-rounding then a check should be made of the pipe OD dimensions to determine if it meets specification.

Max gap 1% of pipe OD



Concentrically Located

Max gap 2% of pipe OD



Eccentrically Located

1.1.3 The maximum gap between eccentrically located pipe and fitting i.e. Pipe touching fitting at one point, must not exceed 2% of the pipe OD.

1.1.4 Sometimes coiled pipes may be too oval to fit into couplers, or the end of the pipe may make the alignment of the ends impossible. In such circumstances the use of a mechanical pipe straightener or rounding tool is necessary.

1.1.5 The equipment and procedures following relate to fittings with center stops. If fittings without center stops are used, the maximum insertion depth must be clearly marked on the pipe ends prior to joining (felt tip pen).

Equipment

- The control box input supply to be from a nominal 240V generator, which is normally of approximately 5kVA capacity. The nominal output of the generator is to be 240V +15%, I 0% between no load and full load. Control boxes are to include safety devices to prevent excessive voltages being present at the control box output. The safety device shall operate in less than 0.5s.

Note that extension leads are not to be used on the control box outlet connections.

WARNING: Control boxes are not intrinsically safe and must therefore not be taken into the trench.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- A mechanical pipe surface preparation tool is to be used before fusion is attempted. The tool is to be capable of removing the oxidized surface of the pipe in excess of the insertion depth. The tool is to remove a layer of surface material0.20.4 mm thick from the outer surface of the pipe preferably in a continuous strip of swarf over that length and round of the pipe.

- Pipe clamps for restraining, aligning and re-rounding the pipes in the fusion process are to be used.

- Pipe cutters with saw and saw guide.

- Protection against adverse weather conditions.

1.2 ELECTRO FUSION JOINTING METHOD / PROCEDURE

Preparation

- Ensure there is sufficient space to permit access to the jointing area. In a trench, a minimum clearance of 150 mm is required.

- Check that the pipe ends to be jointed are cut square to the axis of the pipe and any burrs removed.

- Wipe pipe ends using clean lint-free material to remove traces of dirt or mud, etc...

- Mark the area over which the oxidized pipe surface is to be removed, i.e. In excess of the insertion depth, on each pipe to be joined by placing the socket of the bagged fitting alongside the pipe end. Trace a line round the circumference at the appropriate distance from the end of the pipe using a felt tip pen or similar.

Note that the fitting should not to be removed from the packaging at this stage.

- Connect the electro fusion control box input leads to the generator.
- Check that the reset stop button, if fitted on the control box, is in the correct mode.
- Using the pipe end preparation tool, remove the entire surface of the pipe uniformly, preferably in continuous swarf over the area identified, i.e. In excess of the insertion depth.
- A mechanical scraper could be used however; there is a considerable risk that the end preparation will not be adequate with the use of such a tool.

Note that the prepared pipe surface should not be touched by hand.

- Remove the fitting from its packing and clean the scraped area of the pipe surface and the bore of the fitting with a disposable wipe impregnated with Iso-propanol *I* Acetone. Ensure the prepared surfaces are completely dry before proceeding.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Note that while Iso-propanol is a suitable cleaner, its use is subject to local Health and Safety Regulations.

- Check that the pipe clamps are of the correct size for the pipes to be jointed.
- Insert the pipe ends into the fitting so that they are in contact with the center stop.
- Using the pipe clamps, secure the pipes so that they cannot move during the fusion cycle. Check that the pipe ends and the fitting are correctly aligned.
- Check that there is sufficient fuel for the generator to finish the joint. Start the generator and check that it is functioning correctly.
- Switch on the control box.
- Connect the control box output leads to the fitting terminals and check that they have been fully inserted.

If required by the control box enter the fusion jointing time into the control box timer. The jointing time is indicated on the fitting. Check the correct time is shown on the control box display.

Note 1: Automatic control boxes are available which obviate the need to enter the fusion time.

Note 2: Gloves and goggles should be worn during the Fusion process.

- Press the start button on the control box and check that the heating cycle is proceeding as indicated on the display.
- On completion of the heating cycle, the melt indicators should have risen. If there is no apparent move in the melt indicators, the joint should be cut out and a fresh joint made (See note 3below).
- If a satisfactory joint has been made, the joint is to be left in the clamps for the cooling time specified on the fitting or the automatic control box.

Note 3: If the fusion cycle terminates before completion of the countdown, check for faults as indicated by the control box warning lights and check that there is adequate fuel in the generator. DO NOT attempt a second fusion cycle within one hour *I* cooling of joint at Ambient Temperature of the first attempt.

1.3 RECORDS

Records of appropriate servicing and calibration shall be kept.

1.4 TRAINING

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

It is necessary that operators, inspection and supervisory personnel acquire the skills of electro fusion fitting fusion. The necessary training should be carried out by a qualified instructor with the objective of enabling participants to;

- Understand the principles of electro fusion fitting jointing.
- Identify pipe and appropriate fitting markings.
- Carry out pre-jointing machine and equipment checks.
- Make satisfactory electro fusion fitting joints from pipes and fittings of different sizes.
- Inspect for and identify joints of acceptable quality.

Note that some form of assessment and certification should be associated with the training. The certificate should detail the pipe and fitting size range. And the equipment used. A register of successful participants should be kept.

1.5 ELECTRO FUSION SADDLE JOINTING

- With electro fusion saddle jointing, an electrical resistance element is incorporated in the base of the saddle which, when connected to the appropriate power supply, melts and fuses the material of the fitting and the pipe together.
- The success of the technique depends on effective preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the area equivalent to the area of the saddle base, and cleaning of the pipe surfaces.
- Methods of holding the tapping tee saddle during the fusion cycle are used namely, top loading and under clamping. The general parameters are similar. In some cases, if the manufacturer's procedure for holding the fitting is provided, then the same should be followed during the fusion cycle.

1.6 ELECTRO FUSION SADDLE JOINTING METHOD/ PROCEDURE

- Expose the pipe onto which the tapping tee is to be assembled, ensuring there is sufficient clear space around the pipe. In a trench, a minimum clearance of 150 mm is required.
- Clean the pipe over the general area on which the saddle is to be assembled using clean, disposable lint-free material.
- Without removing the fitting from its packaging, place it over the required position on the main. Mark the pipe surface all around and clear of the saddle base area using a felt tip pen or similar.
- Remove the surface of the pipe to a depth of 0.2 to 0.4 mm over the full area marked using a suitable tool. Remove the swarf.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Connect the electro fusion control box input leads to the generator.

Check that the reset stop button, if fitted on the control box, is in the correct mode.

- Remove the two halves of fitting from its packing and clean the scraped area of the pipe surface and the bore of the fitting with a disposable wipe impregnated with Iso-propanol / Acetone. Ensure the prepared surfaces are completely dry before proceeding.

Note again that while Iso-propanol is a suitable cleaner, its use is subject to local Health and Safety Regulations.

- Position the fitting base onto the prepared pipe surface, and bring the lower saddle into position then gradually and evenly tighten the nuts until the upper saddle makes firm contact with the scraped pipe.

- Check that there is sufficient fuel for the generator to complete the joint. Start the generator and check that it is functioning correctly.

- Switch on the control box if applicable.

- Connect the control box output leads to the fitting terminals and check that they have been fully inserted.

- If required by the control box, enter the fusion jointing time into the control box timer. The jointing time is indicated on the fitting. Check the correct time is shown on the control box display.

Note 1: Automatic control boxes are available which obviate the need to enter the fusion time.
Note 2: Gloves and goggles should be worn during the jointing process.

- Press the start button on the control box and check that the heating cycle is proceeding as indicated on the display.

- On completion of the heating cycle, the melt indicators, where incorporated should have risen. If there is no apparent move in the melt indicators, a new saddle joint should be made. Cut the tee of the faulty joint from its base.

- If a satisfactory joint has been made, the joint is to be left in the clamps for the cooling time specified on the fitting label or by the automatic control box.

Note 3: If the fusion cycle terminates before completion of the countdown, check for faults as indicated by the control box warning lights and check that there is adequate fuel in the generator. DO NOT attempt a second fusion cycle within one hour of the first

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

attempt.

Note 4: The connection of the service pipe to the fitting outlet should be carried out in accordance with the procedure of the appropriate section of this Item.

Note 5: DO NOT attempt to tap the main with the integral cutter for at least I0 minutes after completion of the cooling cycle.

1.7 RECORDS

Records of appropriate servicing and calibration of Electro Fusion machines/ joints shall be kept.

1.8 TRAINING

AS PER 1.6
Note that some form of assessment and certification should be associated with the training. The certificate should detail the pipe and fitting size range and the equipment used. A register of successful participants should be kept.

1.9 STOPPING THE GAS FLOW

In the operation of a distribution system there is a periodic need to stop the gas flow for either routine or emergency maintenance. The flow may be stopped through the use of installed fittings such as valves. Where installed fittings are not available or the use of such would cause significant supply disruption, then one of the following methods may be employed.

1.10 SQUEEZE-OFF

- To control the gas flow a special tool may be used to squeeze the pipe walls together. Hydraulic jacks are used to supply the necessary force to compress the pipe walls for sizes 90 mm and above.

- It will be seen the squeeze-off equipment comprises two bars to apply pressure to the outside of the pipe. The bars are brought together, either manually or hydraulically, squeezing the pipe material together until a seal is formed where the upper and lower walls meet.

- The hydraulic machines should have a spring return for the jack and locking to prevent accidental release of pressure during operation. All squeeze-off machines should be fitted with check plate or stops to avoid over compression of the pipe.

- Where the pipe walls are compressed the polyethylene pipe will be severely deformed in the regions of maximum compression. The pipe will eventually regain its original shall after squeezing but there will be some reduction in the pressure bearing properties.

- A complete stop may not always be obtainable because of wrinkling of the inside of

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

the pipe. If a complete stop is required then a second squeeze can be used, with an intermediate vent to remove the gas which passes the first squeeze from say the trench area. A second squeeze-off procedure should be a minimum of three pipe diameters and right angles to the initial squeeze.

- While not essential it would be good practice to fit a reinforcing stainless steel band do not squeeze again adhesive tape around the pipe upon the completion of a squeezing operation.

1.11 BENDING-BACK

Bending back of the pipe may be performed where the pipe has been severed damaged and stopping the gas flow is imperative. Its application is of a temporary nature, and will provide relief until a permanent repair can be affected. The section of pipe, which has been bent back, will have to be replaced because of the damage caused by the severe ness of the bend back operation. The need for any bend back operation is most likely to occur as a consequence of damage caused to a PE service pipe.

While it is not the prime function of a saddle tee, controlling the flow in a service may be achieved by opening up on an installed saddle tee and winding down the internal tapping tool to shut off the flow into the service pipe.

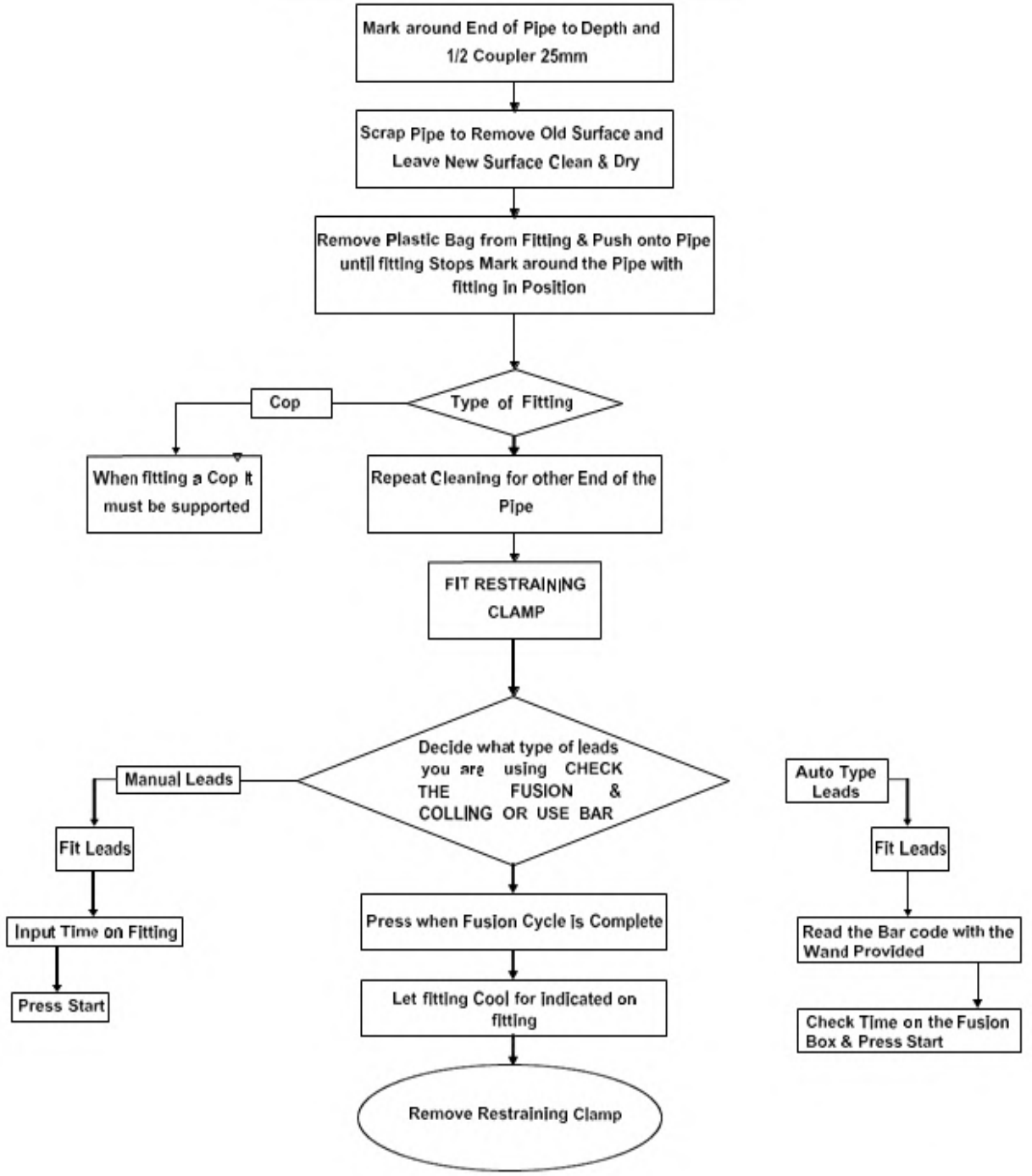
Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

PTS- ELECTRO FUSION FOR PE PIPES & FITTINGS

ANNEXURE # 1

FUSION COUPLERS FORM 20MM TO 180MM



Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION - GI PIPES

VPC – SS – PE - 0005

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	20.06.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 INTRODUCTION AND SCOPE 3
2.0 DEFINITIONS 3
3.0 MATERIAL 3
4.0 DIMENSIONS, THICKNESS & DIMENSIONALTOLERANCES 3
5.0 END CONNECTION OF PIPE 3
6.0 FREEDOM FROM DEFECTS 4
7.0 GALVANIZING 4
9.0 MARKING 5
10.0 INSPECTION / DOCUMENTS 5
11.0 PACKAGING 6

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 INTRODUCTION AND SCOPE

CLIENT/ OWNER plans to augment PNG network. It supplies natural gas to domestic & commercial consumers in the GA.

This present document covers the technical specification for the procurement of GI Pipes used in high pressure natural gas transportation and distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for GI pipes of heavy steel tube. Unless modified by this specification, requirements of IS 1239 (Part-I): 2004 (Latest edition) shall be valid.

2.0 DEFINITIONS

Manufacturer	Means the Manufacturer of the GI pipe.
SS	Means the present <<Standard Specification>> and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by CLIENT.
GTS	Means the present <<General Technical Specification>> and its entire appendix, if any.

3.0 MATERIAL

The material used for the manufacturing of GI pipes confirming to IS 1239 (Part -1): 2004 (Latest edition).

4.0 DIMENSIONS, THICKNESS & DIMENSIONALTOLERANCES

The dimensions & nominal mass of tubes shall be in accordance with Table 5 subject to the tolerances permitted in CL.8.1 & 9 of IS 1239 (Part-I) : 2004 (Latest edition). Length of each pipe shall be 6 mtrs with + 6, - 0 mm tolerance. However, pipe length shall be considered 6 m. only for measurement / payment purpose.

Nominal Diameter DN	15 mm	20 mm
Grade	Heavy	Heavy
Outer Dia. (Max. / Min.)	21.8 mm / 21.0 mm	27.3 mm / 26.5 mm
Thickness (mm)	3.2	3.2
Nominal weight (Kg / m)	1.44	1.87

5.0 END CONNECTION OF PIPE

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

GI Pipes shall be supplied with plain end.

6.0 FREEDOM FROM DEFECTS

On visual examination the outside & inside surfaces of pipes shall be smooth & free from defects such as cracks etc.

7.0 GALVANIZING

- Pipes shall be galvanized to meet the requirement of IS: 4736 – 1986 with latest amendment.
- Zinc conforming to any grade specified in IS: 13229- 1991 with latest amendment shall be used for the purpose of galvanizing.
- Galvanizing bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.
- Mass of zinc coating: Minimum mass of zinc coating determined as per IS: 6745 shall be 360gms/m^2.
- Uniformity of galvanized coating: The galvanized coating when determined on a 100 mm long test piece in accordance with IS 2633: 1986 with latest amendment shall withstand 5 one – minute dips.
- Freedom from defect: The zinc coating on internal & external surfaces shall be uniform adhered, reasonably smooth & free from such imperfections as flux, ash & drop inclusions, bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits & blisters. Rejection & acceptance for these defects shall be as per Appendix - A of IS 2629: 1985 with latest amendments.
- **Samplings**

  a) All materials of the same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be IS: 4711 1995 with latest amendment.

  b) The sample selected according to Clause 6.1 & 6.2 of IS: 4736 – latest edition.

  c) The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 5.1 of IS: 4736 – 1986 with latest amendment.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

d) Criteria for conformity: As per IS: 4736 – 1986 with latest amendments.

8.0 PRESSURE TEST

Hydrostatic pressure test shall be carried out at a pressure of 5 Mpa for the duration of at least 3 second and shall not show any leakage in the pipe. Vendor to submit the internal pressure test certificate for the same. Owner Representative or Third party Inspection Agency appointed by Owner shall witness finish goods testing as per the sample procedure specified in IS: 1239 (Part-1) – latest edition.

9.0 MARKING

Each pipe shall be embossed with CLIENT's logo, manufacturer's name or trademark, size designation, class of pipe at the interval of not more than 1 meters.

Each packing containing pipes shall carry the following embossed, stamped or written by indelible ink.

- Manufacturers name or trademark.
- Class of pipe –Heavy.
- Indian standard mark (ISI).
- Lot number / Batch no. of production.

Each pipe conforming to this standard shall also be marked with BIS standard mark.

10.0 INSPECTION / DOCUMENTS

Inspection shall be carried out as per Owner Technical Specification.

Owner Representative or Third Party Inspection Agency appointed by Owner shall carry out stage wise inspection during manufacturing / final inspection.

The manufacturer shall have a valid license to use ISI monogram for manufacturing of pipe in accordance with the requirement of IS: 1239.

Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / inspection reports as per Owner Tech. Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

For any control, test or examination required under the supervision of TPIA/Owner/Owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date and place along with production schedule.

Even after third party inspection, Owner reserves the right to select a sample of pipes randomly from each manufacturing batch & have these independently tested. Should the

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the right to reject all production supplied from the batch.

11.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION -GI FITTINGS

VPC-SS-PE-0006

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 3
2.0 DEFINATIONS 3
3.0 MATERIAL 3
4.0 DIMENSIONS THICKNESS & DIMENSIONAL TOLERANCES 3
5.0 WEIGHT 3
6.0 THREADS 3
7.0 FREEDOM FROM DEFECTS 4
8.0 GALVANIZING 4
9.0 PRESSURE TEST 4
10.0 COMPRESSION TEST 5
11.0 SAMPLING 5
12.0 MARKING 5
13.0 PACKAGING 5
14.0 INSPECTION / DOCUMENTS 5

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

CLIENT/OWNER plans to augment PNG network. It supplies natural gas to domestic & commercial consumers in the GA.

This present document covers the technical specification for the procurement of GI fittings used in high pressure natural gas transportation and distribution systems. It describes the general requirements, controls, tests, QA/ QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for Malleable Cast Iron Fittings unless modified by this specification, requirements of IS 1879 – latest edition shall be valid.

2.0 DEFINATIONS

Manufacturer	Means the Manufacturer of the GI fittings.
SS	Means the present <<Standard Specification>>and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by CLIENT.

3.0 MATERIAL

The material used for the manufacturing of GI fittings shall conform to ISI 14329 – 1995 with latest amendments Grade BM 300.

4.0 DIMENSIONS THICKNESS & DIMENSIONAL TOLERANCES

- Dimensions of various types of fittings shall be as specified in sections 2 to 10 of IS 1879 – 1987 with latest amendments, as applicable.
- Wall thickness of fittings and tolerances on them shall be as given in Table 1.2 of S 1879 – 1987 with latest amendments,
- In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.
- Elbows, Tees, Sockets and caps shall be of reinforced type.

5.0 WEIGHT

Weights of various types of fittings shall be as specified in sections 2 to 10 of S 1879 – 1987 with latest amendments, as applicable.

6.0 THREADS

- Threads shall be NPT type and conforming to ASME B1.20.1.
- Outlets of fittings shall be threaded to dimensions & the tolerances as specified in ASME B1.20.1.
- All internal & external threads shall be tapered.
- For checking conformity of threads gauging practice in accordance with ASME B1.20.1 shall be followed.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Chamfering: The outlet of fittings shall have chamfer.

7.0 FREEDOM FROM DEFECTS

On visual examination, the outside & inside surfaces of fittings shall be smooth & free from any defects such as cracks, injurious flaws, fine sand depth etc.

8.0 GALVANIZING

- Fittings shall be galvanized to meet the requirement of IS: 4759–1996with latest amendments.

- Zinc conforming to any grade specified in IS: 13229-1991 with latest amendments shall be used for the purpose of galvanizing.

- Galvanizing bath: The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.

- Coating requirements: Mass of coating shall be 610 - 700gms/m2.

- Freedom from defect: The zinc coating shall be uniform adhered, reasonably smooth & free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness runs, rust stains, bulky white deposits &blisters.

- Samplings

    a. All materials of the same type in coating bath having uniform coating characteristics shall be grouped together to continue a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be given in Table 2 of IS 4759 – latest edition.

    b. The sample selected according to Column 1 & 2 of Table 2, IS: 4759 – latest edition shall be tested for visual requirements as per Clause 6.2 of IS:4759 – latest edition

    c. The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 9.2 of IS: 4759 – latest edition.

    d. Criteria for conformity: As per Clause 8.3 of IS: 4759-latestedition.

    e. Test procedure shall be as per Clause 9 of IS: 4759-latestedition.

9.0 PRESSURE TEST

Vendor shall carry out pneumatic pressure test as per Clause 11.1b of 1879 – 1987 with latest amendments on each &every fittings. Vendor to submit the Internal Quality control certificate for the same. Owner shall witness pneumatic testing as per the sampling procedure specified in 1879 – 1987 with latest amendments.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

10.0 COMPRESSION TEST

This test shall be conducted to judge the malleability of the pipe fittings & shall be carried out as per Clause 12 of 1879 – 1987 with latest amendments.

11.0 SAMPLING

Owner Representative of Third Party Inspection Agency appointed by Owner shall witness the tests as per clause 14 of 1879 – 1987 with latest amendments. However, vendor to perform 100% inspection of visual, dimensional & pressure test. Vendor shall furnish Internal test certificates at the time of final inspection to the Owner.

12.0 MARKING

Each fitting shall be embossed with CLIENT's logo, manufacturer's name or trademark and the size designation.

Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.

- Manufacturer's name or trademark.
- Designation of fittings.
- Lot number.

Each fitting conforming to this standard shall also be marked with BIS standard mark.

13.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

14.0 INSPECTION / DOCUMENTS

- Inspection shall be carried out as per Owner Technical Specification.
- Owner Representative or Third Party Inspection Agency appointed by Owner shall carry out stage wise inspection during manufacturing / final inspection.
- Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / Inspection reports as per Owner Tech Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION - COPPER FITTINGS

VPC –SS-PE-0007

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 3
2.0 MATERIAL 3
3.0 DIMENSIONAL TOLERANCES 3
4.0 MANUFACTURE 3
5.0 FREEDOM FROM DEFECTS 3
6.0 HYDROSTATIC TEST 4
7.0 DRIFT EXPANDING TEST 4
8.0 CARBON FILM TEST 4
9.0 CARBON CONTENT TEST 4
10.0 MARKING 4
11.0 PACKAGING 4
12.0 INSPECTION/ DOCUMENTS 4

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

This specification covers the requirements for 12 mm OD X 0.6 mm wall thickness Copper tube, Half Hard. Unless modified by this specification, requirement of BS EN 1057 (latest), Half Hard, shall be valid, with the recommended changes in physical properties to suit wrinkle free bend ability.

2.0 MATERIAL

The material used for the manufacturer of Copper tube shall confirm to BS EN 1057(latest), Grade Cu - DHP or CW024A.

- **Mechanical Properties**:

  a. Ultimate Tensile Strength–250N/sq.mm(min)

  b. Elongation – 30% (min)

  c. Hardness - 75 to 100 on HV scale.

- **Chemical Properties:**

  In Each heat one no. of the copper tube will be tested for chemical properties to confirm to non-arsenical Cu - DHP / CW024A as per BS EN 1057 to have the following chemical composition:

Copper Percentage including silver	**:**	Min 99.9%
Phosphorus Percentage	**:**	0.015 to 0.040%

3.0 DIMENSIONAL TOLERANCES

The mean outside Diameter of the tube shall not vary from the specified outside diameter by more than the amount of tolerances specified in table 4 of BS EN 1057. The tolerance on the wall thickness shall be as specified in table 5 of BS EN 1057.

The length of the tube shall be 3 m. Allowable tolerance shall be (-0, +0.5 mm).

4.0 MANUFACTURE

The tubes shall be solid drawn by the process of melting, extrusion and thereafter Bright annealing. The ends shall be cut clean & square with the axis of the tube in no case shall tubes be redrawn from old or used tubes.

5.0 FREEDOM FROM DEFECTS

- The tubes shall be free from internal & external fins, flaws, skin defects, blow holes etc. or other irregularities which might restrict the free flow of fluid and shall be so designed that resistance to the flow of fluid through the tubes is minimized.
- All tubes will be supplied 100% Eddy Current tested as per ASTM E243 and BS EN 1057. Eddy Current testing is a computer aided test, wherein the tube passes through a probe & an electromagnetic field is created around the peripheral of the tube to detect

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

any flaw or blow hole which may not be visible to the naked eye. The manufacturer must have in-house Eddy Current testing facilities to supply to Client. Client reserves the right to witness the Eddy Current facility at the manufacturer's factory premises.

6.0 HYDROSTATIC TEST

Hydrostatic test shall be carried out minimum 35 bar pressure for a period of 10 second as per EN 1057 (latest).

7.0 DRIFT EXPANDING TEST

Drift expanding test shall be carried out as per EN 1057. The O.D. of the tube end shall be expanded by 30% using a conical mandrel (at angle 45º) with no wrinkles, cracks, break or any form of defect should occur on the tube during & after the test.

8.0 CARBON FILM TEST

Copper tubes to be tested for carbon film test & the manufacturer will certify that the tubes meet the requirement of clause 8.5 of BS EN 1057.

9.0 CARBON CONTENT TEST

Copper tubes to be tested for carbon content test to ensure a carbon level to avoid the formation of carbon film during installation. Max. Carbon level shall be permitted as per clause 6.5 of BS EN1057.

10.0 MARKING

Each tube shall be permanently marked every meter with Client's Logo, manufactures name & size and specification of the tube.

Each packing containing tubes shall carry the following, stamped or written in indelible ink.

- Manufacturers name or trademark
- Designation of tubes (OD x wall thk)
- Lot number.
- No. of the standard (EN1057)

11.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

12.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per Client Technical Specifications, relevant codes/standard and Inspection Plan/ QAP. Vendor to prepare detailed QAP and submit the same for approval of Client / Client's Authorized Representative.
- Client representative or third party inspection agency appointed by Client shall carry out

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

stage wise inspection during manufacturing/ final inspection.

- Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per Client Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.

- Even after third party inspection, Client reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in Client Technical specification, then Client reserves the rights to reject all production supplied from the batch.

- For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date & place along with production schedule.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION - COPPER TUBE

VPC –SS-PE-0008

REV	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 3
2.0 MATERIAL 3
3.0 DIMENSIONAL TOLERANCES 3
4.0 MANUFACTURE 3
5.0 FREEDOM FROM DEFECTS 3
6.0 HYDROSTATIC TEST 4
7.0 DRIFT EXPANDING TEST 4
8.0 CARBON FILM TEST 4
9.0 CARBON CONTENT TEST 4
10.0 MARKING 4
11.0 PACKAGING 4
12.0 INSPECTION/ DOCUMENTS 4

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

This specification covers the requirements for 12 mm OD X 0.6 mm wall thickness Copper tube, Half Hard. Unless modified by this specification, requirement of BS EN 1057 (latest), Half Hard, shall be valid, with the recommended changes in physical properties to suit wrinkle free bend ability.

2.0 MATERIAL

The material used for the manufacturer of Copper tube shall confirm to BS EN 1057(latest), Grade Cu - DHP or CW024A.

- **Mechanical Properties**:

  a. Ultimate Tensile Strength–250N/ sq.mm(min)

  b. Elongation – 30% (min)

  c. Hardness - 75 to 100 on HV scale.

- **Chemical Properties:**

  In Each heat one no. of the copper tube will be tested for chemical properties to confirm to non-arsenical Cu - DHP / CW024A as per BS EN 1057 to have the following chemical composition:

Copper Percentage including silver	**:**	Min 99.9%
Phosphorus Percentage	**:**	0.015 to 0.040%

3.0 DIMENSIONAL TOLERANCES

The mean outside Diameter of the tube shall not vary from the specified outside diameter by more than the amount of tolerances specified in table 4 of BS EN 1057. The tolerance on the wall thickness shall be as specified in table 5 of BS EN 1057.

The length of the tube shall be 3 m. Allowable tolerance shall be (-0, +0.5 mm).

4.0 MANUFACTURE

The tubes shall be solid drawn by the process of melting, extrusion and thereafter Bright annealing. The ends shall be cut clean & square with the axis of the tube in no case shall tubes be redrawn from old or used tubes.

5.0 FREEDOM FROM DEFECTS

- The tubes shall be free from internal & external fins, flaws, skin defects, blow holes etc. or other irregularities which might restrict the free flow of fluid and shall be so designed that resistance to the flow of fluid through the tubes is minimized.
- All tubes will be supplied 100% Eddy Current tested as per ASTM E243 and BS EN 1057. Eddy Current testing is a computer aided test, wherein the tube passes through a probe & an electromagnetic field is created around the peripheral of the tube to detect

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

any flaw or blow hole which may not be visible to the naked eye. The manufacturer must have in-house Eddy Current testing facilities to supply to CLIENT. CLIENT reserves the right to witness the Eddy Current facility at the manufacturer's factory premises.

6.0 HYDROSTATIC TEST

Hydrostatic test shall be carried out minimum 35 bar pressure for a period of 10 second as per EN 1057 (latest).

7.0 DRIFT EXPANDING TEST

Drift expanding test shall be carried out as per EN 1057. The O.D. of the tube end shall be expanded by 30% using a conical mandrel (at angle 45º) with no wrinkles, cracks, break or any form of defect should occur on the tube during & after the test.

8.0 CARBON FILM TEST

Copper tubes to be tested for carbon film test & the manufacturer will certify that the tubes meet the requirement of clause 8.5 of BS EN 1057.

9.0 CARBON CONTENT TEST

Copper tubes to be tested for carbon content test to ensure a carbon level to avoid the formation of carbon film during installation. Max. Carbon level shall be permitted as per clause 6.5 of BS EN1057.

10.0 MARKING

Each tube shall be permanently marked every meter with CLIENT's Logo, manufactures name & size and specification of the tube.

Each packing containing tubes shall carry the following, stamped or written in indelible ink.

- Manufacturers name or trademark
- Designation of tubes (OD x wall thk)
- Lot number.
- No. of the standard (EN1057)

11.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

12.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per CLIENT Technical Specifications, relevant codes/standard and Inspection Plan/ QAP. Vendor to prepare detailed QAP and submit the same for approval of CLIENT / CLIENT's Authorized Representative.
- CLIENT representative or third party inspection agency appointed by CLIENT shall carry

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

out stage wise inspection during manufacturing/ final inspection.

- Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per CLIENT Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.

- Even after third party inspection, CLIENT reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in CLIENT Technical specification, then CLIENT reserves the rights to reject all production supplied from the batch.

- For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vendor about inspection date & place along with production schedule.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION - BRASS FITTINGS

VPC–SS-PE-0009

REV	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 3
2.0 MATERIAL 3
3.0 DIMENSIONAL TOLERANCES 3
4.0 END CONNECTION 3
5.0 CHEMICAL PROPERTIES 3
6.0 CARBON IN BORE 4
7.0 RESISTANCE TO DEZINCIFICATION 4
8.0 STRESS CORROSION RESISTANCE TEST 4
9.0 FREEDOM FROM DEFECT 4
10.0 HYDROSTATIC PRESSURE TEST 4
11.0 PNEUMATIC PRESSURE TEST 4
12.0 MARKING 4
13.0 PACKAGING 4
14.0 INSPECTION/ DOCUMENTS 4

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

This specification covers the requirements for Brass Capillary fittings (End feed fittings). Unless modified by this specification, requirement of BS 864 / EN 1254 Part 1 shall be valid.

2.0 MATERIAL

- The material used for the manufacturer of Brass Capillary Fittings shall conform to EN 1254-1 (latest), Half Hard.

- Material used for the solder should conform to BS EN 29453 and should be lead free. Solder material shall be generally melting within the temperature range 180 ° C to 250 °C.

- Threading on the Brass fittings shall be done as per BS21.

3.0 DIMENSIONAL TOLERANCES

Dimensions tolerances of various types of brass capillary fittings (End feed fittings). shall be as per EN 1254 Part 1.

The tolerances at the end shall be as per EN 1254 Part I in nominal diameter which is as follows (Ref. table 2)

Diameter	Tolerance on the mean diameter with respect to the nominal diameter		Resulting Diametrical difference	
D	Outside Dia. of Male end (mm)	Inside Dia of socket (mm)	Max (mm)	Min (mm)
12 mm	+.0.04 -.0.05	+ 0.15 +0.06	0.20	0.02

The minimum wall thickness of a fitting shall be in accordance as given below (Ref Table 3 of EN 1254 Part 1)

Nominal Dia mm D	Minimum Wall thickness (mm) Brass
12	1.1

4.0 END CONNECTION

End connection of the fitting must be capable of end feeding to the NPT x 12 mm. Internal solder ring type fitting is not acceptable.

5.0 CHEMICAL PROPERTIES

Chemical composition of Brass shall be as mentioned in EN 1254 PART I. Dezincification-resistant brass material CuZn36Pb2As or CW602N.

Cu 61.0-63.0 %
Pb 01.7-02.8 %
As 0.02 -0.15%
Remaining is zinc.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

6.0 CARBON IN BORE

The internal surface of brass capillary fittings for soldering or brazing shall not contain any detrimental film nor present a carbon level high enough to allow the formation of such a film during installation. The maximum total carbon level on internal surfaces shall not exceed 1.0 mg/dm^2 when tested in accordance with the specification. This test shall be carried out as per clause no. 5.4 of EN 1254 -1.

7.0 RESISTANCE TO DEZINCIFICATION

The fittings shall be manufactured from alloys containing more than 10% Zinc. So fittings shall be required to be resistant to dezincification. It shall be carried out as per Cl. 5.5 of EN 1254 -1.

8.0 STRESS CORROSION RESISTANCE TEST

A stress corrosion resistance is to be carried out as per method defined in ISO 6957 using test solution of pH9.5 but without pickling.

9.0 FREEDOM FROM DEFECT

The fittings shall be free from internal fins, blow holes, skin defects etc. or other irregularities which might restrict the free flow of fluid, and shall be designed that resistance to the flow of fluid through the fittings is minimized.

10.0 HYDROSTATIC PRESSURE TEST

All fittings shall be leak tightness tested at 1.5x25 bars for a period of 15 minutes and no leakage is permitted. This test shall be performed on each size of the fittings.

11.0 PNEUMATIC PRESSURE TEST

All fittings shall be leak tested at 6 bars for a period of 10 seconds and no leakage is permitted.

12.0 MARKING

Each fittings shall be embossed with CLIENT' s logo, manufacturers name and trade mark BS 864 / EN 1254 Part– I and designation of fittings.

Each packing containing fittings shall carry the following stamped or written in indelible ink.

13.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during QAP and also complied with at the time of delivery.

14.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per design codes/standards, CLIENT Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

owner/owner's representative.

- CLIENT representative or third party inspection agency appointed by CLIENT shall carry out random inspection during manufacturing/ final inspection.

- Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per CLIENT Technical Specification, at the time of final inspection of each supply lot of material.

- Even after third party inspection, CLIENT reserves the right to select a sample of tube randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in CLIENT Technical specification, then CLIENT reserves the rights to reject all production supplied from the batch.

- Vendor shall prepare and submit the detail drawings of required brass fitting for approval by CLIENT/VCSQSPL before starting production.

- For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION FOR STEEL REINFORCED RUBBER HOSE

VPC-SS-PE-0010

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	17.12.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 3
2.0 SPECIFICATION FOR POWDER COATING 3
3.0 MATERIAL 3
4.0 DIMENSIONS & TOLERANCES 3
5.0 FEATURES 4
6.0 MARKING 5
7.0 PACKAGING 5
8.0 INSPECTION/ DOCUMENTS 5

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

Owner/ Client plans to augment PNG network. It supplies natural gas to domestic & commercial consumers in the GA.

This present document covers the technical specification for the procurement of steel reinforced rubber hose, Type 4 used in distribution systems. It describes the general requirements, controls, tests, QA/QC examination and final acceptance criteria which need to be fulfilled.

This specification covers the requirements for steel reinforced rubber hose unless modified by this specification, requirements of IS: 9573 shall be valid.

2.0 SPECIFICATION FOR POWDER COATING

	)
Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
PTS	Means the present <<Particular Technical Specification>> and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.
Type 4	Wire Reinforced hose for domestic / commercial installations

3.0 MATERIAL

- Lining: - It shall be nitrile – butadiene rubber (NBR) or chloroprene rubber (CR) compound. It shall be smooth in bore, uniform in thickness and free from air blisters, porosity and splits.

- Reinforcement material: - It shall have wire reinforcement in braided form in between the lining & cover.

- Cover:- It shall be manufactured out of synthetic rubber compound resistant to abrasion, weather and natural gas. The cover color shall be YELLOW.

- The whole shall be consolidated by wrapping or any other suitable method and uniformly vulcanized to give good adhesion between reinforcement plies and the rubber lining of the cover.

4.0 DIMENSIONS & TOLERANCES

- Bore size

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Nominal base (mm)	Minimum base diameter(mm)	Minimum bend radius(mm)
8mm	7.9	95

The Nominal bore size of the hose shall be accordance to table # 1 of IS 9573: 1998 shall be as given above table. It shall be tested/ checked as method defined in IS 4143.

- The Minimum thickness so lining & cover shall be 2 mm & 1 mm respectively.

- Length of hose shall be as defined in M.R. & the tolerances on length shall be permitted ±1%.

5.0 FEATURES

- **Mechanical properties**

  Tensile Strength (Lining & Cover) at break - 10 MPa (minimum)

  Elongation (Lining & Cover) in at break (%) - 200 & 250 respectively (minimum)

- **Resistance of Lining to n-pentane**

  The n-pentane absorbed and the n-pentane extractable matter as determined Clause no. 5.4.3.2 of IS 9573: 1998 shall not exceed 10% & 5% respectively to the initial mass of lining.

- **Adhesion**

  The minimum adhesion between rubber lining & reinforcement, between layers of reinforcement and between reinforcement & cover shall be 2KN/m.

- **Low temperature flexibility**

  Flexible hose is conditioned at - 40 ° C for at least 5 hrs. and then bent at 180° around a mandrel with a diameter 12 times the nominal bore diameter of the hose, no cracks or breaks shall be shown.

- **Flexibility of Hose**

  The hose shall be capable of being bent empty to the radius 95 mm without flattening and suffering structural damages.

- **Ozone resistance**

  It shall be carried out as per clause no. 5.5.of IS 9573: 1978

- **Hydro static test**

  All hoses shall be leak tightness tested at 2 MPa for a period of 1 minutes and no leakage is permitted. This test shall be performed on each size of the hoses as per clause no. 5.5.5.1 of IS 9573: 1978.

- **Bursting pressure**

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

It shall be carried out as per Clause 5.5.2 of IS 9573. The minimum burst pressure shall be 5 Mpa.

- **Grip strength test**

  The hose shall comply to the requirement of Clause no. 5.5.7 of IS 9573.

- **Burning behavior**

  The burning test shall be carried out on hose as per clause no. 5.5.8 of IS9573. The hose at least shall not burn till 45second.

6.0 MARKING

Each hose shall be indelibly marked as follows:

- Manufacturer's name or trade mark., if any
- Nominal bore
- Batch no. / Lot no.
- Month and year of manufacturer
- Type of hose i.e. Type 4
- BIS marking

7.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

8.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per design codes/standards, Client Technical Specification and Inspection Plan/ Vendor's detailed QAP duly approved by owner/owner's representative.
- For all tests purposes, the minimum time between vulcanization & testing shall be 16h.
- Client representative or third party inspection agency appointed by Client shall carry out random inspection during manufacturing/ final inspection.
- Vendor shall furnish all the material test certificates, proof of approval/ license from

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

specified authority as per specified standard, if relevant, internal test/ inspection reports as per Client Technical Specification, at the time of final inspection of each supply lot of material.

- Even after third party inspection, Client reserves the right to select a sample of hose randomly from each manufacturing batch and have these independently tested. If the results of these tests fall outside the limits specified in Client Technical specification, then Client reserves the rights to reject all production supplied from the batch.

- Vendor shall prepare and submit the detail drawings of required steel reinforced rubber hose for approval by Client /VCSQSPL before starting production.

- For any control test or examination required under the supervision of TPIA/owner/owner's representative, latter shall be informed in writing one (1) week in advance by vender about inspection date & place along with production schedule.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION FOR PURE POLYSTER POWDER COATING

VPC –SS-PE-0011

REV	DATE	Purpose	Prepared By	Checked By	Approved By
00	17.12.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 3
2.0 SPECIFICATION FOR POWDER COATING 3
3.0 TESTING 3
4.0 MARKING 3
5.0 INSPECTION/ DOCUMENTS 4

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

This Specification specifies the requirements for powder coating (Pure Polyester) of GI Pipes & fitting suitable to use for carrying Natural Gas directly expose to sunlight.

2.0 SPECIFICATION FOR POWDER COATING

Powder Material	:	Pure Polyester.
Application	:	Electrostatic Spraying (40 — 90 KV Manual/ Automatic)
Backing Schedule	:	180^0C to 200^0C for 10 mm (Metal Temperature)
Coating Thickness	:	50-60Microns

3.0 TESTING

Film Type	:	Glossy/Satin 86
Gloss60^0	:	95%
Cross Hatch Adhesion (ASTM D-5870)	:	GT = 0/100
Cylindrical bending Test (ASTM D -522) 5mm Rod dia	:	Passes
Enrichsen cupping (min)	:	8 Passes
Pencil Hardness(mm)	:	2H
Scratch Resistance (Kg. Mm)	:	3
Impact Resistance Kg. Min(ASTM D- 2794)	:	Direct 150 Indirect 150
Salt Spray Resistance (ASTM B-117)	:	1000 Hrs (min)
Porosity (DIN 53161)	:	Passes
Humidity Resistance	:	1000 Hrs(min)

4.0 MARKING

Each fitting shall be embossed with manufacture's name or trademark and the size designation. Each packing containing fittings shall carry the following stamped or written by indelible ink.

- Manufacturers name or trademark.
- Designation of fitting.
- Lot number.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Each fitting conforming to this standard shall also be marked with BIS standard mark.

5.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per OWNER Technical Specification.
- OWNER representative or Third Party Inspection Agency appointed by OWNER shall carry out stage wise inspection during manufacturing/final inspection.
- Vendor shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test inspection reports as per OWNER Tech Spec. &- specified code for 100% material, at the time of final inspection of each supply lot of material.
- Even after third party inspection, OWNER/ OWNER REPRESENTATIVE reserves the rights to select a sample of fittings randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in OWNER technical specification, then OWNER/ OWNER REPRESENTATIVE Reserves the rights to reject all production supplied from the batch. (ASTM D- 2247)

Weathering (sun test with water immersion, Xenon 150K.lux)	: 60-70% Gloss retention after 1000Hrs.
Colour	: Light colour as approved by OWNER/CONSULTANT

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION – FORGED FITTINGS (WROUGHT STEEL FITTINGS) FOR USE AT PRESSURE UP TO 100 MBAR (G)

VPC-SS-PE-0012

REV	DATE	Purpose	Prepared By	Checked By	Approved By
00	18.06.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 3
2.0 SPECIFICATION FOR POWDER COATING 3
3.0 MATERIAL 3
4.0 DIMENSIONS & TOLERANCES 3
5.0 THREADS 3
6.0 FREEDOM FROM DEFECTS 4
7.0 GALVANIZING 4
8.0 PRESSURE TEST 4
9.0 COMPRESSION TEST 5
10.0 SAMPLING 5
11.0 MARKING 5
12.0 PACKAGING 5
13.0 INSPECTION/ DOCUMENTS 5

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

Owner/ Client plans to augment PNG network. It supplies natural gas to domestic & commercial consumers in the GA.

This specification covers the requirements for Wrought Steel Fittings for Natural Gas for use at pressures up to 100 mbar (g). Unless modified by this specification, all the requirements of IS 1239 Part 2: 1992 and the latest editions of the standards mentioned herein this specification, including all revisions, shall apply.

2.0 SPECIFICATION FOR POWDER COATING

	)
Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
SS	Means the present <<Standard Specification>> and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.

3.0 MATERIAL

The material used for the manufacturing of wrought steel fittings shall confirm to IS 1387: 1967 generally, and IS 1239 Part 2: 1992

4.0 DIMENSIONS & TOLERANCES

- Dimensions of various types of fittings shall be as specified in the table 1 to 31 of IS 1239 Part 2: 1992.
- Wall thickness on fittings & tolerances on them shall be as given in table 1 to 31 of IS 1239 Part 2: 1992.
- In case of reducing fittings, the dimensions at each outlet shall be those appropriate to the nominal size of the outlet.

5.0 THREADS

- Outlet of fittings shall be threaded to dimensions & the tolerances as specified in IS 554: 1999.
- All internal & external threads shall be tapered.
- After threading, the pipe body may be hot dip galvanized as per normal practice followed by cold galvanizing (spraying) of the threaded portions. The threaded portions shall be protected using end caps, etc.
- For checking conformity of threads gauging practice in accordance with IS 8999: 2003 shall be followed.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Chamfering: The outlet of fittings shall have chamfer. The chamfer shall have an included angle of 900 ± 50 for internal threads & 700 ± 100 for external threads.

6.0 FREEDOM FROM DEFECTS

On visual examination the outside & inside surfaces of fittings shall be smooth & free from defects such as cracks, injurious flows, fine sand depth, etc. Other workmanship shall be as per Clause 14 of IS 1239 Part 2: 1992.

7.0 GALVANIZING

- Fittings shall be galvanized to meet the requirements of IS 4759: 1996.
- Zinc conforming to any grade specified in IS 209: 1992 or IS 13229: 1991 shall be used for the purpose of galvanizing.
- **Galvanized Bath:** The molten metal in the galvanizing bath shall contain not less than 98.5% by mass of zinc.
- **Coating requirements:** Mass of coating shall be 610 gms/ m2. In case of pipe nipples (manufactured in accordance with the requirements of IS 1239 Part 1: 2004), the mass of coating of 400 gms/m2 shall also be acceptable.
- **Freedom from defects:** The zinc coating shall be uniformly adhered, reasonably smooth & free from such imperfections as flux, ash bare patches, black spots, pimples, lumpiness runs, rust strains, bulky white deposits & blisters; otherwise the pipes shall be liable for rejection.
- **Sampling Plan for galvanizing**

  a) All materials of the same type in a coating bath having uniform coating characteristics shall be grouped together to constitute a lot. Each lot shall be tested separately for the various requirements of the specification. The number of units to be selected from each lot for this purpose shall be as given in Table 2 of IS 4759: 1996.

  b) The sample selected according to Column 1 & 2 of Table 2, IS 4759: 1996 shall be tested for visual requirements as per Para 8 of IS 4759: 1996. Vendor shall have appropriate correspondence between galvanizing lot number and pipe manufacturing lot number for identification / traceability.

  c) The sample found conforming to above requirements shall then be tested for mass of zinc coating in accordance with Clause 9.2 of IS 4759: 1996.

  d) Criteria for conformity: As per Clause 8.3 of IS 4759: 1996.

  e) Test procedure shall be as per Clause 9 of IS 4759: 1996. All galvanizing test results shall be included in the Manufacturer's Test Certificate.

8.0 PRESSURE TEST

Pneumatic pressure test shall be carried out on each & every fittings as per procedure given in IS 1239 Part 2: 1992.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

9.0 COMPRESSION TEST

As per IS 1239 Part 2: 1992.

10.0 SAMPLING

Owner Representative of Third Party Inspection Agency appointed by Owner shall witness the tests as per procedure for sampling plan given in IS 4711: 1974. However, vendor to perform 100% inspection of visual, dimensional & pressure test. Vendor shall furnish Internal test certificates at the time of final inspection to the Owner.

11.0 MARKING

Each fitting shall be embossed with Client's logo, manufacturer's name or trademark and the size designation.

Each packing containing fittings shall carry the following embossed, stamped or written by indelible ink.

- Manufacturer's name or trade mark.
- Designation of fittings.
- Lot number.

Each fitting conforming to this standard shall also be marked with BIS standard mark.

12.0 PACKAGING

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representative before packing the material. The vendor shall submit the packaging details during QAP and also complied with at the time of delivery.

13.0 INSPECTION/ DOCUMENTS

- Inspection shall be carried out as per Owner Technical Specification.

- Owner Representative or Third Party Inspection Agency appointed by Owner shall carry out stage wise inspection during manufacturing / final inspection.

- Vendor shall furnish all the material test certificates, proof of approval / license from specified authority as per specified standard, if relevant, internal test / Inspection reports as per Owner Tech Spec. & specified code for 100% material, at the time of final inspection of each supply lot of material.

- Even after third party inspection, Owner reserves the rights to select a sample of fittings randomly from each manufacturing batch & have these independently tested. Should the results of these tests fall outside the limits specified in Owner technical specification, then Owner reserves the rights to reject all production supplied from the batch.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION – WARNING MAT

VPC –SS-PE-0013

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	17.12.18	ISSUED AS STANDARD	BS	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 3
2.0 DEFINATIONS 3
3.0 REFERENCE CODE 3
4.0 FEATURES 3
5.0 QUALITY ASSURANCE (QA) 4
6.0 DEFECT LIABILITY 4
7.0 APPENDIX - I 4

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

CLIENT/ OWNER plans to augment the PNG Network. It supplies natural gas to domestic & commercial consumers in the GA.
The present document covers the technical specifications for the procurement of Warning Mat. Warning mats shall be laid in the ground above the gas main line in order to indicate their presence.

2.0 DEFINATIONS

	)
Manufacturer	Means the Manufacturer of the Steel Reinforced Rubber Hose.
SS	Means the present <<Standard Specification>> and its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.

3.0 REFERENCE CODE

IS 10889	High Density Polyethylene Films
ASTM D - 638	Standard test method for tensile properties of plastics.

4.0 FEATURES

- **Material**

  Raw material of the warning mat shall be Virgin material.

  The material grade of Warning Mat shall be HDPE with warning sticker / stamp.

  a. Mechanical properties
  b. Tensile strength at break (Machine direction) - 300 Kgf /cm^2(minimum)
  c. Elongation in machine & Transverse direction (%)- 300 (minimum)

- **Colour**

  The Mat shall be of bright golden yellow colour. This colour must not take any appreciable alteration in the course of time.

- **Dimensions**

  Warning Mat shall have following dimensions:
  Width 300 mm ± 5 mm
  Thickness 1 mm (Minimum)
  Negative tolerance on thickness is not allowed.

- **Marking**

  a. Marking on the Mat shall be approved by owner. The warning Mat shall be provided with Chainage marking and the warning mat must be engraved with "Caution: High pressure gas pipeline below" in both English and Hindi along with Client's Logo at a frequency of every meter.
  b. Vendor shall submit proposed Artwork to be marked on the Mat for the approval from Owner / Owner's representative.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- **Tests**

  a. Colour- Fast test

  Test specimen 100 mm to 150 mm wide shall be immersed in a 20% solution of ammonium sulphide at 15 to 20 ºC temperature for 15 days. The colour fastness shall be evaluated by comparing the test specimen with a sample specimen. The comparison shall be made by placing the two specimens on a white back ground in day light, but without exposing them directly to sun light. Test shall be accepted satisfactory, if the colour of the strip remains intact.

  b. Other tests shall be carried out as per relevant national / international standard enclosed in QAP.

- **Packing**

  The warning mat shall be delivered in rolls of 50meters. Packing size to be mentioned to ensure uniformity in delivery conditions of the materials being procured. Bidder shall submit the packing details during offer and also compiled with at the time of delivery.

5.0 QUALITY ASSURANCE (QA)

Manufacturer shall prepare detailed QAP and submit for the approval from Owner / Owner's representative.

6.0 DEFECT LIABILITY

Defect liability period shall be as per the commercial volume I of II

7.0 APPENDIX - I

Vendor to submit the following Data along with BID.

SR.NO.	DESCRIPTION	UNIT	DATA	REMARKS
01.	Average gravimetric Thickness	mm		
02.	Tensile strength at Break (in machine direction)	Kg / cm^2		
03.	Tensile strength at Break (in Transverse direction)	Kg / cm^2		
04.	Elongation at Break (in Transverse direction)	%		
05.	Elongation at Break (in Transverse direction)	%		
06.	Color bleeding	-		
07.	Dimensional stability	% change		

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SS- MEDIUM DENSITY POLYETHLENE BALL VALVE

Rev	Date	Description	Author	Checked	Approved
0	25.04.17	ISSUED FOR TENDER	GS	AD	GSJ

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

TABLE OF CONTENTS

1. SCOPE
2. APPLICABLE CODES, SPECIFICATIONS AND STANDARDS
3. ABBREVIATION AND TERMINOLOGY
4. TECHNICAL REQUIREMENT
5. MATERIAL
6. DESIGN
7. DIMENSIONS AND TOLERANCE
8. DOCUMENT REQUIREMENT
9. QUALITY ASSURANCE PLAN
10. MARKING
11. PACKAGING

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 **SCOPE:**

This technical specification along with datasheet specifies the minimum requirements for design, selection, manufacture, inspection, testing and supply of MDPE Ball Valves and its component made from extruded or injected moulded polyethylene (PE).

This specification elaborates the requirement of MDPE Ball Valve for natural gas distribution systems at operating pressure and operating temperature 4 barg and 25^0C respectively.

This specification is limited to valves with a nominal diameter (de/do) up to and including 180 mm.

Material of grade shall be PE 80 & SDR 11.

2.0 **APPLICABLE CODES, SPECIFICATIONS AND STANDARDS:**

EN 1555-1: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 1: General

EN 1555-2 / ISO 4437-2 / IS-14885: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE)

EN 1555-3: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 3: Fittings

EN 1555-4: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 4: Valves

EN 1555-5: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 5: Fitness for purpose of the system

EN 1555-7: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 7: Guidance for assessment of conformity

ISO TR 13950:1997 or latest edition: Plastics pipes and fittings - Automatic recognition systems for Electro fusions

ISO/IEC 16390:1999 or latest edition: Information technology – Automatic identification and data capture techniques – Bar code symbology specification- Interleaved 2 of 5

ISO 12176-4: Plastics pipes and fittings - Equipment for fusion jointing polyethylene system - part 4: Traceability coding

ISO 17778: Plastics piping systems- Fittings, valves and ancillaries - Determination of gaseous flow rate/pressure drop relationships.

EN ISO 1133, Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics

ISO 3126: Plastics piping systems -- Plastics piping systems — Plastics piping components — Measurement and determination of dimensions

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

PNGRB and other referrals in the above applicable codes.

3.0 ABBREVIATIONS & TERMINOLOGY:

d_n / d_o	: Nominal Outside Diameter
e_n	: Nominal Wall Thickness
SDR	: Standard Dimension Ratio = d_n / e_n
LTHS	: Long Term Hydrostatic Strength (at 20°C for 50yrs)
LCL	: Lower Confidence Limit – Stress value (MPa) of mean LTHS
MRS	: Minimum Required Strength – min. value (in MPa) for LTHS of material
C	: Design Co-efficient – As per ISO: 12162 Table-2
σ_s	: Design Stress (= MRS/C)
MFR	: Melt Mass Flow rate – Value related to viscosity of the molten material at a specified temp. and rate of shear. (expressed in g/10min.)
D_f	: De-rating Co-efficient (Refer Table A.1, Annex A – EN 1555-5)
MOP	: Maximum Operating Pressure = (20 x MRS) / {(SDR-1) x C x D_f}
EF	: Electrofusion

4.0 TECHNICAL REQUIREMENT:

4.1 Design of valve shall be as per European Standards EN 1555-4 and the complementary particular requirement.

4.2 Valves shall be leak proof and it is intended to be use in gas distribution networks made of PE pipes and accessories.

4.3 The valves are laid and to be welded by means of electrofusion method.

4.4 The internal and external surfaces of valves shall be smooth, clean and free from scoring, cavities or other surface defects to an extent that would prevent conformity to EN 1555-4.

4.5 No component of valve shall show any damage, scratches, pitting, bubbles, blisters, inclusions or crack.

4.6 Mechanical characteristics of assembled valves:

a) Valve shall have mechanical characteristics conforming to the requirements given in Table-1 of standard EN 1555-4.
b) Unless otherwise specified by the applicable test method, the test pieces shall be conditioned at (23 ± 2) °C before testing.
c) Testing of valve shall be in accordance with the test methods as specified in Table-1 of standard EN 1555-4 using the indicated parameters.
d) Hydrostatic test pressure and minimum test period shall be as per Table-2 of EN 1555-4.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.7 Physical characteristics of assembled valves:

a) Valve shall have physical characteristics conforming to the requirements given in Table-3 of standard EN 1555-4.
b) Thermal stability test shall be done at 200 deg. C by means of differential scanning calorimetry (DSC), considering oxygen induction time (OIT) ≥ 20 min.
c) Melt mass flow rate shall be calculated at 190 deg. C by applying 5 Kg of load on test specimen. It shall be expressed in g/ 10min.
d) Unless otherwise specified by the applicable test method, the test pieces shall be conditioned at (23 ± 2) °C before testing.
e) Testing of valve shall be in accordance with the test methods as specified in Table-3 of standard EN 1555-4 using the indicated parameters.

4.8 Performance requirements:

When valves are assembled to each other or to components conforming to other parts of EN 1555, the joints shall conform to EN 1555-5.

4.9 Allowable pressure drop shall be as per the standard ISO 17778.

4.10 Color of valve shall be black.

5.0 MATERIAL:

5.1 The PE compound from which the valve body with electrofusion socket is made shall conform to EN 1555-1.

5.2 The PE compound of the valve shall be made only from virgin material conforming to EN 1555-1. PE compound shall be cadmium free pigment compound.

5.3 All parts of the valve in contact with the gas stream shall be resistant to the gas, its condensates and other occurring substances such as dust.

5.4 The PE valves bodies made from below listed material are forbidden:
a) Use of recycled materials
b) Mixture of different materials
c) Addition of complementary materials

5.5 The material and constituent elements used in marking of valve (including elastomers, greases and any metallic part, if used) shall be resistant to the external and internal corrosion and shall have life expectancy under following conditions at least equal to the PE pipes with which they are intended to be used.
a) During storage
b) Under the effect of the gas conveyed
c) With respect to the services environment and operating conditions

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.6 The seals shall be homogeneous without any inner cracks, inclusion or impurities. It can not contain any component that can alter the properties of the materials they are in contact with.

a) The nitrile rubber ring shall comply with standard EN 682.
b) Other seals shall comply with the relevant standard and be suitable for gas service.

5.7 Operating key or extension spindle shall me made of PVC and non-corrosive.

6.0 **DESIGN**

6.1 Valve will be designed for a maximum operating pressure (MOP) equal to 10 barg.

6.2 The wall thickness of the PE valve body shall be equal or greater than the minimum wall thickness of the corresponding SDR 11 series pipes.

6.3 Valve shall be bi-directional.

6.4 Specified End to End dimension in the Data-Sheet is minimum requirement.

6.5 The design of valve shall be such that, when assembling the valve into the pipe or other components, the electrical coil and/ or seals or any other ancillary parts are not displaced.

6.6 Valve ends shall have extended pipes at both plain ends. Pressure rating and thickness of extended pipes shall be compatible with the pipe in the network.

6.7 Valve ends shall be welded to pipes or fittings by means of electrofusion jointing using coupler.

6.8 Electrofusion socket shall have sufficient fusion compatibility to the pipe to which it is fused to meet the requirement of standard EN 1555-4 and EN1555-5.

6.9 PE valves bodies and their PE electrofusion socket / ends shall have a pressure rating of at least that of the pipe to which they are assembled.

6.10 Valve body and valve ends shall not be bolted and screwed and shall also designed that it cannot be dismantled.

6.11 Operating Cap/ Head of valve shall be “non-blow out” type. Size of operating cap shall be 50 mm square socket and 40 mm height as per EN 1555-4.

6.12 The running torque of valve shall be as per standard EN 1555-4. Valve shall be designed in such a way that it cannot be easily operated by hand.

6.13 Operating Key or Extension spindle shall be provided for valve operation as per client requirement. Operating key or extended spindle shall be compatible with operating cap.

6.14 The valve should be equipped with a base plate. In order to achieve this, the valve body will be designed with a flat base or with an attached base plate or an integrated one.

6.15 The operating mechanism and the stop wedges will be protected against water intrusion.

6.16 The valve body is completely sealed except a passage for the spindle mechanism.

7.0 **DIMENSIONS & TOLERANCE:**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

7.1 The dimensions will be in conformity with the standard EN 1555-3 and EN 1555-4.

7.2 Dimensions shall be measured in accordance with ISO 3126 at (23 ± 2) ^{O}C, after being conditioned for at least 4 hrs. The measurement shall not be made less than 24 hrs after manufacture.

7.3 Each valve shall be characterized by its dimensions and associated end connections.

7.4 Technical data given by the manufacture shall include at least following information:

a) the dimensional characteristics, by working drawings
b) the assembly instruction

7.5 The dimensions of electrofusion socket shall conform to EN 1555-3, Table-1.

7.6 Pressure rating or thickness of ends shall confirm to interconnecting pipes specification.

7.7 Tolerance for operating cap of valve shall be (50+0.5) mm square for socket and (40 ± 2) mm for height.

8.0 **DOCUMENT REQUIREMENT:**

8.1 TO BE SUBMITTED ALONG WITH BID

All relevant documents like detailed technical catalogue, technical deviations list (if any) along with quoted price.

8.2 TECHNICAL FILE

The manufactures of the valves-shall deliver for each type of valve a technical file which includes:

a) Raw material used.
b) Drawings, dimensions and tolerances, including for the accessories.
c) Application range (temperature and pressure limits).
d) Running torque and initiating torque.
e) Pressure drop and flow diagram.
f) Test results and Data proving the conformity of the valve in accordance with ENl555-4 and ENl555-7.
g) The pipe elements used during valves testing.
h) The assembly pipes/valves realized during testing shall be in conformity with the manufactures instructions and the extreme installation conditions.
i) For the test assembly due consideration should be taken regarding the fabrication tolerances and the variation of the outside ambient temperature.

9.0 **QUALITY ASSURANCE PLAN:**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The Quality Assurance Plan (QAP). Inspection shall be carried out as per **Annexure –II** and the vendor is to submit the plan accordingly. Vendor to submit their own QAP along with offer based on indicative QAP enclosed in this tender for approval to the Owner / Owner's representative.

10.0 **MARKING:**

Following information shall be embossed upto height of 0.15 mm onto the valve and also in the form of bar code:

a) Owner's name as Client.
b) Manufacturer's name and/or trademark
c) Material and Designation
d) Design application series
e) Nominal diameter
f) Internal fluid gas
g) Direction of flow
h) Traceability code (valve and component) as per standard ISO 12176-4.
i) Number of the system standard. This information can be printed/formed directly on the valve or on a label associated with the valve or on an individual bag
j) Production period, year and month

The marking shall stay legible during normal manipulation, storage and installation.

The marking shall not adversely influence the performance of the valve and prevent the nonconformity of the valve.

11.0 **PACKAGING:**

The valve and its accessories shall be packaged individually in plastic bags in order to prevent them from deterioration. The valves ends shall be protected with external caps.

The cartons and/or individual bags shall bear at least one label with the manufacturer's name, type and dimensions of the part number, number of units in the box and, any special storage conditions and storage time limits.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SUPPLY OF ISOLATION AND APPLIANCE VALVES

SS - ISOLATION VALVE

0	16.05.2018	Issued for Client's Comments	ADE	RNR	AD
Rev.	Date	Subject of revision	Author	Checked	Approved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

TABLE OF CONTENTS

Sr. No. Description Page No.

1.0 INTENT OF SPECIFICATION 3
2.0 SCOPE OF WORKS 3
3.0 DEFINITIONS 3
4.0 MATERIAL SPECIFICATION FOR ISOLATION VALVES 3
5.0 DATA SHEET OF ISOLATION VALVE 5

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of Isolation Ball Valves used for supply of natural gas to domestic & commercial connections.

2.0 SCOPE OF WORKS

The scope of the tenderer will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of Isolation Ball Valves, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in manufacturing standard EN331 (latest edition).

2.1. All codes and standard for manufacture, testing, inspection etc. shall be of latest edition.

2.2. Owner/ Owner's Representative reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 DEFINITIONS

Manufacturer	Means the Manufacturer of the isolation ball valves
SS	Means the present <<Standard Specification>> and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.

4.0 MATERIAL SPECIFICATION FOR ISOLATION VALVES

Please Refer Data Sheet

4.1.1. Markings

Markings shall be provided & shall include:

i) Manufacturer's name or trade mark, Model designation.

ii) Rate working pressure in Barg.

iii) Embossing on valves shall be "**EN 331**" only.

4.1.2. Packaging

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representive before packing the material. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.1.3. Gas Tightness

Valves shall be leak tightness tested in closed position and shall not leak to atmosphere in open and closed position when subjected progressively to internal air pressure of first 0.006 barg and then to at least 1.5 times the maximum operating pressure (MOP) of the valve. This test shall be performed as per EN331 (latest edition).

4.1.4. Temperature resistance test

This test shall be carried out as per EN331 (latest edition).

4.1.5. Mechanical Strength

i) The body of the valves shall be capable of withstanding, without deformation or leakage, a min. torque as per EN331 (latest edition) as applied to a pipe being connected to the valve.

ii) Valve shall be capable of withstanding, without deformation or leakage, a min. bending moment as per EN331 (latest edition) as applied to a pipe being connected to the valve.

iii) The valves shall be capable of withstanding impact without breakage or leakage as per EN331 (latest edition).

iv) Vendor shall submit Model Number along with catalogues in English language along with un-priced bids.

v) Maximum turning torque to operate the valve as per EN331 (latest edition).

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.0 DATA SHEET OF ISOLATION VALVE

S.NO	DESCRIPTION	DATA	
1.00	**PROCESS DATA**		
1.01	Fluid	Natural Gas	
2.00	**Operating condition**		
2.01	Pressure	4 bar (g)	
2.02	Temperature (^{0}C)	0 - 45	
3.00	**Design condition**		
3.01	Pressure	6 bar (g)	
3.02	Temperature (^{0}C)	-5 to 60	
4.00	**VALVE DATA**		
4.01	Size	½" , ¾" & 1"	1 ½" & 2"
4.02	Type	Isolation Ball Valve, Full Bore with NPT (Confirming to ANSI B1.20.1) Female Threaded Ends (both inlet & outlet) for natural gas application with operating knob and locking arrangement, sealing wire and lead seal (without Key). Valve full open/close position shall be at 90^0. The material is required for Domestic Natural Gas Service.	
4.03	Pressure Rating	*	
4.04	End connection	End connection should be NPT Female (conforming to ANSI B1.20.1).	
4.05	Body material	Total body shall be of Forged Brass (ASTM B 283, Alloy UNSC37700) with hard Nickel / Chrome Plated. UTS – Min. 345 Mpa & Elongation 25 %	
4.06	Ball material	Hard Chrome / Nickel Plated (*), Forged Brass (ASTM B 283, Alloy UNSC37700) with Teflon Seat. UTS – Min. 345 Mpa & Elongation 25 %	
4.07	Stem	*	
4.08	Seat & seal	*	
4.09	Fire safe	*	
4.10	Anti blow out	*	
4.11	Antistatic	*	
4.12	Extension stem	NA	
4.13	Operator	Knob and locking arrangement with Butterfly type Handle	Knob and locking arrangement with Lever type Handle
5.00	**PAINTING**		
5.01	Surface preparation	*	
5.02	Primer	*	
5.03	Finish	*	
5.04	Insulation	*	
6.00	**TEST**		
6.01	Hydrostatic Shell Test		
	Test Pressure	7.8 bar(g)	
	Test Medium	*	
6.02	Hydrostatic Seat Test		
	Test Pressure	*	
	Test medium	*	

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

6.03	Functional / Pneumatic Test	
	Test Pressure	7.8 bar(g)
	Test medium	Air
6.04	Tensile Strength Test	As per EN331 (latest edition)
6.05	Bending Test	As per EN331 (latest edition)
6.06	Torque Test	As per EN331 (latest edition)
6.07	Turning Torque Test	As per EN331 (latest edition)
6.08	Antistatic Test	*
6.09	Fire Test	*
6.10	Visual and dimensional examination	As per QAP
Note	Unless otherwise stated all tests will be witnessed by the purchaser	
7.00	**QUALITY CONTROL**	
7.01	Material certificates	EN-10204, 3.2 Certificate
7.02	All testing certificates	*
8.00	**NICKEL-CHROME PLATING**	
8.01	Body, Ball etc.	* (Note-3)

NOTE:

1. All Tests shall be carried out as per EN-331 (Latest Edition).
2. Data / Information as marked " * " shall be provided by Vendor / Manufacturer for review and approval by Client / PMC.
3. Nickel-Chrome Plating thickness shall be 10 micron ± 2 micron on valve body and ball.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SUPPLY OF ISOLATION AND APPLIANCE VALVES

SS - APPLIANCE VALVE

0	16.05.2018	Issued for Client’s Comments	ADE	RNR	AD
Rev.	Date	Subject of Revision	Author	Checked	Approved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

TABLE OF CONTENTS

Sr.No.	Description	Page No.
1.0	INTENT OF SPECIFICATION	3
2.0	SCOPE OF WORKS	3
3.0	DEFINITIONS	3
4.0	MATERIAL SPECIFICATION	3
5.0	DATA SHEET	5

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 INTENT OF SPECIFICATION

The intent of this specification is to establish minimum requirements to manufacture and supply of Appliance Ball Valves used for supply of domestic natural gas.

2.0 SCOPE OF WORKS

2.1. The scope of the tenderer will include manufacture/ supply, inspection/ testing/ marking/ packaging/ handling and despatch of Appliance Ball Valves, as indicated in the Material Requisition & Schedule of Rates, meeting all the requirements as laid down in manufacturing standard EN331 (latest edition).

2.2. All codes and standard for manufacture, testing, inspection etc. shall be of latest edition.

2.3. Owner/ Owner's Representative reserves the right to delete or order additional quantities during execution of order, based on unit rates and other terms & conditions in the original order.

3.0 DEFINITIONS

Manufacturer	Means the Manufacturer of the Appliance Ball Valves
PTS	Means the present <<Standard Specification>> and all its appendix, if any.
Third Party Inspection Agency	Means the Inspection Agency to be appointed by Client.

4.0 MATERIAL SPECIFICATION

Please refer Data sheet.

4.1.1. Markings

Markings shall be provided & shall include:

i) Manufacturer's name or trade mark Model designation

ii) Rate working pressure in Bar.

iii) Embossing on valves shall be "**EN 331**" only.

4.1.2. Packaging

Packing size to be mentioned to ensure uniformity in delivery conditions of the material being procured. Packing size shall be approved by owner / owner's representive before packing the material. Bidder shall submit the packaging details during offer and also complied with at the time of delivery.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.1.3. Gas Tightness

Valves shall be leak tightness tested in closed position and shall not leak to atmosphere in open and closed position when subjected progressively to internal air pressure of first 0.006 barg and then to at least 1.5 times the maximum operating pressure (MOP) of the valve. This test shall be performed as per EN331 (latest edition).

4.1.4. Temperature resistance test

This test shall be carried out as per EN331 (latest edition).

4.1.5. Mechanical Strength

i) The body of the valves shall be capable of withstanding, without deformation or leakage, a min. torque as per EN331 (latest edition) as applied to a pipe being connected to the valve.

ii) Valve shall be capable of withstanding, without deformation or leakage, a min. bending moment as per EN331 (latest edition) as applied to a pipe being connected to the valve.

iii) The valves shall be capable of withstanding impact without breakage or leakage as per EN331 (latest edition).

iv) Vendor shall submit Model Number along with catalogues in English language along with un-priced bids.

v) Maximum turning torque to operate the valve as per EN331 (latest edition).

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.0 DATA SHEET OF APPLIANCE VALVE

S.NO	DESCRIPTION	DATA
1.00	**PROCESS DATA**	
1.01	Fluid	Natural Gas
2.00	**Operating condition**	
2.01	pressure	4 bar (g)
2.02	Temperature (^{0}C)	0 - 45
3.00	**Design condition**	
3.01	pressure	6 bar (g)
3.02	Temperature (^{0}C)	-5 to 60
4.00	**VALVE DATA**	
4.01	Size	1/4”
4.02	Type	Appliance Ball Valve, Full Bore with NPT (Confirming to ANSI B1.20.1) Female Threaded End as an inlet and the outlet shall be having Ni/Cr plated brass or stainless steel nozzle (Serrated to suit 1/4” rubber tubing / hose connection and with a metallic operating knob for full open/close at 90^0 position. The material is required for Domestic Natural Gas Service.
4.03	Pressure Rating	*
4.04	End connection	End connection at the inlet should be NPT Female (conforming to ANSI B1.20.1) and the outlet shall be having Ni/Cr plated brass or stainless steel nozzle
4.05	Body material	Total body including the nozzle shall be of Forged Brass (ASTM B 283, Alloy UNSC37700) with hard Nickel / Chrome Plated. UTS – Min. 345 Mpa & Elongation 25 %
4.06	Ball material	Hard Chrome / Nickel Plated (*), Forged Brass (ASTM B 283, Alloy UNSC37700) with Teflon Seat. UTS – Min. 345 Mpa & Elongation 25 %
4.07	Stem	*
4.08	Seat & seal	*
4.09	Fire safe	*
4.10	Anti blow out	*
4.11	Antistatic	*
4.12	Extension stem	NA
4.13	Operator	Knob with Butterfly type Handle and without locking arrangement
5.00	**PAINTING**	
5.01	Surface preparation	*
5.02	Primer	*
5.03	Finish	*
5.04	Insulation	*
6.00	**TEST**	
6.01	Hydrostatic Shell Test	
	Test Pressure	7.8 bar(g)
	Test Medium	*
6.02	Hydrostatic Seat Test	*
	Test Pressure	*
	Test medium	*

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

6.03	Functional / Pneumatic Test	
	Test Pressure	7.8 bar(g)
	Test Medium	Air
6.04	Tensile Strength Test	As per EN331 (latest edition)
6.05	Bending Test	As per EN331 (latest edition)
6.06	Torque Test	As per EN331 (latest edition)
6.07	Turning Torque Test	As per EN331 (latest edition)
6.08	Antistatic Test	*
6.09	Fire Test	*
6.10	Visual and dimensional examination	As per QAP
Note	Unless otherwise stated all tests will be witnessed by the purchaser	
7.00	**QUALITY CONTROL**	
7.01	Material certificates	EN-10204, 3.2 Certificate
7.02	All testing certificates	*
8.00	**NICKEL-CHROME PLATING**	
8.01	Body, Ball etc.	* (Note-3)

NOTE:

1. All Tests shall be carried out as per EN-331 as per EN331 (latest edition).
2. Data / Information as marked " * " shall be provided by Vendor / Manufacturer for review and approval by Client / PMC.
3. Nickel-Chrome Plating thickness shall be 10 micron ± 2 micron on valve body and ball.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SS – PLB HDPE DUCT

0	03.03.2017	ISSUED FOR APPROVAL	GS	AD	GSJ
Rev.	Date	Description	Author	Checked	Approved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

TABLE OF CONTENTS

1.0 INTRODUCTION 3

2.0 SCOPE 3

3.0 REFERENCE DOCUMENTS 3

4.0 PLB HDPE DUCT SPECIFICATIONS 4

5.0 INSPECTION AND ACCEPTANCE TESTS: 5

6.0 IDENTIFICATION MARKINGS 7

7.0 INSTRUCTION OF TENDERER 8

8.0 TYPE APPROVAL AND ACCEPTANCE TEST: 8

9.0 PACKAGE AND DELIVERY 9

10.0 QUALITY ASSURANCE PLAN 9

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 INTRODUCTION

An Optical Fibre (OFC) system for the Telecommunication requirements has been most suitable for City Gas Distribution pipeline project.

For operation and maintenance of the OFC network, it is desired to purchase double layered permanently lubricated (PLB) HDPE duct for use as underground Optical FibreCable conduits. The HDPE duct shall be either laid in a trench at a depth of 1.65meters or shall be laid through HDD (Horizontal direction drilling) and Optical Fibre cable shall be installed using blowing techniques.

2.0 SCOPE

Objective of this specification is to establish minimum requirements to manufacture and supply of HDPE pipes used for laying OFC.This specification covers the minimum generic requirement of permanently self-lubricated high Density Polyethylene ducts (PLB HDPE ducts) for use as underground conduits for optical fibre cables, suitable for installation of OFC by blowing technique.

The scope of the tender willinclude manufacture/ supply, Inspection / testing / marking / packing / handling and despatch of HDPE pipes as per following specification: per the specification/ requirements given in this document.

Material Grade	50/42, PLB duct as per TEC specifications No. GR/CDS-08/02 Nov 04 or Latest

However Optical Fibre Cable shall be laid in a permanently lubricated HDPE pipe using blowing technique.

All codes and standards for manufacture, testing, inspection etc. shall be of latest edition.

3.0 REFERENCE DOCUMENTS

Unless otherwise specified, this document requires to the latest standards of the following:

TEC/GR/TX/CDS-008/03/MAR-11	Permanently lubricated HDPE telecom Ducts for use as underground optical fibre cable conduits
IS 2530	Method for test for Polyethylene Molding Material and Polyethylene compounds
IS 4984	High Density Polyethylene Pipes for water supply
IS 7328	High Density Polyethylene materials for molding and extrusion
IS 9938	Recommended colours for PVC insulation for LF wires and cables
IS 12235 (Part – 9)	Methods of test for un-plasticized PVC pipes for potable water supplies – Impact strength at 0°C
IS 14151 (Part – 1)	Polyethylene pipes for sprinkler irrigation systems (Part – I Pipes)
ASTMD 1693	Test method for environmental stress cracking of ethylene plastics.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.0 PLB HDPE DUCTSPECIFICATIONS

The PLB HDPE duct shall consist of two concentric layers, the outer layer being HDPE, co-extruded with an inner layer of solid permanent lubricant, to reduce the internal coefficient of Friction (ICF). The lubricant shall be of a solid layer of uniform thickness so formulated to provide a permanent, low friction boundary layer between the inner surface of the duct and Optical Fibre cable. The lubricant layer shall be clearly visible in cross section, concentric with the outer layer.

Alternatively, the duct can be of a homogenous construction (without a separate inner layer) meting all the requirements of this specification.

The PLB HDPE Ducts shall be supplied in coil form, suitable for shipping and handling purposes.

4.1 Construction

Outer Layer

The base HDPE rein used for the outer layer of the PLB HDPE duct shall conform to any designation of IS – 7328 or to any equivalent standard meeting the following requirements, when tested as per IS – 2530. However, the manufacturers shall furnish the designation for the HDPE resin as permanently IS – 7328 as applicable.

Density	0.940 to o.958g/cc at 27ºc, when tested as per IS: 2530 or IS: 7328
Melt Flow Rate	0.2 to 1.1 g/10 minute at 190ºc &5 kg load, when tested as per IS:2530

Inner Layer

The inner lubrication material shall be of friction reducing, polymeric material which shall be integral with HDPE layer. The lubricant materials shall have no toxic or dermatic hazards for safe handling. In the finished PLB HDPE duct, the co-extruded layer of solid permanent lubricant shall be integral part with HDPE and shall be white in colour and clearly visible in cross-section of duct.

The density of inner layer material shall be whitein colour & clearly visible in cross- section of duct. The density of inner layer material shall bebetween 0.940 and 0.958g/cc at 27ºc.

The inner layer of solid permanent lubricant shall be continuous all through and shall not come out during storage, usage and throughout the life of the duct.

4.2 Raw Material

The raw material (s) used for the duct shall meet the following requirements:

- The anti-oxidants used shall be physically harmless.
- None of the additives shall be used separately or together in quantities as to impair long term physical and chemical properties of the duct.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Single pass rework material of the same composition produced from the manufacturer's own production shall be used and it shall not exceed 10% in any case.
- The raw material used for extrusion shall be dried the moisture content to less than 0.1%.
- Suitable UV stabilizers shall be used for manufacturer of the duct to protect against ultra violet degradation, when stored in open for a minimum period of 8 months.
- The raw material used in the manufacturer of the duct shall be such that the service life of the duct can be expected to be more than 50 years including the life of permanent lubricant.

5.0 INSPECTION ANDACCEPTANCE TESTS:

Bidder shall submit Quality Assurance Plan (QAP) immediately after receipt oforder for client's approval. The test and inspection shall be carried out as per the QAP in accordance with the codes and standards outlined in the specification.Following test shall be conducted as a minimum as per the codes and standardsindicated in this document in the manufacturers premises. Test results mustcomply with specifications as per TEC GR Nos. TEC/GR/TX/CDS-008/03/MAR-11, including all the other requirements, which are necessary

Client reserves the right to carry out inspection at vendor place, as per approved QAP, By Client representative or representative of the any third party agency nominated by Client. Notice for inspection shall be given to Engineer-in-charge at least one week in advance.

5.1 Visual Inspection

The ducts shall be checked visually for ensuring good workmanship that the ducts shall be free from blisters, shirks hole, flaking, chips, scratches, roughness, break and other defects. the ducts shall be smooth, clean, round. The ends shall be cleanly cut and shall be square with axis of the duct.

The colour of the duct shall be green and uniform throughout. Each duct shall contain 4 approximately equi-spaced continuous longitudinal stripes of width 3-mm minimum in white colour. These stripes shall be co-extruded during manufacturing. The material of the stripes shall be same as that of base compound for the duct.

In the case of two-layer construction the inner layer (Soil Lubricant) shall be white in colour.

The colours of the duct, stripe and inner layer (in the case of two-layer construction) shall be identifiable under normal lighting conditions and generally conform to IS-9938.

5.2 Dimension of Ducts

Please refer Technical data sheet

5.3 Tensile Strength and Elongation

Test shall be carried out as per ASTM F 2160 (using type IV specimens of ASTM D 638)

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.4 Reversion Test

The test shall be carried out as per IS-4984. For this purpose, a duct length of 200 mm shall be placed horizontally in an air-oven or a suitable liquid bath on a support at 110 ± 2°C for 60 ± 1 minutes so that the dimensional change in duct section are not impeded. After cooling to room temperature, the dimensional change of the duct section shall be measured in the longitudinal direction and the deviation from the initial length shall be calculated and stated in percentage. The dimensions shall not change by more than 3% in the longitudinal direction.

5.5 Environmental Stress Crack Resistance Test

The specimen cut from the PLB HDPE ducts shall meet the environmental stress cracking as described in ASTM D-1693.

5.6 Impact Strength Test

The test has to be carried as per IS-12235 (Part – 9). A sample duct 150 mm in length shall be placed on heavy rigid block whose faces are at an angle of 120°. A striker with a hemispherical nose of 13 mm radius and loaded to a total weight of 10 kg shall be allowed to fall freely in a suitable vertical guide through a height of 1.5 m before striking the duct. The line of fall of the striker shall coincide with the diameter of the duct. The duct shall not crack or split.

5.7 Crush Resistance Test

Samples of duct of 150 mm ± 2 mm in length shall be subjected to a dead load of not less than 50 kg for one minute and shall be allowed to recover for 5 minutes. The deflection with load on and after recovery period shall not exceed 10% and 2% respectively.

5.8 Mandrel Test

A 150-mm long mandrel of diameter, 3 mm less than the internal diameter of the duct shall be passed through a 5-meter length of duct, freely throughout the length, when the duct is bent to a radius of 5 meters.

5.9 Ovality Test

Ovality is the difference between maximum outside diameter and the minimum outside diameter at the same cross-section of the duct, at 300 mm away from the end.

5.10 Coil Set Test:

The PLB HDPE duct shall unroll of the drums without snaking or waving having zero coil set. Thus, the duct shall lay straight into the trench without re-coiling. For this purpose, when a minimum length of 50 meters' duct taken from the coil and laid on the ground, it shall be straight without any bends or kinks and without deformation, except 5 meters from each end.

5.11 Oxidation Induction Test:

The induction time in oxygen when tested with a copper pan as per method specified in Annexure-I of Latest TEC GR and, shall not be less than 30 minutes.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.12 Hydraulic Characteristics:

The duct shall be tested for internal pressure creep rupture test as per IS-4984. For this purpose, a sample length of 10 times the outside diameter of the duct shall be taken. At the end of the test, the sample shall not show signs of localised swelling or leakage and shall not burst during the test duration. The test showing failure within a distance equivalent to the length of end cap from the end shall be disregarded and the test repeated.

5.13 Internal Co-efficient of Friction:

The internal Co-efficient of Friction when tested as permanently method, shall not exceed 0.06 when tested with respect to Nylon jacketed unarmoured Optical Fibre Cable i.e., 48 F Fibre as required.

5.14 Optical Fibre Cable Blowing Test:

For this test an Optical Fibre Cable of a diameter nearest to the diameter indicated in this specification, relevant to the size of duct under test shall be installed by blowing of the cable in a length of 1 km of the duct. The duct shall be laid with bends in the horizontal and vertical planes and a raise in the middle. The 1 km section shall include two couplings at suitable locations.

The OFC shall then be blown out. It shall be inspected for any visual damage. The OFC shall then be blown in again.

It shall be possible to blow in the Optical Fibre Cable through the 1 km duct, each time in not more than 30 minutes. There shall be no visible damage to OFC. The test will be conducted on two samples out of the five submitted for Type Approval.

6.0 IDENTIFICATION MARKINGS

The duct shall be prominently marked with indelible link, with the following information at intervals every meter to enable identification of the pipe. The size of ink markings shall be distinct, clearly and easily visible.

- Client Name
- Client Logo
- Manufacturer’s Name
- Name of the duct with size
- Designation of the Pipe
- Date of manufacturing
- Sequential length marking at every meter.

Marking shall be done in continuous length of pipe as per TEC .In addition to the above the pipe shall be marked as “Client” in continuous lengths at interval of 1 m.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

7.0 INSTRUCTION OF TENDERER

7.1 Length of Pipe:

Length of the Pipes and their supply will be as per following: -

DN 50mm- 500 ± 100 mtr.

7.2 Protection:

The ends shall be protected by proper end caps to prevent from shocks and ingress of the foreign body.

7.3 Documents to be submitted

- The successful bidder shall submit following for approval of Purchaser/ Consultant after placement of order
- The quality Assurance Plan (QAP & Sampling Plan)
- Material Test report as per TEC
- Performance Requirements (TEC)
- Type Test (as per TEC)

7.4 Bidder shall submit following documents at the time of bidding,

a) BIS Certification

b) List of current orders in hand for similar items with full details such as specification, name of purchaser etc.

c) Details of the largest supply executed

d) Name and address of proposed test laboratories along with their credentials / past records for carrying out all required tests.

8.0 TYPE APPROVAL AND ACCEPTANCE TEST:

All the tests mentioned in this document shall be carried out on the 5 standard lengths of ducts and the samples must pass these tests before according the type approval. The supplier shall furnish 5 standard length for carrying out these tests for according type approval. Bulk manufacturer and supply shall start only after issue of type approval. The type approval certificate shall clearly be indicated the type/ grade/ source of high-density polyethylene raw material, the size of the duct and the construction of the duct i.e., Two layer of Homogenous.

8.1 Acceptance Test

The acceptance tests shall be carried out on samples from the lot for Dimensional and Visual requirements. The requirements for Tensile Strength & Elongation, Reversion Test, Environmental Stress Crack resistance, Impact Strength, Crush resistance, Oxidation Induction Test, Hydraulic Characteristics and internal Coefficient of Friction shall be carried out.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

9.0 PACKAGE AND DELIVERY

The store shall be supplied in coils of suitable size for delivery in such a manner that they arrive at their distribution in a safe and undamaged condition and will permit the loading, unloading and handing the stores using standard moving equipment. The minimum inner bending diameter of technical coiled duct shall be 25 times the outer diameter of the cut. The material used for packaging wrapping sealing, moisture, resistant, corrosion prevents etc. as per applicable shall be of recognized brands and shall conform to best standards for packaging. The packing shall protect the material from impact vibration rough handling rain, dust, damp, insects, rodents etc., Each packing should have packing slip and test dispatch clearance documents.

10.0 QUALITY ASSURANCE PLAN

1. Vendor shall submit the details for Quality Assurance Plan followed by them, beginning with raw materials, fabricated components, assemblies, etc., to finished product (As Applicable).
2. The Owner reserves the right to inspect and test duct at all stages of production and testing. The inspection and testing shall include but not be limited to materials, subassemblies, prototypes, produced units, guaranteed, performance specifications etc.
3. For factory inspection and testing, vendor shall arrange all the requirement e.g., quality assurance personnel spaces, test gear etc., for successful carrying out of the job by the Owner's respectively at vendor's cost at the vendor's/ Manufacturer 's works
4. Vendor shall invite the Owner, at least 30 days in advance, of the date on which material shall be ready for inspection and testing. All relevant documents and manuals approved engineering drawings, etc. shall be provided to the Owner well in advance of the start of inspection and Testing.
5. Owner shall, after completion of inspection and testing to their satisfactory, issues factory acceptance certificate to release duct for shipment. No Duct shall be shipped under any circumstances unless a factory acceptance certificate has been issued for it, unless agreed otherwise by Owner.
6. The observation and test results obtained during various tests conducted shall be complied and documented to produce test reports by vendor. The test reports shall be given for each equipment / items and system as a whole.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

	STANDARD SPECIFICATION FOR MDPE LINE PIPE				
			Total Sheets	09	
DOCUMENT NO	VPC	SS	PL	0025	

STANDARD SPECIFICATION

FOR

MEDIUM DENSITY POLYETHYLENE (MDPE)

LINE PIPE

0	10.10.2017	ISSUED AS STANDARD SPECIFICATION	MD	SM	AD
Rev.	**DATE**	**DESCRIPTION**	**PREP**	**CHK**	**APPR**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

TABLE OF CONTENTS

1.0 INTRODUCTION 3

2.0 DEFINITIONS 3

3.0 TERMINOLOGY 3

4.0 DESIGN CODES/ STANDARDS REFERENCES 4

5.0 RAW MATERIAL GRADE AND PROPERTIES 4

6.0 APPROVED MANUFACTURER FOR RAW MATERIAL (PE-80) 5

7.0 PIPE SIZE/ DIMENSION 5

8.0 TOLERANCE 6

9.0 COLOR 6

10.0 MARKING 6

11.0 QUALITY ASSURANCE PLAN (QAP) 7

12.0 TYPE TEST CERTIFICATE 7

13.0 FINISH / DEFECT LIABILITY 7

14.0 FIRST LOT / FIRST CONSIGNMENT LIABILITY 7

15.0 SUPPLY, PACKAGING, HANDLING TRANSPORTATION AND STORAGE OF PE-80 PIPES 7

16.0 DOCUMENTS TO BE SUBMITTED ALONG WITH BID 8

REFERENCES: AMENDMENTS TO THE CLAUSES OF IS-14885:2001 8

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 INTRODUCTION

2.0 DEFINITIONS

Where used in this document, the following terms shall have the meanings indicated below, unless clearly indicated by the context to this order

)

CONSULTANT	:	VCS Quality Services Private Limited (VCSQSPL) the party to act for and on behalf of OWNER for the PMC Services.
MANUFACTURER	:	The party, which manufactures and supplies equipment and services to the OWNER or to CONTRACTOR
MR	:	Material Requisition.

3.0 TERMINOLOGY

- Maximum Allowable Operating Pressure (MAOP): The maximum effective pressure of gas in a piping system, expressed in bars, which is allowed in continuous use. It takes in account physical & mechanical characteristics of the components of piping system.

  The equation for MAOP = 20 x MRS/C X (S D R- 1)

- Minimum Required Strength (MRS) — Minimum value in MPa, for long-term hydrostatic strength (LTHS) of the material.

- Nominal Outside Diameter (d_n): A convenient round number (in millimetres) for reference purposes which is common to all components in all thermoplastic systems, except for flanges and components which are designated by thread size.

- Out of roundness (Ovality): The absolute out of roundness is the difference between the measured maximum outside diameter and the measured minimum outside diameter in the cross - section of pipe.

- Nominal Wall Thickness(e_n): The wall thickness in millimetre
  Corresponding to minimum wall thickness at any point around circumference of the pipe

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Resin: A material (solid or semi-solid) which has a high molecular weight and is a product of polymerization.
- Melt Flow Rate (MFR): is a value relating to the viscosity of the molten material at a specified temperature and a rate of shear.
- Standard Dimension Ratio (SDR). The ratio of nominal outside diameter of a pipe to its nominal thickness.

For any other terminology, IS-14885-2001 (latest) and/ or other applicable National International codes/Standard can be referred.

4.0 DESIGN CODES/ STANDARDS REFERENCES

The following National & international codes/ standards/ references (Latest edition) shall be applicable for PE-80 material as well as Polyethylene pipe.

IS0-14885	Polyethylene pipes for supply of Gaseous Fuels
ISO-4437	Buried Polyethylene pipe for supply of Gaseous fuels – metric Series- Specification
IS-2530	Methods of test for PE moulding materials and PE compound
ISO-11830	Plastic: Methods for determining the density of non-cellular plastic
IS0-1872-28	Plastic: polyethylene (PE) moulding and extrusion material.
ISO-527	Plastics: Determination of tensile properties.
IS0-1133	Plastics - determination of the melt-mass flow rate (MFR) and melt volume flow rate (MVR) of thermoplastic.
EN 1555-7	Gaseous fuels supply polyethylene (PE)

5.0 RAW MATERIAL GRADE AND PROPERTIES

- Raw material grade classification shall conform to Cl.4.2.1 of IS-14885: 2001.
- The raw material of polyethylene pipes shall be PE-80.
- The properties of PE-80 shall conform to the table 2 of IS-14885: 2001.
- Other materials /additives such as, anti-oxidant, UV stabilizer, pigment dispersion etc. shall conform to IS-14885: 2001.
- Raw material of polyethylene pipes shall be of virgin quality. PE compound shall be Cadmium free pigment compound.
- Anti-oxidant & UV stabilised used in PE resin shall not exceed 0.3 and 0.5 % by mass of Finished resin respectively.
- Raw material supplier to supply the certificate for percentage use of U.V. stabilizer in the raw materials (PE compound).

➢ Properties of PE-80

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Property	Unit	Test Method	PE-80
Conventional Density	Kg/m3	IS-7328: 1992	≥ 928.4 at 23°C ≥ 930.0 at 27°C
Tensile Yield strength	MPa	IS-14885: 2001	15, minimum
Elongation at break	%	IS-14885: 2001	350, minimum
Melt-mass Flow Rate	g /10 min.	IS-2530: 1963 IS-14885: 2001	+/- 20% of value nominated by compound producer@ 190°C/ 5.0kg (load)
Thermal stability	Minute	Annexure-D of IS-14885-2001	≥ 20@ 200°C
Oxidation Induction time	Minute	IS-14885: 2001	≥ 20
Volatile Matter Content	(mg/kg)	IS-14885: 2001	≤ 350
Pigment Dispersion		IS-14885: 2001	≤ 3
Resistance to gas constituents	h	IS-14885: 2001	>=20@ 80°C

The above requirements are also same for the final product.

- PE compound quality evaluation shall be as per IS-14885: 2001.

6.0 APPROVED MANUFACTURER FOR RAW MATERIAL (PE-80)

1. INEOS
2. BOREALIS
3. TOTAL PETROCHEMICALS
4. DOW
5. BASELL
6. BOROUGE

7.0 PIPE SIZE/ DIMENSION

- Wall Thickness

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL. NO.	NOMINAL DIA.	MINIMUM WALL THICKNESS,(e) mm	SDR	OVALITY
1	20	3.0	11	IS-14885: 2001
2	32	3.0	11	IS-14885: 2001
3	63	5.8	11	IS-14885: 2001
4	125	11.4	11	IS-14885: 2001

- Length of Pipes

The required minimum length of straight pipes and coils I reels shall be as Follows:

Nominal Diameter (mm)	Packing Length (m)	Straight Length (m)
20	200,Roll	-
32	150,Roll	-
63	100,Roll	-
125	50,Roll	-

- Method of Measurement

The method of measurement of outside diameter, wall thickness, length, ovality etc. of pipe shall conform to IS-14885: 2001 or equivalent code/standards.

8.0 TOLERANCE

❖ Tolerances for Random Length of Pipes

- Tolerances for each rolled pipes - 0/+0.5m
- Tolerances for each straight pipes - 0/+0.05m

❖ Tolerances on Nominal wall thickness at any points of pipe shall be in accordance with IS-14885: 2001 or equivalent codes / standards.

9.0 COLOR

The pipe shall be of YELLOW colour, when the pipe shall be manufactured from PE-80 grade of raw material.

10.0 MARKING

❖ Owner's name as Client to be marked on each pipe.

- All pipes shall be permanently and legibly marked along their length with a legend, which shall be impressed to a depth of not more than 0.15 mm.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Marking details shall be formed in such a way that marking does not initiate cracks or other type of failure and in such a way that with normal storage weathering and processing and permissible method of installation use legibility shall be maintained for the pipe

❖ The embossing for yellow pipe shall have black base. Height of character shall be uniform and at least as given below:

a) 3 mm for pipe less than 90 mm nominal size.

b) 5 mm for pipe greater than 90 mm nominal size.

❖ Legend shall be repeated at intervals of 1 m and shall consist of following Information's:

a) Manufacturer's identity name or trade name,

b) Material and designation

c) Batch no. or lot no

d) Internal fluid

e) SDR

f) Reference of standard

11.0 QUALITY ASSURANCE PLAN (QAP)

Vendor to submit their own QAP along with offer based on indicative QAP enclosed in this tender. However, the same QAP shall be submitted for approval to the Owner/ Owner's representative.

12.0 TYPE TEST CERTIFICATE

Vendor to submit Type Test Certificates as per IS-14885: 2001 along with the offer.

13.0 FINISH / DEFECT LIABILITY

The internal and external surfaces of the pipes shall generally be smooth, clean and free from cavities and other surface defects, which may affect pipe performance. The pipe ends shall be cut cleanly and square to the axis of the pipe and shall be within the tolerances of ends. Defect liability period shall be 24 months from last date of delivery of pipes.

14.0 FIRST LOT / FIRST CONSIGNMENT LIABILITY

Vendor shall supply 1st Lot / 1st Consignment from their Warehouse / Store subject to following tests of at least one sample from that lot / consignment duly witnessed by Client / PMC's Representative:

- Hydrostatic Strength at 80°C for at least 165 hr. as per Cl. 8.1, IS-14885.
- Elongation at break 350 percent (Min.), as per Cl. 8.7, IS-14885.

15.0 SUPPLY, PACKAGING, HANDLING TRANSPORTATION AND STORAGE OF PE-80 PIPES

Packaging shall be done in Hessian cloth (Jute) with polyethylene sheet wrapped around the pipe to avoid direct sunlight and facilitate out-door storage. Packing size to be mentioned to ensure uniformity in delivery conditions of the pipe being procured Bidder shall submit the packaging details during offer and also complied with at the time of delivery. Manufacturer shall make an arrangement for unloading of pipes at Owner's premises.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

16.0 DOCUMENTS TO BE SUBMITTED ALONG WITH BID

All Relevant Documents like BIS Certification, Catalogue Etc. to be Submitted Along With the Bid.

REFERENCES: AMENDMENTS TO THE CLAUSES OF IS-14885:2001

1. **TERMINOLOGY**

1.1 Lot of Batch of Compound

By lot of batch of compound is meant a homogeneous quantity of PE compound of same origin of particular brand.
The lot must be registered under a single identification number (lot No.) which leaves no doubt as to the origin, identity & date of manufacture of the compound.

2. MATERIAL

2.1 Polyethylene Compound

Polyethylene compound used in manufacture of pipes shall not contain following:-

Recycled Materials

Mixture of different material

3. Other Materials

Addition of complementary materials and I or mixture of different materials by the pipe manufacturer is forbidden.

4. PERFORMANCE REQUIREMENTS

4.1 THERMAL STABILITY TO OXIDATION

The Maximum admissible decrease in the oxidation induction time measured on a pipe sample compared to that measured on the raw material shall not exceed 20% of the latter.

5. SAMPLING, FREQUENCY OF TEST AND CRITERIA FOR CONFORMITY

5.1 Acceptance Tests

5.1.1 LOT

All pipes of the same size, same pressure rating and also manufactured essentially under similar conditions of manufacture i.e. made in a continuous process by the same extrusion machine and from the same Lot of batch of compound shall constitute a lot.

6. ANNEXURE – K, (CLAUSE – 11 OF IS-14885): SUPPLY, PACKAGING, HANDLING AND TRANSPORTATION OF POLYETHYLENE PIPES FOR GAS TRANSMISSION

K.1 SUPPLY

Prior to execution of the order, the manufacturer must submit to the company the seals which it intends to use for all the types of pipes ordered. The seals shall preferably be made of PE or material which does not adulterate polyethylene. Metal and PVC seals are not permitted. The seals must be able to withstand storage terms as guaranteed in Clause K6: STORING (of MDPE Pipe) of this Annexure-K and also to withstand handling during installation. They must not be brittle or sharp and the materials, shapes and dimensions

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

thereof most are such that they cannot fully penetrate inside the pipes. They are of the internal plug type for all pipes supplied in straight lengths, and or pipes rolled in coils or on reels, the seals may be caps.

