

- 6.10** Cables shall be installed in final position with all the straight through joints complete. During the high voltage test, all other electrical equipment related to the cable installation, such as switches, instrument transformers, bus bars, etc., must be earthed and adequate clearance shall be maintained from the other equipment and framework to prevent flash over.
- 6.11** In each test, the metallic sheath/screen/armor shall be connected to earth.
- 6.12** All checks and tests shall be made as per Consultant standard test Performa available with site engineer.
- 6.13** All test readings shall be recorded and submitted to Consultant / Owner in triplicate sets.
- 6.14** Cable schedule, cable layout drawings, Interconnection drawings shall be marked by contractor for 'AS BUILT STATUS' and two sets of copies shall be submitted to Consultant / Owner.



Energising Quality

VCS Quality Services Pvt Ltd

STANDARD SPECIFICATION FOR EARTHING INSTALLATION

VCS – SS – EL - 4025

02	25.02.2020	SP	RD	AA	HK
01	16.10.2019	MG	VV	AD	SK
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01	16.10.2019	MG	VV	AD	SK	New revision system updated
02	25.02.2020	SP	RD	AA	HK	New revision system updated

ABBREVIATION

BIS/IS	Bureau of Indian standards
IEC	International Electro-Technical