All seals are fitted with valve to prevent pressurization or depressurization of the pipes, depending on climatologically temperature cycles. In theory, they are placed on the pipes immediately after completion of the manufacturing tests, but before storage of the pipes. In the event of acceptance, the pipe plugs are removed and replaced by the supplier. The seals cannot be recycled after the pipes have been installed. Their removal on site should not require the use of special tools.
PE can be delivered in straight length or coils, transported and stored. Care should be taken to maintain the coil diameter at or above the specified minimum to prevent deformation. Coiled pipe should be contained on a dispensing reel. The pipe should be wrapped with non- transparent PE films of 100 mm gauge to protect from ultra violet rays.

K.2 HANDLING

PE pipe is relatively light and flexible however, it is susceptible to damage from sharp objects and stones. It should not be dragged, dropped or subjected to rough handling during loading or unloading, transport, storage or actual installation.

K.3 TRANSPORTATION

When being transported, care should be taken to ensure pipes are not restrained in such a manner as to cause damage to them. Sharp sections bearing against the pipes should be avoided so as to minimize the chance of indentation or scoring of the pipe wall.

Pipes with end treatment should be stacked or supported in such a way that the ends are free from loading. Pipe ends, particularly ends cut for jointing, should be given special attention at all times to ensure they are free from damage.

K.4 STORAGE

Pipes should be stored in such a manner as to prevent damage from elevated temperatures, direct sunlight and contact with chemicals.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

STANDARD SPECIFICATION FOR MEDIUM DENSITY

POLYETHLENE FITTTINGS

0	26.11.2018	ISSUED AS STANDARD	PK	MD	AD
Rev.	Date	Description	Author	Checked	Approved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

TABLE OF CONTENTS

1. SCOPE
2. APPLICABLE CODES, SPECIFICATIONS AND STANDARDS
3. ABBREVIATIONS AND TERMINOLOGY
4. TECHNICAL REQUIREMENTS
5. MATERIALS
6. DESIGN
7. DIMENSIONS AND TOLERANCES
8. DOCUMENT REQUIREMENT
9. QUALITY ASSURANCE PLAN
10. MARKING
11. PACKAGING

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

This specification along with applicable codes and standards describes the minimum requirements for design, selection, manufacture, inspection/ testing and supply of "MDPE FITTINGS".

This specification elaborates the requirements for Electrofusion fittings in the nominal size range 16 mm to 180 mm made from PE compound used with PE pipes for supply of natural gas and to be used at operating pressure 4.0 bar(g) & operating temperature 25°C.

The material grades shall be PE80 and SDR 11.

2.0 APPLICABLE CODES, SPECIFICATIONS AND STANDARDS

EN 1555-1: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 1: General

EN 1555-2 / ISO 4437-2 / IS-14885: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE)

EN 1555-3: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part 3: Fittings

EN 1555-5, Plastics piping systems for the supply of gaseous fuels -Polyethylene (PE)- Part 5: Fitness for purpose of the system

EN 1555-7: Plastics piping systems for the supply of gaseous fuels- Polyethylene (PE) - part *7*: Guidance for assessment of conformity

EN 1716, Plastics piping systems — Polyethylene (PE) tapping tees — Test method for impact resistance of an assembled tapping tee

ISO TR 13950:1997 or latest edition: Plastics pipes and fittings - Automatic recognition systems for Electro fusions

ISO/IEC 16390:1999 or latest edition: Information technology – Automatic identification and data capture techniques – Bar code symbology specification- Interleaved 2 of 5

EN ISO 17778, Plastics piping systems — Fittings, valves and ancillaries' — Determination of gaseous flow rate/pressure drop relationships

EN ISO 1133, Plastics — Determination of the melt mass-flow rate (MFR) and the melt volume-flow rate (MVR) of thermoplastics

EN ISO 3126, Plastics piping systems — Plastics piping components — Measurement and determination of dimensions

ISO 228-1, Pipe threads where pressure-tight joints are not made on the threads — Part 1: Dimensions, tolerances and designation

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

PNGRB and other referrals in the above applicable codes.

3.0 ABBREVIATIONS & TERMINOLOGY

d_n / d_o	: Nominal Outside Diameter
e_n	: Nominal Wall Thickness
SDR	: Standard Dimension Ratio = d_n / e_n
LTHS	: Long Term Hydrostatic Strength (at 20°C for 50yrs)
LCL	: Lower Confidence Limit – Stress value (MPa) of mean LTHS
MRS	: Minimum Required Strength – min. value (in MPa) for LTHS of material
C	: Design Co-efficient – As per ISO: 12162 Table-2
σ_s	: Design Stress (= MRS/C)
MFR	: Melt Mass Flow rate – Value related to viscosity of the molten material at a specified temp. and rate of shear. (expressed in g/10min.)
D_f	: De-rating Co-efficient (Refer Table A.1, Annex A – EN 1555-5)
MOP	: Maximum Operating Pressure = (20 x MRS) / {(SDR-1) x C x D_f}
EF	: Electrofusion

4.0 TECHNICAL REQUIREMENTS

4.1 The design of fittings shall be as per European Standards EN 1555-3 and the complementary particular requirement.

4.2 The fittings are intended to be use in gas distribution networks made of PE and Steel/GI pipes.

4.3 No component of the fitting shall show any signs of damage, scratches, pitting, bubbles, blisters, inclusions or cracks to an extent that would prevent conformity of the fittings to the requirements of this standard.

4.4 Color of the PE parts of fittings shall be black as per PNGRB.

4.5 Allowable pressure drop shall be as per the standard ISO 17778.

4.6 Any melt exudation shall not cause wire movement in electrofusion fittings such that it leads to short-circuiting, when jointed in accordance with the manufacturer's instructions. There shall be no excessive creasing of the internal surfaces of the adjoining pipes.

4.7 Fittings joints shall conform to EN 1555-5 and shall be leak proof.

4.8 Electrical characteristics

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

a) For voltages greater than 25 V, direct human contact with energized parts shall not be possible when the fitting is in the fusion cycle during assembly in accordance with the instructions of the manufacturers of the fittings and of the assembly equipment, as applicable.

b) The manufacturer shall state the tolerance on the electrical resistance of the fitting at 23 °C. The resistance shall not exceed the following value: [nom. value ± 10 %] + 0.1 Ω.
Note: 0.1 Ω is the assumed value of the contact resistance.
The operating voltage of the fittings shall remain 40 +_ 0.5 V.

c) The surface finish of the terminal pins shall allow a minimum contact resistance in order to satisfy the resistance tolerance requirements. Electrofusion terminal connections shall be as per Annex A of EN 1555-3.

4.9 Mechanical characteristics

a) Fittings shall have mechanical characteristics conforming to the requirements given in Table 4 of standard EN 1555-3.

a) The technical descriptions of the manufacturer shall include the following information:
   a) field of application:
      - pipe and fitting temperature limits;
      - pipe series or SDRs;
      - ovality;
   b) assembly instructions;
   c) fusion instructions:
      - fusion parameters with limits;
   d) data for saddles and tapping tees:
      - the means of attachment (tools and/or under clamp);
      - Need to maintain the under clamp in position in order to ensure the performances of the assembly.

b) Unless otherwise specified by the applicable test method, the test pieces shall be conditioned at (23 ± 2) °C before testing.

c) Testing of fitting shall be in accordance with the test methods as specified in Table 4 of standard EN 1555-3 using the indicated parameters.

d) Hydrostatic test pressure and minimum test period shall be as per Table-5 of EN 1555-3.

4.10 Physical characteristics

a) Fittings shall have physical characteristics conforming to the requirements given in Table 7 of standard EN 1555-3.

b) Thermal stability test shall be done at 200 deg. C by means of differential scanning calorimetry (DSC), considering oxygen induction time (OIT) ≥ 20 min.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

c) Melt mass flow rate shall be calculated at 190 deg. C by applying 5 Kg of load on test specimen. It shall be expressed in g/ 10min.

d) Unless otherwise specified by the applicable test method, the test pieces shall be conditioned at (23 ± 2) °C before testing.

e) Testing of fitting shall be in accordance with the test methods as specified in Table 7 of standard EN 1555-3 using the indicated parameters.

4.11 Performance requirements

When fittings are assembled to each other or to components conforming to other parts of EN 1555, the joints shall conform to EN 1555-5.

In case of wall thickness design different from that according to Table-2 of EN 1555-3, fittings and associated joints shall additionally meet the performance requirement listed in Table-6, EN 1555-3.

4.12 Electro Fusion Fitting Jointing

a) For Electro Fusion fitting jointing an electrical resistance element is incorporated in the socket of fitting which when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

b) The effectiveness of this technique depends on attention to the preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surface are clean. If ovality causes gap between concentrically located pipe and the fitting to exceed 1% of the pipe OD after re-rounding to ensure correct welding. If the gap still exceeds 1% of the pipe OD after re-rounding then a check should be made of the pipe OD dimensions to determine if it meets specification.

c) The maximum gap between eccentrically located pipe and fitting i.e. pipe touching fitting at one point must not exceed 2% of the pipe OD.

d) Sometimes coiled pipes may be too oval to fit into couplers, or the end of the pipe may make the alignment of the ends impossible. In such circumstances the use of a mechanical pipe straightener or rounding tool is necessary.

4.13 Electro-Fusion Saddle Jointing

a) For Electro Fusion fitting jointing an electrical resistance element is incorporated in the socket of fitting which when connected to an appropriate power supply, melts and fuses the materials of the pipe and fitting together.

b) The effectiveness of this technique depends on attention to the preparation of the jointing surfaces, in particular the removal of the oxidized surface of the pipe over the socket depth and ensuring the jointing surface are clean.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

c) Method of holding the tapping tee saddle during the fusion cycle are used namely top loading and under clamping space around the pipe. In a trench a minimum clearance of 150 mm is required.

4.14 Conditioning Period

Refer below table (Table-1 of ISO 11413) for minimum conditioning required for joints.

Nominal wall thickness, e_n Mm	**Minimum conditioning period** H
$e_n < 3$	1
$3 \le e_n < 8$	3
$8 \le e_n < 16$	6
$16 \le e_n < 32$	10
$32 \le e_n$	16

5.0 MATERIALS

5.1 The PE compound from which the fittings with electrofusion socket are made shall conform to EN 1555-1.

5.2 The PE compound of the fittings shall be made only from virgin material conforming to EN 1555-1. PE compound shall be cadmium free pigment compound.

5.3 All parts of the fittings in contact with the gas stream shall be resistant to the gas, its condensates and other occurring substances such as dust.

5.4 The PE fittings made from below listed material are forbidden:

a) Use of recycled materials
b) Mixture of different materials
c) Addition of complementary materials

5.5 The material and constituent elements used in marking of fittings (including elastomers, greases and any metallic part, if used) shall be resistant to the external and internal corrosion and shall have life expectancy under following conditions at least equal to the PE pipes with which they are intended to be used.

a) During storage
b) Under the effect of the gas conveyed
c) With respect to the services environment and operating conditions
d) Fittings material in contact with the PE pipe shall not adversely affect pipe performance or initiate stress cracking.

5.6 All metal parts susceptible to corrosion shall be adequately protected.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.7 When dissimilar metallic materials are used which can be in contact with moisture, steps shall be taken to avoid the possibility of galvanic corrosion.

5.8 Greases or lubricants shall not exude onto fusion areas, and shall not affect the long-term performance of fitting materials. Other materials conforming to 4.2.1 of EN 1555-3 may be used provided that it is proven that the fittings conform to this standard.

6.0 DESIGN

Fittings shall be designed for system operation at the pressures given in below table.

Material	M.R.S. MPa	LCL (200C, 50Yrs 97.5%) MPa	Maximum Allowable Operating Pressure	Operating Voltage
PE 80	8.0	10.00 < LCL< 11.19	7.0 bar	40 +_ 0.5V

Fittings shall be free from cracks, voids, blisters, distortion, dent or other defects.

Fittings shall be capable of being fusion jointed to pipes using control boxes. The fittings shall exhibit the strengths and fusion compatibility with pipes of respective sizes.

Each fitting shall be bar coded which shall conform to ISO/TR 13950:1997 & ISO/IEC 16390:1999 or latest edition's and shall have a permanent fusion indicator.

Heating coil design shall be such that it should not be damaged during assembly leading to short circuit of heating coil.

Electrofusion Jointing:

PE pipes, fittings and valves intended to be used for jointing by electrofusion shall be prepared and assembled in accordance with ISO 11413. The conditions for the preparation of the joints are given in clause 4.2.3 of EN 1555-5 for the assessment of fitness for purpose of electrofusion joints.

For joints with electrofusion saddle fittings, the electrofusion saddle fitting shall be fused to the pipe, while it is pneumatically pressurized to the allowable maximum operating pressure. The pipe shall be cut immediately after the manufacturer prescribed cooling time has elapsed.

These joints with electrofusion saddle fitting should be prepared taking into consideration national safety regulations.

For straight equal electrofusion socket fittings (couplers) test joints on selected diameters out of the product range shall be prepared with a gap of $0.05d_n$ between the pipe end and the maximum theoretical depth of penetration of the fitting, where for diameters greater than 225 mm the adjoining pipes shall be arranged to provide the maximum angular deflection possible for the fitting, limited to 1.5°.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

6.1 Electrofusion Socket Fittings

Electrofusion Socket Fittings shall incorporate a method of controlling pipe penetration within each socket. The inner cold zone of each socket shall not be less than (0.1 d + 5) mm for sizes upto 125 mm & 0.1 d for sizes greater than 125 mm.

Depth of penetration (L1) and Fusion zone length (L2) shall be as per figure-1 & Table-1 (Clause 7.1) of SS.

a) Elbow/Bends: Both ends of Elbow/Bends shall be electrofusion type with integral stop.
b) Coupler: Both ends of coupler shall be electrofusion type with integral stop.
c) Reducer: Reducer ends shall be electrofusion type with integral stop.
d) Cap: Caps shall be electrofusion end type for leak proof termination of line.
e) Equal Tee: Main/Header ends of tee shall be electrofusion type. Branch end shall be plain.

6.2 Tapping Tees & Saddles

Tapping Tees and Saddle shall be Wrap Around type for branch connection for ensuring proper alignment and better fusion process.

The tapping tees shall provide a means of cutting through the pressurized main pipe and allowing the gas flow into the outlet pipe. Internal cutter shall be of SS material.

Branch End shall be plain.

Dimensions H, H1, H2 and L shown in figure 2 of SS shall be as per manufacturer standard.

6.3 Transition Fittings

Transition fitting shall be seal tight, pull out resistant and have greater tensile value than that of PE part.

Ends for transition fittings other than electrofusion shall be as per below requirement:

Table – A1

Transition	Size	PE End	Steel / GI End Connection	Min. Length (mm) End to End	Min. Reqd. Steel Length for BE
PE to SS	20mm x 1/2”	EF	Threaded End	80	-
PE to GI	32mm x 3/4”	EF	Threaded End	80	-
PE to CS	32mm x 1”	EF	Threaded End	80	-
PE to CS	63mm x 2”	Plain End	Bevel End	470	400
PE to CS	125mm x 4”	Plain End	Bevel End	570	480
PE to CS	180mm x 6”	Plain End	Bevel End	590	485

6.3.1 PE Pipes to Bevel Ends

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

To make connection between steel pipe and MDPE pipe, specially fabricated transition pieces consisting of Steel and MDPE pipes should conform to the following requirements:

a) MDPE pipe with one end plain should conform to the specification (EN 1555-2 / ISO 4437-2 / IS-14885/ SDR 11).

b) MDPE end shall be compatible (thickness/ nominal size) to the interconnecting PE pipes of the network.

c) Steel end (CS/SS) shall be compatible (grade of material/ thickness/ nominal size) to the interconnecting steel pipes of the network.

d) Steel end of the fitting should be beveled for welding. Angle of bevel should be 30° + 5°.

e) Steel and MDPE pipes should be so jointed in the factory so as to have a monolithic joint which is leak free and should be mechanically as strong as or stronger than the PE Pipe.

f) Minimum required length of steel for transition fitting is specified in Table A1. Vendor to provide adequate length so that the PE part of the fitting / pipe will not get effected during welding at site.

g) Joint between metallic and non-metallic part of transition fitting shall be leak-proof.

6.3.2 PE Pipes to Threaded Ends

a) Transition fitting for jointing of MDPE Pipes conforming to specification SDR 11, IS: 14855/ ISO: 4437/ EN1555-2.

b) The transition fittings shall be electrofusion type for PE connection, NPT Female threading conforming to ANSI B 1.20.1.

c) Steel end (CS/SS) / GI shall be compatible (grade of material/ thickness/ nominal size) to the interconnecting pipes of the network.

d) Joint between metallic and non-metallic part of transition fitting shall be leak-proof.

7.0 DIMENSIONS AND TOLERANCES

Dimensions shall be measured in accordance with EN ISO 3126 at (23 ± 2) °C, after being conditioned for atleast 4 h. The measurement shall not be made less than 24 h after manufacture.

7.1 For Electro Fusion Socket Fittings

For electrofusion sockets (see Figure 1) having a nominal diameter given in Table-1, the socket diameter and lengths shall be given by the manufacturer and shall conform to Table 1 with the following conditions:

a) $L_3 \geq 5$ mm;

b) $D_2 \geq d_n - 2e_{min}$

Where,

e_{min} is the minimum wall thickness specified for the corresponding pipe conforming to EN 1555-2;

D_1 is the mean inside diameter in the fusion zone measured in a plane parallel to the plane of the mouth at a distance of $L_3 + 0.5L_2$ from that face;

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

D_2 is the bore, which is the minimum diameter of the flow channel through the body of the fitting;

L_1 is the depth of penetration of the pipe or male end of a spigot fitting. In case of a coupling without stop, it is not greater than half the total length of the fitting;

L_2 is the heated length within a socket as declared by the manufacturer to be the nominal length of the fusion zone;

L_3 is the distance between the mouth of the fitting and the start of the fusion zone as declared by the manufacturer to be the nominal unheated entrance length of the fitting.

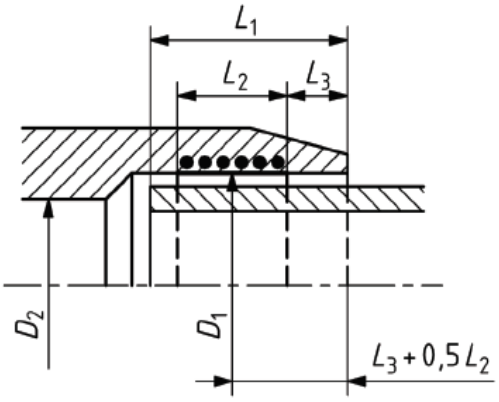


Figure 1 — Dimensions of electrofusion socket fittings

The mean inside diameter of the fitting in the middle of the fusion zone (see L_1 in Figure 1) shall be not less than d_n.

Table - 1

Nominal Diameter d_n (mm)	**Depth of Penetration** L_1, min.			**Fusion Zone** L_2, min.
	Intensity Regulation	Voltage Regulation	L_1, max.	
16	20	25	41	10
20	20	25	41	10
25	20	25	41	10
32	20	25	44	10
40	20	25	49	10
50	20	28	55	10
63	23	31	63	11
75	25	35	70	12
90	20	25	41	10
110	32	53	82	15
125	35	58	87	16
140	38	62	92	18
160	42	68	98	20
180	46	74	105	21

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The manufacturer shall declare the actual minimum and maximum values of D_1 to allow the end-user to determine their suitability for clamping and joint assembly and fitness for purpose testing in accordance with EN 1555-5.

In the case of a fitting having sockets of differing nominal diameters, each one shall conform to the requirements for the nominal diameter of the corresponding component.

7.1.1 Wall Thicknesses

In order to prevent stress concentrations, any changes in wall thickness of the fitting body shall be gradual.

a) The wall thickness of the body of the fitting at any point, E, shall be greater than or equal to e_{min} for the corresponding pipe at any part of the fitting located at a distance beyond a maximum of $2L_1/3$ from all entrance faces if the fitting and the corresponding pipe are made from a polyethylene having the same MRS.

If the fitting is produced from a polyethylene having an MRS that is different from that of the corresponding pipe, the relationship between the wall thickness of the fitting, E, and the pipe, e_{min}, shall be in accordance with Table 2.

Table 2 — Relation between fitting and pipe wall thicknesses

Pipe and fitting material		Relation between fitting wall thickness, E, and pipe wall thickness, e_n
Pipe	Fitting	
PE 80	PE 100	$E \geq 0{,}8e_n$
PE 100	PE 80	$E \geq e_n/0{,}8$

b) In the case of a wall thickness design different from that according to a), fittings and associated fusion joints shall additionally meet the performance requirement given in Table6 of EN 1555-3.

c) When a fitting leaves the site of the manufacturer, the out-of-roundness of the bore of a fitting at any point shall not exceed $0.015d_n$.

d) The dimensional characteristics appropriate to each manufacturer such as the overall dimensions or mounting dimensions shall be specified in a technical file.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

7.2 For Electro Fusion Saddle Tapping Fittings

Outlets from tapping tees and branch saddles shall have an electrofusion socket conforming to Clause 7.1 of SS.

The manufacturer shall specify the overall dimensions of the fitting in a technical file. These dimensions shall include the maximum height of the saddle, H, and for tapping tees the height of the service pipe, H_1 or H_2 (see Figure 2).

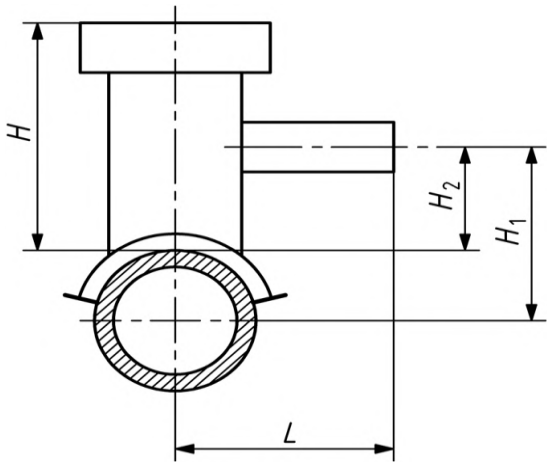


Figure 2 — Dimensions of electrofusion saddle fittings

Where,

H	height of the saddle, which comprises the distance from the top of the main pipe to the top of the tapping tee or saddle
H_1	height of service pipe, which comprises the distance from the axis of the main pipe to the axis of the service pipe
H_2	height of service pipe, which comprises the distance from the top of the main pipe to the axis of the service pipe
L	width of the tapping tee, which comprises the distance between the axis of the pipe and the plane of the mouth of the service tee

7.3 Dimensional Stability:

Couplers (including all forms of socket fittings):

All coupler dimensions shall conform to their specified value when the fitting has been stored for a period of 12 months at a temperature of 30 ± 2°C.

Tapping Tees and Branch Saddle:

All tapping tee and branch saddle dimensions shall conform to their specified agreed values when the fitting has been stored for a period of 12 months at a temperature of 30 ± 2°C.

8.0 **DOCUMENT REQUIREMENT:**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

8.1 To Be Submitted Along with Bid

All relevant documents like detailed technical catalogue, technical deviations list (if any) along with quoted price.

8.2 Technical File:

The manufacturer of the fittings shall make availability of a technical file (generally confidential) with all relevant data to prove the conformity of the fittings to this specification. It shall include all results of the type testing and shall conform to the specification relevant technical brochure (e.g. ISO 12093 for electro fusion fittings).

The technical description of the manufacturer shall include the following information:

a) Field of appliance (pipe and fitting temperature limits SDR's and out of roundness).
b) Assembly instructions.
c) Fusion instruction (fusion parameters with limits).
d) For saddles and tapping tee
    1. The means of attachment (tools and/ or under clamp).
    2. The need to maintain the under clamp in position in order to ensure the performances of the assembly.

For electrofusion fitting, the format of the technical brochure shall conform to ISO DIS 12093.
In the event of modification of the fusion parameters, the manufacturer shall ensure that the joint conforms to this standard.

9.0 QUALITY ASSURANCE PLAN

The Quality Assurance Plan (QAP). Inspection shall be carried out as per **Annexure – I** and the vendor is to submit the plan accordingly. Vendor to submit their own QAP along with offer based on indicative QAP enclosed in this tender for approval to the Owner / Owner's representative.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

10.0 **MARKING:**

Following information shall be embossed upto height of 0.15 mm onto the fitting and also in the form of bar code:

a) Owner name as Client.
b) Manufacturer's name and/or trademark
c) Material and Designation
d) Design application series
e) The size of the fitting in mm
f) Fusion time in seconds
g) Cooling time in minutes
h) Fusion parameters in BAR code
i) Traceability code (fittings) as per standard ISO 12176-4.
j) Number of the system standard. This information can be printed/formed directly on the fitting or on a label associated with the fitting or on an individual bag
k) Production period, year and month

The marking shall stay legible during normal manipulation, storage and installation.

The marking shall not adversely influence the performance of the fitting and prevent the nonconformity of the fitting.

11.0 **PACKAGING:**

The fittings shall be packaged in bulk or individually protected where necessary in order to prevent deterioration. Whenever possible, they shall be placed in airtight plastic bags in card board boxes or cartons.

The cartons and/or individual bags shall bear at least one label with the manufacturer's name, date of manufacturer, type and dimensions of the part, number of units in the box, and any special storage conditions and storage.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS PROJECT CONSULTANTS PVT. LTD.

STANDARD SPECIFICATION

FOR

HEALTH, SAFETY & ENVIRONMENT

VPC – SS – PL - 0021

REV. No	DATE	Purpose	Prepared By	Checked By	Approved By
00	20.06.2018	ISSUED AS STANDARD	PK	MVK	AD

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Contents

1.	SCOPE	3
2.	APPLICABLE SYSTEMS AND PROCEDURES	3
3.	REFERENCES	4
4.	RESPONSIBILITY & ORGANISATION	4
5.	GENERAL REQUIREMENT	4
6.	TRAINING	5
7.	TOOL BOX TALKS	5
8.	INCIDENT/ACCIDENT AND NEAR-MISS REPORTING, INVESTIGATION AND FOLLOW UP	5
9.	HAZARD IDENTIFICATION AND RISK ASSESSMENT SYSTEM (HIRA)	6
10.	SITE HSE INSPECTION/AUDIT	6
11.	FIRST AID FACILITY	7
12.	FITNESS TO WORK	8
13.	PERSONNEL PROTECTIVE EQUIPMENTS	9
14.	EQUIPMENT LIST AND INSPECTION CERTIFICATE	11
15.	HSE REQUIREMENTS AT SITE	11

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1. SCOPE

This specification establishes the Health, safety and Environment (HSE) aspects to be complied with by the contractor during construction at site.

2. APPLICABLE SYSTEMS AND PROCEDURES

The reference standard for setting Quality, Health, Safety and Environment Systems and procedures will be as linked below –

- Guidelines issued by PNGRB.
- ISO 9001 – 2008 - For Quality System.
- ISO 14001 – 2004 - For Environmental Management System
- (OSHAS) 18001-2007 -For occupational health and safety management Systems.

The Occupational Health & Safety Assurance Standard (OHSAS) 18001-2007 gives requirements for an occupational health and safety (OH&S) management system. It enables an organization to control its OH&S risks and improve its performance. It provides a basis for an organization to specify its OH&S performance criteria and design the management system.

OHSAS 18001 is compatible with the ISO 9001 (Quality) and ISO 14001 (Environmental) management systems standards. This facilitates integration of quality, environmental and occupational health and safety management systems by an organization.

Organization structure of the proposed CGD project includes a position for developing, installing and maintaining (with assistance by a specialist entity) Quality Assurance (QA) and Health, Safety and Environment (HSE) systems in line with ISO 9001-2008, OHSAS 18001-2007 and ISO 14001- 2004 Standards.

Documented Standard Operating Procedures (SOP) will be prepared by the Owner/Owner's representative for CGD entity for QA and HSE, for application across the organization. Development of the SOPs and implementation of the same at construction sites, control rooms, regional and corporate offices will be followed by an internal audit to verify conformance.

The CGD Network operating entity will thereafter regularly monitor, through periodic internal and mandatory external audits, effective implementation of the SOPs at the construction sites, control rooms regional and corporate offices as per systems and procedures.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

3. REFERENCES

This document should be read in conjunction with following.

- General Condition of Contract (GCC)
- Special Condition of Contract (SCC)
- Job Specifications
- Relevant IS codes, OSHAS standard
- Reporting Formats

4. RESPONSIBILITY & ORGANISATION

Health, Safety and Environment activities at site shall be under Contractor's scope. Contractor shall be responsible for implementation of HSE provisions. The nominated or designated safety engineer/ officer shall assist and perform day to day HSE work as per his advice.

5. GENERAL REQUIREMENT

5.1. The contractor should follow HSE policy of owner as applicable to construction site.

5.2. The contractor shall ensure that HSE requirements are clearly understood & faithfully implemented at all level, at each site.

5.3. The contractor shall organize safety awareness programs regularly.

5.4. The contractor shall ensure his participation in every HSE meeting called by owner/owner representative.

5.5. The contractor shall conduct daily tool box talk.

5.6. Contractor shall ensure that their safety supervisor must always be present at site.

5.7. Contractor shall take sufficient care in moving his plants, equipment's and materials from one place to another place so that they do not cause any damage to any person or the property of the owner or any third party.

5.8. Working after sunset is strictly prohibited.

5.9. Hygiene requirement must be met on site by providing fresh drinking water at each site

5.10. The contractor shall submit Monthly HSE reports (Form attached in ANNEXURES).

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.11. The contractor shall provide one four wheeler at site during working hour to meet any contingency.

5.12. The contractor shall adhere consistently to all provisions of HSE .In case of non- compliance or continuous failure the owner/ owner representative may impose stoppage of work for the serious HSE violation. All works shall be carried out in presence of Owner/Owner's Representative only.

6. TRAINING

The Contractor duties shall include conducting HSE training for all activities and personnel involved.
The Contractor shall ensure that their Personnel have been given the necessary HSE and work-related skills training in compliance with regulatory requirements prior to engaging the personnel for the work.

7. TOOL BOX TALKS

Contractor's Site Supervisor for specific work location shall conduct a tool box at the commencement of work on daily basis. If different team is working in different area, separate tool box talk covering location and hazard involved shall be carried out.

Each toolbox meeting shall cover the following agenda:

- Discuss safety issues of previous day
- Brief description of activities planned for the day &associated hazard
- Information & resources required to put controls in place
- Location specific hazard and instructions.
- Requirements Open

It is the responsibility of supervisor to convey PPE requirement to all workers and ensure compliance of the same and shall be checked during tool box talk before embarking on work.

Tool box talk report shall be prepared and kept at site within one hour of talk and it must be signed by all attendee to ensure participation of all in the talk. Tool box report shall be submitted to CONSULTANT/ OWNER

8. INCIDENT/ACCIDENT AND NEAR-MISS REPORTING, INVESTIGATION AND FOLLOW UP

8.1. Incident/Accident and Near-Misreporting
All incidents/accidents must be reported immediately. A report should be prepared by the Supervisor and submitted to the Site Manager within 12 hours of the occurrence and shall serve as a source for education of employee to prevent reoccurrence of similar

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

incident/accident.

Contractor shall submit the Initial report of all Accidents/Incidents within 12 hrs.to Owner / Consultant and detail report within 24 hrs. For serious incidents and near misses, with the potential for fatality, serious injury or significant environmental or material damage, Contractor shall notify Owner/Consultant without delay and within twenty four (24) hours.

8.2. Incident/Accident Investigation

All incidents/accidents must be reviewed and analyzed to establish root causes and type of injury, trends and practices.

Investigation shall begin promptly after the occurrence of the incidents/accidents. The completed incidents/accidents investigation report shall be submitted to the Contractor Site Manager within 7 days of the occurrence. A copy shall be submitted to Owner/Consultant.

8.3. Follow-up

All incidents/accidents, including investigation results and recommendations, shall be discussed in the Site HSE meeting and shall be brought to the notice of employees in toolbox meetings.

Key Risks Identification and Management Risks

Working at height is a critical activity. Following hazards are associated with Working at height:

- Person Fall from height
- Material falling From height
- Slips, trips and falls
- Concealed utilities (i.e. electric cable Telephone cable, water line, Drainage line}
- Electric shock

9. HAZARD IDENTIFICATION AND RISK ASSESSMENT SYSTEM (HIRA)

The Contractor shall prepare and implement comprehensive HIRA as part of the HSE Management Plan prior to Commencement of the work or services and during the execution of the work also.

10. SITE HSE INSPECTION/AUDIT

All Site HSE checklists/Inspection reports shall incorporate a follow–up procedure to ensure that any recorded HSE violations have been promptly attended to in a satisfactory manner.

The Site HSE Inspections/Audit shall be planned by the Contractor.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

11. FIRST AID FACILITY

The contractor shall provide the first aid box at all the sites. The content of the first aid box shall include the following items:

- Twenty-four small sterilized dressings.
- Twelve medium size sterilized dressings.
- Twelve large size sterilized dressings.
- Twelve large size sterilized burn dressings.
- Twelve (15 gin) packets of sterilized cottonwood.
- One (200 ml) bottle of certified solution (1 per cent) or a suitable antiseptic solution.
- One (200 ml) bottle of mercurochrome (2 per cent) solution in water. (viii) One (200 ml) bottle of salt-volatile having the dose and mode of administration indicated on the label.
- One pair of scissors
- One roll of adhesive plaster (6 cm x 1in).
- Two rolls of adhesive plaster (2 cm. x 1in).
- Twelve pieces of sterilized eye pads in separate sealed packets.
- One polythene wash bottle (500 cc) for washing eyes.
- Twelve roller bandages 10 cm wide.
- Twelve roller bandages 5 cowhide.
- Six triangular bandages.
- One tourniquet.
- A supply of suitable splints.
- Two packets of safety pins.
- Kidney tray.
- One copy of first-aid leaflet issued by the Directorate General of Factory Advice Service and Labor Institutes, Government of India, Bombay.

All the content shall be kept in clearly marked and easy to remove cartons stored in such a manner that there is no rattling or spilling over even when the container is being moved Whenever applicable the cartons shall bear instructions for use, dosage etc.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

12. FITNESS TO WORK

The objective of Medical Assessment for Fitness to Work (FTW) is to assess health of employees in relation to their specific jobs such as working at height, to ensure they could perform required task without risk to health and safety.

The Contractors workers (as per the above category) shall under go through FTW prior to start work at site. It will be the responsibility of the Contractor to ensure compliance to this requirement.

12.1. Medical Examination requirement for working at height

Below specific requirements are must for Medical examination of Contractors employees working at height:

- History of Epilepsy.
- Blood Pressure.
- ECG+ any History of any Seizures.
- Vision Check.
- Blood Sugar (fasting &PP).
- And other general tests.
- Physical Examination- to confirm the person is physically fit.
- Blood Group (One time Test).
- General check about fear of Heights.

12.2. Other Requirements:

- Contractor to ensure that persons involved in working at height are trained, certified and having Valid I Card.
- Carry out tool box talk before starting of the work.
- Carry out site specific risk assessment and identify risk control measures for specific site work. (Ref doc).
- Ensure that persons are physically & mentally fit for working at height.
- Ensure that equipment shall be used as per approved standard for working at height.
- Ensure that equipment shall have facility of emergency rescue operation.
- Ensure person involved in working at height are trained in emergency rescue

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

operation.

- Ensure that all equipment and safety devices used are inspected, certified by competent authority & valid & suitable for use.
- Quality conformance shall be carried out prior to start of work for working at height equipment's.
- Life cycle of equipment shall be checked
- In case of any part of equipment is found damaged or defective, it will be destroyed. "Working at height equipment's shall never being repaired". The Records, showing reasons for all the defective and damaged material shall be available and shall be stored separately at Contractor's yards.
- Ensure that Personnel Protective Equipment are inspected & in good condition
- Ensure that equipment used is within Safe working load mentioned on equipment.
- Ensure all tools are secured or kept in Tool kit / bag and there are no loose objects or tools.

13. PERSONNEL PROTECTIVE EQUIPMENTS

The contractors shall provide sufficient numbers of following personnel protective equipment's (PPE's) to workmen and supervisors/engineers to use them properly at work site.
Following five numbers of Personnel protective equipment's are identified as MANDATORY for all.

- Safety Helmet
- Coverall
- Safety shoes/footwear
- Safety Glasses
- Hand Gloves (as per job requirement) Other PPEs shall be as per job requirement like Work at height- Full body harness (PETZL or equivalent make), Life line, Safety Net Arc Welding – Welding face shield Grinding – Grinding face shield Height work – Full Body harness (above 2 meters) Contractor to ensure proper use and selection of protective clothing / equipment for specialized jobs.

PPE's to be used shall be as per following Specification:

IS : 2925 – 1984 : Industrial Safety Helmets.

IS : 4770 – 1968 : Rubber gloves for electrical purposes

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

IS : 6994 – 1973 (Part – I)	: Industrial Safety Gloves (Leather& Cotton)
IS : 1989 – 1986 (Part – I &	: Leather safety boots and shoes
IS : 3738 – 1975	: Rubber knee boots
IS : 5557 – 1969	: Industrial and Safety rubber knee boots
IS : 6519 – 1971	: Code of practice for selection, care and repair of Safety footwear
IS : 11226 – 1985	: Leather Safety footwear having direct molding sole
IS : 5983 – 1978	: Eye protectors
IS : 9167 – 1979	: Ear protectors.
IS : 3521 – 1983	: Industrial Safety belts and harness

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Technical Standard for working at height equipment's shall be as per following standard:

Quality Standards

Sr. No.	Name of equipment's	EN Standard
1	Energy absorbers	365
2	Slings	566
3	Retractable type fall arresters	360
4	Guide Type fall arresters on a rigid	353-1
5	Connectors	362
6	Dynamic mountaineering rope	892
7	Descended device	341
8	Anchor device Type-A/B	795
9	Fall arrester harness	361
10	Sit harness	813
11	Lanyards	354
12	Pulleys	12278
13	Fall arrester system	363
14	Work positioning belt	358

14. EQUIPMENT LIST AND INSPECTION CERTIFICATE

Equipment list must be made available and must be certified for safety as per the requirement of Factory Act. Tools and Tackles should be calibrated from the approved agency only.

List of Tools and Tackles

Item	Inspection/Calibration Date
Full body harness	Once in six Month
Rope Grab fall arrestor	Once in six Month
First Aid Box	Once in Month
Fire Extinguisher (10 Kg.)	Once in a Year
Extension board(without cable Joint with Socket) with Circuit Breaker	Monthly
Nylon tie line for tools	Once in a day

15. HSE REQUIREMENTS AT SITE

Contractor may conduct survey to assess the requirement of GI riser for high rise building.

For Work at Height: Contractor shall provide PETZL or equivalent system/metallic

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

scaffolding as a working platform and full body harness with self-locking arrangement. Full body harness with self-locking arrangement shall be used for ascending/descending/work rest.

PETZL system or equivalent system/metallic scaffold should comply with relevant IS/EN/BS standard.

Only certified trained plumber undergone practical training on work at height shall be deployed.

15.1. Any working at height related activities has to be carried out with Permit system.

Work at Height

Working at Height is performing work at height where workers can fall 1.8m or more from where they stand or sit to perform work. This includes gaining access to working at height if there is a risk of falling 1.8m or more.

Examples of Working at Height are:

- Working on temporary platform more than 1.8mhigh
- Working on top of vehicles/tankers or building more than 1.8 m high Risk of Working at Height
- Fall from height
- Falling objects

Safety net, fall arrest system and two lanyard full body harness when working at height
While working at height, all loose tools shall be kept inside a container and good housekeeping shall be maintained.

All Working at Height shall comply with Working at Height Procedures Safety Net System.

"Safety net systems" Safety net systems and their use shall comply with the following provisions.

Safety nets shall be installed as close as practicable under the walking/working surface on which workers are working, but in no case more than 30 feet (9.1 m) below such level. When nets are used on bridges or similar kind, the potential fall area from the walking/working surface to the net shall be un obstructed.

Vertical distance from working level to horizontal plan of net	Minimum required horizontal distance of outer edge of net from the edge of the working surface
Up to 5 feet	8 feet
More than 5 feet up to 10 feet	10 feet.
More than 10 feet	13 feet

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Safety nets shall be installed with sufficient clearance under them to prevent contact with the surface or structures below when subjected to an impact force.
- Safety nets and safety net installations shall be drop-tested at the jobsite after initial installation and before being used as a fall protection system, whenever relocated, after major repair, and at 6-month intervals if left in one place. If drop test not possible designated competent person shall certify that the net and net installation is in compliance with the requirement by preparing a certification record prior to the net being used as a fall protection system. The certification record must include an identification.
- Determined that the identified net and net installation were in compliance and the signature of the person making the determination and certification. The most recent certification record for each net and net installation shall be available at the jobsite for inspection.
- Defective nets shall not be used. Safety nets shall be inspected at least once a week for wear, damage, and other deterioration. Defective components shall be removed from service. Safety nets shall also be inspected after any occurrence which could affect the integrity of the safety net system.
- Materials, scrap pieces, equipment, and tools which have fallen into the safety net shall be removed as soon as possible from the net and at least before the next work shift.
- The maximum size of each safety net mesh opening shall not exceed 36 square inches (230 cm) nor be longer than 6 inches (15 cm) on any side, and the opening, measured center-to-center of mesh ropes or webbing, shall not be longer than 6 inches (15 cm). All mesh crossings shall be secured to prevent enlargement of the mesh opening.
- Each safety net (or section of it) shall have a border rope for webbing with a minimum breaking strength of 5,000 pounds (22.2kN).
- Connections between safety net panels shall be as strong as integral net components and shall be spaced not more than 6 inches (15 cm) apart.

15.6.1 Lifeline

- Horizontal or vertical life line shall be used while working on suspended platform or similar type of platform or working at thereof/edge
- Horizontal/Vertical lifelines shall be designed, installed, and used, under the supervision of a qualified person, as part of a complete personal fall arrest system, which maintains safety factor of at least two.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Lanyards and vertical life line shall have a minimum breaking strength of 5,000 pounds (22.2kN).
- When vertical lifelines are used, each worker shall be attached to a separate lifeline.

15.6.2 Full Body Harness

- Ensure that the full body harness must be inspected prior tousle.
- Ensure that full body harness must be worn by the workmen while working at height.
- Full body harness lanyard must be anchored with a strong member.
- While climbing up or climbing down, one of the hooks of lanyard must be locked alternatively all the time.

15.6.3 Working Platform

Every working platform more than 1.8 mtr. High from which a person is likely to fall shall be of steel plates/planks/cage and shall be:

- Closely boarded, planked or plated.
- At least 700 mm wide if the platform is used as a footing only and not for the deposit/ keeping of materials.
- At least 900 mm wide if the platform is used for the deposit of materials.
- At least 1100 mm wide if the platform is used for the support of higher platform.
- Two metal/planks shall not have 25 mm gap between them the distance between two consecutive transoms or other supports on which a platform rests shall be fixed with due regards to the anticipated load and the nature of platform flooring. As a general rule such transoms shall not be placed more than 1.0 mtr. apart.

15.6.4 Scaffold

Scaffold Inspector (Project Field Officer)

This is the competent individual who shall inspect scaffolding prior to each use and perform full inspections as per the Inspection procedure. He will accept the Scaffold after ensuring the followings;

- The scaffold erected complies with legislation.
- The permissible loads per deck and the working distance between the

Copyright VCS Project – All rights reserved

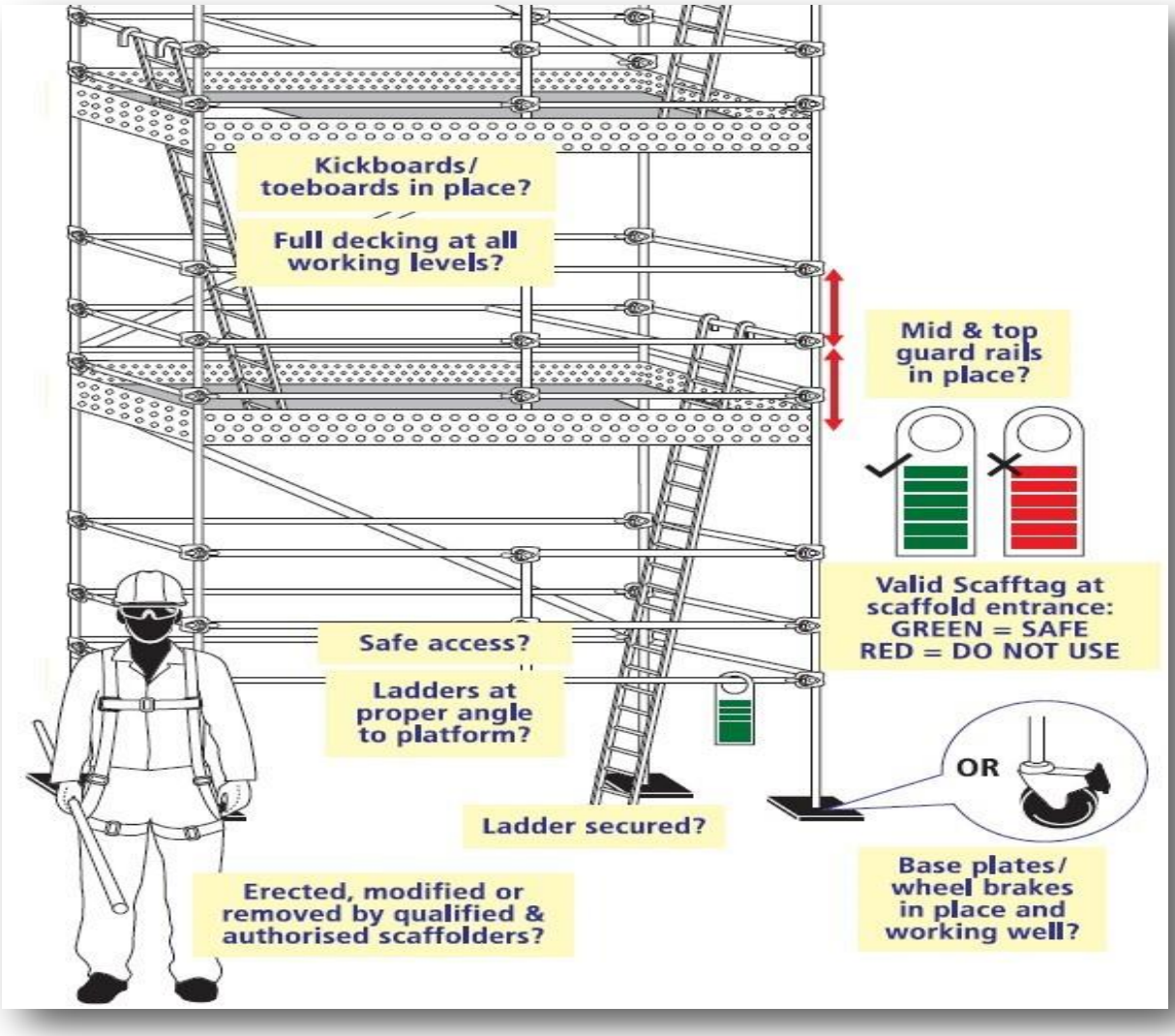
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

scaffold and the work surface are examined.

- Materials used for the scaffold are in a proper condition and in throughout the time it is in place.
- Existence and proper installation of collective protective equipment and means of access.
- Clear display of details of permissible loads on the scaffold.
- Acceptance is carried out prior to the scaffold being made available for the first time and is repeated after any alterations.
- Inspection is repeated at the frequency of 7 days. Issues scaffold tag (Green Tag) before its first use.

Scaffold Contractor

This refers to the company involved in the installation (erection, dismantling and alteration) and/or design of the scaffolding on behalf of CONTRACTOR.



Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- The erection contractor shall ensure that the scaffolding is erected in compliance with the OHSAS/IS standards. Worksite specifications and considerations shall be incorporated into any such plan.
- Ensure availability of competent staff and certified material all the time.
- Scaffolding may be erected, dismantled or altered only under the supervision of a competent individual who has received adequate specific training for the intended operations, specifically including the following:
- Understanding the erection, dismantling and alteration plans for the scaffolding
- Ensure PPEs and Safety at work during erection ,dismantling and alteration of the scaffolding.
- Measures designed to prevent the risk of falling person's and objects.
- Safety measures applicable in the event of a change in weather conditions.
- Permissible structural load criteria.
- Any other risk that may be entailed by erection, dismantling and alteration operations.
- Scaffold material: Safe handling, and storage.

Scaffold User

- The User shall ensure that acceptance of the scaffold has been properly carried out; green Tag is issued and provide notification of any alterations. Work from tagged scaffolds only. Comply with special conditions/additional controls noted on the access tag.
- It shall observe all restrictions on use (particularly permissible loads). Its requirements should be taken into consideration in the specifications during erection.
- Use scaffolds only for their intended purpose.
- Do not use unstable objects or makeshift devices to increase the working height of the scaffolds.
- Use portable ladders as a means of increasing the working height only after the competent person has determined that the stability of the structure has not been compromised, and adequate fall protection is in place.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Do not straddles, stand on, or work outside of the guardrail.
- Use designed access means to descend or ascend a scaffold (stairs, attached ladder, or specially designed end frames). Do not uses cross bracing or side rail
- Keep only the tools and materials on the platform that are necessary to perform the task. Control all slipping and tripping hazards by removing or securing the tools/materials.
- Do not modify or remove a scaffold system/component or status tag.
- Notify supervision immediately if a scaffold is damaged, weakened, or otherwise deficient.
- Scaffold users/ Scaffold erectors shall use IS and EN standard double lanyard safety harness with absorbent.

Inspection Points

To ensure the integrity and proper installation of scaffolding, a certain number of points shall be inspected. Inspection of these points ensures a basic level of safety. Following fundamental inspection points are as follows:

- Environment and location
- Supports and soleplates
- Structure and posts
- Decks
- Scaffold Capacity Standards
- Working levels
- Access
- Signs and signage

Mobile Scaffolding

- Mobile scaffolds are identical in design to fixed scaffolds, except that their tubular structure is lighter and in terms of support, the wheels do not offer the same load-bearing area as footplates on fixed scaffolds.
- Erection is simple and shall be carried out using personal protective equipment. Lastly, during erection, dismantling and use, the brakes shall also be applied. Care should be taken to ensure that mobile scaffolds are installed on flat surfaces.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Mobile scaffolds are highly practical for short jobs at relatively low heights.
- Acceptance is carried out after erection has been completed.
- They are moved as the work being carried out progresses. No fresh acceptance is required after each move, but the workstation shall be verified (working distance, brakes applied)
- A freestanding scaffold shall be considered safe when the total height is equal to or less than four times the minimum or least base dimension.
- Rules for use
- Do not extend the base to increase the height.
- Brace each frame level as per the manufacturer’s instructions.
- Do not raise work surfaces by placing decks on rails or midribs.
- Do not climb on the guardrails or other structural components.
- Observe the manufacturer's guidelines governing the installation of brackets, material hoists etc.
- Stay clear of power lines and observe safety distances. (If any)

Scaffold safety

The following safety tips are as guidelines in avoiding job-site situations that could prove dangerous to scaffold workmen.

- The Scaffold to the Building: Scaffolding should be tied to the structure using heavy wire or tie-in devices. The first vertical tie should be at the maximum height of 4 times the narrowest base dimension. Additional ties are not to exceed 26 feet vertically. Maximum horizontal distance between ties is not to exceed 30feet.
- Don't Overload Scaffolding: Follow the safe load capacities as given by the scaffold manufacturer. There's a limit even to what steel can support. A4-to-1-safety factor must be figured on scaffolding.
- Use Metal Catwalks, Platforms; where available. If wood plank is used, it must be scaffold grade or better. Inspect thoroughly before every job to make sure it is free from breaks, knots, and cracks or warp age. Decking should be full width.
- All working platform must be constructed with the specific requirement of job.
- If the working platform is not permanent then safety belt must be used.
- There shall be firm foundation for all scaffoldings. All scaffolding shall be made of sound material.

Copyright VCS Project – All rights reserved

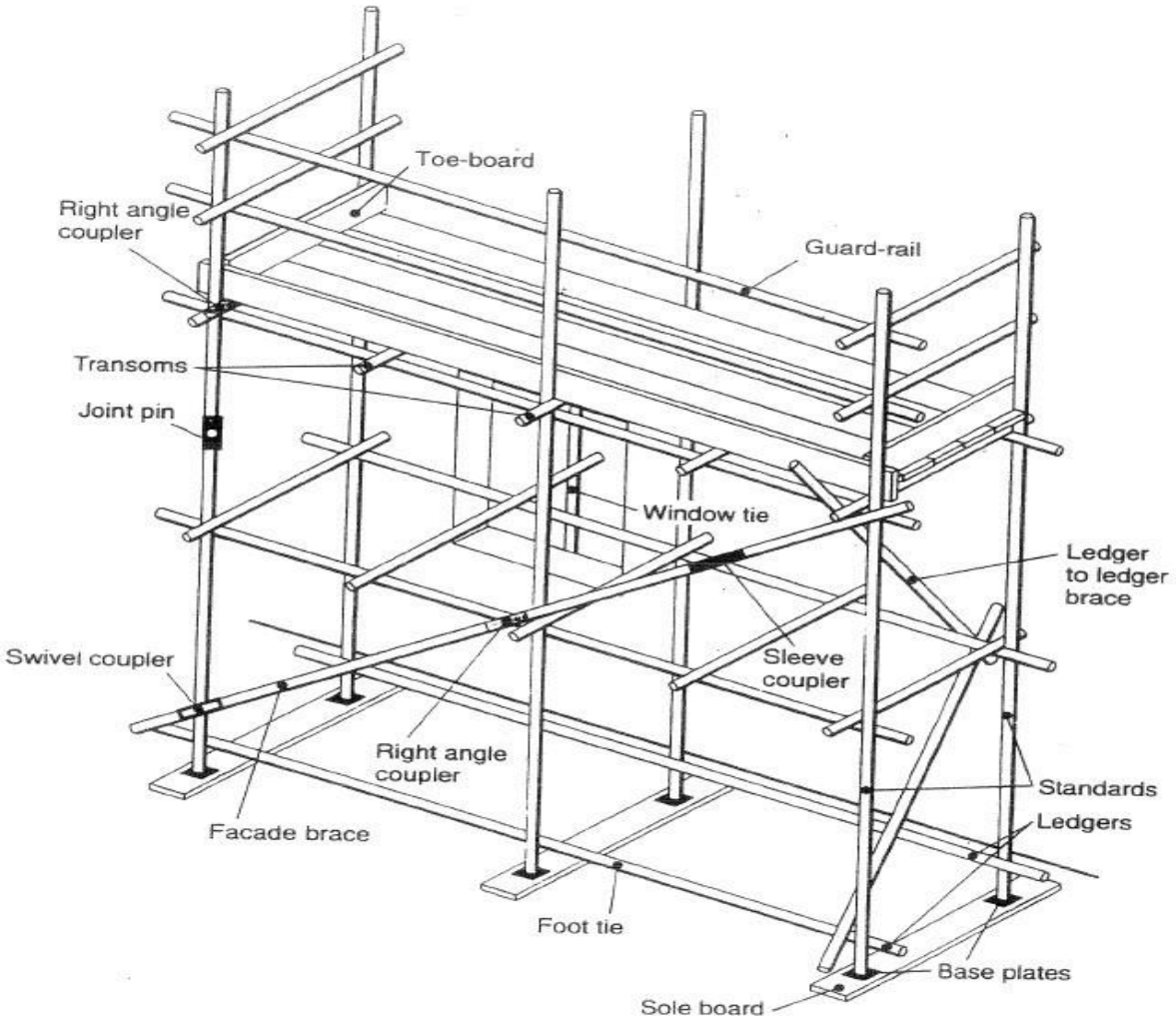
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Scaffolding material shall be inspected and used, only if found in good condition.
- Provide metal base plate is used under all upright or standard scaffoldings. Correct type of couplers shall be used for all connections.
- Plumb and level scaffoldings as erection proceeds, so that braces will fit without forcing.
- Fasten all braces securely.
- Working platforms shall be provided with guards. This should consist of top rail, mid rail, and toe board. The toe board shall be of minimum height 100 mm, while the mid rail and top rail shall be at heights of 600 mm and 1200 mm respectively.
- Do not use ladders or makeshift devices on top of scaffoldings to increase the height.
- Shall be placed at least 75 deg. to the floor.
- Fall arrestor to be used where ever applicable.
- The following safety tips are as guidelines in avoiding job-site situations that could prove dangerous to scaffold workmen.
- Don't Ride Moving Scaffold; and remember scaffold units are limited in height to 4* times
- Their narrowest base dimension (unless base is widened by outriggers or more end frames; or tied into building.) Always keep casters locked. (except tore-spot)
- Don't Climb Braces: Use the steps provided on most steel scaffolds to climb up to or down from work levels. Use scaffold climbing ladders where required.
- Protect Working Levels: Use overhead canopies to protect workers on lower work levels when work is being done overhead. Rope off un safe areas underneath scaffold or provide wire mesh around work area.
- Use Double Guard Rails; and toe board so exposed side sat platform heights of 1.8 meter or more.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Illustration of a Sample Independent Scaffold



15.6.5 Ladders

- Fall protection is not needed when climbing up or down ladders less than 20 feet/6.1 meters, using 3 points of contacts.
- Portable ladders, steps and trestles should only be used for light duties of short duration. Otherwise, properly constructed means of access should be provided.
- Aluminum ladders can generate sparks when struck against rusty iron, so it must be used in Hazardous Areas with special care.
- Aluminum ladders must not be used in areas where they might be splashed with acids or alkalis ; e.g. Utilities Area

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Ladders with metal reinforced, Damaged or rotten stiles, Missed footing on ladder rungs must not be used.
- Over-reaching and over-balancing is not allowed.
- Every time before use, the user will carry out inspection of ladder.
- If the work to be done necessitates the use of both hands, a safety belt must be used.
- Tools and materials must not be hand carried by persons ascending or descending ladders. Where applicable light tools should be carried in pockets, tool belts or shoulder bags, provided they do not impair movement and are held securely.
- Rungs, stiles, or treads to be checked for bending, twisting or signs of abuse or undue wear.
- Feet to be fitted with various types of bases and in good order. Synthetic non-slip, wooden or metal.
- Non-slip stair treads mats of stepladders, should be fitted and in good condition.
- In case of moving ladders fitted with wheels, Hinges and locking devices to be secure and in good working order.
- All portable ladders must be in good condition as per the site norms.
- Ladder shall extend 3' to 4' above the point of Landing and topmost 3 rungs shall not be used.
- Ladder is checked visually for defects before every use.
- Ladders shall not be used in a horizontal position as runways or scaffoldings.
- Ladders shall not be placed in front of a door that opens toward the ladder unless the door is locked, blocked or guarded.

15.6.6 User Ladder Safety Checklist

The following check list specifies the main points to remember when using ladders:

- Do not erect:
- On sloping ground
- On top of movable objects
- In high wind
- In front of a door which may be opened
- Against a slippery or unstable surface

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- At a shallow angle, or use horizontally as a plank or bridge
- Leaning to onside

15.6.7 Donor

- Drop things from ladder.
- Straddle from the ladder to a nearby foothold..
- Allow more than one person up a ladder at time.
- Use a ladder which is too short.
- Use a makeshift or 'home-made' ladder.
- Over-reach (generally always keep hips within the stiles).
- Slide down ladder.
- No ladder should be used if it has: A missing, loose or defective rung or tread.
- A defective stile side member.
- A defective rope or associated fitting (rope operated extension ladders).
- Any sign of warping.
- Missing fastenings or rivets, guide or latching hooks.
- Always Return ladders to store as soon as they are finished with.
- Inspect a ladder immediately after any fall or overload.

15.6.8 Activities Allowed on Ladder

- A ladder is considered to be suitable for access of personnel to an elevated area only. No significant works may be carried out from a ladder. In particular, activities such as those below may not be carried out on ladder:
- Carrying tools (other than those which might clip onto a tool belt) up to an elevated level.
- Activities involving heavy manual labour.
- Activities requiring reaching or stretching such that the body is no longer centered over the ladder.
- For these types of jobs, a work platform such as a scaffold is required. The safe working position from a ladder is to have both thighs and hips within the styles.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

15.6.9 Color code and inspection

- Color code of the year shall be painted on one style only and equal to one rung spacing.

15.2. Roof work

- All roof-work operations should be pre-planned and properly supervised.
- Roof work should only be undertaken by workers who are physically and psychologically fit and have the necessary knowledge and experience for such work.
- Work on roofs shouldn't be carried on in weather condition that threaten the safety of workers.
- Crawling boards, walkways and roof ladders should be securely fastened to a firm structure.
- Roofing brackets should fit the slope of the roof and be securely supported. Where it is necessary for a person to kneel or crouch near the edge of the roof, necessary precautions should be taken.
- On a large roof where work have to be carried out at or near the edge, a simple barrier consisting of crossed scaffold tubes supporting a tubing guardrail may be provided.
- All covers for openings in roofs should be of substantial construction and be secured imposition.
- Roofs with a pitch of more than 10 should be treated as sloping.
- When work is being carried out on sloping roofs, sufficient and suitable crawling boards or roof ladders should be provided and firmly secured imposition.
- During extensive work on the roof, strong barriers or guardrails and toe-boards should be provided to stop a person from falling off thereof.
- Where workers are required to work on or near roofs or other places covered with fragile material, through which they are liable to fall, they should be provided with suitable roof ladders or crawling boards strong enough and
- When spanning across the supports for the roof covering to support those workers.
- A minimum of two boards should be provided so that it is not necessary for a person to stand on a fragile roof to move a board or a ladder, or for any other reason.

15.3. Electrical Safety

- Only authorized electrical engineer / electricians are permitted to do the electrical work.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Do not use extension cords or electric hand tools with exposed wires.
- To switch-off electrical supply in case of an emergency must be enabled at all times.
- All temporary electrical installations carried out on the site must be in accordance with the local regulations and specifications.
- The installations must be inspected regularly by a competent person (e.g. electrical engineer/supervisor) to ensure that they are in safe condition and working faultlessly.
- Each electrical power tools and electrical equipment must be under protection of earth leakage/residual current protective device(ELCB/RCCB).
- Portable power tools used on site must have protective insulation ("double insulation").
- All electrical machines, tools and appliances must be inspected by a competent person (e.g. electrician) to ensure that all equipment's are in safe condition and working faultlessly. To confirm that the inspection was conducted the equipment must be labeled or marked clearly and registered. The documentation must be submitted to TE for records.
- Assume that all circuits are live until they have been thoroughly checked and proven dead. Never work on a live circuit.
- When using electrical equipment in an environment with electrical conductivity (e.g. in confined spaces like case pipes, containers, towers) the voltage used may at maximum be 24 Volt AC. (fed from a safety low voltage transformer)
- Never use a fuse heavier than the capacity of the circuit. Also never attempt to bridge abuse.
- Never tamper with any electrical wiring or apparatus.
- Do the cable laying as per standard specifications and requirement; do not lay down power cables adjacent to secondary cables of welding machine.
- Assess overhead power line hazard and keep safe distance from it.
- All electrical equipment's, motors, transformers, welding machines, etc. to be provided with earth connections.

15.4. Power & Hand Tool Operation

- All portable tools are to be connected through control bus with ELCB.
- All contractors should ensure proper Earthling of all electrical equipment's used by

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

them. Suitable earthling pits must be made if required.

- Examine electric cable for defects before use.
- Do not ever insert free ends of wires into sockets and hold them in place with matchsticks / other means. Always use industrial three pin plugs.
- Check the RPM rating of grinding wheels. The RPM rating must be greater than or same to that of the driver. Wheel guard should be used in proper position before grinding. Also proper PPEs must be ensured (goggles &hand gloves).
- Do not tie electric cords to metal rods or nails.
- No cable should run under the ground. It must run overhead at a 2 m height to avoid pinch point and creating trip hazard
- All tools and Tackles must be examined daily before commencing work and record to be maintained.
- Defective tools are to return to store.
- All electrical tools must be inspected at regular intervals by an authorized electrical person and record to be maintained.
- The weight, size & type of tool should be selected to suit the job carried out.
- The handles of tools should be intact and properly tightened. Split handles should be replaced. To avoid slippage, grease and oil should be wiped off.
- Insulated and non-conducting tools shall be tested for electrical resistance.
- Wrenches should not be pushed but pulled. Chisels struck by others should be held by tongs and not by hands.
- Chipping should always be done away from self.
- Hand tools should not be allowed to lie down on benches, scaffoldings etc. from where they can fall. They should be properly stored.

15.5. Welding

The metal frames and cases of mains-powered welding rectifiers, transformers and voltage regulators and of engine driven welding machines must be positively earthed locally throughout the work.

- Welding leads and return leads must be protected against physical damage.
- Insulated electrode holders and cable lugs / protectors must be used.
- The return lead must be attached to the work place as close as reasonably practicable to the welding point.
- If mains power is used, the work piece must be positively earthed using a well-

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

protected earth wire connected at both ends by bolted lugs or secure screw clamps.

- Bolted joints in pipelines and structures must not be relied upon to provide adequate electrical continuity for welding currents.
- Electric arc welding should not be carried out on equipment suspended from a crane because of the risk of damage to lifting wires from uncontrolled stray currents.
- Welders must not wear metal rings, bracelets or necklaces during the work as induced currents from the welding equipment might heat these.
- Dry, non-conductive gloves should be worn.
- The welder must always disconnect the electrode holder from the supply before attempting to replace an electrode.
- The welder should not lean against an earthed conductor whilst manipulating live electrodes.
- Welders working with electrodes fed from different phases of a three-phase supply should not work in close proximity to one another.
- Ensure that welding machine is in order and approved by site engineer.
- Ensure that welding cables are in order.
- Remove all combustible material from welding area to avoid fire.
- Place a fire extinguisher nearby welding premises.
- Ensure welding holder, cable and its lugs in good condition and use only industrial power socket and plugs (3 Pin) to avoid electricity risk.
- Make sure that welding machine is provided with ON/OFF switch and is earthed/grounding.
- Do not over load electrical appliances and cable, shocked pined.

15.6. Gas Cutting

- Gas cylinders must be secured in the vertical position to prevent them being knocked or pulled over.
- Long lengths of hose should be avoided, but;-
- Cylinders must be kept far enough away from the welding or cutting operations to prevent contact with sparks, flames and metals platter.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Cylinders must be placed where they are unlikely to be damaged by stray electric currents or falling objects.
- Cylinders must not be taken into confined spaces.
- The torch must always be lit from a lighter provided for the purpose. There should be no attempt to light it from hot metal.
- Check the cylinder and its valve or leakage and move out any leaking cylinder immediately.
- Ensure that flash back arresters are installed with torch and NRV (Non return valve) on the gas cylinders side.
- Ensure cylinder is far away from fall of sparks and hot metal.
- Check the regulator and torches that they are inspected prior to every use.
- Check for leaks around regulators, hoses/fittings & nozzle with soap solution.
- Check the entire hose length if it is cracked or worn out cut that length of hose or replace the hose.
- Check that flash back arrester used for the purpose is of approved make/specification only.
- Place a fire extinguisher nearby welding premises.

15.6.1. Gas Cylinders

The handling of gas cylinders must comply with local legislation and TE's regulations as per particulars given below:

- Gas cylinders must be stored protected from excessive heat, fire, dangerous corrosion, mechanical damage or access by unauthorized.
- Gas cylinders must not be stored together with flammable materials.
- Gas cylinders must be secured to prevent them from falling over.
- Gas cylinders must be capped and operated upright.
- Use cylinder trolley / cage for the transportation of gas cylinders at site.
- Never use oil or grease on the regulator of a cylinder valve.
- Store gas cylinders in ventilated area.
- Don’t keep LPG cylinder in confine/below ground area.
- Gas stores must not be set up in critical areas such as stairways, corridors,

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

emergency routes, garages or passages for person's or vehicles.

- Never transport by rolling them on the ground or use them as rollers or supports.
- Never attempt to repair cylinder.
- Leaking regulators, cylinder valves, hose pipes or other equipment should be taken out of service.

15.7. Grinding Operation

- Grinding wheels should be stored in dry place.
- After expiry date, grinding wheel must be condemned, broken in to pieces.
- Power supply cable of adequate current carrying capacity shall be used and it should be in good workable condition without abrasions, cuts or puncture in outer insulation.
- Socket pin provided at supply end and On/off switch in working condition.
- Proper earthling of the body in case of metallic body.
- Wheel guard properly fitted imposition.
- Machine body without any damage like cricket.
- Moving part (wheel) must be properly fixed to the machine with the help of spanner.
- Grinding wheel must be of suitable size as per the speed of grinding machine.
- Grinding wheel without manufacturer's stickers having size, speed and expiry date must be condemned.
- Don't use portable grinding machine as bench grinder.
- Don't fit over size wheel than recommended size by machine/wheel manufacturer.
- Don't grind small, unstable object without fixing it in the vice.
- Don't over press the grinding wheel against the job for fast removal of metal.
- Put OFF the main switch, while machine is not in use (tea breakneck.).
- Don't chip off grinding/cutting wheel for achieving fast cutting rate.

PPEs:

- Use of helmet, face shield or safety goggles (where face shield is not possible.) and hand gloves.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

15.8. Use of Power Tools and Cables

- All electrical equipment and tools used by the contractors and their employees shall be properly checked by contractor's supervisor before use.
- All power tools must have proper guard at all-time.
- Leads /cables must be placed so that they do not create a trippig hazard.

15.9. Pressure / Leak Testing

Hydrostatic and Pneumatic Test

Access to the test area shall be limited to essential personnel only. before the test commences compliance is required with the following points:

- Persons supervising pressure or leak tests must have sufficient knowledge and experience of testing to fully understand the hazards of the activity and the precaution, which must be taken.
- Effective communication, including formal procedures, must be established between sites whenever the test envelope extends beyond one site, for example, pipelines.
- The area shall be cordoned off (using tape, shields or barriers, etc.) at an adequate distance from the equipment to be tested, as specified on the Permit to Work
- Warning signs shall be posted at access ways, at other strategic positions, and on the equipment to be tested (including the doors of test workshops or other designated areas.
- Pressuring equipment shall be provided with suitably calibrated pressure control/regulator devices
- Pressuring equipment shall not be left unattended at any time during the test.
- Pressuring equipment shall be isolated from the equipment under test and where practicable disconnected, when the test pressure has been reached.
- Care must be taken to ensure that materials of construction have the required ductility at the test temperature to prevent brittle fracture.
- A safety valve should be fitted to the equipment/system being tested, set to relieve at a pressure that will prevent over pressurization.
- Sufficient venting / draining points shall be provided in order to prevent trapping of pressurizing medium behind non-return valves, check valves, between isolation

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

valves, or within dead legs of the pressure envelope.

- The equipment/plant to be pressure tested must be subjected to thorough examination prior to testing. It may be necessary to 100% inspect all welds using visual, radio graphic or other NDT techniques.
- The gas supply must be isolated when test pressure has been achieved.
- The pressure envelope must contain sufficient vents, to a safe location.
- De-pressurization after pneumatic testing must be gradual.

15.10. Barricades and Warning Signs

- Area where work is being carried out above man height or below 1' ground depth must be barricaded. Linked barrier with link chains must be provided by the contractor for cordoning the area at ground level, during GI work.
- Follow the instruction of all types of warning signs like "NO SMOKING" "NOENTRY" "DANGER" "Work at height", "Inconvenience to member of public regretted/work in progress","
- Name of the Contractor and contact details"

15.11. Basic Safety Rules For The Construction Site

- The construction site shall be considered a restricted area and unauthorized entry into the site is strictly prohibited. Anyone found trespassing should be asked to leave the site immediately.
- All persons of CLIENT/Consultant/Contractor shall be responsible for their own safety in plant or work sites.
- Nobody authorized to touch any valve, switch, or interfere with plant/site activities.
- Children below 18 years are not allowed inside plant / worksite.
- Never walk on the pipes, equipment, structure etc.
- Always use stairs, handrails & walkover platforms.
- Never carry sharp or pointed tools in pockets.
- Alcoholic beverages will not be consumed, brought into, or manufactured on the work sites or inside the plant.
- Drugs/intoxicant substances will not be used, brought into, or manufacture don't he site or plant.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Cigarette, beedi smoking is not allowed except in the designated smoking booths.
- Firearms, explosives, knives or other types of weapons will not be allowed on the site.
- Gambling or any other form of betting games is prohibited.
- Discrimination on the basis of race, sex or national origin is prohibited.
- Horseplay, Fight, Practical jokes, Aggressive or abnormal behavior is prohibited.
- Individuals under the influence of alcohol or drugs will not be permitted entry to the site.
- Safety helmet, safety shoes, ear plug or ear muff, hand gloves, safety goggles, safety harness &clothing for body protection are mandatory in the plant or work site.
- Use other personal protective equipment as displayed in plan/site.
- It is strictly not allowed to use non-intrinsically safe equipment or instruments in the operational area of site.
- All vehicles for use on the site shall conform to the requirements of the Vehicle Entry Permit. Maximum Speed limit inside complex is 10km/Hr.
- In case of Emergency dial appropriate agency like Fire, Hospital, Security etc. as displayed.

Violation of the Rules and Regulations might result in removing the person(s) concerned from the premises and denying the person(s) concerned from any future access to the site. The site in-charge will judge whether permanent removal of the individual from the premises is justified depending on the seriousness of the violation(s). All Indian laws shall be complied with at all the time.

15.12. Site Emergency Preparedness and Response

The CONTRACTOR shall establish, what are the arrangements in the event of an emergency.

The CONTRACTOR shall ensure that their Personnel are familiar with the essential emergency equipment, the use of which shall be demonstrated and practiced in drills.

The CONTRACTOR shall check the emergency procedures and the location and condition of the emergency equipment.

The CONTRACTOR personnel will be instructed of the actions to take in the event of serious personal injury, gas or toxic release, fire, explosion, heavy rains, wind storms, chemical spillage, land slide, scaffolding or structure collapse, critical damage to operating equipment, etc. and other emergency situations during the induction training and other

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ongoing training sessions.

These situations may demand adequate rescue and relief measure to handle such events quickly and effectively.

In an emergency, or on hearing the alarm, every supervisor shall ensure the following;

- All work is stopped atone.
- All equipment vehicles and tools are shut down (all sources of ignition).
- All men are evacuated to a pre-determined Muster point.
- A roll call is taken and every man is accounted for.
- No one is permitted to return to work until notification has been received from the CONTRACTOR representative that it is safe to dose.

15.12.1. Emergency Preparedness

The basic and essential features of any emergency Preparedness are to analyses and plan for the potential risk. This includes;

- Establishing and maintaining effective communications.
- Liaison with local emergency services and authorities.
- Action Procedure (evacuation routes and assembly pointed.).
- Appointment of key personnel and specifying their duties and responsibility.
- Emergency Response Drills

15.12.2. Emergency Response Drills

Effectiveness and comprehensiveness of Emergency Response Plan must be tested on a regular basis. Drills which reflect the conditions induced from the more likely emergency occurrences must be conducted. CONTRACTOR should conduct such drill on periodic basis. All emergency drills, exercises and responses to actual incidents shall be fully documented and followed by a complete review and when necessary, procedure revision process.

Initiate any required procedural changes, and initiate the dissemination of any lessons learned through the Site HSE communication system.

15.13. Road Safety Norms

- For roadside working site to be barricaded..
- Only eligible driver can drive required vehicle inside site
- Speed limit norms of site must be followed
- No riding or travelling on the back of open end vehicle, fork lift or trailers should be done.

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

15.14. Environment

The CONTRACTOR shall pay due regard to the environment by preserving air, water, soil, animal and plant life from adverse effects of the CONTRACTOR's activities and minimizing any nuisance which may arise from such operations.

All waste generated by the CONTRACTOR shall be contained and disposed of in accordance with the legal requirement on waste management.

15.15. Labor Welfare &Legal Requirement

- All mandatory provisions with regard to safety as prescribed under contract Labor (Abolition & Regulation) Act 1970 and Rules made there under are applicable.
- Workmen compensation insurance and registration under ESI should be maintained.
- Time to time, all rules and regulations suggested by safety committee of site must be followed and implemented

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ANNEXURES

ANNEXURE – A

RELEVANT IS-CODES FOR PERSONNEL PROTECTION

IS : 2925 – 1984	:Industrial Safety Helmets
IS : 4770 – 1968	:Rubber gloves for electrical purposes
IS : 6994 – 1973 (Part – I)	:Industrial Safety Gloves (Leather & Cotton)
IS : 1989–1986 (Part – I & III)	:Leather safety boots and shoes
IS : 3738 – 1975	:Rubber knee boots
IS : 6519 – 1971	:Code of practice for selection, care and repair of Safety footwear
IS : 11226 – 1985	:Leather Safety footwear having direct molding sole
IS : 5983 – 1978	:Eye protectors
IS : 9167 – 1979	:Ear protectors.
IS : 3521 – 1983	:Industrial Safety belts and harness

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ANNEXURE – B

FORMAT - 1.0

1.0 : HEALTHY, SAFETY & ENVIRONMENT (HSE) PLAN

Project : ----------

Contractor:----------

Date : ----------

Owner: ……

(To be prepared & submitted by each Construction Agency)

Activity Description	Procedure/ W.I./ Guidelines	Code of Conformance	Performing Function			Audit Function
			Performance	Checker	Approver	Customer Review/ Audit Requirements

PREPARED BY REVIEWED BY APPROVED BY

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (1/6)

Project: _____ Contractor: _____

Date: _____ Owner: _____

Inspection By:

_____

Note: write 'NC' (Not Concern) wherever any of the items are not applicable

Item	Yes	No	Remarks	Action
HOUSEKEEPING				
Waste containers provided and used				
Sanitary facilities adequate and Clean				
Passageways and Walkways Clear				
General neatness of working areas				
Proper Material Storage				
Wooden Boards properly stacked and nails removed				
Cords, leads out of walk and traffic ways				
Scraps removed from the work site				
Other				
PERSONNEL PROTECTIVE EQUIPMENT				
Goggles : Shields				
Face protection				
Hearing protection				
Safety Shoes provided				
Hand protection				
Respiratory Masks etc.				
Safety Belts				
Safety Helmets				
Other				
EXCAVATIONS / OPENINGS				
Excavation permit				
Excavated earth kept away from edge				
Dewatering pump kept away from edge				
Safe access into excavated area				
Opening properly covered or barricaded				
Excavations shored				
Excavations barricaded				
Overnight lighting provided				
Other				

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (2/6)

Item	Yes	No	Remark	Action
Welding Cutting				
Valid not work permit				
Flashback arrester provided for cylinders				
Power cable not crossing the welding cable				
Adequate earthing provided				
No combustible materials kept near welding & cutting works				
Gas cylinder chained upright & kept in trolleys				
Cables and hoses not obstructing				
Screens or shields used				
Flammable materials protected				
Fire extinguisher (s) accessible				
Other				
SCAFFOLDING				
Fully decked platform				
Guard and intermediate rails in place				
Toe boards in place & tied properly				
Adequate shoring				
Adequate access				
Other				
LADDERS				
Extension side rails I m above				
Top of landing				
Properly secured at top & bottom				
Angle $\pm$ 70° from horizontal				
Other				

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (3/6)

Item	Yes	No	Remark	Action
HOISTS, CRANES AND DERRICKS				
Condition of cables and sheaves OK				
Condition of slings, chains, hooks and eyes OK				
Inspection and maintenance logs maintained				
Outriggers used				
Singh/ barricades provided				
Signals observed and understood				
Qualified operators				
Other				
MACHINERY, TOOLS AND EQUIPMENT				
Proper instruction				
Safety devices				
Proper cords				
Inspections and maintenance				
Other				
VEHICLE AND TRAFFIC				
Rules and regulations observed				
Inspection and maintenance				
Licensed drivers				
Others				

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (4/6)

Item	Yes	No	Remark	Action
TEMPORARY FACILITIES				
Emergency instruction posted				
Fire extinguishers provided				
Fire-aid equipment				
Secured against storm damage				
General nemeses				
In accordance with electrical requirements				
Other				
Fire Prevention				
Personnel instructed				
Fire extinguishers checked				
No smoking in prohibited areas				
Hydrants clear				
Other				
ELECTRICAL				
Proper wiring &earthing				
ELCB’s provided				
Ground fault circuit interrupters				
Protection against damage				
Prevention of tripping hazards				
Proper electrical cable joints				
Light poles secured				
Clear way to power distribution board				
Proper rating of fuses				

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (5/6)

Item	Yes	No	Remark	Action
HANDLING AND STORAGE OF MATERIALS				
Properly stored or stacked				
Passageways clear				
Other				
FLAMMABLE GASES AND LIQUIDS				
Containers clearly identified				
Proper storage				
Fire extinguishers nearby				
Other				
WORKING AT HEIGHT				
Erection plan				
Safety nets				
Safety belts tied properly				
Illumination				
No loose material at height				
No body under working area				
All openings covered				
Other				
ENVIRONMENT				
Chemical and other Effluents properly disposed				
Cleaning liquid of pipes disposed-off properly				
Seawater used for hydrotesting disposed off as per agreed proceeding				
Lubricant Waste/ Engine oils properly disposed				
Waster from Canteen office, sanitation etc. disposed properly				
Disposal of surplus earth stripping materials, Oily rags and combustible materials done properly				
Green belt protection.				

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

MONTHLY CHECKLIST CUM COMPLIANCE REPORT REGARDING HSE (6/6)

Item	Yes	No	Remark	Action
HEALTH CHECK				
Hygienic conditions at labour camps OL				
Availability of First Aid facilities				
Proper sanitation at site, office and labour camps				
Arrangements of medical facility				
Measures for dealing with illness				
Availability of potable drinking waters for workmen & staff				
Provision of creches for children				
ERECTION				
Slings/ D shackle checked				
Signal Man				
Tag line for guiding the load				
Protecting the slings from sharp edges				
No loose materials at height				
Ladder & platform welding inspected				
No one under the suspended load				
Stay rope				
SWL				

.....

Signature Of Resident Engineer with Seal

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Monthly Health, Safety & Environmental (HSE) Report
(To be submitted by each Contractor)

Actual work start date : _____for the month of:_____

Project:_____Report No : _____

Name of the Contractor:_____Status as on:_____

Name of work:_____

Name of safety officer_____

Item	This Month	Cumulative
Total strength (Staff – Workmen)		
Number of HSE meeting organized at site		
Number of HSE awareness programs conducted at site		
Whether workmen compensation policy taken	Y/N	
Whether workmen compensation policy valid	Y/N	
Whether workmen registered under ESI Act	Y/N	
Number of Fatal Accident		
Number of Loss Time Accident (Other than Fatal)		
Other accident (non loss time)		
Total No. of accident		
Total man-hours worked		
Man-hour loss due to fire and accident		
Compensation cases raised with insurance		
Compensation cases resolved and paid to workmen		

Remark

Date:_____/_____/_____ Safety Officer/RCM

(Signature and Name)

To: OWNER…… 1 COPY
RCM/SITE-IN-CHARGE 1 COPY

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SUPPLEMENTARY ACCIDENT, INCIDENT&NEAR MISS REPORT

Project:_____ Supplementary to report No._____

Site : _____ Date:_____

Contractor: _____

NAME OF THE INJURED……

FATHER'S NAME……

SUB-CONTRACTOR M/S……

DATE & TIME OF ACCIDENT……

LOCATION……

BRIEF DESCRIPTION & CAUSE OF A ACCIDENT

NATURE OF INJURY / DAMAGE

COMMENTS FROM MEDICAL PRACTITIONER WHO ATTENDED THE VICITIM/INJURED

SUGGESTED IMPROVEMENT IN THE WORKING CONDITION IF ANY

LOSS OF MANHOURS AND IMPACT ON SITE WORKS

ANY OTHER COMMENT BY SAFETY OFFICER

Date:_____/_____/_____ SIGNATURE OF CONTRACTOR WITH SEAL

To : OWNER……1 COPY

: RCM/SITE-IN-CHARGE……1 COPY

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ACCIDENT REPORT

(To be submitted by Contractor after every accident within 2 hours of accident)

Report No._____ Date:___
Name of Site:_____ COTRACTOR_____

NAME OF THE INJURED……..
FATHER'S NAME……

SUB-CONTRACTOR M/S…….

DATE & TIME OF ACCIDENT……
LOCATION…….

BRIEF DESCRIPTION OF ACCIDENT

CAUSE OF ACCIDENT

NATURE OF INJURY / DAMAGE

MEDICAL AID PROVIDED / ACTIONS TAKEN

INTIMATION TO LOCAL AUTHORITIES

Date :_____/_____/_____ SIGNATURE OF CONTRACTOR WITH SEAL

To : OWNER…… 1 COPY
: RCM/SITE-IN-CHARGE 1 COPY

Copyright VCS Project – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION
FOR
SEAMLESS FITTINGS AND FLANGES
{SIZE UPTO DN 400MM (16")}

VPC – SS – PP - 2024

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
00	28.01.2020	MB	MC	AD	SK

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD						
Rev.	**Revision Date**	**Prepared by**	**Checked by**	**Approved by**	**Authorized by**	**Revision Description**
00	28.01.2020					
		MB	MC	AD	SK	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATIONS:

ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
API	American Petroleum Institute
BHN	Brinell hardness number
HAZ	Heat Affected Zone
MSS-SP	Manufacturers Standardization Society - Standard Practice
RTJ	Ring Type Joint
SSPC	Steel Structures Painting Council
CE	Carbon Equivalent
LTCS	Low Temperature Carbon Steel
LPG	Liquefied Petroleum Gas

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 4

2.0 REFERENCE DOCUMENTS 4

3.0 MATERIALS 5

4.0 DESIGN AND MANUFACTURE 5

5.0 INSPECTION AND TESTS 6

6.0 PAINTING 6

7.0 MARKING 7

8.0 TEST CERTIFICATES 7

9.0 PACKING & SHIPPING 7

10.0 DOCUMENTATION 7

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

This Technical specification specifies the minimum requirements for the design, manufacture and supply of following carbon steel flanges (such as welding neck flanges, blind flanges, spectacle blinds, spacers and blind etc.) and seamless fittings (such as tees, elbows, reducers, caps, outlets etc.) size DN up to 400 mm (16") to be installed in onshore pipeline systems handling non-sour hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG).

2.0 REFERENCE DOCUMENTS

Reference has been made in this specification to the latest edition (edition enforce at the time of issue of enquiry unless specified otherwise) of the following Codes, Standards and Specification.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

B31.4	:	Pipeline Transportation system for liquid Hydrocarbon & other liquids.
B 31.8	:	Gas Transmission and Distribution Piping Systems.
B16.5	:	Pipe Flanges and Flanged Fitting.
B16.9	:	Factory made Wrought Butt Weld Fittings.
B 16.11	:	Forged Steel Fittings, Socket welding and Threaded.
B 16.48	:	Steel Line Blanks.
Section VIII	:	Boiler and Pressure Vessel Code - Rules for Construction of Pressure Vessels.
Section IX	:	Welding and Brazing Qualifications.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A370	:	Standard Test Methods and Definitions for Mechanical Testing of Steel Products.

MANUFACTURERS STANDARDIZATION SOCIETY (MSS)

SP-25	:	Standard Marking System for Valves, Fittings, Flanges and Unions.
SP-97	:	Forged Carbon Steel Branch Outlet Fittings- Socket Welding, Threaded and Butt Welding Ends

In case of conflict between various requirements of this specification and the requirements of above referred Codes and Standards, more stringent requirement shall apply unless otherwise agreed by Purchaser.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

3.0 MATERIALS

The Material of flanges & fittings shall be as indicated in purchase requisition. In addition, the material shall also meet the requirements specified hereinafter.

3.1 The Carbon Steel used for the manufacture of flanges and fittings shall be fully killed.

3.2 The carbon equivalent (CE) shall not exceeding 0.45, based on check analysis calculated in accordance with following.

$$CE = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

3.3 For flanges and fittings specified to be used for gas service or LPG service, Charpy V-notch test shall be conducted on each heat of steel. Unless specified otherwise, the Charpy V-notch test shall be conducted at 0^0 C in accordance with the impact test provisions of ASTM A 370 for flanges and MSS-SP-75 for all fittings.

The average absorbed impact energy values of three full-sized specimens shall be 27 joules. The minimum impact energy value of any one specimen of the three specimens analysed as above shall not be less than 22 Joules.

When Low Temperature Carbon Steel (LTCS) materials are specified for flanges and fittings in Purchase Requisition, the Charpy V-notch test requirements of applicable material standard shall be complied with.

3.4 For flanges and fittings specified to be used for Gas service or LPG service, Hardness test shall be carried out as per ASTM A 370 for each heat of steel used. A full thickness cross section shall be taken for this purpose and the maximum hardness of base metal, Weld metal and heat affected zone shall not exceed 248 HV_{10}.

3.5 In case of RTJ (Ring Type Joint) flanges, the groove hardness shall be minimum 140 BHN. Ring Joint flanges shall have octagonal section of Ring joint.

4.0 DESIGN AND MANUFACTURE

4.1 Flanges such as weld neck flanges and blind flanges shall conform to the requirements of ASME B 16.5.

4.2 Spectacle blind and spacer & blind shall conform to the requirements of ASME B 16.48.

4.3 Fittings such as tees, elbows, reducers, etc. shall be seamless type and shall conform to ASME B 16.9 for sizes DN 50mm (2") to DN 400mm (16") (both sizes included) and ASME B 16.11 for sizes DN 15mm(1½") &below.

4.4 Fittings such as weldolets, sockolets, nippolets, etc. shall be manufactured in accordance with MSS-SP-97.

4.5 Repair by Welding on flanges and fitting is not permitted.

4.6 All butt weld ends shall be beveled as per ASME B 16.5/ASME B 16.9/MSS-SP-97 as applicable

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.7 Type, face and finish of flanges shall be as specified in purchase requisition. The interpretation of range of face finish shall be as follows:

Serrated Finish/125 AARH	:	Serration with 125 to 250µ in AARH.
63 AARH	:	32 to 63µ in AARH.

4.8 Flanges and fittings manufactured from bar stock are not acceptable.

5.0 INSPECTION AND TESTS

The Manufacture shall perform all inspections and tests in accordance with the requirements of this specification and the relevant codes, at his works, prior to shipment. Such inspection and testing shall include, but not be limited to, the following:

5.1 TESTING OF MATERIALS

Chemical composition and mechanical tests including yield strength, ultimate tensile strength, impact test, elongation and hardness shall be carried out for each heat of steel used as per the applicable standard as referred to in this specification.

5.2 VISUAL INSPECTION AND DIMENSIONAL CHECK

All flanges and fittings shall be visually inspected. The internal and external surface of the flanges and fittings shall be free from any strikes, gauges and other detrimental defects.

Dimensional checks shall be carried out on finished products as per ASME B 16.5 for flanges, ASME B 16.48 for spacers and blinds and ASME B 16.9/MSS-SP-97 as applicable for fittings and as per this specification.

5.3 NON-DESTRUCTIVE EXAMINATION

All finished wrought weld ends subject to welding in field, shall be 100% tested for lamination type defects by ultrasonic test. Any lamination larger than 6.35 mm shall not be acceptable.

5.4 The Purchaser reserves the right to perform stage wise inspection and witness tests as indicated above, at the Manufacturer's works, prior to shipment. The Manufacturer shall give reasonable notice of date and time for such inspection and shall provide reasonable access and facilities required for inspection, to the Purchaser's Inspector.

The Purchaser reserves the right to require additional testing, at any time, to confirm Or further investigate a suspected fault. All costs incurred shall be for the Manufacturer's account. In no case shall any action of the Purchaser, or his Inspector, relieve the Manufacturer of his responsibility for material, design, quality, or Performance of the materials concerned. Inspection and tests performed/witnessed by the Purchaser's Inspector shall in no way relieve the Manufacturer of his obligation to perform the required inspection and tests.

6.0 PAINTING

Once all inspection and test have been carried out all external surface shall be thoroughly cleaned to remove grease, dust & rust. Standard mill coating shall be applied on external surface to protect against corrosion during transmit and storage. The coating shall be removable type in field.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

7.0 MARKING

All Flanges & fittings shall be stamped with the requirements of applicable dimensional manufacturing standard. The marking shall also include following:

- PO Number.
- Item Code.

8.0 TEST CERTIFICATES

Manufacture who intends bidding for fittings must possess the records of a successful proof test, in accordance with the provision of ASME 16.9/MSS-SP-75,as applicable.

Manufacturer shall furnish the following certificates:

- Test certificates relevant to the chemical analysis and mechanical properties, including hardness of the materials used for manufacture of flanges and fittings in accordance with the requirement of relevant standards and this specification.
- Test reports on radiography, ultrasonic and magnetic particle examination.
- Certificates for each fitting stating that it is capable of withstanding without leakage a test pressure, which results in a hoop stress equivalent to 100% of the specified minimum yield strength for the pipe with which the fitting is to be attached without impairment of serviceability.

9.0 PACKING & SHIPPING

Ends of all fittings and weld neck flanges shall be suitable protected to avoid any damage during transit. Metallic or high impact plastic bevel protected shall be provided for flanges and fittings. Flanges face shall be suitably protected to avoid any damage during transit.

10.0 DOCUMENTATION

The Manufacturer shall supply documentation in accordance with the Vendor Data Requirements List (VDRL) as attached with Purchase Order.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION FOR FABRICATION AND ERECTION OF PIPING

VCS-SS-PP-2507

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
01	30.06.2022	RP	MC	HK	GW
00	13.05.2017	CM	SM	AD	SK

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD						
Rev.	**Revision Date**	**Prepared by**	**Checked by**	**Approved by**	**Authorized by**	**Revision Description**
00	28.01.2020					
		MB	AK	AD	SK	
01	30.06.2022					VCS QMS Integration
		RP	MC	HK	GW	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Abbreviations:

AS	:	Alloy Steel
ASME	:	American Society of Mechanical Engineers
CI	:	Cast Iron
CS	:	Carbon Steel
HMTD	:	Heat & Mass Transfer Division
IBR	:	Indian Boiler Regulations
LTCS	:	Low Temperature Carbon Steel
NACE	:	National Association of Corrosion Engineers
NB	:	Nominal Bore
NDT	:	Non Destructive Testing
P & ID	:	Piping and Instrumentation Diagram
PMI	:	Positive Material Identification
SS	:	Stainless Steel
SMMS	:	Specialist Material & Maintenance Services

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE..... 4

2.0 SCOPE OF WORK OF CONTRACTOR 4

3.0 BASIS FOR WORK 6

4.0 FABRICATION..... 7

5.0 ERECTION 10

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

This specification covers general requirements of fabrication and erection of above ground and trench piping systems at site. The specification covers the scope of work of Contractor, basis of work to be carried out by Contractor and standards, specifications and normal practice to be followed during fabrication and erection by the Contractor.

2.0 SCOPE OF WORK OF CONTRACTOR

Generally the scope of work of Contractor shall include the following:

2.1 Transportation of required piping materials (as described in C1.2.1.1), pipe support (material as described in C1. 2.3) and all other necessary piping materials from Owner's storage point or Contractor's storage point (in case of Contractor's scope of supply) to work site/shop including raising store requisitions for issue of materials in the prescribed format & maintaining an account of the materials received from Owner's stores.

2.1.1 Piping materials include the following but not limited to the same.

a. Pipes (All sizes and schedule)

b. Flanges (All sizes, types & Pressure ratings).

c. Fittings (All sizes, types and schedule)

d. Valves (All sizes, types and Ratings)

e. Gaskets (All sizes, types & Ratings)

f. Bolts, Nuts or M/C Bolts (All types)

g. Expansion Joint/Bellows (All types)

h. Specialty items like online filters, ejectors, sample coolers, steam traps, strainers, air traps, springs, silencers, snubbers, steam and condensate manifolds, injection nozzles, MOVs, sight glass, spray nozzles, integrated steam traps, hoses, hose couplings, etc.

i. Online instruments like control valve, orifice flange, rotameter, safety valves, restriction orifice, rupture disc, de-super heaters, corrosion probes, annubar, magnetic flow meter, ultrasonic flow meter, Coriolis mass flow meters, venturi PG/PT/ Flow transmitter, ejectors, static mixers, flame arrestors, thermal flow switches, pre-fabricated hook-ups etc.

j. Shutdown Valves with and without fire box.

2.2 Shop & field fabrication and erection of piping in accordance with documents listed under C1.3.0 i.e. 'BASIS OF WORK' including erection of all piping materials enumerated above.

2.3 Fabrication and erection of pipe supports like shoe, saddle, guide, stops, anchors, clips, cradles, hangers, tum-buckles, supporting fixtures, bracket cantilevers, struts, tee-posts including erection of spring supports, sway braces, dummy pipes, corrosion pads/protection shields, low friction pads, clamps, special support, expansion bellows, steam and condensate manifolds supports etc. Corrosion Pads/Protection shields, stiffeners and stiffening rings, if not covered in the specifications/standards, shall be of the same material as of parent pipes.

2.4 Site fabrication of Piping items

Site fabrication of Piping items shall include but not be limited to the following

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

2.4.1 Fabrication of piping specials like special radius bends, reducers, mitres etc.

2.4.2 Fabrication of plain and threaded nipples from pipes as required during erection.

2.4.3 Fabrication of swage nipples as and when required.

2.4.4 Fabrication of odd angle elbow like 60°, 30° or any other angle from 90°/45° elbows as and when required.

2.4.5 Fabrication of flange, reducing flange, blind flange, spectacle blinds as and when required.

2.4.6 Fabrication of stub-in connection with or without reinforcement.

2.4.7 Grinding of edges of pipes, fittings, flanges etc. to match mating edges of uneven/different thickness wherever required.

2.4.8 Fabrication of circular pipe for steam rings, fire water lines, utility lines.

2.4.9 Threading of all small bore piping as per piping material specifications.

2.4.10 Drilling on blind flange for inserting / joining small bore lines.

2.4.11 Fabrication and welding of reinforcement pads at branch pipe locations wherever required.

2.4.12 Equipment nozzle reinforcement with pads, jacket & stiffeners wherever required.

2.4.13 Fabrication of injection nozzles as per details provided wherever required.

2.4.14 Fabrication of chain operation arrangement for valves, wherever required. All material required for this modification shall be supplied by Contractor.

2.4.15 Fabrication and erection in position of funnels required for OWS/ SS/ Condensate blow down system as per direction of Engineer-in-charge.

2.4.16 Grinding & finishing of uneven surfaces/ joints after welding. Internal grinding of welds of orifice flanges to render smooth surface.

2.4.17 Tapping and drilling of holes in flanges, blind flanges, piping connections for jack screw, if required.

2.4.18 Providing bird screens at the outlet of lines open to atmosphere.

2.5 Modifications like providing additional cleats, extension of stem of valve, locking arrangement of valves etc. as and when required.

2.6 Piping isometrics for main process/utility lines shall be provided to the Contractor.

Preparation of miscellaneous small bore isometrics with bill of materials for process and utility lines (up to 1½" size) like instruments & pump flushing / cooling, sample connection, purging, pump casing vents & drains, pump base plate drains, control valve drains / vent to flare, instrument drains & vents, steam tracing (non-IBR) from steam supply stations up to condensate recovery station, and lines specified as field routed within the Unit battery limit as and when required are in Contractor's scope of work. Approval for these isometrics prepared by the Contractor shall be taken from Engineer-in-charge before erection.

Small bore piping isometrics given by Owner shall be rechecked by Contractor before erection and installation.

2.7 Obtaining approval for drawings prepared by Contractor from statutory authority, if required.

2.8 Spun concrete lining of the inside of pipes 3" NB & above including fittings and flanges as

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

required in accordance with specification.

2.9 Rubber lining inside pipes, fittings, flanges as and when required, in accordance with specification.

2.10 Radiography, stress relieving, dye penetration, magnetic particle test etc. as required m specification.

2.11 Performing PMI using alloy analysers as per Standard Specification for Positive Material Identification at Construction Sites, VCS-SS-PP-2502.

2.12 Casting of concrete pedestals and Fabrication and erection of small structures/ platforms for pipe supports and valve operation / attending some instruments, spectacle blinds etc., providing brackets, modification / extension of platforms, providing additional platforms / ladders for improving / providing accessibility.

2.13 Providing insert plates with anchor fasteners in concrete structures / paved floors and repair of platform gratings around pipe openings and providing suitable members for support under the platform grating.

2.14 Making material reconciliation statement and return of Owner's supply left over materials to Owner's storage.

2.15 Flushing and testing of all piping systems as per standard specification for inspection, flushing and testing of piping systems (Specification No. 6-44-0013). The accessories required for blinding the line like flange, blind flange, gasket (all sizes, type and rating), stud-bolts, flexible hoses etc. are to be arranged by the Contractor. During flushing the discharged water / air shall be drained / routed as directed by the Engineer - In Charge.

2.16 Contractor shall prepare welding specifications for all weld joints where dissimilar welding will be performed, and obtain approval from VCS.

2.17 Contractor to ensure meeting all requirements for carrying out work in shutdown/running plant.

2.18 Pickling (as and when applicable) as per Job specification(s) for chemical cleaning of CS suction piping of compressors, SS Piping, Weldment etc., as applicable.

2.19 Chemical Cleaning/ Hydro jet cleaning as per marked-up P&IDs with supply of chemicals, consumables, DM water, equipment's, boilers, coupons, tools & tackles and other testing equipment's required for the same.

3.0 BASIS FOR WORK

3.1 The complete piping work shall be carried out in accordance with the following:

3.1.1 "Approved for Construction" drawings and sketches issued by VCS to the Contractor - Plans and/or Isometrics.

3.1.2 "Approved for Construction" drawings and sketches issued by Tum-key bidders to the Contractor - Plans and/or Isometrics.

3.1.3 Approved Process Licensor's standards and specifications.

3.1.4 Drawings, sketches and documents prepared by Contractor duly approved by Engineer-in- Charge (such as isometrics of small bore piping and offsite piping etc.).

3.1.5 VCS specifications / documents as below:

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

a. Process and Instrument Diagram.

b. Job Piping Materials Specification (****-6-44-0005). **** denotes job number.

c. Piping support, engineering standards.

d. Line list

e. Piping support indices (only in offsite), if supports are not shown in plan.

f. Job specification of Non-destructive Requirement of Piping (VCS-SS-PP-0036)

g. Job Welding specification for fabrication of piping (VCS-SS-PP-0040).

h. Any other VCS or OTHER specifications attached with Piping Material Specification or special condition of contract (such as standard for cement lining of pipe, standard of jacketed piping, standard for steam tracing, Dimensional Tolerances etc.)

i. Standard specification for positive material identification (PMI) at construction sites, 6-82-0002

j. Standard Spec for application of torque & hydraulic bolt tension for flange joints (6-76-0002) and its addendum, if any.

3.1.6 Following codes, standards and regulations

a.	ASME B 31.3	:	Process Piping
b.	ASME Sec. VIII	:	Code for unfired pressure vessel.
c.	IBR Regulations		
d.	ASME Sec. IX	:	Qualification standard for welding and brazing procedures, welders, brazers and welding and brazing operators.
e.	NACE Std.	:	Code for Sour Services material requirements MR-0175/MR0103/Job spec(NACE), as applicable

Note: All codes referred shall be latest edition, at the time of award of contract.

3.2 Deviations

Where a deviation from the "Basis of Work" and approved job procedure described above is required or where the basis of work does not cover a particular situation, the matter shall be brought to the notice of Engineer-in-Charge and the work carried out only after obtaining written approval from him in each case.

4.0 FABRICATION

4.1 Piping Material

Pipe, pipe fittings, flanges, valves, gaskets, studs bolts etc. used in a given piping system shall be strictly as per the "Piping Material Specification" for the "Pipe Class" specified for that system. To ensure the above requirement, all piping material supplied by the Owner / Contractor shall have proper identification marks as per relevant standards / VCS specifications / Licensors specification. Contractor shall provide identification marks on left over pipe lengths wherever marked up pipe lengths have been fabricated / erected. Material-

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

traceability is to be maintained for A.S., S.S., NACE, L TCS, material for Hydrogen service and other exotic materials by way of transferring heat number, etc. (hard punching) as per approved procedure. This shall be in addition to colour coding for all piping materials to avoid mix-up.

For the purpose of common understanding the construction job procedure, to be submitted by the Contractor, shall include proposal for

- Maximizing prefabrication, inspection and testing at fabrication shop with minimum field joints.
- Positive material identification, handling, storage & preservation.

4.2 Dimensional Tolerances

The Contractor shall be responsible for working to the dimensions shown on the drawings. However, the Contractor shall bear in mind that there may be variations between the dimensions shown in the drawing and those actually existing at site due to minor variations in the location of equipment's, inserts, structures etc. To take care of these variations "Field Welds" shall be provided during piping fabrication. An extra pipe length of 100 mm over and above the dimensions indicated in the drawing may be left on one side of the pipe at each of the field welds. During erection, the pipe end with extra length at each field weld shall be cut to obtain the actual dimension occurring at site. Isometrics, if supplied may have the field welds marked on them. However, it is the responsibility of the Contractor to provide adequate number of field welds. In any case no extra claims will be entertained from the Contractor on this account. Wherever errors / omissions occur in drawings and Bills of Materials it shall be the Contractor's responsibility to notify the Engineer-in-Charge prior to fabrication or erection.

4.3 IBR Piping

4.3.1 Contractor shall obtain approval for the piping systems failing under purview of IBR from the statutory Indian Boiler Regulations (IBR) authority of the state where the plant is situated. The Owner shall provide documentation for the IBR System. The Contractor shall carry out the fabrications, erection and testing of this piping as per requirements of Indian Boiler Regulations and to the entire satisfaction of the local Boiler Inspector. The Contractor shall also get the approval of IBR inspector for all fabrication and testing done by him at his own cost. All certificates of approval shall be in proper IBR forms.

4.3.2 IBR Package for residual, field routed and site modified steam lines shall be prepared by the Contractor. IBR approval for the same shall be in Contractor's scope, at his own cost.

4.4 Pipe Joints

The piping class of each line specifies the type of pipe joints to be adopted. In general, joining of lines 2" and above in process and utility piping shall be accomplished by butt- welds. Joining of lines 1-1/2" and below shall be by socket welding/butt welding/threaded joints as specified in "Piping Material Specifications". However, in piping 1-1/2" and below where socket welding/ threaded joints are specified butt - welds may be used with the approval of Engineer-in-Charge for pipe to pipe joining in long runs of piping. This is only applicable for non-galvanized piping without lining.

Flange joints shall be used at connections to Vessels, Equipment's, Valves and where required for ease of erection and maintenance as indicated in drawings.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.5 Butt Welded and Socket Welded Piping

End preparation, alignment and fit-up of pipe pieces to be welded, welding, pre-heating, post-heating and heat treatment shall be as described in the Job welding specification (VCS-SS-PP-0040) and NDT specification (VCS-SS-PP-0036).

4.6 Screwed Piping

In general, Galvanized piping shall have threads as per IS:554 or ANSI B2.1 NPT as required to match threads on fittings, valves etc. All other piping shall have threads as per ANSI B2.1, tapered unless specified otherwise.

Threads shall be clean cut, without any burrs or stripping and the ends shall be reamed. Threading of pipes shall be done preferably after bending, forging or heat treating operations. If this is not possible, threads shall be gauge checked and chased after welding heat treatment etc.

During assembly of threaded joints, all threads of pipes and fittings shall be thoroughly cleaned of cuttings, dirt, oil or any other foreign matter. The male threads shall be coated with thread sealant and the joint tightened sufficiently for the threads to seize and give a leak-proof joint. Threaded joints to be seal-welded shall be cleaned of all foreign matter, including sealant and made up to full thread engagement before seal welding.

4.7 Flange Connections

All flange facings shall be true and perpendicular to the axis of pipe to which they are attached. Flanged bolt holes shall straddle the normal centrelines unless different orientation is shown in the drawing.

Wherever jack screws are to be provided, drilling and tapping for the jack screws in the flange, shall be done as per VCS Standard before welding it to the pipe.

4.8 Branch Connections

Branch connections shall be as indicated in the piping material specifications. For end preparation, alignment, spacing, fit-up and welding of branch connections refer welding specifications. Templates shall be used wherever required to ensure accurate cutting and proper fit-up.

For all branch connections accomplished either by pipe to pipe connections or by using forged tees the rates quoted for piping shall be inclusive of this work.

Reinforcement pads shall be provided wherever indicated in drawings / specifications etc.

4.9 Bending

Bending shall be as per ASME B31.3 except that corrugated or creased bends shall not be used.

Cold bends for lines 1-1/2" and below, with a bend radius of 5 times the nominal diameter shall be used as required in place of elbows wherever allowed by piping specifications. Bending of pipes 2" and above may be required in some cases like that for headers around heaters, reactors etc.

The completed bend shall have a smooth surface, free from cracks, buckles, wrinkles, bulges, flat spots and other serious defects. They shall be true to dimensions. The flattening of a bend, as measured by the difference between the maximum and minimum diameters at any

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

cross-section, shall not exceed 8% and 3% of the nominal outside diameter, for internal and external pressure respectively.

4.10 Forging and Forming

Forging and forming of small bore fittings, like reducing nipples for piping 1-1/2" and below, shall be as per ASME B 31.3.

4.11 Mitre Bends and Fabricated Reducers

The specific application of welded mitre bends and fabricated reducers shall be governed by the Piping Material Specifications. Reducers shall be fabricated as per directions of Engineer-in-Charge. The radiographic requirements shall be as per Material Specifications for process and utility systems and NDT Specification for steam piping under IBR, radiographic requirements of IBR shall be complied with.

4.12 Cutting and Trimming of Standard Fittings & Pipes

Components like pipes, elbows, couplings, half-couplings etc. shall be cut / trimmed / edge prepared wherever required to meet fabrication and erection requirements, as per drawings and instructions of Engineer-in-Charge. Nipples as required shall be prepared from straight length piping.

4.13 Galvanized Piping

Galvanized carbon steel piping shall be completely cold worked, so as not to damage galvanized surfaces. This piping involves only threaded joints and additional external threading on pipes may be required to be done as per requirement.

4.14 Jacketed Piping

The Jacketing shall be done in accordance with VCS Specification or Licensors specification as suggested in material specification or special condition of contract.

Pre-assembly of jacketed elements to the maximum extent possible shall be accomplished at shop by Contractor. Position of jump-over and nozzles on the jacket pipes, fittings etc. shall be marked according to pipe disposition and those shall be prefabricated to avoid damaging of inner pipe and obstruction of jacket space. However, valves, flow glasses, in line instruments or even fittings shall be supplied as jacketed.

4.15 Shop Fabrication / Prefabrication

The purpose of shop fabrication or pre-fabrication is to minimize work during erection to the extent possible. Piping spool, after fabrication, shall be stacked with proper identification marks, so as facilitate their withdrawal at any time during erection. During this period all flange (gasket contact faces) and threads shall be adequately fabricated by coating with removable rust preventive. Care shall also be taken to avoid any physical damage to flange faces and threads.

4.16 Miscellaneous

4.16.1 Contractor shall fabricate miscellaneous elements like flash pot, seal pot, sample cooler, supporting elements like tum-buckles, extension of spindles and interlocking arrangement of valves, operating platforms as required by Engineer-in-Charge.

4.16.2 Spun Concrete Lining

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The work of inside spun concrete lining of pipes and specials of diameter 3" and above shall be done as per material specifications and special condition contract.

4.16.3 Fabrication of pipes from plate

Pipes shall be fabricated at site as and when required as per the specifications and the actual Piping Material Specification.

5.0 ERECTION

5.1 Cleaning of Piping before Erection

Before erection all pre-fabricated spool pieces, pipes, fittings etc. shall be cleaned inside and outside by suitable means. The cleaning process shall include removal of all foreign matter such as scale, sand, weld spatter chips etc. by wire brushes, cleaning tools etc. and blowing with compressed air/or flushing out with water. Special cleaning requirements for some services, if any, shall be as specified in the piping material specification or isometric or line list. S.S jacketed piping requiring pickling shall be pickled to remove oxidation and discoloring due to welding.

5.2 Piping Routing

No deviations from the piping route indicated in drawings shall be permitted without the consent of Engineer-in-Charge.

Pipe to pipe, pipe to structure / equipment's distances / clearances as shown in the drawings shall be strictly followed as these clearances may be required for the free expansion of piping / equipment. No deviations from these clearances shall be permissible without the approval of Engineer-in-Charge.

In case of fouling of a line with other piping, structure, equipment etc. the matter shall be brought to the notice of Engineer-in-Charge and corrective action shall be taken as per his instructions.

5.3 Cold Pull

Wherever cold pull is specified, the Contractor shall maintain the necessary gap, as indicated in the drawing. Confirmation in writing shall be obtained by the Contractor from the Engineer-in-Charge, certifying that the gap between the pipes is as indicated in the drawing, before drawing the cold pull. Stress relieving shall be performed before removing the gadgets for cold pulling.

5.4 Slopes

Slopes specified for various lines in the drawings / P&ID shall be maintained by the Contractor. Corrective action shall be taken by the Contractor in consultation with Engineer-in-Charge wherever the Contractor is not able to maintain the specified slope.

5.5 Expansion Joints / Bellows

Installation of Expansion Joints/Bellows shall be as follows:

5.5.1. All Expansion joints / Bellows shall be installed in accordance with the specification and installation drawings, supplied to the Contractor.

5.5.2. a. Upon receipt, the Contractor shall remove the Expansion Joints / Bellows from the case(s) and check for any damage occurred during transit.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

b. The Contractor shall bring to the notice of the Engineer-in- Charge any damage done to the bellows / corrugations, hinges, tie-rods, flanges/ weld ends etc.

c. Each Expansion Joint / Bellow shall be blown free of dust / foreign matter with compressed air or cleaned with a piece of cloth.

5.5.3. a. For handling and installation of Expansion Joints, great care shall be taken while aligning. An Expansion Joints shall never be slinged from bellows corrugations/ external shrouds, tie / rods, angles.

b. An Expansion Joints / Bellow shall preferably be slinged from the end pipes / flanges or on the middle pipe.

5.5.4. a. All Expansion Joints shall be delivered to the Contractor at "Installation length", maintained by means of shipping rods, angles welded to the flanges or weld ends or by wooden or metallic stops.

b. Expansion Joints stop blocks shall be carefully removed after hydrostatic testing. Angles welded to the flanges or weld ends shall be trimmed by saw as per manufacturer's instructions and the flanges or weld ends shall be ground smooth.

5.5.5. a. The pipe ends in which the Expansion Joint is to be installed shall be perfectly aligned or shall have specified lateral deflection as noted on the relevant drawings.

b. The pipe ends / flanges shall be spaced at a distance specified in the drawings.

5.5.6. The Expansion Joint shall be placed between the mating pipe ends / flanges and shall be tack welded/bolted. The mating pipes shall again be checked for correct alignment.

5.5.7. Butt-welding shall be carried out at each end of the expansion joint. For flanged Expansion Joint, the mating flanges shall be bolted.

5.5.8. After the Expansion Joint is installed the Contractor shall ensure that the mating pipes and Expansion Joints are in correct alignment and that the pipes are well supported and guided.

5.5.9. The Expansion Joint shall not have any lateral deflection. The Contractor shall maintain parallelism of restraining rings or bellows convolutions.

5.5.10. Precautions

a. For carrying out welding, earthing lead shall not be attached with the Expansion Joint.

b. The Expansion bellow shall be protected from arc weld spot and welding spatter.

c. Hydrostatic Testing of the system having Expansion Joint shall be performed with shipping lugs in position. These lugs shall be removed after testing and certification IS over.

5.6 Flange Connections

While fitting up mating flanges, care shall be exercised to properly align the pipes and to check the flanges for trueness, so that faces of the flanges can be pulled together, without inducing any stresses in the pipes and the equipment nozzles. Extra care shall be taken for flange connections to pumps, turbines, compressors, cold boxes, air coolers etc. The flange connections to these equipment's shall be checked for misalignment, excessive gap etc. after the final alignment of the equipment is over. The joint shall be made up after obtaining

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

approval of Engineer-in-Charge.

Hydraulic bolt tensioning & torque tensioning shall be performed on flange joints as per the requirements specified in "standard Specification for application of Torque & bolt Tension for flange joints,VCS-SS-PP-0041 and its addendum, if any.

Temporary protective covers shall be retained on all flange connections of pumps, turbines, compressors and other similar equipment's, until the piping is finally connected, so as to avoid any foreign material from entering these equipment's.

The assembly of a flange joint shall be done in such a way that the gasket between these flange faces is uniformly compressed. To achieve this, the bolts shall be tightened in a proper sequence. All bolts shall extend completely through their nuts but not more than 1/4".

Steel to C.I. flange joints, if any, shall be made up with extreme care, tightening the bolts uniformly after bringing flange flush with gaskets with accurate pattern and lateral alignment.

5.7 Vents and Drains

High point vents and low point drains shall be provided as per the instructions of Engineer-in-Charge, even if these are not shown in the drawings. The details of vents and drains shall be as per piping material specifications / job standards.

5.8 Valves

Valves shall be installed with spindle / actuator orientation / position as shown in the layout drawings. In case of any difficulty in doing this or if the spindle orientation / position is not shown in the drawings, the Engineer-in-Charge shall be consulted and work done as per his instructions. Care shall be exercised to ensure that globe valves, check valves, and other uni- directional valves are installed with the "Flow direction arrow "on the valve body points in the correct direction. If the direction of the arrow is not marked on such valves, this shall be done in the presence of Engineer-in-Charge before installation.

Fabrication of stem extensions, locking arrangements and interlocking arrangements of valves (if called for), shall be carried out as per drawings / instructions of Engineer-in-Charge.

5.9 Instruments

Installation of in-line instruments such as control valve, orifice flange, rotameter, safety valves, restriction orifice, rupture disc, de-super heaters, corrosion probes, annubar, magnetic flow meter, ultrasonic flow meter, Coriolis mass flow meters, venturi PG/PTI Flow transmitter, ejectors, etc. and Shut Down Valves with fireboxes shall form a part of piping erection work.

Fabrication and erection of piping upto first block valve / nozzle / flange for installation of offline Instruments for measurement of level, pressure, temperature, flow etc. shall also form part of piping construction work. The limits of piping and instrumentation work will be shown in drawings / standards / specifications. Orientations / locations of take-offs for temperature, pressure, flow, level connections etc. shown in drawings shall be maintained.

Flushing and testing of piping systems which include instruments mentioned above and the precautions to be taken are covered in flushing, testing and inspection of piping (VCS Spec.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

VCS-SS-PI-0007). Care shall be exercised and adequate precautions taken to avoid damage and entry foreign matter into instruments during transportation, installation, testing etc.

5.10 Line Mounted Equipment's / Items

Installation of line mounted items like filters, strainers, steam traps, air traps, de-super heaters, ejectors, samples coolers, mixers, flame arrestors, sight glasses etc., including their supporting arrangements shall form part of piping erection work.

5.11 Bolts and Nuts

The Contractor shall apply molycoat grease mixed with graphite powder (unless otherwise specified in piping classes) all bolts and nuts during storage, after erection and wherever flange connections are broken and made-up for any purpose whatsoever. The grease and graphite powder shall be supplied by the Contractor within the rates for piping work.

5.12 Pipe Supports

Pipe supports are designed and located to effectively sustain the weight and thermal effects of the piping system and to prevent its vibrations. Location and design of pipe supports will be shown in drawings for lines 2" NB & above. For lines $1^1/_2$"NB & below Contractor shall locate and design pipe supports in line with VCS Std's. In case of IBR Lines $1^1/_2$"NB & below only indicative supporting shall be provided & detailing of such supports is in Contractor's scope. Contractor shall obtain approval of Engineer - in - Charge on drawings prepared by Contractor, before erection. However, any extra supports desired by Engineer- in-Charge shall also be installed.

No pipe shoe / cradle shall be offset unless specifically shown in the drawings.

Hanger rods shall be installed inclined in a direction opposite to the direction in which the pipe move during expansion.

Pre-set pins of all spring supports shall be removed only after hydrostatic testing and insulation is over. Springs shall be checked for the range of movement and adjusted if necessary to obtain the correct positioning in cold condition. These shall be subsequently adjusted to hot setting in operating condition. The following points shall be checked after installation, with the Engineer-in-Charge and necessary confirmation in writing obtained certifying that:

- All restraints have been installed correctly.
- Clearances have been maintained as per support drawings.
- Insulation does not restrict thermal expansion.
- All temporary tack welds provided during erection have been fully removed.
- All welded supports have been fully welded.

Copyright VCS Quality Services Private Limited – All rights reserved

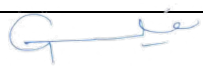
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION
FOR
CHECK VALVES

VCS – SS – PP -2006

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
					
05	29.04.2022	RP	MC	HK	GW
04	07.01.2022	SR	MC	HK	HK

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	23.06.2017					Issued as Standard Spec.
		AS	SM	AD	SK	
01	25.06.2019					Re-Issued as Standard Spec.
		BS	MC	AD	SK	
02	15.11.2019					Re-Issued as Standard Spec.
		HS	MC	AD	SK	
03	28.01.2020					Documents Formatting, numbering updated from VPC-SS-PL-0020 to VPC-SS-PP-2006,
		MB	MC	AD	SK	
04	07.01.2022					Revised as Marked
		SR	MC	HK	HK	
04	07.01.2022					VCS QMS Integration
		RP	MC	HK	GW	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATIONS:

ANSI	American National Standards Institute
ASTM	American Society for Testing and Materials
ASME	American Society of Mechanical Engineers
API	American Petroleum Institute
DN	Nominal Size
EN	European Committee for Standardization
ISO	International Standards Organization
MSS	Manufacturers Standardization Society
NACE	National Association of Corrosion Engineers
NDE	Non Destructive Examination
NPS	Nominal Pipe Size
UT	Ultrasonic Testing

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 SCOPE 5

2.0 REFERENCE DOCUMENTS 5

3.0 MANUFACTURER'S QUALIFICATION 6

4.0 MATERIALS 7

5.0 DESIGN AND CONSTRUCTION REQUIREMENTS 8

6.0 INSPECTION AND TESTS 9

7.0 TEST CERTIFICATES 11

8.0 PAINTING 9

9.0 MARKING AND SHIPMENT 11

10.0 SPARES & ACCESSORIES 12

11.0 DOCUMENTATION 12

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE

This Specification covers the minimum requirements for design, manufacture and supply of carbon steel check valves of size DN 50 mm (2" NB) to DN 600 mm (24" NB) and ANSI Class 150# thru 900# for use in onshore pipeline systems handling non-sour hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG).

2.0 REFERENCE DOCUMENTS

2.1 All valves shall be manufactured and supplied in accordance with the American Petroleum Institute (API) Specification 6D, latest edition in force at the time of issue of enquiry, Specification for Pipeline & Piping valves with additions and modifications (alternations) as indicated in the following sections of this Specification.

2.2 Reference has also been made in this specification to the latest edition (edition in force at the time of issue of enquiry) of the following Codes, Standards and Specifications.

AMERICAN SOCIETY OF MECHANICAL ENGINEERS (ASME)

B 31.4	:	Pipeline Transportation Systems for Liquids and Slurries
B 31.8	:	Gas Transmission and Distribution Piping Systems
B 31.3	:	Process Piping
B 16.5	:	Steel Pipe Flanges and Flanged Fittings
B 16.25	:	Butt-welding Ends
B 16.10	:	Face to Face and End to End Dimensions of Valves
B 16.34	:	Valves – Flanged, Threaded, and Welding End
B 16.47	:	Large Diameter Steel Flanges
Sec.VIII.Div.1:		Boiler and Pressure Vessel Code - Rules for Construction of Pressure Vessels
Sec. IX	:	Boiler and Pressure Vessel Code – Welding and Brazing Qualifications

AMERICAN PETROLEUM INSTITUTE (API)

1104	:	Specification for Welding Pipelines and Related Facilities
6D	:	Specification for Valves
6FA	:	Fire Test for Valves
6FD	:	Fire Test for Check Valves

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Std. 594 : Check Valves: Wafer, Wafer-Lug, and Double Flanged Type

Std. 598 : Valve Inspection & Testing

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

A 105 : Specification for Forgings, Carbon Steel for Piping Components

A 216 : Specification for Steel Castings, Carbon, Suitable for Fusion Welding for High Temperature Service

A 182 : Specification for Austenitic Stainless Steel

A 234 : Specification for Piping Fittings of Wrought Carbon Steel and Alloy Steel for Moderate and Elevated Temperatures

A 350 : Specification for Carbon and Low Alloy Steel Forgings Requiring Notch Toughness Testing for Piping Components

A 351 : Specification for Casings, Austenitic – Ferritic (Duplex) Pressure Containing Parts

A 370 : Mechanical Testing of Steel Products

MANUFACTURERS STANDARDIZATION SOCIETY (MSS)

SP-25 : Standard Marking System for Valves, Fittings, Flanges and Unions

SP-6 : Standard Finishes for Contact Faces of Pipe Flanges and Connecting End Flanges of Valves and Fittings

SP-44 : Steel Pipeline Flanges

SP-53 : Quality Standard for Steel Castings and Forgings for Valves, Flanges and Fittings and Other Piping Components- Magnetic Particle Examination Method.

2.3 In case of conflict between the requirements of this specification, API 6D and the Codes, Standards and Specifications referred in clause 2.2 above, the requirements of this specification shall govern.

3.0 MANUFACTURER'S QUALIFICATION

Manufacturer who meets the following requirements shall be considered as qualified.

3.1 The Manufacturer shall have a valid license to use API Monogram for his supply of valves with similar design and material of construction.

3.2 Manufacturer shall submit the proof of evidence that he offered similar design of valves as specified in this specification are supplied in the last five years and functioning satisfactorily.

The manufacturer shall submit valid API 6D certificate.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.0 MATERIALS

4.1 Material for major components of the valves shall be as indicated in Valve Data Sheet. Other components shall be as per Manufacturer's standard (suitable for the service conditions indicated in Data Sheet) and shall be subject to approval by the Company. In addition, the material shall also meet the requirements hereinafter.

4.2 All process wetted parts, metallic and non-metallic, and lubricants shall be suitable for the service specified by the Purchaser. Manufacturer shall confirm that all wetted parts are suitable for treated water/ sea water environment which may be used during field testing.

Nonmetallic components of valves intended for hydrocarbon gas service shall be resistance to explosive decompression.

4.3 Carbon Steel used in the manufacture of valves shall be fully killed.

4.4 Based on product analysis, Carbon Equivalent (CE) shall not exceed 0.43 for each heat of steel used for welding of valve end connections by the Company.

$$CE = C + Mn/6 + (Cr + Mo + V)/5 + (Ni + Cu)/15$$

Carbon content shall not exceed 0.23%, Sulphur content of maximum 0.035% and Phosphorous maximum content of 0.035%.

4.5 CHARPY V-NOTCH TEST REQUIREMENTS

Charpy V-notch test on each heat of base material shall be conducted for all pressure containing parts such as Body, End Flanges and Welding Ends as well as Bolting materials for pressure containing parts.

Test procedure for Charpy V-Notch Test shall conform to ASTM A370.
For Carbon Steel, alloy steel & Stainless Steel (except Austenitic Grades) Materials, the impact test temperature shall be 0°C or minimum design temperature indicated in valve data sheet, whichever is lower. The average absorbed energy value of three full sized specimens shall be 27 J (for materials with Specified Minimum Tensile Strength <100,000 psi)/ 34 J (for materials with Specified Minimum Tensile Strength >100,000 psi). The minimum impact energy value of any one specimen of the three specimens analysed as above, shall not be less than 22 J (for materials with Specified Minimum Tensile Strength <100,000 psi)/ 26 J (for materials with Specified Minimum Tensile Strength >100,000 psi).

For Low Temperature Carbon Steel Materials, the impact test temperature shall be as per requirement of Material Standard or minimum design temperature indicated in valve data sheet, whichever is lower. The average absorbed energy value of three full sized specimens shall be 27 J (for materials with Specified Minimum Tensile Strength <100,000 psi)/ 34 J (for materials with Specified Minimum Tensile Strength >100,000 psi). The minimum impact energy value of any one specimen of the three specimens analysed as above, shall not be less than 22 J (for materials with Specified Minimum Tensile Strength <100,000 psi)/ 26 J (for materials with Specified Minimum Tensile Strength >100,000 psi).

Where the material specification requires impact values to be higher than specified in the above paragraphs, the higher values shall apply.

Result of Charpy Test shall be recorded.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.6 HARDNESS TEST REQUIREMENTS

Hardness test shall be carried out as per ASTM A 370 for each method of manufacture and each heat of steel used in the manufacture of valves. A full thickness cross section shall be taken for this purpose and the maximum hardness of the materials of valve components shall not exceed 248 HV_{10}.

Result of Hardness Test shall be recorded.

5.0 DESIGN AND CONSTRUCTION REQUIREMENTS

5.1 Only Swing type Check Valves meeting the requirements of API Specification 6D are acceptable.

Valve design shall meet the requirements of API Specification 6D and shall be suitable for the service conditions indicated on the Valve Data Sheet. The ASME Boiler and Pressure Vessel Code, Section VIII, Division 1 shall be used to design the valve body. Allowable stress requirements shall meet the provisions of above code. In addition, corrosion allowance indicated in Valve Data Sheet shall be considered in valve design. However, minimum wall thickness shall not be less than minimum requirements of ASME B 16.34.

Manufacturer shall have a valid licence to use API 6D monogram for manufacture of Check Valves.

5.2 The disc hinge shall be mounted on the valve body and shall not be attached to the valve body cover for swing check valves. Valve body cover joint shall be of bolted design and screwed covers shall not be used. For 900# class valve, cover shall be pressure seal type.

5.3 Valve shall be provided with non-renewable integral type seats as indicated in Valve Data Sheets. Non-renewable seats shall be of a design, which does not require renewal over the design life of the valve.

5.4 Unless specified otherwise in data sheet all check valves 3" and above, shall be provided with, drain connection as per the Manufacturer's standard. Drain tapping shall be provided with plug as per ASME B 16.34 in a position suitable to completely drain the valve with valve in either horizontal or vertical position.

5.5 Wherever specified for the parts of valve in valve datasheets, minimum thickness of stelliting shall be 1.6 mm

5.6 VALVE ENDS

Valve ends shall be either flanged/ or butt welded or one end flanged and one end butt welded as indicated in the Valve Data Sheets and as per API 6D. Flanges of the flanged end cast body valves shall be integrally cast with the body of the valve. Face to face/ end to end dimensions shall conform to API 6D, valve sizes which are not specified in API 6D shall be in accordance with ASME B 16.10 or as per Manufacturer Standard and shall be subject to approval by Company.

5.7 Flanged end, if specified, shall have flanges as per ASME B 16.5 for valve sizes up to DN 600 mm (NPS 24”) excluding DN 550 mm (NPS 22”) and as per MSS SP-44/ ASME B 16.47 Series A for valve sizes DN 550 mm (NPS 22”) and for DN 650 mm (NPS 26”) and above. Flange face shall be either raised face or ring joint type as indicated in Valve Data

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Sheet. Smooth finish when specified shall be 125 to 250 AARH. In case of the RTJ flanges, the groove hardness shall minimum 140 BHN.

5.8 Butt weld end preparation shall be as per ANSI B 16.25. The thickness of the pipe to which the valve has to be welded shall be as indicated in the Valve Data Sheet. Valves shall be without transition pups. In case difference exists between thickness of valve neck end and connecting pipe. The bevel end shall be prepared as per ANSI B 31.4 or ANSI B 31.8 as applicable.

5.9 Valve sizes DN 200 mm (NPS 8") and above shall be equipped with lifting lugs. Tapped holes and eye bolts shall not be used for lifting lugs.

5.10 An arrow indicating the direction of flow shall be embossed or cast on the body of all valves.

5.11 WELDING

All welds shall be made by welders with welding procedures qualified in accordance with the provisions of ASME Section IX.

5.12 REPAIR WELDING

Repair by welding is permitted for cast body valves subject to written approval by Company and shall be carried out as per ASME B 16.34. Repair shall be carried out before any heat treatment of casting is done. Repair welding procedure qualification shall also include impact test and hardness test when required as per Clause 4.5 and 4.6 of this specification and shall meet the requirements as specified therein. Heat treatment and radiography shall be repeated after the weld repair.

6.0 INSPECTION AND TESTS

6.1 The Manufacturer shall perform all inspection and tests as per the requirements of this specification and the relevant Codes, Standards and Specifications, prior to shipment at his works but not limited to the following.

6.2 All valves shall be visually inspected. The internal and external surfaces of the valves shall be free from any strikes, gauges, dirt, rust, scales and other detrimental defects.

6.3 Dimensional check on valves shall be carried out as per the Company approved drawings.

6.4 Chemical composition and mechanical properties, including hardness shall be checked as per the relevant material Standards and this Specification for each heat of steel used.

6.5 The Manufacturer shall carry out nondestructive examination of individual valve materials and components consisting of, but not limited to, forgings, plates and assembly welds.

6.6 Body castings of all valves of all valves shall be radiographically examined as per ASME B 16.34. Procedure and acceptable criteria shall be as per ASME B 16.34. The extent of radiography as follows.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Pressure Class Rating	Valve Size	Extent of Radiography
ANSI 150# class	≤ DN 600 mm (24") ≥ DN 650 mm (26")	Nil 100%
ANSI 300# class	≤ DN 400 mm (16") ≥ DN 450 mm (18")	Nil 100%
ANSI 600# class & 900# class	All Sizes	100%

Radiography shall be performed after the final heat treatment also.

All castings of valves of size NPS 20" & above shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with ASME B16.34.

6.7 All valves, with body fabricated from plates or made by forgings, shall be ultrasonically examined in accordance with the procedure and acceptance standard of Appendix IV of ASME B 16.34.

6.8 All forgings of valves of size NPS 20" & above shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with ASME B 16.34.

All finished wrought weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.

Weld ends of all cast valves subject to welding in field shall be 100% radiographically examined and acceptance criteria shall be as per ASME B 16.34.

After final machining, all bevel surfaces shall be inspected by dye penetrant or wet magnetic particle methods. All defects longer than 6.35 mm are not acceptable. Weld repair of bevel surface is not permitted.

6.9 All valves shall be tested in compliance with the requirements of API 6D. Hydrostatic test pressure shall be held for at least 30 minutes. No leakage is permissible during hydrostatic testing.

6.10 A supplementary air seat test as per API 6D (Annex I, Para I.9 Type II), shall be carried out for all valves. No leakage is allowed. Test pressure shall be held for at least 15 minutes.

6.11 Company reserves the right to perform stage wise inspection and witness tests as indicated in clause 6.0 above at Manufacturer's works prior to shipment. Manufacturer shall give reasonable access and facilities required for inspection to the Company's Inspector. Company reserves the right to require additional testing at any time to confirm or further investigate a suspected fault. The cost incurred shall be to Manufacturer's account.

In no case shall any action of Company or its Inspector relieve the Manufacturer of his responsibility for material, design, quality or operation of valves.

Inspection and tests conducted/ witnessed by the Company's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and tests.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

7.0 TEST CERTIFICATES

The manufacturer shall submit following test certificates.

a. Mill test certificates relate to the chemical analysis and mechanical properties of the materials used for the valve construction as per the relevant Standards.
b. Test certificates of hydrostatic and pneumatic tests complete with records of timing and pressure of each test.
c. Test reports of radiography, ultrasonic, magnetic particle inspection as applicable.
d. All other certificates and test reports as required by API 6D and this Specification.

The certificates shall be valid only where signed by Company's Inspector. Only those valves which have been certified by the Company's Inspector shall be dispatched from Manufacturer's work.

8.0 PAINTING

8.1 Valve surface shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of corrosion resistant paint. Surface preparation shall be carried out by shot blasting to SA-2 1/2 / SSPC-SP10. For the valves to be installed underground, when indicated in Valve Data Sheet, the external surfaces of buried portion of the valve shall be painted with 100% solid high build epoxy with a minimum dry film thickness of 800 microns or 1.5 mm thick polyurethane coating.

9.0 MARKING AND SHIPMENT

9.1 All valves shall be marked as per API 6D. The units of marking shall be metric except nominal diameter, which shall be in inches.

9.2 Valve ends shall be suitably protected to avoid any damage during transit. All threaded and machined surfaces shall be well protected by a coat of grease or other suitable material to avoid the corrosion. All valves shall be provided with suitable protectors for flange faces, securely attached to the valves. Bevel ends shall be protected with metallic or high impact plastic level protectors.

9.3 All sealant lines and other cavities of the valve shall be filled with sealant before shipment.

9.4 Packaging and shipping instructions shall be as per API 6D.

9.5 On packages, the following shall be marked legibly with suitable marking ink:

a. Order Number
b. Manufacturer's Name
c. Valve Size And Rating
d. Tag No
e. Serial No

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

10.0 SPARES & ACCESSORIES

10.1 Manufacturer shall furnish list of recommended spares and accessories for valves for valves required for startup and commissioning and supply of such spares shall be included in the price quoted by manufacturer.

10.2 Manufacturer shall furnish list of recommended spares and accessories for two years of normal operation and maintenance of valves and price of such spares shall be quoted by separately.

11.0 DOCUMENTATION

The Manufacturer shall supply documentation in accordance with the Vendor Data Requirements List (VDRL) as attached with Purchase Order.

Documentation to be submitted by Manufacturer to Company is summarized below. Number of Copies (Hard copies / soft copies etc.) shall be as indicated in CONTRACT document.

11.1 At the time of bidding, Manufacturer shall submit the following documents:

a. Reference list of similar check valves manufactured and supplied in last seven years indicating all relevant details including project, year, client, location, size, rating, service etc.

b. Copy of valid API 6D Certificate.

c. List of recommended spares required during start-up and commissioning and 2 years of normal operation & maintenance.

11.2 After placement of Order, the Manufacturer shall submit, but not limited to, the following drawings, documents and specifications for Company's approval:

a. Detailed sectional & General arrangement drawings showing all parts with reference numbers and materials specification, overall dimensions & features, painting/ coating scheme.

b. Details of corrosion resistant paint to be applied on the valves.

Manufacture of valves shall commence only after approval of the above documents.

11.3 Within two weeks from the approval date, Manufacturer shall submit to Company all approved drawings, documents and specifications as listed in clause 11.2 above. Manufacturer shall also submit manual for installation, erection & maintenance instructions.

11.4 Prior to shipment, Manufacturer shall submit to Company the test certificates as listed in clause 7.0 of this specification. All reports shall be submitted in electronic format also.

11.5 All documents shall be in English language only.

Copyright VCS Quality Services Private Limited – All rights reserved

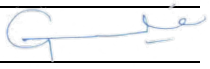
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT.LTD.

STANDARD SPECIFICATION
FOR
PIPELINE BALL VALVES

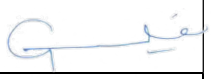
VCS-SS-PP-2004

					
04	29.04.2022	RP	MC	HK	GW
03	07.01.2022	SR	MC	HK	HK
Rev. No	**Date**	**Prepared By**	**Checked By**	**Approved By**	**Authorized By**

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD						
Rev.	**Revision Date**	**Prepared by**	**Checked by**	**Approved by**	**Authorized by**	**Revision Description**
00	23.06.2017					Issued as Standard
		AS	SM	AD	SK	
01	22.05.2019					Revised based on API 6D 24TH Edition.
		BS	MC	AD	SK	
02	28.01.2020					Documents Formatting, numbering updated from SS-PL-004 to VPC-SS-PP-2004, vent drain Diagram updated, other Detail updated as marked
		MB	MC	AD	SK	
03	07.01.2022					Revised as Marked
		SR	MC	HK	HK	
04	29.04.2022					VCS QMS Integration
		RP	MC	HK	GW	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATIONS:

ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
API	American Petroleum Institute
BHN	Brinell Hardness Number
DN	Nominal Size
HAZ	Heat Affected Zone
LC	Lock Close (valve locked in full close position)
LO	Lock Open (valve locked in full open position)
MSS-SP	Manufacturers Standardization Society - Standard Practice
NDT	Non Destructive Testing
NPS	Nominal Pipe Size
RTJ	Ring Type Joint
SSPC	Steel Structures Painting Council
MPI	Magnetic Particle Inspection
DP	Dye Penetrant

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1 SCOPE 5
2 REFERENCE DOCUMENTS 5
3 MATERIALS 6
4 DESIGN AND CONSTRUCTION REQUIREMENTS 7
5 INSPECTION & TESTS 13
6 TEST CERTIFICATES 16
7 PAINTING 16
8 MARKING & SHIPMENT 16
9 SPARES & ACCESSORIES 17
10 DOCUMENTATION 17

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1 SCOPE

This specification covers the minimum requirements for design, manufacture, testing and supply of carbon steel ball valves of size DN 50 mm (2") and above and ASME pressure rating Class 150# thru 900# for use in onshore pipeline systems handling non-sour hydrocarbons in liquid or gaseous phase including Liquefied Petroleum Gas (LPG).

2 REFERENCE DOCUMENTS

All valves shall be manufactured and supplied in accordance with the American Petroleum Institute (API) Specification 6D, latest edition (edition in force at the time of issue of enquiry), Specification for Pipeline and Piping Valves, with additions and modifications as indicated in the following sections of this specification.

Reference has also been made in this specification to the latest edition (edition in force at the time of issue of enquiry) of the following Codes, Standards and Specifications.

2.1 American Society of Mechanical Engineers (ASME)

B31.3	:	Process Piping.
B31.4	:	Pipeline Transportation System for Liquid and Slurries.
B 31.8	:	Gas Transmission and Distribution Piping Systems.
B16.5	:	Pipe Flanges and Flanged Fittings.
B16.10	:	Face to Face and End to End Dimensions of Valves.
B 16.25	:	Butt Welding Ends.
B 16.34	:	Valves-Flanged, Threaded and Welding Ends.
B 16.47	:	Large Diameter Steel Flanges.
Section VIII	:	Boiler and Pressure Vessel Code - Rules for Construction of Pressure Vessels.
Section IX	:	Welding and Brazing Qualifications.

2.2 American Petroleum Institute (API)

1104	:	Specification for Welding of Pipelines and Related Facilities.

2.3 American Society for Testing and Materials (ASTM)

A370	:	Standard Test Methods and Definitions for Mechanical Testing of Steel Products.
B 733	:	Auto catalytic (Electro less) Nickel - Phosphorus Coatings on Metal.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

2.4 Manufacturers Standardization Society (MSS)

SP-6	:	Standard Finishes for contact faces of Pipe Flanges and Connecting – End Flanges of Valves and Fittings.
SP-44	:	Steel Pipeline Flanges.

2.5 Steel Structures Painting Council (SSPC)

SSPC-VIS-I	:	Steel Structures Painting Council Visual Standard-Guide and Reference Photographs for Steel Surfaces prepared by Dry Abrasive Blast Cleaning.

2.6 In case of conflict between the requirements of this specification, API 6D and the Codes, Standards and Specifications referred above, the requirements of this specification shall govern.

3 MATERIALS

3.1 The material of major components of the ball valves shall be as indicated in Valve Data Sheet. Remaining components shall be as per Manufacturer's standard (suitable for the service indicated in the data Sheet) and shall be subjected to approval by Company. In addition, the material shall also meet the requirement specified hereinafter.

All process-wetted parts, metallic and non-metallic, sealant and lubricants shall be suitable for the service specified by the Company. Manufacturer shall confirm that all wetted parts are suitable for treated water/ seawater environment, which may be used during field testing.

Non-metallic parts of the valves (including O-rings, soft seals etc.) intended for hydrocarbon gas service shall be resistant to explosive decompression.

3.2 Carbon steel used for the manufacture of valves shall be fully killed.

3.3 The carbon equivalent (CE_{IIW}) of valve end connections which are subject to further field welding by Company shall not exceed 0.43 on check analysis for each heat of steel used, as calculated by the following formula:

$$CE_{IIW} = C + \frac{Mn}{6} + \frac{Cr + Mo + V}{5} + \frac{Cu + Ni}{15}$$

3.4 Charpy V-Notch Test Requirements

Charpy V-notch test on each heat of base material shall be conducted for all pressure containing parts such as Body, End Flanges, Stem and Welding Ends as well as Bolting materials for pressure containing parts.

Test procedure for Charpy V-Notch Test shall conform to ASTM A370.

For Carbon Steel, alloy steel & Stainless Steel (except Austenitic Grades) Materials, The impact test temperature shall be 0 °C or minimum design temperature indicated in valve

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

data sheet / MR, whichever is lower. The average absorbed energy value of three full sized specimens shall be 27 J (for materials with Specified Minimum Tensile Strength ≤100,000 psi)/ 34 J (for materials with Specified Minimum Tensile Strength >100,000 psi). The minimum impact energy value of any one specimen of the three specimens analysed as above, shall not be less than 22 J (for materials with Specified Minimum Tensile Strength ≤100,000 psi)/ 26 J (for materials with Specified Minimum Tensile Strength >100,000 psi).

For Low Temperature Carbon Steel Materials, the impact test temperature shall be as per requirement of Material Standard or minimum design temperature indicated in valve data sheet/MR, whichever is lower. The average absorbed energy value of three full sized specimens shall be 27 J (for materials with Specified Minimum Tensile Strength ≤100,000 psi)/ 34 J (for materials with Specified Minimum Tensile Strength >100,000 psi). The minimum impact energy value of any one specimen of the three specimens analysed as above, shall not be less than 22 J (for materials with Specified Minimum Tensile Strength ≤100,000 psi)/ 26 J (for materials with Specified Minimum Tensile Strength >100,000 psi).

Where the material specification requires impact values to be higher than specified in the above paragraphs, the higher values shall apply.

For duplex & super duplex stainless steel the Charpy V-Notch test values and test temperature shall be as per API 6D.

3.5 Hardness Test Requirements

For valves specified to be used for Gas service or LPG service, Hardness test shall be carried out as per ASTM A370 for each method of manufacture and each heat of steel used in the manufacture of valves. A full thickness cross section shall be taken for this purpose and the maximum hardness of the materials of valve components shall not exceed 248 HV_{10}.

3.6 Electroless Nickel Plating Requirements

For all such valves where Carbon Steel/Low temperature carbon steel is used as ball material, the ball shall have 75 micrometers (0.003 inches) thick Electro less Nickel Plating (ENP) as per ASTM B 733 with following classification:

- SC2, Type II, Class 2.

The hardness of plating shall be minimum 50 RC.

4 DESIGN AND CONSTRUCTION REQUIREMENTS

4.1 General

Valve design shall meet the requirements of API Specification 6D and shall be suitable for the service conditions indicated in the Valve Data Sheet. The ASME Boiler & Pressure Vessel Code, Section VIII, Div 1 shall be used to design the valve body. Allowable stress requirements shall comply the provisions of above code. Also, corrosion allowance indicated in Valve Data Sheet shall be considered in valve design; however, the minimum wall thickness shall not be less than the minimum requirement of ASME B16.34. The

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

manufacturer shall have valid license to use API monogram on valves manufactured as per API 6D.

4.2 Valve Installation

Valves shall be suitable for either buried or above ground installation as indicated in Valve Data Sheet/ Material requisition.

4.3 Valve Body

4.3.1 For above ground valve, valve body design shall be either fully welded or bolted type. For buried valves, valve body design shall be fully welded type only. Valve body joints with threads are not permitted.

4.3.2 Ball mounting shall be trunnion or pivot type only. Valve design shall minimize the possibility of debris ingress into the trunnion as far as practicable

4.4 Ball

Ball shall be of single piece, solid type construction.

4.5 Valve Bore Configuration

Valves shall be Full bore (FB) or Reduced bore (RB) as indicated in the Valve Data Sheet.

Full Opening Valve

Full bore valves shall be suitable for the passage of all types of pipeline pigs including instrumented intelligent pigs and regular cleaning, batching and scraper pigs on regular basis without causing damage to either the valve component or the pig. The full bore, valve shall provide an unobstructed profile for pigging operations in either direction. Full bore valves shall be designed to minimize accumulation of debris in the seat ring region to ensure that valve movement is not impeded. The bore of full bore butt-welded & flanged valves shall be in line with Connecting pipe as stated in valve data sheet or Valve MR, however in any case it shall not be less than the minimum required shown in Client Ball Valve specification & API 6D.

Reduced Opening Valve

The bore size of reduced bore valve shall correspond to that of a full-bore valve of smaller nominal diameter as indicated in Table- 4.5 below. For sizes of a particular rating not covered in API 6D, the bore size of the reduced bore valve shall be as per manufacturer`s Standard.

TABLE – 4.5

Nominal Valve Size	Nominal Valve Size for Reduced Bore	Nominal Valve Size	Nominal Valve Size for Reduced Bore
DN mm (NPS inches)	DN mm (NPS inches)	DNmm (NPSinches)	DNmm (NPS inches)
50 (2)	40 (1.5)	600 (24)	500 (20)

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

80 (3)	50 (2)	650 (26)	550 (22)
100 (4)	80 (3)	700 (28)	600 (24)
150 (6)	100 (4)	750 (30)	600 (24)
200 (8)	150 (6)	800 (32)	650 (26)
250 (10)	200 (8)	850 (34)	700 (28)
300 (12)	250 (10)	900 (36)	750 (30)
350 (14)	250(10)	950 (38)	800 (32)
400 (16)	300 (12)	1000 (40)	850 (34)
450 (18)	350 (14)	1050 (42)	900 (36)
500 (20)	400 (16)	1200 (48)	1050 (42)
550 (22)	450 (18)		

4.6 Seat Design

The valves shall either be a soft seated valve or metal seated valve or with primary metal-to metal contact and secondary soft seats or seat design shall be as indicated in valve data sheet.

For soft seated valves, Metal seat rings may be provided with soft insert. The same shall be positively locked in position in Metal seat rings.

For valves with primary metal to metal contact and secondary soft seats, O-rings or other seals if used for drip tight sealing shall be encased in a suitable groove in such a manner that it cannot be removed from seat ring and there is no extrusion during opening or closing operation of valve at maximum differential pressure corresponding to valve class rating. The seat rings shall be so designed as to ensure sealing at low as well as high differential pressures.

4.7 Valves shall be designed to withstand a sustained internal vacuum of at least 1 (one) mille-bar in both open and closed positions.

4.8 Double Block & Bleed Design

Valves shall have double block and bleed feature to facilitate complete flush, drain and venting of the valve body cavity. Cavity relief pressure shall be as per API 6D.

4.9 Sealant Injection

Full bore valves of nominal valve size DN 200 mm (8") & above and Reduced Bore valves of nominal valve size DN 250 mm (10") & above, shall have provision for secondary sealant injection under full line pressure for seat and stem seals. All sealant injection connections shall be provided with block valve and an internal non-return valve. Valve design shall have a provision to replace the sealant injection fitting under full line pressure. Location and arrangement of sealant points shall be as per Fig 4.9.

4.10 Vent & Drain

Valves shall be provided with vent and drain connections. Location and arrangement of

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

vents and drains shall be as per Fig. 4.9. Body vent and drain shall be provided with valves (Ball or Plug type). Number and size shall be as per Fig. 4.9.

Valve design shall ensure repair of stem seals/ packing under full line pressure.

4.11 Support Foot

Full bore valves of nominal valve size DN 200 mm (8") & above and Reduced bore valves of nominal valve size DN 250 mm (10") & above, shall be equipped with support foot and lifting lugs unless specified otherwise. Tapped holes and eyebolts shall not be used for lifting lugs. Height of support foot shall be kept minimum. The location and size of support foot/ lifting lugs shall ensure unrestrictive operation of vent/ drain valves. The design of support foot shall be such that it shall take minimum double the weight of the valve assembly.

4.12 Valve design shall be such as to avoid bimetallic corrosion between carbon steel and high alloy steel components. Suitable insulation shall be provided as required.

4.13 The valve body cavity over-pressure shall be prevented by self-relieving seat rings/ assemblies. Valve Cavity relief pressure when added to the valve pressure rating shall not exceed 133% of the pressure rating of the valve at its maximum specified design temperature.

4.14 Valve Ends

Valve ends shall be either flanged/ or butt welded or one end flanged and one end butt welded as indicated in the Valve Data Sheet. Flanges of the flanged end cast/ forged body valves shall be integrally cast/ forged with the body of the valve. Face to face/ end to end dimensions shall conform to API 6D. Face-to-face and end-to-end dimensions for valve sizes not specified in API 6D shall be in accordance with ASME B 16.10. Face-to-face and end-to-end dimensions not shown in API 6D or in ASME B 16.10 shall be as per Manufacturer Standard and shall be subject to approval by Company.

Flanged ends, if specified, shall have flanges as per ASME B16.5 for valve sizes up to DN 600 mm (24") excluding DN 550 mm (22"), as per MSS-SP-44/ ASME B 16.47 Series A for valve sizes DN 550 mm (22") and for DN 650 mm (26 inches) and above. Flange face shall be either raised face or ring joint type (RTJ) as indicated in Valve Data Sheet. Flange face finish shall be serrated or smooth as indicated in Valve Data Sheet. In case of RTJ flanges, the groove hardness shall be minimum 140 BHN.

Butt weld end preparation shall be as per ASME B 16.25. The thickness of the pipe to which the valve has to be welded shall be as indicated in the Valve Data Sheet. In case difference exists between thickness of welding ends of valve and connecting pipe, the welding ends of valve shall have bevel preparation as per ASME B31.4 or ASME B31.8 as applicable.

In case of all Butt welded end valves (including soft seated valves or valves with primary metal to metal and secondary soft seats), actual yield strength of valve body shall not be less than 2/3rd of the specified minimum yield strength (SMYS) of the connecting pipe material.

For soft seated valves with Butt welded end, valves shall be provided with pup pieces on

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

either side of length 200 mm each for size up-to 8" & 250 mm for size 10" and above, with material as specified in valve data sheet. Length of pup piece shall be confirmed by manufacturer so as to avoid damage to seats during field welding or post weld heat treatment. Pup piece thickness shall be calculated for the class rating. Vendor shall provide for each type (considering size, grade and thickness of the pup pieces used for all offered valves) of pup piece, test rings (500 mm long) from pup piece material for field weld procedure qualification. Valves shall be tested along-with pup piece.

4.15 Design of weld end valves shall be such that during field welding operations, the soft seals or plastic components of the valve (where ever used) is not liable to be damaged. The manufacturer shall furnish necessary field welding instructions and post-weld test procedure to demonstrate integrity and leak-tightness of valves after field welding operations.

4.16 POSITION INDICATORS

Valve shall be provided with ball position indicator and stops of rugged construction at the fully open and fully closed positions. For actuated valves, additionally mechanical means of position indicator shall be provided.

4.17 STEM EXTENSIONS

When stem extension requirement is indicated in Valve Data Sheet, the valves shall have the following provisions.

a. Valves provided with stem extension shall have water proof outer casing. Length of stem extension shall be as indicated in Valve Data Sheet. The length indicated corresponds to the distance between centerline of the valve opening and the top of mounting flange for valve operating device (gear operator/ power actuator as applicable).

b. In case of below Ground LTCS valves, Stem extension material shall be equivalent to stem material.

c. Vent and drain connections and sealant injection lines shall be terminated adjacent to the valve operator by means of suitable piping anchored to the valve body. The pipe used shall be API 5L Gr. B/ ASTM A 106 Gr. B, with Sch 160 for carbon steel valves and ASTM A 333 Gr 6, with Sch 160 for Low temperature carbon steel valves or the material shall be as specified in valve data sheet. The material of fittings for Carbon Steel valve shall be ASTM A105/ ASTM A234 Gr. WPB and material for the fittings for low temperature carbon steel valves shall be ASTM A 350 Gr LF2 Cl 1 or the material shall be as specified in valve data sheet. The fittings and valve end shall be Socket welded ANSI class 6000# as per ASME B 16.11 (For piping class up to 600#) and BW end (For Piping Class 900#).

d. Stem extension and stem housing design shall be such that the complete assembly will form a rigid unit giving positive drive under all conditions with no-possibility of free movement between valve body, stem extension or its operator.

e. Outer casing of stem extension shall have 3/8” or 1/2" NPT plugs at the top and bottom, for draining and filling with oil to prevent internal corrosion.

f. The Stem Extension shall be self-relieving.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.18 OPERATING DEVICES

a. Valves shall have a power actuator or manual operator as indicated in the Valve Data Sheet. In case of manual operator, valve sizes, DN ≤ 100 mm (4") shall be wrench operated and valve sizes, DN ≥ 150 mm (6") shall be gear operated. The length of wrench shall not be longer than twice the face to face or end to end dimension of the valve. Each wrench operated valve shall be supplied with wrench. Valve design shall be such that damage due to malfunctioning of the operator or its controls will only occur in the operator gear train or power cylinder and that damaged parts can be replaced without the valve cover being removed.

b. The power actuator shall be in accordance with the Company Specification issued for the purpose and as indicated in the Valve and Actuator Data Sheet. Operating time shall be as indicated in Valve Data Sheet. Valve operating time shall correspond to full close to full open/ full open to full close under maximum differential pressure corresponding to the valve rating. For actuated valves, the actuator's rated torque output shall be 1.25 times the break torque required to operate the ball valve under the maximum differential pressure corresponding to the Valve Class Rating.

c. For the manual operator of all valves, the diameter of the hand wheel or the length of operating wrench shall be such that under the maximum differential pressure, the total force required to operate the valve does not exceed 350N. However, failing to meet above requirement, vendor shall offer gear operated valves. Manufacturer shall also indicate the number of turns of hand wheel in case of gear operators (along with their offer) required for Operating the valve from full open to full close position. The numbers of turn shall not exceed 250 for valves sizes up to 24” and 450 for valve size above 24”.

d. Direction of operation of hand wheel or wrench shall be in clock-wise direction while closing the valve. Hand wheels shall not have protruding spokes.

e. Gear operators, when provided, shall have a self-locking provision and shall be fully encased in water proof/ splash proof enclosure and shall be filled with suitable grease.

4.19 The tolerance on internal diameter and out of roundness at the ends for welded ends valves shall be as per connected pipe specification as indicated in the Valve Data Sheet.

4.20 LOCKING DEVICES

When indicated in Material Requisition/Data sheet/ Tender, valves shall have locking devices to lock the valve either in full open (LO) or full close (LC) positions. Locking devices shall be permanently attached to the valve operator and shall not interfere with operation of the valve.

4.21 WELDING

All welds shall be made by welders and welding procedures qualified in accordance with the provisions of ASME Section IX. The procedure qualification shall also include impact test and hardness test when required as per Clause 3.4 to 3.5 of this specification and shall meet the requirements as specified therein.

4.22 REPAIR WELDING

Repair by welding is not permitted for fabricated and forged body valves. However, repair

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

by welding as per ASME B16.34 is permitted for cast body valves. Such repairs shall be carried out at casting supplier's care only. Repair shall be carried out before any heat treatment of casting is done. Repair welding procedure qualification shall also include impact test and hardness test when required as per Clause 3.4 to 3.5 of this specification and shall meet the requirements as specified therein. Heat treatment and radiography shall be repeated after the weld repair.

4.23 No Casting is permitted for stem and stem extended material of all valve. Valve stem shall be capable of withstanding the maximum operating torque required to operate the valve against the maximum differential pressure corresponding to applicable class rating. The combined stress shall not exceed the maximum allowable stresses specified in ASME section VIII, Division 1. For power actuated valves, the valve stem shall be designed for maximum output torque of the selected power actuator (including gear box, if any) at valve stem.

4.24 Wherever specified for the part of valve in valve data sheet, minimum thickness of stelliting shall be 1.6mm

4.25 All Soft seated valves shall be fire safe design and qualified as per API 6FA/ API 607/ ISO 10497.

4.26 Soft-seated valves shall have antistatic device.

5 INSPECTION & TESTS

5.1 The Manufacturer shall perform all inspection and tests as per the requirements of this specification and the relevant codes, prior to shipment, at his works. Such inspection and tests shall be, but not limited to, the following:

5.2 All valves shall be visually inspected. The internal and external surfaces of the valves shall be free from any strikes, gouges and other detrimental defects. The surfaces shall be thoroughly cleaned and free from dirt, rust and scales.

5.3 Dimensional check on all valves shall be carried out as per the Company approved drawings.

5.4 Chemical composition and mechanical properties shall be checked as per this specification and relevant material standards, for each heat of steel used.

5.5 Non-destructive examination of individual valve material and component consisting of but not limited to castings, forgings, plates and assembly welds shall be carried out by the Manufacturer.

a. Body castings of all valves shall be radio graphically examined as per ASME B16.34. Procedure and acceptance criteria shall be as per ASME B 16.34. The extent of the radiography shall be as under:

Pressure Class Rating	Valve Size	Extent of Radiography
ANSI 150 # Class	≤ DN 600 mm (24")	Nil
	≥ DN 650 mm (26")	100%

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ANSI 300 # Class	≤ DN 400 mm (16") ≥ DN 450 mm (18")	Nil 100%
ANSI 600 # Class and above	All sizes	100%

Radiography shall be performed after the final heat treatment also.

All castings shall be wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall, comply with ASME B 16.34.

b. All valves, with body fabricated from plates or made by, forgings, shall be ultrasonically examined in accordance with the procedure and acceptance standard as per ASME B16.34.

   All forgings shall be Wet magnetic particle inspected 100% of the internal surfaces. Method and acceptance shall comply with ASME B16.34.

c. Bodies and bonnets made by welded assembly of segments of castings, forgings, plates or combinations thereof shall be examined, as applicable, by methods of 5.5 (a) for cast components or 5.5 (b) for forged components and plates.

5.6 Full inspection by radiography shall be carried out on all welds of pressure containing parts. Acceptance criteria shall be as per ASME B 31.4 or ASME B31.8 as applicable and API 1104.

5.7 Welds, which in Company's opinion cannot be inspected, by radiographic methods, shall be checked by ultrasonic or magnetic particle methods and acceptance criteria shall be as per ASME Sec. VIII , Division 1, Appendix 12 and, Appendix 6 respectively.

5.8 All finished wrought weld ends subject to welding in field shall be 100% ultrasonically tested for lamination type defects for a distance of 50 mm from the end. Laminations shall not be acceptable.

a. Weld ends of all cast valves subject to welding in field shall be 100% radio graphically examined and acceptance criteria shall be as per ASME B16.34.

b. After final machining, all bevel surfaces shall be inspected by dye penetrant or wet magnetic particle methods. All defects longer than 6.35 mm are rejected, as are the defects between 6.35 mm and 1.59 mm that are separated by a distance less than 50 times their greatest length. Rejectable defects must be removed. Weld repair of bevel surface is not permitted.

5.9 All valves shall be tested in compliance with the requirements of API 6D. During pressure testing, valves shall not have sealant lines and other cavities filled with sealant, grease or other foreign material: The drain, vent and sealant lines shall be either included in the hydrostatic shell test or tested independently. Test pressure shall be held for at least 30 minutes for both Shell & seat Test. No leakage is permissible during hydrostatic testing. The body cavity self-relieving feature meeting the requirements of clause 4.13 of this specification shall also be checked.

5.10 A supplementary air seat test as per API 6D (Annex I, Para I.9 Type II) shall be carried

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

out for all valves. A bubble tight seal is required without the use of any sealant. No leakage is allowed. Test pressure shall be held for at least 15 minutes.

5.11 Valves shall be subjected to Operational Torque Test as per API 6D (Annex I, Para I.6) under hydraulic pressure equal to maximum differential pressure corresponding to the applicable ANSI class rating of valve. It shall be established that the force required to operate the valve does not exceed the requirements stated in section 4.18 (C) of this specification.

5.12 Power actuated valves shall be tested after assembly of the valve and actuator, at the valve Manufacturer's works. At least five Open-Close-Open cycles without internal pressure and five Open-Close-Open cycles with maximum differential pressure corresponding to the valve rating shall be performed on the valve actuator assembly. The time for Full Open to Full Close shall be recorded during testing. If required, the actuator shall be adjusted to ensure that the opening and closing time is within the limits stated in Valve Data Sheet.

Hand operator provided on the actuator shall also be checked after above testing, for satisfactory manual over-ride performance.

These tests shall be conducted on minimum one valve out of a lot of five (5) valves of the same size, rating and the actuator model/ type. In case, the tests do not meet the requirements, retesting/ rejection of the lot shall be decided by the Company's Inspector.

5.13 Subsequent to successful testing as specified in clause 5.11 and 5.12 above, one (1) valve out of the total ordered quantity shall be randomly selected by the Company Representative for cyclic testing as mentioned below:

a. The valve shall be subjected to at least 100 Open-Close-Open cycles with maximum differential pressure corresponding to the valve rating.
b. Subsequent to the above, the valve shall be subjected to hydrostatic test and supplementary air seat test in accordance with clause 5.9 and 5.10.

In case this valve fails to pass these tests, the valve shall be rejected and two more valves shall be selected randomly and subjected to testing as indicated above. If both valves pass these tests, all valves manufactured for the order (except the valve that failed) shall be deemed acceptable. If either of the two valves fails to pass these tests, all valves shall be rejected or each valve shall be tested at the option of manufacturer.

Previously carried out test of similar nature shall be considered acceptable if the same has been carried out by Manufacturer in last two years. Valves of two sizes below and two sizes above the size of valve previously tested, and rating similar or one rating lower of valve tested previously, shall be qualified.

5.14 Checks shall be carried out to demonstrate that the dissimilar metals used in the valves are successfully insulated as per the requirement of clause 4.12 of this specification.

5.15 Anti-Static testing for soft seated valves in accordance with L.5 of API 6D.

5.16 Company reserves the right to perform stage wise inspection and witness tests as indicated in clause 5.1 above at Manufacturer's works prior to shipment. Manufacturer shall give reasonable access and facilities required for inspection to the Company's

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Inspector. Company reserves the right to require additional testing at any time to confirm or further investigate a suspected fault. The cost incurred shall be to Manufacturer's account.

In no case shall any action of Company or his inspector shall relieve the Manufacturer of his responsibility for material, design, quality or operation of valves.

Inspection and tests performed/ witnessed by the Company's Inspector shall in no way relieve the Manufacturer's obligation to perform the required inspection and tests.

6 TEST CERTIFICATES

Manufacturer shall submit the following certificates in accordance with EN 10204 3.2.

a. Mill test certificates relevant to the chemical analysis and mechanical properties of the materials used for the valve construction as per the relevant standards.
b. Report on heat treatment carried out.
c. Test certificates of hydrostatic and pneumatic tests complete with records of timing and pressure of each test.
d. Test reports of radiograph and ultrasonic inspection, MPI and DP Inspection
e. Test report on operation of valves conforming to clause 5.11, 5.12 and 5.13 of this specification.
f. All other test reports and certificates as required by API 6D and this specification.

The certificates shall be considered valid only when signed by Company's Inspector. Only those valves which have been certified by Company's Inspector shall be dispatched from Manufacturer's works.

7 PAINTING

Valve surface shall be thoroughly cleaned, freed from rust and grease and applied with sufficient coats of corrosion resistant paint. Surface preparation shall be carried out by shot blasting to SA-2 ½ / SSPC-SP10. For Coastal area, painting shall be suitable for industrial marine environment. For the valves to be installed underground, when indicated in Valve Data Sheet, the external surfaces of buried portion of the valve shall be painted with 100% Solid high build epoxy with a minimum dry film thickness of 1000 microns or 1.5 mm thick polyurethane coating.

8 MARKING & SHIPMENT

8.1 All valves shall be marked as per API 6D. The units of marking shall be metric except nominal diameter, which shall be in inches.

8.2 Valve ends shall be suitably protected to avoid any damage during transit. All threaded and machined surfaces subject to corrosion shall be well protected by a coat of grease or other suitable material. All valves shall be provided with suitable protectors for flange faces, securely attached to the valves. Bevel ends shall be protected with metallic or high impact plastic bevel protectors.

8.3 All sealant lines and other cavities of the valve shall be filled with sealant before shipment.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

8.4 Packaging and shipping instructions shall be as per API 6D.

8.5 The serial number of each valve indicated on its name plate shall appear on all required documentation in accordance with EN 10204 3.2.

8.6 Name Plate material shall be minimum stainless steel. Marking shall be as per MSS-SP-25

8.7 All valves shall be transported with ball in fully opened condition

8.8 On packages, following shall be marked legibly with suitable marking ink:

a. Order Number
b. Manufacturer's Name
c. Valve size and rating
d. Tag Number
e. Serial Number

9 SPARES & ACCESSORIES

9.1 Manufacturer shall furnish list of recommended spares and accessories for valves required during start-up and commissioning and supply of such spares shall be included in the price quoted by Manufacturer.

9.2 Manufacturer shall furnish list of recommended spares and accessories required for two years of normal operation and maintenance of valves and price for such spares shall be quoted separately.

10 DOCUMENTATION

Documentation to be submitted by Manufacturer to Company is summarized below. Number of Copies (Hard copies / soft copies etc.) shall be as indicated in CONTRACT document.

10.1 At the time of bidding, Manufacturer shall submit the following documents:

a. Reference list of similar ball valves manufactured and supplied in last seven years indicating all relevant details including project, year, client, location, size, rating, service etc.

b. Torque curves for the power actuated valves along with the break torque, running torque for the valve stem and maximum allowable stem torque.

c. Copy of valid API 6D Certificate.

d. Fire Safe test certificate qualifying the valves as per API 6FA/ API 607/ ISO 10497 carried out in last 10 years shall be furnished.

e. Details of support foot including dimensions and distance from valve centreline to bottom of support foot.

f. List of recommended spares required during start-up and commissioning & 2 years of normal operation and maintenance.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

10.2 After placement of order, the Manufacturer shall submit the following drawings, documents and specifications for Company's approval*:*

a. General arrangement & detailed sectional drawings showing all parts with reference numbers and material specifications, overall dimensions and features. Number of turns of hand wheel required for operating the valve from full open to full close position for Gear Operated valves, painting/ coating scheme, Complete dimensional details of support foot (where applicable), shall be indicated in the GA.

Manufacture of valves shall commence only after approval of the above documents. Once the approval has been given by Company, any changes in design, material and method of manufacture shall be notified to Company whose approval in writing of all changes shall be obtained before the valve is manufactured.

10.3 Within 30 days from the approval date, Manufacturer shall submit to Company the approved drawings, documents and specifications as listed in clause 10.2 above.

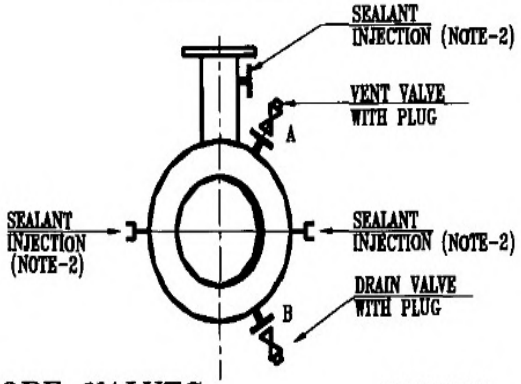
10.4 Prior to shipment, Manufacturer shall submit to Company following:

a. Test certificates as per clause 6.0 of this specification.

b. Manual for installation, erection, maintenance and operation instructions including a list of recommended spares for the valves.

10.5 All documents shall be in English language only.

ABOVE GROUND INSTALLATION



FULL BORE VALVES

VALVE SIZE, DN(mm)	A, DN(mm)	B, DN(mm)
50 TO 150	-	15
200 TO 600	15	25
650 & ABOVE	15	40

REDUCED BORE VALVES

VALVE SIZE, DN(mm)	A, DN(mm)	B, DN(mm)
50 TO 200	-	15
250 TO 750	15	25
ABOVE 750	15	40

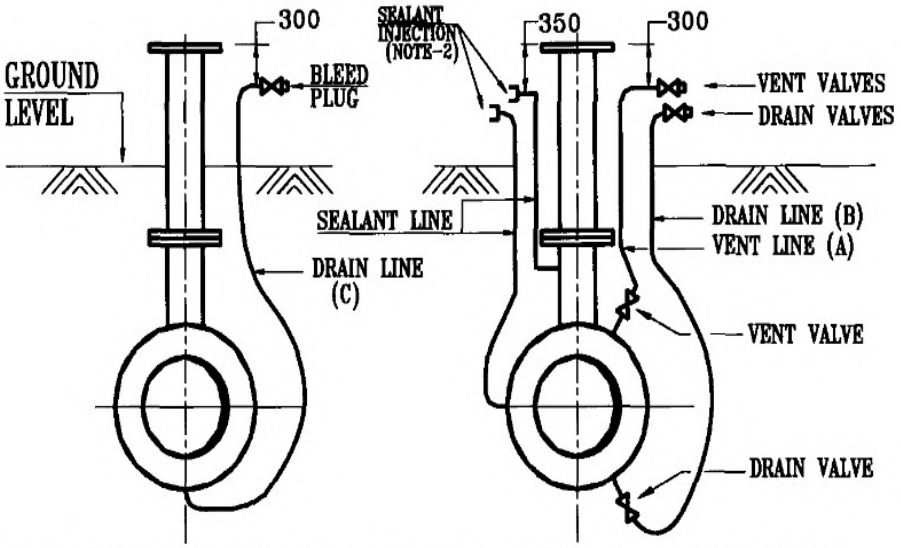
NOTES:-

1 ALL VALVES (BALL OR PLUG) AND PLUGS FOR A AND B SHALL BE APPROVED BY THE PURCHASER.
2 SEALANT POINTS SHALL BE PROVIDED FOR FULL BORE VALVES OF NOMINAL VALVE SIZE 200 mm (8") & ABOVE AND REDUCED BORE VALVES OF NOMINAL VALVE SIZE, DN 250 mm (10") AND ABOVE ONLY. SEALANT LINES SHALL HAVE PROVISION TO REPLACE THE SEALANT INJECTION FITTING UNDER FULL LINE PRESSURE. SEALANT LINES SHALL HAVE BLOCK VALVE & INTERNAL NON RETURN VALVE.
3 ALL VENT/DRAIN CONNECTION SHALL BE WELDED WITH THE BODY.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

UNDERGROUND INSTALLATION



FULL BORE (FB) VALVES

VALVE SIZE, DN(mm)	A, DN(mm)	B, DN(mm)	C, DN(mm)
50 TO 150	-	-	15
200 TO 300	25	25	-
350 TO 600	25	25	-
650 & ABOVE	40	40	-

REDUCED BORE (RB) VALVES

VALVE SIZE, DN(mm)	A, DN(mm)	B, DN(mm)	C, DN(mm)
50 TO 200	-	-	15
250 TO 400	25	25	-
450 TO 750	25	25	-
800 & ABOVE	40	40	-

NOTES:-

1 ALL VALVES (BALL OR PLUG) AND PLUGS FOR A AND B SHALL BE APPROVED BY THE PURCHASER.

2 SEALANT POINTS SHALL BE PROVIDED FOR FULL BORE VALVES OF NOMINAL VALVE SIZE 200 mm (8") & ABOVE AND REDUCED BORE VALVES OF NOMINAL VALVE SIZE, DN 250 mm (10") AND ABOVE ONLY. SEALANT LINES SHALL HAVE PROVISION TO REPLACE THE SEALANT INJECTION FITTING UNDER FULL LINE PRESSURE. SEALANT LINES SHALL HAVE BLOCK VALVE & INTERNAL NON RETURN VALVE.

3 ALL VENT/DRAIN CONNECTION IN BURIED SECTION SHALL BE OF WELDED CONSTRUCTION. ALL PIPING INCLUDING VALVE ENDS IN BURIED PORTIONS OF VENT & DRAIN SHALL BE WELDED TYPE.

FIGURE-4.9

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION

FOR
NON-DESTRUCTIVE EXAMINATION REQUIREMENTS OF PIPING

VCS – SS – PP - 2508

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
02	30.06.2022	RP	MC	HK	GW
01	28.11.2019	MB	AK	AD	SK
00	13.05.2017	CM	SM	AD	SK

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	28.01.2020					
		MB	AK	AD	SK	
01	30.06.2022					VCS QMS Integration
		RP	MC	HK	GW	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Abbreviations:

AS	:	Alloy Steel
ASME	:	American Society of Mechanical Engineers
ASTM	:	American Society for Testing & Materials
CS	:	Carbon Steel
DP/LP	:	Dye/Liquid Penetrant
IBR	:	Indian Boiler Regulations
MP	:	Magnetic Particle
PMS	:	Piping Material Specification
SS	:	Stainless Steel

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 GENERAL 4
2.0 VISUAL EXAMINATION 4
3.0 NON-DESTRUCTIVE EXAMINATION 6
4.0 TABLE-1 (with applicable notes) 7

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 GENERAL

1.1 Scope

This specification covers the general requirements for non-destructive examination of shop & field fabricated piping.

1.2 Related Codes & Engineering Standards

Referred codes/ standards are as follows. Latest editions of the Codes/Standards referred to shall be followed.

a) ASME Boiler & Pressure Vessel Codes, Section V & VIII (Div.1) including addenda.
b) ASME B31.3
c) ASME B16.5
d) ASME B16.34
e) Standard Piping Material Specification; XXXX-XX-XX-XXX
f) Standard Specification for Fabrication & Erection of Piping; VCS-SS-PP-2507
g) ASTM EIO
h) Design Guide for Radiography Requirements; VCS-SS-PP-2506
i) Indian Boiler Regulations (IBR)

2.0 VISUAL EXAMINATION

2.1 Weld shall be visually inspected wherever accessible in accordance with the following requirements:

a)	Internal misalignment	1.5 mm or less
b)	Cracks or lack of fusion	not permitted
c)	Incomplete penetration	Depth shall not exceed the lesser of 0.8mm or 0.2 times thickness of thinner component joined by butt-weld. The total length of such imperfections shall not exceed 38 mm in any 150 mm of weld length.
d)	Surface porosity and exposed slag inclusions (For nom. wall thickness 4.7 mm and less)	not permitted
e)	Concave root surface (Suck up)	For single sided welded joints, concavity of the root surface shall not reduce the total thickness of joint, including reinforcement, to less than the thickness of the thinner of the components being joined.
f)	Weld ripples irregularities	2.5 mm or less.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

g) Lack of uniformity in bead width — 2.5 mm or less.

h) Lack of uniformity of leg length — 2.5 mm or less.

i) Unevenness of bead — 2.0 mm or less

j) Weld undercutting — 0.8 mm or 1/4 thickness of thinner components joined by butt weld, whichever is less. (shall be smooth finished)

k) Overlap — 1.5mm or less

l) Bead deflection — 2.5 mm or less

m) External weld reinforcement and internal weld protrusion (when backing rings are not used) shall be fused with and shall merge smoothly into the component surfaces. The height of the lesser projection of external weld reinforcement or internal weld protrusion from the adjacent Base material surface shall not exceed the following limits:

Wall thickness of thinner component joined by butt Weld (mm)	Weld reinforcement or internal protrusion (mm) max
6.4 and under	1.6
Over 6.4 -12.7	1.2
Over 12.7 -25.4	4.0
Over 25.4	4.8

n) Throat thickness of fillet welds:

Nominal thickness of the thinner component x 0.7 or more.

o) Flattening

Flattening of a bend, as measured by difference between the nominal outside diameter and minimum or maximum diameter at any cross section shall not exceed 5 % of the nominal outside diameter of pipe.

p) Reduction of wall thickness

Reduction of wall thickness of a bend, as measured by difference between the nominal thickness and minimum thickness shall not exceed 10 % of the nominal wall thickness of pipe.

2.2 Welds having any of imperfections which exceed the limitations specified in various clauses of 2.1 shall be repaired by welding, grinding or overlaying etc. Number of times of repair welding for the same weld, however shall conform to applicable notes to Table 1- Note 6(b) b.5.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

3.0 NON-DESTRUCTIVE EXAMINATION

3.1 The type and extent of weld examination shall be in accordance with Table-1. A11 visual and supplementary methods of girth weld examination shall be in accordance with ASME B31.3 & the requirements of this standard specification.

3.2 Welds between dissimilar materials shall be examined by method & to the extent required for the material having the more stringent examination.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.0 TABLE-1 (with applicable notes)

TABLE 1: CLASS, TYPE & EXTENT OF WELD EXAMINATION (CONTD.)

INSPECTION CLASS: II

INSPN. CLASS	SERVICE	MATERIAL (NOTE 3)	P.NO.	TEMP. DEG. C	PRESS. CLASS B16.5/ B16.34	APPLICA-BLE PIPING CLASS	TYPE OF EXAMINATION	TYPE OF WELD EXAMINED				
								GIRTH BUTT WELD	SOCKET WELD (NOTE 2)	ATTAC-HMENT WELD	FAB. BRANCH WELD (NOTE 1)	FAB. WELDS OF MITRES / REDUC.
1	2	3	4	5	6	7	8	9	10	11	12	13
II	a) ALL SERVICES COVERED UNDER INSPECTIONCLASS-1, BUT, EXCEEDING CATEGORY 'D' PR/T EMP LIMITATIO-NS. b) ALL SERVICES OTHER THAN COVERED UNDER INSPECTIONCLASS-1, BUT NON-TOXIX, NOT SUBJECTED TO SEVERE CYCLIC CONDITIO-NS. c) TOXIC, NON-LETHAL & FLAMMABLE d) FLAMMABLE/NON FLAMMABLE & TOXIC/NON-TOXIC; NOT SUBJECT TO SEVERE CYCLIC CONDITIO-NS	CARBON STEEL	1	-29 TO 427	150# TO 60#	**15HC, 30HC, 60HC**	a) VISUAL	100%	100%	100%	100%	100%
							b) RADIOGRAPHY (NOTE 5,6)	5%	---	---	---	20%
							c) MP / LP (NOTE 4,6,10,11)	---	5%	---	5%	20%
							d) HARDNESS	NOTE-7	NOTE-7	NOTE-7	NOTE-7	NOTE-7
		LTCS		-45 TO 204		**15HLT, 30HLT, 60HLT**						

REMARKS FOR ABOVE TABLE:

i. MITRES & FABR1CATED REDUCERS ARE PERMITTED ONLY IF SPECIFIED IN PMS.

ii. NOTE- 7 FOR HARDNESS IS NOT VALID FOR P. NO. 8.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Applicable Notes to Table-1

1. Branch welds shall consist of the welds between the pipe & reinforcing element (if any), nozzles & reinforcing element and the pipe & nozzle under the reinforcing element. Reinforcing element to be interpreted as pads, saddles, weldolets, sockolets etc.

2. Seal welds of threaded joints shall be given the same examination as socket welds.

3. Unless specifically stated, all materials shall be for "Non-IBR" service.

4. Magnetic Particle & the Liquid Penetrant method of examination shall be in accordance with Section V of the ASME Boiler and Pressure Vessel Code, Article VII and VI respectively. The entire area of the accessible finished weld surface shall be examined. Selected root runs, subject to a maximum of 10%, before finished weld, may also be examined, at the discretion of the engineer-in-charge.

   a) Wherever MP / LP testing is specified, either MP or LP test may be used. But wherever only MP test is specified, LP method of examination may be used only if MP examination is impracticable in the field as concurred by PMC/ Company site-in charge.

   b) "Random 5%" of Liquid Penetrant / Magnetic Particle test shall mean testing, by applicable test, one weld for each twenty welds or less made by the same welding procedure. "Random 10%" shall mean testing, by applicable test, one weld for each ten welds or less made by the same welding procedure. Similarly "Random 20%" shall mean testing, by applicable test, one weld for each five welds or less made by the same welding procedure.

   c) When Liquid Penetrant examination is specified, the surface shall be free of peened discontinuities.

   d) Inspection shall be performed in the welds excluding those for which radiography has been done.

   e) Girth weld, branch weld, attachment weld & socket weld of 3-1/2% Ni steel shall be Liquid Penetrant tested only when welded with austenitic material where MP test has been specified.

5. Radiography:

   a) "Random 5%, 10% or 20% radiography" shall mean examining not less than one from each 20 welds or less in case of "Random 5% radiography", 10 welds or less in case of "Random 10% radiography", one from each five welds or less in case of "Random 20% radiography" made by the same welding procedure. Irrespective of percentage, no. of welds to be radiographed shall be minimum 1. However first two welds made by each welder shall also be radiographed in case of "Random radiography". Welds selected for examination shall not include flange welds and shall be radiographed for their entire length. However, where it is impossible or impracticable to examine the entire weld length of field welds for either random or 100% radiography, and if the same impossibility is agreeable to site-in-charge, then a single 120 deg. exposure of the weld length may be given a Magnetic Particle test or Liquid Penetrant test.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

However in such cases for ferro-magnetic materials, only MP test shall be acceptable for classes higher than 600#.

b) In-process examination shall not be substituted for any required radiographic examination.

c) Number of radiography per one circumferential weld shall be as per ASME Sec.V Articles 2 and 22.

6. When radiography or other non-destructive inspection is specified, acceptance criteria for repairs or defects shall be as follows:

a) In case of 100% examination, any unacceptable weld shall be repaired and re inspected.

b) If required random examination reveals a defect requiring repair, then:

i. Two additional examinations of same type shall be made of the same kind of item (if welded joint, then by the same welding procedure or operator or both).

ii. If the group of items examined as required by b.1 above is acceptable, the items requiring repair shall be repaired or replaced and re-examined as required and all items represented by this additional examination shall be accepted.

iii. If any of the items examined as required by b.1 above reveals a defect requiring repair, two further comparable items shall be examined for each defective item found by examination.

iv. If all the items examined as required by b.3 are acceptable, the items requiring repair shall be repaired or replaced and re-examined as required, and all items represented by this further examination shall be accepted.

v. Number of times repair welding could be done for the same weld before acceptance shall be as follows:

Material	**No. of times repair welding is allowed**
C.S. up to 300#	3 or less
C.S. above 300#	2 or less
Killed steel	2 or less
Low alloy steel	2 or less
Austenitic S.S.	2 or less
3.5 Ni steel	2 or less
Al & Al base alloy	2 or less

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Cu & Cu base alloy	2 or less
Others	2 or less

vi. Welds not found acceptable for allowed number of times of repair as per b.5 above shall be replaced and re-examined.

vii. If any of the items examined as required by b.4 above reveals a defect requiring repair, all items represented by these examinations shall be either :

- Repaired or replaced and re-examined as required.
- Fully examined and repaired or replaced as necessary, and re-examined as necessary.

7. Hardness Test:

a) Hardness test shall be in accordance with ASTM specification E10. Hardness tests of the heat affected zone shall be made at a point as near as practicable to the edge of the weld. One test per weld shall be performed.

b) Hardness test where specifically called out in Table-1 of this specification or in PMS, shall be carried out irrespective of thickness and to the extent (%age) as mentioned therein.

c) All welds which are given heat treatment shall be hardness tested. Hardness test shall be performed after final heat treatment.

d) A minimum of 10% of welds, hot bends, and hot formed components in each furnace heat treated batch and 100% of those which are locally heat treated shall be hardness tested.

e) Hardness test requirement not covered in this specification shall be as per ASME B31.3.

f) The hardness limit applies to the weld and heat affected zone. Following hardness values shall be maintained:

Base Metal Group	**Maximum Hardness (BHN/RC)**
CS	238BHN/RC22
CS (NACE), Caustic, Amine, H2	200BHN
Cr Up to 2%	225BHN
Cr 2.25%-10%	241BHN
18/8 SS (NACE)	RC22

8. For IBR service lines, following IBR requirements shall apply in addition to the notes 4, 5, 6, 7, 12 and Table 1. In case of conflict between above notes and these requirements, the more stringent ones shall apply. IBR piping shall be erected of IBR inspector approved

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

material and construction procedure. Erected piping shall be hydro tested, inspected and approved by IBR inspector.

a) Piping over 102 mm (4") bore:

10%of welds made by each welder on a pipeline with a minimum of two welds per welder, selected at random, shall be subjected to radiography.

b) Piping 102 mm (4") bore and under, but not less than 38 mm (1-1/2") bore:

Two percent of welds made by each welder on a pipeline with a minimum of one weld per welder, selected at random, shall be subjected to radiography or may be cut for visual examination and tests.

c) Piping less than 38 mm (1.5") bore:

Special tests are not normally required but 2% of welds by each welder on a pipe line may be cut out from the pipeline for the visual examination and bend tests.

d) Retests:

If any test specimen is unsatisfactory, two further weld specimens for retests shall be selected from the production welds and subjected to tests. In the event of failure of any retest specimens, the production welds carried out by this welder subsequent to the previous test shall be given special consideration.

9. For fabricated fittings LP test shall be done on the final pass of welding only, in addition to visual examination.

10. For mitres and fabricated reducers, LP / MP test shall be done on root pass in addition to radiography applicable to circumferential joint of respective piping class.

11. For branch connections, LP/MP test shall be done on root pass and final pass.

12. 10% of the butt weld joints shall be radiographed, however, 50% of these butt weld joints shall be field weld joints.

13. For lined specs, testing (MP/LP/Radiography etc.) shall be performed before lining.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION

FOR
PAINTING

VCS – SS – PP - 2502

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
04	30.06.2022	RP	MC	HK	GW
03	28.01.2020	MB	AK	AD	SK
02	19.02.2018	ADE	RNR	AD	SK
01	15.05.2017	ADE	RNR	AD	SK

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD						
Rev.	**Revision Date**	**Prepared by**	**Checked by**	**Approved by**	**Authorized by**	**Revision Description**
00	15.05.2017					
		AS	SM	AD	SK	
01	09.02.2018					
		ADE	RNR	AD	SK	
02	10.04.2018					
		ADE	RNR	AD	SK	
03	28.01.2020					Format change. Doc Number Change from SS-PI-008 to VCS-SS-PP-2502
		MB	AK	AD	SK	
04	30.06.2022					VCS QMS Integration
		RP	MC	HK	GW	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 GENERAL ..... ….2

2.0 CODES & STANDARDS 4

3.0 CONDITIONS OF DELIVERY 6

4.0 COMPOSITION OF THE PAINT PRODUCTS USED 6

5.0 IDENTIFICATION 7

6.0 SURFACE PREPARATION STANDARDS 8

7.0 PREPARATION OF THE SURFACES 8

8.0 METALLISATION 16

9.0 CARRYING OUT THE PAINTWORK 16

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 GENERAL

1.1 This technical specification shall be applicable for the work covered by the contract, and without prejudice to the provisions of various codes of practice, standard specifications etc. It is understood that contractor shall carry out the work in all respects with the best quality of materials and workmanship and in accordance with the best engineering practice and instructions of Engineer-In-Charge.

Wherever it is stated in the specification that a specific material is to be supplied or a specific work is to be done, it shall be deemed that the same shall be supplied or carried out by the contractor. Any deviation from this standard without written deviation permit from appropriate authority will result in rejection of job.

1.2 SCOPE

1.2.1 Scope of work covered in the specification shall include, without being limited to the following.

1.2.2 This specification defines the requirements for surface preparation, selection and application of primers and paints on external surfaces of equipment, vessels, machinery, piping, ducts, steel structures, external & internal protection of storage tanks for all services, MS Chimney without Refractory lining and Flare lines etc. The items listed in the heading of tables of paint systems is indicative only, however, the contractor is fully responsible for carrying out all the necessary painting, coating and lining on external and internal surfaces as per the tender requirement.

1.2.3 Extent of Work

1.2.3.1 The following surfaces and materials shall require shop, pre-erection and field painting:

a. All un-insulated C.S. & A.S. equipment like columns, vessels, drums, storage tanks (both external & internal surfaces), heat exchangers, pumps, compressors, electrical panels and motors etc.

b. All un-insulated carbon and low alloy piping, fittings and valves (including painting of identification marks), furnace ducts and stacks.

c. All items contained in a package unit as necessary.

d. All structural steel work, pipe, structural steel supports, walkways, handrails, ladders, platforms etc.

e. Flare lines, external surfaces of MS chimney with or without refractory lining and internal surfaces of MS chimney without refractory lining.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

f. Identification colour bands on all piping as required including insulated aluminium clad, galvanised, SS and nonferrous piping.

g. Identification lettering/numbering on all painted surfaces of equipment/piping insulated aluminium clad, galvanized, SS and non-ferrous piping.

h. Marking / identification signs on painted surfaces of equipment/piping including hazardous service.

i. Supply of all primers, paints and all other materials required for painting (other than Owner supplied materials)

j. Over insulation surface of equipments and pipes wherever required.

k. Painting under insulation for carbon steel, alloy steel and stainless steel as specified.

l. Painting of pre-erection/fabrication and Shop primer.

m. Repair work of damaged pre-erection/fabrication and shop primer and weld joints in the field/site before and after erection as required.

n. All CS Piping, equipments, storage tanks and internal surfaces of RCC tanks in ETP plant.

1.2.3.2 The following surfaces and materials shall not require painting in general. However, if there is any specific requirement by the owner, the same shall be painted as per the relevant specifications:

a. Un-insulated austenitic stainless steel.
b. Plastic and/or plastic coated materials
c. Non-ferrous materials like aluminum.

1.2.4 Documents

1.2.4.1 The contractor shall perform the work in accordance with the following documents issued to him for execution of work.

a. Bill of quantities for piping, equipment, machinery and structures etc.
b. Piping Line List.
e. Painting specifications including special civil defence requirements.

1.2.5 Unless otherwise instructed, final painting on pre-erection/ shop primed pipes and equipments shall be painted in the field, only after the mechanical completion, testing on systems are completed as well as after completion of steam purging wherever required.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.2.6 Changes and deviations required for any specific job due to clients requirement or otherwise shall be referred to VCS for deviation permit.

2.0 CODES & STANDARDS

Without prejudice to the specifications of the contract, the following codes and standards shall be followed for the work covered by this contract.

IS: 5 Colors for ready mixed paints and enamels.

RAL DUTCH International Standard for colour shade (Dutch Standard)

IS: 101 Methods of test for ready mixed paints and enamels,

IS: 161 Heat resistant paints.

IS: 2074 Specifications for ready mixed paint, red oxide zinc chrome priming.

IS: 2379 Color code for identification of pipelines.

IS: 2932 Specification for enamel, synthetic, exterior (a) undercoating. (b) Finishing.

3.0 CONDITIONS OF DELIVERY

Packaging

Every recipient will be fitted with a hermetically-sealed lid with an opening that is sufficiently large to allow the contents to be stirred: the outside and inside are protected against oxidation, and, the lid, are marked with a strip of color identical to the contents.

4.0 COMPOSITION OF THE PAINT PRODUCTS USED

a) Quality

The composition and quality of the products may not differ from batch to batch. A batch is all of the products of a specified manufacture. If the analyses of products bring to light that the composition does not conform to the specifications of the paint manufacturer, the OWNER may refuse to use this batch of products. The paint products must comply with the following conditions

- They must have the viscosity necessary for the described use and the established condition: use of the brush - paint roller (spray gun only for special cases and in the workshop)

b) Quality control - Sampling

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

While the works are in progress on the construction site, the OWNER may carry out sampling on the paint being used for the purpose of checking conformity. The paint products must be made available free of charge to the laboratory or the approved supervisory body in sufficient quantities so that all the tests can be carried out on the same batch.

If analyses reveal a non-conformity in the composition of the products used (tolerance of $\pm$ 3 % of the dosage of every component), the OWNER may refuse application of the product under consideration, halt the work and have the nonconforming product already applied removed.

Before proceeding the work, a product that does conform will be required. The only Purpose of the analysis is to reveal any nonconformity of the composition of the products. Their purpose is therefore not to assess the quality of the different components. The analyses concerned are not acceptance tests of the products supplied and in no way affect the obligations of the contractor specified in the contract towards the OWNER.

5.0 IDENTIFICATION

Every recipient will bear the following information:

- Name of the manufacturer
- Date and number of manufactures
- Name of the product type
- Batch no
- Net weight of the produced or the contents of the recipient
- Date of the expiry.

At the time of delivery, this packaging must bear labels in conformity with the legal stipulations in force.

Leaving the site after work

After completion of a job a general clean-up shall be carried out by the Contractor to remove all debris, materials or irregularities that his work has brought to the site so that it is left tidy:

The restoration work includes among other things:

- The removal of abrasives.
- The removal of the different protective coverings.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- The Contractor will make the required repairs to any damage after refitting the supports.

- The removal of paint and cleaning of the stains on the floor.

6.0 SURFACE PREPARATION STANDARDS

Following latest edition of standards shall be followed for surface preparations:

1. Swedish Standard Institution- SIS-05 5900-1967/ISO 8501-1

2. Steel Structures Painting Council, U.S.A. (Surface Preparation Specifications (SSPC-SP)

3. British Standards Institution (Surface Finish of Blast-cleaned for Painting) BS-4232.

4. National Association of Corrosion Engineers. U.S.A. (NACE).

5. IS-1477-1971 (Part-1) - Code of Practice for Painting of Ferrous metals in Buildings. (Part 1, Pre-treatment)

   a) The contractor shall arrange, at his own cost to keep a set of latest edition of above standards and codes at site.

   b) The paint manufacturer's instruction shall be followed as far as practicable at all times. Particular attention shall be paid to the following:

      - Proper storage to avoid exposure as well as extremes of temperature.
      - Surface preparation prior to painting.
      - Mixing and thinning.
      - Application of paints and the recommended limit on time intervals between coats.

   c) Any painting work (including surface preparation) on piping or equipment shall be commenced only after the system tests have been completed and clearance for taking up painting work is given by the OWNER, who may, however, at his discretion authorize in writing, the taking up of surface preparation or painting work in any specific location, even prior to completion of system test.

7.0 PREPARATION OF THE SURFACES

7.1 General Specifications

The cases that occur in practice on building sites, with regard to painted surfaces, can be broken down as follows:

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Material of which the oxide content disappears by natural oxidation.
- Material that has already been covered with a layer of paint in the workshop.
- Material that is covered with old paint layers that show different degrees of weathering.

Good preparation of surface is the best guarantee for good anti-corrosion protection.

Paintwork may never begin until the surface to be treated is dry and is independent of the base coat and cleared of dirt, dust, rust, scale, grease, salt attack, cement powder, cement mud-scale, sand, oil, etc.

Based on the environmental conditions of coastal and saline nature, the Painting specification for station pipes defines the complete requirements like:

- Surface preparation standards like NACE etc.
- Sand blasting process
- Color Codes for piping
- Paint materials types and their DFT measurement.
- Selection and application of paints on external surfaces.

The pipeline passes through the coastal and marine environment, the **Table-4** of this specification to be followed for the painting works.

The method of preparation of the surface will be implemented in accordance with the preparation methods described below:

- Bright blast-cleaning
- Mechanical or Power tool cleaning
- Manual or hand tool cleaning

The Contractor should have the required material at his disposal to clean the surfaces to be coated thoroughly in accordance with the preparation methods regardless of the form or the condition of such surfaces. The cleaning devices that might be damaged during the surface preparation shall be screened off by the Contractor.

7.2 Air blast cleaning with abrasive

Before beginning cleaning by blasting, the person carrying out the work will take the following measures:

- Clear the steel surface of oil and/or grease;
- Ensure that each flange collar (section where the sealing is applied) is properly screened off against the blasting and the subsequent works;
- Check that no blasting grains can act into the pipes during this process. Any openings not sealed off must be screened off;

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Where there are valves, regulators and other devices, the manufacturer's identification plate will be dismantled so that all surfaces can be treated. The plate will then be put back again.
- Screen off all non-metal structures such as rubber where there is a filter;
- With valves, operators and other devices, care should be taken to ensure that no metal filings or paint get into the apparatus:
- The OWNER reserves the right to carry out part or all of these works himself.

To prevent rust forming quickly as the result of humidity on the blasted surface, cleaning by blasting may only be carried out when the temperature of the steel surface is at least 3°C higher than the dew-point of the ambient air.

Blasting may not be carried out if the relative degree of humidity exceeds 80%. The choice of the type of blasting medium used depends on local circumstances such as the possible presence of gas and the material to be blasted.

The abrasive to be used must conform to the local law i.e. it may contain no carbon and less than 1% free silicon dioxide. The Sa 3 will always be requested and must at least reach Sa 2½ during the initial stage of the paintwork. For blasting followed by metallization, the surface preparation degree to be achieved is always Sa 3. The degree of cleanliness to be obtained will be inspected in accordance with the Swedish standard SVENSK STANDARD ISO 8501-1-1988 SIS 05.5900.

- Sa 3: surface blasted down to the bare metal; when the surface is inspected with a magnifying glass, scale, rust and foreign bodies must be completely removed and it should be possible to raise a metallic -shine on the treated surface.

- Sa 2 1/2: blasted very carefully. Scale, rust and foreign bodies must be removed in such a way that anything left behind will only be visible as nuances (shading) or strips.

The blast-cleaning will be carried out by means of compressed air free of water and oil.

After the blasting and before painting, the surface should be completely cleaned of blasting material and so forth with a soft brush, a dry cloth or dry compressed air.

7.3 Mechanical or Power tool cleaning

If sandblasting is not permitted or if the metal structures are not easily accessible for blasting or blasting for one reason or other is technically unfeasible, mechanical de rusting can be used instead. With mechanical cleaning by means of chipping, rotating steel brushes and sanding discs, a degree of cleanliness St. 3 should be reached.

St 3 : removal of the old paint layers of which the adhesion leaves something to be desired and/or of which the paint layer no longer fulfills the requirements.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

If parts are present that are so corroded that St 3 is difficult to achieve, this should be notified to the OWNER representative prior to the start of the works.

N.B:
St. 3 : means removal of every old paint layer. Retouching means local polishing with St. 3 or Sa 3 followed by application of the desired painting system.

After mechanical cleaning, the surface should be made dust-flee with a cloth or a so brush, washed with an organic solvent and thoroughly dried off with a dry cloth (e.g. with 1.1.1. Trichoroethane such as Solvethane, Chloroethene).

7.4 Manual or Hand tool cleaning

Manual derusting with the aid of scrapers. steel brushes, sandpaper etc. shall only be permitted in exceptional cases for local repairs. Any deviation there from must be requested from the OWNER/ OWNER 's Representative.

With manual derusting, a surface preparation degree St 3 must be obtained. The length of the handles of the equipment used may not exceed 50 cm.

7.5 Preparation of a surface covered with a layer of paint in the workshop.

This layer is in general applied by the manufacturer, for example, on valves, regulators etc. Layers of this kind will be checked for their proper adhesion in accordance with ASTM D 3359, method A (Standard Test Method for measuring adhesion by tape test). The adhesion should be at least.

If the paint layer shows less adhesion or is incompatible with the rest of the system it should be completely removed. If the paint layer is not removed, the Contractor accepts it in the state in which the coating is found and the guarantee remains in force. The adhesion does not have to be examined if system 63 has already been applied in the workshop on behalf of the OWNER.

The Contractor, who must provide for the protection on the construction site, must therefore obtain the information regarding the treatment of the surface and the quality of the paint that was used and must, moreover, examine the adhesion of the layer on the construction site, the percentage of damage and weathering as well as the value of the preparation of the surface in the workshop together with the thickness thereof that must be supplemented if necessary.

a) Galvanized surface

Galvanized surfaces, both old and new will be carefully roughened up. Every foreign body (concrete splatters, chalk marks, grease and oil stains, etc.) will be removed. Thereafter, rub the surfaces with abundant water and, if necessary, with cleaning products.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

To this end, nylon brushes will be used for every kind of dirt as well as for removing zinc salt residue. Thereafter, the surfaces will be treated in accordance with system 21. Where the zinc layer is lacking, it will be derusted manually to a degree of cleanliness St 3, after which a primer coat will be applied in accordance with system 22.

b) Metallized surfaces treated with an impregnation layer

- Degrease with the desired degreasing product:
- Clean under high pressure or with a product prescribed by the paint supplier.

If the paint layer adheres well and is applied on a clean base, the painting system described may be continued. If the percentage of damage and weathering does not exceed 5 % m. retouching may be considered. These partial repairs will be carried out.

If on the other hand, the percentage of damage does exceed 5 %/m or if the layer applied in the workshop comes loose the Contractor must draw the attention of the OWNER to this and carry out the complete application system.

7.6 Preparation of surfaces covered with earlier paint layers that show different degrees of weathering.

If the surfaces do not show deep weathering limited to the spread of rust by small pitted areas or non-penetrative rust in spots, it will very often be sufficient to clean the surfaces with abrasives or with an abrasive disc, then to rub them down with steel wool, remove the dust and wash off. If thick rust appears, in spots, scale rust and active rust canker, this should be removed with needle hammers or stripped away directly by blasting, removing the dust and washing off.

7.7 Preparation of concrete or cement plaster surfaces

Remove unsound paint layers and loose components with scrapers, blades or rotating steel brushes. Thoroughly clean the entire surface with water containing ammonia. Thoroughly remove moss, algae and fungal growths. Where these growths have been removed, treat the area with a fungicide in accordance with the instructions for use.

Once the entire area is completely dry, brush off the dead residue of moss, algae and fungus with a hard brush. In the case of reinforcement steel that has been laid bare, remove as rust, dust and grease as possible and treat with a printer coat. When painting concrete surfaces, they must first be checked for cracks. Cracks larger than 0.3 mm must be repaired with an appropriate system in accordance with the type and extent of the repairs (e.g. injection with epoxy mortar). Repair damage such as cracks and bursts to concrete parts with a two-component mortar or preferably with micro-mortars. Finally check the alkalinity of the surface with the aid of litmus paper and neutralize it if necessary.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

7.8 Use of solvents

It is sometimes necessary to use solvents when the surfaces to be painted are streaked with grease or oil. In this case a suitable organic solvent should be applied. The operation should be carried out with the aid of clean brushes or rags and clean solvent.

All the legal specifications in connection with solvents etc. must be adhered to. The OWNER/OWNER's Representative will be informed in advance of any toxicity or flammability. All measures must be taken to prevent any risk of fire and to nick out any possibility of poisoning (ventilation). The Contractor will provide drip collectors to keep the environment free of pollution.

7.9 Condition of the metal after stripping

The Contractor must call in a representative of the OWNER/OWNER's representative or of the Approved supervisory Body responsible for checking the condition of the metal during stripping and informing the OWNER/OWNER's representative immediately of any damage that he might have noticed.

- Deep corrosion of the plates - rivets - bolts
- Faulty welding
- Fittings that appear to be dangerous because of their age.

7.10 Removing coating from surface pipelines

The Contractor must have the equipment necessary for the removal of asphalt from the pipe without damaging the latter (scratching, impact, etc,). The Contractor undertakes to carry out the work in accordance with an approved procedure.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

TABLE-1 (FOR CLAUSE 7.0)
SURFACE PREPARATION STANDARDS

SL. NO.	DESCRIPTION	VARIOUS INTERNATIONAL STANDARDS (EQUIVALENT)			REMARKS
		ISO 8501-1/ SIS-05 59 00	SSPC-SP, USA	NACE, USA	
1	Manual or hand tool cleaning Removal of loose rust, loose mill scale and loose paint, chipping, scrapping, standing and wire brushing. Surface should have a faint metallic sheen	ST.2	SSPC-SP-2	-	This method is applied when the surface is exposed to normal atmospheric conditions when other methods cannot be adopted and also for spot cleaning during maintenance painting.
2	Mechanical or power tool cleaning Removal of loose rust loose mill scale and loose paint to degree specified by power tool chipping, de-scaling, sanding, wire brushing and grinding, after removal of dust, surface should have a pronounced metallic sheen.	ST.3	SSPC-SP-3	-	
3	Dry abrasive Blast cleaning There are four common grades of blast cleaning				

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

3.1	White metal Blast cleaning to white metal cleanliness. Removal of all visible rust. Mill scale, paint & foreign matter 100% cleanliness with desired surface profile.	SA 3	SSPC-SP-5	NACE#1	Where extremely clean surface can be expected for prolong life of paint system.
3.2	Near white metal Blast cleaning to near white metal cleanliness, until at least 95% of each element of surface area is free of all visible residues with desired surface profile.	SA 2½	SSPC-SP-10	NACE#2	The minimum requirement for chemically resistant paint systems such as epoxy, vinyl, polyurethane based and inorganic zinc silicate paints, also for conventional paint systems used under fairly corrosive conditions to obtain desired life of paint system.
3.3	Commercial Blast Blast cleaning until at least two-third of each element of surface area is free of all visible residues with desired surface profile.	SA 2	SSPC-SP-6	NO.3	For steel required to be painted with conventional paints for exposure to mildly corrosive atmosphere for longer life of the paint systems.
3.4	Brush-off Blast Blast cleaning to white metal cleanliness, removal of all visible rust, mill scale, paint & foreign matter. Surface profile is not so important.	SA 1	SSPC-SP-7	NO.4	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

8.0 METALLISATION

8.1 Applying the metallization

Metallization must be carried out in accordance with ISO 2063,

Metallization is carried out as rapidly as possible after blasting in order to limit corrosion of the pipes (max. 3 hours later). With metallization, a surface preparation degree Sa 3 is compulsory. The roughness of the blasted surfaces should be from 25 to 50µ R_{Max}.

- The metallizing is always carried out on dry parts in good weather conditions (maximum relative humidity 80 %);
- For metallization, a wire composed of 85 % zinc and 15 % aluminum with a minimum guaranteed degree of purity of 99.5 % is used (subject to other specifications). The application thereof is always carried out in accordance with the conditions of the manufacturer and may at all times be submitted to the OWNER’s representative.
- The sealant should be applied maximum 3 hours alter metallization.
- The sealant must be thinned and applied as per the present specifications. A visual inspection whereby the sealant completely covers the metallization will suffice here.
- When evaluating the metallization, a negative deviation from the minimum coating thickness, to 80 µ for 20% of the measurements will be permitted.

9.0 COATING PROCEDURE AND APPLICATION

9.1 Conditions for carrying out paintwork

Painting may not be carried out in unsuitable conditions.

All preparatory work and painting may only he carried out in dry weather and at a minimum temperature of 10℃, except for special eases requested by the OWNER's Representative.

Unless otherwise stipulated in the specifications of the paint supplier, application of the paint is forbidden if it is forecast that the temperature will fall to below 0℃ before the paint is dry. The temperature of-the surface to be painted must be at least 3°C higher than the dew point of the ambient air. Application of the paint is also not permitted if there is a danger that the coat of paint will not be dry before dew or condensation sets in.

The work must be stopped:

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- If the temperature of the surface to be painted is higher than that described by the supplier.

- In rain, snow, mist or fog or when the relative humidity is higher than 80 %.

Coats that have not yet dried and have been exposed to frost, mist, snow or rain and might thereby be damaged must be removed after drying and the surfaces must be repainted at the expense of the Contractor.

Working in direct sunlight or in hot weather must be avoided,

The first coat of paint must be applied maximum 3 hours after the preparation of the surface of the relative humidity of the air is between 50% and 80%. This time span may be increased to 6 hours if the relative humidity is less than 50%. In all cases, the preparation of the surface must exhibit degree Sa 3 and at the very least the appearance of degree Sa 2 ½ at the time of painting.

The coats of paint may only be applied on carefully cleaned surfaces that must be dry and free of grease and dust.

9.2 Special conditions

Painting may be carried out when the Contractor can be sure that the instructions of the paint supplier have been scrupulously followed with regard to the parameters in the following (non-exhaustive) list:

- Ambient temperature.
- Surface temperature.
- Relative humidity.
- Dew point.
- Drying times.

The Contractor must in this respect be able to produce the instructions for the paint on the site. The OWNER/CONSULTANT will guarantee 100% supervision in this regard during the execution of the work.

In addition, the paintwork may only be carried out to a minimum ambient temperature of 5°C and/or to a maximum relative degree of humidity of 85 %. Application of the paint is also not permitted if there is a danger that the coat of paint will not be dry before dew or condensation sets in.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

10.0 PAINT MATERIAL

Manufacturers shall furnish the characteristics of all paints indicating the suitability for the required service conditions. Primer and finish coats shall be of class-I quality and shall conform to the following:

a) Primer (P-1)

Red oxide Zinc Chromate Primer

Type and Composition	Single pack, Modified phenolic alkyd medium pigmented with red oxide and zinc chromate.
Volume solids	30 - 35% (min)
DFT	25 microns/coat (min)
Covering capacity	12 - 13 M^2/Lit/coat

b) Primer (P-2)

High build chlorinated rubber zinc phosphate primer

Type and Composition	Single pack, Air Drying Chlorinated rubber medium Plasticized with unsaponifiable plasticiser pigmented with zinc phosphate
Volume solids	35 - 40% (min)
DFT	30 - 40 microns/coat (min)
Covering capacity	7 - 8 M^2/Lit/Coat

c) Primer (P-3)

High build zinc phosphate primer

Type and Composition	Single Pack, Synthetic medium, pigmented with zinc phosphate.
Volume solids	40 - 45% (min)
DFT	35 - 50 microns/coat (min)
Covering capacity	10 - 12 M^2/Lit/coat
Heat resistance	Upto 80 ºC (dry)

d) Primer (P-4)

Etch Primer / Wash Primer

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Type and Composition	Two pack Poly vinyl butyral resin medium cured with phosphoric acid solution pigmented with zinc tetroxy chromate.
Volume solids	7 - 8% (min)
DFT	8 - 10 microns/coat (min)
Covering capacity	7 - 8 M^2/lit/coat

e) Primer (P-5)

Epoxy Zinc Chromate Primer

Type and Composition	Two packs, Polyamide cured epoxy resin medium pigmented with zinc chromate.
Volume solids	40 % (min)
DFT	35 microns/coat (min)
Covering capacity	11 - 12 M^2/lit/Coat

f) Primer (P-6)

Epoxy Zinc Phosphate Primer

Type and Composition	Two packs, Polyamide cured Epoxy resin medium pigmented with zinc phosphate.
Volume solids	40% (min)
DFT	35 - 50 microns/coat (min)
Covering capacity	11 - 12 M^2/lit/coat

g) Primer (P-7)

Epoxy high build M10 Paint (Intermediate Coat)

Type and composition	two pack Poly Polyamide cured epoxy resin medium pigmented with micaceous iron oxide. Volume solids 7- 8%
Volume Solids	50% (min)
DFT	100 microns/coat (min)
Covering capacity	5.0 M^2/lit/coat

h) Primer (P-8)

Epoxy Red Oxide zinc phosphate primer

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Type and Composition	two pack. Polyamine cured epoxy resin pigmented with Red oxide and Zinc phosphate.
Volume solids	42% (min)
DFT	30 microns/coat (min)
Covering capacity	13 - 14 M^2/lit/coat

i) Primer (P-9)

Epoxy based tie coat (suitable for conventional alkyd based coating prior to application of acrylic polyurethane epoxy finishing coat)

Type and Composition	Two packs, Polyamide cured epoxy resin medium suitably pigmented.
Volume solids	50 - 60% (min)
DFT	50 microns/coat (min)
Covering capacity	10 - 12 M^2/Lit/Coat

j) Finish Coats (F-1)

Synthetic Enamel

Type and Composition	Single pack, Alkyd medium pigmented with superior quality water and weather resistant pigments
Volume solids	30 - 40% (min)
DFT	20 - 25 microns/coat
Covering capacity	16 - 18 M^2/lit/Coat

k) Finish coat (F-2)

Acrylic Polyurethane paint

Type and Composition	Two pack, Acrylic resin and iso-cyanate hardener suitably pigmented.
Volume Solids	40% (min)
DFT	30 - 40 microns / coat
Covering Capacity	10 - 12 M^2/lit/ coat

l) Finish Coat (F-3)

Chlorinated Rubber Paint

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Type and Composition	Single pack, Plasticised chlorinated rubber medium with chemical & weather resistant pigments.
Volume solids	40% (min)
DFT	30 - 40 microns/coat (min)
Covering capacity	8 - 10 M^2/lit /coat

m) Finish Coat (F-4)

High build chlorinated rubber M10 paint.

Type and Composition	Single pack Chlorinated rubber based high build pigmented with micaceous iron oxide.
Volume solids	40 - 50% (min)
DFT	65 - 75 microns/coat
Covering capacity	6.0 - 7.0 M^2/lit/coat

n) Finish coat (F-5)

Chemical Resistant Phenolic based Enamel

Type and Composition	Single pack phenolic medium suitably pigmented.
Volume solids	35 - 40% (min)
DFT	25 microns/ coat
Covering capacity	15.0 M^2/lit/coat

o) Finish Coat (F-6)

Epoxy High Building Coating

Type and Composition	Two pack. Polyamide-amine cured epoxy resin medium suitably pigmented.
Volume solids	60 - 65% (min)
DFT	100 microns/coat (min)
Covering capacity	6.0 - 6.5 M^2/lit/coat

p) Finish Coat (F-7)

High build Coal Tar Epoxy

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Type and Composition	Two pack, Polyamine cured epoxy resin blended with Coal Tar.
Volume solids	65% (min)
DFT	100 - 125 microns/coat
Covering capacity	6.0 - 6.5 M^2/lit/coat

q) Finish Coat (F-8)

Self-priming epoxy high build coating (complete rust control coating)

Type and Composition	Two packs. Polyamide-amine cured epoxy resin suitably pigmented. Capable of adhering to manually prepared surface and old coatings.
Volume solids	65 - 80% (min)
DFT	125 - 150 microns/coat
Covering capacity	4 - 5 M^2/lit/coat

r) Finish Coat (F-9)

Inorganic Zinc Silicate coating

Type and Composition	Two packs, self-cured solvent based inorganic zinc silicate coating.
Volume solids	60% (min)
DFT	65 - 75 microns/coat
Covering capacity	8 - 9 M^2/lit/coat

s) Finish coat (F-10)

High build Black

Type and Composition	Single pack. Reinforced bituminous composition phenol based resin.
Volume solids	55 - 60% (min)
DFT	100 microns/coat (min)
Covering capacity	5.5 - 6.0 M^2/lit/coat

t) Finish Coat (F-11)

Heat Resistant Aluminium Paint Suitable up to 250°C.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Type and Composition	Duel container (paste & medium). Heat resistant spec varnish medium combined with aluminium flakes.
Volume solids	20 - 25% (min)
DFT	20 microns/coat (min)
Covering capacity	10 - 12 M^2/lit/coat

u) Finish Coat (F-12)

Heat Resistant Silicon Paint suitable up to 400º C.

Type and Composition	Single pack Silicone resin based with aluminium flakes.
Volume solids	20 - 25% (min)
DFT	20 microns/coat (min)
Covering capacity	10 - 12 M^2/lit/coat

v) Finish Coat (F-13)

Synthetic Rubber Based Aluminium Paint Suitable up to 1508C.

Type and Composition	Single Pack, Synthetic medium rubber medium combined with leafing Aluminium,
DFT	25 microns/coat (min)
Covering capacity	9.5 M^2/lit/coat

Notes:

1 Covering capacity and DFT depends on method of application Covering capacity specified above is theoretical. Allowing the losses during application, min specified DFT should be maintained.

2. All paints shall be applied in accordance with manufacturer's instructions for surface preparation, intervals, curing and application. The surface preparation quality and workmanship should be ensured.

3. Selected chlorinated rubber paint should have resistance to corrosive atmosphere and suitable for marine environment,

4 All primers and finish coats should be cold cured and air-drying unless otherwise specified.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5. Technical data sheets for all paints shall be supplied at the time of submission of quotations.

6. In case of use of epoxy tie coat, manufacturer should demonstrate satisfactory test for inter coat adhesion. In case of limited availability of epoxy tie coat (P-9) alternate system may be used taking into the service requirement of the system.

7. In case of F-6, F-9, F-1 1 & F-1 2 Finish Coats, No Primer are required.

MANUFACTURERS

The paints shall conform to the specifications given above and Class-I quality in their products range of any of the-following manufacturer or other approved vendors:

i) Asian Paints (India) Ltd.
ii) Bombay Paints
iii) Berger Paints India Ltd.
iv) Akzo Nobel
v) Jenson & Nicholson
vi) Shalimar Paints

STORAGE

All paints and painting material shall be stored only in rooms to be provided by contractor and approved by OWNER/ OWNER 's Representative for the purpose. AlI necessary precautions shall be taken to prevent fire. The storage building shall preferably be separate from adjacent, building.

A signboard bearing the words given below shall be clearly displayed outside:
PAINT STORAGE No NAKED LIGHT highly -inflammable

12.0 COLOR CODE FOR PIPING:

i) For identification of pipelines, the color code as per Table -1 shall be used.

ii) The color code scheme is intended for identification of the individual group of the pipeline. The system of color coding consists of a ground color and color bands superimposed on it.

iii) Colors (Ground) as given in Table-2 shall be applied throughout the entire length of un insulated pipes, on the metal cladding & on surfaces. Ground color coating of minimum 2m length or of adequate length not to be mistaken as color band shall be applied at places requiring color bands. Color bands shall be applied as per approved procedure.

iv) Line coating shall meet DIN 30670 standard for external coating and API 5L RP – 2 for internal coating.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

v) The thickness for the epoxy should be 180 microns, adhesive 200 microns and balance should be PE .

vi) The minimum coating thickness on weld seam shall be 3.2 mm and minimum coating thickness on body should be 3.2.

vii) Minimum thickness for liquid epoxy for internal coating should be 100 ± 20 microns.
Max design temperature for coating should be considered +80 ºC.

COLOR CODE:

A) Ball Valve (Above Ground) : Off White
B) Globe Valve (Above Ground) : Oxford Blue-RAL 5005, IS-519941005
C) Check Valve(Above Ground) : Oxford Blue-RAL 5005, IS-519941005
D) Launcher / Receiver : Yellow Golden
E) Jib Crane / Trolley : Yellow Golden
F) All underground valves shall have epoxy base coating after surface finish of SA 2:5
G) Valves and above ground pipes need to be properly blasted to achieve surface finish of Sa 2:5 before the application of paints.

Table 12.1 Colour Coding Scheme for Pipes and Equipment

SI. No.	Description	Ground Color	First Color Band	Second Color Band
1	**COMPRESSED AIR**			
a)	Plant Air	Sky Blue	Silver Grey	-
b)	Instrument Air	Sea Green	Black	-
2	*GASES*			
a)	Charge Gas	Canary Yellow	Signal Red	Smoke Grey
b)	Regeneration Gas	Canary Yellow	White	Dark Violet
c)	Residue Gas	Canary Yellow	White	French Blue
d)	LPG	Canary Yellow	Brilliant Green	White
e)	Acetylene	Canary Yellow	Dark violet	-
	Flare Lines	Heat resistant aluminium		
f)	Fire water and Foam & Extinguisher	Post office red		
3	*ALL EQUIPMENT*			
a)	Vessels. Columns, exchangers, etc. containing non- hazardous fluids.	Light Grey		
b)	Base Frame/Structure	Black		
b)	All equipment containing hazardous fluids	Canary Yellow		

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

c)	Pipe carrying hazardous fluids	Bar is to be replaced by Hazardous Marking as per IS:2379 Clause 7.1C		

IDENTIFICATION SIGN

i) Colors of arrows shall be black or white and in contrast to the color on which they are superimposed.

ii) Product names shall be marked at pump inlet, outlet and battery limit in a suitable size as approved by OWNER.

iii) Size of arrow shall be either of the following:

a) Color Bands

Minimum width of color band shall be as per approved procedure.

b) Whenever it is required by the OWNER to indicate that a pipeline carries a hazardous material, a hazard marking of diagonal stripes of black and golden, yellow as per IS:2379 shall be painted on the ground color.

IDENTIFICATION OF EQUIPMENT

All equipment shall be stenciled in black or white on each vessels, column, equipment, and painting as per approved procedure.

INSPECTION AND TESTING

1. All painting materials including primers and thinners brought to site by contractor for application shall be procured directly from manufactures as per specifications and shall be accompanied by manufacturer's test certificates Paint formulations without certificates are not acceptable.

2. The painting work shall be subject to inspection by OWNER/ OWNER's Representative at all times. In particular, following stage wise inspection will be performed and contractor shall offer the work for inspection and approval at every stage before proceeding with the next stage.

In addition to above. record should include type of shop primer already applied on equipment e.g. Red oxide zinc chromate or zinc chromate or Red lead primer etc.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Any defect noticed during the various stages of inspection shall be rectified by the contractor to the entire satisfaction of OWNER/ OWNER's Representative before proceeding further. Irrespective of the inspection, repair and approval at intermediate stages of work. Contractor shall be responsible for making good any defects found during final inspection/guarantee period/defect liability period as defined in general condition of contract. Dry film thickness (DFT) shall be checked and recorded after application of each coat and extra coat of paint should be applied to make-up the DFT specified without any extra cost to OWNER.

PRIMER APPLICATION

i. The contractor shall provide standard thickness measurement instrument with appropriate range(s) for measuring.

   Dry film thickness of each coat, surface profile gauge for checking of surface profile in case of sand blasting. Holiday detectors and pinhole detector and protector whenever required for checking in case of immerse conditions.

ii. At the discretion of OWNER/ OWNER's Representative, contractor has to provide the paint manufacturers expert technical service at site as and when required. For this service, there should not be any extra cost to the OWNER.

iii. Final Inspection shall include measurement of paint dry film thickness, check of finish and workmanship. The thickness should be measured at as many points/ locations as decided by OWNER/ OWNER's Representative and shall be within +10% of the dry film thickness.

iv. The contractor shall produce test reports from manufacturer regarding the quality of the particular batch of paint supplied. The OWNER shall have the right to test wet samples of paint at random for quality of same. Batch test reports of the manufacturer's for each batch of paints supplied shall be made available by the contractor.

18.0 PAINT SYSTEMS

The paint system should vary, with type of environment envisaged in and around the plants. The types of environment as given below are considered for selection of paint system. The paint system is also given for specific requirements.

a) Normal Industrial Environment, Table 18.2.
b) Corrosive industrial Environment, Table 18.3
c) Coastal & Marine Environment, Table 18.4

Notes 1. Primers and finish coats for any particular paint systems shall be from same manufacturer in order to ensure compatibility.

TABLE 18.1: LIST OF PRIMERS & FINISH PAINTS

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

PRIMERS	
P-1	Red oxide Zinc chromate Primer
P-2	Chlorinated rubber zinc Phosphate Primer
P-3	High build Zinc phosphate Primer
P-4	Etch Primer/Wash Primer
P-5	Epoxy Zinc Chromate Primer
P-6	Two component Epoxy Zinc Phosphate Primer cured with polyamine hardener
P-8	Epoxy red oxide zinc phosphate primer
FINISH COATS / PAINTS	
F-1	Synthetic Enamel
F-2	Two component Acrylic – Polyurethane finish paint
F-3	Chlorinated Rubber finish paint
F-5	Chemical resistant phenolic based enamel
F-6	High Build Epoxy finish coating cured with **polyamide** hardener
F-7	High build Coal Tar Epoxy coating cured with **polyamine** hardener
F-8	Self priming surface Tolerant High Build epoxy coating. cured with **polyamine** hardener
F-9	Two component Inorganic Zinc Silicate coating
F-10	High build Reinforced bituminous composition phenol based resin.
F-11	Heat resistant synthetic medium based Aluminium paint suitable for 250 deg C
F-12	Two component Heat resistant Silicone Aluminium paint. suitable for 400 deg C
F-13	Synthetic based aluminium Paint suitable for 150 deg C

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Table – 18.2: Painting System for Normal Industrial Environment for Piping and Equipment (Above Ground)

Sl. No.	Temp. Range	Surface Preparation	Primer	Finish Coat	Total DFT	Remarks
1	-10 to 20	SSPC-SP-3	One coat P-2 50 microns / coat (min)	One coat F-4 65 microns/ coat (min) Two coats F-3, 30 Microns/coat (min)	175	Primer and Finish coat can be applied at ambient temp.
2	21 to 60	SSPC-SP-6	Two coats P-1, 25 microns/ coat (min.)	Two coats of F-1, 20 microns/coat (min)	90	-
3	61 to 80	SSPC-SP-6	Two coats P-3, 50 microns/ coat (min)	Two coats of F-13, 25 microns/coat (min)	150	-
4	81 to 250	SSPC-SP-6	-	Three coats of F-11, 20 microns/ coat (min)	60	Paint application at ambient temp. curing at elevated temp. during start-up.
5	251 to 400	SSPC-SP-10	-	Three coats of F-12, 20 microns/ coat (min)	60	-do-

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Table – 18.3: Painting System for Corrosive Industrial Environment for Piping and Equipment (Above Ground)

SI. No.	Temp. Range	Surface preparation	Primer	Finish Coat	Total DFT	Remarks
1	-14 to 80	SSPC-SP-10	Two coats P-6, 35 microns / coat (min.)	One coats F- 6, 100 microns coat (min.) and one coats F- 2 40 microns coat (min.)	210	Paint application at ambient temp.
2	81 to 250	SSPC-SP-10	-	Three coats F-11, 20 Microns / coat (min.)	60	Paint application at ambient temp. and curing at 250°C for 4 hours
3	81 to 400	SSPC-SP-10	-	Three coats F-12, 20 Microns / coat (min.)	60	Paint application at ambient temp. and curing at 250°C for 4 hours

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Table – 18.4 :Painting System for Coastal and Marine Environment for Piping and Equipment (Above Ground)

SI. No.	Temp. Range	Surface Preparation	Primer	Finish Coat	Total DFT	Remarks
1	-14 to 80	SSPC-SP-10	Two coats P-6. 35 Microns. coat (Min.)	Two coats F- 6, 100 microns /coat (min.) and one coats F-2 40 Microns /coat (min.)	310	Primer and Finish coat application at Ambient temp.
2	81 to 400	SSPC-SP-I0	-	- Three coats F- 12, 20 Microns / coat (min.)	60	Paint application. at ambient temp, and curing at 250°C for 4 hours
3	401 to 550	SSPC-SP- 10	-	Three coats F- 12, 20 Microns / coat (min.	60	Paint application. at ambient temp, and curing at 250°C for 4 hours

Table – 18.5 : Painting System for External Side of Underground Tanks in all areas.

SI. No.	Temp. Range	Surface Preparation	Primer	Finish Coat	Total DFT	Remarks
External side of un-insulated underground storage tanks:						
1	-40 to 80	SSPC-SP-10	1 coat of F-9 @ 65-75µ DFT/ coat	3 coats of F-7 @ 100µ DFT/coat (3x100=300)	365-375	

18.2 Precautions to be taken

Neither the environment of the site nor the marking labels of devices may be covered with paint and they must be kept free of paint splashes. To this end, it is advisable to use removable masking tape.

Paint splashes, leaks, etc. on any adjacent installations such as measuring apparatus, valves, pipes. Sources of light, insulation, heat insulators, walls, concrete, etc, must immediately be wiped up and the damage repaired before the paint is dry.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Otherwise, the OWNER will be obliged to have the cleaning carried out at the expense of the Contractor. The paint recipient will only be opened at the time of use (unless otherwise specified by the manufacturer).

The product will be mixed in the recipient with the aid of suitable tools and thus homogenized.

18.3 Method of application

Normally, three methods of application will be used on the construction site for the paint products. i.e. with a brush, with a roller or with a spray gun.

- The brush method makes it possible to obtain good penetration of the paint over irregularities in the metal.
- Only this method will be used for application of the base coats, for retouching and for protrusions, welded areas, riveted joints or bolted joints:
- The roller method may be used on large flat surfaces for the intermediate and topcoats.
- The spray gun method must be used in accordance with the instructions of the manufacturer and carried out by qualified personnel.

The Contractor must guarantee that all safety measures have been taken for such work. The spray gun method may only he used on site for places that are difficult to reach with the brush. In this case, a request must be made to the OWNER/ OWNER's Representative for a deviation.

All paintwork will be carried out with good brushes or rollers that are suitable for the type of paint being used and for the form of the material to be painted and fitted with short handles. The maximum length of the brush and roller handles will be 50 cm; longer handles may only be used for places that are absolutely inaccessible. The maximum width of a brush will be 13 cm.

18.4 Application of the coating

Application of the paint will be carried out in accordance with best practice in order to obtain a homogeneous and continuous layer. The OWNER or the Approved Supervisory body demands that painting of a layer will only be started after acceptance by them of the surface preparation or of the previous layer of paint.

The layers of paint must have a uniform thickness. They must he spread in such a way that all concave parts are dried out and that the surface is completely covered and has a

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

glossy appearance without leaving brush marks and without exhibiting bubbles, foam, wrinkles, drips, craters, skins or gums that arise from weathered paint,

Each layer must have the color stipulated in the tables of the present specifications, which clearly differs from the previous layer, taking account of the Color of the top layer, all of which for the purpose of being able to identify the number of coats and their order of sequence. If the color of the coats is not mentioned in the tables the color difference in consecutive coats must, if possible, he at least 100 RAL. The color of the top layer is given in the table.

The coating power should be such that the underlying layer is not visible. Only 1 layer per day may be applied, unless otherwise specified by the OWNER or the Approved Supervisory Body.

The drying times prescribed by the paint manufacturer must be strictly observed in relation to the environmental conditions before proceeding with the application of the next layer.

The dry coating thickness indicated in the description of the paint systems are minimum thickness. In this connection, the Contractor is obliged to contact the paint manufacturer and conform to his guidelines. The Contractor must respect the thickness specified by the supplier.

18.5 Transporting treated items

In the case of works being carried out in a workshop, the metal structures will be surrounded by ventilated contraction film that prevents damage during transportation. This film may only be applied after complete polymerization of the paint.

19.0 GROUND-LEVEL TRANSITION POINT

19.1 Polyester protection system

The Contractor will provide system 02 over the entire length of the pipes above ground and below ground and up to a height of 20 cm and a depth of 40 cm. perpendicular to the ground level mark. In each case, he must ensure that the jointing below the asphalt is in good condition and assures' faultless adhesion. He will apply the following products over the entire surface area, prepared in accordance with is Sa 3:

1) The primer of system 01.

2) Reinforced polyester ± 20 cm above the ground level marker and ± 5 cm on the asphalt cleaned beforehand (application of reinforced polyester is carried out in accordance with the work method prescribed by the manufacturer). Moreover, in the case of PE, in contrast to asphalt, he will apply a polygon primer to PE immediately before applying the reinforced polyester.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

3) He will then apply the other coats of system 01a to the surface section and thus cover the reinforced polyester with about 5 cm.

4) For new constructions, the polygon primer will be applied to PE and then subsequently processed as described under point 2.

20.0 USE OF SCAFFOLDING

Mounting, maintenance and dismantling of scaffolding for carrying out adaptation and/or paintwork to surface gas pipes or gas transport installations in use;

- The Contractor will specify the cost of scaffolding in the price list.
- The supplementary rental price for delays attributable to the Contractor will be charged to him:
- In his price quotation the Contractor should present the OWNER with diagrams of the scaffolding that he intends to install for carrying out the works of the OWNER.

21.0 QUALITY CONTROLS AND GUARANTEE

21.1 The Contractor is responsible for checking the weather conditions to ascertain whether the paintwork can be carried out within the technical specifications.

The Contractor should have the required calibrated monitoring apparatus for this purpose on site (with calibration certificates). The personnel who will have to use this apparatus should have the training for this purpose.

The OWNER or his representative and possibly the approved supervisory body indicated by the OWNER will maintain supervision during the works and inspect the works with random checks. A daily report will be drawn up in relation to the department that maintains supervision of these works.

The supplementary inspection and the supervision by the OWNER or the approved supervisory body do not diminish in any way the liability of the Contractor. The proper execution of the work and the materials used may be checked at any time.

21.2 Reference Surfaces

At the start of the works. The OWNER or the approved supervisory body will indicate a few surfaces that the Contractor will prepare and cover in accordance with the recognized method of operation under the inspection and to the satisfaction of all parties; the OWNER or his representative, the approved supervisory body, the contractor and possibly the paint manufacturer. These reference surfaces will serve as a point of comparison for the good adhesion of the paint on the installations as a whole. The parties will together

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

work out a system for the identification of these surfaces in order to be able to monitor the conditions of the coatings over time. If the paintwork on a section of the installations is in a worse condition than the reference surfaces, the Contractor may be obliged to treat these parts again.

21.3 Measures to be taken in the event of a dispute

If on delivery of the works no agreement can be reached between the Contractor and the OWNER regarding the conformity of the works to the requirements of these specifications, an Approved Supervisory Body will he Called in. The Approved Supervisory Body will then carry out inspections' on site whereby the following assessment criteria will be used:

- The Swedish standards ISO 8501-1 1988 SS 05.5900 concerning the degree of cleanliness of the areas derusted by blasting, by machine or by hand.

- The wet film thickness of the paint will be measured in accordance with ISO 2808 or ASTM DI 212;

- The dry layer thickness of the film will be measured electronically, will complete statistical information. in accordance will, ISO 2808 or ASTM D 1186.

- The thickness of each layer will be measured in accordance with ISO 2808. ASTM 4138 or DIN 50986.

- Adhesion tests will be carried out in accordance with ISO 2409. ASTM 3359 or DIN 53151.

- Traction tests will he carried out in conformity with ISO 4624 or ASTM D 4541.

- The rugosity will be measured electronically in accordance with DIN 4768;

- The non-porosity will be measured with a test tension depending on the type of coating, the layer thickness and after consultation with the Paint manufacturer.

- Any defects in the paint film may be inspected visually by means of a magnifying glass or microscope. If necessary a photographic report may be drawn up in accordance with ASTM Standard D 4121-82.

The final judgment of the Approved Supervisory Body is irrevocable and binding for the Contractor and the OWNER. In the event of non-conformity of the works with the criteria of these specifications, all costs arising from the inspection by the Approved Supervisory Body shall be borne by the Contractor.

21.4 Guarantee

a) General Principles

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

The Contractor declares that he is aware of:

- The maximum operating temperature of the surfaces to be covered.
- The maximum permitted degree of humidity of the bearing surface.

- The properties of the environment to which the surfaces to be covered are: subject.

b) Summary of the Guarantee.

The contractor fully guarantees the following without reservation:

- The observance of all stipulations of the specifications for paintwork regarding, among other things:
  - The preparation of the surfaces.
  - The thickness of each layer.
  - The total thickness of the covering.
- The uniformity of the materials used.
- The repair of all defects before delivery of the works.

The Contractor will carry out the requested repair work as promptly as possible.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION

FOR
ASSORTED PIPES

VCS – SS – PP - 2503

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
01	30.06.2022	RP	MC	HK	GW
00	28.01.2020	MB	AK	AD	SK

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	12.10.2019					
		MB	AK	AD	SK	
01	30.06.2022					VCS QMS Integration
		RP	MC	HK	GW	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATIONS:

ANSI	American National Standards Institute
API	American Petroleum Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing & Materials
BHN	Brinell Hardness Number
BIS	Bureau of Indian Standards
E.FS.W	Electric Fusion Weld
E.R.W	Electric Resistance Weld
HAZ	Heat Affected Zone
HIC	Hydrogen Induced Cracking
IBR	Indian Boiler Regulations
IGC	Inter Granular Corrosion
IS	Indian Standard
LT	Low Temperature
MR	Material Requisition
NACE MR	National Association of Corrosion Engineers : Material Requirement
NB	Nominal Bore
NPT	Nominal Pipe Thread
PMI	Positive Material Identification
PR	Purchase Requisition
SMYS	Specified Minimum Yield Strength
SS	Stainless Steel

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 GENERAL……1

2.0 IBR PIPES……7

3.0 ACCEPTABLE DEVIATION……..…….... . 8

4.0 HYDROSTATIC TEST……..……..……8

5.0 MARKING AND DESPATCH……...11

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1. GENERAL

1.1. All pipes and their dimensions, tolerances, chemical composition, physical properties, heat treatment, hydrostatic test and other testing and marking requirements shall conform to the latest codes and standards specified in the material requisition (MR). Supplier shall strictly comply with MR/ PR stipulations and no deviations shall be permitted.

1.2. **Testing**

1.2.1. Test reports shall be supplied for all mandatory tests as per the applicable material specifications. Test reports shall also be furnished for any supplementary tests as specified in the MR & Clauses 1.10 & 1.11.

1.2.2. Material test certificates (physical property, chemical composition & heat treatment report) shall also be furnished for the pipes supplied.

1.2.3. PMI shall be performed as per the scope and procedures at supplier`s work.

1.3. **Manufacturing Processes**

1.3.1. Steel made by acid Bessemer process shall not be acceptable.

1.3.2. All longitudinally welded pipes should employ only automatic welding.

1.4. Pipe shall be supplied in single or double random length of 4 to 7 and 7 to 14 meters respectively.

1.5. a. Seamless and E.R.W. pipes shall not have any circumferential seam joint in a random length. However, in case of E.FS.W pipe, in one random length one welded circumferential seam of same quality as longitudinal weld is permitted. This weld shall be at least 2.5 m from either end. The longitudinal seams of the two portions shall be staggered by 90°. Single random length in such cases shall be 5 to 7 m.

b. Unless otherwise mentioned in the respective material code, E.FS.W pipes < 36" shall not have more than one longitudinal seam joint and E.FS.W pipes ≥ 36" shall not have more than two longitudinal seam joints.

1.6. Pipe with screwed ends shall have NPT external taper pipe threads conforming to ASME/ANSI B1.20.1 up to 1.5" NB & IS 554 for 2" to 6" NB.

1.7. Pipe with beveled ends shall be in accordance with ASME B16.25. Weld contours shall be as follows

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Material	Wall Thickness	Weld Contour
Carbon Steel Except Low Temp. Carbon Steel	Up to 22 mm	Figure 2 Type A
	> 22 mm	Figure 3 Type A
Alloy Steel, Stainless Steel & Low Temp. Carbon Steel	Up to 10 mm	Figure 4
	> 10 mm & Up to 25 mm	Figure 5 Type A
	> 25 mm	Figure 6 Type A

1.8. Galvanized pipes shall be coated with zinc by hot dip process conforming to IS 4736 / ASTM A 153.

1.9. All austenitic stainless steel pipes shall be supplied in solution annealed condition. All types of 321 or 347 stainless steel pipes shall be in a stabilized heat treated condition. Stabilizing heat treatment shall be carried out subsequent to the normal solution annealing. Soaking time & holding temp. for stabilizing heat treatment shall be 4 hrs & 900°C respectively.

1.10. **I.G.C. (Inter Granular Corrosion) Test for Stainless Steels**

1.10.1. For all austenitic stainless steel pipes inter-granular corrosion test shall have to be conducted as per following:
ASTM A262 Practice "B" with acceptance criteria of "60 mils/year (max.)".

OR

ASTM A262 Practice E with acceptance criteria of no cracks at 20X magnification and microstructure to be observed at 250X magnification shall ensure the absence of any cracks/ fissures. When testing is conducted as per practice 'E' photograph of microstructure shall be submitted for record.

1.10.2. When specifically asked for in MR for high temperature application of some grades of austenitic stainless steel (eg.SS 309, 310, 316, 316H etc.) ASTM A262 Practice "C" with acceptance criteria of "15 mils/year (max.)" shall have to be conducted

1.10.3. For the IGC test as described in 1.10.1 & 1.10.2, two sets of samples shall be drawn from each solution annealing lot; one set corresponding to highest carbon content and the other set corresponding to the highest pipe thickness.

1.11. All welded pipes indicated as `CRYO' & 'LT' in MR shall be impact tested per requirement & acceptance criteria of ASME B31.3. The impact test temperature shall be -196°C & -45°C for stainless steel and carbon steel respectively unless specifically mentioned otherwise in MR.

1.12. **NACE/HIC Requirements**

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.12.1. Pipes under "NACE" category and those designated as "HIC1" shall meet the requirements given in NACE MR-0103 unless mentioned otherwise.

1.12.2. Pipes made from plates and designated as "HIC1" shall meet the HIC requirements of specification unless mentioned otherwise

1.13. Specified heat treatment for carbon steel and alloy steel and solution annealing for stainless steel pipes shall be carried out after weld repairs. Number of weld repairs at the same spot shall be restricted to maximum two by approved repair procedure.

1.14. For black or galvanized pipes to IS 1239, the minimum percentage of elongation shall be 20%.

1.15. All 1Cr-1/$_2$Mo and 1 ¼ Cr-1/$_2$Mo seamless pipes shall be normalized and tempered.

1.16. For all welded alloy steel pipes with mandatory requirement of heat treatment and radiography, radiography shall be performed after heat treatment.

1.17. For Hydrogen service pipes following special requirements shall also be met:

1.17.1. All carbon steel pipes having wall thickness 9.53 mm (0.375") and above shall be normalized. Cold drawn pipes shall be normalized after the final cold draw pass for all thicknesses.

1.17.2. All alloy steel (Cr-Mo) pipes shall be normalized and tempered. The normalizing and tempering shall be a separate heating operation and not a part of the hot forming operation. The maximum room temperature tensile strength shall be 100,000 psig.

1.17.3. For carbon steel Pipes, hardness of weld and HAZ shall be 200 BHN (max.). For alloy steel Pipes, hardness of weld and HAZ shall be 225 BHN (max.).

1.17.4. For all austenitic stainless steels, the weld deposit shall be checked for ferrite content. A Ferrite No.(FN) not less than 3% and not more than 10% is required to avoid sigma phase embrittlement during heat treatment. FN shall be determined by Ferrite scope prior to post weld heat treatment.

1.17.5. For all Carbon steel and Alloy steel pipes with wall thickness over 20mm, Charpy-V Notch impact testing shall be carried out in accordance with paragraph UG-84 of ASME Section VIII, Div-1 for weld metal and base metal from the thickest item per heat of material and per heat treating batch. Impact test specimen shall be in complete heat treated condition and accordance with ASTM A370. Impact energies at 0°Celsius shall average greater than 27J (20 ft-lb) per set of three specimens, with a minimum of 19J (15 ft-lb).

1.18. For dual grades of SS where specified, chemical composition and mechanical

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

properties of both grades specified shall be ensured.

2. IBR PIPES

2.1. IBR Documentation

2.1.1. Pipes under purview of IBR shall be accompanied with IBR certificate original in Form III-A duly approved and countersigned by IBR authority/local authority empowered by the Central Boiler Board of India (Photocopy of the original certificate duly attested by the local boiler inspector where the supplier is located is the minimum requirement for acceptance) or Form III-D [for well-known pipe manufacturers as per IBR] signed by Manufacturer's authorized representative. Well known pipe manufacturers, as recognized by IBR, shall submit a duly attested copy of Form XVI-G along with Form III-D.

2.1.2. For materials 1¼ Cr - ½ Mo (ASTM A335 Gr.P11 / A691 Gr. 1¼Cr), 2¼Cr - 1Mo (ASTM A335 Gr.P22 / A691 Gr. 2¼Cr) & 9Cr -1Mo-V (A335 Gr.P91/A691 Gr.91), Form III-A approved by IBR shall include the tabulation of Et, Sc & Sr values for the entire temperature range given below. Et, Sc & Sr values shall be such that throughout the temperature range

$$\left.\begin{array}{ll} E_t/1.5 & \geq \\ S_r/\ 1.5 & \geq \\ S_c & \geq \end{array}\right| S_A$$

where,

S_A Allowable stress at the working metal temperature.

E_t Yield point (0.2% proof stress at the working metal temperature)

S_c The average stress to produce elongation of 1%(creep) in 100000 hrs at the working metal temperature.

S_r The average stress to produce rupture in 100000 hrs at the working metal temperature and in no case more than 1.33 times the lowest stress to produce rupture at this temperature

SA (psi)												
Temp (°F) Material	**500**	**600**	**650**	**700**	**750**	**800**	**850**	**900**	**950**	**1000**	**1050**	**1100**
A335 Gr.P11	17200	16700	16200	15600	15200	15000	14500	12800	9300	6300	4200	2800
A691	18900	18300	18000	17600	17300	16800	16300	15000	9900	6300	4200	2800

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SA (psi)												
Temp (°F) Material	**500**	**600**	**650**	**700**	**750**	**800**	**850**	**900**	**950**	**1000**	**1050**	**1100**
Gr. 1¼ Cr												
A335 Gr.P22 / A691 Gr. 2¼ Cr	17900	17900	17900	17900	17900	17800	14500	12800	10800	7800	5100	3200
A335 Gr.P91/ A691 Gr.91	28100	27700	27300	26700	25900	24900	23700	22300	20700	18000	14000	10300

Note : S_A values shall be as per the latest edition prevailing.

2.2. For carbon steel pipes under IBR the chemical composition shall conform to the following:

Carbon (max) : 0.25%

Others (S, P, Mn) : As prescribed in IBR.

The chemical composition as indicated in this clause is not applicable for pipes other than IBR services.

3. ACCEPTABLE DEVIATIONS

3.1. Pipes to IS 3589 Gr.410 are acceptable in place of IS 3589 Gr.330.

3.2. Pipes of Grades SS317 of corresponding material are acceptable in place of Grades SS316 or SS316(2.5 Mo min.).

3.3. Pipes of Grades SS317L of corresponding material are acceptable in place of Grades SS316L or SS316L(2.5Mo min.).

3.4. Seamless pipes are acceptable in place of welded pipes except in the case of welded

SS321/SS321H pipes with nominal thickness greater than 9.53mm.

4. HYDROSTATIC TEST

4.1. All pipes shall be hydrostatically tested.

4.2. The mill test pressure shall be as follows:

4.2.1. Seamless, E.R.W. & Spiral Welded

a) Carbon Steel

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Material Std.	Test Pressure Std.
ASTM A106 Gr.B	ASTM A530
A*PI* 5L Gr.B, Seamless	API 5L
API 5L, E.R.W.	API 5L
API 5L, Spiral	API 5L
ASTM A333 Gr.3 & 6, Seamless	ASTM A530
ASTM A333 Gr.3 & 6, E.R.W.	ASTM A530

b) Seamless Alloy Steel

Material Std.	Test Pressure Std.
ASTM A335 Gr.P1, P12, P11, P22, P5, P9	ASTM A530
ASTM A268 TP 405, TP410	ASTM A530

c) Seamless Stainless Steel

Material Std.	Test Pressure Std.
ASTM A312 Gr.TP 304, 304L, 304H, 316, 316L, 316H, 321, 347.	ASTM A999

d) Seamless Nickel Alloy

Material Std.	Test Pressure Std.
ASTM B161 UNS No. 2200	ASTM B161
ASTM B165 UNS No. 4400	ASTM B165
ASTM B167 UNS No. 6600	ASTM B167
ASTM B407 UNS No. 8800	ASTM B407

e) Welded Nickel Alloy

Material Std.	Test Pressure Std.
ASTM B725 UNS No. 2200,4400	ASTM B725
ASTM B517 UNS No. 6600	ASTM B517

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ASTM B514 UNS No. 8800	ASTM B514

4.2.2. Electric Fusion Weld

a) Carbon Steel & Alloy Steel E.FS.W (16" & above)

Material Std	Test Pressure Std.
API 5L Gr.B ASTM A671 Gr.CC65, 70 (Cl.32) ASTM A672 Gr.C60, 65, 70 (Cl.12,22) ASTM A671 Gr.CF60, 65, 66, 70 (Cl.32) ASTM A691 Gr. ½ Cr, 1Cr, 1¼ Cr, 2¼ Cr, 5Cr, 9Cr (Cl.42)	P = 2ST/D S = 90% of SMYS Except for API 5L Gr.B S = 85% of SMYS For API 5L Gr.B T = Nominal Wall Thickness D = O.D of Pipe

b) Stainless Steel E.FS.W (2" to 6")

The hydrostatic test pressure in kg/cm^2 for the following materials shall be as given below :

Material Gr.1 :ASTM A312 TP 304 / 304H / 316 / 316H / 321 / 347 welded.

Material Gr.2 :ASTM A312 TP 304L / 316L welded.

Size	Pipe Schedule : 10S		Pipe Schedule : 40S		Pipe Schedule : 80S	
	Material Gr. 1	Material Gr.2	Material Gr.1	Material Gr.2	Material Gr.1	Material Gr.2
2"	100	80	155	130	230	190
3"	80	60	155	130	230	190
4"	80	50	155	130	230	190
6"	65	35	90	75	155	130

c) Stainless Steel E.FS.W (8" and above).

Material Std	Test Pressure Std.
ASTM A358 TP 304L, 304, 304H, 316L,316, 316H, 321, 347 (Classes 1, 3 & 4)	P = 2ST/D S = 85% of SMYS T = Nominal Wall Thickness D = O.D of Pipe

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ASTM A358 TP 304L, 304, 304H, 316L, 316, 316H, 321, 347 (Classes 2 & 5)	P = 2ST/D S = 72% of SMYS T = Nominal Wall Thickness D = O.D of Pipe

4.2.3. Carbon Steel Pipe to BIS Standards

Material Std	**Test Pressure Std.**
IS 1239	IS 1239
IS 3589	IS 3589

4.3. Hydrostatic pressure testing shall be performed using iron free water, which is clean and free of silt. Maximum chloride content in water for hydrostatic testing for SS piping shall be 50 ppm.

5. MARKING AND DESPATCH

5.1. All pipes shall be marked in accordance with the applicable codes, standards and specifications. In addition the purchase order number, the item code & special conditions like "IBR", "CRYO", "NACE", "H2" etc. shall also be marked.

5.2. Pipes under "IBR","CRYO", "NACE" & "H2" shall be painted with one circumferential stripe of colour red, light purple brown, canary yellow & white respectively for easy identification. Width of stripe shall be 12mm for pipe sizes less than 3" and 25mm for pipes 3" and above.

5.3. Paint or ink for marking shall not contain any harmful metal or metallic salts such as zinc, lead or copper which cause corrosive attack on heating.

5.4. Pipes shall be dry, clean and free from moisture, dirt and loose foreign materials of any kind.

5.5. Pipes shall be protected from rust & corrosion

5.6. Rust preventive used on machined surfaces to be welded shall be easily removable with a petroleum solvent and the same shall not be harmful to welding.

5.7. Both ends of the pipe shall be protected with the following material:

Plain end : Plastic cap

Bevel end : Wood, Metal or plastic cover

Threaded end : Metal or plastic threaded cap

5.8. Pipes may be provided with plastic push-fit type end caps/ steel caps without belt wire.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.9. Steel end protectors to be used on galvanized pipes shall be galvanized. Plastic caps can also be used as end protectors for galvanised pipe ends.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality	**PROJECT NUMBER: C261162**	HPOIL GAS

PIPING MATERIAL SPECIFICATION			Total Sheets	29	
Document No	C261162	00	PP	PMS	2001

HPOIL GAS PVT. LTD.(HOGPL)

C1	06.05.2026	ISSUED FOR CLIENT REVIEW	AS	PA	DK
REV	**DATE**	**DESCRIPTION**	**PREP**	**CHKD**	**APPR**

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATION

ANSI	American National Standards Institute
ASME	American Society of Mechanical Engineers
ASTM	American Society for Testing and Materials
AARH	Arithmetic Average Roughness Height
BS	British Standards
CS	Carbon Steel
MS	Mild Steel
IS	Indian Standard Code
NFPA	National Fire Protection Association
OISD	Oil Industry Safety Directorate
PNRGB	Petroleum & Natural Gas Board
ERW	Electric Resistance Welding
BE	Bevel End
BW	Butt Welded
FF	Flat Face
PBE	Plain Both End
PE	Plain End
RF	Raised Face
SCRF	Screwed End - Female
SCRM	Screwed End - Male
CA	Corrosion Allowance
M	To Match Pipe

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

CONTENTS

1.0 INTRODUCTION 4
2.0 CODES AND STANDARDS 4
3.0 MATERIAL SPECIFICATIONS 4
4.0 CLASS DESIGNATION CODE 5
5.0 TECHNICAL REQUIREMENTS 5
6.0 PIPELINE 6
7.0 PIPES 6
8.0 FITTINGS 7
9.0 BENDS 7
10.0 FLANGES 7
11.0 GASKETS 9
12.0 BOLTING & THREADS 9
13.0 THREAD SEALANT 9
14.0 VALVES 9
15.0 QUICK OPENING END CLOSURE 11
16.0 HYDROTESTING VENTS AND DRAINS 11
17.0 PIPING SPECIATLITY ITEMS 11
18.0 INSULATING GASKET, SLEEVE AND WASHER 11
19.0 CHARPY V-NOTCH TEST & HARDNESS TEST 13
APPENDIX – A PIPING MATERIAL SPECIFICATION – INDEX 14
APPENDIX – B PIPING CLASS 17

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 INTRODUCTION

This specification covers minimum requirements for the material specification for pipe, fittings, flanges, line blinds, bolts, gaskets, and valves that shall be used for natural gas pipeline and associated facilities in accordance with ASME B31.8, OISD-226 and PNGRB guideline.

This specification also defines, by piping class for each listed service, and defines the pressure/temperature limitations within which they may be used.

This specification shall be read in conjunction with various codes and standards as applicable.

2.0 CODES AND STANDARDS

Pipeline and pipeline terminal facilities envisaged as part of this project shall be designed and engineered primarily in accordance with the provisions of the latest edition of the following codes:

ASME 31.3	:	Process Piping
ASME 31.8	:	Gas Transmission and Distribution Piping Systems
OISD STD-226	:	Natural Gas Transmission Pipeline and City Gas Distribution Networks
PNGRB	:	Petroleum and Natural Gas Regulatory Board

All codes, standards and specifications referred herein shall be the latest edition of such documents.

For sake of brevity the initials of the society to which the codes are referred may be omitted in the specifications, for example, B16.5 is a code referring to ASME A106 is a code referring to ASTM.

In addition to this PMS, various piping and pipeline materials shall also be applicable.

3.0 MATERIAL SPECIFICATIONS

Individual piping class has been generally designed to cover a set of service operating within pressure-temperature consideration as per ASME B16.5/ B16.34 or part of it. Deviations of material from class specifications may occur due to specific design conditions and/or availability. These deviations are permissible if they equal or better the individual class requirements and shall be subjected to approval on case-to-case basis.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

4.0 CLASS DESIGNATION CODE

The piping class designation shall generally consist of three digits made up of a letter, number & letter e.g. 15HC, 15HLT, 30HC, 30 HLT etc. as follows:

First two numerals letter indicates ASME class rating, e.g.

15 - 150 Class

30 - 300 Class

The first alphabet indicates differences in the Fluid Services within the same class rating and material, e. g. H stands for Hydrocarbon, W stands for Water, G stands for Galvanize etc.

The last one or two letter (as applicable) indicates type of material, e.g.

C - Carbon steel

LT - Low Temperature (Carbon Steel)

5.0 TECHNICAL REQUIREMENTS

5.1 General Notes

1. All piping materials selected under this specification shall be in compliance with the project specification.

2. Material selections shall comply with the maximum pressure and temperature limitation as specified in the service summary.

3. Substitution of equivalent materials is subject to approval of the Client /PMC. All requests for substitution shall be accompanied with sufficient data, drawings, and descriptive details to permit evaluation by the Client /PMC.

4. Cast iron, ductile or malleable iron, aluminum, plastic, or copper-bearing alloys shall not be used in hydrocarbon service.

5. Piping design pressure is based on flange maximum-allowable working pressure, unless otherwise noted in Job Specification.

6. When required, impact testing shall comply with applicable standards and material specifications.

7. All gaskets shall be asbestos free.

8. Aluminum jumper shall be provided across the flanged joint and length of the bolt shall be taken such that at least two threads remain exposed after the nut for fixing the continuity jumper.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.2 Units

1. All units are expressed in SI system with the exception of nominal pipe sizes (NPS) and bolting diameters, which are in inches.
2. Pressures are gauge pressures (in Kg/cm^2g) and temperatures are in deg. Celsius (°C).
3. Pressures and Temperatures ratings are based ASME 16.5.

6.0 PIPELINE

- Line pipe material grade and wall thickness details are indicated in PMS.

7.0 PIPES

- Carbon steel pipe shall be made by open hearth, electric furnace or basic oxygen process only. The steel used shall be fully killed and made with fine grain structure. The grade and wall thickness of various sizes of pipes shall be as per piping material specification for the applicable class.
- Pipe dimensions shall be in accordance with ASME B 36.10 for carbon steel ASTM standard pipes & API 5L for carbon steel API 5L grade pipes.
- All pipe threads shall conform to American Standard taper as per ASME B 1.20.1 NPT, unless otherwise specified.
- For butt weld end, bevel shall be in accordance with API specification 5L or ASME B16.25 as applicable.
- Where difference in thickness of matching pipe ends exist, bevels for such matching pairs shall be prepared in accordance with ASME B 31.8.
- Pipes shall be supplied with beveled end. Beveling shall be in accordance with ASME B16.25. Where plain end pipes are specified, as for small bore pipes for socket welded piping, the pipes shall be supplied with square cut ends.
- All pipe threads shall conform to American Standard taper as per ASME B 1.20.1 NPT, unless otherwise specified.
- Dimensions of socket weld ends shall confirm to ASME B 16.11. Bore shall match pipe OD and pipe ID.
- Pipe to pipe joints shall be made as follows:

For sizes up to & including DN40	Socket weld/ As per Piping Class
For size DN50 and above	Butt Welded

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

8.0 FITTINGS

- Fully killed carbon steel shall be used in the manufacture of fittings. The fitting shall have carbon equivalent not exceeding 0.45, based on check analysis.
- Threaded joints, if used, shall conform to American Standard taper as per ASME B1.20.1 NPT.
- Dimensions of socket welded/screwed fittings shall conform to ASME B 16.11. Swage shall be as per BS 3799.
- Dimensions of steel butt welded fittings shall be as per ASME B 16.9.
- Bore of socket welded fittings shall suit outside diameter (OD) of pipe and its thickness.
- Butt welding ends shall conform to API specification 5L or ASME B 16.25 as applicable. In case of difference in thickness of matching ends, requirements of ASME B 31.4 shall apply.
- Integrally reinforced forged branch fittings such as Sockolet, Weldolet etc. shall be as per MSS-SP-97. Fittings not covered in ASME B16.9 and MSS-SP-97 shall conform to manufacturer's standard.
- Fittings thickness tolerances shall match pipe thickness tolerance.

9.0 BENDS

- Unless otherwise specified for process piping, elbow of radius R = 1.5 D shall only be used.
- In order to accommodate changes in vertical and horizontal alignment in piggable section of pipeline, Elastic bends/ Cold field bends/ Hot formed long radius bends shall be used. Radius of bend shall be as per Design Basis.

  D = Specified Outside Diameter
- Miters shall not be used.

10.0 FLANGES

- Pressure Temperature rating of flanges shall conform to B16.5/ MSS-SP44/ B16.47 Series A, as applicable.
- Dimensions of flanges shall be in accordance with B16.5/ MSS-SP44/ B16.47 Series A, as applicable.
- Neck of weld neck (WN) flanges shall suit pipe bore and thickness.
- Bore of socket welded (SW) flanges shall suit pipe O.D. and its thickness.
- Threads for screwed flanges, if used, shall conform to American Standard taper as per ASME B 1.20.1 NPT.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Sizes for blind flanges shall be indicated by nominal pipe size.
- Unless specified otherwise in Piping Material Specification the flange face finish shall be as per ASME B16.5.
- Butt welding ends of WN flanges shall conform to ASME B 16.25.
- Spectacle blind/spacer & blinds shall be in accordance with ASME B 16.48/ manufacturer's standard.
- Flange face finish for raised face flanges shall be as per ASME B16.5/ ASME B 16.47 as applicable. For RTJ flanges groove finish shall be 32-63 micro inches AARH as per MSS-SP-6. Hardness of groove surface shall be minimum 140 BHN.
- Butt welding ends of WN flanges shall conform to ASME B 16.25.
- Spectacle blind/spacer & blinds shall be in accordance with ASME B16.48 / manufacturer's standard.
- Two jackscrews, 180° apart shall be provided for all RTJ flange assemblies and Spacer blind/ Figure 8 assemblies. Holes for jackscrews shall be drilled and tapped at site. Jackscrews shall be as per ASTM A193 Gr. B7. Heads of jackscrews shall be heavy hexagonal type and jackscrew end shall be rounded. Dimensions shall be as per ASME B18.2.1.
- Flanges shall be packed and shipped in such a way as to prevent damage of machined parts.
- All machined or threaded parts shall be protected in accordance with ASTM A700. Suitable protection shield, or cover shall be provided on the gasket contact surface.
- Carbon steel forgings shall be supplied with a maximum carbon content of 0.25% and CE of 0.45 by product analysis.
- The finish of contact faces of pipe flanges & connecting end flanges of valves & fittings shall be governed by ASME B16.5 & following:

  Roughness requirements (Finish: AARH standards per ASME B46.1):

  a) Raised Face (RF): Serrated finish 125 to 250 µin Ra.

  b) Flat Face (FF): Serrated finish 125 to 250 µin Ra.

  c) Ring Type Joint (RTJ): Extra-smooth finish 63 µin Ra max.

- Flat face flanges, unless specified on the Piping Specifications, shall not be used without specific Client/PMC approval. Full-face gaskets shall be used with flat-face flanges as per ASME B16.20.
- All flanged joints shall be installed with a single gasket between contact faces.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- Spectacle blank (figure 8 blank), blank (blind) & spacer shall confirm to the requirement of ASME B16.48 up to sizes 24". For 150#, 300# and 600# spectacle blank shall be used up to 8", blank (blind) & spacer for sizes 10" & above

11.0 GASKETS

- Spiral wound metallic gasket with Graphite filled winding with SS304 inner ring and CS outer ring/ Soft iron octagonal ring type joint gasket, and shall conform to ASME B 16.20/ API 601
- Spiral wound gaskets shall be self-aligning type.

12.0 BOLTING & THREADS

- Nuts for stud bolts shall be American Standard Hexagon Heavy Series and double chamfered.
- Dimension and tolerances for stud bolts and nuts shall be as per ASME B18.2.1 and 18.2.2 with full threading to ASME B 1.1 Class 2A thread for bolts and Class 2B for nuts. Diameter and length of stud bolts shall be as per ASME B16.5/ASME B16.47 with full threading.
- Threads for nuts shall be as per ASME B 1.1 as follows:

Nuts for stud bolts Dia ¼" to 1"	:	UNC-2B
Nuts for stud bolts Dia 1⅛" to 3¼"	:	8UN-2B

- Threads for stud bolts shall be as per ASME B 1.1, as follows:

Stud bolts Dia ¼" to 1"	:	UNC-2A
Stud bolts Dia 1⅛" to 3¼"	:	8UN-2A

- Threads for threaded pipe, fitting, flanges and valve shall be in accordance with B1.20.1 taper threads, unless specified otherwise.
- Heads of jack screws shall be heavy hexagonal type. Jack screw end shall be rounded. Stud bolts shall be fully threaded with two hexagonal nuts.

13.0 THREAD SEALANT

- Threaded joints shall be made with 1" wide PTFE jointing tape.

14.0 VALVES

- Valve ends shall be as per valve data sheets for various piping class.
- Sectionalizing valves, Block valves and other isolation valves installed on the main pipeline shall be ball valves with butt welding ends. All inline isolation valves on the mainline (pipeline) shall be full bore valves to allow smooth passage of cleaning as well as intelligent pigs.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- All buried valves shall be provided with stem extension shall have Butt Welded ends as per relevant specification/ data sheet.
- All valves in the piggable section of pipeline and Main Process Flow Line shall be Full Opening valve as per API 6D. Other valves shall be Reduced Opening type unless specified otherwise in P&ID.
- Flange dimensions and face finish of flanged end valves shall conform to clause 10.0 of this specification.
- Butt welding ends of Butt-Welded valves shall conform to ASME B 16.25.
- Face to face and end to end dimensions shall conform to applicable standards.
- Valves shall conform to following standards unless specified otherwise in piping material specification for various piping class.

Flanged/Socket Welded end valves (1½" and below)
Design STD. for Process lines

Gate Valves	:	API 602
Globe Valves	:	BS EN ISO 15761
Check Valves	:	BS EN ISO 15761
Ball Valve	:	BS EN ISO 17292
Plug Valve	:	BS 5353

Flanged/Butt Welded end valves (2" and above)
Design STD. for Process Lines

Gate Valves	:	API 6D
Globe Valves	:	BS 1873
Check Valves	:	API 6D
Ball Valve	:	API 6D
Plug Valve	:	API 6D

- All manual operated valves shall be provided with wrench / hand wheel or gear operator as specified here in below.
- **Gate Valves**

For ANSI class 150 and 300	-	Hand wheel operated for size ≤ 12" NB. Gear operated for size ≥ 14" NB.
For ANSI class 600	-	Hand wheel operated for size ≤ 10" NB. Gear operated for size ≥ 12" NB.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

- **Globe Valves**

  For ANSI class 150, 300, 600 and 900 - Hand wheel operated for all Size.

- **Ball Valves & Plug Valves**

  For all ANSI class - Wrench operated for size ≤ 4" NB.
  Gear operated for size ≥ 6" NB.

- **Actuated Valves**

  Actuated valves shall be as per P&IDs. The actuator shall have provision for remote operation as per P & IDs. All Actuated valves shall have additional provision of hand wheel operation.

15.0 QUICK OPENING END CLOSURE

Quick opening end closure to be installed on scraper traps shall be designed in accordance with Section VIII of ASME Boiler and Pressure Vessel Code and equipped with safety locking devices in compliance with Section VIII, division 1, UG-35.2 of ASME Boiler and Pressure Vessel Code.

16.0 HYDROTESTING VENTS AND DRAINS

In terminal piping, high point vents and low point drains required for the purpose of hydro testing shall be of size 0.75". These vents & drains shall consist of gate valves with blind flange assembly.

17.0 PIPING SPECIATLITY ITEMS

- Primary material Pipeline specialty items viz. flow tees, insulating joints, LR bends etc. shall be as per respective data sheets and specification.
- For mainline items, corrosion allowance shall be as per respective data sheet.

18.0 INSULATING GASKET, SLEEVE AND WASHER

The insulating gasket shall consist of a PTFE (Teflon) spring-energized face seal, or an elastomeric O-ring, seated in an isolating laminate, which shall be permanently bonded to a high strength metal gasket core. Due to this unique pressure activated sealing mechanism, the gasket requires far less bolt stress to seal than any other gasket. The gasket inner diameter shall be exactly matched to the flange bore to eliminate turbulent flow and flange face erosion/ corrosion. The seal elements shall be replaceable in the reusable gasket retainer. The core of gasket shall be made of annealed 316 stainless steel or other metals including duplex and Inconel etc.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Insulating gasket shall include the following applications,

- Flange isolation in conjunction with Cathodic protection.
- Isolation between dissimilar metals to prevent galvanic corrosion.
- Mating mismatched ring-joint to raised –face flanges.
- Eliminate fluid trap corrosion between ring-joint (RTJ) flanges where high concentrations of Co2, H2S and other aggressive hydrocarbon media are present.
- Eliminate turbulence and flow induced erosion between ring-joint (RTJ) flanges.
- Protect against coating impingement on coated flange faces.
- To seal between flanges subjected to vibration/ cavitation.

18.1 Insulating Gaskets, Sleeves and Washer Materials Properties

Compressive Strength	:	65000 psi
Average Dielectric Strength	:	15 kV or more
Electrical Resistance	:	>1 MΩ (When tested with 500-1000 V DC merger)
Max. Operating Temperature	:	302°F (150°C)
Min. Operating Temperature	:	(-) 200°F (-129°C)
Water Absorption	:	5%
Flexural Strength	:	70000 psi
Tensile Strength	:	50000 psi
Bond Strength	:	2600 lb.
Shear Strength	:	22000 lb.

18.2 Seal Material

The sealing elements shall intend to provide an impervious barrier through which no contained media or other substance can penetrate. The composite retainer backing material behind the seal remains uncontaminated and thus permanently holds the seal in place in a static, fully encapsulated manner.

Viton as a seal material shall consist following properties,

- General purpose oilfield elastomer.
- Excellent resistance to aliphatic hydrocarbons, glycols and H2S.
- Good resistance to aromatic hydrocarbons.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Isolating Sleeve

Mylar as a seal material shall consist following properties,

- Spiral wound Mylar is a general-purpose material recommended for bolting application with flange temperatures below 250°F.
- Material shall be fair resistance to crushing, cracking, breaking and thread pinch.

Isolating washer: 1/8" (0.125) Thick washer

Steel Washer: ZPS standard – Zinc plated steel washers.

Butt weld (BW) ends of the insulating assembly shall be protected by metallic or high impact plastic bevel protectors.

The dimensions of insulating components (gaskets, sleeves and washers) shall be as indicated in Data Sheet. The insulating gasket and washers shall have adequate compressive strength to permit proper tightening of flange bolts for leak proof joint.

The insulating material shall be suitable for pressure and temperature indicated in Data Sheet under connecting pipeline details and shall be resistant to the fluid to be handled through the pipeline.

I.D. and O.D. of insulating washers shall be designed to fit over insulating sleeves and within spot faces on flanges.

After the hydrostatic test, insulating flange assembly shall be tested with air at 5 kg/cm2 for 10 minutes. The tightness shall be checked by immersion or with a frothing agent. No leakage shall be accepted.

Insulating gasket, sleeve and washer after the field hydrostatic test shall be tested for dielectric integrity at 5000 V A.C., 50 Hz for one minute and the leakage current before and after shall be equal. Testing time, voltage and leakage shall be recorded and certified. The test shall be carried out in dry conditions.

19.0 CHARPY V-NOTCH TEST & HARDNESS TEST

All piping material like valves, fittings, flanges bolting etc. shall be Charpy impact tested. Charpy V-notch impact tests are required for the base metal weld metal and heat-affected zone (HAZ)

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Appendix – A

Piping Material Specification – Index

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Sr. No.	Piping Class	Rating	C. A. (MM)	Spl. Reqt.	Basic Material	Service	Remarks
1	15HC	150	1.5	NON-IBR	CARBON STEEL	NON-CORROSIVE PROCESS-FLAMMABLE /NONFLAMMABLE, NON-LETHAL- HYDROCARBONS	Page 17
2	15HLT	150	1.5	LOW TEMPERATURE SERVICE	CARBON STEEL	NON-CORROSIVE PROCESS-FLAMMABLE /NON-FLAMMABLE, NON-LETHAL- HYDROCARBONS	Page 22
3	30HC	300	1.5	NON-IBR	CARBON STEEL	NON-CORROSIVE PROCESS-FLAMMABLE / NONFLAMMABLE, NON-LETHAL- HYDROCARBONS	Page 28
4	30HLT	300	1.5	LOW TEMPERATURE SERVICE	CARBON STEEL	NON-CORROSIVE PROCESS-FLAMMABLE / NONFLAMMABLE, NON-LETHAL- HYDROCARBONS	Page 35
5	60HC	600	1.5	NON-IBR	CARBON STEEL	NON-CORROSIVE PROCESS-FLAMMABLE / NONFLAMMABLE, NON-LETHAL- HYDROCARBONS	Page 40
6	60HLT	600	1.5	LOW TEMPERATURE SERVICE	CARBON STEEL	NON-CORROSIVE PROCESS-FLAMMABLE / NONFLAMMABLE, NON-LETHAL- HYDROCARBONS	Page 47

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Appendix – B

Piping Class

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

PIPE CLASS	**15HC**
DESIGN CODE	ASME B31.8
RATING	150#
BASE MATERIAL	CARBON STEEL
CA	1.5 MM
SPECIAL REQUIREMENT	Non-IBR
SERVICE	Natural Gas, Utilities (water, inst. air, plant air, nitrogen, carbon dioxide)

Temperature (Deg. C) and Pressure (Kg/cm^{2}g) Ratings

Temperature	-29	38	93	149	204	260	316	343	371
Pressure	20.03	20.03	18.28	16.17	14.06	11.95	9.84	8.78	7.73

NOTES:

1. All vents and drains shall be provided with gate valve with blind flange assembly unless otherwise indicated in P&ID.
2. NDT of welds shall be as follows:

   Radiography : All butt welds 100%

   MPI : Socket welds 100%
3. Piping design as per ASME B 31.8, OISD 226 & PNGRB Guidelines
4. Charpy V notch test and hardness test shall be conducted for pipes, fittings and flanges at (-) 29°C.
5. All branch connections including vent, drain, pressure and temperature connection shall be as per branch connection table.
6. For valves, refer valve data sheets.

ITEM	SIZE	DESCRIPTION
Maintenance joints	ALL	Flanged, to be kept minimum
Pipe joints	1.5" & BELOW	SW coupling
	2.0" & ABOVE	Butt welded
Drains	ON LINES <= 1.5"	Refer std. Drawing
	ON LINES >= 2.0"	As per P&ID or 0.75". Refer std. Drawing
Vents	ON LINES <= 1.5"	Refer std Drawing
	ON LINES >= 2.0"	As per P&ID or 0.75". Refer std. Drawing

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Temp. Connection	1.5"	Flanged, installation as per std. Drawing, except skin temperature measurement.
Press. Connection	0.75"	SW nipple with Plug/ Ball Valve to spec. as per Refer std. Drawing

Branch Table

														T	**24**	**BRANCH PIPE (INCH)**
													T	T	**20**	
												T	T	T	**18**	
											T	T	T	T	**16**	
										T	T	T	T	T	**14**	
									T	T	T	T	T	T	**12**	
								T	T	T	T	T	T	T	**10**	
							T	T	T	T	T	T	T	W	**8**	
						T	T	T	T	T	T	W	W	W	**6**	
					T	T	T	W	W	W	W	W	W	W	**4**	
				T	T	T	W	W	W	W	W	W	W	W	**3**	
			T	T	T	W	W	W	W	W	W	W	W	W	**2**	
		T	T	T	T	S	S	S	S	S	S	S	S	S	**1.5**	
	T	T	T	T	S	S	S	S	S	S	S	S	S	S	**1**	
T	T	T	T	S	S	S	S	S	S	S	S	S	S	S	**0.75**	
0.5	**0.75**	**1**	**1.5**	**2**	**3**	**4**	**6**	**8**	**10**	**12**	**14**	**16**	**18**	**20**	**24**	**0.5**
PIPE RUN Size (INCH)																

CODES	DESCRIPTION
T	Tees
W	Weldolet
S	Sockolet

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Item	Lower Size (Inch)	Upper Size (Inch)	Sch. / Thk.	Dmn. STD	Material (Charpy)	Description
PIPE GROUP						
PIPE	00.500	00.750	S160	B-36.10	ASTM A 106 GR.B	PE, SEAMLESS
PIPE	01.000	01.500	XS	B-36.10	ASTM A 106 GR.B	PE, SEAMLESS
PIPE	02.000	02.000	XS	B-36.10	ASTM A 106 GR.B (Charpy)	BE, SEAMLESS
PIPE	03.000	14.000	STD	B-36.10	ASTM A 106 GR.B (Charpy)	BE, SEAMLESS
PIPE	16.000	24.000	STD	B-36.10	ASTM A 672 B65 CL-12 (Charpy)	BE, E.FS.W
NIPPLE	00.500	01.500	M	B-36.10	ASTM A 106 GR.B	PBE, SEAMLESS
FLANGE GROUP						
FLNG.SW	00.500	01.500	M	B-16.5	ASTM A 105	150, RF/ 125AARH
FLNG.WN	2.000	24.000	M	B-16.5	ASTM A 105 (Charpy)	150, RF/ 125AARH
FLNG.BLIND	00.500	01.500		B-16.5	ASTM A 105	150, RF/ 125AARH
FLNG.BLIND	00.500	24.000		B-16.5	ASTM A 105 (Charpy)	150, RF/ 125AARH
FLNG.FIG.8	00.500	08.000		ASME B16.48	ASTM A 105 (Charpy)	150, FF/ 125AARH
SPCR&BLND	10.000	24.000		ASME B16.48	ASTM A 105 (Charpy)	150, FF/ 125AARH
FITTING GROUP						
ELBOW.90	00.500	01.500		B-16.11	ASTM A 105	SW, 6000
ELBOW.90	02.000	12.000	M	B-16.9	ASTM A 234 GR.WPB (Charpy)	BW, 1.5D
ELBOW.45	00.500	01.500		B-16.11	ASTM A 105	SW, 6000
ELBOW.45	02.000	24.000	M	B-16.9	ASTM A 234 GR.WPB (Charpy)	BW, 1.5D
T.EQUAL	00.500	01.500		B-16.11	ASTM A 105	SW, 6000
T.EQUAL	02.000	24.000	M	B-16.9	ASTM A 234 GR.WPB (Charpy)	BW

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

T.RED	00.500	01.500		B-16.11	ASTM A 105	SW, 6000

Item	Lower Size (Inch)	Upper Size (Inch)	Sch. / Thk.	Dmn. STD	Material (Charpy)	Description
T.RED	02.000	24.000	M, M	B-16.9	ASTM A 234 GR.WPB (Charpy)	BW
REDUC. CONC	02.000	24.000	M, M	B-16.9	ASTM A 234 GR.WPB (Charpy)	BW
REDUC. ECC	02.000	24.000	M, M	B-16.9	ASTM A 234 GR.WPB (Charpy)	BW
SWAGE. CONC	00.500	03.000	M, M	BS-3799	ASTM A 105 (Charpy)	PBE
SWAGE.ECC	00.500	03.000	M, M	BS-3799	ASTM A 105	PBE
CAP	00.500	00.750		B-16.11	ASTM A 105	SCRF, 6000
CAP	01.000	01.500		B-16.11	ASTM A 105	SCRF, 3000
CAP	02.000	24.000	M	B-16.9	ASTM A 234 GR.WPB (Charpy)	BW
PLUG	00.500	00.750		B-16.11	ASTM A 105	SCRM, 6000
O'let						
WELDOLET	02.000	06.000	M, S160	MSS-SP97	ASTM A 105 (Charpy)	BW
SOCKOLET	00.500	00.750		MSS-SP97	ASTM A 105	SCRF, 6000
SOCKOLET	01.000	01.500		MSS-SP97	ASTM A 105	SW, 3000
VALVES GROUP						
VLV.GLOBE	00.250	01.500		BS EN 1SO 15761	BODY-ASTM A 105,TRIM-STELLITED,STEM-13%CR STEEL	SW, 800, 3000, B-16.11
VLV.GLOBE	02.000	24.000		BS-1873	BODY-ASTM A 216 GR.WCB,TRIM- 13% CR.STEEL	FLGD, 150, B-16.5, RF/125AARH
VLV.CHECK	00.250	01.500		BS EN 1SO 15761	BODY-ASTM A 105,TRIM-STELLITED	SW, 800, 3000, B-16.11

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

VLV.CHECK	02.000	24.000		API-6D	BODY-ASTM A 216 GR.WCB,TRIM- 13% CR.STEEL	FLGD, 150, B-16.5, RF/125AARH

Format: C261162-FMT-001_00
© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Item	Lower Size (Inch)	Upper Size (Inch)	Sch. / Thk.	Dmn. STD	Material (Charpy)	Description
VLV.BALL	00.500	01.500		BS EN 1SO 17292	BODY-ASTM A 105,TRIM-13% CR.STEEL, SEAT-RPTFE	SW, 800, B-16.11, RF/125AARH
VLV.BALL	02.000	24.000		API-6D	BODY-ASTM A216 GR.WCB,TRIM/BALL SEAT-(AISI 4140 + 0.003"ENP)/AISI 410	FLGD, 150, B-16.5, RF/125AARH
VLV.BALL	02.000	24.000		API-6D	BODY-ASTM A 216 GR.WCB, TRIM-BALL, SEAT-(AISI 4140 + 0.003"ENP) /AISI 410	BW, 150, B-16.25
VLV.PLUG	00.500	01.500		BS-5353	BODY-ASTM A 105,PLUG - A105 + 0.003" ENP	SW, 800, 3000, B-16.11,
VLV.PLUG	02.000	24.000		API-6D	BODY- A 216GR. WCB, PLUG: A216 GR.WCB + 0.003" ENP	FLGD, 150, B-16.5, RF/125AARH
VLV.PLUG	02.000	24.000	M	API-6D	BODY-ASTM A 216 GR.WCB, PLUG: A216 GR.WCB + 0.003"ENP	BW, 150, B-16.25
BOLT GROUP						
BOLT.STUD	00.500	48.000		B-18.2	BOLT:A193 GR.B7, NUT:A194 GR.2H	
GASKET GROUP						
GASKET	00.500	24.000		B-16.20-ANSI B16.5	SP.WND METTALIC WITH GRAPHITE FILLER	SPIRAL, 150
GASKET	26.000	48.000		B-16.20-ANSI B16.47A	SP.WND METTALIC WITH GRAPHITE FILLER	SPIRAL, 150

Note: For all Valves, valve data sheets shall also be referred, stringent requirement among data sheet and above details shall be followed.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

PIPE CLASS	**15HLT**
DESIGN CODE	ASME B31.8
RATING	150#
BASE MATERIAL	CARBON STEEL
CA	1.5 MM
SPECIAL REQUIREMENT	Low Temperature Service
SERVICE	Natural Gas, Utilities (water, inst. air, plant air, nitrogen, carbon dioxide)

Temperature (Deg. C) and Pressure (Kg/cm^{2}g) Ratings

Temperature	-45	38	93
Pressure	18.63	18.63	17.92

NOTES:

1. All vents and drains shall be provided with gate valve with blind flange assembly unless otherwise indicated in P&ID.
2. NDT of welds shall be as follows:

   Radiography : All butt welds 100%

   MPI : Socket welds 100%
3. Piping design as per ASME B 31.8, OISD 226 & PNGRB Guidelines
4. Charpy V notch test and hardness test shall be conducted for pipes, fittings and flanges at (-) 45°C.
5. All branch connections including vent, drain, pressure and temperature connection shall be as per branch connection table.
6. For valves, refer valve data sheets.

ITEM	SIZE	DESCRIPTION
Maintenance joints	ALL	Flanged, to be kept minimum
Pipe joints	1.5" & BELOW	SW coupling
	2.0" & ABOVE	Butt welded
Drains	ON LINES <= 1.5"	Refer std. Drawing
	ON LINES >= 2.0"	As per P&ID or 0.75". Refer std. Drawing
Vents	ON LINES <= 1.5"	Refer std. Drawing
	ON LINES >= 2.0"	As per P&ID or 0.75". Refer std Drawing

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Temp. Connection	1.5"	Flanged, installation as per std. Drawing, except skin temperature measurement.
Press. Connection	0.75"	SW nipple with Plug/ Ball Valve to spec. as per Refer std. Drawing

Branch Table

						T	**6**	**BRANCH PIPE (INCH**
					T	T	**4**	
				T	T	T	**3**	
			T	T	T	W	**2**	
		T	T	T	T	S	**1.5**	
	T	T	T	T	S	S	S	**1**
	T	T	T	T	S	S	S	**0.75**
T	T	T	T	S	S	S	S	**0.5**
0.5	**0.75**	**1**	**1.5**	**2**	**3**	**4**	**6**	
PIPE RUN Size (INCH)								

CODES	DESCRIPTION
T	Tees
W	Weldolet
S	Sockolet

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Item	Lower Size (Inch)	Upper Size (Inch)	Sch. / Thk.	Dmn. STD	Material (Charpy)	Description
PIPE GROUP						
PIPE	00.500	00.750	S160	B-36.10	ASTM A 333 GR.6	PE, SEAMLESS
PIPE	01.000	01.500	XS	B-36.10	ASTM A 333 GR.6	PE, SEAMLESS
PIPE	02.000	02.000	XS	B-36.10	ASTM A 333 GR.6	BE, SEAMLESS
PIPE	03.000	06.000	STD	B-36.10	ASTM A 333 GR.6	BE, SEAMLESS
NIPPLE	00.500	01.500	M	B-36.10	ASTM A 333 GR.6	PBE, SEAMLESS
FLANGE GROUP						
FLNG.WN	00.500	06.00	M	B-16.5	ASTM A 350 GR.LF2	150, RF/125AARH
FLNG.BLIND	00.500	06.00		B-16.5	ASTM A 350 GR.LF2	150, RF/125AARH
FLNG.FIG.8	00.500	06.00		ASME B16.48	ASTM A 350 GR.LF2	150, FF/ 125AARH
FITTING GROUP						
ELBOW.90	00.500	00.75		B-16.11	ASTM A 350 GR.LF2	SW, 6000
ELBOW.90	01.000	01.500		B-16.11	ASTM A 350 GR.LF2	SW, 3000
ELBOW.90	02.000	6.000	M	B-16.9	ASTM A 420 GR.WPL6	BW, 1.5D
ELBOW.45	00.500	00.75		B-16.11	ASTM A 350 GR.LF2	SW, 6000
ELBOW.45	01.000	01.500		B-16.11	ASTM A 350 GR.LF2	SW, 3000
ELBOW.45	02.000	6.000	M	B-16.9	ASTM A 420 GR.WPL6	BW, 1.5D
T.EQUAL	00.500	00.75		B-16.11	ASTM A 350 GR.LF2	SW, 6000

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Item	Lower Size (Inch)	Upper Size (Inch)	Sch. / Thk.	Dmn. STD	Material (Charpy)	Description
T.EQUAL	01.000	01.500		B-16.11	ASTM A 350 GR.LF2	SW, 3000
T.EQUAL	02.000	06.000	M	B-16.9	ASTM A 420 GR.WPL6	BW
T.RED	00.500	00.75		B-16.11	ASTM A 350 GR.LF2	SW, 6000
T.RED	01.000	01.500		B-16.11	ASTM A 350 GR.LF2	SW, 3000
T.RED	02.000	06.000	M, M	B-16.9	ASTM A 420 GR.WPL6	BW
REDUC. CONC	02.000	06.000	M, M	B-16.9	ASTM A 420 GR.WPL6	BW
REDUC. ECC	02.000	06.000	M, M	B-16.9	ASTM A 420 GR.WPL6	BW
SWAGE. CONC	00.500	03.000	M, M	BS-3799	ASTM A 350 GR.LF2	PBE
SWAGE.ECC	00.500	03.000	M, M	BS-3799	ASTM A 350 GR.LF2	PBE
CAP	00.500	01.500		B-16.11	ASTM A 350 GR.LF2	SCRF, 3000
CAP	02.000	06.000	M	B-16.9	ASTM A 420 GR.WPL6	BW
PLUG	00.500	01.500		B-16.11	ASTM A 350 GR.LF2	SCRM, 3000
COUPLING FULL	00.500	00.75		B-16.11	ASTM A 350 GR.LF2	SW, 6000
COUPLING FULL	01.000	01.500		B-16.11	ASTM A 350 GR.LF2	SW, 3000
COUPLING HALF	00.500	00.75		B-16.11	ASTM A 350 GR.LF2	SW, 6000
COUPLING HALF	01.000	01.500		B-16.11	ASTM A 350 GR.LF2	SW, 3000

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Item	Lower Size (Inch)	Upper Size (Inch)	Sch. / Thk.	Dmn. STD	Material (Charpy)	Description
O'let						
WELDOLET	02.000	06.000	M, XXS	MSS-SP97	ASTM A 350 GR.LF2	BW
SOCKOLET	00.500	00.750		MSS-SP97	ASTM A 350 GR.LF2	SW, 6000
SOCKOLET	01.000	01.500		MSS-SP97	ASTM A 350 GR.LF2	SW, 3000
VALVES GROUP						
VLV.GLOBE	00.50	01.500		BS EN 1SO 15761	BODY-ASTM A 350 GR.LF2,TRIMSTELLITED, STEMSS304	SW, 800, 3000, B-16.11
VLV.GLOBE	02.000	06.000		BS-1873	BODY-ASTM A 350 GR.LF2,/ ASTM A 352 GR.LCB	FLGD, 150, B-16.5, RF/125AARH
VLV.CHECK	00.50	01.500		BS EN 1SO 15761	BODY-ASTM A 350 GR.LF2,	SW, 800, 3000, B-16.11
VLV.CHECK	02.000	06.000		API-6D/BS-1868	BODY-ASTM A 350 GR.LF2,/ ASTM A 352 GR.LCB TRIM-STELLITED	FLGD, 150, B-16.5, RF/125AARH
VLV.BALL	00.500	01.500		BS EN 1SO 17292	BODY-ASTM A352 GR.LCB / ASTM A350 GR.LF2 CL.1,TRIM-BODY SEAT-RPTFE	SW, 800, 3000, B-16.11
VLV.BALL	02.000	06.000		API-6D	BODY-ASTM A352 GR.LCB / ASTM A350 GR.LF2 CL.1,	FLGD, 150, B-16.5, RF/125AARH
VLV.BALL	02.000	06.000		API-6D	BODY-ASTM A352 GR.LCB / ASTM A350 GR.LF2 CL.1,	BW, 150, B-16.25

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

BOLT GROUP						
BOLT.STUD	00.500	6.000		B-18.2	BOLT:A320 GR.L7, NUT:A194 GR.4	
GASKET GROUP						
GASKET	00.500	6.000		B-16.20-ANSI B16.5	SP.WND SS316+ GRAFOIL	SPIRAL, 150

Note: For all Valves, valve data sheets shall also be referred, stringent requirement among data sheet and above details shall be followed.

© Copy Right VCS Quality Services Pvt. Ltd. All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY	DATA SHEET : BALL VALVE (LESS THAN 2.0 INCH) SOCKET WELDED/THREADED (PIPING CLASS -15HC)		
PMC	**VCS QUALITY SERVICES PVT. LTD.**		
GENERAL SPECIFICATION			
Process Fluid	NG	**ANSI Pressure Rating**	800#
Design Temperature	(-)29°C to 65°C	**Design Pressure**	19 bar
Size, Inch (DN)	Less than 2" (50)		
Valve Type	Full Bore, Floating Ball		
End Connection Type	Socket Welded	**Design Standard**	BS EN ISO 17292
Face Finish	Not Applicable	**Locking Arrangement**	As per P&ID
VALVE DESIGN CONDITIONS			
Corrosion Allowance	1.5 mm	**Design Factor**	0.5
Installation	Above Ground	**Stem Ext Length (mm)**	Not Applicable
VALVE OPERATION			
Actuation Type	Not Applicable	**Type of Actuator**	Not Applicable
PUP PIECE DETAILS			
100mm extension pups in ASTM A106 Gr.B, Sch 160 (for 3/4") and Sch XS (for 1 1/2") in case of Socket weld			

VALVE MATERIAL SPECIFICATION

PART DESCRIPTION	MATERIAL SPECIFIED	MATERIAL OFFERED (Equivalent or Higher)
Body	ASTM A105	
Ball	13% Cr Steel	
Body Seat	RPTFE/ DELRIN	
Gland	13% Cr Steel	
Stem (No Casting)	13% Cr Steel	
Body Seal	Grafoil	
Stem Seal	Grafoil	
Body Studs/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

TESTING REQUIREMENT		
Hydrostatic Test Pressure & Time	Body: 205.94 barg & 30 Minutes	Seat: 152 barg & 30 Minutes
Pneumatic Test Pressure & Time	5.49 - 6.86 barg & 15 Minutes	
Hardness Test	248 HV10 max.	
Charpy Impact Test @ Temperature	Yes (at -29°C)	
Anti-Static Testing Requirement	As per BS EN ISO 17292	
Fire Safe Test	API 607 / API 6FA	

DOCUMENT NO.							
C261162-00-PP-DS-2001A							
		C1	**05.04.2026**	**AS**	**PA**	**DK**	**ISSUED FOR BID**
SHEET NO.	**1 OF 2**	**REV**	**DATE**	**PRPD**	**CHKD**	**APVD**	**REMARKS**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY	**DATA SHEET : BALL VALVE (LESS THAN 2.0 INCH) SOCKET WELDED (PIPING CLASS -15HC)=C1**
PMC	**VCS QUALITY SERVICES PVT. LTD.**

Valve Painting Specification :	
1	Surface Preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
2	For above ground installation - Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shalll be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.
3	Lock open/ lock close requirement : **As indicated in P&ID / Schedule of Rates (SOR).**
NOTES :	
1	This Data Sheet shall be read in conjunction with Tender Documents & Specifications.
2	Material test certificates and hydrostatic test reports shall be furnished prior to dispatch.
3	Gland Packing Assembly shall permit repair of gland packing under full line pressure.
4	Detailed dimensional drawings showing cross-section with part numbers and materials shall be submitted for purchaser's approval prior to manufacture of the valves.
5	All valves shall be provided with valve position indicator.
6	Separate wrench shall be provided with each wrench operated valve.
7	Stops shall be provided to ensure positive alignment of ball with ports and ensure proper installation of handle.
8	The Charpy Impact Test temperature specified in datasheet shall supersede the specification requirements.
9	Painting procedure of valves shall be as per Manufacturer's standard.
10	All tests shall be as per BS EN 12266.
11	Inspection and Testing shall be as per attached QAP, this datasheet, BS EN 12266, other relevant standards.
12	Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.

DOCUMENT NO.							
FALSE							
		C1	**05.04.2026**	**AS**	**PA**	**DK**	**ISSUED FOR BID**
SHEET NO.	**2 OF 2**	**REV**	**DATE**	**PRPD**	**CHKD**	**APVD**	**REMARKS**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality

DATA SHEET OF FE/BW, ABOVEGROUND, MANUAL BALL VALVE DN 50 (NPS 2" "), RATING 150# , PIPING CLASS - 15HC, SPLIT /WELDED BODY DESIGN

DOC. NO.: C261162-PP-DS-2001A

No. of Pages : 02

Revision	
C1	
05.04.2026	

Location		**-**		**MR No.**	**-**
Sr. No.		**-**		**P.O No.**	**#**
1	GENERAL	Valve Manufacturer			
2		Tag Numbers / Material Requisition Item No.		**Refer Material Requistion (MR) Item No / As per P&ID**	
3		Company's Specification No.		**VCS-SS-PP-2004**	
4		Category		**Station Piping Ball Valve**	
5		Pipeline Line No		**Not Required**	
6		Class		**15HC**	
7	DESIGN AND TEST REQUIREMENTS	Size		**DN 50 (NPS 2")**	
8		Type of Valve		**Trunnion Mounted, Double Block and Bleed, Antistatic, Vent Drain/ Flush Connection with Anti Blowout Stem, Split Body Design/ Fully Welded Body Design as specified in MR, Tight Shut Off (As Applicable)**	
9		Type of Port (Full/ Reduced)		**As per P&ID**	
10		Design Temperature (ºC)	Maximum	**65**	
11			Minimum	**-29**	
12		Corrosion Allowance (mm)		**1.5**	
13		Installation (Aboveground/Underground)		**AboveGround**	
14		Service		**Natural Gas (NG)**	
15		End Connection		**As per P&ID**	
16		Flange Face Finish		**RF/125AARH for Flanged Ends (As applicable)**	
17		Design Standards		**API 6D**	
18		End Connection Standard		**ANSI B16.5 for Flanged Ends (As applicable)/ ANSI 16.25 for Butt Welded Ends (As applicable)**	
19		ASME Class		**150#**	
20		Stem Extension Requirement (If required, Note - 20)		**Not Required**	
21		Length of Stem Extension		**Not Applicable**	
22		Orientation of Stem		**Perpendicular to Valve axis**	
23		Type of Valve Operator		**DN ≤ 100 mm (4") - Wrench / Lever - Pull Force 350N max. DN ≥ 150 mm (6") - Gear Operated**	
24		Valve Actuator Operating Time		**Not Applicable**	
25		Requirement of Locking Mechanism (LO / LC)		**As per P&ID**	
26		Length of Pup Piece / Nipple (mm), (If Required) (Note-16) (Integrally welded to the BW valve on each side)		**Required for Welded End Valves, as per Standard Valve Specification**	
27		Pup Piece Size / Material Grade / Schdeule/ Thickness (Note-16)		**As per Piping Material Specification**	
28		Operator Specification No.		**Not Applicable**	
29		Valve Design Pressure (kg/cm^2)		**19 kg/cm^2**	
30		Hydrostatic Test Pressure (kg/cm^2) & Time		**Body : 28.5 kg/cm^2 & Test Duration - 30 Minutes**	**Seat : 21 kg/cm^2 & Test Duration 30 Minutes**
31		Pneumatic Test Pressure (kg/cm^2) & Time		**7.0 kg/cm^2 & Test Duration - 15 Minutes**	
32		Charpy Impact Test (º C)		**Yes (at -29 °C)**	
33		Fire Safe Design (Note-24)		**API 6FA / ISO10497**	
34		Anti Static Testing Requirement		**As per API 6D Latest Edition**	
35		Hardness Test		**248 HV10 max**	
36		Painting (Note-21)		**As per specification (Suitable for Highly Corrosive Environment) Note-21**	
37		Operator Data Sheet No.		**Not Applicable**	
38	PROCESS DATA (Applicable for Actuator)	Flow (Min/Nor/Max) (m^3/hr)		**Not Applicable**	
39		Pressure (Min/Nor/Max) (barg)		**Not Applicable**	
40		Temperature (Min/Nor/Max) (º C)		**Not Applicable**	
41		Max Shutoff DP (barg)		**Not Applicable**	
42		Viscosity (cP)		**Not Applicable**	
43		Density (Kg/m^3)		**Not Applicable**	
44		Mol . Wt		**Not Applicable**	
45		Sp Heat Ratio (Cp/Cv)		**Not Applicable**	
46		Compressibility (Z)		**Not Applicable**	
47		Ambient Temperature		**Not Applicable**	
48	CONNECTING PIPE DETAIL	Outside Diameter (Inch)		**DN 50 (NPS 2")**	
49		Thickness (mm) / Schedule		**As per Piping Material Specification**	
50		Pipe Material		**As per Piping Material Specification**	
51		Design Code		**ASME B31.8**	
52		ASME Rating		**150#**	
53		Piping Class		**15HC**	
54		Orientation of Pipe		**Suitable for all orientation**	

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality

DATA SHEET OF FE/BW, ABOVEGROUND, MANUAL BALL VALVE DN 50 (NPS 2" "), RATING 150# , PIPING CLASS - 15HC, SPLIT /WELDED BODY DESIGN

DOC. NO.: C261162-PP-DS-2001A

No. of Pages : 02

Revision	
C1	
05.04.2026	

Location	-	**MR No.**	-
Sr. No.	-	**P.O No.**	#

		Part Description	Material Specified	Material Offered (By Bidder)
55	VALVE MATERIAL			
56		Body	**ASTM A216 GR. WCB/ASTM 105**	
57		Ball (Single Piece, Solid Construction)	**SS-304 / SS-316 (Solid) OR (ASTM A105/ ASTM A216 Gr. WCB) + 75 micron ENP**	
58		Seat Rings (No Casting)	**(AISI 4140 +75 micron ENP)/ AISI 410/ SS 304/ SS 316**	
59		Seat Seal	**Primary Devlon V/ PEEK/ Viton with Secondary Metal to Metal**	
60		Stem (No Casting)	**(AISI 4140 +75 micron ENP)/ AISI 410 / SS 304 / SS 316**	
61		Stem Seal	**GRAFOIL / R-PTFE**	
62		Body Seal	**GRAFOIL / R-PTFE**	
63		Gland	**13% Cr. Steel/ SS 316 / SS 304 / ASTM A105**	
64		Stud Bolts/Nut	**ASTM A 193 Gr. B7/ ASTM A 194 Gr. 2H**	
65		Handle / Lever / Hand Wheel	**Carbon Steel**	

66	DATA TO BE PROVIDE BY VENDOR (if Applicable)	Valve Model No.		*
67		Flow Coefficient, Kv (Cubic Meters per Hour)		*
68		Valve Cavity Volume(CC)	Open position	*
69			Closed position	*
70		Operator Manufacturer / Model No.		*
71		Break-away Torque Under Max. Diff Pressure(Nm)		*
72		Running Torque (Open - Close/Close - Open) (Nm)		*

73	NOTES	**NOTES:**
74		1. Bidder to submit in offer, Soft Seal details and type, grade & class selected with manufacturer's recommendation like Pressure-Temperature Curve/Table for not to damage the soft seal during welding of valve ends at site.
75		2. This Data Sheet shall be read in conjunction with Material Requisition, Piping Material Specification, valve Specification & other Tender Documents.
76		3. Dimension / Input Data as & where marked " * " shall be supplied by Vendor.
77		4. Manufacturer shall have valid API 6D license to use API monogram. API monogram is required.
78		5. Valve design shall ensure repair of stem seals / packing under full line pressure.
79		6. 100.0 % Valve castings shall undergo Radiographic Examination.
80		7. Valves shall have support foot & lifting lugs as per valve Specification.
81		8. Valve design shall ensure repair of stem seals / packing under full line pressure.
82		9. Wrench operated valves shall be supplied with wrench.
83		10. The Charpy Impact temperature shall be -29°C as specified in data sheet and it shall superceded the Specification (VCS-SS-PP-2004) requirement at 0°C
84		11. A supplementary air seat test as per API 6D (Annex I, Para I.9 Type II) shall be carried out for all valves. A bubble tight seal is required without the use of any sealant. No leakage is allowed. Test pressure shall be held for at least 15 minutes.
85		12. Design of weld end valves shall be such that during field welding operations, the soft seals or plastic components of the valve (where ever used) is not liable to be damaged. The manufacture shall furnish necessary field welding instructions and post-weld test procedure to demonstrate integrity and leak-tightness of valves after field welding operations.
86		13. Gear operators, when provided, shall have a self-locking provision and shall be fully encased in water proof/ splash proof enclosure and shall be filled with suitable grease
87		14. For the manual operator of all valves, the diameter of the hand wheel or the length of operating wrench shall be such that under the maximum differential pressure, the total force required to operate the valve does not exceed 350N.
88		15. Manufacturer shall also indicate the number of turns of hand wheel in case of gear operators (along with their offer) required for Operating the valve from full open to full close position. The numbers of turn shall not exceed 250 for valves sizes up to 24" and 450 for valve size above 24".
89		16. Adequacy for Length of pup piece/ Nipple shall be confirmed by manufacturer so as to avoid damage to seats during field welding or post weld heat treatment.These nipples shall be welded to the valve body by the manufacturer before fitting the packings, seats & seals.
90		17. Name plate material shall be minimum stainless steel. Marking shall be as per MSS-SP-25
91		18. Valve body & other pressure containing parts shall be designed as per ASME Sec-VIII Div-I. Minimum thickness shall not be less than ASME B16.34.
92		19. For tag No./ Fluid Data/ Operating Data refer Process Document , P&IDs
93		20. Stem extension length shall be finalized during drawing approval stage after award of order.
94		21.For the valves to be installed underground the external surfaces of buried portion of the valve shall be painted with 100% Solid high build epoxy(Powercrete R-95) with a minimum dry film thickness of 1000 microns or 1.5 mm thick polyurethane coating
95		22. Bidder shall clearly write all / any deviation against each part material of valve in the space provided for. Wherever bidder agrees with company's spec bidder shall indicate "agreed". Flanges of flanged end cast/ forged body shall be integrally cast/ forged with the body of valve.
96		23. All Elastomereric material used for pressure tight sealing or drip sealing shall be of anti Explosive Decompression type and must be certified according to testing Procedures. Manufacturer shall submit test certificate confirming conformance with Anti Explosive Decompression. Manufacturer shall confirm the suitability of soft sealing and seating material for the pressure and temperature & service mentioned above in this data sheet.
97		24. Not only during commissioning, but also during life cycle of all valves, sediments/corrosion deposits/ silica/ mill scale of less than 40 mesh percent in process fluid have to be tolerated by all valves with malfunctioning.
98		24.Fire Safe test certificate qualifying the valves as per API 6FA/ API 607/ ISO 10497 carried out in last 10 years shall be furnished.
99		25. Flanges of flanged end cast/ forged body shall be integrally cast/ forged with the body of valve.Vendor to guarantee the suitability of seat/ seal material for the given service condition
100		26. Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.
101		27. Cyclic test is required. The valve shall be subjected to at least 200 open close cycle with maximum differential pressure corresponding to valve rating.
102		28. Stem seal / body seal, gland packing materials shall be provided with corrosion inhibitor.
103		29. Vendor to guarantee the suitability of seat/ seal material for the given service condition

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY	**DATA SHEET : BALL VALVE (LESS THAN 2.0 INCH) FLANGE END (PIPING CLASS - 15HC, 150#)**
PMC	**VCS QUALITY SERVICES PVT. LTD.**

GENERAL SPECIFICATION			
Process Fluid	NG	**ANSI Pressure Rating**	150#
Design Temperature	(-)29 ºC to 65 ºC	**Design Pressure**	19 bar
Size, Inch (DN)	Less than 2" (50)		
Valve Type	Full Bore / Reduced Bore, Floating Ball		
End Connection Type	Flange End	**Design Standard**	BS EN ISO 17292
Face Finish	ASME B16.5, 150#,RF/125AARH	**Locking Arrangement**	As per P&ID
Material Requisition Item No.			

VALVE DESIGN CONDITIONS			
Corrosion Allowance	1.5 mm	**Design Factor**	0.5
Installation	Above Ground	**Stem Ext Length (mm)**	Not Applicable

VALVE OPERATION			
Actuation Type	Not Applicable	**Type of Actuator**	Not Applicable

PUP PIECE DETAILS
Not Applicable

VALVE MATERIAL SPECIFICATION		
PART DESCRIPTION	**MATERIAL SPECIFIED**	**MATERIAL OFFERED (Equivalent or Higher)**
Body	ASTM A105	
Ball	13% Cr Steel	
Body Seat	RPTFE/ DELRIN	
Gland	13% Cr Steel	
Stem (No Casting)	13% Cr Steel	
Body Seal	Grafoil	
Stem Seal	Grafoil	
Body Studs/ Nuts	ASTM A193 Gr. B7/ A194 Gr. 2H	

TESTING REQUIREMENT		
Hydrostatic Test Pressure & Time	Body: 28.5 bar & 30 Minutes	Seat: 21 bar & 30 Minutes
Pneumatic Test Pressure & Time	7 bar & 15 Minutes	
Hardness Test	248 HV10 max.	
Charpy Impact Test @ Temperature	Yes (at -29 ºC)	
Anti-Static Testing Requirement	As per BS EN ISO 17292	
Fire Safe Test	API 607 / API 6FA	

DOCUMENT NO.							
C261162-00-PP-DS-2001B							
		C1	**05.04.2026**	**AS**	**PA**	**DK**	**ISSUED FOR CLIENT REVIEW**
SHEET NO.	**1 OF 2**	**REV**	**DATE**	**PRPD**	**CHKD**	**APVD**	**REMARKS**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

DATA SHEET : BALL VALVE (LESS THAN 2.0 INCH) FLANGE END (PIPING CLASS - 15HC)

PMC	**VCS QUALITY SERVICES PVT. LTD.**

Valve Painting Specification :

1	Surface Preparation by Short Blasting as per grade SA 2 1/2, Swedish Standard SIS-055 909.
2	For above ground installation - Three coats of corrosion resistant paint shall be applied with minimum thickness of 300 micron (Permissible thickness in each coat shalll be within 80 to 120 micron). Colour of paint shade shall be RAL-7038, however any change in colour shall be finalized during drawing approval stage.
3	Lock open/ lock close requirement : **As indicated in P&ID / Schedule of Rates (SOR).**

NOTES :

1	This Data Sheet shall be read in conjunction with Tender Documents & Specifications.
2	Material test certificates and hydrostatic test reports shall be furnished prior to dispatch.
3	Gland Packing Assembly shall permit repair of gland packing under full line pressure.
4	Detailed dimensional drawings showing cross-section with part numbers and materials shall be submitted for purchaser's approval prior to manufacture of the valves.
5	All valves shall be provided with valve position indicator.
6	Separate wrench shall be provided with each wrench operated valve.
7	Stops shall be provided to ensure positive alignment of ball with ports and ensure proper installation of handle.
8	The Charpy Impact Test temperature specified in datasheet shall supersede the specification requirements.
9	Painting procedure of valves shall be as per Manufacturer's standard.
10	All tests shall be as per BS EN 12266.
11	Inspection and Testing shall be as per attached QAP, this datasheet, BS EN 12266, other relevant standards.
12	Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.

DOCUMENT NO.							
C261162-00-PP-DS-2001B							
		C1	**05.04.2026**	**AS**	**PA**	**DK**	**ISSUED FOR CLIENT REVIEW**
SHEET NO.	**2 OF 2**	**REV**	**DATE**	**PRPD**	**CHKD**	**APVD**	**REMARKS**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

DATA SHEET OF FLANGED / BW, ABOVEGROUND, GLOBE VALVE DN 50 (NPS 2"), RATING 150#, PIPING CLASS - 15HC

DOC. NO.: C261162-PP-DS-2002D		
No. of Pages : 02	Revision	
	C1	
	05.04.2026	

Location			**-**	**MR No.**	**-**
SR.NO			**-**	**P.O No.**	**#**
1	GENERAL	Valve Manufacturer			
2		Tag Numbers / Material Requisition Item No.		**Refer Material Requistion (MR) Item No / As per P&ID**	
3		Company's Specification No.		**VCS-SS-PP-2504**	
4		Category		**-**	
5		Pipeline Line No		**Not Required**	
6		Class		**15HC**	
7	DESIGN AND TEST REQUIREMENTS	Size		**DN 50 (NPS 2")**	
8		Type of Valve		**Rising Stem, Plug type disc, OS & Y , Straight Pattern**	
9		Type of Port (Full / Reduced)		**Not Applicable**	
10		Design Temperature (º C)	Maximum	**65**	
11			Minimum	**-29**	
12		Corrosion Allowance (mm)		**1.5**	
13		Installation (Aboveground/Underground)		**Aboveground**	
14		Service		**Natural Gas (NG)**	
15		End Connection		**As per P&ID**	
16		Flange Face Finish		**RF/125AARH for Flanged Ends**	
17		Design Standards		**BS 1873, ASME 16.34 & API 598**	
18		End Connection Standard		**ASME B16.5 - Flanged End ASME B16.25 - Butt Welded End**	
19		ASME Class		**150#**	
20		Stem Extension Requirement		**Not Required**	
21		Length of Stem Extension (If required, Note - 15)		**Not Applicable**	
22		Orientation of Stem		**Perpendicular to Valve Axis**	
23		Type of Valve Operator		**As per Standard Specification**	
24		Valve Actuator Operating Time		**Not Applicable**	
25		Requirement of Locking Mechanism (LO / LC)		**As per P&ID**	
26		Length of Pup Piece / Nipple (mm), (If Required) (Integrally welded to the BW valve on each side)		**Not Applicable**	
27		Pup Piece Size / Material Grade / Schdeule/ Thickness		**Not Applicable**	
28		Operator Specification No.		**Not Applicable**	
29		Valve Design Pressure (kg/cm^2)		**19 (kg/cm^2)**	
30		Hydrostatic Test Pressure (kg/cm^2) & Time		**Body : 28.5 kg/cm^2 & Test Duration - 30 Minutes**	**Body : 21 kg/cm^2 & Test Duration - 30 Minutes**
31		Pneumatic Test Pressure (kg/cm^2) & Time		**7.0 kg/cm^2 & Test Duration - 15 Minutes**	
32		Charpy Impact Test (ºC)		**Yes (at -29 °C)**	
33		Fire Safe Design (Note- 16 & 17)		**API 6FA / ISO10497**	
34		Anti Static Testing Requirement		**As per BS-1873 Latest Edition**	
35		Hardness Test		**248 HV10 max**	
36		Painting (Note-14)		**As per specification (Suitable for Highly Corrosive Environment)**	
37		Operator Data Sheet No.		**Not Applicable**	
38	PROCESS DATA (Applicable for Actuator)	Flow (Min/Nor/Max) (m^3/hr)		**Not Applicable**	
39		Pressure (Min/Nor/Max) (barg)		**Not Applicable**	
40		Temperature (Min/Nor/Max) (º C)		**Not Applicable**	
41		Max Shutoff DP (barg)		**Not Applicable**	
42		Viscosity (cP)		**Not Applicable**	
43		Density (Kg/m^3)		**Not Applicable**	
44		Mol . Wt		**Not Applicable**	
45		Sp Heat Ratio (Cp/Cv)		**Not Applicable**	
46		Compressibility (Z)		**Not Applicable**	
47		Ambient Temperature		**Not Applicable**	
48	CONNECTING PIPE DETAIL	Outside Diameter (Inch)		**DN 50 (NPS 2")**	
49		Thickness (mm) / Schedule		**As per Piping Material Specification**	
50		Pipe Material		**As per Piping Material Specification**	
51		Design Code		**ASME B31.8**	
52		ASME Rating		**150#**	
53		Piping Class		**15HC**	
54		Orientation of Pipe		**Suitable for all orientation**	

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

DATA SHEET OF FLANGED / BW, ABOVEGROUND, GLOBE VALVE DN 50 (NPS 2"), RATING 150#, PIPING CLASS - 15HC

DOC. NO.: C261162-PP-DS-2002D

No. of Pages : 02	Revision	
	C1	
	05.04.2026	

Location	-	**MR No.**	-
SR.NO	-	**P.O No.**	#

		Part Description	Material Specified	Material Offered (By Bidder)
55	VALVE MATERIAL			
56		Body (Forged / Cast)	**ASTM A216 GR. WCB/ASTM 105**	
57		Bonnet (Pressure Seal Type)	**ASTM A216 GR. WCB/ASTM 105**	
58		Disc (Plug Type)	**Hard faced (Trim 5), Loose Plug, Conical**	
59		Stem (Rising)	**SS - 304 / SS - 316 (NO CASTING)**	
60		Body Seat Ring	**STELLITED-6**	
61		Gland / Stem Packing	**Corrosion inhibited die formed flexible graphite with braided anti-extrusion ring (Renewable with valve open on stream)**	
62		Bonnet Gasket	**Soft Iron (Max 90 BHN)/ Graphite with Braided Anti ExtrusionRing**	
63		Body Stud	**ASTM A 193 Gr. B7**	
64		Body Nut	**ASTM A 194 Gr. 2H**	
65		Handle / Lever / Hand Wheel	**Carbon Steel**	

66	DATA TO BE PROVIDE BY VENDOR (if Applicable)	Valve Model No.		*
67		Flow Coefficient, Kv (Cubic Meters per Hour)		*
68		Valve Cavity Volume(CC)	Open position	*
69			Closed position	*
70		Operator Manufacturer / Model No.		*
71		Break-away Torque Under Max. Diff Pressure(Nm)		*
72		Running Torque (Open - Close/Close - Open) (Nm)		*

73	NOTES	**NOTES:**
74		1. This Data Sheet shall be read in conjunction with Tender Documents & Specifications.
75		2. Dimension / Input Data as & where marked " * " shall be supplied by Vendor.
76		3.All tests shall be carried out as per BS 1873 & BSEN 12266 part-1.
77		4. Gland packing assembly shall permit repair of gland packing under full line pressure.
78		5. Valve design shall ensure repair of stem seals / packing under full line pressure.
79		6. 100.0 % Valve castings shall undergo Radiographic Examination.
80		7. Valves shall have support foot & lifting lugs as per valve Specification.
81		8. Valve design shall ensure repair of stem seals / packing under full line pressure.
82		9. Wrench operated valves shall be supplied with wrench.
83		10. The Charpy Impact temperature shall be -29°C as specified in data sheet and it shall superceded the Specification (VCS-SS-PP-2504) requirement at 0°C
84		11. Design of Welded Valves shall be such that during field welding operation, the soft or plastic components of valve are not liable to be damages.
85		12. Gasket Material Graphite Shall Be Provided With Corrosion Inhibitor.
86		13. Valve wall thickness shall be as per ANSI B16.34 / API 623. Manufacturer shall have valid API 623 license to use API monogram. API monogram is required.
87		14 .For the valves to be installed underground the external surfaces of buried portion of the valve shall be painted with 100% Solid high build epoxy (Powercrete R-95) with a minimum dry film thickness of 1000 microns or 1.5 mm thick polyurethane coating
88		15. Stem extension length shall be finalized during drawing approval stage after award of order.
89		16. For Metal Seated Valves, Bidder to Confirm that in offered valves, there shall not be any external leakage during fire and valve is capable of handling fire for the mentioned time as specified in API 6FA/ ISO 10497/API 6FD. Bidder also to confirm that in case of fire, the valve shall be unseated from the closed position against the high test pressure and moved to the fully open position i.e. In case of fire, valve shall complete one open-close cycle. For Soft Seated Valves, Bidder to carry out Fire Safe Design & test as per API 6FA/ ISO 10497/API 6FD.
90		17. The offered valve shall deemed to have been fire-tested if vendor submit Fire Test Certificate (Approved & Certified by Governing TPIA) of earlier tested valve of similar design & size.(Qualification Size as per API 6FA/ ISO 10497/API 6FD Codes)
91		18. Minimum all pressure containing and controlling parts of the valve shall be provided with EN 10204-3.2 certificate.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

DATA SHEET OF FE/BW, CHECK VALVE, DN 50 (NPS 2"), RATING 150# , PIPING CLASS - 15HC,

DOC. NO.: C261162-PP-DS-2004

No. of Pages : 02	Revision	
	C1	
	05.04.2026	

Location			**-**	**MR No.**	**-**
SR.NO			**-**	**P.O No.**	**#**
1	GENERAL	Valve Manufacturer			
2		Tag Numbers / Material Requisition Item No.		**Refer Material Requistion (MR) Item No**	
3		Company's Specification No.		**VCS-SS-PP-2006**	
4		Category		**-**	
5		Pipeline Line No		**Not Required**	
6		Class		**15HC**	
7	DESIGN AND TEST REQUIREMENTS	Size		**DN 50 (NPS 2")**	
8		Type of Valve		**Swing Type**	
9		Type of Port (Full / Reduced)		**Not Applicable**	
10		Design Temperature (º C)	Maximum	**65**	
11			Minimum	**-29**	
12		Corrosion Allowance (mm)		**1.5**	
13		Installation (Aboveground/Underground)		**Aboveground**	
14		Service		**Natural Gas (NG)**	
15		End Connection		**ANSI B16.5 for Flanged Ends (As applicable)/ ANSI 16.25 for Butt Welded Ends (As applicable)**	
16		Flange Face Finish		**RF/125AARH for Flanged Ends (As applicable)**	
17		Design Standards		**API 6D**	
18		End Connection Standard		**ANSI B16.5 for Flanged Ends (As applicable)**	
19		ASME Class		**150#**	
20		Stem Extension Requirement		**Not Applicable**	
21		Length of Stem Extension		**Not Applicable**	
22		Orientation of Stem		**Not Applicable**	
23		Type of Valve Operator		**As per Standard Specification**	
24		Valve Actuator Operating Time		**Not Applicable**	
25		Requirement of Locking Mechanism (LO / LC)		**Not Applicable**	
26		Length of Pup Piece / Nipple (mm), (If Required) (Note-16) (Integrally welded to the BW valve on each side)		**Not Applicable**	
27		Pup Piece Size / Material Grade / Schdeule/ Thickness (Note-16)		**Not Applicable**	
28		Operator Specification No.		**Not Applicable**	
29		Valve Design Pressure (barg)		**19 kg/cm^2**	
30		Hydrostatic Test Pressure (barg) & Time		**Body : 28.5 kg/cm^2 & Test Duration - 30 Minutes**	**Seat : 21 kg/cm^2 & Test Duration 30 Minutes**
31		Pneumatic Test Pressure (barg) & Time		**7.0 kg/cm^2 & Test Duration - 15 Minutes**	
32		Charpy Impact Test (º C)		**Yes (at -29 °C)**	
33		Fire Safe Design (Note-24)		**API 6FA / ISO10497**	
34		Anti Static Testing Requirement		**As per API 6D Latest Edition**	
35		Hardness Test		**248 HV10 max**	
36		Painting (Note-17)		**As per specification (Suitable for Highly Corrosive Environment)**	
37		Operator Data Sheet No.		**Not Applicable**	
38	PROCESS DATA (Applicable for Actuator)	Flow (Min/Nor/Max) (m^3/hr)		**Not Applicable**	
39		Pressure (Min/Nor/Max) (barg)		**Not Applicable**	
40		Temperature (Min/Nor/Max) (º C)		**Not Applicable**	
41		Max Shutoff DP (barg)		**Not Applicable**	
42		Viscosity (cP)		**Not Applicable**	
43		Density (Kg/m^3)		**Not Applicable**	
44		Mol . Wt		**Not Applicable**	
45		Sp Heat Ratio (Cp/Cv)		**Not Applicable**	
46		Compressibility (Z)		**Not Applicable**	
47		Ambient Temperature		**Not Applicable**	
48	CONNECTING PIPE DETAIL	Outside Diameter (Inch)		**Size 2"**	
49		Thickness (mm) / Schedule		**As per Piping Material Specification**	
50		Pipe Material		**As per Piping Material Specification**	
51		Design Code		**ASME B31.8**	
52		ASME Rating		**150#**	
53		Piping Class		**15HC**	
54		Orientation of Pipe		**Suitable for all orientation**	

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

DATA SHEET OF FE/BW, CHECK VALVE, DN 50 (NPS 2"), RATING 150# , PIPING CLASS - 15HC,

DOC. NO.: C261162-PP-DS-2004

No. of Pages : 02	Revision	
	C1	
	05.04.2026	

Location	-	MR No.	-
SR.NO	-	P.O No.	#

		Part Description	Material Specified	Material Offered (By Bidder)
55	VALVE MATERIAL			
56		Body	**ASTM A216 Gr.WCB/ ASTM A105**	
57		Cover	**ASTM A216 Gr.WCB/ ASTM A105**	
58		Disc	**STELLITED-6**	
59		Seat Ring	**STELLITED-6**	
60		Disc Hinge	**SS 304 / SS 316**	
61		Hinge Pin	**SS 304 / SS 316 (NO CASTING)**	
62		Body Stud	**ASTM A320 GR.L4**	
63		Body Nut	**ASTM A194 GR.4/ GR.7**	
66		Cover Gasket	**SP WIND SS316 - CA FILLER**	

67	DATA TO BE PROVIDE BY VENDOR (if Applicable)	Valve Model No.		*
68		Flow Coefficient, Kv (Cubic Meters per Hour)		*
69		Valve Cavity Volume(CC)	Open position	*
70			Closed position	*
71		Operator Manufacturer / Model No.		*
72		Break-away Torque Under Max. Diff Pressure(Nm)		*
73		Running Torque (Open - Close/Close - Open) (Nm)		*

74	NOTES	**NOTES:**
75		1. Bidder to submit Soft Seal details and type, grade & class selected with manufacturer's recommendation like Pressure-Temperature Curve/Table for not to damage the soft seal during
76		2. This Data Sheet shall be read in conjunction with Piping Material Specification, valve Specification & other Tender Documents.
77		3. Dimension / Input Data as & where marked " * " shall be supplied by Vendor.
78		4. Manufacturer shall have valid API 6D license to use API monogram.
79		5. Full inspection by radiography shall be carried out on all welds of pressure containig parts. Acceptance criteria shall be as per ASME B31.4 or ASME B
80		6. 100.0 % Valve castings shall undergo Radiographic Examination.
81		7. Valves shall have support foot & lifting lugs as per valve Specification.
82		8. All Check Valves 3" & above shall be provided with drain connection with plug as per ASME B 16.34 in a position suitable to drain the valve completely.
83		9. Valve seat shall be non renewable and integral type.
84		10. The Charpy Impact temperature specified in this data sheet shall superceded the test requiremetn specified in Valve Specification (VCS-SS-PP-2006) at 0oC
85		11. Name plate material shall be minimum stainless steel. Marking shall be as per MSS-SP-25
86		12. Valve body & other pressure containing parts shall be designed as per ASME Sec-VIII Div-I. Minimum thickness shall not be less than ASME B16.34.
87		13. For tag No./ Fluid Data/ Operating Data refer Process Document , P&IDs
88		14. For the valves to be installed underground the external surfaces of buried portion of the valve shall be painted with 100% Solid high build epoxy (Powercrete R-95 with a minimum dry film thickness of 1000 microns or 1.5 mm thick polyurethane coating
89		15. Bidder shall clearly write all / any deviation against each part material of valve in the space provided for. Wherever bidder agrees with company's spec bidder shall indicate "agreed".
90		16. Bidder to confirm that in offered valves, there shall not be any external leakage during fire and valve is capable of handling fire for the mentioned time as specified in API 6FA/ ISO 10497/API 6FD. Bidder also to confirm that in case of fire, the valve shall be unseated from the closed position against the high test pressure and moved to the fully open position i.e. In case of fire, valve shall complete one open-close cycle.
91		17. As a evidence that offered valve are fire safe design, Bidder can submit Fire Test Certificate (Approved & Certified by Governing TPIA) of earlier tested valve of similar design & size.(Qualification Size as per API 6FA/ ISO 10497/API 6FD Codes)

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
FLANGES & SPECTACLE BLINDS
VCS – ITP – PP – 2003

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
01	19/12/2021	SR	MC	HK	GW

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	22/04/2020					
		MB	MC	AD	SK	
01	19/12/2021	R Srinivasan				Revised as Marked
		SR	MC	HK	GW	

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATIONS:			
CE	Carbon Equivalent	NDT	Non-Destructive Testing
DCN	Dispatch Clearance Note	PO	Purchase Order
HT	Heat Treatment	PR	Purchase Requisition
IC	Inspection Certificate	RT	Radiography Testing
IR	Inspection Report	TC	Test Certificate
IRC	Inspection Release Certificate	TPI or TPIA	Third Party Inspection Agency
ITP	Inspection and Test Plan	UT	Ultrasonic Testing
MPT/MT	Magnetic Particle Testing	VDR	Vendor Data Requirement
MTC	Material Test Certificate		

LEGENDS:
H - Hold (Do not proceed without approval)
W - Witness (Give due notice, work may proceed after scheduled date)
P – Perform
R - Review
RW - Random Witness [As specified or 10% (min.1 no. of each size and type of Bulk items)]

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Flanges, Spectacle Blinds & Drip Rings.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Procedure**						
1.1	Heat Treatment, NDT and Other Procedures	Documented Procedures	100%	Procedure Documents	-	H	R
2.0	**Material Inspection**						
2.1.	Raw Material Inspection	Chemical, Mechanical, Properties	100%	Test Certificates	-	H	R
3.0	**In Process Inspection**						

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.1	Heat Treatment	Stress Relieving, Normalising, Tempering, Solution Annealing, Stabilization Heat Treatment etc. as applicable	100%	HT Chart	-	H	R
3.2	Identification of Test Samples	Product Chemical, Mechanical, Impact and Other test as applicable	One/Heat/Lot	Test Report	-	H	H
3.4	Product Analysis (As applicable)	Chemical Composition	As per PR/Purchase Specification	Test Reports	-	H	R
3.5	Destructive Testing	Mechanical, Impact and Other test as applicable	One/Heat/Lot	Test Reports	-	H	H
3.6	MPI	Surface & Internal Imperfections	As per PR/Purchase Specification	NDT Reports	-	H	R
4.0	**Final Inspection**						
4.1	Final Inspection	1. Visual 2 Dimensions 3. Hardness 4. Marking etc	100%	Inspection Report	-	H	W

Copyright VCS Quality Services Private Limited - All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
4.2	PMI Check	Chemical	As per Spec.	Inspection Report	-	H	RW
4.3	Final Stamping	Stamping Of Accepted Flanges & Spectacle Blinds	Stamping of Valves which are witnessed by TPIA.	Inspection Report	-	H	H
5.0	**Painting**						
5.1	Rust Preventive Coating & Colour Coding	Visual & Colour Coding as applicable	100%	Inspection Report	-	H	-
6.0	**Documentation & IC**						
6.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Vendor TC & IC	-	H	H
7.0	**Final Documentation & Submission of Reports**	Compilation of IR/IRC/DCN/MTC/DRGS./VDR	100%	Compliance Certificate (Note-1)	-	H	-

NOTES (As applicable):

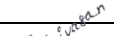
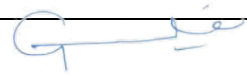
1. If the certification is specified as EN 10204 Type 3.1 in Datasheet / Material Requisition, then '**W**' may be replaced with '**R**' with Material Traceability.
2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

Copyright VCS Quality Services Private Limited - All rights reserved
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
GATE/GLOBE/CHECK VALVES
VCS –ITP –PP –2008

					
02	27/05/2022	SR	MC	HK	GW
Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	22/04/2020					Revised as Marked
		MB	MC	AD	SK	
01	19/12/2021					Revised as Marked
		SR	MC	HK	HK	
02	27/05/2022					Revised as Marked
		SR	MC	HK	GW	

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATIONS:			
CE	Carbon Equivalent	NDT	Non-Destructive Testing
DCN	Dispatch Clearance Note	PO	Purchase Order
DFT	Dry Film Thickness	PQR	Procedure Qualification Record
DPT	Dye Penetrant Testing	PR	Purchase Requisition
HT	Heat Treatment	RT	Radiography Testing
IC	Inspection Certificate	TC	Test Certificate
IR	Inspection Report	TPI or TPIA	Third Party Inspection Agency
IRC	Inspection Release Certificate	UT	Ultrasonic Testing
ITP	Inspection and Test Plan	VDR	Vendor Data Requirement
MPT/MT	Magnetic Particle Testing	WPQ	Welders Performance Qualification
MTC	Material Test Certificate	WPS	Welding Procedure Specification

LEGENDS:
H - Hold (Do not proceed without approval)
W - Witness (Give due notice, work may proceed after scheduled date)
P - Perform
R - Review
RW - Random Witness [As specified or 10% (min.1 no. of each size and type of Bulk items)]

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Valves.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Procedure**						
1.1	Hydrostatic Test, NDT and Other Procedures	Documented Procedures	100%	Procedure Documents	-	H	R
1.2	WPS, PQR & WPQ	Welding Parameters & Qualification Record	100%	WPS, PQR & WPQ	-	H	W- New R- Existing

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
2.0	**Material Inspection**						
2.1	Castings & Forgings (Body, Bonnet, Disc, Stem, Body ring)	Chemical, Mechanical, Heat Treatment, NDT & Other Properties as applicable	100%	Test Certificates	H	R	W (Note-1)
2.2	Castings & Forgings (Body, Bonnet, Disc, Stem, Body ring)	Visual & Dimension	100%	Inspection Report	H	H	-
2.3	Body and Bonnet Castings	Radiography Examination	As per PR / Purchase Specification	Films and report	H	R (RT-Film review)	R (RT-Film review) (Note-1)
2.4	Bars for Trim material	Chemical Analysis	Each Heat	Test Certificates& Lab Report	H	R	R
2.5	Gaskets, Gear units, Fasteners, Gland, Packings, etc.	Physical / Chemical Properties	100%	Test Certificates& Lab Report	H	R	R

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
2.6	Actuators as applicable	Performance, Statutory Certificates as applicable	100%	Test Certificates& Lab Report	H	H	R
3.0	**In Process Inspection**						
3.1	Welding	Welding Parameters as per WPS / PQR	100%	Inspection Reports	-	H	R
3.2	Machining of components	Visual / Dimension	100%	Inspection Reports	-	H	-
4.0	**Final Inspection**						
4.1	Hydrostatic / Pneumatic Test	Hydrostatic Test – Shell Pneumatic Test – Seat & Back Seat	As per PR / Purchase Specification	Test Report	-	H	RW
4.2	Visual / Dimension	Surface & Dimension Check	100%	Test Report	-	H	RW
4.3	Final Stamping	Stamping Of Accepted Valves	Stamping of Valves which are witnessed by TPIA.	Inspection Report	-	H	H

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
4.4	Strip Test	Component integrity, PMI of BOM	One per size per rating	Test report	H	H	H
5.0	**Painting**						
5.1	Painting and Colour coding as applicable	Visual / DFT Check	100%	Inspection Report	-	H	R
6.0	**Documentation & IC**						
6.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Vendor TC & IC	-	H	H
7.0	**Final Documentation & Submission of Reports**	Compilation of IR/IRC/DCN/MTC/DRGS. /VDR	100%	Compliance Certificate (Note-1)	-	H	-

NOTES (As applicable):

1. If the certification is specified as EN 10204 Type 3.1 in Data sheet / Material Requisition, then '**W**' may be replaced with '**R**' with Material Traceability.

2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

Copyright VCS Quality Services Private Limited - All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
FORGED, SEAMLESS & WELDED FITTINGS (16” NB & BELOW)
VCS – ITP – PP – 2005

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
01	19/12/2021	SR	MC	HK	GW

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	22/04/2020					
		MB	MC	AD	SK	
01	19/12/2021	R.Srinivasan				Revised as Marked
		SR	MC	HK	GW	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATIONS:			
CE	Carbon Equivalent	PMI	Positive Material Identification
DCN	Dispatch Clearance Note	PO	Purchase Order
DFT	Dry Film Thickness	PQR	Procedure Qualification Record
DPT	Dye Penetrant Testing	PR	Purchase Requisition
HT	Heat Treatment	RT	Radiography Testing
IC	Inspection Certificate	TC	Test Certificate
IR	Inspection Report	TPI or TPIA	Third Party Inspection Agency
IRC	Inspection Release Certificate	UT	Ultrasonic Testing
ITP	Inspection and Test Plan	VDR	Vendor Data Requirement
MPT/MT	Magnetic Particle Testing	WPQ	Welders Performance Qualification
MTC	Material Test Certificate	WPS	Welding Procedure Specification
NDT	Non-Destructive Testing		

LEGENDS:
H- Hold (Do not proceed without approval)
W-Witness (Give due notice, work may proceed after scheduled date)
P-Perform
R-Review
RW-Random Witness [As specified or 10% (min. 1 no. of each size and type of Bulk item)]

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Forged, Seamless & Welded Fittings.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Procedure**						
1.1	Heat Treatment / NDT	Documented Procedures	100%	Procedure Documents	-	H	R
1.2	WPS, PQR & WPQ	Welding Parameters & Qualification Record	100%	WPS, PQR & WPQ	-	H	W- New R- Existing
2.0	**Material Inspection**						
2.1	Raw Material Identification (Billets, Rounds, Pipes, Coil, Plates, etc.)	Chemical and Mechanical Properties, Size & Steel making practice etc	100%	Mill test certificate, Vendor's Inspection Report	-	H	R

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.0	**In Process Inspection**						
3.1	Welding	Welding Parameters as per WPS / PQR	100%	Inspection Reports	-	H	-
3.2	Heat Treatment	Stress Relieving, Normalising, Tempering, Solution Annealing, Stabilization Heat Treatment etc. as applicable	100%	HT chart	-	H	R
3.3	RT For Fittings As Applicable	Weld defects	PR / Purchase Specification	RT films & Reports	-	H	R (RT film review)
3.4	Identification of Test Samples	Product Chemical, Mechanical, Impact, Hardness and other test as applicable	One/Heat/Lot	Test Reports	-	H	H

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.5	Product Analysis	Chemical Composition	PR/ Purchase Specification	Test Reports	-	H	R
3.6	Destructive Testing	Mechanical, Impact, Hardness and Other test as applicable	One/Heat/Lot	Test Reports	-	H	H
3.7	MPT/LPT	Surface & Internal Imperfections	PR/ Purchase Specification	NDT Reports	-	H	R
4.0	**Final Inspection**						
4.1	Visual and Dimensional Inspection (VDI)	Surface finish, Dimensions, Marking etc	100%	Inspection report	-	H	RW
4.2	PMI Check	Chemical Check	As Per Spec./Code	Inspection report	-	H	RW

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL.NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
4.3	Final Stamping	Stamping of accepted Items	100%	Inspection report	-	H	H
5.0	**Painting**						
5.1	Rust Preventive Coating & Colour Coding	Visual Inspection & Colour Coding	100%	Inspection report	-	H	-
6.0	**Documentation & IC**						
6.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Vendor TC & IC	-	H	H
7.0	**Final Documentation and Submission of Reports**	Compilation of IR/IRC/DCN/MTC/DRGS. /VDR	100%	Compliance Certificate (Note-1)	-	H	-

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

NOTES (As applicable):

1. If the certification is specified as EN 10204 Type 3.1 in Datasheet / Material Requisition, then '**W**' may be replaced with '**R**' with Material Traceability.

2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
ASSORTED PIPES

VCS – ITP – PP – 2021

Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By
01	19/12/2021	SR	MC	HK	GW

UNCONTROLLED COPY	:	**If printed**
CONTROLLED COPY	:	**If in soft and signed**

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	22/04/2020					
		MB	MC	AD	SK	
01	19/12/2021	R.Srinivasan				Revised as Marked
		SR	MC	HK	GW	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATIONS:			
CE	Carbon Equivalent	NDT	Non-Destructive Testing
HT	Heat Treatment	PO	Purchase Order
DCN	Dispatch Clearance Note	PMI	Positive Material Identification
IC	Inspection Certificate	PR	Purchase Requisition
IR	Inspection Report	TC	Test Certificate
IRC	Inspection Release Certificate	TPI or TPIA	Third Party Inspection Agency
ITP	Inspection and Test Plan	VDR	Vendor Data Requirement
MPT / MT	Magnetic Particle Testing		
LEGENDS:			
H- Hold (Do not proceed without approval)			
W-Witness (Give due notice, work may proceed after scheduled date).			
P-Perform			
R-Review			
RW - Random Witness (As specified or 10% (min.1 no. of each size and type of Bulk item))			

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1. SCOPE

This Inspection and Test Plan covers the minimum testing requirements of small sizes and Assorted length Pipes.

2. REFERENCE DOCUMENTS:

PO/PR/ Standards referred there in/ Job specifications /Approved documents.

3. INSPECTION AND TEST REQUIREMENTS:

SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
1.0	**Pipe Inspection**						
1.1	Pipe Inspection	Chemical & Mechanical Properties	100%	Test Certificates and marking on pipe (EN 10204 Type 3.2)	-	H	R
2.0	**Final Inspection (In case of non-availability of 3.2 Certificate)**						
2.1	Hydrostatic Testing	Leak Check	100%	Test Report	-	H	R
2.2	1) Visual 2) Dimension 3) Marking w.r.t MTC	Surface Condition, Straightness, End Finish, Bevel Angle, Root Face, Outer Dia., Thickness, Length, End Finish, Marking etc	100%	Inspection Report	-	H	RW

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
2.3	PMI Check	Chemical Check	As Per Spec.	Inspection Report	-	H	RW
2.4	Identification of Test Samples	Product Chemical, Mechanical, Impact and Other test as applicable	As Per Spec. / Code	Test Reports	-	H	H
2.5	Product Analysis	Chemical Composition	As Per Spec. / Code	Test Reports	-	H	R
2.6	Destructive Testing	Mechanical, Impact, and Other test as applicable	As Per Spec. / Code	Test Reports	-	H	H
2.7	PMI Check	Chemical Check	As Per Spec. / Code	Inspection Report	-	H	RW
2.8	Final Stamping	Stamping Of Accepted Pipes	Stamping of Pipes	Inspection Report	-	H	H

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL. NO.	STAGE/ACTIVITY	CHARACTERISTICS	QUANTUM OF CHECK	RECORD	SCOPE OF INSPECTION		
					SUB VENDOR	VENDOR	TPIA
3.0	**Painting**						
3.1	Rust Preventive Coating & Colour Coding	Visual Inspection & Colour Coding	100%	Inspection Report	-	H	-
4.0	**Documentation & IC**						
4.1	Documentation & Inspection Certificate (IC)	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	Vendor TC/IR/IRC/DCN/DRGS. /VDR (Note-1)	-	H	-

NOTES (As applicable):

1. Items shall be accepted based on EN 10204 type 3.2/3.1 certification as specified in material requisition.

2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

INSPECTION AND TEST PLAN
FOR
BALL VALVE
VCS – ITP – PP – 2007

		R.Srinivasan			
04	27/05/2022	SR	MC	HK	GW
Rev. No	**Date**	**Prepared By**	**Checked By**	**Approved By**	**Authorized By**

UNCONTROLLED COPY	:	**If printed**
CONTROLLED COPY	:	**If in soft and signed**

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REVISION RECORD

Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	16/06/2017					
		GS	ADE	AD	SK	
01	20/01/2020					Formatting update, Doc Numbering change from VCS-SD-ITP-007 to VCS-ITP-PP-2007
		AG	MC	AD	SK	
02	19/05/2020					Revised as Marked
		AG	MC	AD	SK	
03	19/12/2021					Revised as Marked
		SR	MC	HK	HK	
04	27/05/2022	R Srinivasan				Revised as Marked
		SR	MC	HK	HK	

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ABBREVIATIONS:			
CE	Carbon Equivalent	NDT	Non-Destructive Testing
DCN	Dispatch Clearance Note	PO	Purchase Order
DFT	Dry Film Thickness	PQR	Procedure Qualification Record
DPT	Dye Penetrant Testing	PR	Purchase Requisition
HT	Heat Treatment	RT	Radiography Testing
ITP	Inspection and Test Plan	TC	Test Certificate
IC	Inspection Certificate	TPI or TPIA	Third Party Inspection Agency
IGC	Inter Granular Corrosion	UT	Ultrasonic Testing
IR	Inspection Report	VDR	Vendor Data Requirement
IRC	Inspection Release Certificate	WPQ	Welders Performance Qualification
MPT / MT	Magnetic Particle Testing	WPS	Welding Procedure Specification
MTC	Material Test Certificate		

LEGENDS:
H - Hold (Do not proceed without approval)
W – Witness (Give due notice, work may proceed after scheduled date)
P - Perform
R - Review
RW - Random Witness [As specified or 10% (min.1 no. of each size and type of Bulk items)]

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.0 SCOPE:

This Inspection and Test Plan covers the minimum testing requirements of Ball Valves.

2.0 REFERENCE DOCUMENTS:

PO / PR / Standards referred there in / Job specifications / Approved documents.

3.0 INSPECTION AND TEST REQUIREMENTS:

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS / METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTENCE CRITERIA	FORMAT OF RECORD	SCOPE OF INSPECTION		
						SUB VENDOR	VENDOR	TPIA
1.0	**PROCEDURES**							
1.1	Hydrostatic Test, NDT and Other Procedures	Documented Procedures	100%		Procedure Documents	-	H	R
1.2	WPS,PQR & WPQ	Welding Parameters & Qualification Record	100%		WPS ,PQR & WPQ	-	H	W- New R- Existing
1.3	Pre-Qualification Tests	Fire safe, Cryogenic & Other Test as applicable	As per PR/Purchase Specification		Acceptance Report	-	H	H (If new)
2.0	**RAW MATERIAL**							
2.1	Forging / Casting: 1) Body 2) End Piece 3) Ball 4) Seat Ring 5) Pup Piece (as applicable)	Visual & Dimension	100%	Material & Technical Specification	Inspection Report	H	H	-
		Chemical: Chemical Analysis IGC (For SS component)	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
		Mechanical: Mechanical Test	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	W (Note-1)

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS / METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTENCE CRITERIA	FORMAT OF RECORD	SCOPE OF INSPECTION		
						SUB VENDOR	VENDOR	TPIA
		Impact Test (@ - 29°C): for CS Impact Test (@ - 45°C): for LTCS	All Heats	Material & Technical Specification / ASME B 16.34	Test Report	H	R	W (Note-1)
		Non-Destructive Examination (NDT): Radiography (100% Critical Area)	100%	Material & Technical Specification /ASME B 16.34	RT Report	H	R (RT-Film review)	R (RT-Film review)
		Non-Destructive Examination (NDT): Magnetic Particle Examination (100% exterior & accessible interior)	100%	Material & Technical Specification /ASME B 16.34	MPI Report	H	R	R
		ENP (For Ball): Visual, Thickness & Hardness	100%	25 microns (min) & 50 HRC (min)	Vendor Test Certificate	H	R	R
3.0	**INCOMING / BOF ITEMS**							
3.1	Stem	Chemical: Chemical Analysis	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
		Mechanical: Mechanical Test	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
3.2	Fasteners	Chemical: Chemical Analysis	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
		Mechanical: Mechanical Test	All Heats	Material & Technical Specification	Vendor Test Certificate	H	R	R
		Impact Test (@ - 29°C): for CS Impact Test (@ - 45°C): for LTCS	All Heats	Material & Technical Specification /ASME B 16.34	Test Report	H	R	R
3.3	Gaskets, Gear units, Gland, Packings, etc.	Physical / Chemical Properties	100%	Material & Technical Specification	Test Certificates& Lab Report	H	R	R

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS / METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTENCE CRITERIA	FORMAT OF RECORD	SCOPE OF INSPECTION		
						SUB VENDOR	VENDOR	TPIA
4.0	**MACHINED COMPONENTS**							
4.1	Body, Connector, Ball & Seat Ring	Surface examination & Dimension Inspection: Visual & Measurement	100%	Manufacturer's Drawing	Inspection Reports	100%	R	R
5.0	**IN-PROCESS**							
5.1	Body & Connector joint welding	Non-Destructive Examination (NDT): Magnetic Particle Examination (MPI)	100%	ASME Sec VIII - Appendix V & VI	MPI Report	100%	R	R
5.2	Valve & Pup Piece Bevel Ends joint welding	Non-Destructive Examination (NDT): Radiography (100% on weld joint)	100%	ASME B16.34	RT Report	100%	R (RT-Film review)	R (RT-Film review)
6.0	**FINAL INSPECTION**							
6.1	Finished Valve Assembly: Pressure Test & Final Inspection	Shell Test: Hydrostatic	100%	Testing Procedure as per Code	Test Record	-	H	RW
6.2		Seat Test: Hydrostatic				-	H	RW
6.3		Seat Test: Pneumatic				-	H	RW
6.4		Functional Test - Actuated Valve @ Atm. Pressure & Max. Diff. Pressure: Operation- Open / Close				-	H	RW
6.5		Double Block & Bleed: Hydrostatic				-	H	RW
6.6		Final Inspection: Visual, Dimension, TC Verification, Special Requirements & Marking as per sale order	100%	Approved GA Drawing (if applicable)	Test Report	-	H	RW
6.7		Anti-Static Test	100%	API 6D & Technical Specification	Test Record	-	H	RW

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS / METHOD OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENT & ACCEPTENCE CRITERIA	FORMAT OF RECORD	SCOPE OF INSPECTION		
						SUB VENDOR	VENDOR	TPIA
6.8		Fire Safe Test	100%	API-6FA / ISO-10497	Fire safe type test report	-	H	R
6.9	Final Stamping	Stamping Of Accepted Valves	Stamping of Valves which are witnessed by VCS/TPIA	As per Tender Specification	Inspection Report	-	H	H
6.10	Strip Test	Component integrity, PMI of BOM	One per size per rating	-	Test report	H	H	H
7.0	**PAINTING & PACKING**	Surface examination & DFT Inspection: Visual & Measurement	100%	As per Tender Specification	Painting Record	-	H	R
8.0	**DOCUMENTATION & INSPECTION CERTIFICATE(IC)**	Review of Stage Inspection Reports / Test Reports & Issue of IC	100%	As per Tender Specification	Vendor TC & IC	-	H	H
9.0	**FINAL DOCUMENTATION & SUBMISSION OF REPORTS**	Compilation of IR/IRC/DCN/MTC/DRGS./VDR	100%	EN 10204 type 3.2/3.1 certification as specified in valve datasheet (Note-1)	Compliance Certificate	-	H	-

NOTES (As applicable):

1. If the certification is specified as EN 10204 Type 3.1 in Data sheet / Material Requisition, then '**W**' may be replaced with '**R**' with Material Traceability.

2. ITP shall be submitted including but not limited to the item/activity covered above. Any item/activity identified and required for the completeness shall also be covered in the ITP submitted by the manufacturers.

Copyright VCS Quality Services Private Limited – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality	**QUALITY ASSURANCE PLAN FOR HDPE DUCT**	**CONSULTANT: VCS Quality Services Pvt. Ltd.** **QAP No.: VPC-QAP-PE-004** **Rev.: 0**

INSTRUCTIONS FOR FILLING UP:

1. QAP shall be submitted for each equipment separately with breakup of assembly / sub-assembly & part/component or for group of equipment having same specification.
2. Use numerical codes as indicated for extent of inspection & tests and submission of test certificates & documents. Additional codes & description for extent of inspection & test may be added as applicable for the plant and equipment.
3. Separate identification number with quantity for equipment shall be indicated wherever equipment having same specifications belonging to different facilities are grouped together.
4. Weight in kilogram must be indicated under column 5 for each item. Estimated weights may be indicated wherever actual weights are not available.

ABBREVIATION USED :

CONTR : CONTRACTOR
MFR : MANUFACTURER
TPI : THIRD PARTY INSPECTION

CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS:

Code	Description
1.	Visual
2.	Dimensional
3.	fitment & alignment
4.	Physical Test (Sample)
5.	Chemical test(Sample)
6.	Ultrasonic test
7.	Magnetic particle test(MPT)
8.	Radiography test
9.	Dye Penetrant test
10.	Measurement of IR value
a)	Before HV test
b)	After HV test
11.	High voltage test/ Dielectric test

Code	Description
12.	Routine test as per relevant IS other standard
13.	Type test as per relevant IS/ other standard
14.	Impulse Test
15.	Partial Discharge Test
16.	Heat run risc test/temper
17.	Enclosure protection test
18.	Calibration
19.	Noise & Vibration
20.	Test certificate of bought out components
21.	Tank pressure test
22.	Paint shed vibration

Code	Description
23.	Short time rating
24.	Operational & functional test
25.	Over speed test
26.	Flame proof Test
27.	Clearance and creepage distance
28.	Acceptance test
29	Honing Test
30	Hydro test/ Shell leak test
31	Pneumatic Seat leak test
32	Impact test

Code	Description
D1.	Approved GA drawing.
D2.	Approved single line/ schematic diagram
D3.	Test certificates
D4.	Approved Bill of materials
D5.	Un-priced P.O. copy
D6.	Calibration certificates of all measuring instrument and gauges.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality	QUALITY ASSURANCE PLAN FOR HDPE DUCT	CONSULTANT: VCS Quality Services Pvt. Ltd. QAP No.: VPC-QAP-PE-004 Rev.: 0

Sl. No	Components & Operations	Description of Test.	Category	Extent of Check	Ref. Doc. & Cl. No.	Acceptance Criteria	Format of Records	INSPECTION		Remarks
								Manufacturer	TPIA	
HDPE Duct										
1	HDPE Duct	Dimension of Duct	Dimensional	ST	ADS	ADS	IF	P	RW	Minimum 5% to be randomly witnessed by TPIA
		Tensile Strength and Elongation	Physical	ST	ADS	IS-14151 (Part – I)	IF	P	RW	Minimum 5% to be randomly witnessed by TPIA
		Reversion Test	Physical	AT	ADS	IS-4984	IF	P	R	
		Environmental Stress Crack Resistance Test	Physical	AT	ADS	ASTM D-1693	IF	P	R	
		Impact Strength Test	Physical	AT	ADS	IS-12235 (Part – 9)	IF	P	R	
		Crush Resistance Test	Physical	AT	ADS	ADS	IF	P	R	
		Mandrel Test	Physical	AT	ADS	ADS	IF	P	R	
		Ovality Test	Physical	AT	ADS	ADS	IF	P	R	

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

		Coil Set Test	Physical	AT	ADS	ADS	IF	P	R	
		Oxidation Induction Test	Physical	AT	ADS	ADS	IF	P	R	
		Internal pressure creep rupture test	Physical	AT	ADS	IS-4984	IF	P	R	
		Internal Co-efficient of Friction	Test	AT	ADS	ADS	IF	P	R	
2	Optical Fibre Cable Blowing Test	Visual damage	Physical	AT	ADS	ADS	IF	P	RW	Minimum 5% to be randomly witnessed by TPIA

LEGENDS: R – Review, W – Witness, P – Perform, RW – Random Witness, TPIA – Third Party Inspection Agency, AT-All to be tested, ST- Sample test (5%), ATS-Approved Technical Specifications, MTR- Material Test Report, IF-Inspection Format, ADS-Approved Data Sheets.

Notes:

1. The above-mentioned testing and acceptance criteria are minimum requirements; however, supplier shall ensure that the product also comply with additional requirements as per standard specification and Data Sheet.
2. The supplier shall submit their own detailed ITP prepared on the basis of the above for approval of Owner / Owner's representative and TPIA.
3. TPIA shall have right to inspect minimum 5% of all manufacturing activities on each day or as specified above.
4. TPIA along with Owner / Owner's representative shall review / approve all the documents related to QCT / Quality Manuals Drawings etc, submitted by supplier.
5. TPIA shall also review the test certificates submitted by the manufacturer.
6. Supplier shall in coordination with sub-vendor issue detailed production and inspection schedule indicating the dates and the locations to facilitate Owner / Owner's representative to organize inspection.
7. Supplier shall submit their own Detailed ITP and regulator tag / nameplate format Duly Signed and Stamped.
8. TPIA shall review all the reports 100 %.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ANNEXURE-I

QUALITY ASSUARANCE PLAN

Item: Electrofusion Fittings PE 80- Coupler, Reducer, Elbow 90^0, Elbow 45^0, End Caps, Saddle, Equal tee & Transition Fittings

Sr. No.	Test Description	Type Of Check	Quantum Of Check	Ref. Document	Acceptance Norms	Documentation	Inspection		Remarks
							Mfg.	C/ TPIA	
1	Dimension Check	Geometrical Characteristics	01 No. from Lot	Mfg. Drawing	EN 1555-3 / Mfg. Drawing	Mfg. test certificate	P	W	
2	Melt mass flow rate	Physical Characteristics	01 No. from Lot	ISO 1133	MFR 190°/5kg. 0.20 – 1.20 gm./10 min.	Mfg. test certificate	P	R	
3	Density	Physical Characteristics	01 No. from Lot	ISO 1183	0.926 to 0.94 g/cm^3	Mfg. test certificate	P	R	
4	OIT (Thermal Stability)	Physical Characteristics	01 No. from Lot	ISO 11357-6/ EN 728	Oxidation Induction Time ≥ 20 min/200° C	Mfg. test certificate	P	R	
5	Appearance, Color	General Characteristics	01 No. from Lot	EN 1555- 3	Mfg. Spec.	Mfg. test certificate	P	W	
6	Hydrostatic Strength (PE100)	Mechanical Characteristics		EN 1555- 3 & ISO 1167-1-4	Case I- 165h/80°C/(5.5MPa) Case II- 100h/20°C/(12 MPa) Case II- 100h/20°C/(10 MPa)	Hydrotest Report	P	W	
8	Peel Decohension Test for Electrofusion socket fitting	Mechanical Characteristics		ISO 13954	EN 1555-3	Inspection Report	P	W	
9	Crush Decohension Test for Electrofusion socket fitting	Mechanical Characteristics		ISO 13955	EN 1555-3	Inspection Report	P	W	

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

10	Decohension Test (tear test) for Electrofusion saddle fittings	Mechanical Characteristics		ISO 13956	EN 1555-3	Inspection Report	P	W	
11	Impact Resistance for Electrofusion saddle fittings	Mechanical Characteristics		EN 1716	EN 1555-3	Inspection Report	P	W	
12	Pressure Drop.	Mechanical Characteristics	01 No. from Lot	ISO 17778	EN 1555-3	Inspection Report	P	R	
13	Electrical Resistance	Electrical Characteristics	01 No. from Lot	EN 1555-3	EN 1555-3	Inspection Report	P	R	

Note:

1. The above testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Standard specifications(SS).
2. The supplier shall submit their own detailed QAP prepared on the basis of above / technical specification for approval of Owner/Owner's representative.
3. Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc. submitted by supplier.
4. Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7. All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA/ Client at the time of Inspection
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality	QUALITY ASSURANCE PLAN	VPC-QAP-PE-002

LEGENDS:

M – Monitor
R – Review
H – Hold
TPIA – Third Party Inspection Agency
P – Perform
W – Witness
C- Customer
V – Verification of Mfg. Test Certificate

Prepared by	Reviewed / Checked by	Approved by
(Name / Signature / Date / Stamp)	**(Name / Signature / Date / Stamp)**	**(Name / Signature / Date / Stamp)**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality	QUALITY ASSURANCE PLAN ISOLATION VALVE	Consultant : VCS Quality Services Pvt. Ltd. QAP NO : 1007-CD-MC-QAP-001 Rev. 0

SR. NO.	INSPECTION AND TESTING	QUANTUM OF CHECK / TEST	PROCEDURE	ACCEPTANCE CRITERIA AND CERTIFICATE	FORMAT OF RECORD	INSPECTION BY		REMARKS
						Manufacturer	TPIA	
1.0	Raw Material							
1.1	Metallic Parts (Chemical / Physical Requirement)	One in each heat	As per ASTM B 283 (ALLOY UNS C37700) / EN 331	As per ASTM B 283 (ALLOY UNS C37700) / EN 331	MATERIAL TEST CERTIFICATE	P	R	
1.2	Seat & Stem Seal	One in each heat	As per EN 331 / Manufacturer's Standard	As per EN 331 / Manufacturer's Standard	MATERIAL TEST CERTIFICATE	P	R	
2.0	Final Product :							
2.1	Gas Tightness Test	100%	As per EN 331	As per EN 331	TEST REPORT	P	W = Ten nos. per size per Lot	
2.2	Bending Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.3	Turning Torque Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.4	Temperature Resistance Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.5	Flow Capacity Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
3.0	Visual Inspection (Free from defects)	100%	As per EN 331	As per EN 331	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
4.0	Dimension Tolerances (Min. length of engagement , OD , wall thk.)	100%	As per Approved Drawing	As per Approved Drawing	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
5.0	Marking	100%	As per EN 331	As per EN 331	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
6.0	Final Documentation		As per P.O. / SS	As per P.O. / SS	EN 10204 3.2 CERTIFICATE	P	H	

LEGEND: R - Review, W - Witness, H - Hold, P - Perform, TPIA - Third Party Inspection Agency, CA - Control Authority (Owner / Owner's representative)

Notes: -

1	The Above Testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Standard Specification (SS)
2	The supplier shall submit their own detailed QAP prepared on the basis of above / Standard specification for approval of Owner/Owner's representative.
3	Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc. submitted by supplier.
4	Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.
5	Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6	Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time
7	All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA / Client Consortium at the time of Inspection
8	At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.
9	All Tests shall be carried out as per EN-331 (Latest Edition).

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ANNEXURE-II

QUALITY ASSUARANCE PLAN

Item: MDPE Ball Valve – PE 80/PE100 (Without Stem)

Sr. No.	Test Description	Type Of Check	Quantum Of Check	Ref. Document	Acceptance Norms	Documentation	Inspection		Remarks
							Mfg.	C/TPIA	
1	Dimension Check	Geometrical Characteristics	01 No. from Lot	Mfg. Drawing	EN 1555-3 / EN 1555-4 / Mfg. Drawing	Mfg. test certificate	P	W	
2	Melt mass flow rate	Physical Characteristics	01 No. from Lot	ISO 1133	MFR 190°/5kg. 0.20 – 1.20 gm./10 min.	Mfg. test certificate	P	R	
3	Density	Physical Characteristics	01 No. from Lot	ISO 1183	0.926 to 0.94 g/cm^3	Mfg. test certificate	P	R	
4	OIT (Thermal Stability)	Physical Characteristics	01 No. from Lot	ISO 11357-6/ EN 728	Oxidation Induction Time ≥ 20 min/200° C	Mfg. test certificate	P	R	
5	Volatile Content	Physical Characteristics	01 No. from Lot	EN 12099	≤ 350 mg/kg	Mfg. test certificate	P	R	
6	Carbon Black Content	Physical Characteristics	01 No. from Lot	ISO 6964	2.50 ± 0.5%	Mfg. test certificate	P	R	
7	Appearance, Color	General Characteristics	01 No. from Lot	EN 1555- 4	Mfg. Spec.	Mfg. test certificate	P	W	
8	Hydrostatic Strength	Mechanical Characteristics	01 No. from Lot	EN 1555- 4 & ISO 1167-1/4	Case I- 165h/80°C/(5.5MPa) Case II- 100h/20°C/(12 MPa)	Hydrotest Report	P	W	
9	Operating Torque	Mechanical Characteristics	01 No. from Lot	EN 1555- 4	Ø≤63 35Nm Ø63- Ø 125 ≤70Nm Ø125- Ø315 ≤150Nm	Mfg. test certificate	P	R	
10	Leak Tightness	Mechanical Characteristics	01 No. from Lot	EN 1555- 4	Table-1, EN 1555-4	Mfg. test certificate	P	R	
11	Pressure Drop.	Mechanical Characteristics		ISO 17778	EN 1555-3	Approval Certificate	P	R	

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality	QUALITY ASSURANCE PLAN	VPC-QAP-PE-003

Note:

1. The above testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Standard Specification (SS).
2. The supplier shall submit their own detailed QAP prepared on the basis of above / technical specification for approval of Owner/Owner's representative.
3. Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc. submitted by supplier.
4. Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7. All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA / Client Consortium at the time of Inspection
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

LEGENDS:

M – Monitor **R –** Review **H –** Hold **TPIA –** Third Party Inspection Agency
P – Perform **W –** Witness **C**- Customer **V –** Verification of Mfg. Test Certificate

Prepared by	Reviewed / Checked by	Approved by
(Name / Signature / Date / Stamp)	**(Name / Signature / Date / Stamp)**	**(Name / Signature / Date / Stamp)**

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality

QUALITY ASSURANCE PLAN
APPLIANCE VALVE

Consultant : VCS Quality Services Pvt. Ltd.

QAP NO : 1007-CD-MC-QAP-002

Rev. 0

SR. NO.	INSPECTION AND TESTING	QUANTUM OF CHECK / TEST	PROCEDURE	ACCEPTANCE CRITERIA AND CERTIFICATE	FORMAT OF RECORD	INSPECTION BY		REMARKS
						Manufacturer	TPIA	
1.0	**Raw Material**							
1.1	Metallic Parts (Chemical / Physical Requirement)	One in each heat	As per ASTM B 283 (ALLOY UNS C37700) / EN 331	As per ASTM B 283 (ALLOY UNS C37700) / EN 331	MATERIAL TEST CERTIFICATE	P	R	
1.2	Seat & Stem Seal	One in each heat	As per EN 331 / Manufacturer's Standard	As per EN 331 / Manufacturer's Standard	MATERIAL TEST CERTIFICATE	P	R	
2.0	**Final Product**							
2.1	Gas Leak Tightness Test	100%	As per EN 331	As per EN 331	TEST REPORT	P	W = Ten nos. per size per Lot	
2.2	Bending & Torque Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.3	Operating Torque Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.4	Temperature Resistance Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
2.5	Flow Capacity Test	One no. per Heat per Size	As per EN 331	As per EN 331	TEST REPORT	P	W = One no. per size per Lot	
3.0	Visual Inspection (Free from defects)	100%	As per EN 331	As per EN 331	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
4.0	Dimension Tolerances (Min. length of engagement , OD , wall thk.)	100%	As per Approved Drawing	As per Approved Drawing	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
5.0	Marking	100%	As per EN 331	As per EN 331	INSPECTION REPORT	P	W = Ten nos. per size per Lot	
6.0	Final Documentation		As per P.O. / SS	As per P.O. / SS	EN 10204 3.2 CERTIFICATE	P	H	

LEGEND: R - Review, W - Witness, H - Hold, P - Perform, TPIA - Third Party Inspection Agency, CA - Control Authority (Owner / Owner's representative)

Notes: -

1. The Above Testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per standard Specification (SS)
2. The supplier shall submit their own detailed QAP prepared on the basis of above / Technical specification for approval of Owner/Owner's representative.
3. Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc. submitted by supplier.
4. Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organize Inspection.
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time
7. All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA / Client Consortium at the time of Inspection
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note & MTC.
9. All Tests shall be carried out as per EN-331. However, other additional tests, which are not covered in EN-331, shall be carried out as per ASME B16.33.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality

QUALITY CONTROL TABLES
GI PIPES CONFORMING TO IS:1239 (PART-1):2004 (Latest edition)

REV.: 0

S.NO.	COMPONENTS /OPERATIONS	CHARACHTERISTICS	CLASSIFICATION	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTANCE NORMS	FORMAT OF RECORD	VENDOR	TPIA
1	2	3	4	5	6	7	8	9	10	11
1	Raw Material Inspection									
1.1	RAW MATERIAL	IDENTIFICATION	Major	Co-relation with MTC.	100%	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	T.C.	p	R
		CHEMICAL COMPOSITION	Major	Chern. Analysis	One I Heat	IS: 1239 / P.P. Spec.	IS: 1239 / P.O. Spec.	IIR	p	R
		PHYSICAL PROPERTIES (T.S., Y.S., % Eiong.)	Major	Lab. Test	One/ Heat	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	IIR	P	R
		VISUAL & DIMENSIONS	Major	Visual & Measur.	100%	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	IIR	p	R
2	IN PROCESS INSPECTION									
2.1	PIPE MANUFECTURING	SURFACE DEFECT	Major	Visual	100%	IS:1239/P.O. Spec.	IS: 1239 / P.O. Spec.	IIR	p	R
		DIMENSIONS (O.D., THK., LENGTH etc.)	Major	Measure.	As Per Relevant Std.	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	IIR	p	R
		MASS (Kg Mtr.)	Major	Measure.	As Per Relevant Std.	IS: 1239 / P.O. Spec.	IS:1239/P.O. Spec.	IIR	p	R
2.2	END PREPARATION	END TYPE & DIMENSIONS	Major	Visual & Measur.	100%	IS: 1239 / P.O. Spec.	IS:1239/P.O. Spec.	IIR	p	R
2.3	PHYSICAL PROPERTIES	TENSILE, ELONGATION & BEND FLATTENING TEST AS APPLICABLE	Major	Lab. Test	As Per Relevant Std.	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	liR	p	R
2.4	LEAK TEST	HYDRAULIC	Critical	Leak Test	100%	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	IIR	p	w
2.5	GALVANIZING	ZINC COATING UNIFORMITY & MASS	Major	Mass of Zinc Coating & Uniformity	2 Sample I Shift	IS: 4736	IS: 4736	IIR	p	w
2.6	FINISH, PAINTING & MARKING	OVERALL FINISH, PAINTING & MARKING	Major	Visual	100%	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	l!R	p	R

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality	QUALITY CONTROL TABLES GI PIPES CONFORMING TO IS:1239 (PART-1):2004 (Latest edition)								REV.: 0	
S.No.	COMPONENTS/ OPERATIONS	CHARACTERISTICS	CLASSIFICATIO N	TYPE OF CHECK	QUANTUM OF CHECK	REFERENCE DOCUMENTS	ACCEPTA NCE NORMS	FORMAT OF RECORD	VENDOR	TPIA
1	2	3	4	s	6	7	8	9	10	11
3	FINAL INSPECTION									
		FINISH DIMENSIONS	Major	Visual &Measur.	Random As Per IS:47ll	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	IR	p	w
	FINISHED PRODUCT	PHYSICAL PROPERTIES (TENSILE, ELONGATION & BEND FLATTENING TEST AS APPLICABLE)	Major	Lab.Test	Random As Per !S:4711	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	IR	p	w
3.1		LEAK TEST (HYDRAULIC TEST)	Critical	Leak Test	Randomly (10% of lot qty)	IS: 1239 / P.O. Spec.	IS: 1239 / P.O. Spec.	IR	P	w
		REVIEW OF ALL TEST CERTIFICATE *I* REPORTS & VENDOR'S IlR	Major	Review	-	IS:l239/ P.O. Spec., EN 10204	IS:l239/ P.O. Spec., EN	R	p	R

LEGENDS H-HOLD P-PERFORMANCE R-REVIEW W-WITNESS TC-TEST CERTIFICATE IIR-INTERNAL INSPECTIONR EPORT CA-CONTROL AUTHOIRTY TPIA - THIRD PARTY INSPECTION AGENCY

1. The above testing and acceptance criteria are minimum requirements; however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Particular Technical specifications (PTS).
2. The supplier shall submit their own detailed ITP prepared on the basis of above I Technical specification for approval of Owner/ Owner's representative.
3. Owner / Owner representative shall review / approve all the documents related to ITP / Quality manuals / Drawings etc. submitted by supplier
4. Contractor shall in coordination with Supplier / Sub vendor issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner / Owner's representative and TPIA to organize Inspection.
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used in case of conflict between specifications more stringent condition shall be applicable.
6. Owner/Owner'srepresentativeincludingTPIAwillhavetherighttoinspectanyactivityofmanufacturingatanytime.
7. All reference Codes / Standards. Documents, P.O. Copies shall be arranged by vendor I supplier for reference of TPIA / Client consortium at the time of inspection.
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note, dispatch clearance note & MTC.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality

QUALITY CONTROL TABLES GI FITTINGS

SR. No	DESCRIPTION	COMPONENT	CHARACTERISTICS	QUANTUM OF CHECK	REF. DOC.	ACCEPTANCE NORMS	RECORD	INSPECTION			REMARKS
								MANUF.	TPIA	CA	
1	Chemical composition of material	Test Bar	Marking and correlation	IS: 14329 Grade BM 300	PO, Material specification	IS 14329/ PO, Material specifications	Mill TC	R	R	R	
2	Chemical composition of Final product	Fitting	Chemical properties	IS: 14329 Grade BM 300	PO, Material specification	IS 14329/ PTS	TC	P	E	R	
3	Cleaning and Flushing	Fitting	Descaling	100%	IS 14329/ PTS	IS 14329/ PTS	Inspection Report	W	RW	R	
4	Destructive Testing (Tensile, Elongation & Hardness)	Fitting	Mechanical Properties	IS 14329	IS 14329/ PTS	IS 14329/ PTS	Lab Report	W	W	RW	
5	Compression Test	-	Malleability	Three samples per Heat	IS 1879/ PTS	IS 1879/ PTS	Inspection Report	P	W	RW	
6	Pressure Test	-	-	IS 1879	IS 1879/ PTS	IS 1879/ PTS	Inspection Report	P	W	RW	As per sampling procedure of IS 1839
7	Alignments of Thread	-	-	IS 1879	IS 1879/ PTS	IS 1879/ PTS	Inspection Report	P	W	RW	
8	Galvanizing	Fitting	Integrity of galvanized coating	As listed in IS 4759	IS 4736/ PTS	PTS	Inspection / Lab Report	W	W	RW	
9	Final inspection	Fitting	Visual, Dimensions, Finish, weld bevel, Bore, Marking, Colour coding	IS 1879	IS 1879/ PTS	IS 1879/ PTS	Inspection Report	W	W	R	
10	Marking	-	-	100%	PTS	PTS	Inspection Report	P	R	R	
11	Documentation	-	-	-	As per the terms and conditions of the PO & PTS	As per the terms and conditions of the PO & PTS	Compliance certificate	-	-	-	

LEGENDS H-HOLD P-PERFORMANCE R-REVIEW W-WITNESS TC-TEST CERTIFICATE IIR-INTERNAL INSPECTION REPORT
CA-CONTROL AUTHOIRTY TPIA-THIRD PARTY INSPECTION AGENCY

1. The above testing and acceptance criteria are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Particular Technical specifications(PTS)
2. The supplier shall submit their own detailed ITP prepared on the basis of above I Technical specification for approval of Owner / Owner's representative
3. Owner / Owner representative shall review / approve all the documents related to ITP / Quality manuals / Drawings etc. submitted by supplier
4. Contractor shall in coordination with Supplier / Sub vendor issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner / Owner's representative and TPIA to organize Inspection
5. Special manufacturing procedure shave to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6. Owner/ Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7. All reference Codes / Standards documents, P.O. Copies shall be arranged by vendor I supplier for reference of TPIA / Client Consortium at the time of inspection.
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note, dispatch clearance note & MTC.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality	**QUALITY CONTROL TABLES BRASS FITTINGS**	REV.: 0

						INSPECTION		
SR. No	**DESCRIPTION**	**QUANTUM OF CHECK**	**PROCEDURE**	**ACCEPTANCE CRITERIA (As per EN 1057/ PTS)**	**FORMAT OF RECORD**	**VENDOR**	**TPIA/ CLIENT**	**REMARKS**
1	Raw material: Chemical/ Physical Requirement	one in each heat	As per EN 2164	As per EN 12164/ PTS	MTC	P	W	Preferably witness by CA
2	Final product		As per EN 2164			P	W	
3	Resistance dezincification	one in each heat	As per EN 6957	As per EN 1254	Test Report	P	W	
4	Carbon bore test	one in each heat	As per EN 2164	As per ISO 6957/ PTS	Test Report			
5	Stress corrosion resistance test	one in each heat	As per EN 2164	As per ISO 1254/ PTS	Test Report	P	W	
6	Hydrostatic pressure test	100%	As per EN 2164	Min 37.5 bar @ 15 min.	Test Report	P	W	Preferably witness by CA
7	Pneumatic pressure test	100%	As per EN 12164	Min 6 bar @ 15 second	Test Report	P	W	Preferably witness by CA
8	Visual Inspection (Free from defect)	100%	As per EN 12164	As per EN 1254/ PTS	Test Report	P	R	
9	Dimensional Inspection (O.D, Wall thk, Length etc.)	100%	As per EN 12164	As per EN 1254/ PTS	Test Report	P	W	
10	Marking	100%	As per EN 12164	As per EN 1254		P	R	
11	Documentation	-	PO/ PTS	PO/ PTS	Test Report	P	H	

LEGENDS H-HOLD W-WITNESS P-PERFORM TPIA- THIRD PARTY INSPECTION AGENCY CA- CONTROL AUTHOIRTY

1. The above testing and acceptance criteria are minimum requirements; however, manufacturer shall ensure that the product shall also comply to the additional requirements as per specification.
2. The supplier shall submit their own detailed ITP prepared on the basis of above I Technical specification for approval of Owner / Owner's representative.
3. Owner/ Owner representative shall review/ approve all the documents related to ITP / Quality manuals / Drawings etc. submitted by supplier
4. Contractor shall in coordination with Supplier / Sub vendor issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner / Owner's representative and TPIA
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7. All reference Codes / Standards. Documents, P.O. Copies shall be arranged by vendor I supplier for reference of TPIA/ Client Consortium at the time of inspection.
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note, dispatch clearance note & MTC.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality

QUALITY CONTROL TABLES STEEL REINFORCED RUBBER HOSE

REV.: 0

SR. No	DESCRIPTION	TEST PARAMETERS	QUANTUM OF CHECK	PROCEDURE	ACCEPTANCE CRITERIA (As per EN 1057/ PTS)	CERTIFICATE	INSPECTION		REMARKS
							VENDOR	TPIA/ CLIENT	
1	Raw Material	Chemical & Mech Test of material os Steel Reinforced Rubber Hose (Lining, Reinforced	100%	IS 9573	IS 9573	MTC	P	R	
2	Final Product								
3	Final Inspection	Mechanical Properties	one (1) per batch	Tensile Strength = 10Mpa (Min.) El (Lining & Cover) is 200 & 250 resp.	PTS & IS 9573	Inspection Report	P	W	
		Resistance of Lining to n-pentane	one (1) per batch	Shall not exceed 10% absorbed & 5% extractable as per Cl. No. 5.2 of PTS	Cl. 5.4.3.2 of IS 9573	Inspection Report	P	W	
		Adhesion Test	one (1) per batch	Min. Adhesion shall be 2 KN/m as Cl. No. 5.3 of PTS	Cl. 5.5.1 of IS 9573	Inspection Report	P	W	
		Low Temperature Flexibility Test	One (1) per batch	Conditioned at -40 deg for 50 hours and bent at 180 deg around mandrel of dia 12 times the Nominal Bore of hose as per Cl no. 5.4 of PTS	Cl. 5.5.2 of IS 9573	Inspection Report	P	W	
		Flexibility of hose at 1.5 x design pressure	one (1) per batch	Bend empty to radius 95 mm without Flattening & suffering structural damages.	Cl. 5.5.3 of IS 9573	Inspection Report	P	W	Witness by CA
		Ozone Resistance Test	one (1) per batch	Cl. No 5.9 of PTS	Cl. 5.5.4 of IS 9573	Inspection Report	P	W	Witness by CA
		Hydrostatic/ Proof Pr. Test	100%	Min. as per Cl. No. 5.7 of PTS	Cl. 5.5.1 of IS 9573	Inspection Report	P	W	Witness by CA
		Burst test	one (1) per batch	Cl. No. 5.9 of PTS	Cl. 5.5.2 of IS 9573	Inspection Report	P	W	
		Grip Strength test	one (1) per batch		Cl. 5.5.7 of IS 9573 & Annex A of IS 9573	Inspection Report	P	W	
		Burning Test	one (1) per batch	Shall not burn till 45 sec. as per Cl. No. 5.10	Cl. 5.5.8 of IS 9573	Inspection Report	P	W	
		Visual & dimensional check	100%	Cl. No. 4.0 of PTS & IS 9573	IS 9573	Inspection Report	P	R	
		Cover color- Orange	100%	Cl. No. 5.2.3 of PTS	PTS & IS 9573	Inspection Report	P	R	
4	End Fittings (Adaptors, nuts, washer)	-	100%	As per Cl. No. 6.0 of PTS	PTS & IS 9573	Inspection Report		R	
5	Marking	-	100%	As per Cl. No. 7.0 of PTS	PTS & IS 9573	Inspection Report	P	R	
6	Documentation	-	-	As per term & conditions of P.O & PTS	As per term & conditions of P.O & PTS	3.2 Certification as per EN 1024	P	H	

LEGENDS H-HOLD W-WITNESS P-PERFORM TPIA- THIRD PARTY INSPECTIONAGENCY CA- CONTROL AUTHOIRTY

1. The above testing and acceptance criteria are minimum requirements; however, manufacturer shall ensure that the product shall also comply to the additional requirements as per specification.
2. The supplier shall submit their own detailed ITP prepared on the basis of above I Technical specification for approval of Owner / Owner's representative.
3. Owner/ Owner representative shall review/ approve all the documents related to ITP / Quality manuals / Drawings etc. submitted by supplier
4. Contractor shall in coordination with Supplier / Sub vendor issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner / Owner's representative and TPIA
5. Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent
6. Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7. All reference Codes / Standards. Documents, P.O. Copies shall be arranged by vendor I supplier for reference of TPIA/ Client Consortium at the time of inspection.
8. At the time of delivery of material in stores, vendor will submit copy of all related document of inspection along with release note, dispatch clearance note & MTC

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

QUALITY ASSURANCE PLAN
FOR
MDPE PIPE

Consultant : VCS Quality Services Pvt. Ltd.
QAP. No. : VPC-QAP-PE-001
Rev. No.: 0 Date :

S.No.	Activity	Quantum of Check	Acceptance Criteria (IS-14885:2001 or and PTS-71127/D/31/0398)	Format of Record	Vendor	TPIA	Remarks
1	**Raw Material Inspection**						
	Test result of PE compound	Per Lot of Batch of Compound	Cl. No. 5 of IS & PTS	MTC of manufacturer	R	R	Witness may be done by CA to insure use of compound material
2	**Type approval test for long term hydrostatic strength & Others**	-	@ 80 º C for 1000 hours @ 20 º C for more than100 hours As per Table 7 of IS	TPIA approved certificate	R	R	
3	**In-Progress Inspection**						
3.1	**Raw Material Identification at the time of pouring the bags in Hopper.**	Each Bag	Cl. No. 5 of IS & PTS	Consumption Report	P	H	TPI to verify MTC of each batch for consumption
4	**Final Inspection**						
4.1	Visual Apperance						
	a) Smoothness & Cleanliness	One out of 10 Pipes	Smooth & clean or as specified in CL no. 7 of IS 14885	--	P	W	
	b) Surface Defects		Free from grooves, scoring etc. or as specified in CL no. 7 of IS 14885	--	P	W	
	c) Cuttings		Cleanly cut ends & square to axis or as specified in CL no. 7 of IS 14885	--	P	W	
4.2	Dimension						
	a) Outside diameter	One out of 10 Pipes	Cl no. 6 /Table 4 of IS	Inspection Report	P	W	
	b) WallThickness		Cl no. 6 /Table 4 of IS	Inspection Report	P	W	
	c) Ovality		Cl no. 6 /Table 3 of IS	Inspection Report	P	W	
	d) Length		Cl. No. 7.2 & 8 of PTS	Inspection Report	P	W	
4.3	Hydraulic Characterstics						
	80^{O}C for 165 hrs	Table 9	Cl 8.1, Annexure A & B & Table 7 of IS	Hydrotest Report	P	W	Preferably random witness by CA
4.4	Heat reversion test	Table 11	CL 8.2, Annexure C of IS / Not more than 3%	Inspection Report	P	W	
4.5	Density (matl. From pipe)		@ 23 º C $\geq$ 928.4 kg/m3 & '@ 27 º C $\geq$ 930 kg/m3	Inspection Report	P	W	
4.6	Melt Flow Rate - Pipe		Cl 5.3 of PTS	Inspection Report	P	W	
4.7	Thermal Stability to Oxidation		Cl 8.5, Annexure D of IS / OIT $\geq$ 20 minutes	Inspection Report	P	W	
4.8	Volatile Matter Content Test	-	Cl 8.6, Annexure H of IS / $\leq$ 350 mg/kg	Inspection Report	P	W	

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

S.No.	Activity	Quantum of Check	Acceptance Criteria (IS-14885:2001 or and PTS-71127/D/31/0398)	Format of Record	Vendor	TPIA	Remarks
4.9	Tensile Test & Elongation at break	Table 11	Cl 8.7& Annexure J of IS / Tensile Yield Strength = 15 Mpa (min.), Elongation = 350% (Min.)	Inspection Report	P	W	Preferably random witness by CA
4.10	Resistance to weathering	-	Cl 8.8 & Annexure F of IS	Inspection Report	P	R	
4.11	Squeeze Off Test	-	Cl 8.9 & Annexure G of IS	Inspection Report	P	W	
5	**Marking Information**						
	1. Legibility	Table 10	Visual / Should be legible	Inspection Report	P	R	
	2. Depth	Table 10	As per Cl 10.1 of PTS, Depth $\leq$ 0.15 mm	Inspection Report	P	RW	
	3. Marking Strip	Table 10	Cl 10.3 of IS, Single Strip for Pipes with Nominal Size <=32mm & two strips on opposite side of pipe for other pipes.	Inspection Report	P	RW	
	4. Colour or Marking	Table 10	As per Cl 10.2 of PTS, Black colour	Inspection Report	P	RW	
	5. Height of Character	Table 10	As per Cl 10.2 of PTS, Min.3 mm for $\leq$ 90mm pipe sizes & Min. 5 mm for > 90mm pipe sizes.	Inspection Report	P	RW	
	6. Legends	Table 10	As per Cl 10.3 of PTS, At interval of 1 mtrs. And should contain information as specified in PTS	Inspection Report	P	RW	
6	Final Documentation	-	P.O. / PTS	Compliance Certificate	p	H	

LEGENDS: R - Review, W - Witness, RW - Random Witness, H - Hold, P - Perform, TPIA - Third Party Inspection Agency , CA - Control Authority (Owner / owner's representative) , P.O. - Purchase order

Notes: -

1	The Above Testing and acceptance critera are minimum requirements, however, manufacturer shall ensure that the product shall also comply to the additional requirements as per Particular Technical specifications(PTS)
2	The supplier shall submit their own detailed QAP prepared on the basis of above / Technical specification for approval of Owner/Owner's representati
3	Owner/Owner representative shall review/approve all the documents related to QAP/Quality manuals/Drawings etc.submitted by supplier.
4	Contractor shall in coordination with Supplier/Sub vendor shall issue detailed Production and Inspection schedule indicating the dates and the locations to facilitate Owner/Owner's representative and TPIA to organise Inspection.
5	Special manufacturing procedures have to be specially approved or only previously approved procedures have to be used, in case of conflict between specifications more stringent condition shall be applicable.
6	Owner / Owner's representative including TPIA will have the right to inspect any activity of manufacturing at any time.
7	All reference Codes/ Standards, Documents, P.O. Copies shall be arranged by vendor / supplier for reference of TPIA at the time of Inspection
9	At the time of deleivery of materail in stores, vendor will submit copy of all related document of inspection along with release note & MTC.

Prepared by	Reviewed / Checked by	Approved by
(Name / Signature / Date / Stamp)	(Name / Signature / Date / Stamp)	(Name / Signature / Date / Stamp)

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

ENERGISING QUALITY	**LIST OF RECOMMENDED VENDORS FOR BOUGHT OUT ITEMS**		
		TOTAL SHEETS	61
DOCUMENT NO	VCS-00-00-VL-0001		

LIST OF RECOMMENDED VENDORS FOR BOUGHT OUT ITEMS

REV	DATE	DESCRIPTION	PREP	CHK	APPR
17	01.04.2026	Issued as Standard	Durgesh Baghel	Rajesh Sharma	Ashwani Chandra

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

TABLE OF CONTENT

ENERGISING QUALITY 1

A. MECHANICAL & PIPELINE 7

1.0 CARBON STEEL PIPES 7
1.1 PIPE CARBON STEEL TO INDIAN STANDARDS 7
1.2 PIPE & TUBULARS TO A.P.I. STANDARDS 8
1.3 PIPE/TUBE CS (SEAMLESS) TO ASTM STANDARDS 9
1.4 PIPE CARBON STEEL (WELDED) TO ASTM STANDARDS 10
2.0 VALVES 10
2.1 GLOBE VALVES 10
2.2 CHECK VALVES 11
2.3 PLUG VALVES 12
2.4 BALL VALVES 12
2.5 GATE VALVES 13
3.0 TEE 13
3.1 FLOW TEE 13
3.2 SPLIT TEE 13
4.0 FLANGES 13
5.0 FITTINGS 14
6.0 PIG LAUNCHERS/ RECEIVERS/ PIG SIGNALERS 15
7.0 LONG RADIUS BENDS 16
8.0 CLEAN AGENT SYSTEM 16
9.0 INSULATING JOINTS 16
10.0 GASKETS 17
11.0 FASTENERS 17
12.0 WELDING ELECTRODES FOR PIPELINE/PIPING WORK 18
13.0 STRAINERS 18
14.0 COLD APPLIED TAPES 18

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

15.0 HEAT SHRINKABLE SLEEVE/ FIBREGLAS REINFORCED SLEEVE ... 18
16.0 STUD BOLTS WITH NUTS ... 18
17.0 WARNING MAT ... 18
18.0 HDPE PIPES/DUCT ... 18
19.0 DRY GAS FILTER & FILTER SEPERATOR ... 19
20.0 FILTER ELEMENT ... 20
21.0 NDT AGENCY ... 20
22.0 Cold Applied Tapes ... 20
22.1 End Seal Tape-PVC ... 21
23.0 PUR Coating ... 21
24.0 Casing End Closure ... 21
25.0 Casing Insulators ... 21
26.0 FIRE FIGHTING EQUIPMENT ... 21
26.1 FIRE EXTINGUISHERS ... 21
26.2 FIRE HYDRANTS, MONITORS, DELUGE VALVE, NOZZLES ... 21
26.3 FIRE & GAS DETECTION & ALARM ... 22
26.4 RRL Hose ... 22
26.5 HOSES ... 22

B. CIVIL AND STRUCTURAL ... 23
C. ELECTRICAL ... 28

1.0 AIR CONDITIONER ... 28
2.0 BATTERIES (LEAD ACID) ... 28
3.0 BATTERIES (NICKEL CADMIUM) ... 29
4.0 BATTERIES (Lithium-ion) ... 29
5.0 BATTERY CHARGER/DC-DC CONVERTER ... 29
6.0 CABLE – FIRE ALARM & COMMUNICATION CABLES ... 29
7.0 CABLE – HT(XLPE) ... 29
8.0 CABLE – LT / MV POWER AND CONTROL ... 30
9.0 CABLE – GLAND ... 30
10.0 CABLE – LUGS & TERMINAL BLOCKS ... 31
11.0 CABLE – TRAY ... 31
12.0 CABLE TERMINATION AND JOINTING KIT ... 31

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

13.0 CEILING/EXHAUST/PEDESTAL FANS & CIRCULATORS 31
14.0 CONTRACTORS – AC POWER 32
15.0 CONTROL TRANSFORMER 32
16.0 GAS GENERATOR/DIESEL GENERATOR SET 32
17.0 FLAME PROOF LDB'S/ JB'S/CONTROL STATION/ SWITCHES 33
18.0 HIGH MAST 33
19.0 HIGH VOLTAGE PCC/ MCC PANELS 34
20.0 INDICATING LAMPS 34
21.0 INDICATING METERS 34
22.0 LIGHTING FIXTURES 35
23.0 LIGHTING FIXTURES – FLAMEPROOF 35
24.0 MINIATURE CIRCUIT BREAKERS (MCBS) AND LIGHTING DB 35
25.0 MOULDED CASE CIRCUIT BREAKER (MCCBS) 36
26.0 PROTECTION RELAYS 36
27.0 LOW/MEDIUM VOLTAGE POWER CONTROL CENTER (PCC)/ MCC/ PDB/ MLDB/ LDB 37
28.0 PUSH BUTTONS 37
29.0 SWITCHES-CONTROL 38
30.0 SWITCHES – 5/15A PIANO/ PLATE, SWITCH SOCKET 38
31.0 SWITCH SOCKET OUTLETS (INDUSTRIAL) 38
32.0 SOLAR POWER SYSTEM MODULES 38
33.0 SOLAR PCU/CHARGE CONTROLLER 39
34.0 TERMINALS BLOCKS 39
35.0 DISTRIBUTION TRANSFORMERS 39
36.0 UPS SYSTEM AND INVERTER 40
37.0 GI-OCTAGONAL POLE 40
38.0 ELECTRICAL MOTORS 40
39.0 ELECTRICAL PROCESS HEATER 41
40.0 CATHODIC PROTECTION AGENCIES/CONTRACTOR/ VENDERS 41
41.0 BACKUP AGENCY FOR INTERFERENCE SURVEY & MITIGATION 41
42.0 PERMANENT REFERENCE CELL 42

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

43.0 CP CABLES 42
44.0 CP SACRIFICIAL ANODES 42
45.0 CP PORTABLE /PERMANENT REFERENCE CELL 43
46.0 CPTR (AC OPERATED) 43
47.0 PIN BRAZING / THERMITWELD 43
48.0 CP SURGE DIVERTER/SPARK GAP ARRESTOR (EX-D) 43
49.0 CP SOLID STATE POLARISATION CELL. 43
50.0 PETROLEUM COKE BREEZE: 44
51.0 CP ANODE (MMO TYPE): 44
52.0 HEAT SHRINK CAP FOR CP ANODE 44
53.0 ER- PROBE (EXTERNAL CORROSION) ER- PROBE & CORROSION COUPON ASSEMBLY 44
54.0 HEAT SHRINK CAP FOR ANODE TO CABLE JOINT 44
55.0 MMO WIRE ANODES (WITH FACTORY PRE-PACKED COKE BREEZE) 45
56.0 MMO WIRE ANODES (WITHOUT FACTORY PRE-PACKED COKE BREEZE) 45
57.0 MMO TUBULAR/ STRIP/ RIBBON ANODES 45

D. INSTRUMENTATION 46

1.0 PRESSURE GAUGES 46
2.0 TEMPERATURE GAUGES 46
3.0 TEMPERATURE ELEMENTS INCLUDING SKIN TYPE 47
4.0 POSITIVE DISPLACEMENT FLOW METERS 47
5.0 TURBINE FLOW METER 48
6.0 ELECTRONIC VOLUME CORRECTOR 48
7.0 ORIFICES (METER RUN, FLOW CONDITIONER, ORIFICE PLATE AND ASSEMBLY) 48
8.0 ULTRASONIC FLOW METERS 48
9.0 MASS FLOW METERS 48
10.0 FIELD INSTRUMENTS (P, DP, F, L, T) 49
11.0 LEVEL GAUGES/ LEVEL INSTRUMENTS 49
12.0 PRESSURE REGULATOR AND SLAM SHUT VALVE 49

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

13.0 PRESSURE SAFETY VALVES 50
14.0 CONTROL PANEL & ACCESSORIES 50
15.0 JUNCTION BOXES AND CABLES GLANDS 51
16.0 CONTROL AND SIGNAL CABLES 51
17.0 GAS DETECTION SYSTEM 52
18.0 MOV ACTUATOR: 52
19.0 PNEUMATIC ACTUATOR (SOLENOID OPERATED ON-OFF TYPE) 52
20.0 SOLENOID VALVES 53
21.0 ELECTRO – HYDRAULIC ACTUATOR 53
22.0 GAS OVER OIL ACTUATOR 53
23.0 OFC 53
24.0 FLOW CONTROL VALVES 54
25.0 FLOW COMPUTERS 54
26.0 INDICATORS & CONTROLLERS 54
27.0 BARRIERS 54
28.0 GAS CHROMATOGRAPH 55
29.0 I/P CONVERTERS 55
30.0 SS FITTINGS, INSTRUMENT VALVES & MANIFOLDS 55
30.1 FOR CNG WORK: 55
30.2 EXCEPT CNG WORK: 55
31.0 SS TUBES 56
31.1 FOR CNG WORK: 56
31.2 EXCEPT CNG WORK: 56
E. SHOP & FIELD PAINTING 57
1.0 INDIAN VENDORS 57
2.0 FOREIGN VENDORS FOR OVERSEAS PRODUCTS 57
F. FOR PE & LMC WORK (GI/CU) 59
1.0 MDPE PIPE 59
2.0 MDPE FITTINGS & MDPE VALVES 59
3.0 GI PIPE 59
4.0 CASTING GI FITTINGS 59

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

5.0 FORGED GI FITTING (FOR HIGH RISE SEGMENT) 60
6.0 COPPER TUBES & FITTINGS 60
7.0 BRASS VALVES 60
8.0 Isolation & Appliance valves 60
9.0 BRASS FITTINGS 60
10.0 STEEL RE-INFORCED RUBBER HOSE (TYPE-4) 60
11.0 CORRUGATED FLEXIBLE METAL HOSES (ANACONDA) 61

A. MECHANICAL & PIPELINE

1.0 CARBON STEEL PIPES

1.1 PIPE CARBON STEEL TO INDIAN STANDARDS

a. A.S.T. Pipes Pvt. Ltd. (AST Group)
b. Advance Steel Tube Ltd.
c. Apl Apollo Tubes Ltd. (Er. Bihar Tubes Ltd.)
d. Asian Mills Pvt. Ltd.
e. Asrani Tubes Limited
f. Dadu Pipes (P) Ltd.
g. Essar Steel Limited (Er Hazira Pipes Mill)
h. Gaurang Products Pvt Ltd. (Ast Group)
i. Goodluck Steel Tubes Ltd.
j. Hi-Tech Pipes Limited
k. Indus Tube Limited
l. Jindal Industries Ltd
m. Jindal Pipes Ltd.
n. Jindal Saw Ltd (Kosi Works)
o. Jotindra Steel & Tube Ltd
p. Lalit Pipes And Pipes Ltd.
q. Maharashtra Seamless Ltd.
r. Man Industries (India) Ltd. – Pithampur
s. Man Industries (India) Ltd. Anjar
t. Mukat Tanks & Vessels Ltd.
u. Nezone Tubes Limited
v. North Eastern Tubes Limited

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

w. Pratibha Industries Limited
x. Pratibha Pipes & Structural Ltd.
y. Psl Ltd (Chennai)
z. Psl Ltd (V1, V2 & NC)
aa. Rama Steel Tubes Ltd.
bb. Ratnamani Metals And Tubes Ltd.
cc. Ravindra Tubes Limited
dd. Samshi Pipe Industries Limited
ee. Surya Roshni Ltd.
ff. Swastik Pipes Ltd.
gg. Utkarsh Tubes & Pipes Ltd. (Formly Bmw)
hh. Welspun Corp. Limited (Dahej)
ii. Zenith Birla (India) Limited

1.2 PIPE & TUBULARS TO A.P.I. STANDARDS

a. Arcelormittal Tubular Products Roman Sa, Romania
b. Bhel (Trichy),India
c. Dalmine Spa (Enquiry To Tenaris),Uae
d. Eewkorea Co. Ltd (Germany), Korea
e. Eew Korea Co. Ltd. (Korea), Korea
f. Eisenbau Kramer Gmbh, Germany
g. Hyundai Rb Co. Ltd. South Korea
h. Ilva Lamiere E Tubi Srl (Enq To Ilva Spa, Italy
i. Inox Tech. Spa, Italy
j. ISMT Ltd. Ahmedngr, India
k. TATA Steel, India
l. PSL
m. Jindal Pipes Ltd., India
n. Jindal Saw Ltd. (Kosi Works), India
o. Jindal Saw Ltd. (Nashik Works), India
p. Lalit Pipes And Pipes Ltd. India
q. Maharashtra Seamless Ltd., India
r. Man Industries (I) Ltd. (Pithampur), India
s. Mukat Tanks & Vessels Ltd., India
t. Pratibha Industries Limited, India

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

u. Ratnamani Metals And Tubes Ltd., India
v. Siderca S.A.I.C (Enquiry Totenaris), Uae
w. Sumitomo Metal Ind. Ltd., India
x. Surya Roshni Ltd., India
y. Swastik Pipes Ltd, India
z. Tata Steel Uk Limited (Formerly C702)
aa. Tubos De Acero De Mexico Sa (Enq. Tenaris), Uae
bb. Tubos Reunidos Sa Spain
cc. Umran Steel Pipe Inc (Turkey), Turkey
dd. Valcovny Trub Chomutov, Czech Republic
ee. Vallourec And Mannesmann Tubes, France
ff. Welspun Corp Limited (Dahej), India

1.3 PIPE/TUBE CS (SEAMLESS) TO ASTM STANDARDS

a. Arcelormittal Tubular Products Roman Sa, Romania
b. Bhel (Trichy), India
c. Changshu Seamless Steel Tube Co. Ltd., China
d. Dalmine Spa (Enquiry To Tenaris, Uae
e. Heavy Metals & Tubes Limited (Mehsana), India
f. Ismt Ltd. Ahmedngr, India
g. Ismt Ltd. Baramati India
h. Jfe Steel Corporation, Uae
i. Jindal Sdaw Ltd (Nashik Works) India
j. Klt Automotive And Tubular Products Ltd., India
k. Mahalaxmi Seamless Limited, India
l. Maharashtra Seamless Ltd, India
m. Products Tubulares S.A.U, Spain
n. Ratnadeep Metal Tubes Ltd., India
o. Staineest Tubes Pvt Ltd., India
p. Sumitomo Metal Ind. Ltd., India
q. Tubos Reunidos Sa Spain
r. Valcovny Trub Chomutov, Czech Republic
s. Vallourec Andmannesmann Tubes France
t. Yangzhou Chengde Steel Pipe Co. Ltd Dubai (UAE)
u. Jindal SAW Ltd Kosi Kalan Mathura

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

1.4 PIPE CARBON STEEL (WELDED) TO ASTM STANDARDS

a. Eew Korea Co. Ltd. (Germany), Korea
b. Eew Korea Co. Ltd. (Korea), Korea
c. Eisenbau Kramer Gmbh, Germany
d. Hyundai Rb Co. Ltd., South Korea
e. Inox Tech. Spa, Italy
f. Jindal Saw Ltd (Kosi Works), India
g. Lalit Pipes and Pipes Ltd., India
h. Man Industeries (I) Ltd.(Pithampur), India
i. Man Industries (India) Ltd. Anjar, India
j. Mukat Tanks & Vessels Ltd., India
k. Ratnamani Metals And Tubes Ltd., India
l. Sumitomo Metal India Ltd., India
m. Tata Steel Uk Limited

2.0 VALVES

2.1 GLOBE VALVES

a. BDK (New Delhi)
b. Datre Corpn (Calcutta)
c. KSB Pumps (New Delhi)
d. L&T (New Delhi)
e. Neco Schuber & Salzer Ltd. (New Delhi)
f. Niton Valve (Mumbai)
g. Ornate Valves (Mumbai)
h. Panchavati Valves (Mumbai)
i. AV Valves Ltd.
j. BHEL (Trichy), India
k. Econo Valves Pvt Ltd, India
l. Fouress Engg (I) Ltd (Aurangabad)
m. Guru Industrial Valves Pvt Ltd
n. Leader Valves Ltd, India
o. NSSL Ltd. (Neco Schubert & Salzerltd)
p. Oswal Industries Ltd, India
q. Petrochemical Engineering Enterprises, India
r. Sakhi Engineers Pvt Ltd

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

s. Shalimar Valves Pvt Ltd
t. Steel Strong Valves India Pvt Ltd, India
u. Petro Valves Pvt. Limited, Ahmedabad
v. Hawa Engineers Limited, Ahmedabad (Non API)
w. G M Engineering PVT LTD (Non API)
x. Libra Valves India Pvt. Ltd.

2.2 CHECK VALVES

a. Advance Valves Pvt. Ltd., Noida
b. Aksons & Mechanical Enterprises, Mumbai
c. Larsen & Toubro Limited (Audco India Limited, Chennai)
d. AV valves Ltd., Agra
e. BDK engineering India Ltd., Hubli
f. BHEL, OFE&OE Group, New Delhi
g. Datre Coroportion Limited, Calcutta
h. Leader Valves Ltd., Jalandhar
i. Neco schubert & Salzer Ltd., New Delhi
j. Niton Valves Industries (P) Ltd., Mumbai
k. Precision Engg. Co., Mumbai
l. Econo Valves Pvt Ltd, India
m. Fouress Engg (I) Ltd (Aurangabad)
n. KSB Pumps Ltd (Coimbatore), India
o. NSSL Ltd. (Neco Schubert & Salzer Ltd)
p. Oswal Industries Ltd, India
q. Panchvati Valves & Flanges Pvt Ltd, India
r. Petrochemical Engineering Enterprises, India
s. Sakhi Engineers Pvt Ltd
t. Shalimar Valves Pvt Ltd
u. Steel Strong Valves India Pvt Ltd, India
v. Shiv Shakti Engineering Works (Approved up to 06 inch)
y. Hawa Engineers Limited, Ahmedabad
z. G M Engineering PVT LTD (Non API)
aa. Libra Valves India Pvt. Ltd.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

2.3 PLUG VALVES

a. Breda Energia Sesto Industria Spa, Italy
b. Fisher Sanmar Ltd., Chennai
c. Larsen & Toubro Ltd., New Delhi
d. Nordstrom Valves, USA
e. Serck Audco Valves, UK
f. Sumitomo Corporation India Pvt. Ltd., New Delhi
g. Z Corporation, Korea
h. Hawa Valves (India) Pvt. Ltd., Mumbai
i. Steel Strong Valves India Pvt. Ltd., Navi Mumbai
j. Econo Valves
k. Flow-Serve PTE (Mfr. SERCK), India
l. Libra Valves India Pvt. Ltd.

2.4 BALL VALVES

a. Hawa Valves (India) Pvt. Ltd, Navi Mumbai
b. Larsen & Toubro, Delhi
c. Microfinish Valves Pvt. Ltd., Noida
d. Oswal Industries Ltd., Gandhi nagar
e. Virgo Engineers Ltd., Delhi
f. Boteli Valve Group Co. Ltd., China
g. Cameron (Malaysia) SDN BHD, Malaysia
h. Dafram S.P.A., Italy
i. Fangyuan Valve Group Co. Ltd., China
j. Franz Schuck GmbH, Germany
k. O.M.S. Saleri (Italy)
l. Pibi Viesse S.P.A (Italy)
m. Nuovo Pignone (Italy)
n. Perar S.P.A (Italy)
o. Pietro Fiorentini (Italy)
p. Cooper Cameron Valv Italy SRL-FRM, Itly
q. Petrol Valves SRL
r. Tormene Gas Technology S.P.A (VALVITALIA)
s. Petro Valves Pvt. Limited, Ahmedabad
t. Shiv Shakti Engineering Works (Approved up to 08 inch)

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

u. Hawa Engineers Limited, Ahmedabad

v. G M Engineering PVT LTD.

w. DelVal Flow Controls Pvt. Ltd

x. Libra Valves India Pvt. Ltd.

2.5 GATE VALVES

a. Libra Valves India Pvt. Ltd.

3.0 TEE

3.1 FLOW TEE

a. Coprosider SPA, Italy

b. GEA Energy System India Limited, Chennai

c. Multitex Filteration

d. Pipeline Engineering, UK

e. Scomark Engg. Limited (U.K.)

f. Skeltonhall Limited, Engaland(U.K.)

g. Technospecial SPA, Italy

h. Tectubi SPA, Italy

i. RMA Germany

j. Pipefit Engineers Pvt. Ltd.

k. Vee Kay Vikram & Co.

l. United Forge Industries

3.2 SPLIT TEE

a. IPSCO, Canda

b. TD Willamsons, USA

c. Plant-Tech Power Technical Services Pvt Ltd

d. Teemans, UK

e. Vee Kay Vikram & CO.

4.0 FLANGES

a. Aditya Forge Ltd., Vadodara

b. Amforge Industries Ltd., Mumbai

c. CD Engineering Co., Ghaziabad

d. Echjay Forgings Pvt. Ltd. (Bombay), Mumbai

e. Echjay Industries Ltd., Rajkot

f. Forge & Forge Pvt. Ltd., Rajkot

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

g. Golden Iron & Steel Works, New Delhi
h. JK Forgings, New Delhi
i. Metal Forgings Pvt. Ltd., Mumbai
j. Perfect Marketings Pvt. Ltd., New Delhi
k. Sky Forge, Faridabad
l. S&G, Faridabad
m. Chaudhry Hammer Works Ltd, India
n. JAV Forgings (P) Ltd, India
o. Kunj Forgings Pvt Ltd, India
p. MS Fittings
q. R.N. Gupta & Co. Ltd, India
r. R.P. Engineering Pvt Ltd, India
s. Sanghvi Forgings & Engineering Ltd
t. Shri Ganesh Forgings Ltd., India
u. Uma Shankar Khandelwal & Co., India
v. Sawan Engineers, Baroda
w. Stewarts & Lloyds of India Ltd., Kolkata
x. Engineering Services Enterprises
y. Pipefit Engineers Pvt. Ltd.
z. Jindal Forging
aa. Vivial Forges
bb. N J Engineers (Up to 12 Inch Class 600 Only)
cc. United Forge Industries

5.0 FITTINGS

a. Commercial Supplying Agency, Mumbai
b. Dee Development Engineers Ltd.
c. Eby Industries, Mumbai
d. Flash Forge Pvt. Ltd., Vishakhapatnam
e. Gujarat Infra Pipes Pvt. Ltd., Vadodara
f. M.S. Fittings Mfg. Co. Pvt. Ltd., Kolkata
g. Stewarts & Lloyds of India Ltd., Kolkata
h. Teekay Tubes Pvt. Ltd., Mumbai
i. Pipe Fit, Baroda
j. Sky Forge, Faridabad

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

k. S&G, Faridabad

l. Sawan Engineers, Baroda

m. Eby Fasteners, India

n. Leader Valves Ltd, India

o. R.N. Gupta & Co. Ltd, India

p. Exten Engg Pvt Ltd

q. Sivananda Pipe & Fittings Ltd

r. Jindal Forging

s. Vivial Forges

t. PK Tubes Rajasthan

u. CSA Fitting

v. Gujarat Infrapipes pvt ltd, Vadodara

w. KS Pipes Fitting Pvt Ltd, Palwal

x. Tube Bend, Kolkata

y. United Forge Industries

6.0 PIG LAUNCHERS/ RECEIVERS/ PIG SIGNALERS

a. Bassi Luigi Fittings B.V., Holland

b. BRAUN STAHL PIPE TEC, GERMANY

c. FORAIN, ITALY

d. Fluidel SRL, ITALY

e. RMA Maschinen- und, GERMANY

f. Siiritec Nigi, Itlay

g. SCHUCK ARMATUREN, GERMANY

h. T.D. Williamson Inc., USA

i. Tectubi SPA, Italy

j. Taylor Forge Engineering System INC, USA

k. Tormene Americana S.A. (Argentina)

l. Tormene Gas Technology S.p.A., Italy

m. PIPELINE ENGINEERING, UNITED KINGDOM

n. Krohne, Oil & Gas BV, Drive Houston,

o. Multitex Filtration Engrs. Ltd, New Delhi

p. BGR ENERGY SYSTEMS LIMITED New Delhi

q. Glapwell Contracting Services Ltd. UK

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

r. FULGOSI GIOVANNI S.n.c di Corrado & C, ITALY

s. VEEKAY VIKRAM & CO, GUJRAT

t. GBM S.R.L, ITALY

u. Cardew Ltd., Alexeander

v. Forain S.R.L.

w. GD Engineering, India

x. Pipeline Engineering, UK

y. Siirtec Nigi SPA

z. Control Plus

aa. Oswal Infrastructure

7.0 LONG RADIUS BENDS

a. Jindal Saw Ltd. (Kosi Works), India

b. PSL Limited (Gandhidham – Mfrg), India

c. BHEL, Trichy, Tamilnadu

d. Welspun, Gujarat

e. Sawan

f. Gujarat Infra

g. P K Tubes

h. DEE Development

i. Pipefit Engineers Pvt. Ltd.

8.0 CLEAN AGENT SYSTEM

a. ADN Fire Safety Pvt Ltd (Vashi East, Thane)

b. Chetan Corporation (Ahmedabad)

c. Chetan Engineers (Ahmedabad)

d. Mx Systems International Pvt. Ltd. (Mumbai)

e. New Fire Engineers (P) Ltd (Sil Vassa)

f. Nitin Fire Protection Industries Ltd (New Bombay)

g. Nohmi Bosai (India) Private Limited

h. Tyco Fire & Security India Pvt. Ltd (Bangalore)

i. Vimal Fire Controls Pvt Ltd (Vadodara)

9.0 INSULATING JOINTS

a. IGP Engineers

b. V K Vikram

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

c. Advance Electronics

d. Nupros INC

10.0 GASKETS

a. IGP Engineers (P) Ltd., Madras

b. Madras Industrial Products, Madras

c. Dikson & Company, Bombay

d. Banco Products (P) Ltd., Vadodara

e. Goodrich Gaskets Pvt Ltd

f. Starflex Sealing India Pvt Ltd, India

g. Teekay Meta Flex Pvt Ltd

h. UNIKLINGER Ltd

i. HEM Engg. Corp.

j. Unique Industrial Packing Pvt. Ltd.

11.0 FASTENERS

a. Nireka Engg. Co. (P) Ltd., Calcutta

b. Precision Taps & Dies, Bombay

c. AEP Company, Vithal Udyoug Nagar

d. Fix Fit Fasteners, Calcutta

e. Precision Engg. Industries, Baroda

f. Echjay Forgings Pvt. Ltd., Bombay

g. Capital Industries, Bombay

h. Boltmaster India Pvt Ltd, India

i. Deepak Fasteners Limited, India

j. Fasteners & Allied Products Pvt Ltd, India

k. Hardwin Fasteners Pvt Ltd, India

l. J.J. Industries, India

m. Multi Fasteners Pvt Ltd, India

n. Nexo Industries, India

o. Pacific Forging & Fasteners Pvt Ltd, India

p. Pioneer Nuts & Bolts Pvt Ltd, India

q. Precision Auto Engineers, India

r. President Engineering Works, India

s. Sandeep Engineering Works, India

t. Syndicate Engineering Industries, India

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

12.0 WELDING ELECTRODES FOR PIPELINE/PIPING WORK

a. For Mainline – Lincoln/ Bohler make

b. For Terminal – For root pass –Lincoln/ Bohler make

For other passes – Lincoln, D&H or equivalent make Lincon

c. D & H SECHERON ELECTRODE PVT. LTD. (For Mainline & Terminal- Root & Other pass)

13.0 STRAINERS

a. Bombay Chemical Equipments

b. Gujarat Auto filed

c. Multitex Filtration Engineering Limited

d. Grand Prix Engineering Limited

14.0 COLD APPLIED TAPES

a. Denso GmbH

b. Raychem

15.0 HEAT SHRINKABLE SLEEVE/ FIBREGLAS REINFORCED SLEEVE

a. Covalence - Seal For Life India Pvt. Ltd. (Formerly Covalence Raychem- Berry Plastics Corporation)

b. Canussa-CPS

c. Rigil Techno India(Distributor for M/s CYG Changtong New Material Co Ltd,China)

d. M/s Shri Narayan lmpac-lndia LLP

16.0 STUD BOLTS WITH NUTS

a. Multi Thread Fasteners, Baroda

b. Darukhanwala

c. Precision Engineers, Baroda

d. Unbrako

e. TVC

17.0 WARNING MAT

a. Sparco Multiplast Pvt. Ltd., Ahmedabad

b. Singhal Industries , Ahemdabad

c. Puja Packing, Mumbai

d. Bina Enterprises, Mumbai

e. Shree Vijay Wire & Cable Industries

18.0 HDPE PIPES/DUCT

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

a. Climax Synthetics (P) Ltd., Vadodra
b. Indian Poly Pipes, Calcutta
c. Jain Irrigation Systems Ltd., Jalgaon
d. Kirti Industries (India) Ltd., Indore
e. Ori Plast Limited, Calcutta
f. Phoel Industries Limited, Delhi
g. Sangir Plastics (P) Ltd., Mumbai
h. Veekay Plast,Jaipur
i. Kisan Irrigation
j. Dutron Polymers Ltd.
k. Manikya Plastichem (P) Ltd
l. Himalyan Pipe Industries
m. NorthEast Polypipes LLP
n. Mukand Poly Products (for Duct)

19.0 DRY GAS FILTER & FILTER SEPERATOR

a. Grand Prix Fab (Pvt.) Ltd. (New Delhi)
b. Perry Equipment, USA
c. Faudi Filter, Germany
d. Forain S.r.l., Italy
e. ABB, Faridabad
f. Burgess Manning, USA
g. Multitex Filtration Engineers India
h. Triveni Plenty Engg. Ltd. (New Delhi)
i. Siirtec International Contractor S.P.A (Italy)
j. Flashpoint, Pune india
k. Filteration Engineers (I) Pvt Ltd, India
l. Gujarat Otofilt, India
m. Tormene Gas Technology
n. Ultrafilter (India) Pvt Ltd, India
o. Ravi Techno Systems Pvt Ltd, India
p. Siirtec Nigi S.P.A
q. Filtan Filter Anlagenbau Gmbh
r. Fairley Arlon BV
s. PECO Facet

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

t. EPE Epenstenner GMBH

u. Filtrex srl

v. Petromar Engineered Soln

w. Plenty Filter

x. Eurofiltec

y. PTI Technologies Inc

z. R S Instrumentation and Services

aa. Inel Gas Control Pvt Ltd

20.0 FILTER ELEMENT

a. Peco – Facet

b. Velcon

c. Pall – Filterite

d. Burgress Manning

21.0 NDT AGENCY

a. NDT Services, Ahmedabad

b. GEECY Industrial Services Pvt. Ltd., Mumbai

c. Corrosion Control Services, Mumbai

d. Perfect Metal Testing & Inspection Agency, Calcutta

e. Inter Ocean Shipping Co., New Delhi

f. RTD, Mumbai

g. Sievert, Mumbai

h. X-Tech, Vizag

i. Industrial X Ray and Allied Radiographers (I) Pvt. Ltd.

j. Inspection Technology

k. IXAR

l. Aditya NDT Services

m. Riya NDT Engineers

n. Star NDT Services

o. Technical testing & Inspection Services

p. PD Engineering Inspection Services

q. Victor Engineering & Testing

22.0 Cold Applied Tapes

a. Denso GmBH
b. Polyken (Berry Plastics Corporation)

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

22.1 End Seal Tape-PVC

a. MAASH Industries

23.0 PUR Coating

a. Powercrete (Berry Plastics Corporation)

24.0 Casing End Closure

a. Raci, Italy
b. Raychem RPG Limited

25.0 Casing Insulators

a. Raci, Italy
b. Raychem RPG Limited
c. VeekayVikram

26.0 FIRE FIGHTING EQUIPMENT

26.1 FIRE EXTINGUISHERS

a. Avon Services (Production & Agencies) Pvt. Ltd., Bombay
b. Kooverji Devshi & Co., Bombay
c. Reliable (Fire Protection) India Ltd., Bombay
d. Zenith Fire Services, Bombay
e. Safex Fire Services, Bombay
f. Brij Basi Hi
g. tech Udyog
h. Bharat Engg Works, India
i. Gunnebo India Ltd
j. Nitin Fire Protection Industries Ltd, India
k. Supremex Equipments, India
l. Vimal Fire Controls Pvt Ltd., India

26.2 FIRE HYDRANTS, MONITORS, DELUGE VALVE, NOZZLES

a. Zenith
b. Minimax
c. Newage
d. HD Fire
e. Vijay Fire

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

f. Asco Strumech Pvt Ltd, India

g. Brij Basi Hi

h. tech Udyog

i. Gunnebo India Ltd

j. Nitin Fire Protection Pvt Ltd

k. Shah Bhogilal Jethamal & Brothers

l. Pumps & Engineering Works

26.3 FIRE & GAS DETECTION & ALARM

a. Ambetronics Engineers PVT LTD.

26.4 RRL Hose

a. Jayshree

b. Newage

26.5 HOSES

a. Ashit Sales Corporation, Bombay

b. Royal India Corporation, Bombay

c. Gayatri Industrial Corporation

d. Simplex Rubber Products Ltd., Ahmedabad

e. Zaverchand Marketing Pvt. Ltd., Baroda

f. Presidency Rubber Mill, Calcutta

g. The Cosmopolite, Calcutta

h. Simplex Rubber Products, Thane

NOTE:

1) For procuring bought out items from vendors other than those listed above, the same may be acceptable subject to the following: -

   a) The vendor/ supplier of bought out item(s) is a manufacturer/ supplier of said item(s) for intended services and the sizes being offered is in their regular manufacturing supply range.

   b) The vendor / supplier should not be in the Holiday list of CLIENT / VCS / other PSU.

   c) Should have supplied at least one single random length (i.e. 5.5 meters to 6.5 meters) for item assorted pipes / tubes and for other items, which are to be supplied in quantity on number-basis (other than assorted pipes / tubes) minimum 01 (One) number of same or higher in terms of size and rating as required for intended services. The bidder should enclose documentary evidences i.e. PO copies, Inspection Certificate etc. for the above, along with their bids.

2) For any other item(s) for which the vendor list is not provided, bidders can supply those item(s) from vendors/ suppliers who have earlier supplied same item(s) for the

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

intended services in earlier projects and the item(s) offered is in their regular manufacturing/ supply range. The bidder is not required to enclose documentary evidences (PO copies, Inspection Certificate etc.) along with their offer, however in case of successful bidder, these documents shall require to be submitted by them within 30 days from date of Placement of Order for approval to CLIENT / VCS.

3) The details of vendors indicated in this list are based on the information available with VCS, Contractor shall verify capabilities of each vendor for producing the required quantity with. PMC does not guarantee any responsibility on the performance of the vendor. It is the contractor's responsibility to verify the correct status of vendor and quality control of each parties and also to expedite the material in time.

B. CIVIL AND STRUCTURAL

Sr. No.	Items/ Name of Products	Make/ Brands/ Manufactures
1.	Reinforcement Steel	TATA, SAIL, RINL, JSW.
2.	Cement	Ambuja, ACC, JK, Grasim, Ultratech, Birla, L&T, Cement Corporation of India
3.	Structural Steel	TATA, SAIL, RINL, IISCO, ESSAR
4.	Structural Steel Tubes ISI Marked	TATA, JINDAL, SURYA
5.	Mineral wool for thermal insulation of ceilings (Under deck insulation)	Rock wool (india) Ltd. Minwool Rock Fibres Ltd., Lloyd Insulation.
6.	Synthetic Enamel Paint (1st quality only)	ICI Paint (Dulux), Asian Paint (Apcolite), Berger Paints (Luxol). Goodlass Nerolac Paints (Nerolac), Jenson & Nicholson Paints Ltd (Borolac)
7.	G.I SHEET	ESSAR, JSW, SAIL
8.	Sheeting Screw	Corroshield, Buildex,
9.	Chemical for Antitermite treatment	DE- NOCIL Bombay, Pest Control of India, Trishul
10.	Factory made Panelled Door shutter	Century; Godrej ; M/s Hindustan Housing factory Ltd., New Delhi ; M/s Delhi Construction Eqp, Sadar Bazar, Delhi ; M/s Joinery manufacturing Co., Calcutta;
11.	PVC Panel Door (Solid Core)	Rajshri Plastiwood Limited, Sintex, Hindopan, Marino
12.	Pressed steel door frames/ cupboard and window frames (manufacturers)	M/s SAIL, M/s TATA
13.	Pressed steel door frames/ cupboard and window frames (fabricators)	M/s Loyal safe works Mayapuri, N/Delhi M/s Multiwyn Industrial Corpn Calcutta M/s Metal Window Corpn N/Delhi

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

		M/s Chhabra Steel Udyog, 260 Sadar Bazar, Meerut Cantt. M/s Delite safe works, Rani Jhansi Road, N/Delhi
14.	Steel Windows, Ventilators (as per IS- 1038 of 1983) & frames pressed steel door/window	M/S Multiwyn Industrial Corpn, Calcutta ; M/S Metal Window Corp, N/ Delhi ; M/S Chhabra Steel Udyog 260, Sadar Bazar, Meerut Cantt ; Agent steel MFG Pvt Ltd, Ahmedabad ; Godrej ;
15.	AI Section for AI Door/ Window/ Partitions	Hindalco, Ajit India, Jindal
16.	AluminumI Door/ Window/ Glazing Fabricated and Anodized	M/s Alumilite Pvt Ltd, M/s Ajit India Pvt Ltd, M/s Ramniklal S Raste Agra, Argent Industries, M/s Aluminium Tech Industries, I-2249 DSIDC Narela, Delhi, M/s VR Associates, GH-14/242 Paschim Vihar, Delhi
17.	Aluminium door and windows Fittings	M/s Elite Enterprises C/6 Shalimar Hardware 133, Jarg Mahal, Dhobitalao Mumbai 400002. M/s Mohan Metal Industries 178/2-A, Bhole Nath Nagar, Shahadara, Delhi 110032. Mepro, Argent New Delhi, Classic, New Delhi. Jindal, Argent New Delhi,Golden Industries Pvt. Ltd. ECIE
18.	Aluminium Grill	Alu Grill, Arihant Aluminium Corporation, Decogrille
19.	Door Closer	Everite, Golden, Gandhi,
20.	Floor Spring	Prabhat, Everite
21.	Plywood for general purpose (IS-303)	National Plywood Inds Pvt Ltd, S Fancy lane, 8th floor, Calcutta-700001, Merino Plywood, Archid Ply, Ply, Swastik, Universal, Century, Greenply, National.
22.	Pre laminated Particle board	Kitply, Bhutan board, Ecoboard, Novapan, Archid ply, Merinova, Merino
23.	Laminated Sheets	Formica, Merino Lam, Greenlam, National,Century
24.	Modular Partitions	Godrej, Blowplast
25.	False Ceiling (Mineral Fibre Board)	Armstrong, Daiken, Luxalon, Llyods, Gypboard, Trac, Aerolite
26.	Aluminium False Ceiling	Lloyds, Armstrong, Luxlon,Trac
27.	Flooring Tiles (Mosaic / Terrazzo / PCC) (1st quality only)	Kajaria Ceramics, NITCO, Royal Tiles, Gem Tiles, Hindustan Tiles, M/S National Tiles & Industries, Ultra Tiles
28.	Glazed Ceramic Tiles, Non-Skid (Floor/Wall), (1st quality only)	Kajaria, Somany, NITCO. Murudeshwar Ceramic Ltd (Navin Diamond tile), Johnson (Marbonite),
29.	Vitrified/ Designer Vitrified Tiles (1st quality only)	Asian, Marbonite (Johnson), Kerrogres (Kajaria), NITCO, Orient
30.	PVC Tiles/Flooring (IS 3461) (1st quality only)	Marblex Tiles, Krishna Tiles, Polyfin, Armstrong, Wonder floor.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

31.	False Flooring	Godrej or equivalent
32.	Glass Mosaic Tiles (1st quality only)	Paladio, Coral, Accura, Bisazza, Italia, Mridul.
33.	Designer Paver Tiles/ Interlocking tiles ISI marked/ Grass-jointed Tiles. (1st quality only)	Pavit, Ultra, Hindustan, Eurocon, Vyara, National Tiles, Gem, Unistone, Konkrete, Unitile
34.	Wall care Putty for Base preparation (1st quality only)	Birla Wall care putty, Berger, Jenson & Nicholson, JK White
35.	White Cement (1st quality only)	Birla, JK
36.	Cement based Paints (1st quality only)	Super Snowcem, Duracem, Super Acrocem.
37.	Dry Distemper / Oil bound Distemper (1st quality only)	Goodlass Nerolac Paint, Shalimar Paint, Jenson & Nicholson, Asian Paint, Berger. ICI Dulux
38.	Acrylic Washable Distemper (1st quality only)	Asian, Berger, ICI Dulux, Jenson & Nicholson, Nerolac, Shalimar, Garware & Goodlass
39.	Plastic Emulsion Paint (1st quality only)	Asian, Berger, ICI, Nerolac, Jenson & Nicholson, Shalimar,Garware & Goodlass
40.	Exterior Acrylic Emulsion (1st quality only)	ICI (Weathercoat), Excel (Nerolac), Apex (Asian), Berger, Jenson & Nicholson, Shalimar,Garware & Goodlass
41.	Polymer based Paint	STP, CICO
42.	Textured Paint / Wall Tile (1st quality only)	Unitile, Heritage, Spectrum, Iokos, Acropaints, Asian
43.	Flexible board for Expansion joint	STP or equivalent
44.	Grout	Shrinkomp, Fosroc,Fairmate
45.	Integral water proofing compound	STP, Pidilite, Fosroc, CICO, Sika.
46.	Concrete Admixture	Pidilite, Fosroc, CICO, Sika.
47.	Water proofing for cementations surface IS-2645	Acrocrete & Acrocote, CICO, Fosroc, STP
48.	Bituminous Product	M/s Faridabad Spinning & Woolen Mills Pvt Ltd, 837, SP Mukherjee Marg Delhi, M/s STP Ltd (Formerly Shalimar Tar Products) M/s Bitufelt Pvt Ltd 123/377 Fazalm Ganj Kanpur 208012, Texas, Texas India Ltd, Multiplas
49.	Hardeners	Ironite, Ferrok, Hardonate
50.	Construction Chemicals	Choksey, CICO, Forsroc, Sika

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

51.	Stainless Steel Cladding	Jindal
52.	Punch Tape Concertina Coil	Global Technocrat, S.G. Engineers Delhi
53.	Stainless Steel Railing	Jindal
54.	FRP/ HDPE Garbage Bins	Sintex, Swift, Nutech, Sheetal
55.	Sanitary ware	Neycer Kermag (standard), Hindustan Sanitary Ware (Ist quality), Parryware (superfine), Cera (Ist quality), Classica (Ist / standard)
56.	WC seat cover ISI Marked	Parryware, Neycer Kermag (standard), Hindustan Sanitary Ware (Ist quality), Cera (Ist quality), Classica (Ist / standard)
57.	PVC Flushing Cistern IS: 774-1984 (ISI Certified)	Parryware, Hindustan Sanitary Wares, Cera.
58.	Faucets & Taps, Stop Valves & Pillar Taps, Surgical basin mixer, Shower rose etc.	Gem, Parko, Parryware, HSW, Jaquar
59.	Kitchen Stainless Steel Sink	Diamond, Nirali, Neel Kanth, Jayna
60.	Looking Mirror	Saint Gobain, Modi Float, Triveni Float Glass, Crown, Atul.
61.	Readymade Bathroom Cabinets	Commander Gratings (I) Pvt Ltd, Gratolite Cabinet, A- 4 Sector Viii Noida-202701, Alpina, Cera.
62.	Float Valve	Leader, Bombay Metal & Alloy Co, Bombay superflow.
63.	SGSW Pipes (IS-651) ISI Marked	Perfect Agra, Devraj Ind Gaziabad, Buran, RK, Prince,
64.	CI (Centrifugally Cast) Pipes for sewage disposal ISI marked	NICCO, SRIF, A-1 Singhal Casting Co Agra, Jindal Saw, Kesoram, NECO
65.	PVC rain water/sewage pipes (IS-4985)	Reliance, Finolex, Supreme, Kisan, Prince, Hindustan Plastic & machine corporation, Polypack industries (P) Ltd.
66.	HDPE Water storage tanks (Rotational Moulded)	Sintex, Swift, Nutech, Sheetal
67.	Cast Iron Pipes and Fittings	Hindustan Engineering Products Company Calcutta, S.L.C., Standard approved manufacturers of any other brand of fittings having ISI marking, RIF, BIS
68.	RCC Pipes	Indian Hume Pipe Company, Delhi / Allahabad / Chandigarh / Lucknow; Hindustan Pressure Pipes, Kolhapur; Dhere Concrete Products, Pune or any other approved manufacturer conforming B.I.S. Standard
69.	Brass Fittings	Leader Engineering Works, Jalandhar; L & K Mathura; Luster Sanitary, Jalandhar; Annapurna Metal Works, Calcutta; Neta Metal Works, Jalandhar
70.	C.P. Fittings	Ego Metal Works, Ballabhgarh; Jaquar Industries, Delhi; Soma Plumbing Fixtures Limited, Calcutta; Gem Sanitary Appliances Pvt. Ltd., Delhi; Essco

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

		Sanitations, Delhi.
71.	Stone Ware (Salt-Glazed) Pipes	Hind Ceramics Limited, Orissa; Ceramic Industries Limited, Sambalpur; Shrikamakshi Agencies, Madras; Binary Udyog Pvt. Limited, Howrah; Tirumati Moulds Limited, Nagpur.
72.	Asbestos Cement Pipes and Fittings	Ganga Asbestos Limited, U.P.; Hyderabad Asbestos Cement Products Limited; J.K. Super Pipe Industries, Nanded; Konark Cement and Asbestos Limited, Orissa; Maharashtra Asbestos Limited, Bombay.

List of Recommended Vender/Suppliers of Major Bought-Out Items: Unless otherwise specifically mentioned in the Schedule of Items, Contractor has to use materials as listed below, of only these brand names/Company's names, which are mentioned in the RECOMMENDED list for structural items thereon.

Sl. No.	Items/Name of Products	Makes/Brands/Manufactures
1	Structural Steel	SAIL / TATA / RINL / IISCO / ESSAR / ISPAT
2	Structural Steel Tubes ISI Marked	TATA / JINDAL / SURYA / SWASTIK
3	Synthetic Enamel Paint 1st Quality only	ICI Paint (Deluxe), Asian Paint (Apcolite), Shalimar Paint (Superlac), Goodlass,Nerolac Paint (Nerolac), Berger Paints

Any materials not fully specified in these specifications and which may be offered for use in the works shall be subject to approval of Engineer, without which it shall not be used anywhere in the construction works.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

C. ELECTRICAL

LIST OF SUPPLIERS OF MAJOR BOUGHT-OUT ITEMS

1.0 AIR CONDITIONER

a. Blue Star
b. O General.
c. Daikin.
d. Carrier
e. Hitachi.
f. LG.
g. Lloyds
h. Mitsubishi
i. Panasonic
j. Sharp
k. Samsung.
l. Blue star.
m. Haier.
n. Voltas.
o. Videocon.

2.0 BATTERIES (LEAD ACID)

a. Amco Batteries Ltd.
b. Exide Industries Ltd.
c. HBL Power System Ltd.
d. Amara Raja Batteries Ltd.
e. Su-Kam Power Systems Ltd.
f. Base Corporation Ltd.
g. Okaya Power Ltd.
h. Southern Batteries Pvt Ltd.
i. True Power International Ltd.
j. Evolute Solutions Pvt Ltd.
k. Greenvision Technologies Pvt Ltd.
l. Artheon Electronics Ltd.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

3.0 BATTERIES (NICKEL CADMIUM)

a. Amco Saft Batteries Ltd.

b. HBL Power Systems Ltd.

4.0 BATTERIES (Lithium-ion)

a. PROSTARM INFO SYSTEMS LTD.

5.0 BATTERY CHARGER/DC-DC CONVERTER

a. Amara Raja Power System(P)Ltd.

b. BCH.

c. Chhabi Electricals Pvt. Ltd.

d. Caldyne Automatics Limited.

e. HBL Nife Power Systems Ltd..

f. Universal Instrument Mfg. Co Pvt Ltd.

g. Hitachi HI-REL Power Electronics P. Ltd

h. Mass-Tech Controls Pvt Ltd

i. Dubas Engineering Pvt Ltd

j. Chloride Power Systems & Solutions Ltd

k. Synergee

l. Enertech

m. Vertiv

6.0 CABLE – FIRE ALARM & COMMUNICATION CABLES

a. Cords Cable Industries Ltd.

b. CMI.

c. Delton cables Ltd.

d. ELKAY Telelinks.

e. KEI Industries Ltd.

f. Elkay Telelinks

7.0 CABLE – HT(XLPE)

a. Universal Cable Ltd.

b. KEI Industries Ltd.

c. Industrial Cables.

d. NICCO Corporation Ltd.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

e. Uniflex.

f. Polycab.

g. Torrent cables Ltd.

8.0 CABLE – LT / MV POWER AND CONTROL

a. Cords Cable Industries Ltd.

b. Universal Cable Ltd.

c. KEI Industries Ltd.

d. Havells.

e. Delton.

f. Elkay Telelinks.

g. Evershine Electricals.

h. Ecko.

i. Ravin.

j. Rallison.

k. Suyog.

l. Netco.

m. Uniflex.

n. Paramount.

o. Gloster.

p. Associated cables Pvt Ltd.

q. CMI.

r. Gemscab.

s. Industrial cables.

t. NICCO.

u. Polycab.

v. Torrent.

9.0 CABLE – GLAND

a. Baliga.

b. Comet.

c. Flexpro.

d. Flameproof.

e. FCG.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

f. Electro Werke.

g. Dowels.

h. CCI.

i. Sudhir Switchigear

j. Keyson Techno Equipments,

k. RAY Flameproof Pvt Ltd

10.0 CABLE – LUGS & TERMINAL BLOCKS

a. Dowels.

b. Jainson.

c. Sharma Electrical

d. Punitam

e. Yamuna Powers

f. Rapid Manufacturer

g. Varun Controls.

11.0 CABLE – TRAY

a. Ercon Composites.

b. Yamuna Power & Infrastructure Ltd.

c. MEM

d. Bharti

e. Profab.

f. Ratan.

g. Slotco.

12.0 CABLE TERMINATION AND JOINTING KIT

a. CCI.

b. Raychem.

c. M-Seal.

13.0 CEILING/EXHAUST/PEDESTAL FANS & CIRCULATORS

a. Bajaj Electricals Ltd.

b. Crompton Greaves Ltd.

c. Khaitan Electricals Ltd.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

d. Havell's.
e. Philips
f. Usha
g. Orient

14.0 CONTRACTORS – AC POWER

a. Andrew Yule.
b. ABB.
c. BHEL.
d. C&S.
e. Havell's.
f. L&T.
g. Schneider.
h. Siemens Ltd.
i. Telemechanique.
j. GE India Industrial

15.0 CONTROL TRANSFORMER

a. AE.
b. Indushree.
c. Intra Vidyut.
d. Kalpa Electricals.
e. Transpower Industries Ltd.
f. Siemens.
g. PROSTARM INFO SYSTEMS LTD.

16.0 GAS GENERATOR/DIESEL GENERATOR SET

a. Sterling and Wilson.
b. Jackson Limited.
c. Sudhir Gensets.
d. Power Engineering (India) Pvt Ltd.
e. Prasha Technologies Limited.
f. Kumar Generator house.
g. Ashok Leyland Ltd.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

h. Powerica Limited.
i. Supernova Engineers Limited.
j. Bhaskar Power Products (P) Ltd.
k. Caterpillar India (P) Ltd.
l. Cummins India Ltd.
m. Escorts Ltd.
n. Greaves Cotton Ltd.
o. Kirloskar ltd.
p. Mahindra & Mahindra Ltd.
q. Honda.
r. Perkins.
s. Eicher.
t. Tata Motors.
u. Ashok Leyland.

17.0 FLAME PROOF LDB'S/ JB'S/CONTROL STATION/ SWITCHES

a. FCG.
b. Sudhir switchgears.
c. Prompt Engineering Works
d. Flame Proof equipments pvt. Ltd.
e. Baliga Lighting Equipments Pvt. Ltd.
f. Flexpro Electricals Pvt. Ltd.
g. Exprotecta, Beroda.
h. FFLP Control Gears.
i. Sterling.
j. Kaysons Techno Equipment
k. Bajaj
l. Phoenix Contact
m. RAY Flameproof Pvt Ltd

18.0 HIGH MAST

a. Bajaj Electricals Limited.
b. Crompton Greaves Limited.
c. Philips India Limited.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

d. Surya Roshani.

e. Transrail

19.0 HIGH VOLTAGE PCC/ MCC PANELS

a. BHEL.

b. Control and Switchgear.

c. Siemens.

d. ~~Tricolite Electrical Industries~~.

e. Schneider.

f. CGL.

g. L&T.

h. ABB.

20.0 INDICATING LAMPS

a. Alstom Ltd.

b. BCH.

c. L&T Ltd.

d. Siemens Ltd.

e. Vaishno Electricals.

f. Tecknik

g. ABB

21.0 INDICATING METERS

a. L&T

b. ABB.

c. AMCO.

d. AE

e. Alstom Ltd. (EE).

f. Conzerv/Schneider

g. Elecon Measurement Pvt. Ltd.

h. HPL Electric & Power Pvt. Ltd.

i. MECO Instruments Ltd.

j. Minilec.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

k. Rishabh Instruments Pvt. Ltd.

l. Trinity energy system.

m. Kaycee.

n. Salzer.

o. Trinity

p. Secure Meters Limited

22.0 LIGHTING FIXTURES

a. GE Lighting Pvt. Ltd.

b. Bajaj Electricals Ltd.

c. Crompton Greaves Ltd.

d. Philips India Ltd.

e. Havells

f. Wipro

g. Osram

h. Siska

i. Halonix

j. Surya

k. Polycab

l. Kawlity Photonix

23.0 LIGHTING FIXTURES – FLAMEPROOF

a. Bajaj Electricals Ltd.

b. Baliga Lighting Equipment Pvt. Ltd.

c. Crompton Greaves Ltd.

d. CEAG Flameproof Controlgear Pvt. Ltd.

e. Flexpro Electricals Pvt. Ltd.

f. Philips India Ltd.

g. Sudhir Switchgears Pvt. Ltd.

h. FCG.

24.0 MINIATURE CIRCUIT BREAKERS (MCBS) AND LIGHTING DB

a. ABB.

b. Hagger.

c. Havell's India Ltd.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

d. Indo Asian Fusegear Ltd.
e. Legrand.
f. MDS Switchgear Ltd.
g. Schneider.
h. Siemens Ltd..
i. HPL.
j. L & T
k. Siemens

25.0 MOULDED CASE CIRCUIT BREAKER (MCCBS)

l. ABB.
m. Andrew Yule.
n. Larsen & Toubro.
o. Schneider.
p. Siemens.
q. Control and Switchgear.
r. Indo Asian,
s. Hager.
t. Merlin Gerin.
u. Havell's India Ltd
v. General Electric

26.0 PROTECTION RELAYS

a. BCH.
b. L&T Ltd.
c. Siemens Ltd.
d. Tele-menchanique & Controls (India) Ltd.
e. Eaton
f. Alsthom
g. ABB
h. Ashida
i. Novatek Electronics
j. Cantronics
k. Control & Switchgear
l. Frick Electronics

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

m. Indian Technologies

n. Rao Electromechanical

o. Kudam Corporation

27.0 LOW/MEDIUM VOLTAGE POWER CONTROL CENTER (PCC)/ MCC/ PDB/ MLDB/ LDB

a. ABB.

b. BCH.

c. BHEL.

d. C & S.

e. Elecmech Switchgear & Instrumentation.

f. KMG ATOZ.

g. L&T.

h. Pyrotech Electronics Pvt. Ltd.

i. Risha Control Engineers Pvt. Ltd.

j. UDKAM PROCESS EQUIPMENT INDIA PVT. LTD

k. Tricolite Electrical Industries.

l. Unilec Engineers ltd.

m. Vidyut Control India Pvt. Ltd.

n. Control and Schematic.

o. Zenith Engineering.

p. Schneider Electric,

q. AEG,

r. HAVELL'S,

s. MDS

t. Synergy System

u. Expert Engineers

v. R K Engineering & Infrastructure

28.0 PUSH BUTTONS

a. BCH.

b. Alstom Ltd.

c. L&T.

d. Siemens Ltd.

e. Tele-Menchanique & Controls (India) Ltd.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

f. Vaishno Electricals.

29.0 SWITCHES-CONTROL

a. BCH.

b. Easum Reyrolle Relays & Devices Ltd.

c. Alstom.

d. Kaycee Industries Ltd..

e. L&T.

f. Siemens Ltd.

30.0 SWITCHES – 5/15A PIANO/ PLATE, SWITCH SOCKET

a. Anchor Electronics & Electricals Pvt. Ltd.

b. Kingal Electricals Pvt. Ltd.

c. North-West Switchgear Ltd.

d. Schneider

e. Havells

f. Cona

g. Orient

h. Panasonic

31.0 SWITCH SOCKET OUTLETS (INDUSTRIAL)

a. Alstom Ltd.

b. Best & Cromption Engineering Ltd.

c. BCH.

d. Crompton Greaves Ltd.

e. Essen Engineering Company Pvt. Ltd.

32.0 SOLAR POWER SYSTEM MODULES

a. Tata Power Solar Systems Ltd

b. REIL,

c. CEIL,

d. HBL Power.

e. Vikram Solar.

f. Waaree Solar.

g. Solar Semiconductor.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

h. Sonali.
i. Mundra Solar
j. Vikram Solar
k. Bharat Electronics Limited
l. Waaree
m. Lumipex
n. Independent Qualitative Accessories
o. Statcon Energy
p. Volks Energy
q. Green Engineering

33.0 SOLAR PCU/CHARGE CONTROLLER

a. Statcon Energy
b. Enertech UPS Pvt Ltd
c. Consul Nowatt
d. OPS India
e. Schneider
f. Delta Electronics
g. ABB Ltd
h. KACO
i. SMA
j. HBP Power
k. Universal Instrument

34.0 TERMINALS BLOCKS

a. Connectwell.
b. Controls & Switchgear Co. Ltd.
c. Elmex Controls Pvt. Ltd.
d. Essen Engineering Co. Pvt. Ltd.
e. Phoenix Contact

35.0 DISTRIBUTION TRANSFORMERS

a. ABB.
b. Andrew Yule.
c. Areva.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

d. BHEL.
e. Bharat Bijlee
f. Crompton Greaves.
g. EMCO Ltd.
h. Intra Vidyut.
i. Indushree.
j. Indcoil
k. Kirloskar.
l. Skippers Electricals.
m. Transformers & Rectifiers (I) Ltd.
n. Voltamp.

36.0 UPS SYSTEM AND INVERTER

a. DB Power.
b. Keltron.
c. Hi-Rel/HITACHI.
d. Dubas.
e. Toshiba Corporation.
f. Fuzi Electric Co Ltd.
g. Emerson.
h. Synergy System.
i. Eaton.
j. Enertech
k. PROSTARM INFO SYSTEMS LTD.

37.0 GI-OCTAGONAL POLE

a. Bajaj.
b. Transrail.
c. Wipro.
d. K.L. Industries.

38.0 ELECTRICAL MOTORS

a. Siemens.
b. Crompton Greaves.
c. Kirloskar.
d. BHEL.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

e. Bharat Bijlee.

f. Hindustan motors.

g. Alstom.

h. Texmo.

i. GE India.

j. National Motors.

k. ABB.

39.0 ELECTRICAL PROCESS HEATER

a. Escorts Limited, Faridabad, Haryana.

b. Spherehot / Kanti Lal Chuni Lal & Sons Appliances Pvt Ltd.Surat.

c. Kerone, Bhayander(E), Thane – 401105.

d. Excel Heaters, Andheri (West), Mumbai - 400 053, India.

e. Nirmal Industrial Controls Pvt. Ltd., Mulund(W), Mumbai - 400 080.

40.0 CATHODIC PROTECTION AGENCIES/CONTRACTOR/ VENDERS

a. CALTECH Engineering Service.

b. Universal Corrosion Prevention India.

c. Cathodic Technology Limited.

d. Cathodic Control Company Pvt. Ltd.

e. CORRTECH International Pvt Ltd.

f. MITCORR Cathodic Protection Pvt Ltd.

g. Underground Pipeline & NDTS Pvt. Ltd.

h. JG Corrosion Solution.

i. Mercury Cathodic Protection Service.

j. UNDTS Corrosion Service.

k. SARK EPC Projects Pvt. Ltd.

41.0 BACKUP AGENCY FOR INTERFERENCE SURVEY & MITIGATION

a. PLE Germany

b. Vendor Velde

c. Nippon Japan

d. SSS India CIPL / interference survey.

e. Balslev Denmark, .

f. SSS Germany

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

g. Jef Techno Slutions Pvt. Ltd.

h. SARK EPC Projects Pvt. Ltd.

42.0 PERMANENT REFERENCE CELL

a. PERMACELL/ HARCO (USA)

b. CORRTECH (ZULU), INDIA

c. TINKER RASOR, USA

d. SILVION, UK

43.0 CP CABLES

a. Brooks Cables.

b. Nicco Corporation Ltd.

c. CCI Ltd.

d. Delton Cables Ltd.

e. KEI Industries.

f. Torrent Cables.

g. Universal cables.

h. Victor Cables.

i. Associated Flexible & Wires Pvt Ltd.

j. Asain Cables (RPG Cables).

k. Fort Gloster (Gloster Cables Ltd).

l. Finolex Cable.

m. Rediant Cables.

n. NETCO Cables Pvt Ltd.

o. Havells Ltd.

44.0 CP SACRIFICIAL ANODES

a. Scientific Metals Engineers Pvt. Ltd., Karaikudi

b. PSL Holding Pvt. Ltd., Mumbai.

c. Cathodic Controls, Bangalore.

d. BHEL, Bhopal.

e. Nippon Corrosion, Japan.

f. AFIC, KSA.

g. Platt Bros. and Company, USA

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

h. Wilson Walton International.

i. Impalloy International.

j. Corrpro International.

k. HOCKWAY, UK

l. NAKABOHTEC, Japan .

m. Cortech International

n. Titanor Component

o. Shakti Metals, Ahmedabad

p. Shaktianodes Private Limited, Ahmedabad

45.0 CP PORTABLE /PERMANENT REFERENCE CELL

a. M/S PERMACELL/HARCO, USA

b. M/S BORIN MANUFACTURER, USA

c. M/S M.C.MILLER, USA

d. M/S TINKER RASOR

46.0 CPTR (AC OPERATED)

a. Canara Electric

b. CATHODIC CONTROL COMPANY PVT LTD.

c. Kriston Systems

47.0 PIN BRAZING / THERMITWELD

a. SAFETRACK, SWEDEN

b. CadWeld

c. BAC, UK

d. ERICO, USA

e. THERMOWELD, USA

f. ERICO, EUROPE

48.0 CP SURGE DIVERTER/SPARK GAP ARRESTOR (EX-D)

a. Dhen,

b. OBO

c. Corrpro system

d. Sohne

e. Dairyland

49.0 CP SOLID STATE POLARISATION CELL.

a. Dairyland

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

b. Metricorr
c. Rustol
d. Dhen
e. Kriston Systems

50.0 PETROLEUM COKE BREEZE:

a. M/S LORESCO, USA
b. M/S ASBURY, USA
c. M/S GOA CARBON, GOA
d. M/S INDIA CARBON, CALCUTTA
e. M/S PETROCARBON & CHEMICAL COMPANY, HALDIA

51.0 CP ANODE (MMO TYPE):

a. Corrtech
b. Scientific Metal Engineers Karaikudi
c. Titanor Component Ltd., Goa, India.
d. Denora Permelic S.P.A (Italy). .
e. Oronzio De Nora S.A. Ingano Switzerland
f. CER Anode Technologies International USA
g. ACTEL, UK
h. ELTECH System Corporation, Texas
i. MAGNETO-CHEMIE, Netherlands
j. MATCOR (USA)

52.0 HEAT SHRINK CAP FOR CP ANODE

a. MATCOR (USA) To Cable Joint
b. Seal For Life

53.0 ER- PROBE (EXTERNAL CORROSION) ER- PROBE & CORROSION COUPON ASSEMBLY

a. Rose Corrosion Services UK
b. Metal Samples, USA. .
c. Roharbak Cosasco USA
d. Caproco UK
e. Emetricorr, Denmark

54.0 HEAT SHRINK CAP FOR ANODE TO CABLE JOINT

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

a. Raychem, USA

b. Matcor (USA)

55.0 MMO WIRE ANODES (WITH FACTORY PRE-PACKED COKE BREEZE)

a. Matcor (USA)

b. Covalence (USA)

c. Berry Plastics (USA) – (Seal for Life Industries)

56.0 MMO WIRE ANODES (WITHOUT FACTORY PRE-PACKED COKE BREEZE)

a. GROUPPO DENORA, GOA, INDIA

b. CERANODE TECHNOLOGIES, USA

c. TELPRO, USA

57.0 MMO TUBULAR/ STRIP/ RIBBON ANODES

a. GROUPPO DENORA, GOA, INDIA

b. ORANZIO DE NORA, ITALY

c. MAGNETOCHEMIE, HOLLAND

d. ACTEL LTD., U.K.

e. ELTECH SYSTEMS CORPORATION, USA

f. CERANODE TECHNOLOGIES, USA

g. MATCOR (USA)

Note: -

For any other brought out item(s) for which the vendor list is not provided in the tender , bidders can supply those item(s) from vendors/ suppliers who have earlier supplied similar item(s) for the intended services in earlier Oil and Gas projects and the item(s) offered is in their regular manufacturing/ supply range.

1) The vendor/supplier should not be in the Holiday list of OWNER/ ONSULTANT/other PSU

2) The bidder is not required to enclose documentary evidences (PO copies, Inspection & Completion with satisfactory working certificates etc.) along with their offer, however in case of successful bidder, these documents shall required to be submitted by them within 30 days from date of Placement of Order for approval to OWNER / CONSULTANT.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

D. INSTRUMENTATION

LIST OF RECOMMENDED VENDER/SUPPLIERS OF MAJOR BOUGHT-OUT ITEMS

1.0 PRESSURE GAUGES

a. AN Instruments Pvt Ltd
b. Badotherm Process Instruments B.V.
c. Baumer Bourdon Haenni S.A.S
d. British Rototherm Co Ltd
e. Budenberg Gauge Co Ltd
f. Dresser Inc
g. Forbes Marshall (Hyd) Pvt Ltd
h. General Instrument Consortium
i. H. Guru Instruments (South India) Pvt Ltd
j. Manometer (India) Pvt Ltd
k. Nagano Keiki Seisakusho Ltd
l. Hirlekar Precision, India
m. Waaree Instruments Ltd
n. Walchandnagar Industries Ltd (Tiwac Divn)
o. Wika Alexander Wiegand & Co GmbH
p. Wika Instruments India Pvt Ltd
q. Ashcroft India Pvt Ltd.
r. ITEC Measures Pvt Ltd

2.0 TEMPERATURE GAUGES

a. AN Instruments Pvt Ltd.
b. Badotherm Process Instruments B.V.
c. Bourdon Haenni S.A.
d. Dresser Inc.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

e. General Instruments Consortium
f. H. Guru Instruments (South India) Pvt Ltd
g. Nagano Keiki Seisakusho Ltd
h. Solartron ISA
i. Walchandnagar Industries Ltd (Tiwac Divn)
j. Wika Alexander Wiegand & Co GmbH
k. Wika Instruments India Pvt Ltd
l. Pyro Electric, Goa
m. Ashcroft India Pvt Ltd.
n. ITEC Measures Pvt Ltd

3.0 TEMPERATURE ELEMENTS INCLUDING SKIN TYPE

a. ABB Automation Ltd
b. Altop Industries Ltd
c. Bourdon Haenni S.A.
d. Detriv Instrumentation & Electronics Ltd
e. General Instruments Consortium
f. Japan Thermowell Co Ltd
g. Tecnomatic S.P.A
h. Tempsen Instrument India Ltd
i. Thermo Electric Co. Inc.
j. Thermo-Couple Products Co
k. Thermo-Electra B.V.
l. Wika Alexander Wiegand & Co GmbH
m. Altop Industries Ltd., Baroda
n. Nagman Sensors (Pvt.) Ltd.
o. Pyro Electric, Goa
p. ITEC Measures Pvt Ltd

4.0 POSITIVE DISPLACEMENT FLOW METERS

a. RMG (Germany)
b. Elster Instromet
c. Romet
d. Dresser
e. Itron

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

f. FMG

g. Common

h. Metreg

i. Raychem RPG

j. Vemmtec

5.0 TURBINE FLOW METER

a. Daniel

b. Elster Instromet

c. Itron

d. RMG

e. Rockwin

6.0 ELECTRONIC VOLUME CORRECTOR

a. Elgas

b. Itron

c. Plum

d. Pietro Fiorentini

7.0 ORIFICES (METER RUN, FLOW CONDITIONER, ORIFICE PLATE AND ASSEMBLY)

a. Emerson

b. FMC, USA

c. Pietro Fiorentini S.P.A (Italy)

d. Canalta Controls, Canada

8.0 ULTRASONIC FLOW METERS

a. Daniel (USA)

b. RMG (Germany)

c. Instromet International (Belgium)

d. Sick Maihak, Germany

e. FMC, Germany

9.0 MASS FLOW METERS

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

a. Daniel Measurement & Control Asia Pacific

b. Endress + Hauser Instruments International

c. FMC Measurements Solutions

d. Heinrichs Messtechnik GMBH

e. Rheonik MessGerate GMBH

10.0 FIELD INSTRUMENTS (P, DP, F, L, T)

a. ABB Ltd
b. Honeywell
c. Fuji Electric Instruments Co Ltd
d. Yokogawa
e. Invensys India Pvt.Ltd

11.0 LEVEL GAUGES/ LEVEL INSTRUMENTS

a. Bliss Anand
b. Chemtrols
c. V-Automat
d. Levcon
e. Nivo Controls
f. Sbeletro Mechanicals
g. TRAC

12.0 PRESSURE REGULATOR AND SLAM SHUT VALVE

a. Pietro Fiorentini S.P.A. (Italy)
b. Emerson
c. RMG-Regel Messtechnik (Germany
d. Mokveld Valves BV (Netherlands)
e. Schlumberger (USA)
f. Gorter Controls B V (Netherlands)
g. Instromet International NV

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

h. Nirmal Industrial Controls Pvt Ltd. (up to 6" size only)

i. ESME Valves Ltd

j. Kaye & Macdonald Inc.

k. Nuovo Pignone S.P.A (Italy) (GE Oil Co.)

l. Richards Industries (Formerly Treloar)

m. Samson AG Mess-und Regeltechnik

n. Tormene Gas Technology

o. Dresser Inc, USA (upto 8" size, 300# class only)

13.0 PRESSURE SAFETY VALVES

a. Keystone Valves (India) Pvt. Ltd.

b. Larson & Toubro Ltd.

c. Lesser GmbH & Co KG

d. Mekaster Engg Ltd..

e. Tyco Sanmar Ltd. (New Delhi)

f. Anderson Greenwood Crosby

g. BHEL (Trichy)

h. Curtiss Wright Flow Control Corporation

i. Dresser Inc.

j. Fukui Seisakusho Co. Ltd

k. Nakakita Seisakusho Co Ltd

l. Nuovo Pignone S.P.A (Italy) (GE Oil co)

m. Parcol S.P.A

n. Safety Systems UK Ltd

o. Tai Milano S.P.A

p. Weir Valves & Controls France

q. Bliss Anand Pvt Ltd.

14.0 CONTROL PANEL & ACCESSORIES

a. Keltron Controls Ltd., Kerala

b. Elechmec Corporation Ltd., Mumbai

c. Industrial Controls & Appliances Pvt. Ltd.,

d. Alstom System Ltd., Noida

e. Emerson Process Management (I) Pvt. Ltd.

f. ABB Instruments Ltd., New Delhi

g. Larsen & Toubro Ltd.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

h. Control & Automation, New Delhi

i. GE Fanuc Systems Pvt. Ltd., New Delhi

j. Rockwell Automation (I) Ltd., Ghaziabad

k. Honeywell Automation Ltd.

l. Rittal

m. Pyrotech Elcronics Pvt Ltd.

n. Positronics Pvt Ltd.

o. Electronics Corporation of India Ltd.

p. Phoenix Contact (I) Pvt. Ltd

15.0 JUNCTION BOXES AND CABLES GLANDS

a. Ex-Protecta

b. Flameproof Control Gears

c. Baliga

d. Flexpro Electricals

e. RAY Flameproof Pvt Ltd (Flameproof Weatherproof)

16.0 CONTROL AND SIGNAL CABLES

a. Associated Cables

b. Brook

c. Associated Flexibles & Wires (Pvt) Ltd

d. Universal Cables Ltd,India

e. Delton Cables Ltd, India

f. KEI Industries Ltd INDIA

g. CMI Limited

h. Cords Cable Industries Ltd, India

i. Elkay Telelinks (P) Ltd., India

j. Udey Pyrocables Pvt Ltd, India

k. Goyolene Fibres (I) Pvt Ltd, India

l. Netco Cable Industries Pvt Ltd, India

m. Nicco Corporation Ltd, India

n. Paramount Communications Ltd, India

o. Polycab Wires Pvt Ltd, India

p. Radiant Cables Pvt Ltd, India

q. Reliance Engineers Ltd., India

r. Suyog Electricals Ltd, India

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

s. Thermo Cables Ltd

17.0 GAS DETECTION SYSTEM

a. Crowcon Detection Instruments Ltd
b. Detection Instruments (I) Pvt Ltd
c. Detector Electronics Corporation
d. Drager Safety AG & Co. KGAA
e. General Monitors Ireland Ltd
f. Mine Safety Appliances Company
g. MSA – Mines Safety Appliances(India) Ltd
h. Industrial Scientific Oldham France S.A.
i. Riken Keiki Co Ltd
j. Simrad Optronics Icare
k. Honeywell Analytics
l. Net Safety Monitoring Inc.
m. Simtronics SAS
n. Pollution Protection Systems Mumbai Pvt Ltd

18.0 MOV ACTUATOR:

a. Rotork- UK, USA & INDIA
b. Limitorque
c. Auma- India
d. Biffi- Italy
e. DelVal Flow Controls Pvt. Ltd

19.0 PNEUMATIC ACTUATOR (SOLENOID OPERATED ON-OFF TYPE)

a. Metso Automation
b. Tyco
c. Samson Controls
d. L&T
e. Emerson
f. Fisher
g. Masoneilan Process Control
h. Instrumentation Limited (IL)-Palghat

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

i. Micro Finish

j. Rotex

20.0 SOLENOID VALVES

a. Avcon

b. Festo

c. DelVal Flow Controls Pvt. Ltd

21.0 ELECTRO – HYDRAULIC ACTUATOR

a. Avcon Rotork controls (Deutchland Gmbh)

b. Biffi Italia Srl

c. Ledeen (Italy)

d. Virgo Valves and Controls ltd.-India

e. Limittorque

f. Reineke

g. Voith

h. Bettis

i. Rotork- UK, USA & INDIA

j. Rotex

k. Schuck Group

l. DelVal Flow Controls Pvt. Ltd

22.0 GAS OVER OIL ACTUATOR

a. Biffi Italia Srl,

b. Ledeen(Italy)

c. Virgo Valves & Control ltd.-India,

d. Voith,

e. Bettis,

f. Rotork-UK, USA, India,

g. Rotex,

h. Schuck Group,

i. Valve Italia.

23.0 OFC

Manufacture/ Procurement, Testing and supply of suitable OFC Joint closures including all necessary accessories of any of the following make:

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

a. Raychem
b. 3M
c. Siemens
d. Any other make from the approved vendor list of client with supporting paper.

24.0 FLOW CONTROL VALVES

a. Fouress Engg. (New Delhi)
b. Fisher Xomox (New Delhi)
c. MIL Control Ltd. (Noida)
d. KOSO India Pvt ltd
e. Samson Control (Thane)
f. Dresser Valves India Pvt Ltd.
g. Fisher Controls
h. Valvitalia Italy
i. CCI Valve technology
j. Flowserve Pvt Ltd.
k. Metso Singapore Pvt Ltd.
l. Instrumentation Ltd Palghat
m. Dresser Inc. USA

25.0 FLOW COMPUTERS

a. Emerson
b. Instromet International (Belgium)
c. FMC Measurement Solutions (UK)
d. RMG (Germany)
e. OMNI Flow Computers Inc.
f. Thermo Fisher, USA

26.0 INDICATORS & CONTROLLERS

a. Yokogawa
b. Eurotherm Chessel
c. Honeywell
d. Emerson

27.0 BARRIERS

a. MTL
b. STHAL

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

c. P&F

d. Phoenix Contact (I) Pvt. Ltd.

28.0 GAS CHROMATOGRAPH

a. ABB

b. Emerson

c. Instromet International, NV

d. RMG Regal+Messtechnik GmbH

e. Yokogawa

29.0 I/P CONVERTERS

a. ABB

b. Emerson

c. IMI Watson Smith Ltd.

d. Moore Controls Ltd

e. Shreyas Instruments Pvt Ltd, India

f. Thermo Brandt Instruments

30.0 SS FITTINGS, INSTRUMENT VALVES & MANIFOLDS

30.1 FOR CNG WORK:

a. DK-LOK

b. Swagelok Co.

c. Parker

d. Dawsons Tech Components LLP

e. ASTEC Valves & Fittings Pvt Ltd

f. Thomas & Brian Mfg. Pvt. Ltd

g. Global Valves and fittings(India) Pvt Ltd

30.2 EXCEPT CNG WORK:

a. Swagelok Co.

b. Parker

c. Aura INC.

d. HOKE

e. Excelsior Engineering works

f. Swastik Engineering works India

g. Comfit and valves pvt ltd

h. Arya craft and engineering Pvt ltd

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

i. DK lok

j. ASTEC Valves & Fittings Pvt Ltd

k. Dawsons Tech Components LLP

l. DelVal Flow Controls Pvt. Ltd

m. Thomas & Brian Mfg. Pvt. Ltd

n. Global Valves and fittings(India) Pvt Ltd

31.0 SS TUBES

31.1 FOR CNG WORK:

a. Swagelok Co.

b. Parker

c. Sandvik

d. Jindal Saw

e. Tubacex Tubes and Pipes Private Ltd

f. Krystal Global Engineering Ltd.

g. Maxim Tubes Company Pvt. Ltd.

h. VENUS PIPES & TUBES LIMITED

31.2 EXCEPT CNG WORK:

a. Swagelok Co.

b. Parker

c. Sandvik

d. Heavy metal and tube limited

e. Nuclear fuel complex India

f. Scorodite

g. Ratnamani Metals and Tubes

h. Jindal Saw

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

E. SHOP & FIELD PAINTING

LIST OF RECOMMENDED VENDER/SUPPLIERS OF MAJOR BOUGHT-OUT ITEMS

1.0 INDIAN VENDORS

a. Asian Paints (I) Ltd.

b. Berger Paints Ltd.

c. Goodlass Nerlolac Paints Ltd.

d. Jenson And Nicholson Paint Ltd & chokuGu Jenson & Nicholson Ltd.

e. Shalimar Paints Ltd.

f. Sigma Coating, Mumabai

g. CDC Carboline Ltd.

h. Premier Products Ltd.

i. Coromandel Paints & Chemicals Ltd.

j. Anupam Enterprises

k. Grand Polycoats

l. Bombay Paints Ltd.

m. Vanaprabha Esters & Glycer, Mumbai

n. Sunil Paints and Varnishes Pvt. Ltd.

o. Courtaulds Coating & Sealants India (Pvt.) Ltd.

p. Mark-chem Incorporated, Mumbai (for phosphating chemicals only)

q. VCM Polyurethane Paint (for polyurethane Paint only)

2.0 FOREIGN VENDORS FOR OVERSEAS PRODUCTS

a. Sigma Coating, Singapore

b. Ameron, USA

c. Kansai Paint, Japan

d. Hempel Paint, USA

e. Valspar Corporation, USA

f. Courtaulds Coating, UK.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Notes:

1. Bidder can select equipment of two different makes, selected from this VENDOR LIST and mention the same in the checklist for technical evaluation attached with the tender. The offered bid must include filled datasheet indicating make, model, size, rating of offered instrument/ equipment duly supported by sizing calculation of offered equipment (wherever applicable).

2. Vendors who have already supplied above equipment in other terminals of client, shall also be considered qualified for this tender provided the supplied equipment are commissioned and running successfully and they have not been put on holiday.

3. Equipment / Instruments of any make which is offered by one bidder and acceptable to client shall be accepted for other bidder also. After placement of order, on request of the successful bidder list of other qualified makes for a particular item (for which successful bidder wants to change the vendor) shall be provided.

4. Bidder shall take prior approval of the make / model no of the offered item and it shall be from the list given above. However additional vendors will be considered in exceptional cases, provided they have supplied for similar application to reputed gas transmission/distribution companies, in quantities at least half the numbers being supplied for this tender, and working satisfactorily for minimum 6 months. Documentary evidence substantiating above shall be submitted for taking approval.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

F. FOR PE & LMC WORK (GI/CU)

1.0 MDPE PIPE

a. Mukand Poly Products,

b. Dewa Polymers Pvt. Ltd.

c. Rungta Irrigation Ltd.

2.0 MDPE FITTINGS & MDPE VALVES

d. Aliaxis,

e. George Fischer,

f. Al-Aziz,

g. Kimplas,

h. Banides,

i. Agru,

j. Friatech,

k. Plasson

3.0 GI PIPE

a. Swastik Pipe Ltd.

b. Jindal Industries Ltd.

c. Vishal Pipes Ltd.

d. Indus Tubes Ltd

e. Advance steel Tubes Ltd.

f. Good Luck Tubes Ltd.

g. Surya Roshni Limited

h. APL Apollo Tubes Limited

i. Jindal Pipes Limited

j. RK Steel Manufacturing Company Private Limited

k. PSL Tubes Limited

4.0 CASTING GI FITTINGS

a. Sarin Industries Ltd.

b. Jupiter Metal Industries Ltd.

c. Jainsons Industries Ltd.

d. Jinan Meide Casting Co. Ltd.

e. Green Malleable Pvt. Ltd.

f. Chandan Enterprises

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

g. Unique Pipe Fitting Co

5.0 FORGED GI FITTING (FOR HIGH RISE SEGMENT)

a. Jainsons Industries

b. B.M. Meters Pvt. Ltd.

6.0 COPPER TUBES & FITTINGS

a. Jay Banas Mehta Tubes Limited- Trade Mark "MEXFLOW"

b. Rajco metal (Tubes & Fittings)

c. Paras Industries

d. MERCURE METAL & ALLOYS PVT LTD

e. Chandan Enterprises (Fittings only)

7.0 BRASS VALVES

a. Universal srl, Italy

b. Tiemme Raccorderie Sede, Italy

c. Enolgas Bonimu s.a.s., Italy

d. Fratelli Fortis s.r.l, Italy

e. Giacomo Climbrio, Italy

f. Parker Hannifin S.P.A., USA

g. Singapore Valve & Amp; Fittings Pte Limited, Singapore /Bengaluru

h. Rubinetterie Utensilerie Bonomi (RUB), Italy

i. Zhegiang Valogin Technology Co. Ltd., China,

j. Ningbo Zhiqing Industrial Co. Ltd., China,

k. Zhegiang Dunan Valve Co. Ltd.,

l. Ningbo Huaping, China.

m. Chandan Enterprises

8.0 Isolation & Appliance valves

a. Chandan Enterprises

9.0 BRASS FITTINGS

a. Chandan Enterprises

b. Paras Industries Ltd.

c. Chokhawala Distributors – Brass Adaptor.

10.0 STEEL RE-INFORCED RUBBER HOSE (TYPE-4)

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

a. Super Seal Flexible Hose Ltd.

b. Suraksha Products Pvt. Ltd.

c. Vansh Industries

d. T & L Gases

11.0 CORRUGATED FLEXIBLE METAL HOSES (ANACONDA)

a. KPC Flex Tubes

b. Vestas Hose Division

c. Alpha Flexi Tubes

d. Chandan Enterprises

Note:

1. Vendor may procure material from any of approved vendors listed.
2. For equipment/components other than the above, vendor shall submit past track record for the proposed sub-vendors and obtain written approval from Owner / Consultant before placing order.
3. In case of exigencies like long delivery periods from approved vendors, the contractor shall list down the proposed suppliers/vendors for such items and submit the same for owner review/approval along with necessary documents/PTR.
4. Non-acceptance of a particular proposed vendor due to any reasons whatsoever shall not be a cause of schedule and cost implication. If equipment is sourced from outside India, vendor shall obtain prior approval for make of equipment before placement of order.

Above mentioned vendor list is tentative and further addition/deletion may be done as per discretion of Owner/VCS.

Copyright VCS Quality Services – All rights reserved

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

PROBABLE VENDOR LIST FOR MLC PIPES & FITTINGS

Energising Quality

MLC PIPES AND FITTING

- NEXGEN COMPOSITE INDUSTRIES PRIVATE LIMITED
- JINDAL PE-X TUBES PRIVATE LIMITED
- NUTECH PIPES WORLD

Note :

The procuring of bought out item from vendor other then those listed above, the same may be acceptable subject to the following:

a. The vendor / supplier of bought out items is a regular and reputed manufacturer / supplier of said item for intended services and the sizes being offered is in their regular manufacturing / supply range.

b. The vendor / supplier should not be in the Holiday List of M/s HPCL.

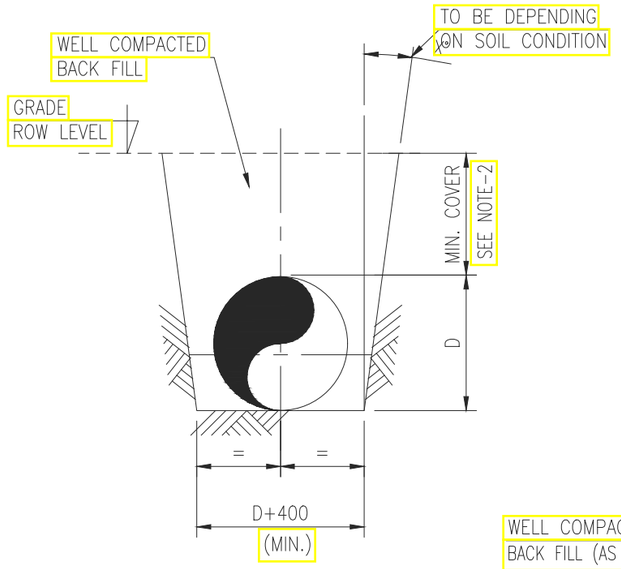
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Energising Quality	LIST OF AUTHORIZED THIRD-PARTY INSPECTION AGENCY (TPIA)	DOC. NO.- VCS-C&P-TPIA-001

Rev No : 17

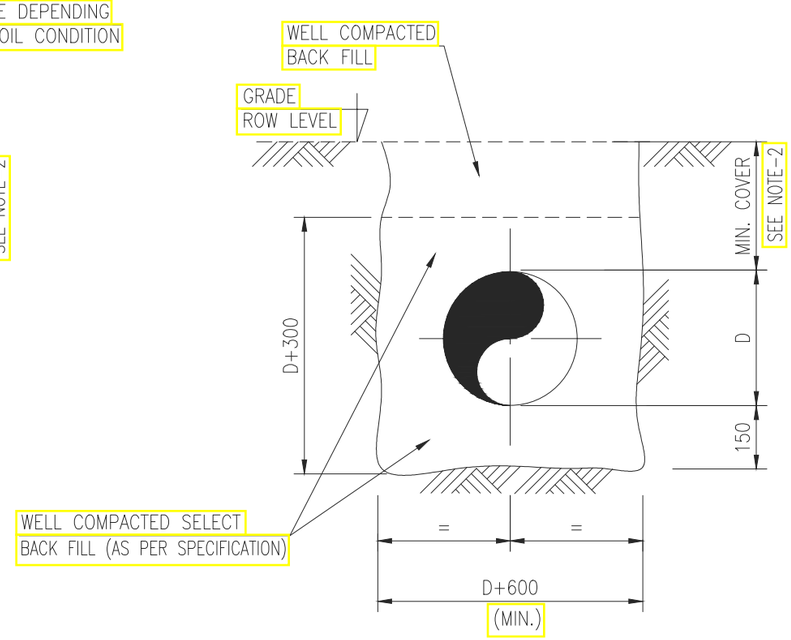
SL. NO.	NAME OF TPIA
1	Det Norske Veritas (DNV)
2	Germanischer Lloyd Industrial Services GmbH
3	Bureau Veritas (India) Pvt. Ltd.
4	Moody International (India) Pvt. Ltd. (Industry Services Division)
5	SGS India Pvt. Ltd.
6	Certification Engineer International Limited (CEIL)
7	TÜV SÜD South Asia Pvt. Ltd.
8	ABS Industrial Verification (India) Pvt. Ltd.
9	Lloyd Register of Industrial Services
10	IRCLASS Systems and Solutions Private Limited
11	Tata Projects Limited
12	International Certification Services Pvt. Ltd.
13	TUV India Pvt. Ltd., Industrial Services Division
14	Intertek India Pvt. Ltd. (Industry Services Division)
15	Quality Austria Central Asia Pvt. Ltd.
16	Edlipse Engineering Global Pvt. Ltd.
17	TUV-Rheinland
18	Hertz Inspection & Services Pvt Ltd
19	Alfred H Knight India Pvt ltd (Formely known as Dr. Amin Controllers Pvt Ltd)

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST



TRENCH IN NORMAL SOIL

TYPICAL SECTION



TRENCH IN CONSOLIDATED ROCK

TYPICAL SECTION

NOTES:-

1. ALL DIMENSIONS ARE IN MM .
2. FOR ALL PIPELINE TO BE CONSTRUCTED IN THE LAND UNDER JURISDICTION OF GOVT OF INDIA THE MIN COVER TO BE ADOPTED SHALL BE 1000MM IN ACCORDANCE WITH GOVT. OF INDIA PETROLEUM PIPELINE (AQUISITION OF RIGHT OF USER IN LAND) ACT NO 50, 1962 AND AMENDMENT ACT NO 13 OF 1977. ANY EXTRA COVER REQUIREMENT SHALL BE IN ACCORDANCE WITH SPECIFICATIONS.
3. MIN. COVER REQUIREMENT SHALL BE SUBJECT TO APPROVAL OR CONCERNED AUTHORIES WHEREVER REQUIRED.
4. EXTRA COVER REQUIREMENT SHALL BE ESTABLISHED AT ALL OVER BE NOS AND HORIZONTAL BE NOS WHEREVER NECESSARY.
5. FOR MIN. COVER REQUIRMENT AT PIPELINE CROSSING ROADS, RAILWAY TRACKS, RIVER MARSHY AREAS ETC REFER RELEVANT STANDARDS.

REFERENCE DRAWINGS								
NO.	TITLE	DRAWING NO.	REV.	DATE	BY	CHK.	APPD.	DESCRIPTION

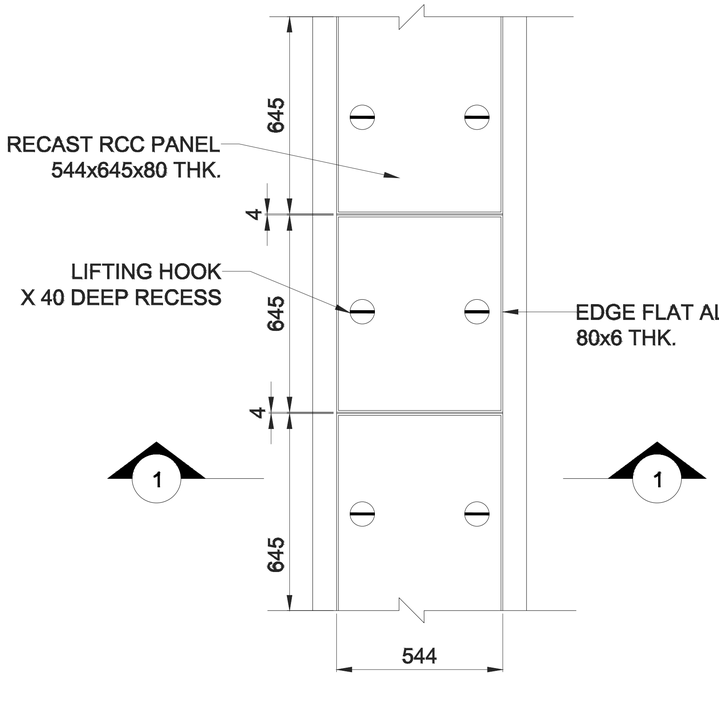
PMC: M/S. VCS QUALITY SERVICES PVT. LTD.

PROJECT: CITY GAS DISTRIBUTION PROJECT

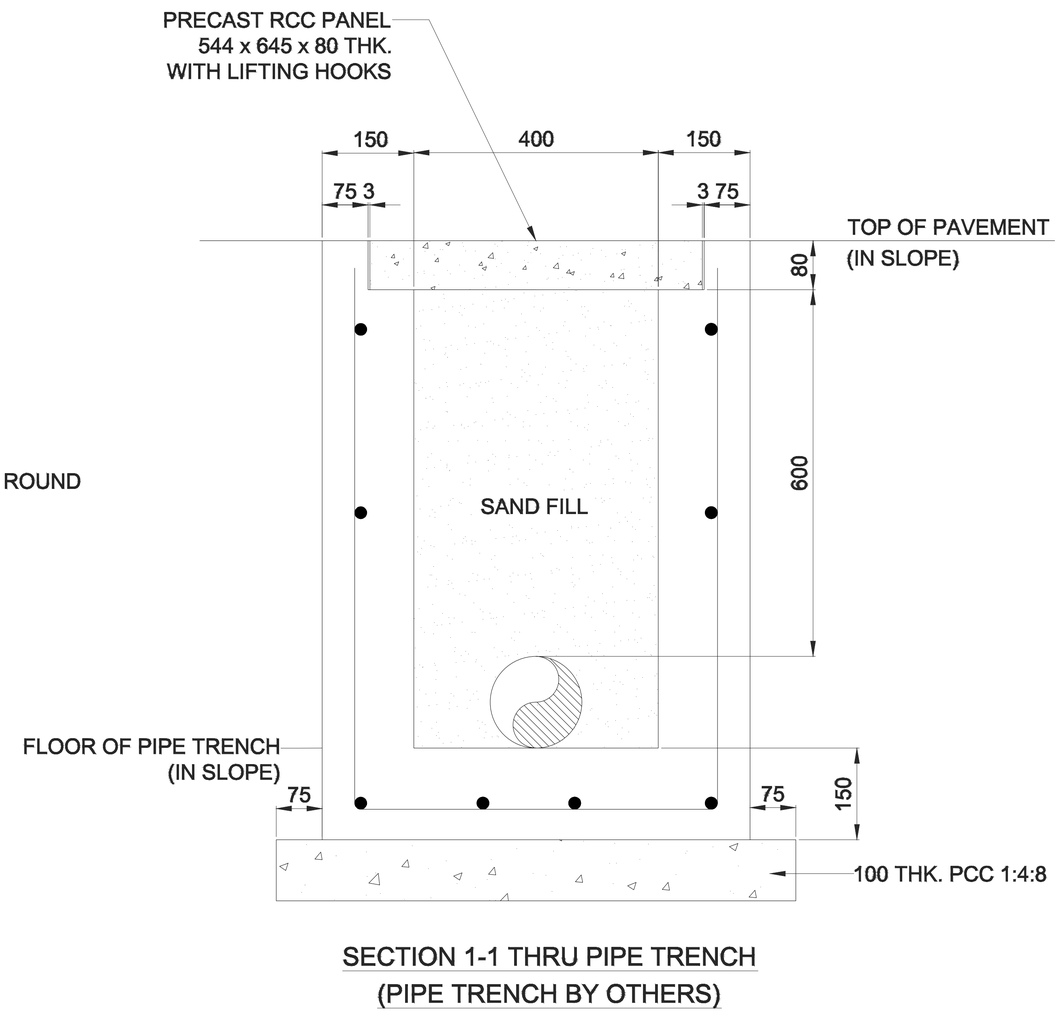
TITLE: TYPICAL TRENCH DIMENSIONS FOR PIPELINE

SCALE	DATE	CAD FILE:		
NTS	01-07-2014	DATE	CAD	A3

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST



G.A. PLAN OF COVER SLAB



SECTION 1-1 THRU PIPE TRENCH
(PIPE TRENCH BY OTHERS)
SCALE 1:10

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOTE SCALE THE DRAWING.

Digitally signed by Privek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

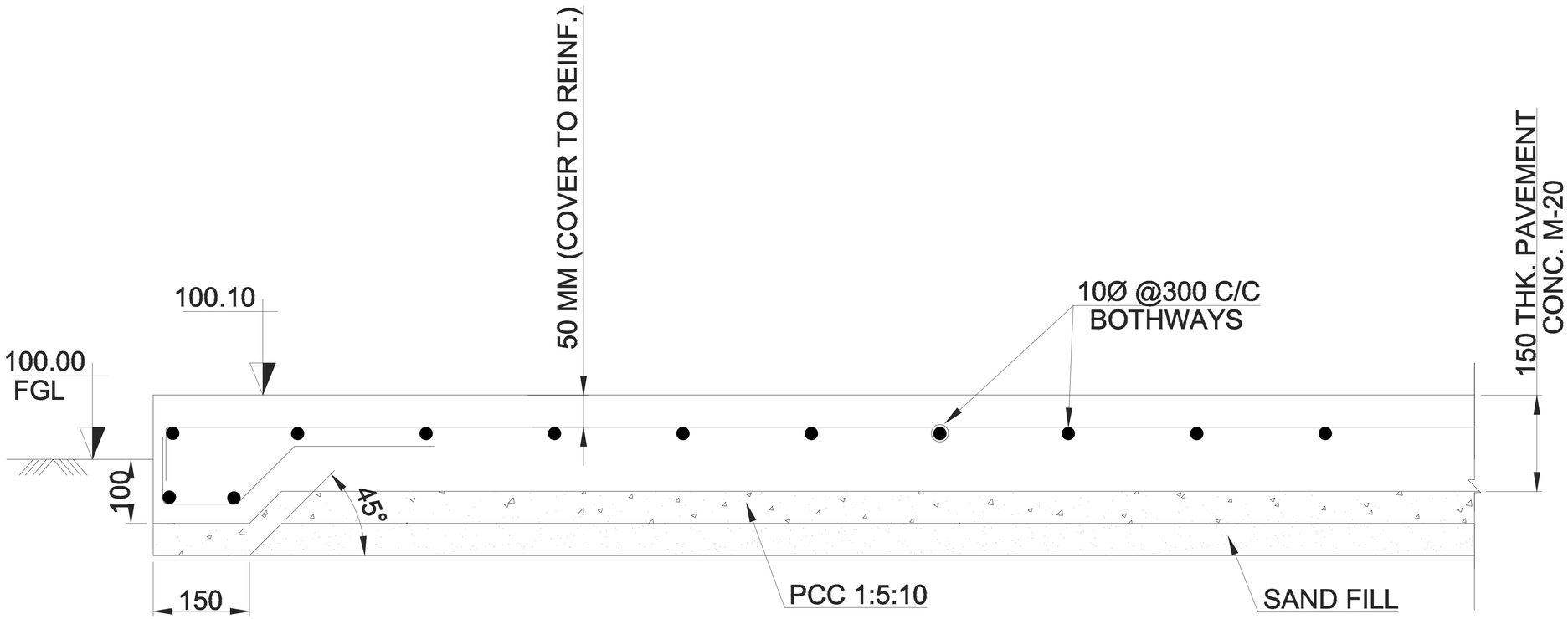
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: DETAILS OF PIPE TRENCH

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2001	0

FORMAT NO C211050-FMT-005_00



RCC PAVEMENT DETAIL

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOTE SCALE THE DRAWING.

Digitally signed by Rivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

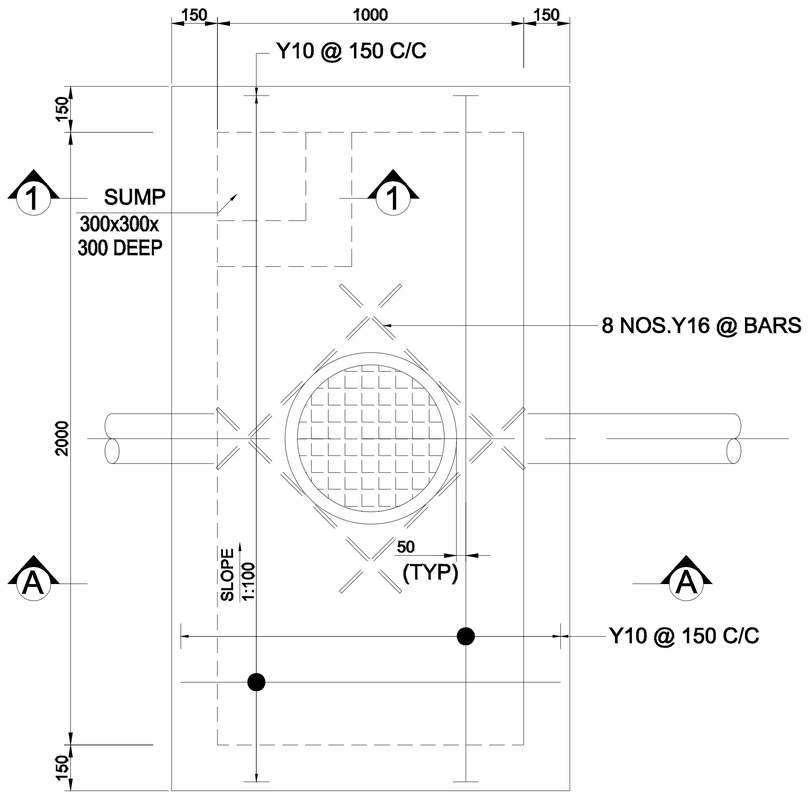
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: STANDARD DETAILS OF RCC PAVEMENT

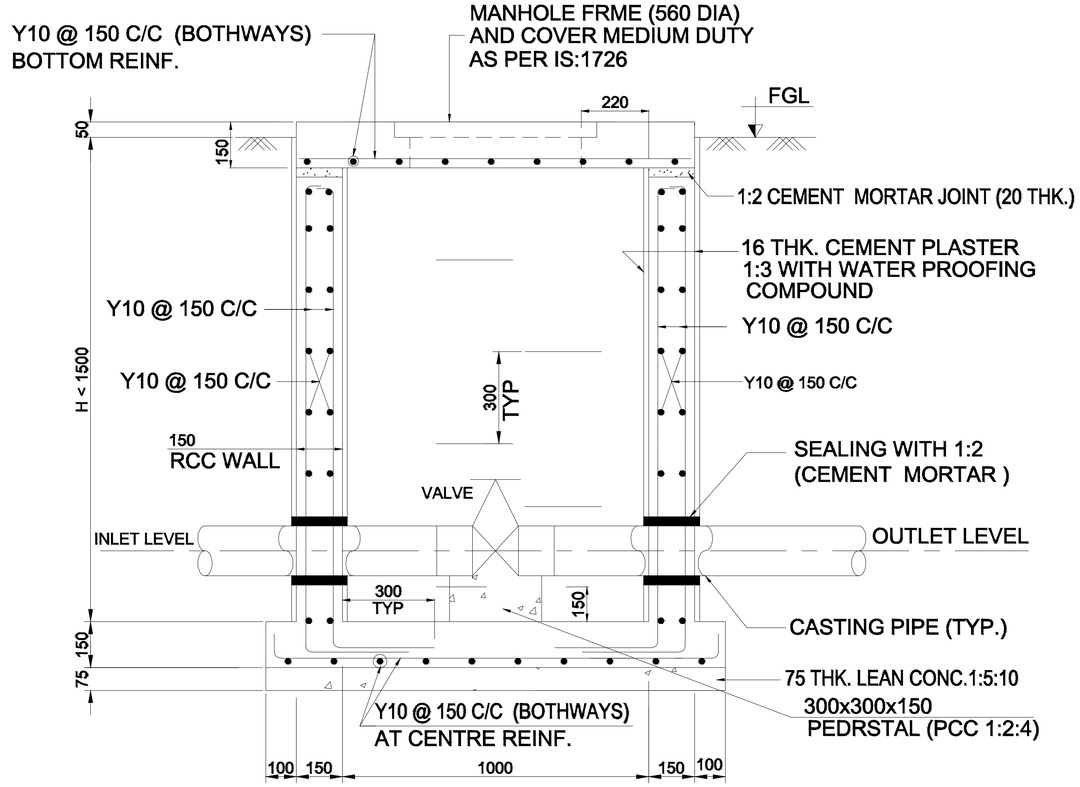
SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1

SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2002	0

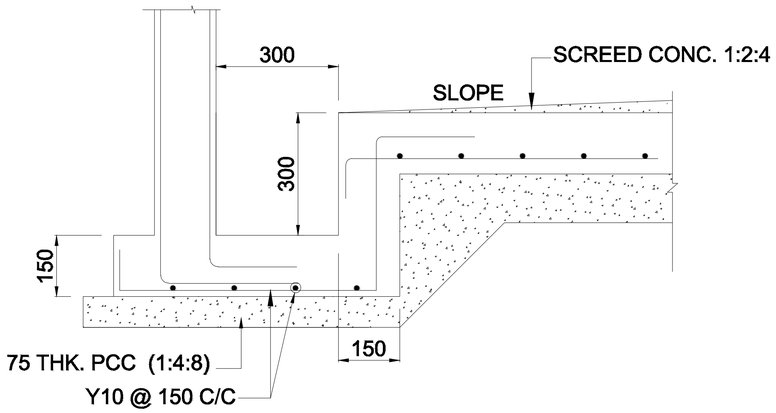
FORMAT NO C211050-FMT-005_00



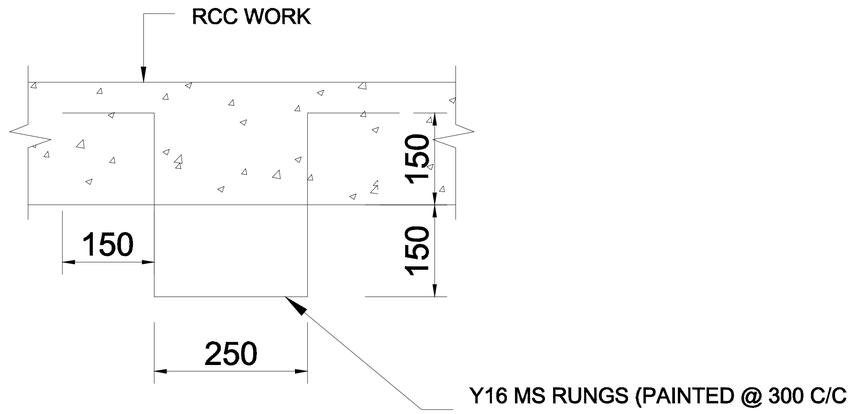
VALVE PIT PLAN
(SCALE 1:20)



SECTION A-A
(SCALE 1:20)



SECTION 1-1
(SCALE 1:15)



TYPICAL DETAILS OF MS RUNGS
(SCALE 1:10)

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAW ING
3. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE (a) SLAB 20 mm
4. GRADE OF CONCRETE USED SHALL BE M-25 CONFORMING.
5. REINFORCEMENT SHALL BE HYSD BARS OF (GRADE Fe 415) CON FORMING TO IS:1786.

Digitally signed by Dhiraj Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

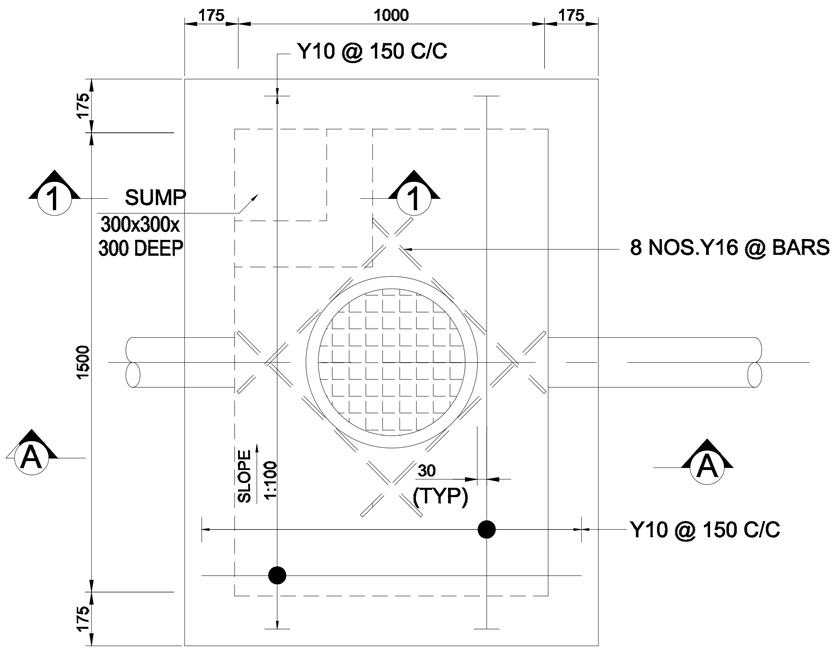
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

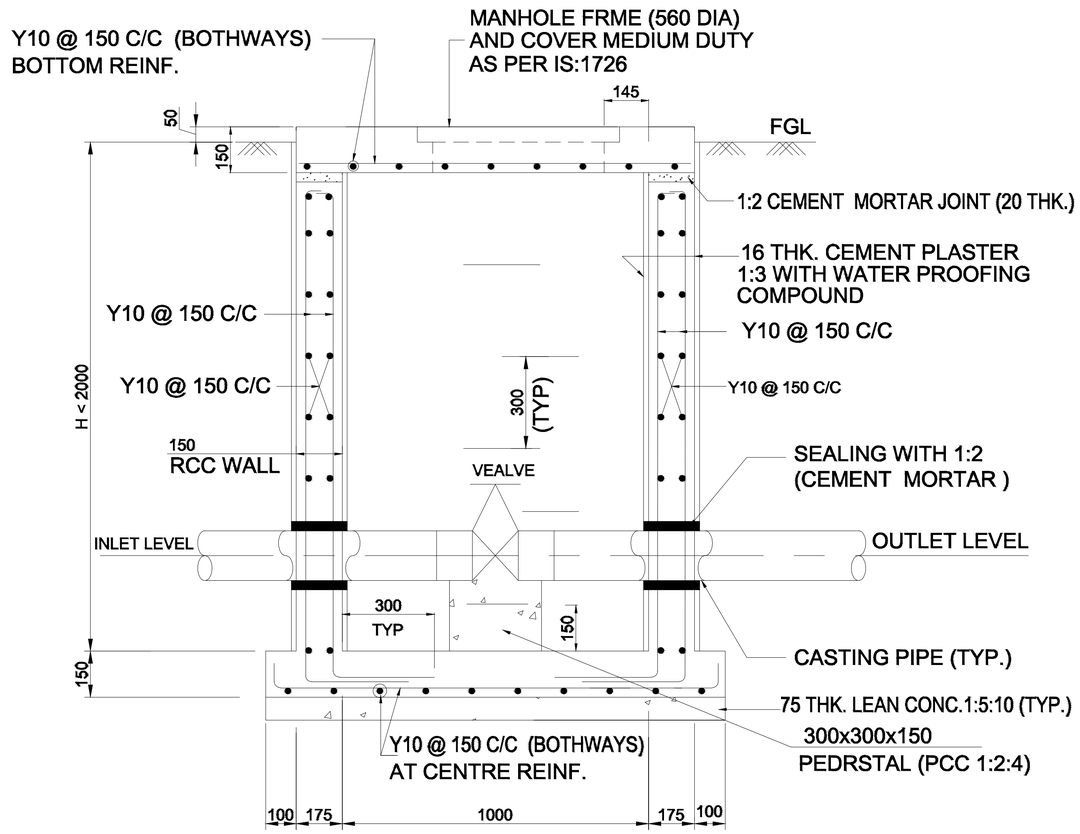
TITLE: STANDARD DETAIL OF RCC VALVE CHAMBER (TYPE-1)

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2003	0

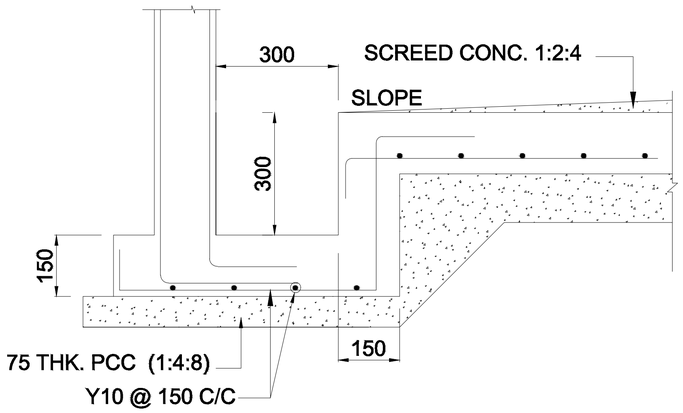
FORMAT NO C211050-FMT-005_00



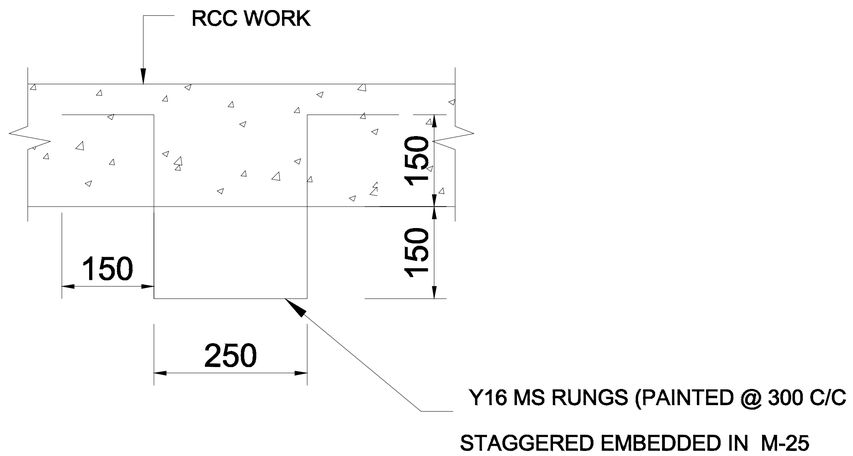
VALVE PIT PLAN
(SCALE 1:20)



SECTION A-A
(SCALE 1:20)



SECTION 1-1
(SCALE 1:15)



TYPICAL DETAILS OF MS RUNGS
(SCALE 1:10)

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAW ING
3. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE (a) SLAB 20 mm
4. GRADE OF CONCRETE USED SHALL BE M-25 CONFORMING.
5. REINFORCEMENT SHALL BE HYSD BARS OF (GRADE Fe 415) CON FORMING TO IS:1786.

Digitally signed by Rivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

CLIENT:

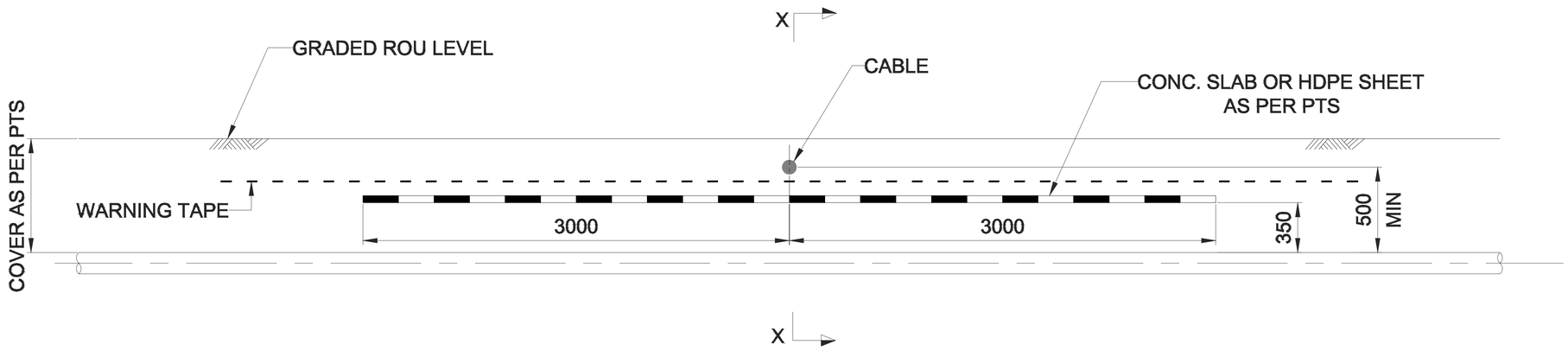
PMC: VCS QUALITY SERVICES PVT. LTD.

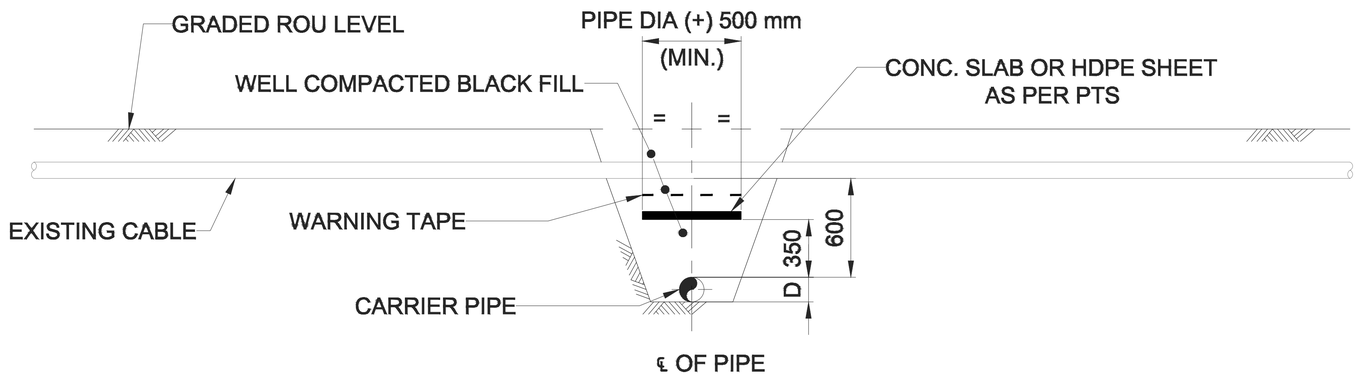
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: STANDARD DETAIL OF RCC VALVE CHAMBER (TYPE-2)

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2004	0

FORMAT NO C211050-FMT-005_00





SECTION X-X

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWINGS.
3. A MODIFIED PIPELINE WARNING SIGN SHALL BE INSTALLED CLOSE TO THE CROSSING.
4. IN CASE OF ARMOURED OFC CABLE, C.P. BONDING IS TO BE PROVIDED BETWEEN PIPELINE AND CABLE ARMOUR. IN CASE OF UNARMOURED CABLE, ARRANGEMENT FOR SHIELDING (BY PROVIDING CASING ON EITHER SIDE OF THE PIPELINE OR CABLE) SHALL BE CONSIDERED.
5. APPROVAL OF THE CROSSING SHALL BE OBTAINED FROM CONCERNED AUTHORITIES.

Digitally signed by Pavek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

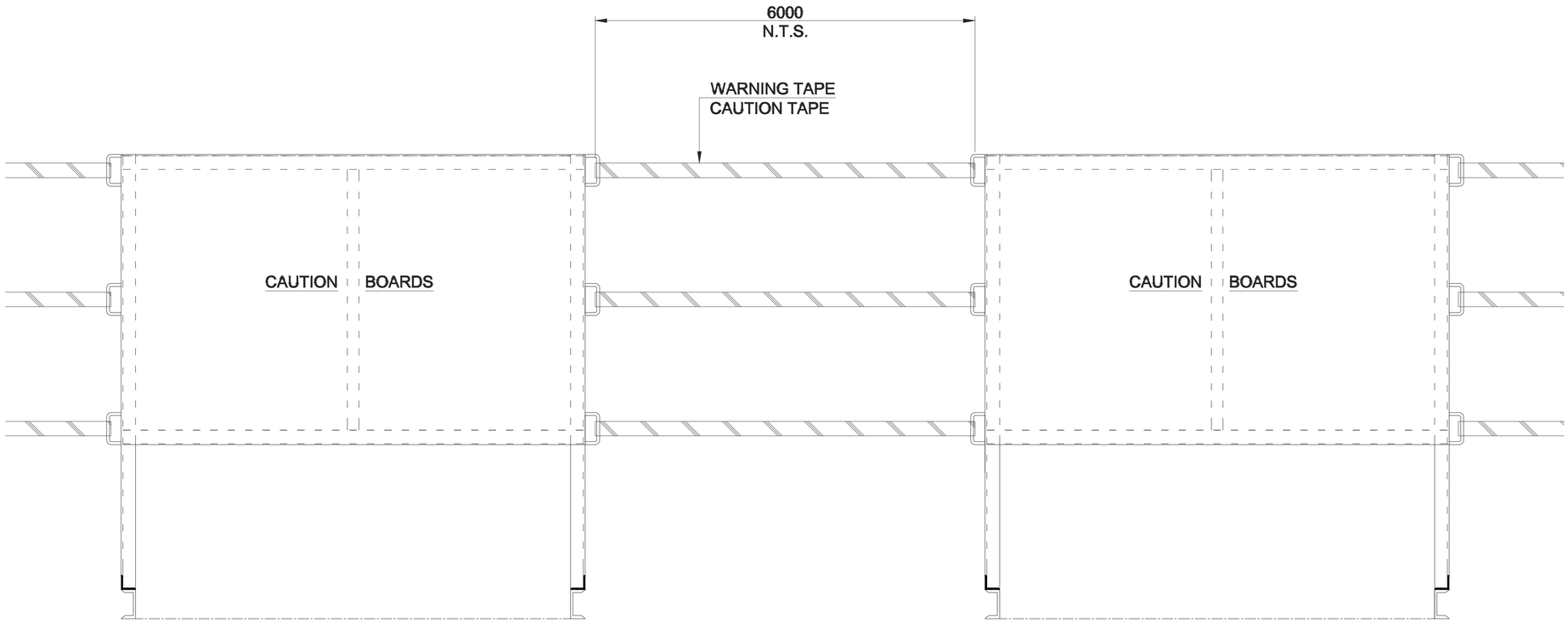
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL UNDERGROUND CABLE CROSSING DETAILS

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2007	0

FORMAT NO C211050-FMT-005_00



SCHEMATIC LAYOUT OF CAUTION BOARDS AND BARRICADING

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOTE SCALE THE DRAWING.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

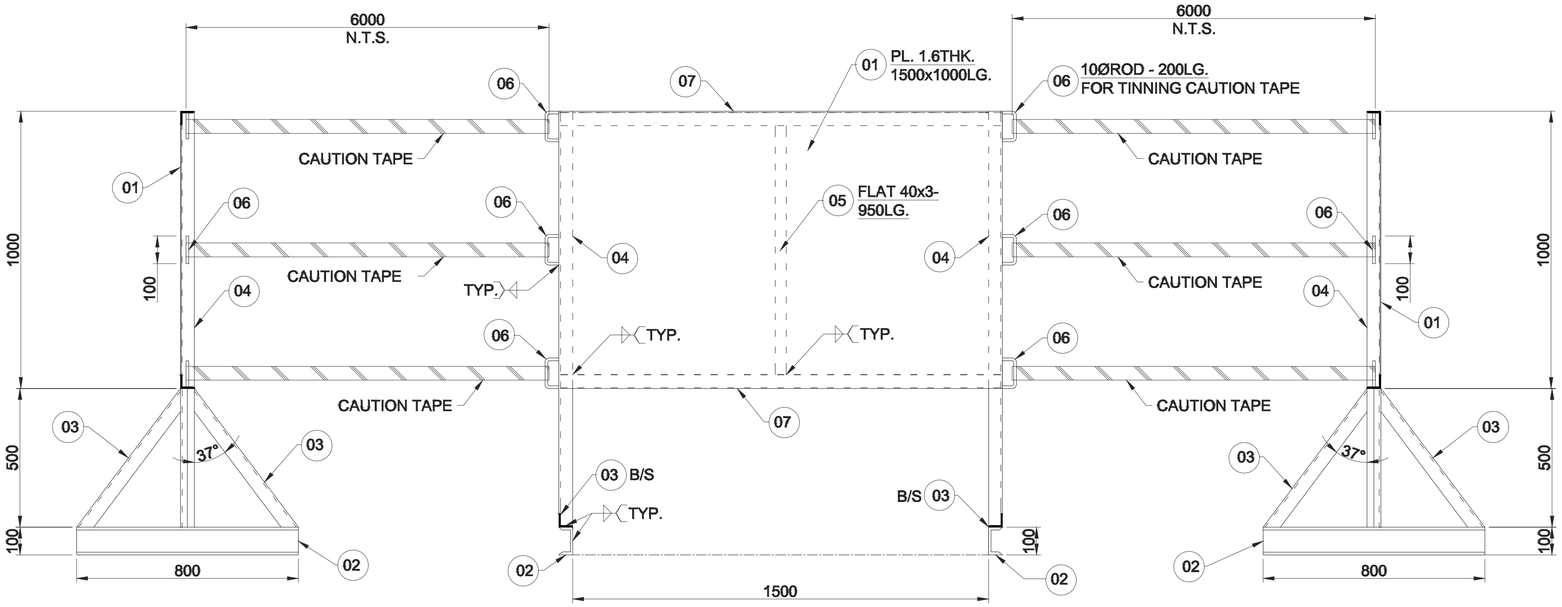
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: BARRICADING

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2008	0

FORMAT NO C211050-FMT-005_00



ELEVATION B-B

ELEVATION A-A

ELEVATION B-B

IN RED → **CAUTION**

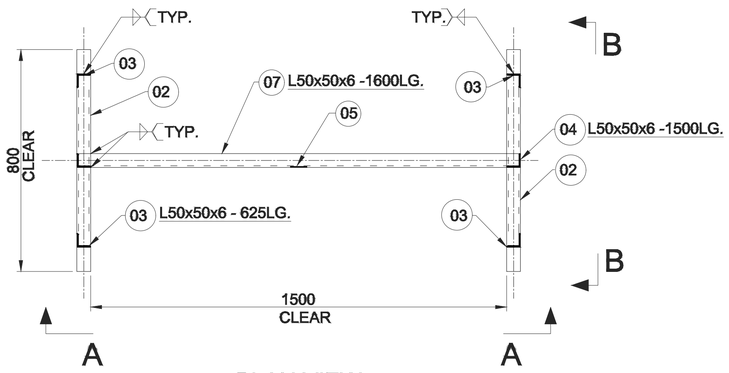
WORK IN PROGRESS

LAYING OF NATURAL GAS PIPELINE
CLIENT : OWNER'S NAME
CONTRACTOR NAME:
DATE OF COMMENCEMENT:
DATE OF COMPLETION:
EMERGENCY PHONE NOS.:

IN BLACK

← CLIENT LOGO

TO BE PRINTED ON ITEM NO. 01



PLAN VIEW

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOTE SCALE THE DRAWING.

BILL OF MATERIAL

Item Mkd.	Section	Width	Length	Item Qty. (All Marks)	Weight Kgs./M,M2	Total Weight In Kgs.
1.	PL. 1.6 THK.	1600	1000	1	12.56	20.10
2.	ISMC 100	–	800	2	9.20	14.72
3.	L50x50x6	–	625	4	4.50	11.25
4.	L50x50x6	–	1500	2	4.50	13.50
5.	Flat 3Thk.	900	40	1	0.94	0.03
6.	10Ø Rod	–	200	6	0.62	0.74
7.	L50x50x6	–	1600	2	4.50	14.40
				Grand Total (Kg)		74.74

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

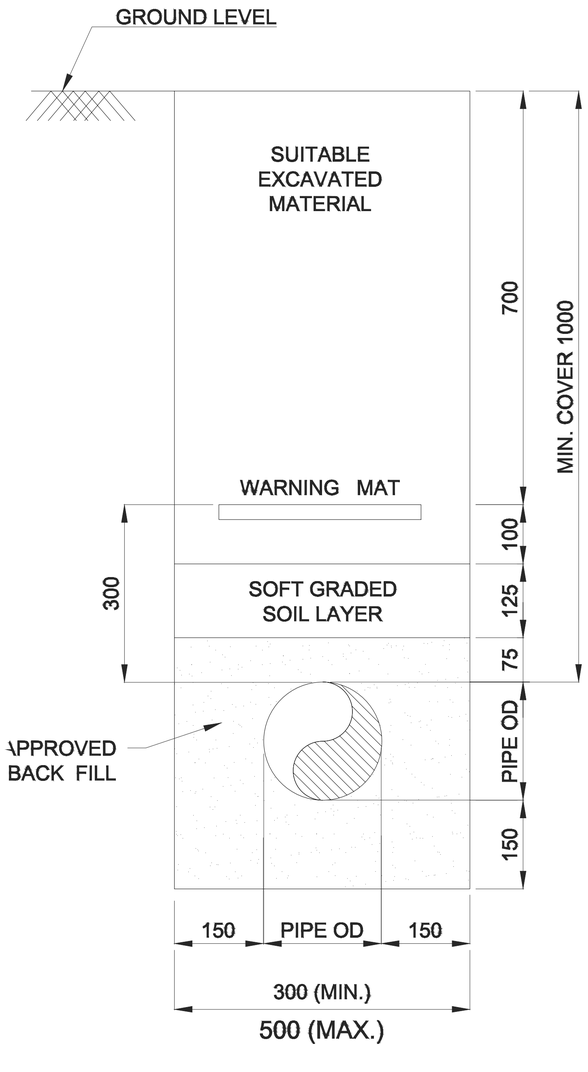
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

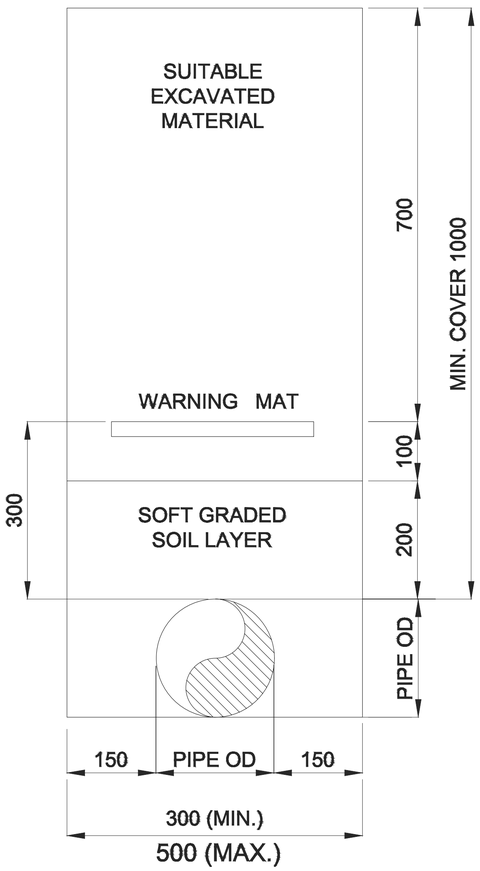
TITLE: CAUTION BOARD & TAPE ARRANGEMENT IN G.I / RISER INSTALLATION

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2009	0

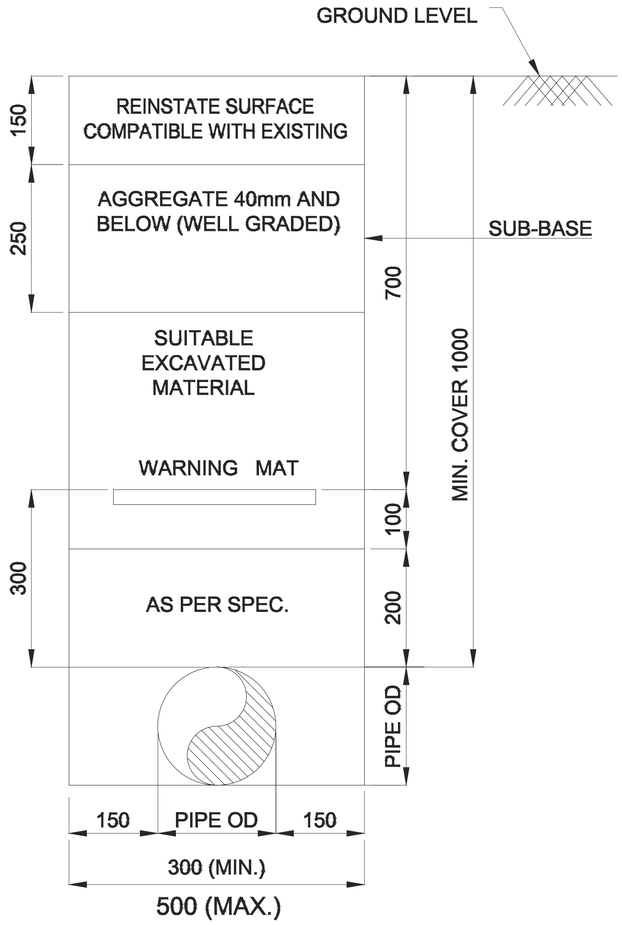
Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST



TRENCH IN ROCKY STRATA
TYPICAL SECTION



TRENCH IN NORMAL SOIL
TYPICAL SECTION



TRENCH RESTORATION DETAIL
TYPICAL SECTION

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.
3. FOR ALL PIPELINE TO BE CONSTRUCTED IN THE LAND UNDER JURISDICTION OF GOVT. OF INDIA, THE MIN COVER TO BE ADOPTED SHALL BE 1000MM IN ACCORDANCE WITH GOVT. OF INDIA PETROLEUM PIPELINE (ACQUISITION OF RIGHT OF USER IN LAND) ACT NO. 50, 1962 AND AMENDMENT ACT NO. 13 OF 1977. ANY EXTRA COVER REQUIREMENT SHALL BE IN ACCORDANCE WITH SPECIFICATIONS.
4. MIN. COVER REQUIREMENT SHALL BE SUBJECT TO APPROVAL OF CONCERNED AUTHORITIES WHEREVER REQUIRED.
5. EXTRA COVER REQUIREMENT SHALL BE ESTABLISHED AT ALL OVER BE NOS AND HORIZONTAL BE NOS WHEREVER NECESSARY.
6. FOR MINIMUM COVER REQUIREMENT AT PIPELINE CROSSING ROADS, RAILWAY TRACKS, RIVER MARSHY AREAS, ETC., REFER RELEVANT STANDARDS.

Digitally signed by Rivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL TRENCH DIMENSIONS FOR PIPELINE

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2010	0

FORMAT NO C211050-FMT-005_00

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. FOLLOW WRITTEN DIMENSIONS ONLY DO NOT SCALE.

Digitally signed by Bhavek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

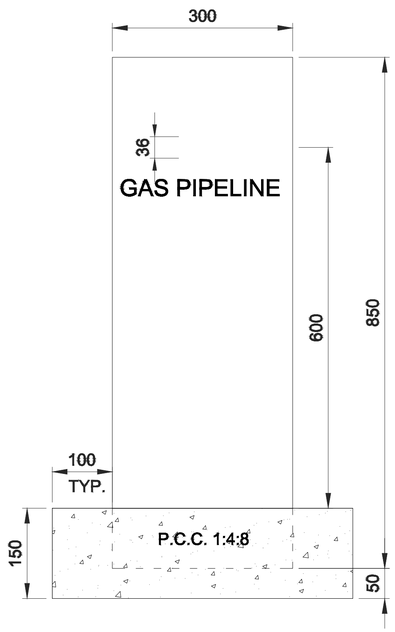
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

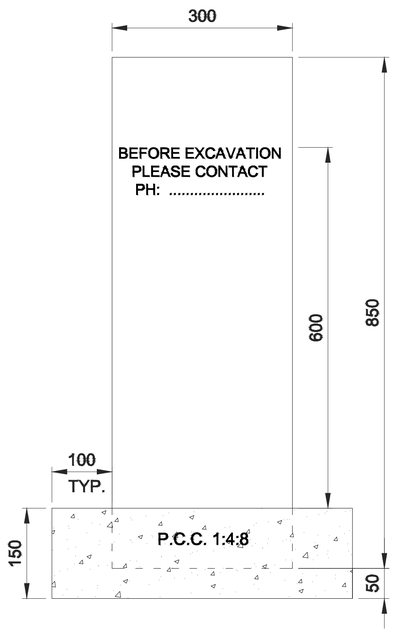
TITLE: PLATE MARKER

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2011	0

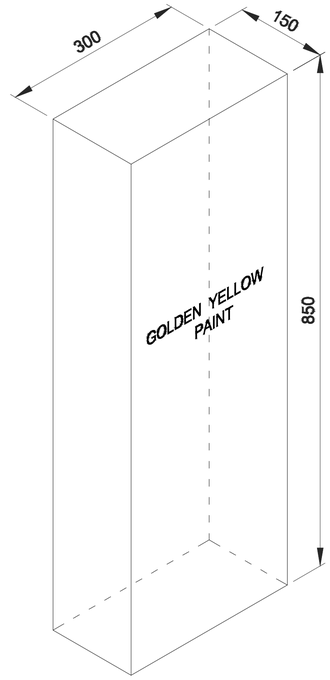
FORMAT NO C211050-FMT-005_00



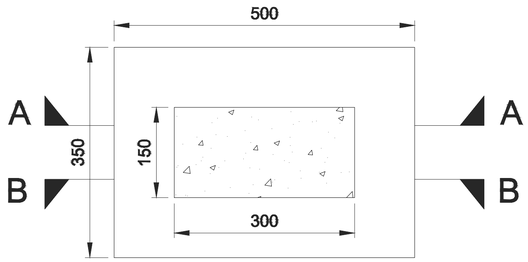
SECTION A-A



SECTION B-B



ISOMETRIC VIEW



PLAIN VIEW

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.
3. ALL TEXT SHOULD BE WRITTEN IN BLACK COLOR.

Digitally signed by Rivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

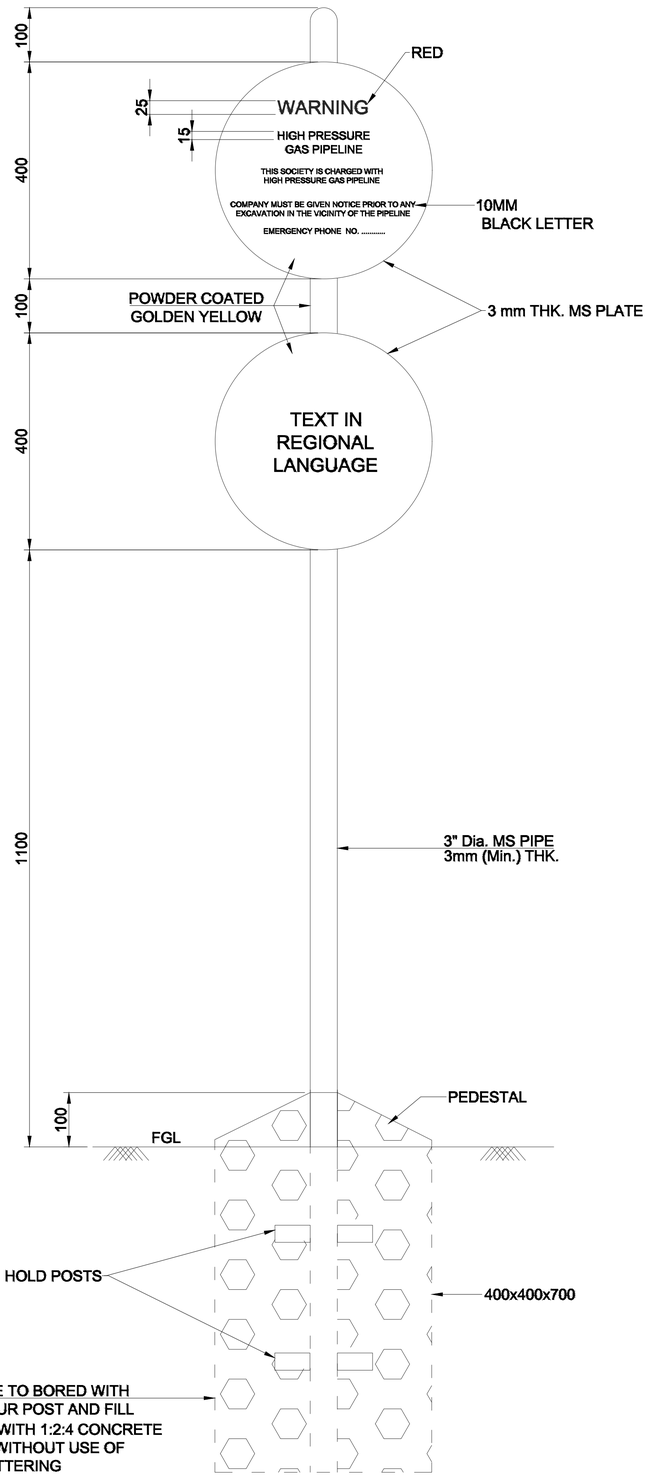
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

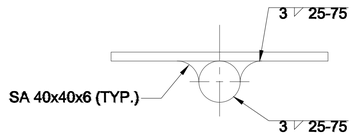
TITLE: SKETCH FOR STONE MARKER

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2012	0

FORMAT NO C211050-FMT-005_00



FIXING DETAILS



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. WARNING TEXT AND MARKER SIZES ARE INDICATIVE AND ARE SUBJECT TO THE APPROVAL BY OWNER / OWNER'S REPRESENTATIVE BEFORE FABRICATION.
3. SCHEME FOR POWDER COATING AND COLORING : ONE COAT OF PRIMER & TWO COATS OF SPECIFIED PAINTS. ALL LETTERS EXCEPT 'WARNING' TO BE PAINTED BLACK.
4. APPROVAL OF WARNING MARKER DESIGN SHALL BE OBTAINED BEFORE THE COMMENCEMENT OF WORK.

Digitally signed by Rivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

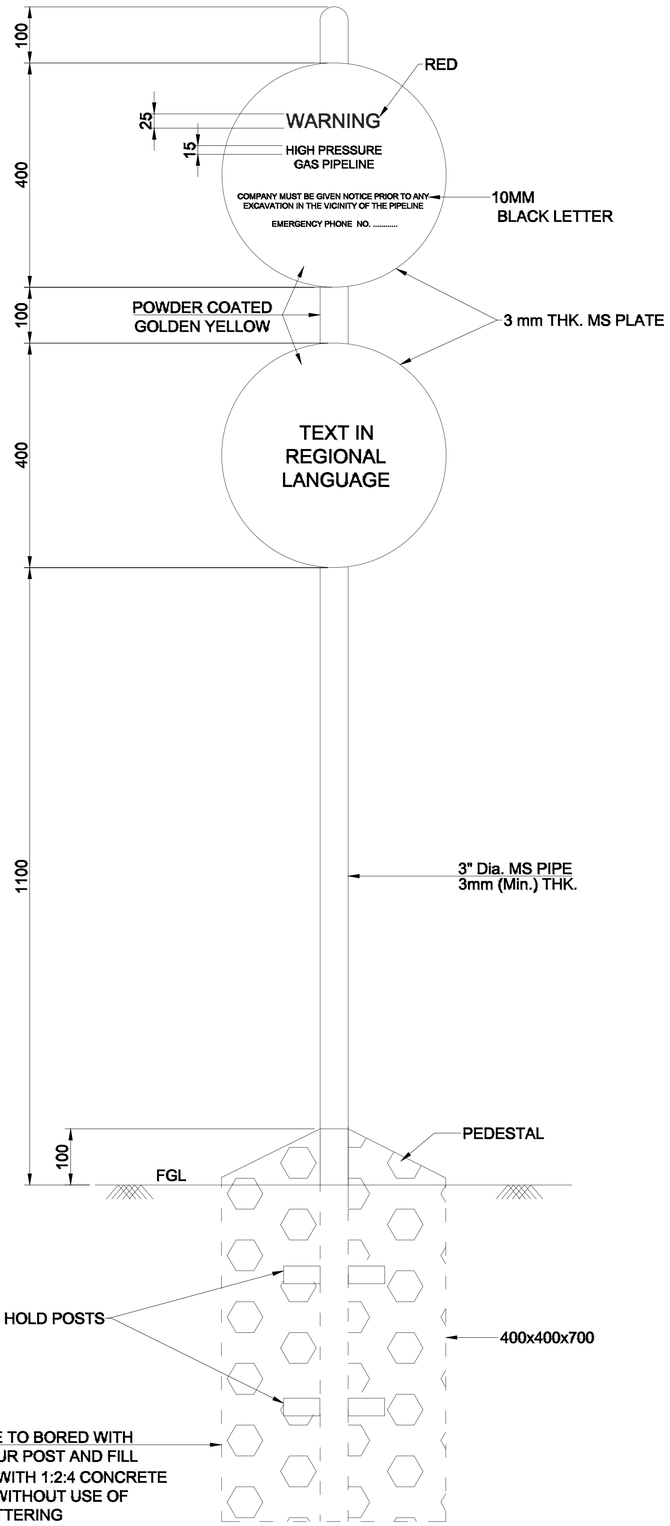
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

PMC: VCS QUALITY SERVICES PVT. LTD.

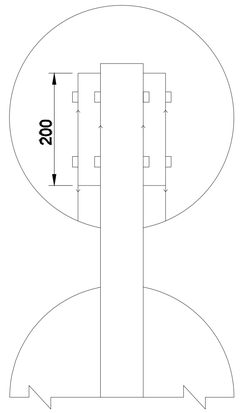
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

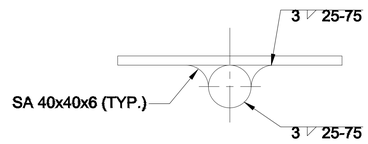
TITLE: POLE MARKER WITH FOUNDATION (INDIVIDUAL SOCIETIES / AREAS)

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2013	0



FIXING DETAILS





REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. WARNING TEXT AND MARKER SIZES ARE INDICATIVE AND ARE SUBJECT TO THE APPROVAL BY OWNER / OWNER'S REPRESENTATIVE BEFORE FABRICATION.
3. SCHEME FOR POWDER COATING AND COLORING : ONE COAT OF PRIMER & TWO COATS OF SPECIFIED PAINTS. ALL LETTERS EXCEPT 'WARNING' TO BE PAINTED BLACK.
4. APPROVAL OF WARNING MARKER DESIGN SHALL BE OBTAINED BEFORE THE COMMENCEMENT OF WORK.

Digitally signed by Rajeev Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

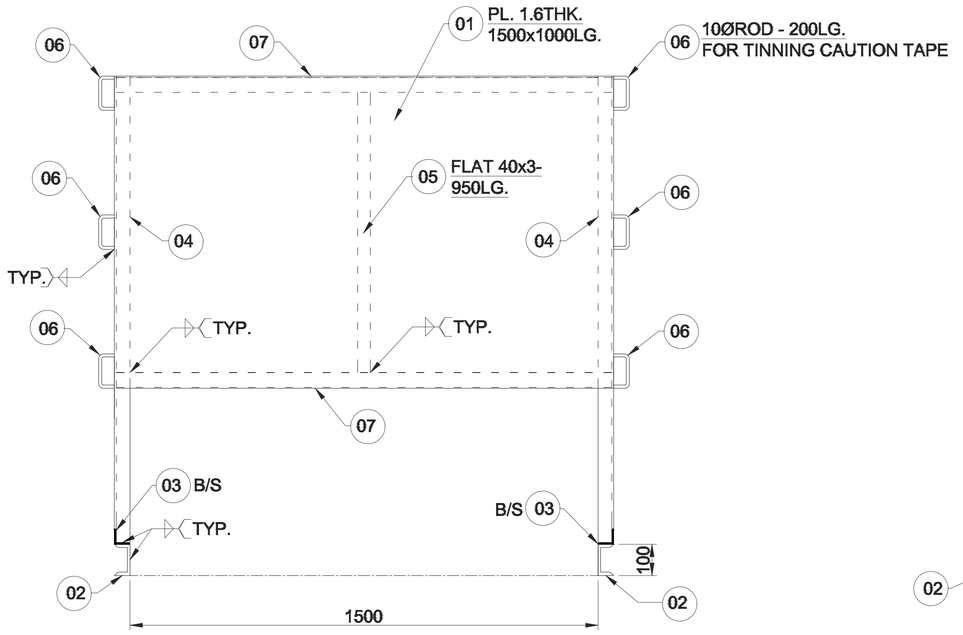
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

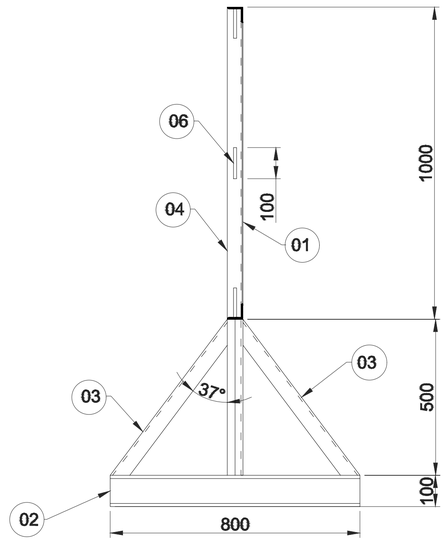
TITLE: POLE MARKER WITH FOUNDATION

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2014	0

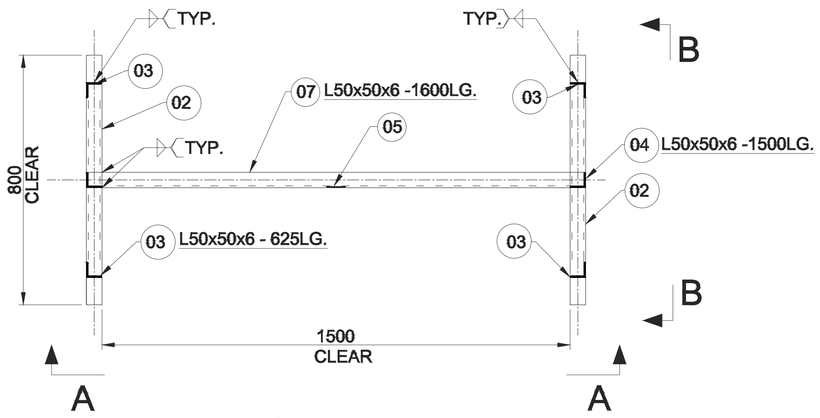
FORMAT NO C211050-FMT-005_00



ELEVATION A-A



ELEVATION B-B



PLAN VIEW

IN RED → **CAUTION** ← CLIENT LOGO

WORK IN PROGRESS

IN BLACK

LAYING OF NATURAL GAS PIPELINE
CLIENT : OWNER'S NAME
CONTRACTOR NAME:
DATE OF COMMENCEMENT:
DATE OF COMPLETION:
EMERGENCY PHONE NOS.:

TO BE PRINTED ON ITEM NO. 01

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

BILL OF MATERIAL

Item Mkd.	Section	Width	Length	Item Qty. (All Marks)	Weight Kgs./M,M2	Total Weight In Kgs.
1.	PL. 1.6 THK.	1600	1000	1	12.56	20.10
2.	ISMC 100	–	800	2	9.20	14.72
3.	L50x50x6	–	625	4	4.50	11.25
4.	L50x50x6	–	1500	2	4.50	13.50
5.	Flat 3Thk.	900	40	1	0.94	0.03
6.	10Ø Rod	–	200	6	0.62	0.74
7.	L50x50x6	–	1600	2	4.50	14.40
				Grand Total (Kg)		74.74

Digitally signed by Ravik Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

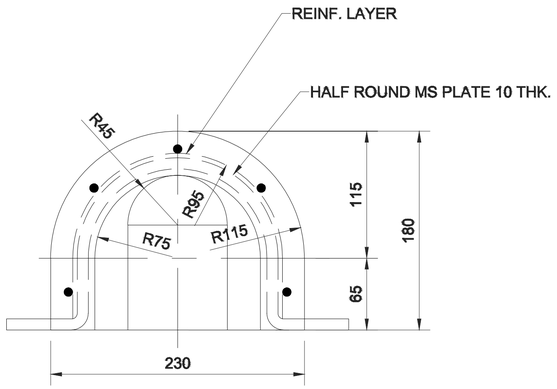
PMC: VCS QUALITY SERVICES PVT. LTD.

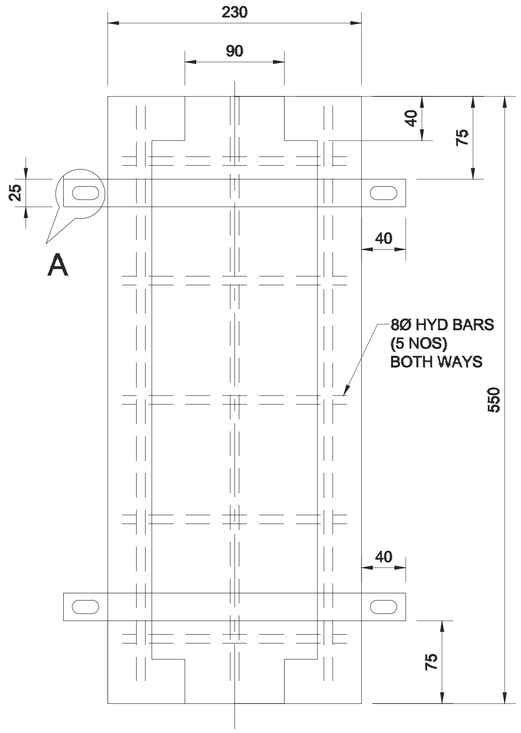
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

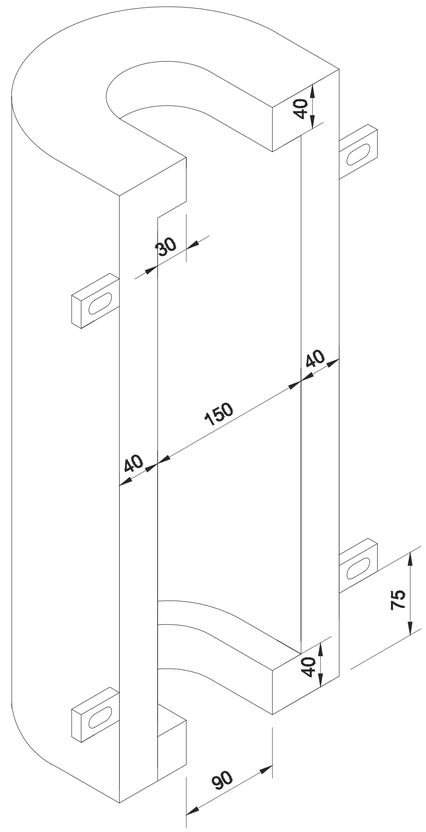
TITLE: CAUTION BOARD

SCALE:	NTS	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2015	0

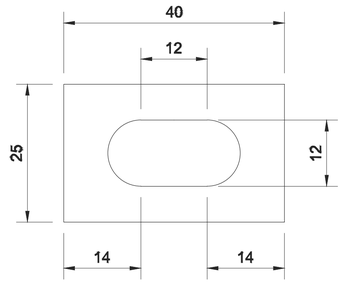
FORMAT NO C211050-FMT-005_00







ISOMETRIC VIEW



DETAIL-A
SCALE 1:1

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.
3. GRADE OF CONCRETE SHALL BE M25.
4. REINFORCEMENT IS HYD. TO IS:1786.
5. CONCRETE SLEEVE TO BE CLAMPED TO WALL WITH 10Ø ANCHOR BOLTS.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:25 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	22.06.23	IFC / IFE / TENDER	ARV.	A.K	SKN

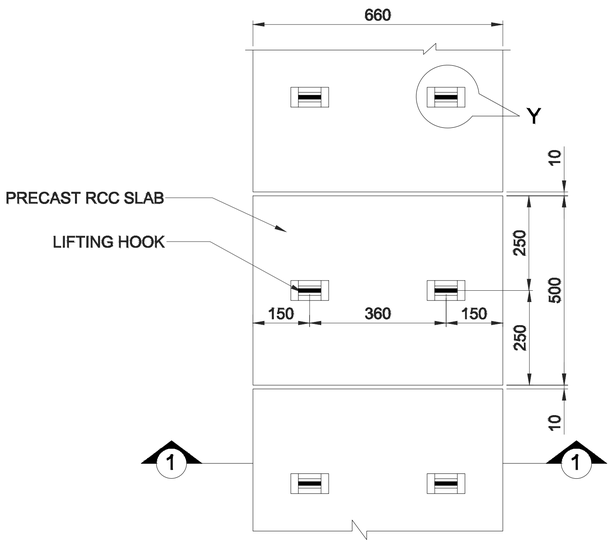
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

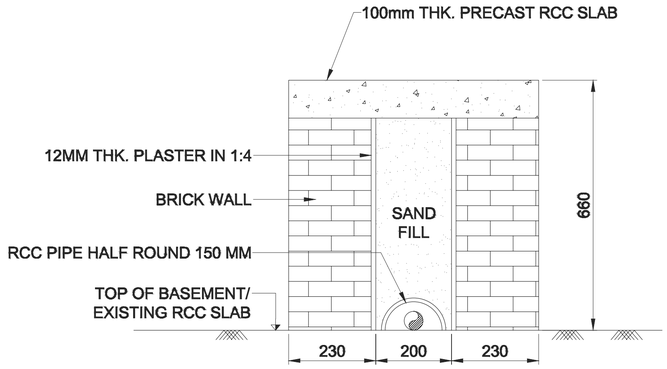
TITLE: HALF ROUND CONCRETE SELEEVE

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2016	0

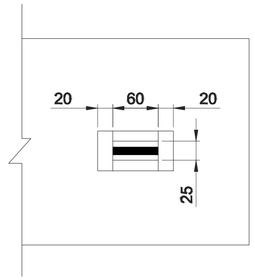
FORMAT NO C211050-FMT-005_00



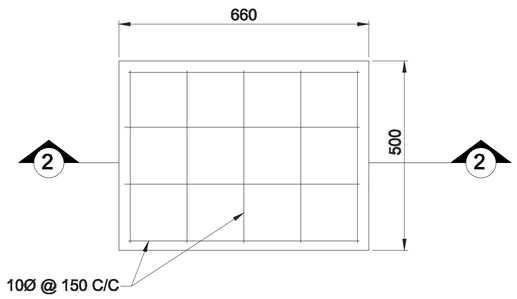
G.A PLAN OF COVER SLAB



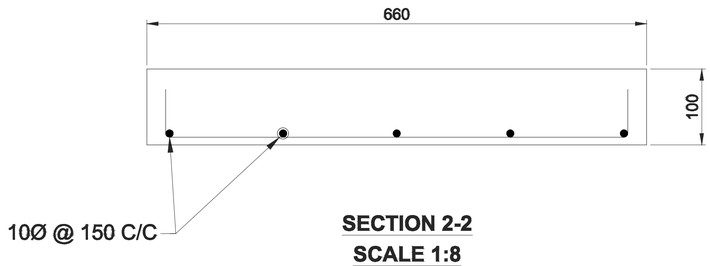
SECTION 1-1 THRU PIPE TRENCH



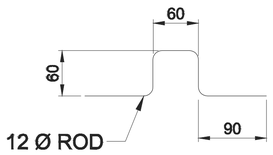
DETAIL - Y
SCALE 1:8



PRECAST RCC SLAB



SECTION 2-2
SCALE 1:8



LIFTING HOOK
SCALE 1:8

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

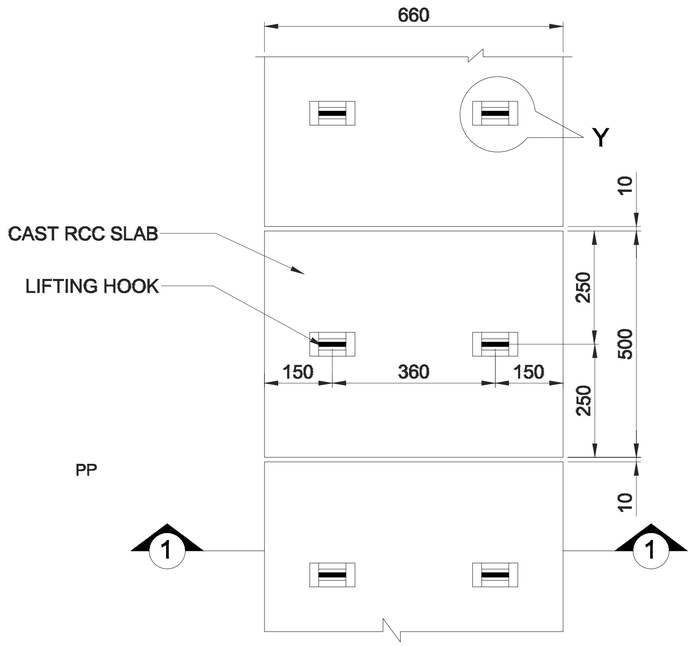
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

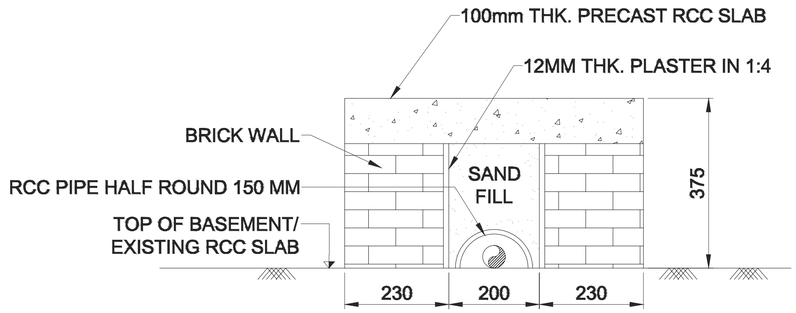
TITLE: TYPICAL BRICKWALL TRENCH (0.66 X 0.66 X 1.0)

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2017	0

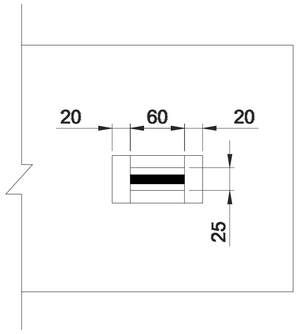
FORMAT NO C211050-FMT-005_00



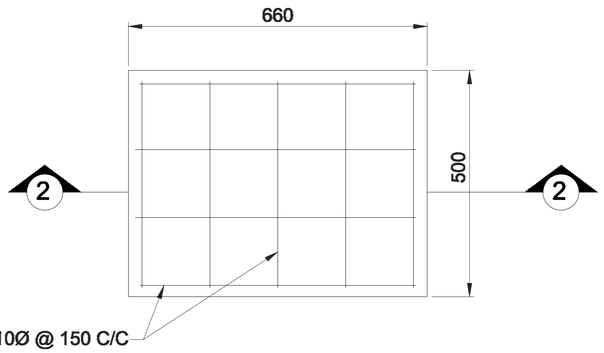
G.A PLAN OF COVER SLAB



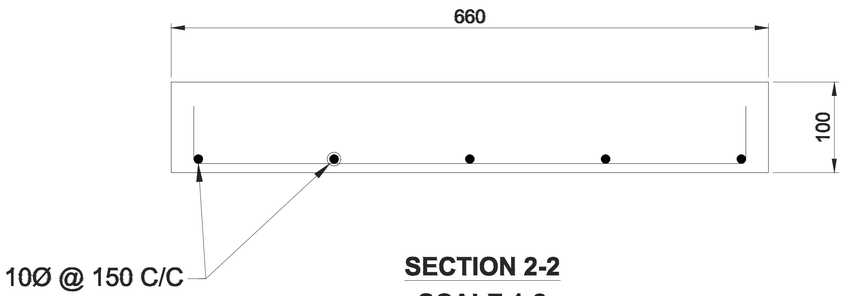
SECTION 1-1 THRU PIPE TRENCH



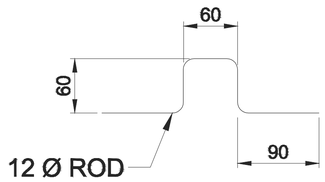
DETAIL - Y
SCALE 1:8



PRECAST RCC SLAB



SECTION 2-2
SCALE 1:8



LIFTING HOOK
SCALE 1:8

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

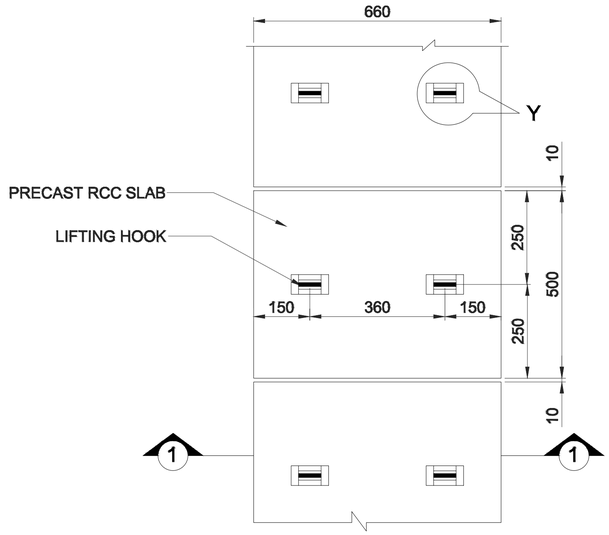
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

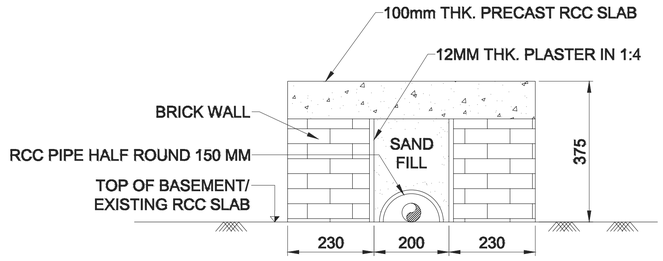
TITLE: TYPICAL BRICKWALL TRENCH (0.375 X 0.66 X 1.0)

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2018	0

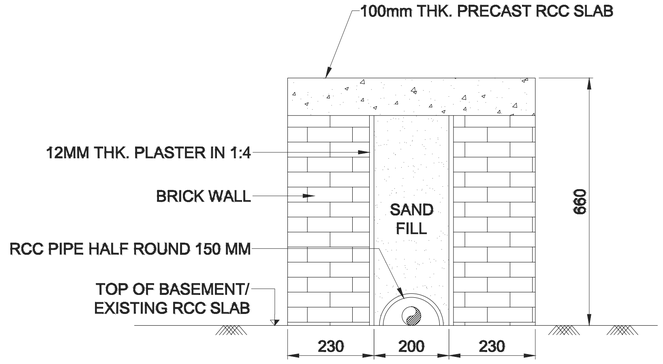
Digitally signed by Pravek Kumar Singh
Date: 2026.07.17 19:06:26 IST



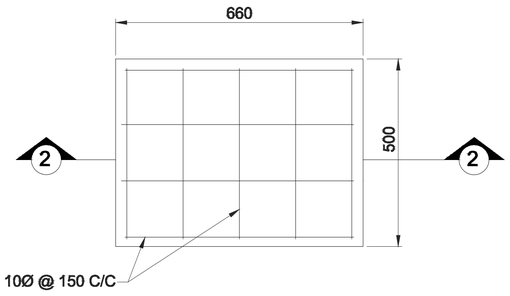
G.A PLAN OF COVER SLAB



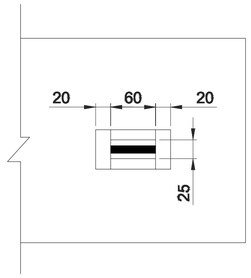
SECTION 1-1 THRU PIPE TRENCH



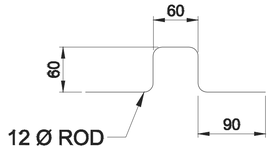
SECTION 1-1 THRU PIPE TRENCH



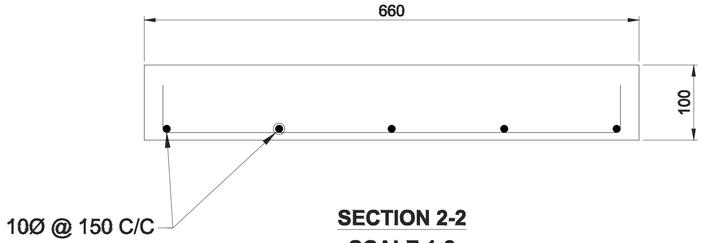
PRECAST RCC SLAB



DETAIL - Y
SCALE 1:8



LIFTING HOOK
SCALE 1:8



SECTION 2-2
SCALE 1:8

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

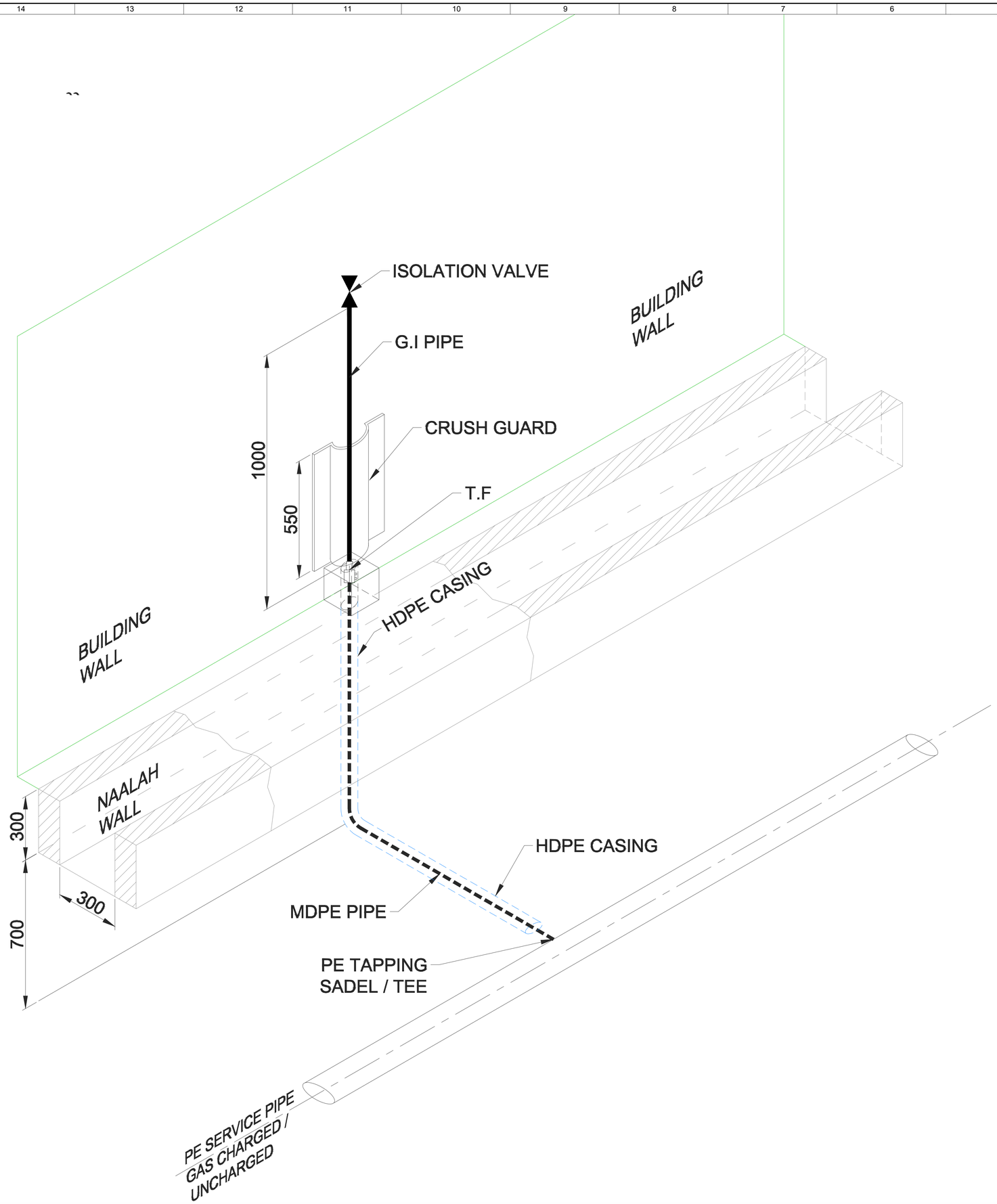
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL BRICKWALL TRENCH UPTO 7M ROAD CROSSING INSIDE SOCIETY

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2019	0

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

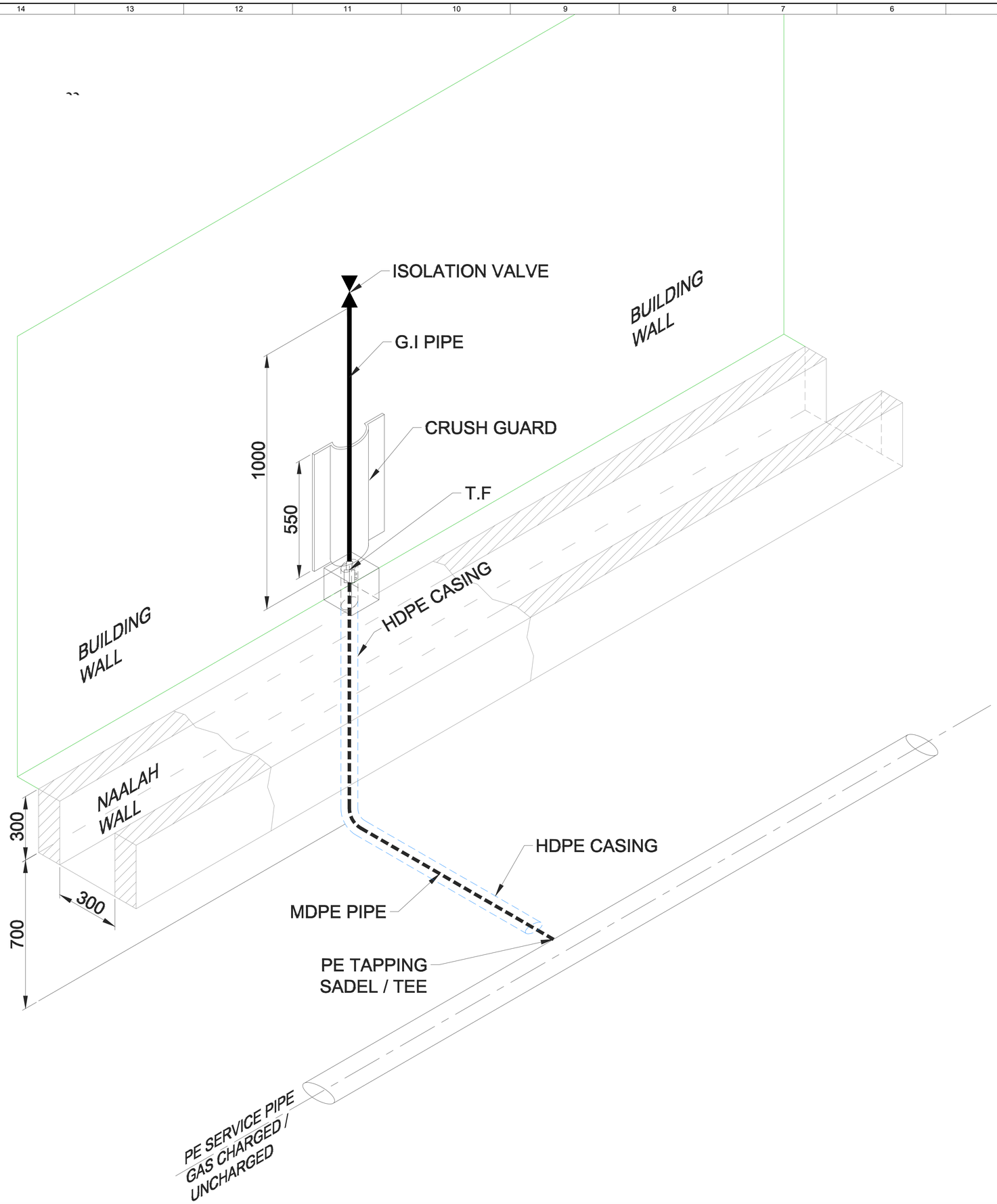
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: DRAIN CROSSING FOR LAYING OF SERVICE LINES WHERE PEDESTAL IS POSSIBLE

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2020	0

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

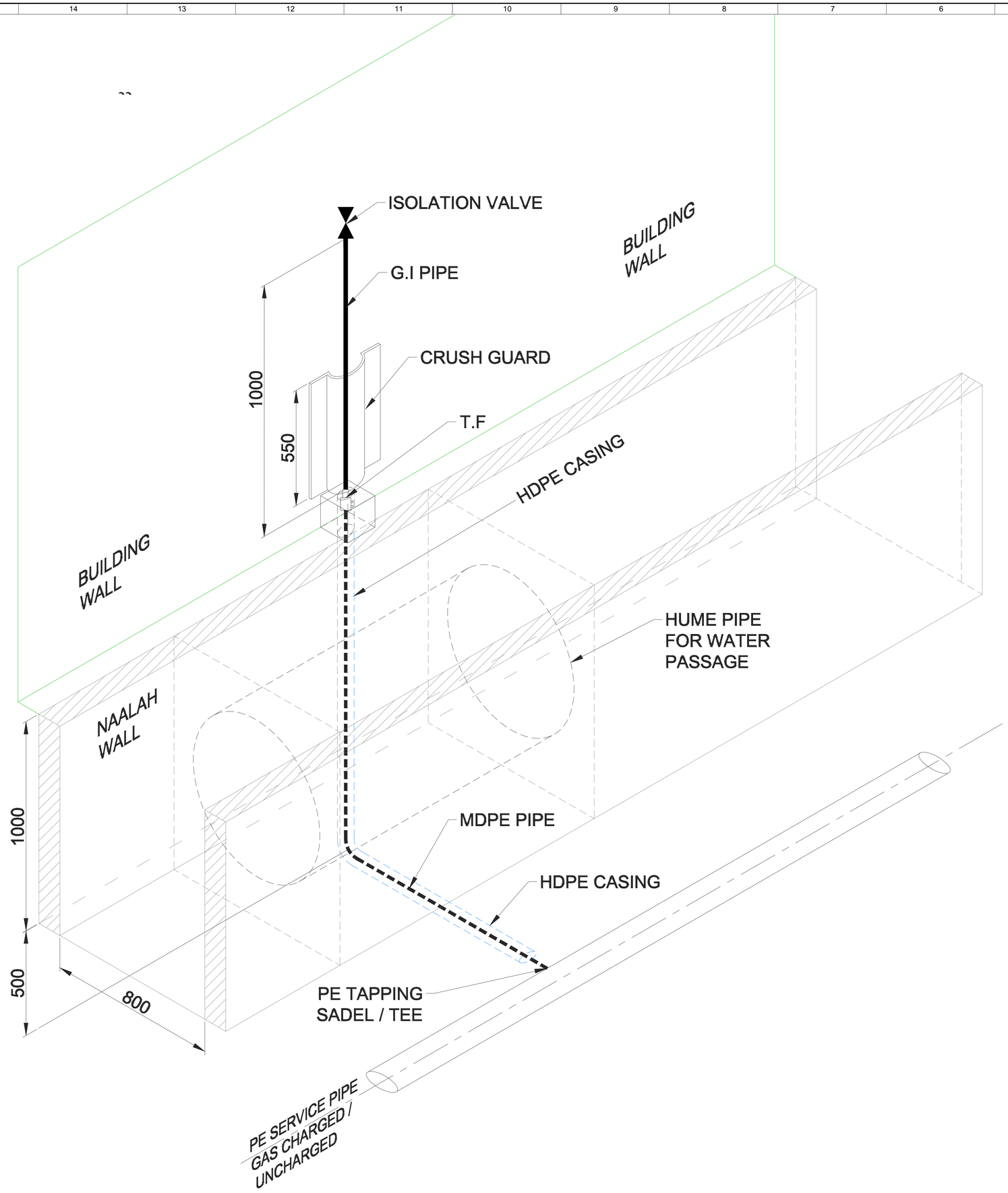
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: DRAIN CROSSING FOR LAYING OF SERVICE LINES WHERE PEDESTAL IS NOT POSSIBLE

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2021	0

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.

Digitally signed by Vivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

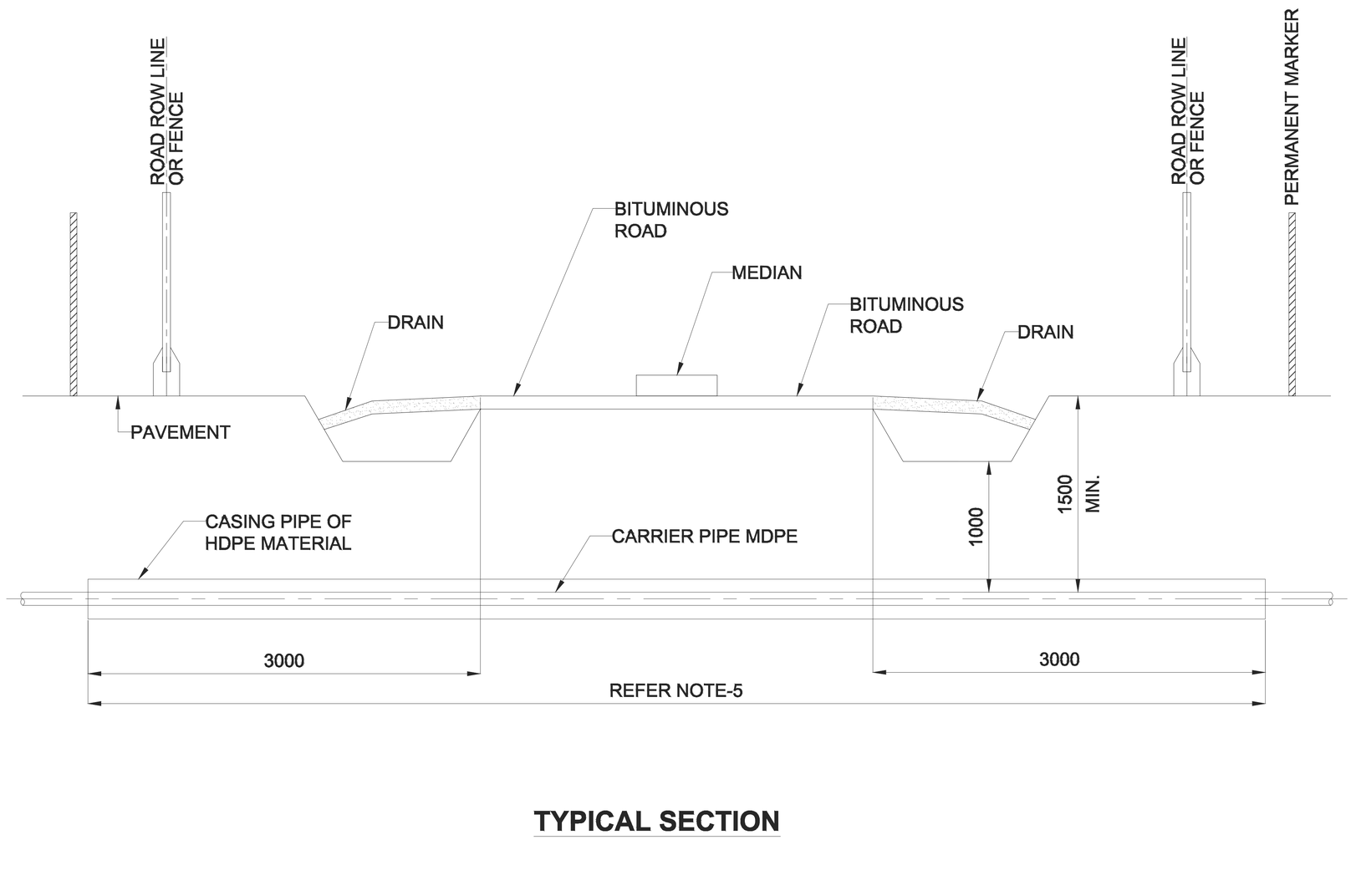
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: NALLAH CROSSING FOR LAYING OF SERVICE LINES

SCALE: SCALE	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	-----	VCS-STD-PP-2022 / 0

FORMAT NO C211050-FMT-005_00



TYPICAL SECTION

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES.

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWINGS.
3. ROAD / HIGHWAY CROSSING SHALL BE RESTORED TO ORIGINAL CONDITION TO THE ENTIRE SATISFACTION OF OWNER AND CONCERNED AUTHORITIES HAVING JURISDICTION.
4. REFER API RP 1102 FOR OTHER DESIGN AND INSTALLATION REQUIREMENTS.
5. ANGLE OF INTERSECTION BETWEEN PIPELINE AND THE ROAD / HIGHWAY SHALL BE AS CLOSE TO 90° AS POSSIBLE BUT IN NO CASE LESS THAN 30°.
6. CONTRACTOR SHALL VERIFY THE ACTUAL DIMENSION WITH RESPECT TO SURVEY DETAILS OF EACH ROAD / HIGHWAY CROSSING AND PREPARE DETAILED DRAWINGS FOR INDIVIDUAL CROSSING TAKE ENGINEER-IN-C

Digitally signed by Shivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

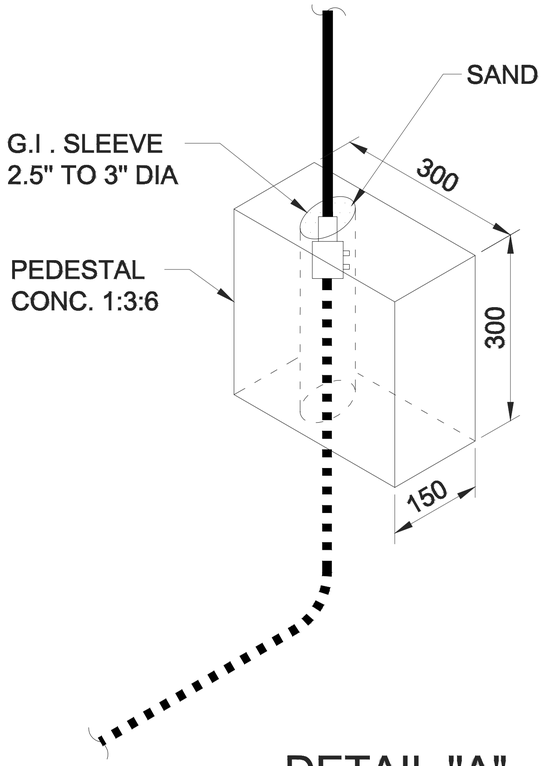
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

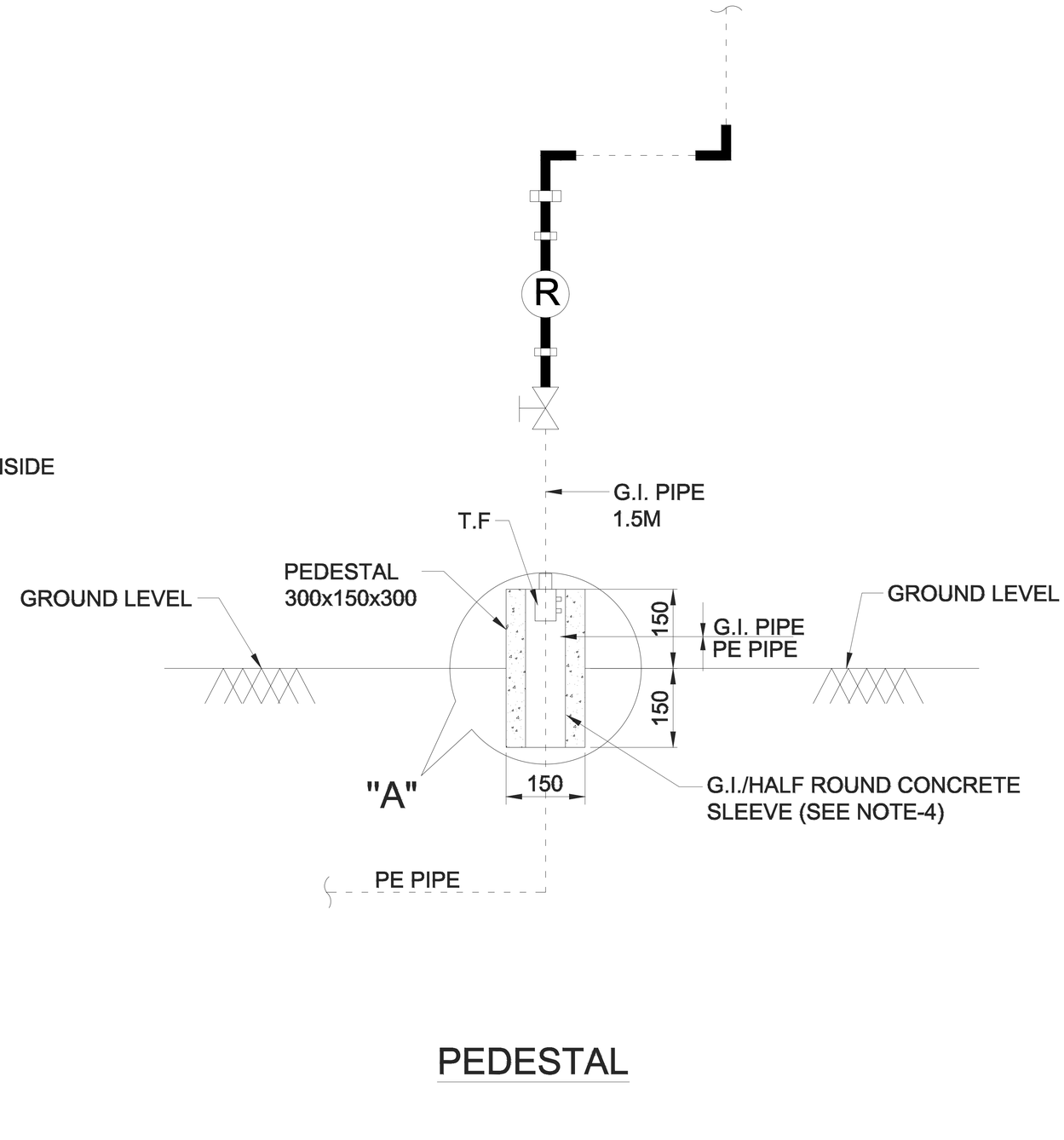
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: ROAD/ HIGHWAY CASED CROSSING FOR MDPE PIPE

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2023	0



DETAIL "A"



PEDESTAL

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWINGS.
3. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED WHILE DETAIL ENGINEERING.
4. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNERS REPRESENTATIVE AS PER SITE CONDITION.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

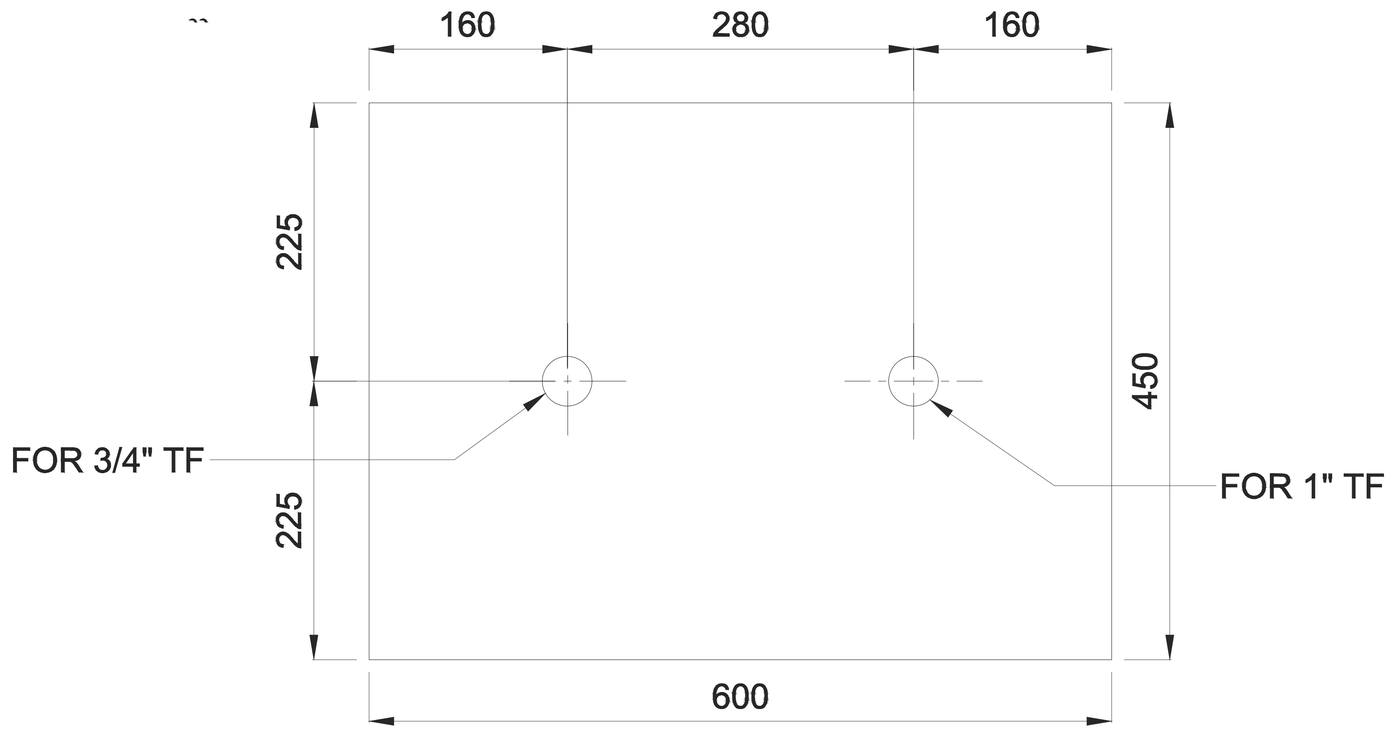
PMC: VCS QUALITY SERVICES PVT. LTD.

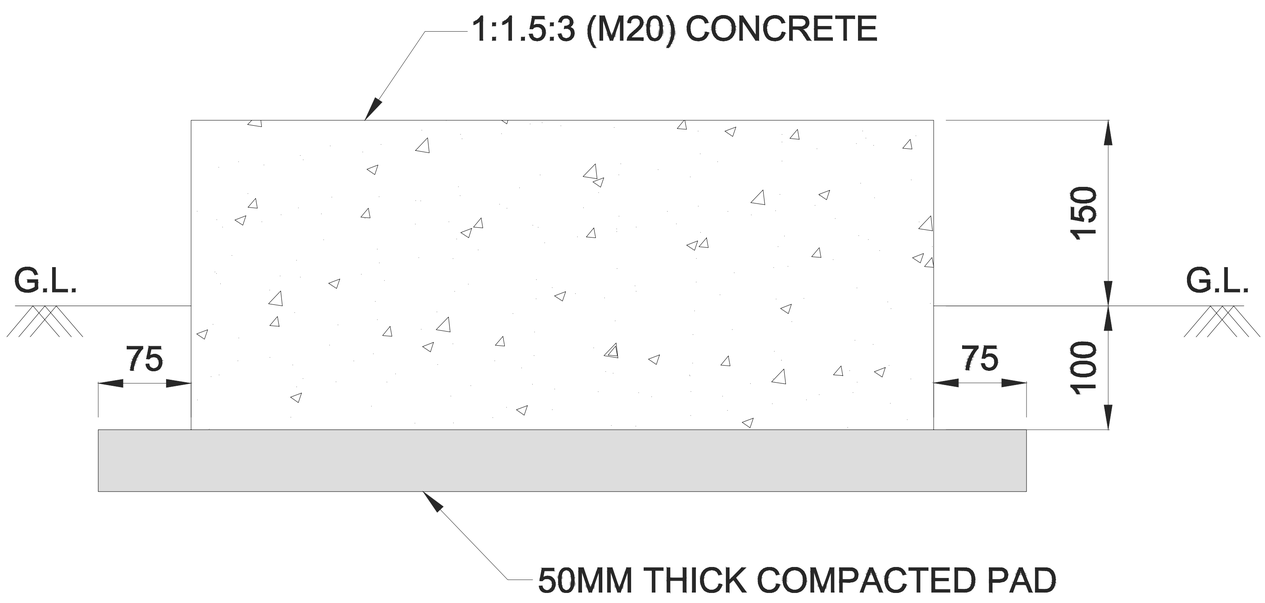
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: G.I PIPE SLEEVE

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2024	0

FORMAT NO C211050-FMT-005_00





REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

Digitally signed by Dinesh Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

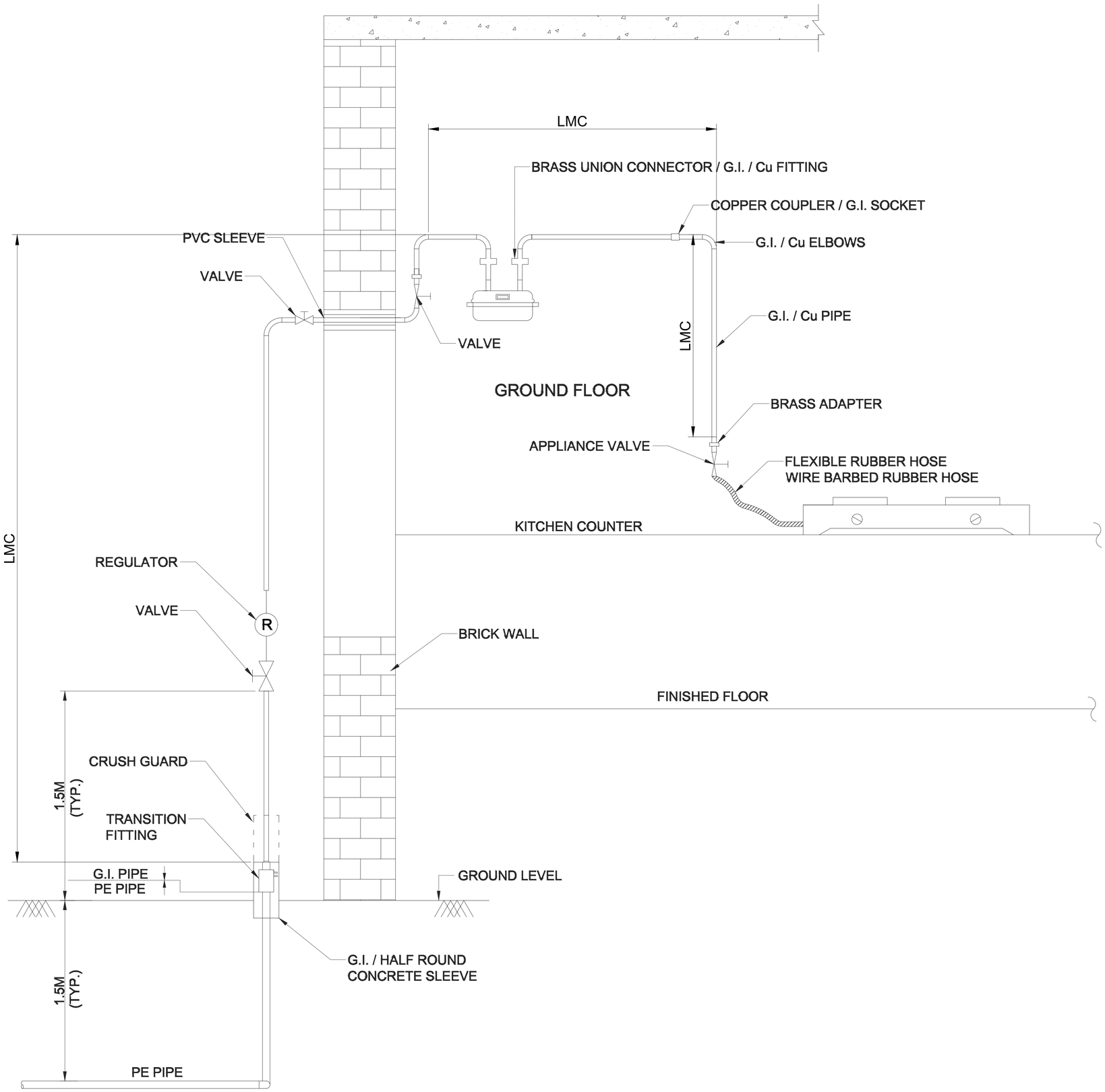
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SCHEMATIC DIAGRAM OF FOUNDATION FOR SINGLE STREAM SERVICE REGULATOR

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2025	0

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.
8. TAPPING SHALL BE LEFT NEAR OUTSIDE THE KITCHEN AS DIRECTED BY OWNER / OWNER'S REPRESENTATIVE..

Digitally signed by Bhavik Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

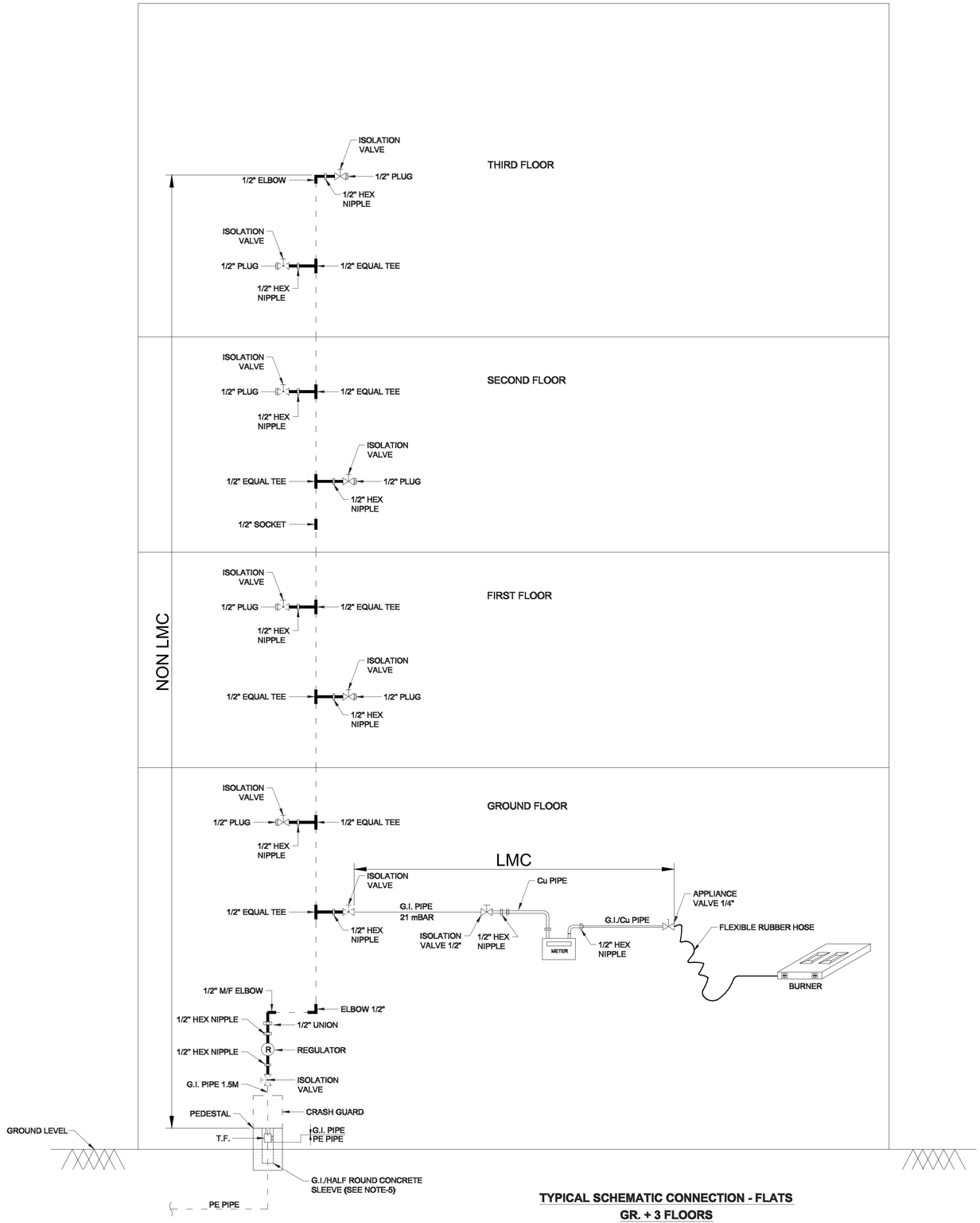
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION (NON LMC & LMC)

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2026	0

FORMAT NO C211050-FMT-005_00



TYPICAL SCHEMATIC CONNECTION - FLATS
GR. + 3 FLOORS

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.
8. METER CLAMP SHALL BE APPROVED FROM OWNER / OWNER'S REPRESENTATIVE..

Digitally signed by Shivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

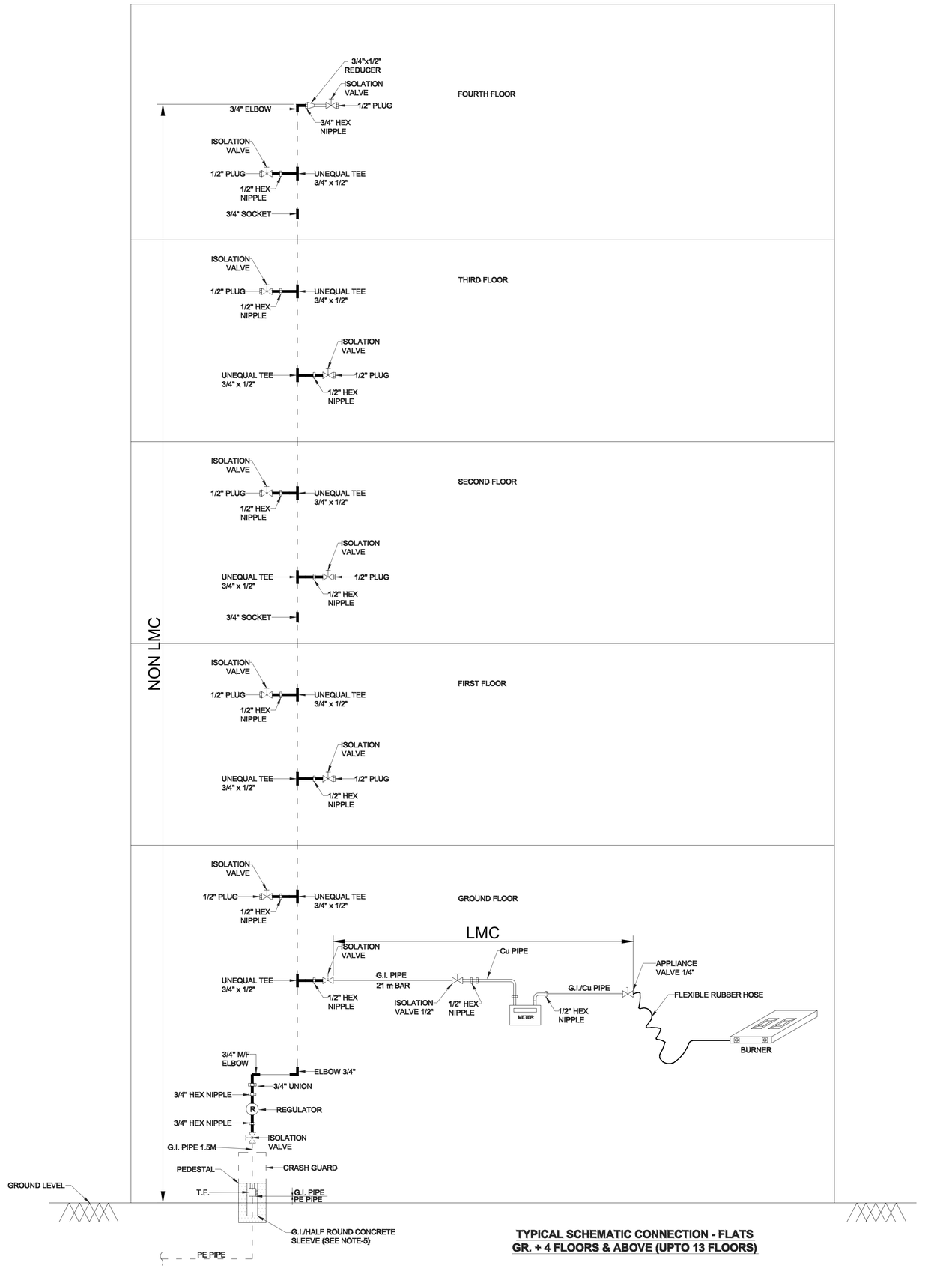
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL SCHEMATIC CONNECTION- FLAT GR. + 3 FLOORS

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2027	0

FORMAT NO C211050-FMT-005_00



TYPICAL SCHEMATIC CONNECTION - FLATS
GR. + 4 FLOORS & ABOVE (UPTO 13 FLOORS)

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.
8. METER CLAMP SHALL BE APPROVED FROM OWNER / OWNER'S REPRESENTATIVE..

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

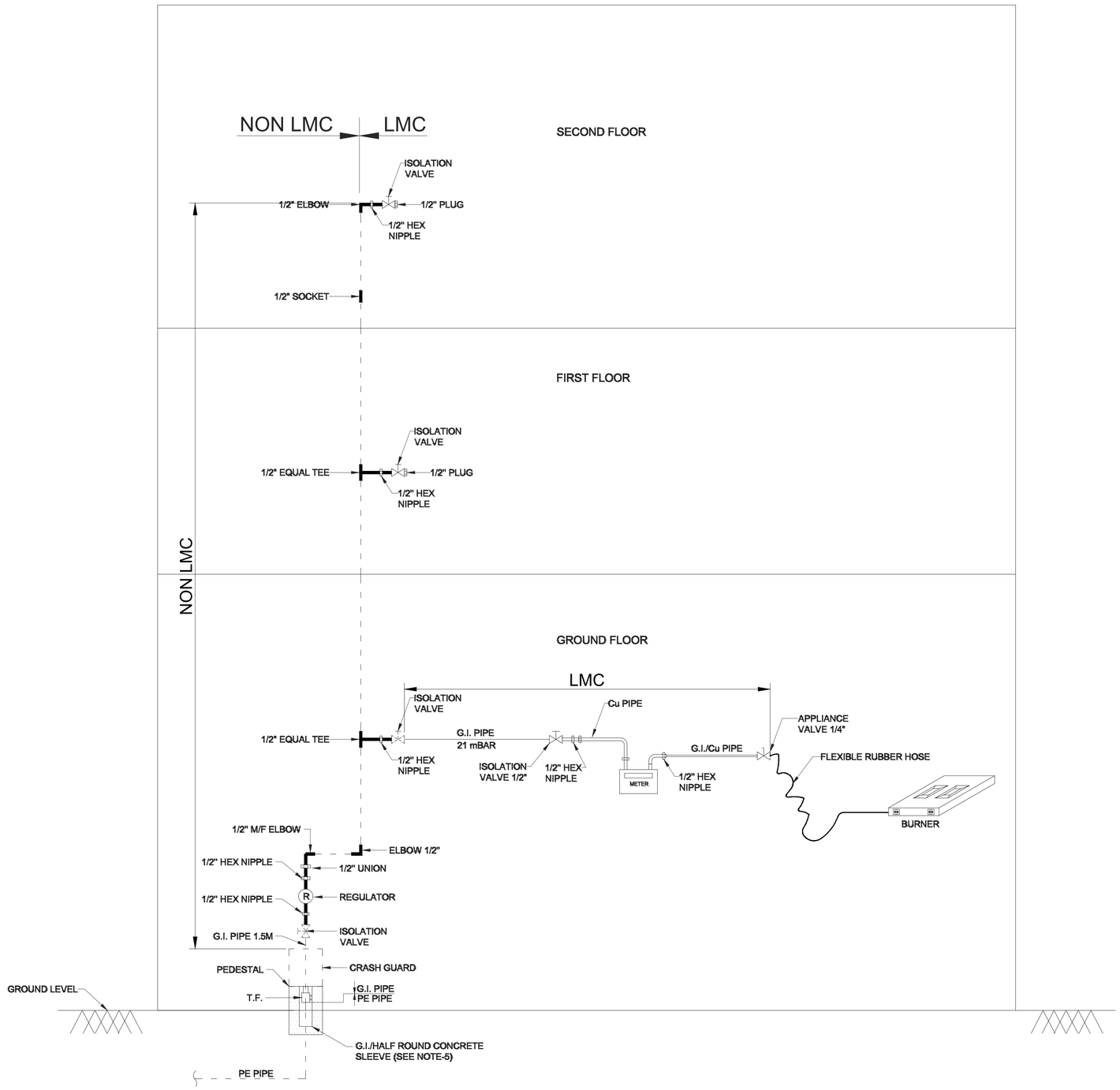
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL SCHEMATIC CONNECTION- FLAT GR. + 4 FLOORS & ABOVE (UPTO 13 FLOORS)

SCALE: SCALE	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	-----	VCS-STD-PP-2028 / 0

Digitally signed by Rivek Kumar Singh
Date: 2026.07.17 19:06:26 IST



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.
8. METER CLAMP SHALL BE APPROVED FROM OWNER / OWNER'S REPRESENTATIVE..

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

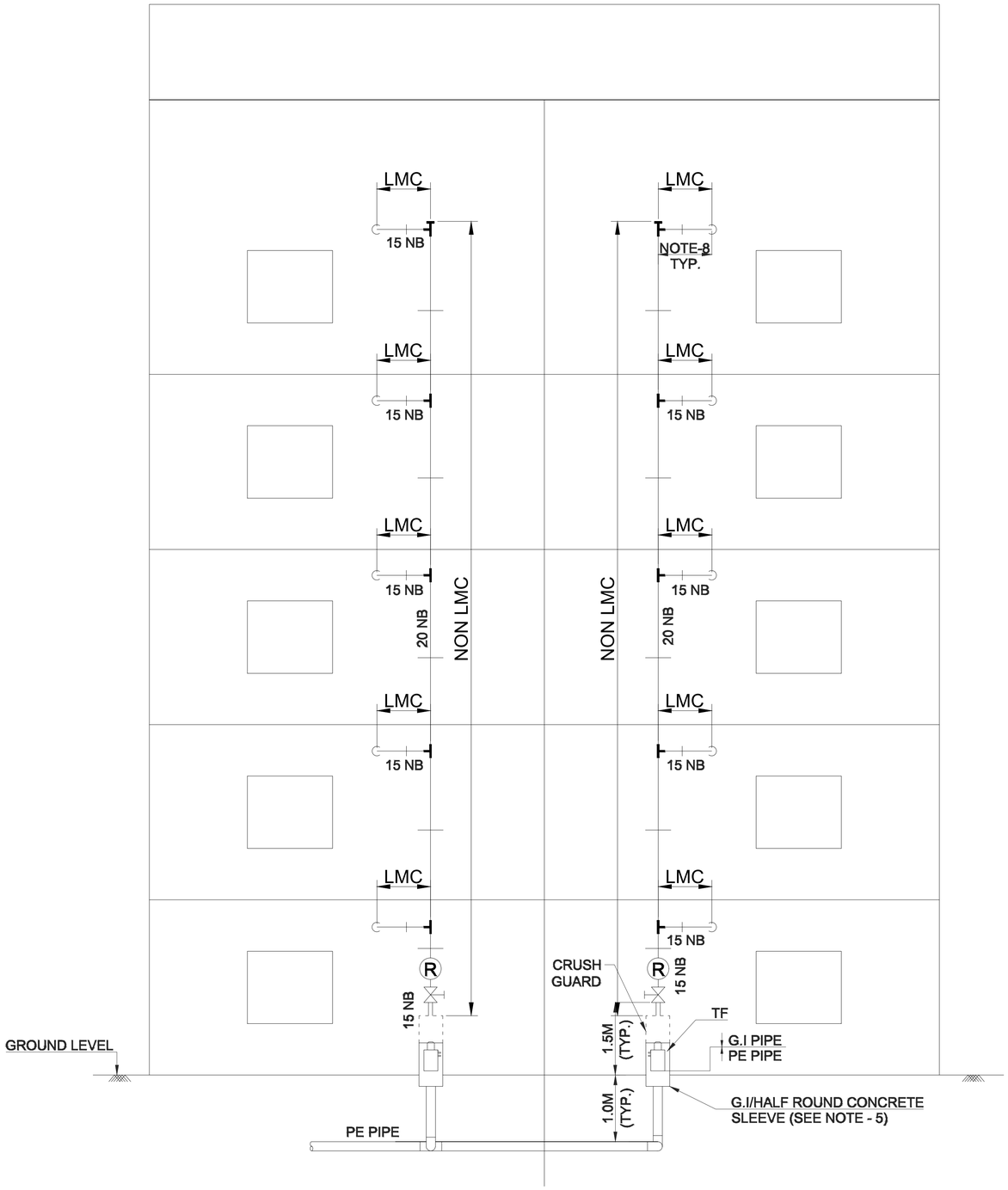
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL SCHEMATIC CONNECTION- KOTHI

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2029	0

FORMAT NO C211050-FMT-005_00



INDICATIVE RISER ARRANGEMENT IN GR+4 & ABOVE BUILDING (METER INSTALLED INSIDE THE KITCHEN)

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.
8. TAPPING SHALL BE LEFT NEAR OUTSIDE THE KITCHEN AS DIRECTED BY OWNER / OWNER'S REPRESENTATIVE.
9. FROM TRANSITION FITTING TO THE ISOLATION VALVE, SHALL BE CONSIDERED IN THE OUTSIDE KITCHEN PIPING.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

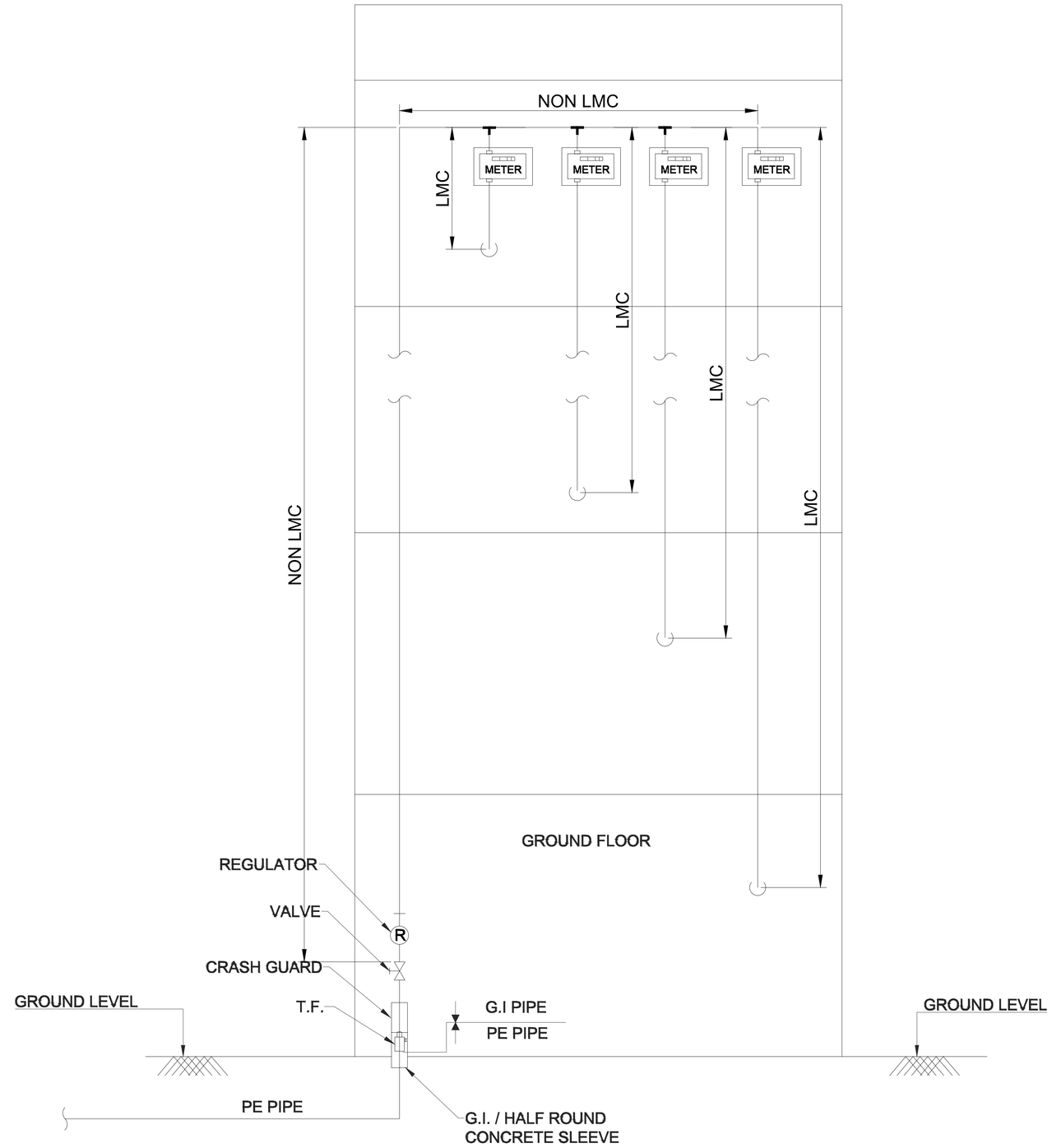
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2030	0

FORMAT NO C211050-FMT-005_00



INDICATIVE RISER ARRANGEMENT IN BUILDING, IF METER IS INSTALLED AT TOP OF FLOOR

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.
8. TAPPING SHALL BE LEFT NEAR OUTSIDE THE KITCHEN AS DIRECTED BY OWNER / OWNER'S REPRESENTATIVE.
9. FROM TRANSITION FITTING TO THE ISOLATION VALVE, SHALL BE CONSIDERED IN THE OUTSIDE KITCHEN PIPING.
10. AT THE TIME OF MEASURING LENGTH OF G.I./COPPER PIPE, G.I./COPPER FITTINGS SHALL BE COUNTED IN THE PIPE LENGTH.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

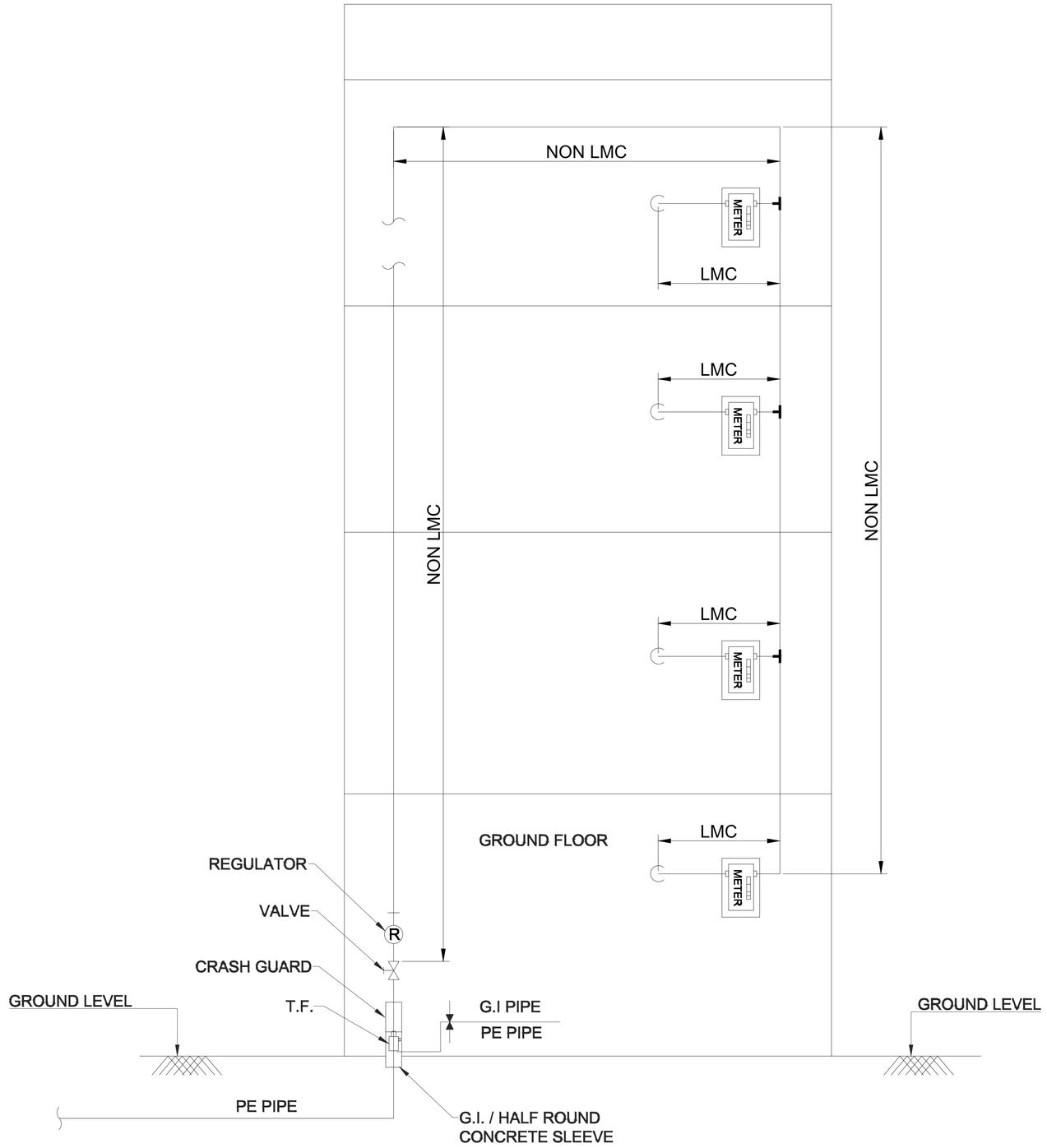
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2031	0

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST



INDICATIVE RISER ARRANGEMENT IN BUILDING, IF METER IS INSTALLED AT EACH FLOOR

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.
8. TAPPING SHALL BE LEFT NEAR OUTSIDE THE KITCHEN AS DIRECTED BY OWNER / OWNER'S REPRESENTATIVE.
9. FROM TRANSITION FITTING TO THE ISOLATION VALVE, SHALL BE CONSIDERED IN THE OUTSIDE KITCHEN PIPING.
10. AT THE TIME OF MEASURING LENGTH OF G.I./COPPER PIPE, G.I./COPPER FITTINGS SHALL BE COUNTED IN THE PIPE LENGTH.

Digitally signed by Pavek Kumar Singh
Date: 2026.07.17 19:06:26 IST

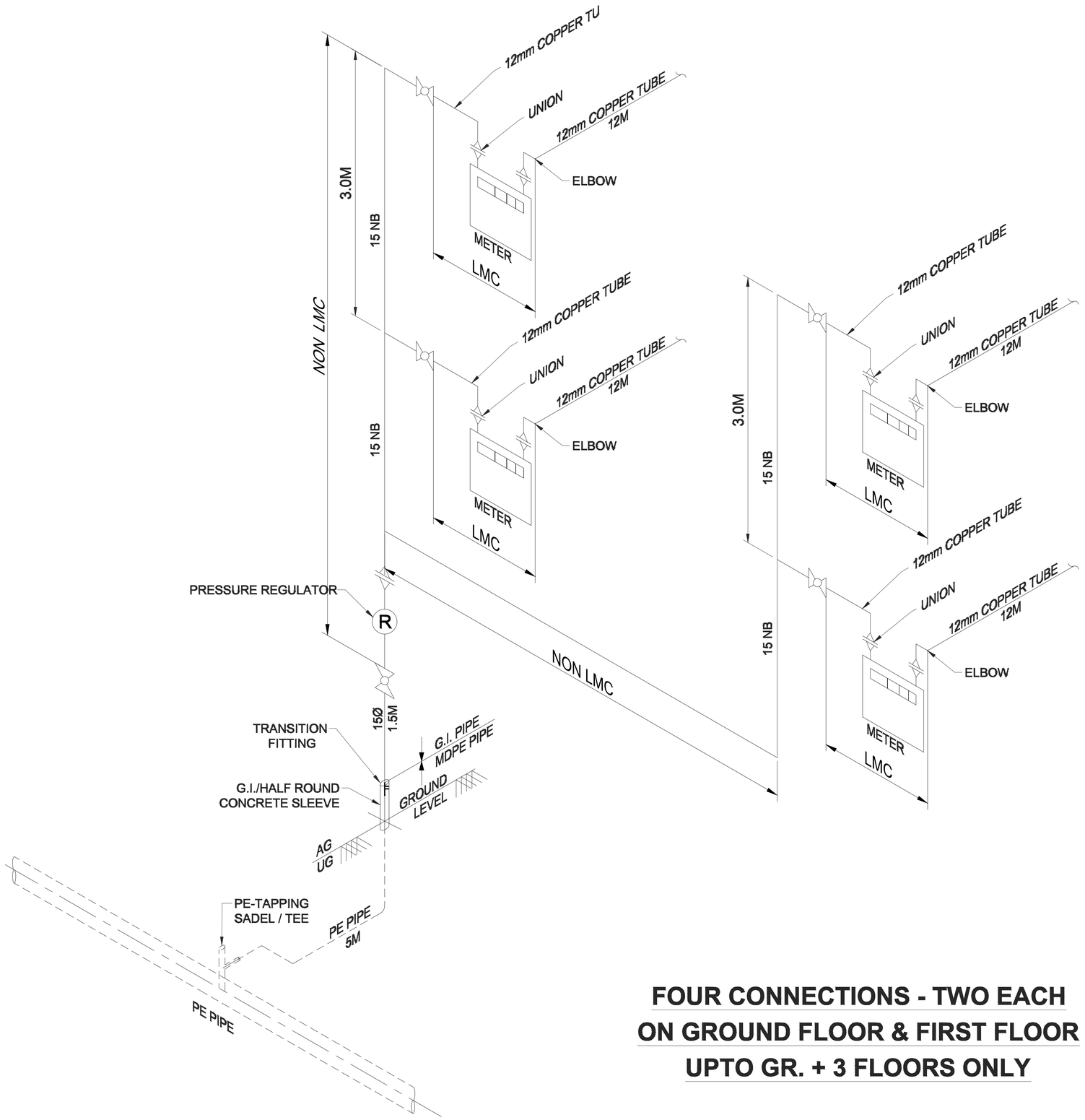
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2032	0



FOUR CONNECTIONS - TWO EACH ON GROUND FLOOR & FIRST FLOOR UPTO GR. + 3 FLOORS ONLY

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.

Digitally signed by Rivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

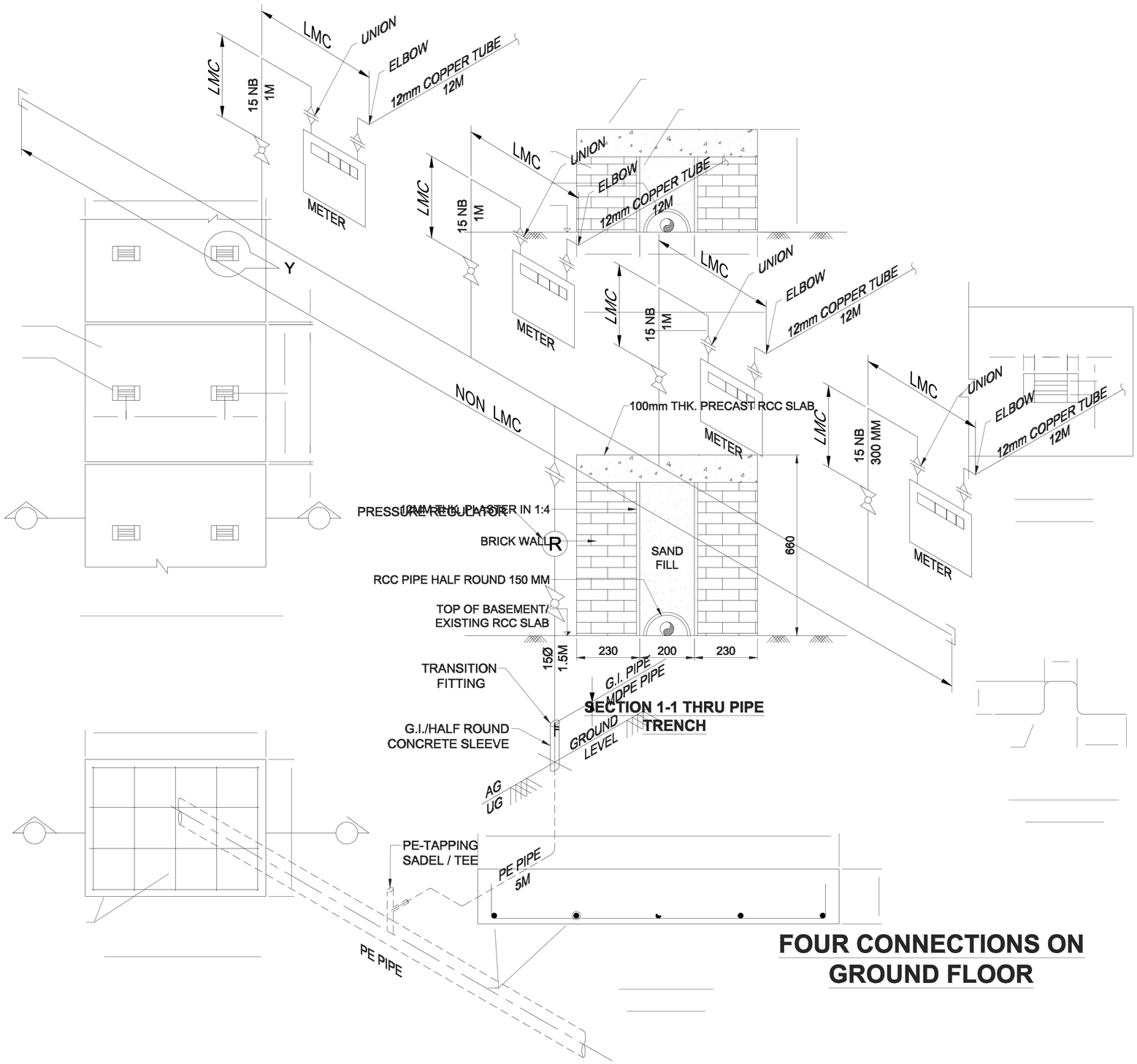
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2033	0



SECTION 1-1 THRU PIPE TRENCH

FOUR CONNECTIONS ON GROUND FLOOR

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

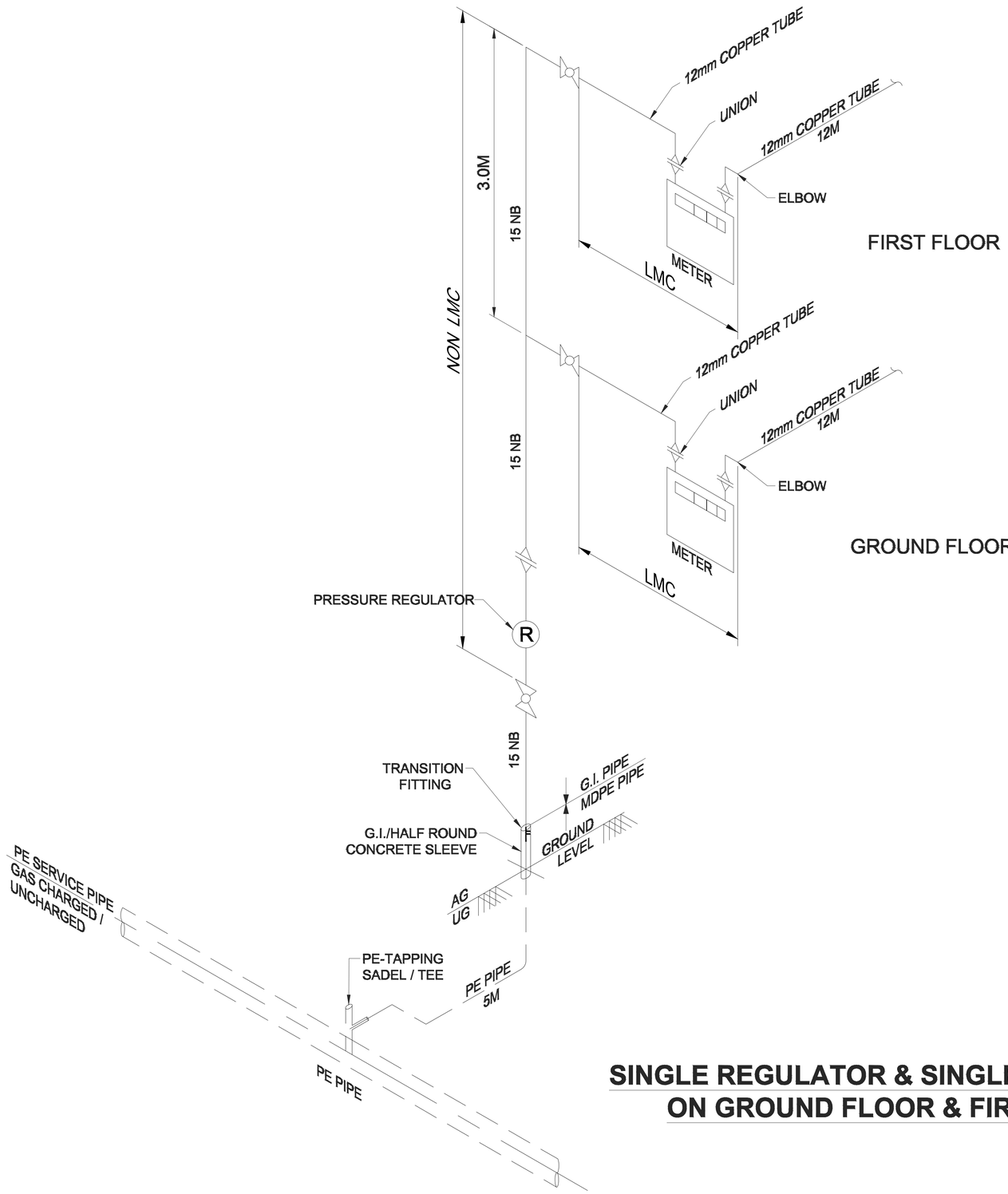
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2034	0

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST



SINGLE REGULATOR & SINGLE CONNECTION ON GROUND FLOOR & FIRST FLOOR

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

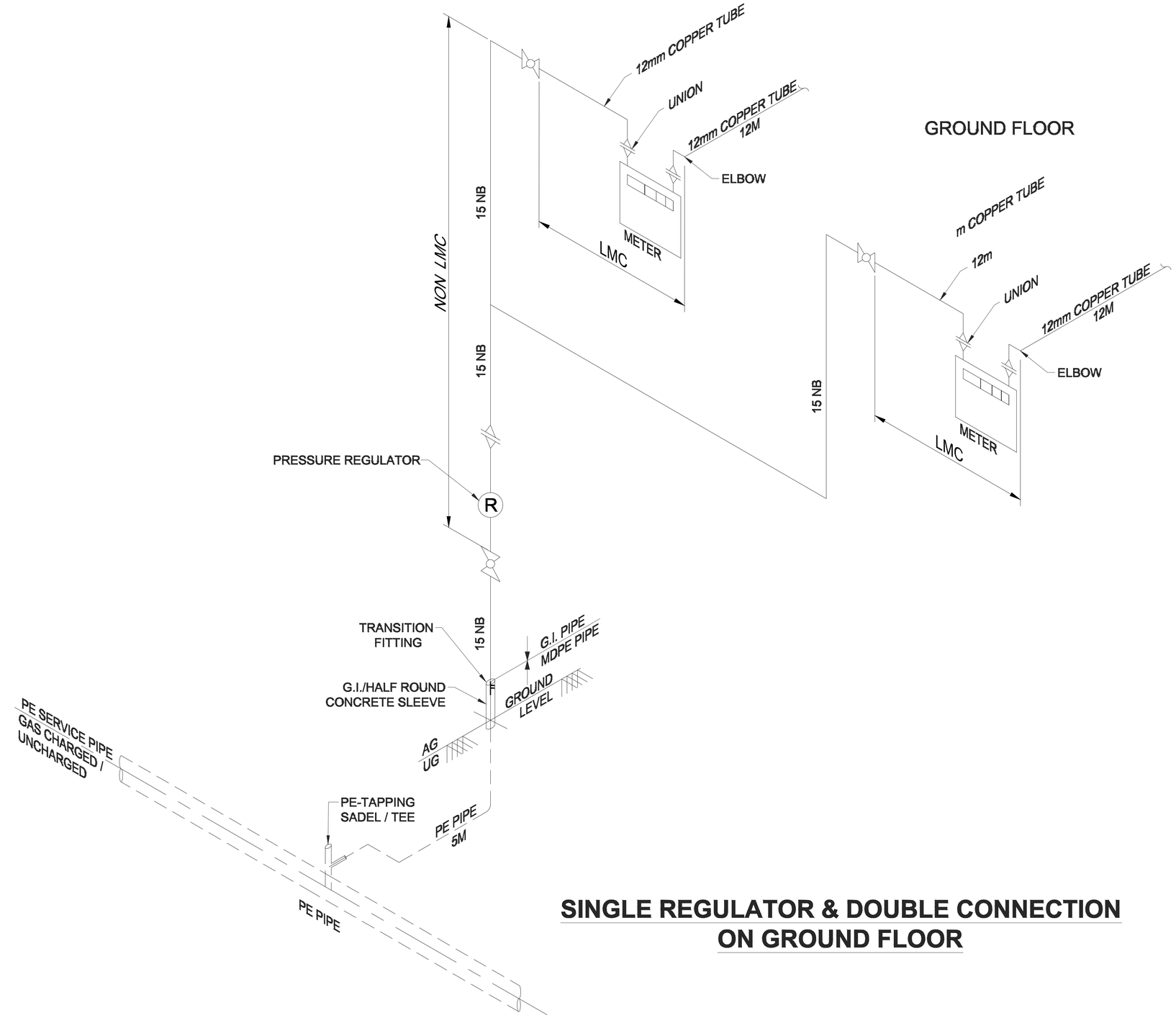
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG FOR FLAT

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2035	0

Digitally signed by Dhiraj Kumar Singh
Date: 2026.07.17 19:06:26 IST



SINGLE REGULATOR & DOUBLE CONNECTION ON GROUND FLOOR

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.

Digitally signed by Dhiraj Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

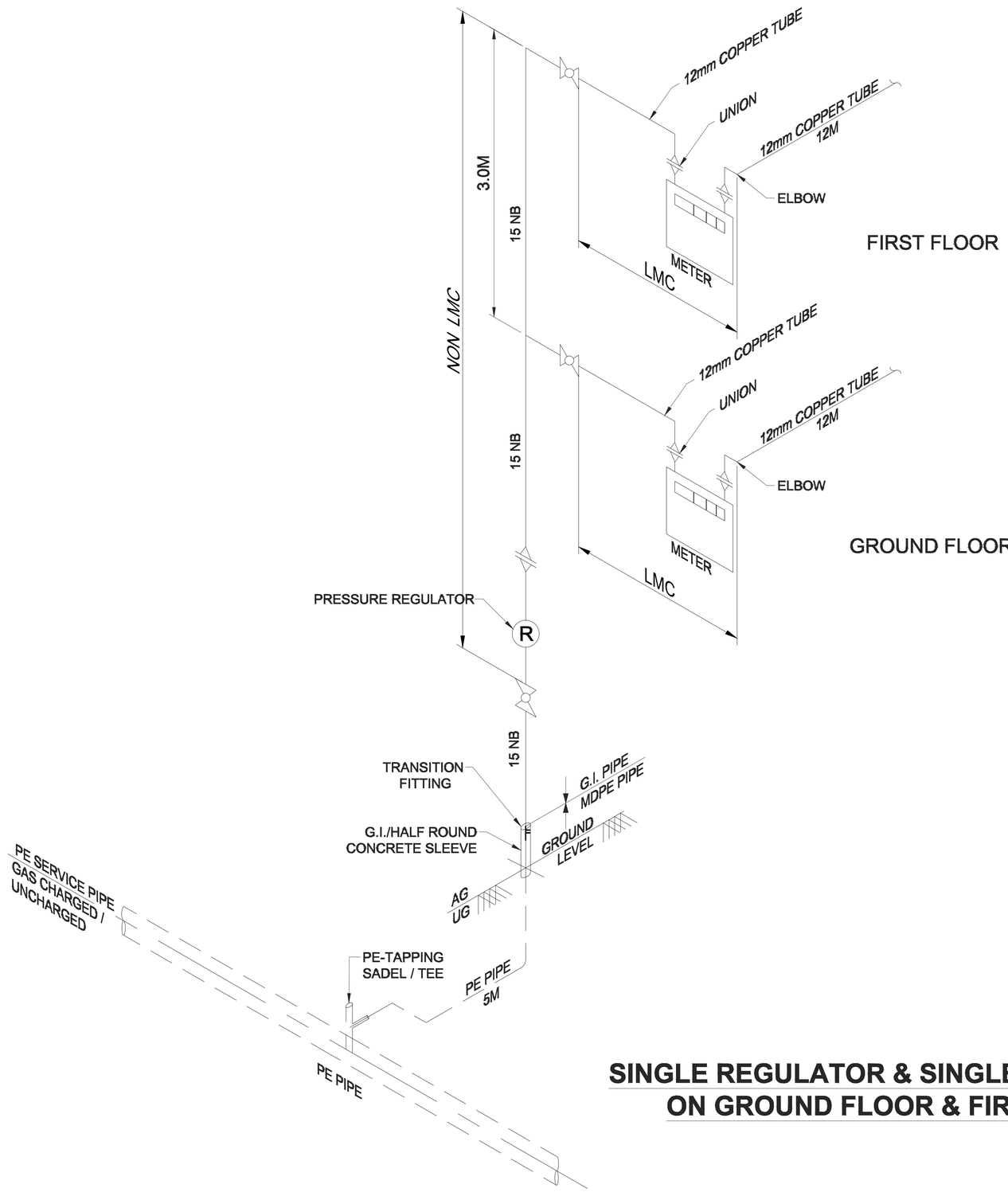
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2036	0

FORMAT NO C211050-FMT-005_00



SINGLE REGULATOR & SINGLE CONNECTION ON GROUND FLOOR & FIRST FLOOR

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.

Digitally signed by Privek Kumar Singh
Date: 2026.07.17 19:06:26 IST

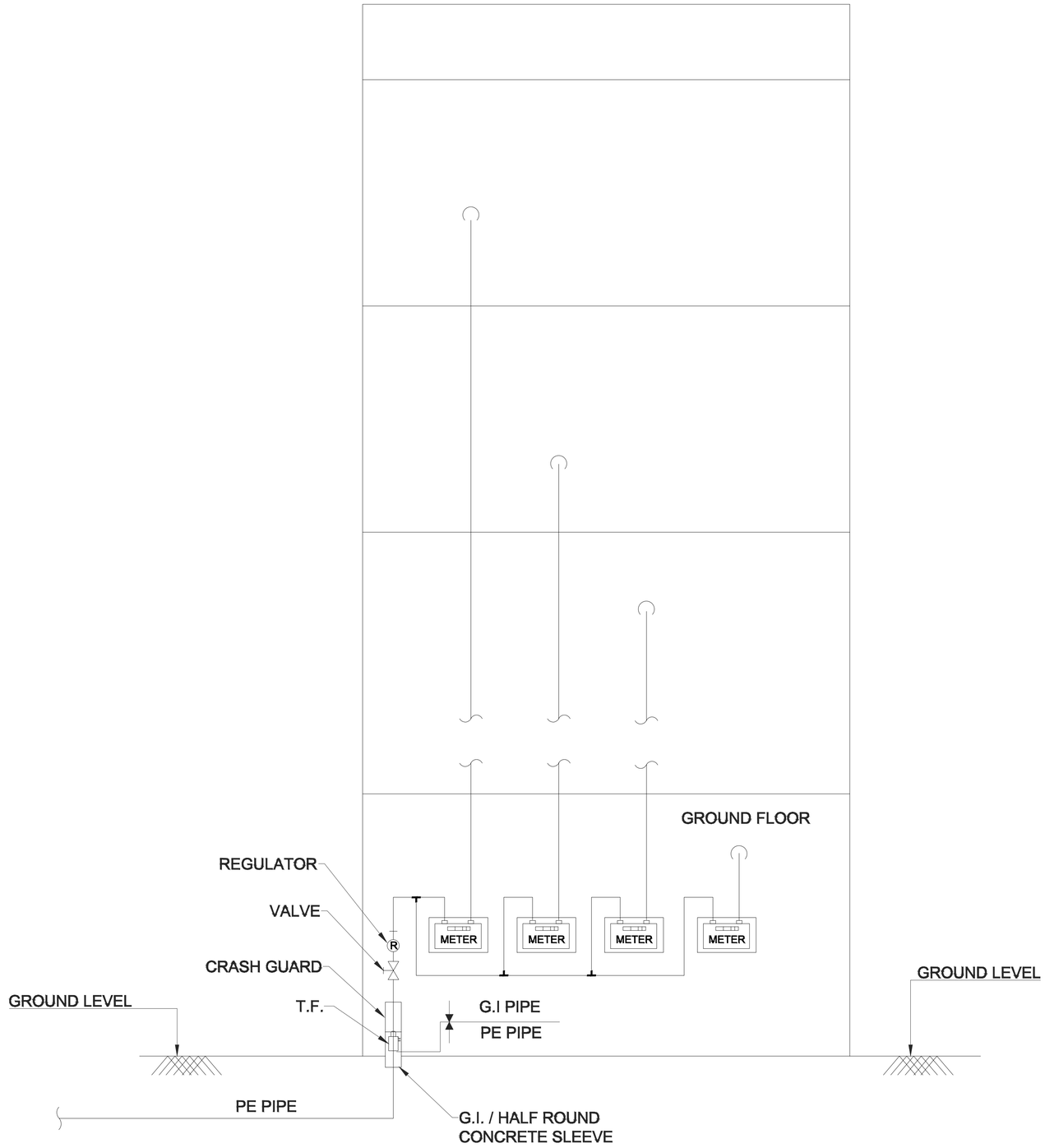
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG FOR KOTHI

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2037	0



INDICATIVE RISER ARRANGEMENT IN BUILDING, IF METER INSTALLED AT GROUND FLOOR

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.
8. TAPPING SHALL BE LEFT NEAR OUTSIDE THE KITCHEN AS DIRECTED BY OWNER / OWNER'S REPRESENTATIVE.
9. FROM TRANSITION FITTING TO THE ISOLATION VALVE, SHALL BE CONSIDERED IN THE OUTSIDE KITCHEN PIPING.
10. AT THE TIME OF MEASURING LENGTH OF G.I./COPPER PIPE, G.I./COPPER FITTINGS SHALL BE COUNTED IN THE PIPE LENGTH.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

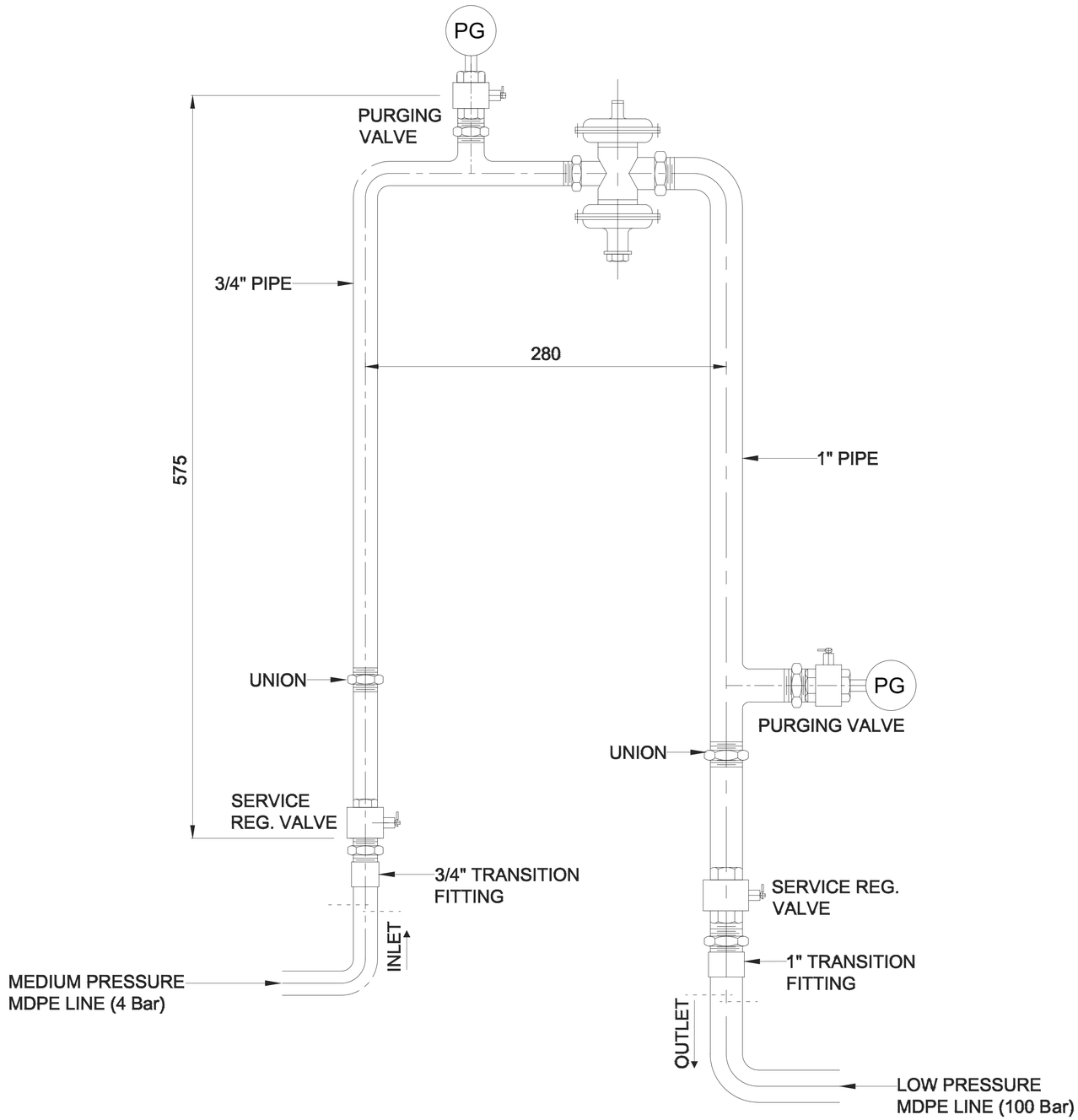
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2038	0

Digitally signed by Pravek Kumar Singh
Date: 2026.07.17 19:06:26 IST

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

Digitally signed by Ankit Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

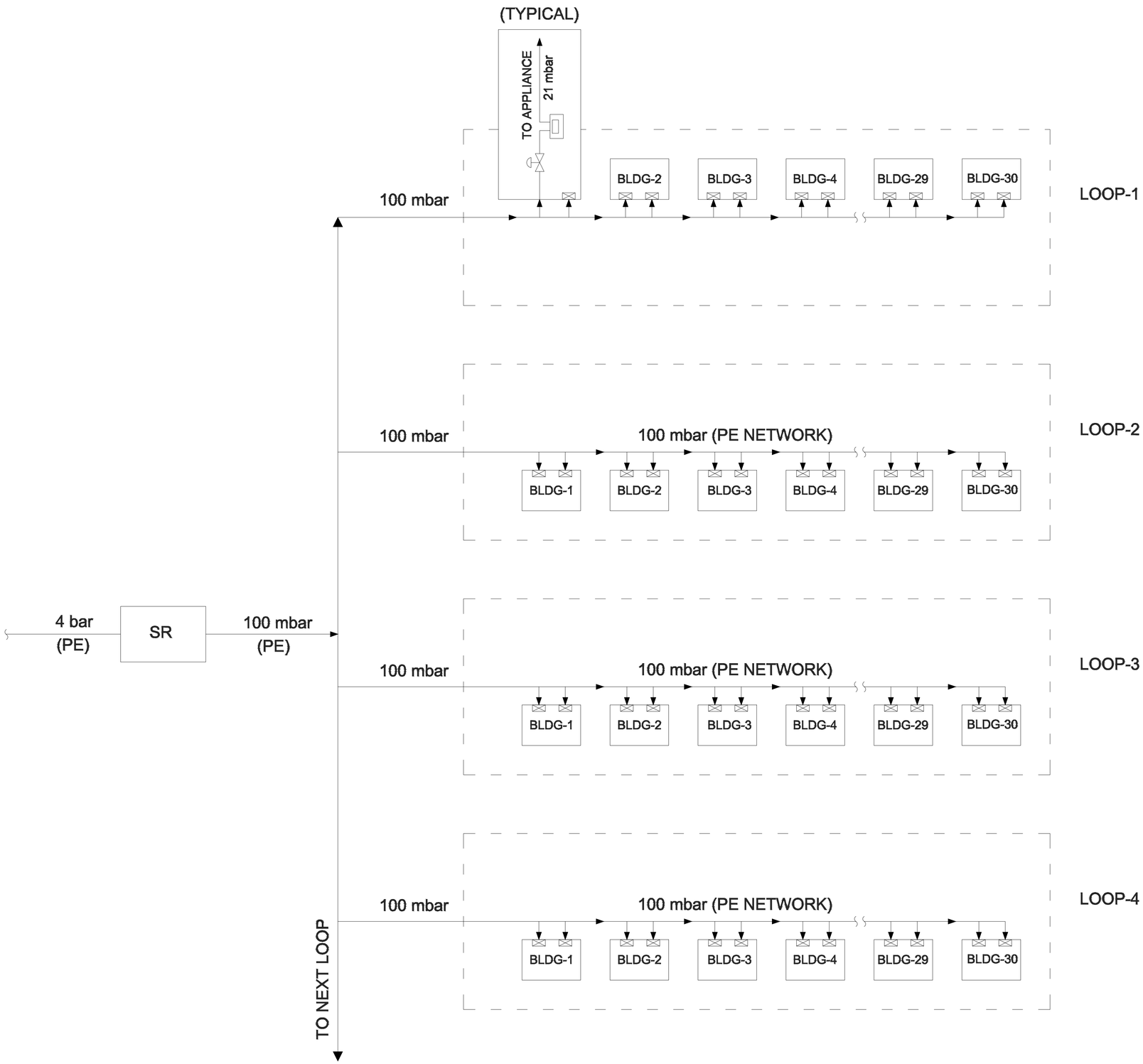
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SCHEMATIC DIAGRAM FOR SINGLE STREAM REGULATOR

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2039	0

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

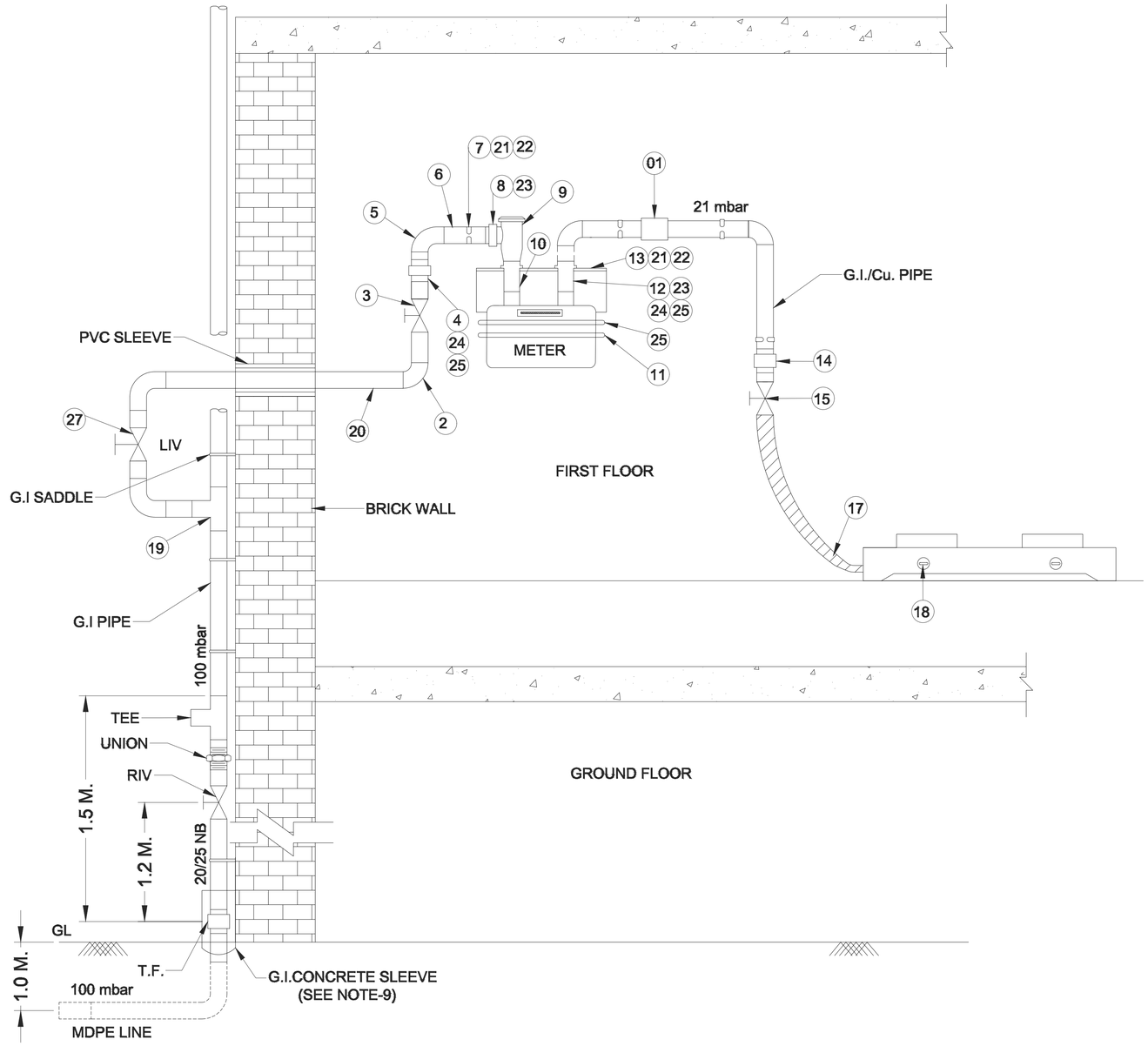
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SCHEMATIC DIAGRAM DESCRIBING DIFFERENT PRESSURE SYSTEM (SR TO APPLIANCE IN KITCHEN)

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2040	0

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE SIZES SHOWN IN THE DRAWING ARE TENTATIVE AND SHALL BE DECIDED AT THE TIME OF DETAIL ENGINEERING.
3. PIPING DOWNSTREAM METER SHALL BE COPPER IN CASE METER IS INSTALLED WITHIN THE KITCHEN.
4. TENTATIVE RISER LENGTH (FROM OUTLET OF TRANSITION FITTING TO INLET OF ISOLATION VALVE) SHALL BE 1.5M. ANY CHANGES IN RISER LENGTH SHALL BE AFTER APPROVAL FROM EIC.
5. G.I. INSTALLATION / METER INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
6. IF COPPER PIPE GOES TO THE APPLIANCE VALVE THEN BRASS FITTING SHALL BE USED AT THE OUTLET OF METER OR IF G.I. PIPE GOES TO THE APPLIANCE VALVE THEN G.I. FITTING SHALL BE USED AT THE OUTLET OF THE METER.
7. MAXIMUM DISTANCE BETWEEN CLAMPS SHALL BE 1.5M WHEN PIPE GOES IN THE STRAIGHT LENGTH, IF ANY TEE OR ANY FITTING IS USED IN BETWEEN THE PIPE THEN CLAMP SHALL BE PLACED 150 MM AWAY FROM CENTER LINE OF THE FITTING AT EVERY SIDE. HOWEVER, THE SAME MAY BE CHANGED AS PER SITE CONDITIONS / AS DIRECTED BY EIC.
8. TAPPING SHALL BE LEFT NEAR OUTSIDE THE KITCHEN AS DIRECTED BY OWNER / OWNER'S REPRESENTATIVE.
9. G.I CONCRETE SLEEVE INSTALLATION SHALL BE DECIDED BY OWNER / OWNER'S REPRESENTATIVE AS PER SITE CONDITIONS.
10. REGULATOR TO BE FIXED NEAR THE METER AS PER INSTRUMENT AS PER INSTRUCTION OF EIC.

Digitally signed by Brijesh Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

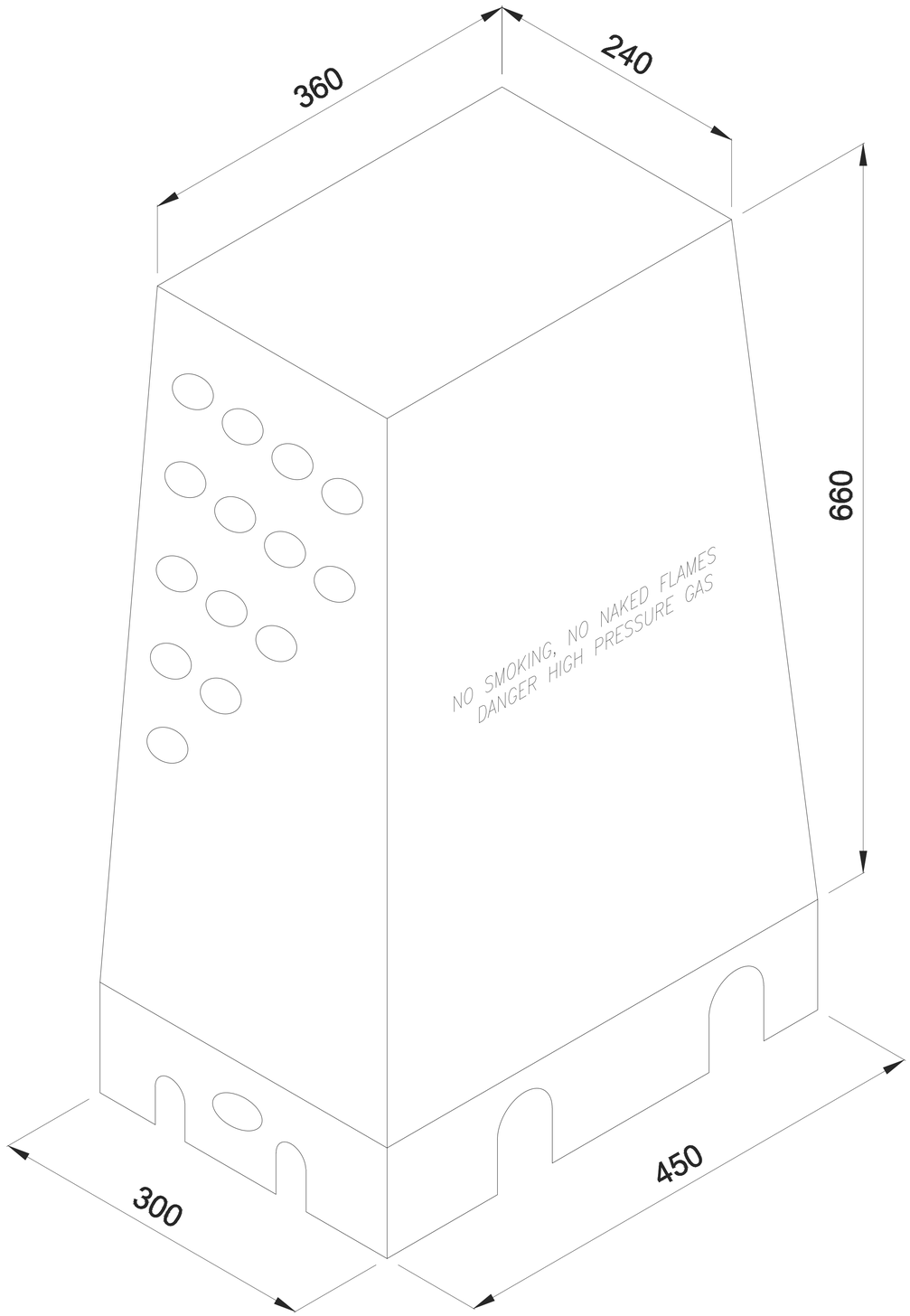
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: TYPICAL DOMESTIC CONNECTION LAYOUT OF NG DISTRIBUTION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2041	0

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. THE HOUSING SHOULD BE OF FIBER REINFORCED PLASTIC (FRP).
3. 40mm GROUTING WITH NON SHRINKAGE COMPOUND SHALL BE PROVIDED AT BOTTOM OF SERVICE REGULATOR.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

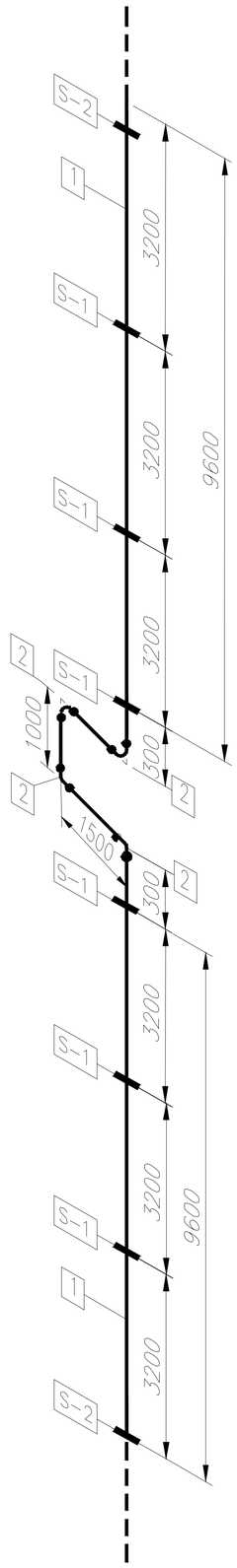
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

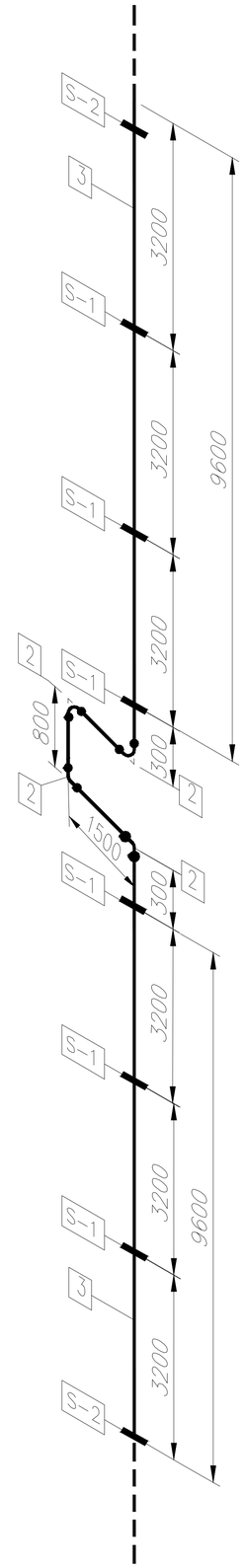
TITLE: SCHEMATIC DIAGRAM OF HOUSING FOR SINGLE SERVICE REGULATOR

SCALE: SCALE	TOTAL NO. OF SHTS: 1 OF 1	
SIZE	JOB NO.	DRAWING NUMBER / REV.
A3	-----	VCS-STD-PP-2042 / 0

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

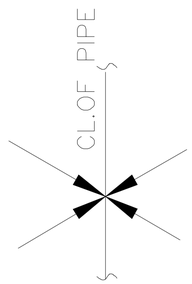


OPTION–A
(LOOP SIZE–1500X1000)

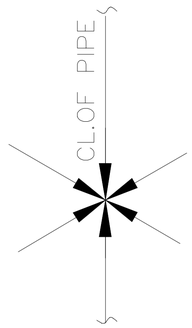


OPTION–B
(LOOP SIZE–1500X800)

SUPPORT SYMBOLS



(GUIDE S–1.)



(ANCHOR S–2)

BILL OF MATERIAL

S.NO.	SIZE (NB)	DESCRIPTION	QTY.	UNIT / CODE
1	50	GI PIPE –IS–1239 PART–1	20.8	M
2	50	ELBOW 90°,	04	Nos.
3	50	GI PIPE –IS–1239 PART–1	20.6	M

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

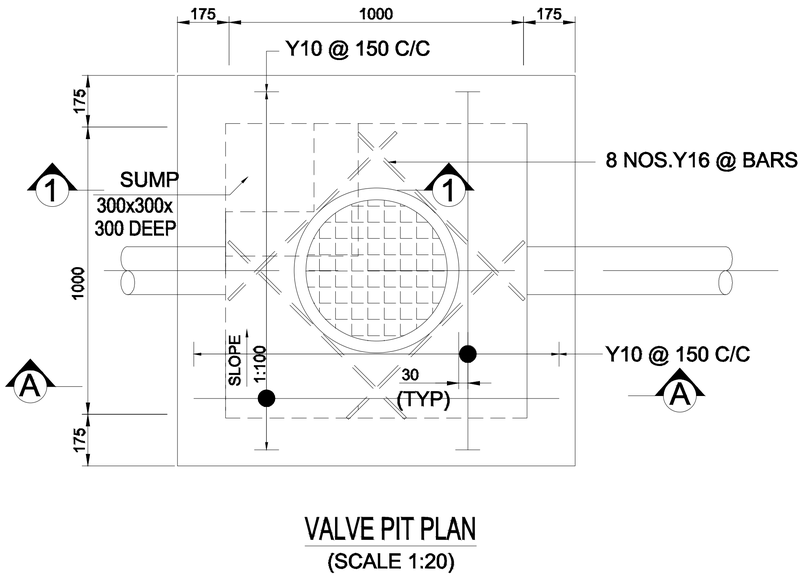
REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

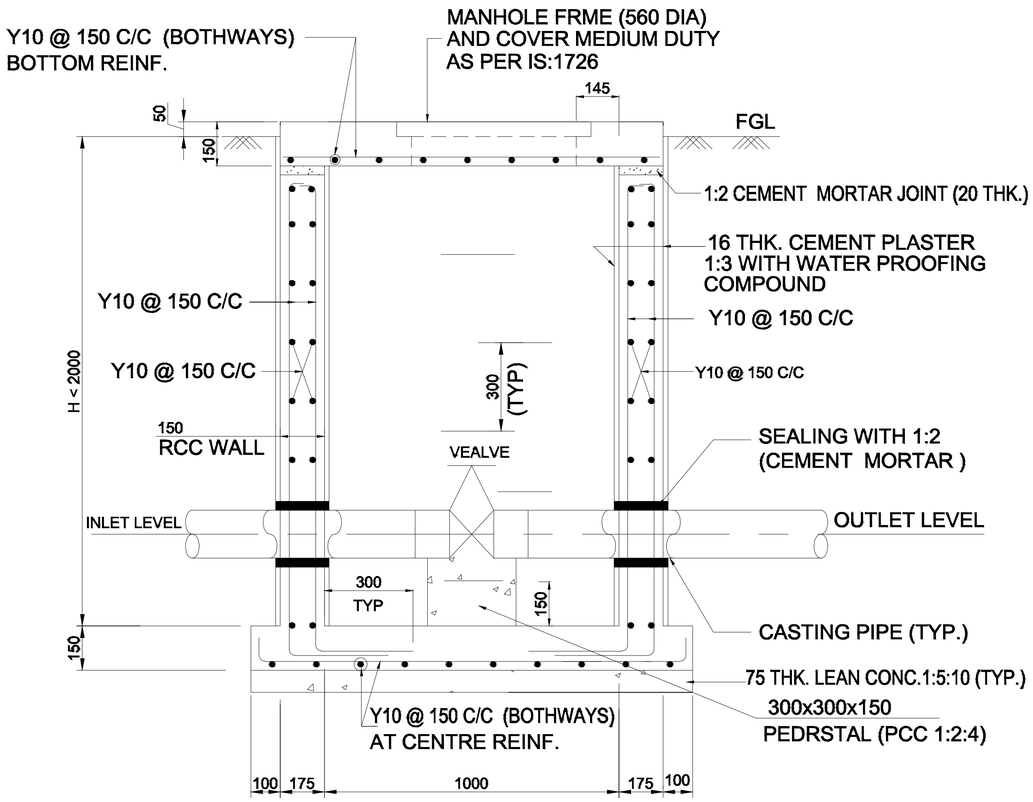
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: EXPANSION LOOP FOR RISER IN HIGH RISE BUILDING

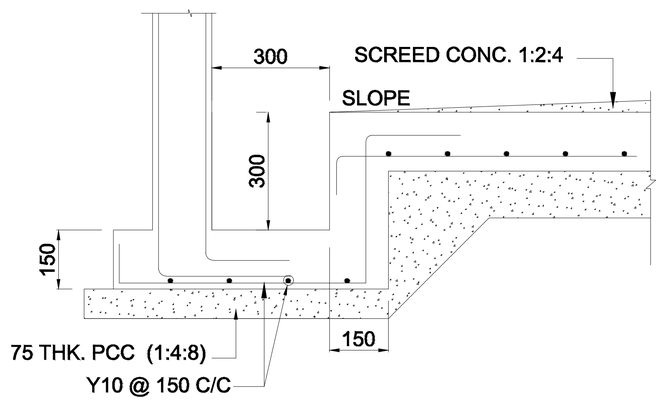
SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2043	0



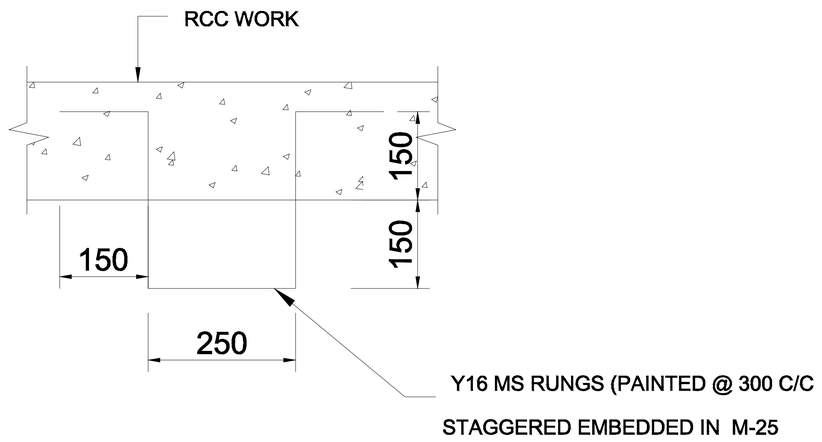
VALVE PIT PLAN
(SCALE 1:20)



SECTION A-A
(SCALE 1:20)



SECTION 1-1
(SCALE 1:15)



TYPICAL DETAILS OF MS RUNGS
(SCALE 1:10)

RCC VALVE CHAMBERS SIZES 1M x 1M

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES :

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING
3. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE (a) SLAB 20mm
4. GRADE OF CONCRETE USED SHALL BE M-25 CONFORMING.
5. REINFORCEMENT SHALL BE HYSD BARS OF (GRADE Fe 415) CONFORMING TO IS:1786.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

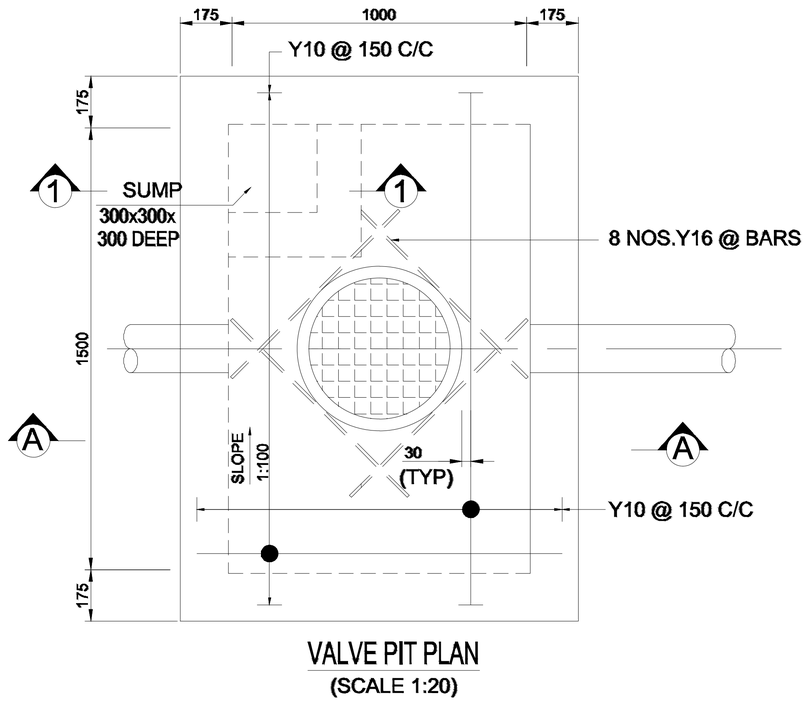
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: STANDARD DETAIL OF RCC VALVE CHAMBER (1M x 1M)

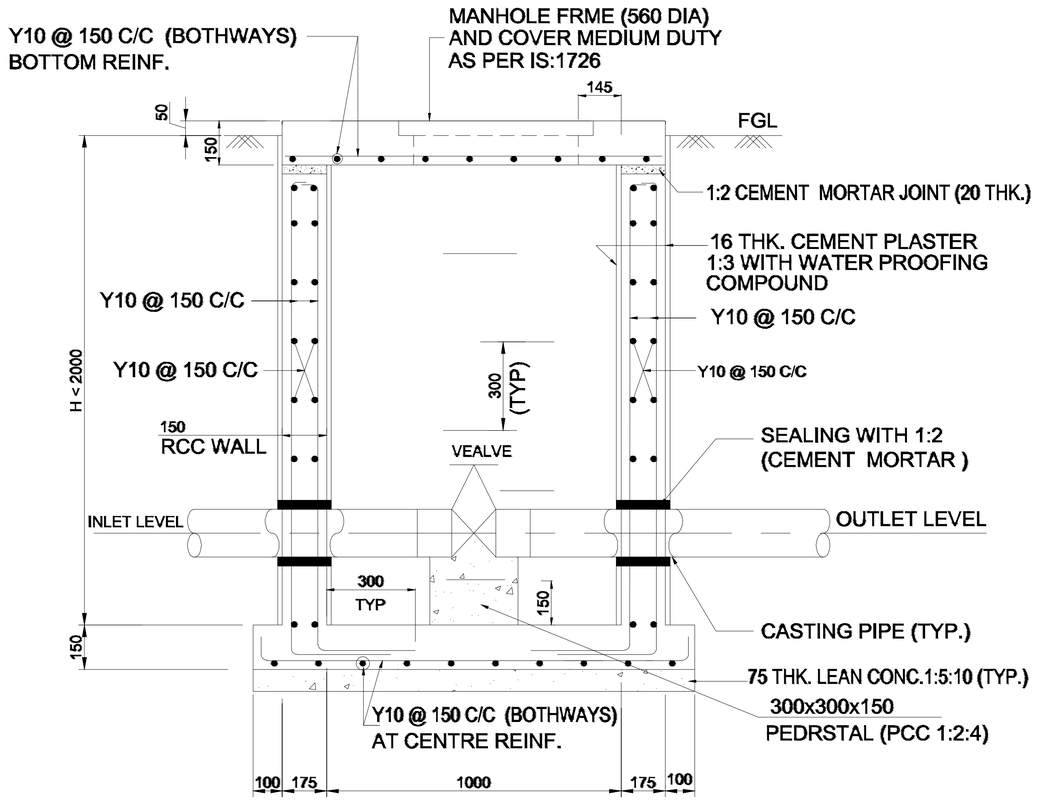
SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2044	0

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

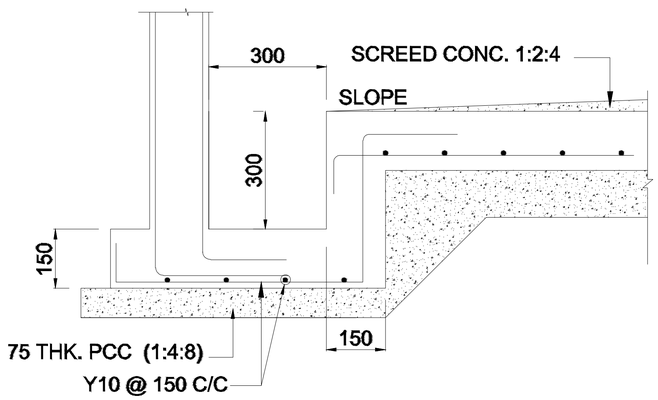
FORMAT NO C211050-FMT-005_00



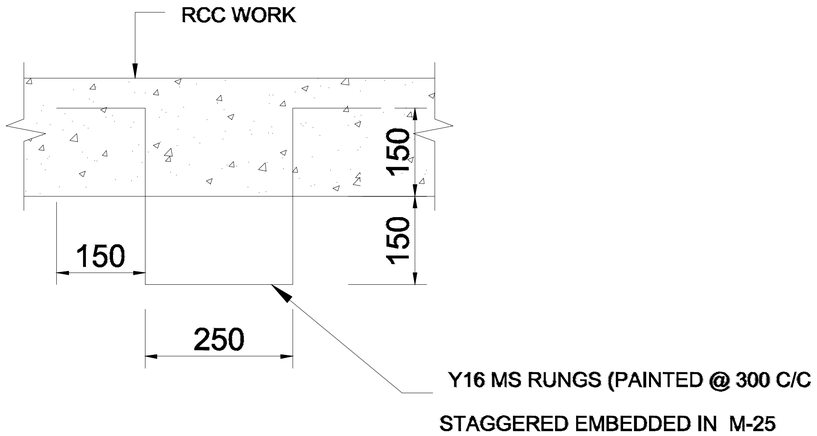
VALVE PIT PLAN
(SCALE 1:20)



SECTION A-A
(SCALE 1:20)



SECTION 1-1
(SCALE 1:15)



TYPICAL DETAILS OF MS RUNGS
(SCALE 1:10)

RCC VALVE CHAMBERS SIZES 1.5M x 1M

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES :

1. ALL DIMENSIONS ARE IN MM UNLESS NOTED OTHERWISE.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE THE DRAWING
3. CLEAR COVER TO MAIN REINFORCEMENT SHALL BE (a) SLAB 20mm
4. GRADE OF CONCRETE USED SHALL BE M-25 CONFORMING.
5. REINFORCEMENT SHALL BE HYSD BARS OF (GRADE Fe 415) CONFORMING TO IS:1786.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

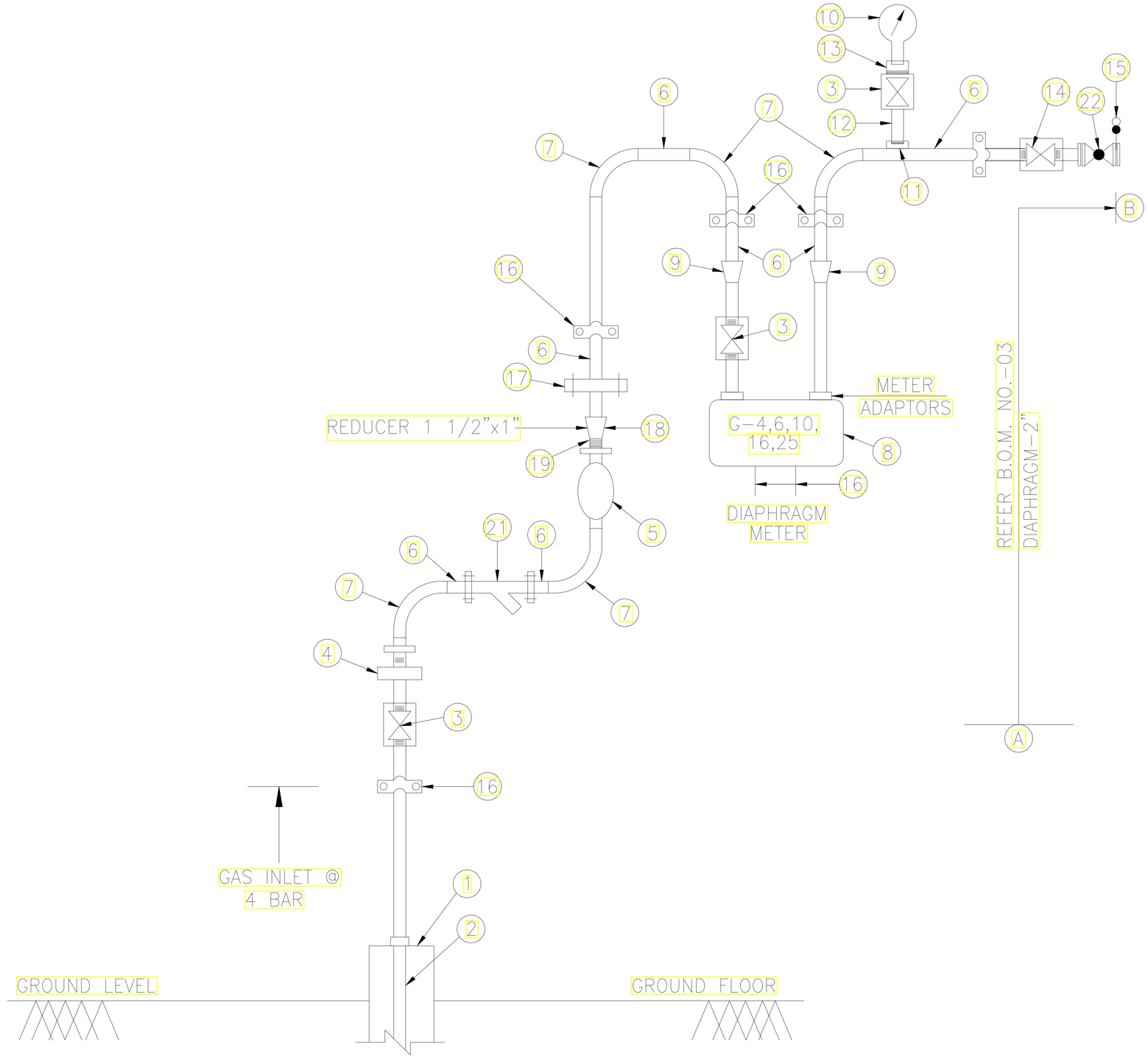
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: STANDARD DETAIL OF RCC VALVE CHAMBER (1.5M x 1M)

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2045	0

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:25 IST



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. CS PIPE SHALL CONFIRM TO ASTM A106 Gr B.
2. CS FITTINGS SHALL CONFIRM TO ASTM A105.
3. NPT THREADS SHALL CONFIRM TO ANSI B1.20.1
4. WELDING OF PIPES & FITTINGS SHALL BE CARRIED OUT AS PER API 1104.
5. ALL MATERIAL EXCEPT BELOW MENTIONED IS IN CONTRACTOR'S SCOPE.
6. ANY ADDITIONAL ITEM REQUIRED FOR COMPLETION OF WORK SHALL BE CONTRACTOR'S RESPONSIBILITY WITHOUT ANY COST/TIME IMPLICATION.
7. ANY ADDITIONAL SUPPORT/CLAMPS REQUIRED AT THE TIME OF INSTALLATION OF MRS SKID SHALL BE CONTRACTOR'S RESPONSIBILITY.
8. GIVIN BOM IS INDICATIVE ONLY. INDICATIVE ITEM MAY VERY DURING ACTUAL CONSTRUCTION ON SITE.
9. APART FROM FREE ISSUE MATERIAL BALANCE MATERIAL SHALL BE SUPPLIED BY CONTRACTOR.
10. CONTRACTOR TO ENSURE PROVISION FOR LOCKING/ SEALING ARRANGEMENT FOR METER/VALVE TO AVOID MISUSE.
11. IN CASE OF SPACE CONSTRAINT, FLANGE END Y-TYPE STRAINER MAY BE INSTALLED VERTICALLY.

MATERIAL SUPPLIED

1. METER
2. REGULATOR
3. ISOLATION VALVE

1. SUPPLY OF IF NOT IN CONTRACTOR SCOPE.
2. THE FITTING AS MARKED ALL DRAWING ARE TENTATIVE & MAY CHANGE DISCREPANCY UPON METER & REGULATOR'S OUTLET/INLET ENDS AS SUPPLIED BY VENDOR TO IGL.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

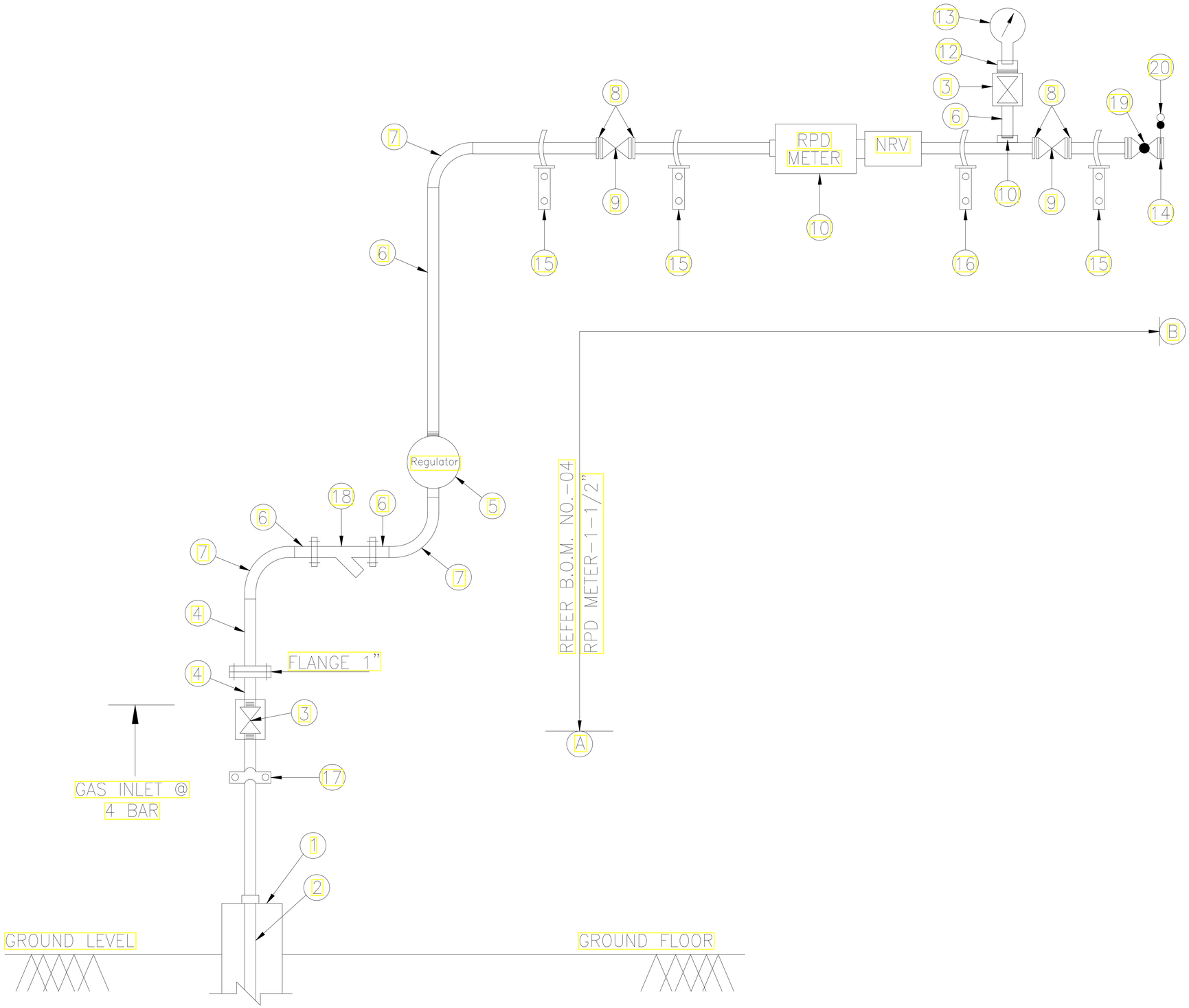
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SCHEMATIC DIAGRAM METERING & REGULATING STATION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2046	0

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. CS PIPE SHALL CONFIRM TO ASTM A106 Gr B.
2. CS FITTINGS SHALL CONFIRM TO ASTM A105.
3. NPT THREADS SHALL CONFIRM TO ANSI B1.20.1
4. WELDING OF PIPES & FITTINGS SHALL BE CARRIED OUT AS PER API 1104.
5. ALL MATERIAL EXCEPT BELOW MENTIONED IS IN CONTRACTOR'S SCOPE.
6. ANY ADDITIONAL ITEM REQUIRED FOR COMPLETION OF WORK SHALL BE CONTRACTOR'S RESPONSIBILITY WITHOUT ANY COST/TIME IMPLICATION.
7. ANY ADDITIONAL SUPPORT/CLAMPS REQUIRED AT THE TIME OF INSTALLATION OF MRS SKID SHALL BE CONTRACTOR'S RESPONSIBILITY.
8. GIVIN BOM IS INDICATIVE ONLY. INDICATIVE ITEM MAY VERY DURING ACTUAL CONSTRUCTION ON SITE.
9. APART FROM FREE ISSUE MATERIAL BALANCE MATERIAL SHALL BE SUPPLIED BY CONTRACTOR.
10. CONTRACTOR TO ENSURE PROVISION FOR LOCKING/ SEALING ARRANGEMENT FOR METER/VALVE TO AVOID MISUSE.
11. IN CASE OF SPACE CONSTRAINT, FLANGE END Y-TYPE STRAINER MAY BE INSTALLED VERTICALLY.

MATERIAL SUPPLIED

1. METER
2. REGULATOR
3. ISOLATION VALVE

1. SUPPLY OF IF NOT IN CONTRACTOR SCOPE.
2. THE FITTING AS MARKED ALL DRAWING ARE TENTATIVE & MAY CHANGE DISCREPANCY UPON METER & REGULATOR'S OUTLET/INLET ENDS AS SUPPLIED BY VENDOR TO IGL.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

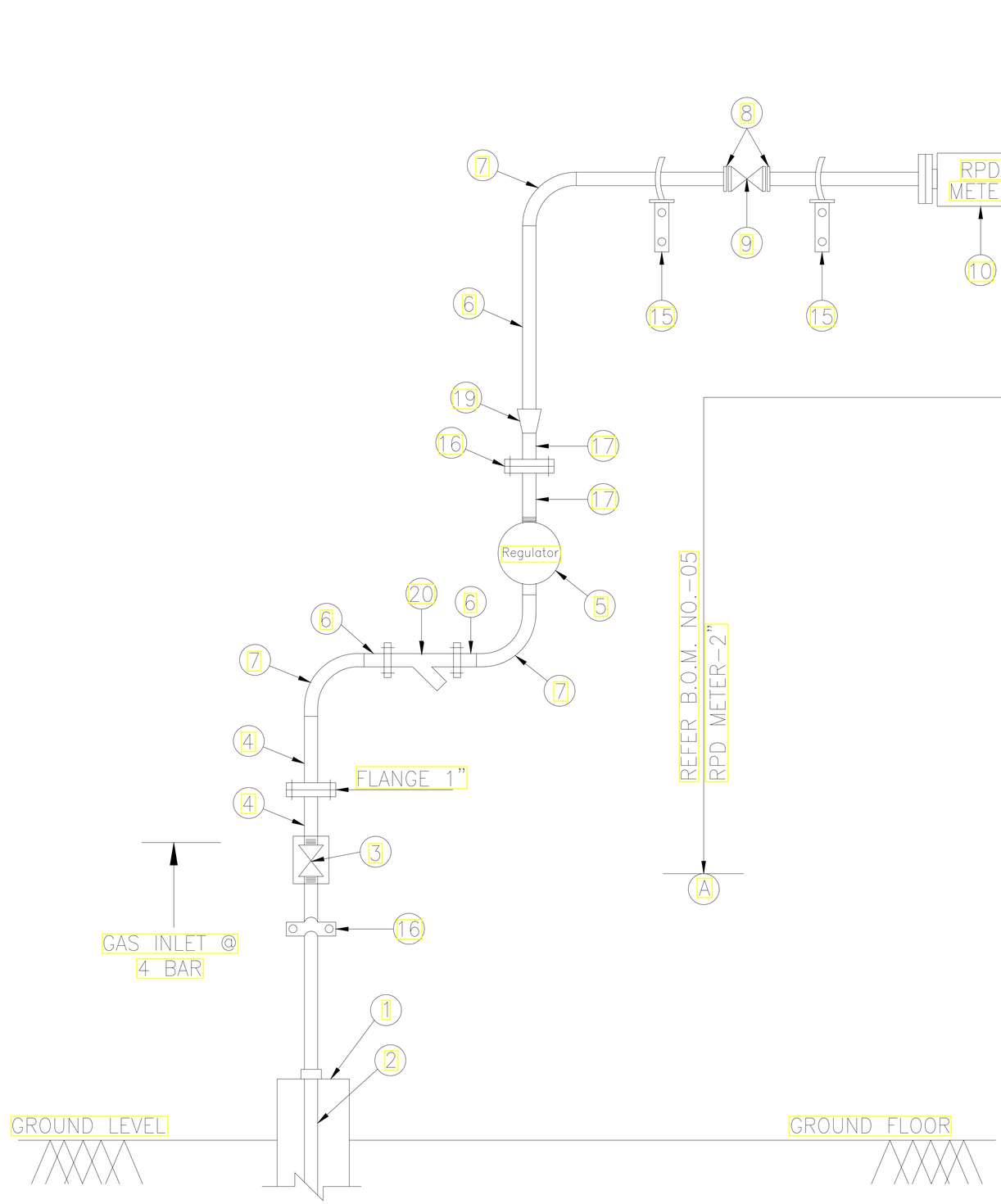
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SCHEMATIC DIAGRAM METERING & REGULATING STATION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2047	0

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. CS PIPE SHALL CONFIRM TO ASTM A106 Gr B.
2. CS FITTINGS SHALL CONFIRM TO ASTM A105.
3. NPT THREADS SHALL CONFIRM TO ANSI B1.20.1
4. WELDING OF PIPES & FITTINGS SHALL BE CARRIED OUT AS PER API 1104.
5. ALL MATERIAL EXCEPT BELOW MENTIONED IS IN CONTRACTOR'S SCOPE.
6. ANY ADDITIONAL ITEM REQUIRED FOR COMPLETION OF WORK SHALL BE CONTRACTOR'S RESPONSIBILITY WITHOUT ANY COST/TIME IMPLICATION.
7. ANY ADDITIONAL SUPPORT/CLAMPS REQUIRED AT THE TIME OF INSTALLATION OF MRS SKID SHALL BE CONTRACTOR'S RESPONSIBILITY.
8. GIVIN BOM IS INDICATIVE ONLY. INDICATIVE ITEM MAY VERY DURING ACTUAL CONSTRUCTION ON SITE.
9. APART FROM FREE ISSUE MATERIAL BALANCE MATERIAL SHALL BE SUPPLIED BY CONTRACTOR.
10. CONTRACTOR TO ENSURE PROVISION FOR LOCKING/ SEALING ARRANGEMENT FOR METER/VALVE TO AVOID MISUSE.
11. IN CASE OF SPACE CONSTRAINT, FLANGE END Y-TYPE STRAINER MAY BE INSTALLED VERTICALLY.

MATERIAL SUPPLIED

1. METER
2. REGULATOR
3. ISOLATION VALVE

1. SUPPLY OF IF NOT IN CONTRACTOR SCOPE.
2. THE FITTING AS MARKED ALL DRAWING ARE TENTATIVE & MAY CHANGE DISCREPANCY UPON METER & REGULATOR'S OUTLET/INLET ENDS AS SUPPLIED BY VENDOR TO IGL.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

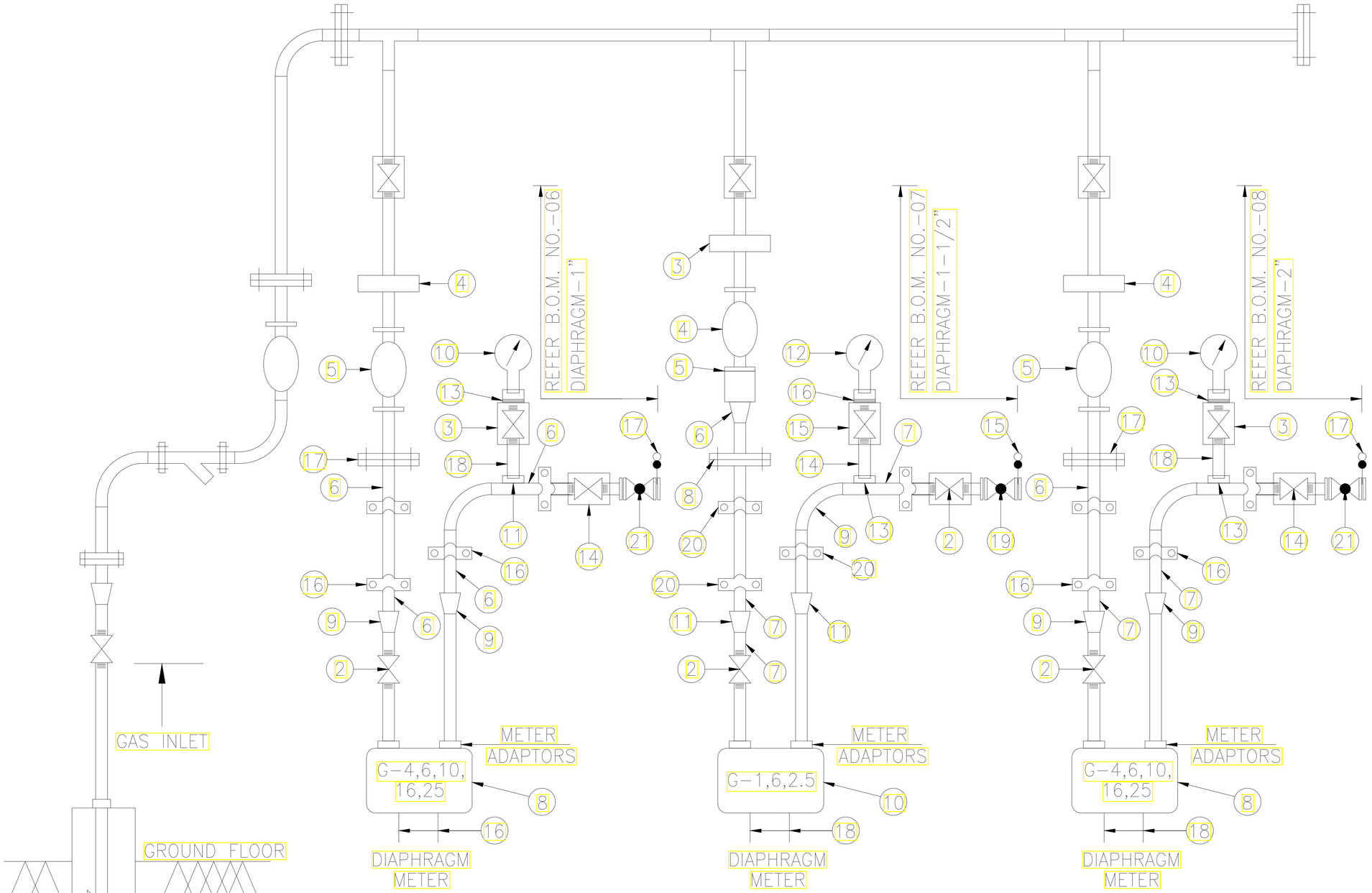
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SCHEMATIC DIAGRAM METERING & REGULATING STATION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2048	0

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:25 IST



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. CS PIPE SHALL CONFIRM TO ASTM A106 Gr B.
2. CS FITTINGS SHALL CONFIRM TO ASTM A105.
3. NPT THREADS SHALL CONFIRM TO ANSI B1.20.1
4. WELDING OF PIPES & FITTINGS SHALL BE CARRIED OUT AS PER API 1104.
5. ALL MATERIAL EXCEPT BELOW MENTIONED IS IN CONTRACTOR'S SCOPE.
6. ANY ADDITIONAL ITEM REQUIRED FOR COMPLETION OF WORK SHALL BE CONTRACTOR'S RESPONSIBILITY WITHOUT ANY COST/TIME IMPLICATION.
7. ANY ADDITIONAL SUPPORT/CLAMPS REQUIRED AT THE TIME OF INSTALLATION OF MRS SKID SHALL BE CONTRACTOR'S RESPONSIBILITY.
8. GIVIN BOM IS INDICATIVE ONLY. INDICATIVE ITEM MAY VERY DURING ACTUAL CONSTRUCTION ON SITE.
9. APART FROM FREE ISSUE MATERIAL BALANCE MATERIAL SHALL BE SUPPLIED BY CONTRACTOR.
10. CONTRACTOR TO ENSURE PROVISION FOR LOCKING/ SEALING ARRANGEMENT FOR METER/VALVE TO AVOID MISUSE.
11. IN CASE OF SPACE CONSTRAINT, FLANGE END Y-TYPE STRAINER MAY BE INSTALLED VERTICALLY.

MATERIAL SUPPLIED

1. METER
2. REGULATOR
3. ISOLATION VALVE

1. SUPPLY OF IF NOT IN CONTRACTOR SCOPE.
2. THE FITTING AS MARKED ALL DRAWING ARE TENTATIVE & MAY CHANGE DISCREPANCY UPON METER & REGULATOR'S OUTLET/INLET ENDS AS SUPPLIED BY VENDOR TO IGL.

Digitally signed by Rivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

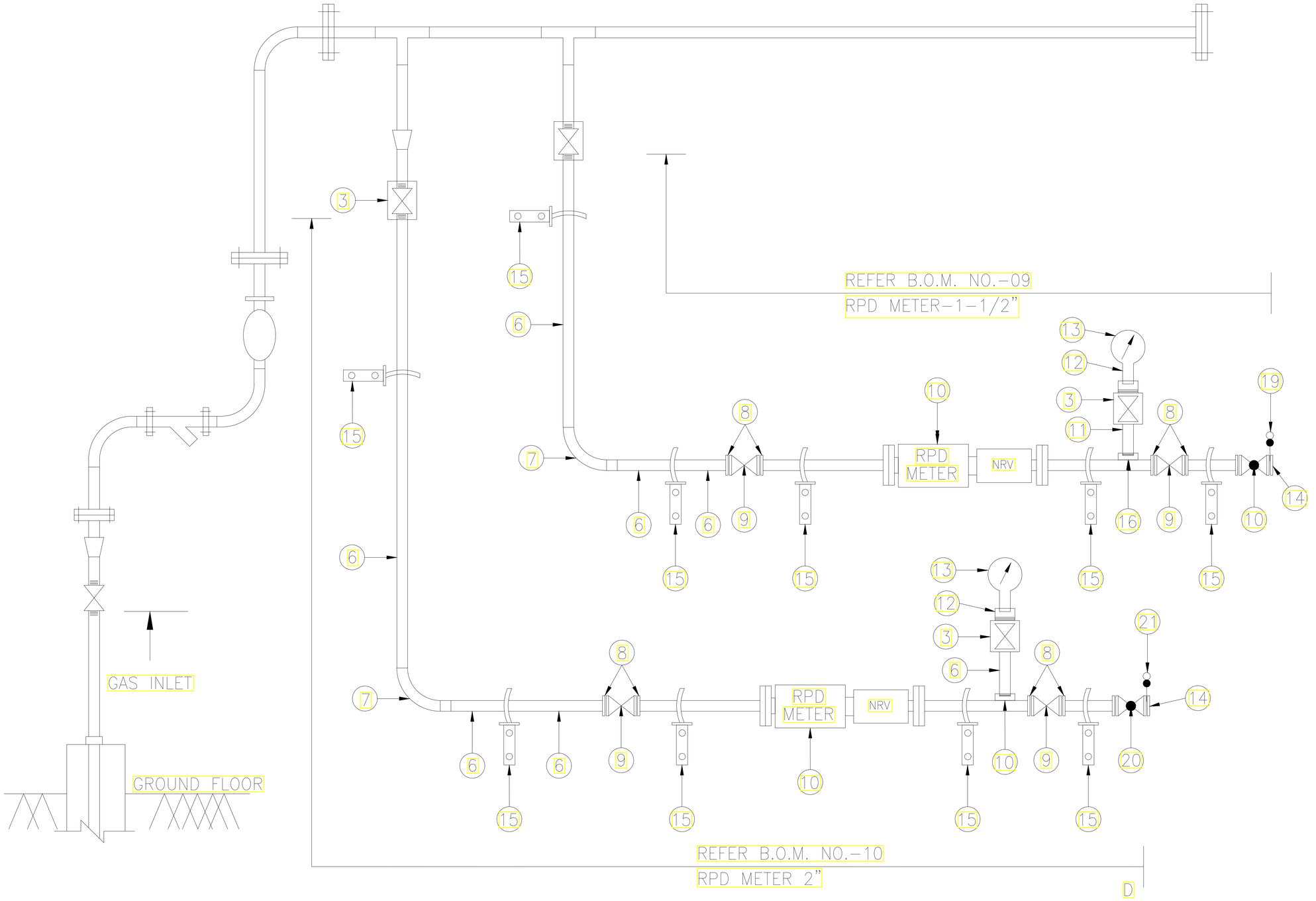
PMC: VCS QUALITY SERVICES PVT. LTD.

PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SCHEMATIC DIAGRAM METERING & REGULATING STATION

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2049	0

FORMAT NO C211050-FMT-005_00



REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. CS PIPE SHALL CONFIRM TO ASTM A106 Gr B.
2. CS FITTINGS SHALL CONFIRM TO ASTM A105.
3. NPT THREADS SHALL CONFIRM TO ANSI B1.20.1
4. WELDING OF PIPES & FITTINGS SHALL BE CARRIED OUT AS PER API 1104.
5. ALL MATERIAL EXCEPT BELOW MENTIONED IS IN CONTRACTOR'S SCOPE.
6. ANY ADDITIONAL ITEM REQUIRED FOR COMPLETION OF WORK SHALL BE CONTRACTOR'S RESPONSIBILITY WITHOUT ANY COST/TIME IMPLICATION.
7. ANY ADDITIONAL SUPPORT/CLAMPS REQUIRED AT THE TIME OF INSTALLATION OF MRS SKID SHALL BE CONTRACTOR'S RESPONSIBILITY.
8. GIVIN BOM IS INDICATIVE ONLY. INDICATIVE ITEM MAY VERY DURING ACTUAL CONSTRUCTION ON SITE.
9. APART FROM FREE ISSUE MATERIAL BALANCE MATERIAL SHALL BE SUPPLIED BY CONTRACTOR.
10. CONTRACTOR TO ENSURE PROVISION FOR LOCKING/ SEALING ARRANGEMENT FOR METER/VALVE TO AVOID MISUSE.
11. IN CASE OF SPACE CONSTRAINT, FLANGE END Y–TYPE STRAINER MAY BE INSTALLED VERTICALLY.

MATERIAL SUPPLIED

1. METER
2. REGULATOR
3. ISOLATION VALVE

1. SUPPLY OF IF NOT IN CONTRACTOR SCOPE.
2. THE FITTING AS MARKED ALL DRAWING ARE TENTATIVE & MAY CHANGE DISCREPANCY UPON METER & REGULATOR'S OUTLET/INLET ENDS AS SUPPLIED BY VENDOR TO IGL.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:25 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

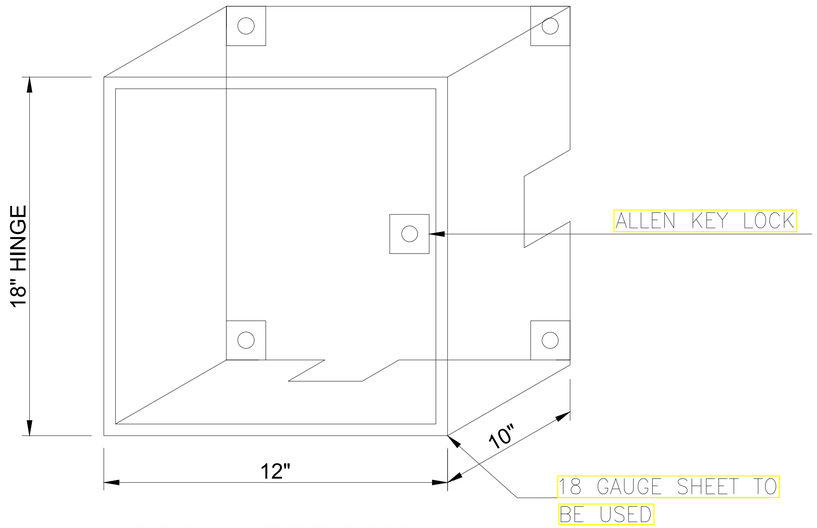
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SCHEMATIC DIAGRAM METERING & REGULATING STATION

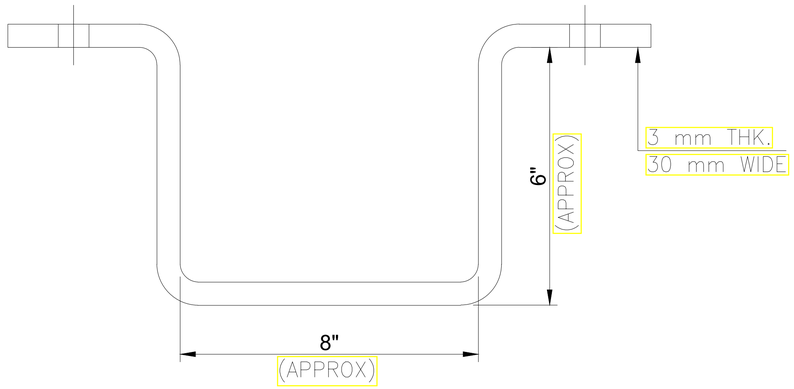
SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2050	0

FORMAT NO C211050-FMT-005_00

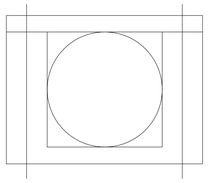
SKETCH OF REGULATOR BOX, BRACKETS & CLAMPS



REGULATOR BOX

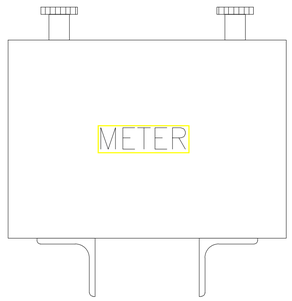


BRACKETS FOR METER (DOMESTIC)

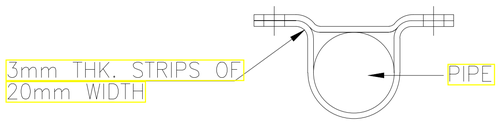


TYPE-1

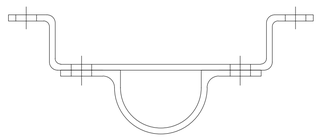
PE/PVC CLAMPS FOR COPPER PIPE



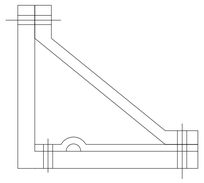
ANGLE BRACKETS 50x50mm
FOR NON DOMESTIC METERS



TYPE-1



TYPE-2



TYPE-3

MS CLAMPS FOR
3/4"& 1/2" GI PIPE

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE SPECIFIED.
2. CLAMPS, REGULATOR BOX AND METER BRACKET ARE TO BE MADE AS PER DIRECTION AND APPROVAL OF EIC.
3. CLAMPS/BOXES BRACKETS TO BE TIGHTLY SECURED TO THE WALL WITH PROPER ROWEL PLUGS, SCREWS ETC WOODEN BLOCKS TO BEUSED IN CASE ROWEL PLUGS DO NOT HOLD PROPER THE AREA.
4. PAINTING WITH ONE COAT OF ZINC PRIMER AND THREE COATS OF SYNTHETIC ENAMEL PAINT OF REPUTED MAKE.
5. CLAMPS ON PIPE TO BE FIXED AT MINIMUM DISTANCE OF 1.5 METERS AND AT BENDS.

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

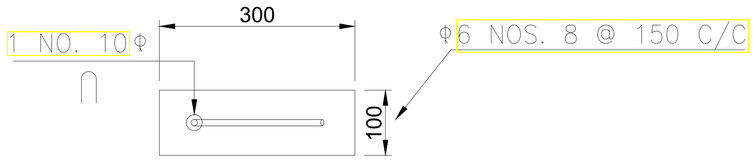
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SKETCH OF REGULATOR BOX, BRACKETS & CLAMPS

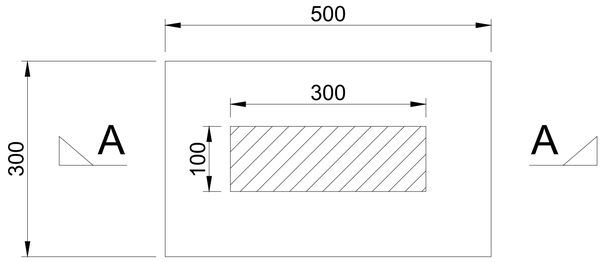
SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2051	0

Digitally signed by Rivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

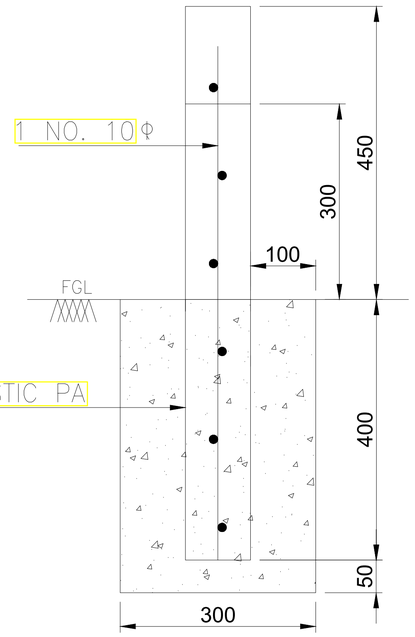
FORMAT NO C211050-FMT-005_00



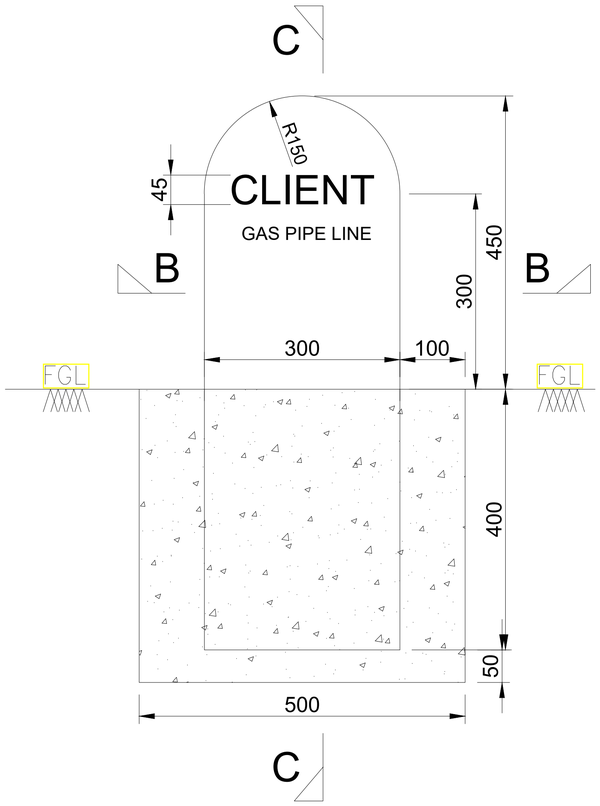
SECTION - B-B



PLAN

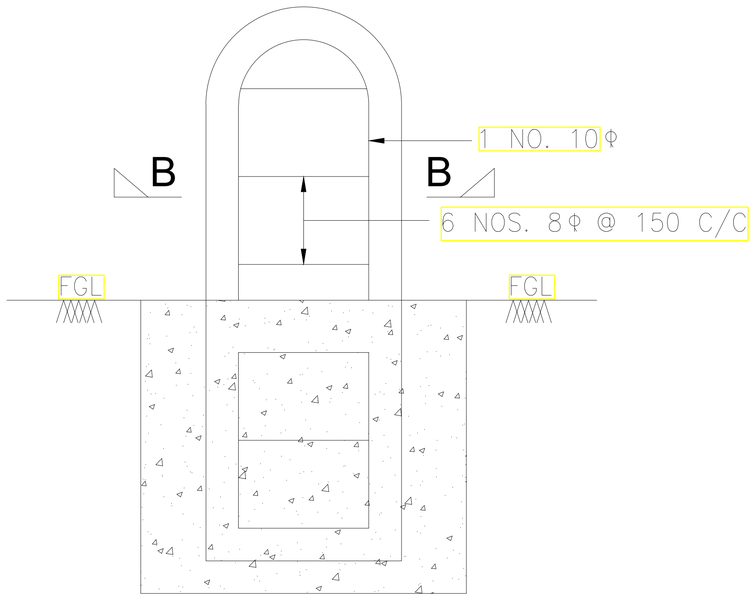


SECTION - C-C



SECTION - A-A

(FOR DIMENSIONS)



SECTION - A-A

(FOR REINFORCEMENT)

REFERENCE DRAWINGS

DRAWING TITLE	DRAWING NUMBER

NOTES:-

1. DRAWING IS NOT SCALE.
2. ALL DIMENSIONS ARE IN MM UNLESS OTHERWISE.
3. MARKERS SHALL BE INSTALLED IN EVERY 50 METER INTERVAL AS PER INSTRUCTIONS OF ENGINEER-IN-CHARGE.
4. ALL BOUNDARY MARKERS SHALL BE PRESENT & INSCRIPTION SHALL BE ENGRAVED 5mm DEEP IN THE MOULD ON BOTH FACE.
5. CONCRETE FOR BOUNDARY MARKERS SHALL BE M-20.

Digitally signed by Pavek Kumar Singh
Date: 2026.07.17 19:06:26 IST

REV.	DATE	DESCRIPTION	PREP.	CHKD.	APPD.
0	23.06.23	IFC / IFE / TENDER	P.S.S	D.G	S.K.N

PMC: VCS QUALITY SERVICES PVT. LTD.

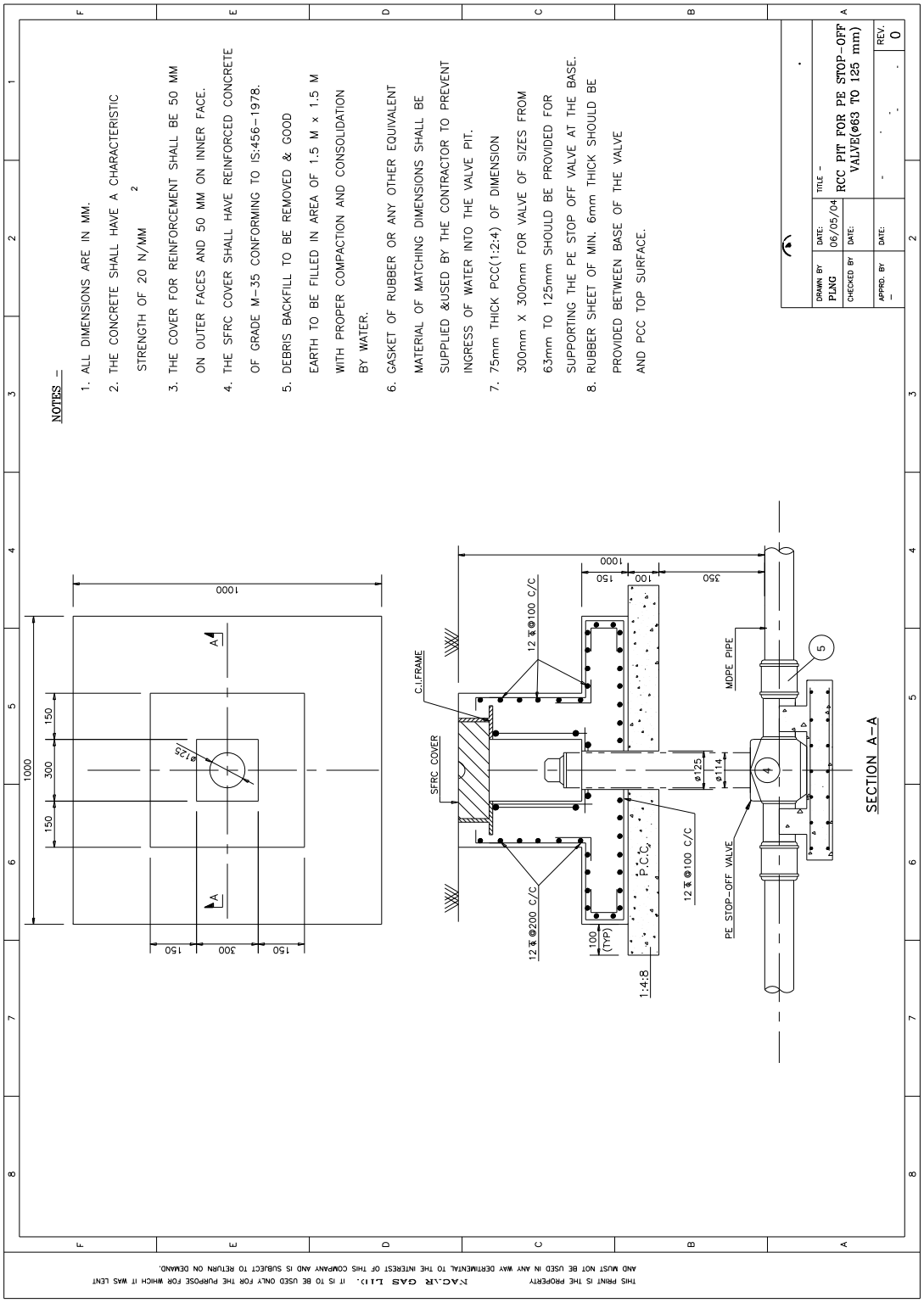
PROJECT: LAYING OF MDPE NETWORK AND GI/COPPER INSTALLATION

TITLE: SKETCH FOR RCC ROUTE MARKER

SCALE:	SCALE	TOTAL NO. OF SHTS:	1 OF 1
SIZE	JOB NO.	DRAWING NUMBER	REV.
A3	-----	VCS-STD-PP-2052	0

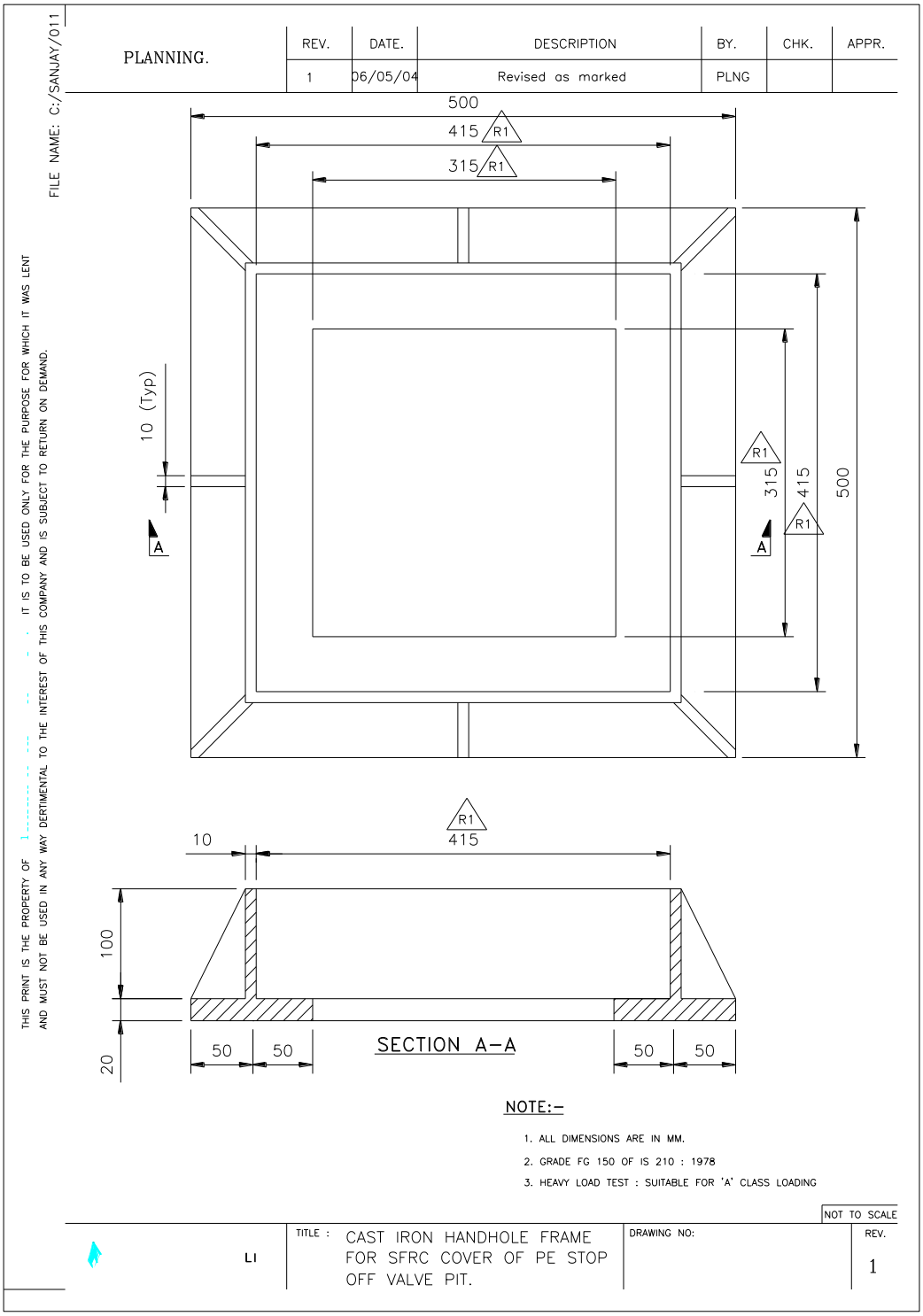
FORMAT NO C211050-FMT-005_00

Valve pit details for MDPE Valves



Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

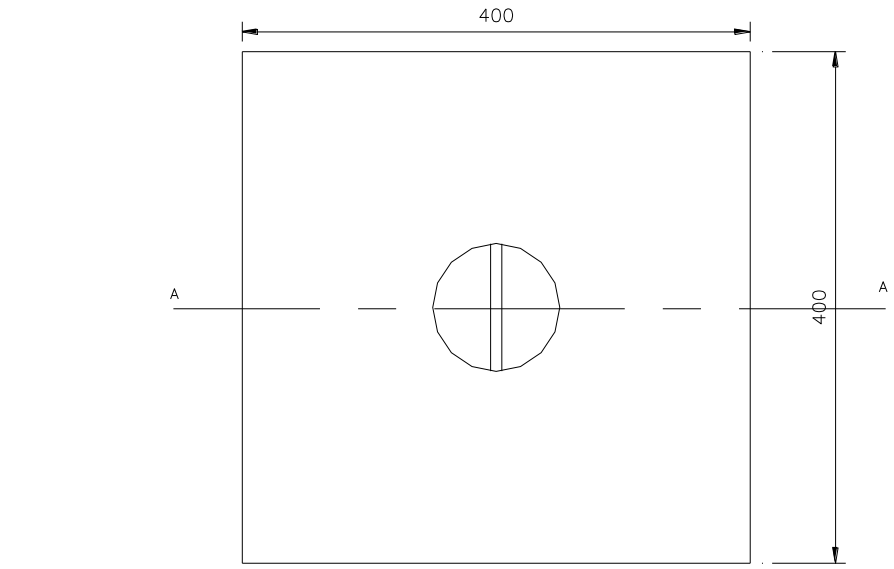
Valve pit details for MDPE Valves - Contd.

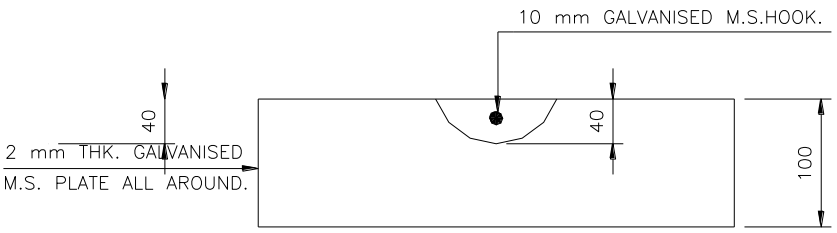


Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST

Valve pit details for MDPE Valves - Contd.

PLANNING.	REV NO.	DATE.	DESCRIPTION	BY.	CHK.	APPR.
	0	06.05.04	————	PLNG		





SECTION A–A

NOTE:–

1. ALL DIMENSIONS ARE IN MM.
2. THE SFRC COVER SHALL HAVE REINFORCED CONCRET OF GRADE M–35 CONFORMING TO IS:456–1978.
3. HEAVY LOAD TEST : SUITABLE FOR 'A' CLASS LOADING
4. PERFORMENCE REQUIREMENTS–
   a) SAMPLING AND CRITERIA FOR CONFORMITY: AS PER IS:12592 (Part–1) – 1998
   b) LOAD TEST: AS PER OS:12592 (Part–1) – 1998
   c) INSPECTION AND MANUFACTURES GUARANTEE : AS PER IS:12592 (Part–1) – 1998

NOT TO SCALE

	TITLE :	DRAWING NO:	REV.
- .	SERC COVER FOR PE STOP OFF VALVE PIT.	_1	0

THIS PRINT IS THE PROPERTY OF . IT IS TO BE USED ONLY FOR THE PURPOSE FOR WHICH IT WAS LENT AND MUST NOT BE USED IN ANY WAY DERTIMENTAL TO THE INTEREST OF THIS COMPANY AND IS SUBJECT TO RETURN ON DEMAND.

Digitally signed by Bivek Kumar Singh
Date: 2026.07.17 19:06:26 IST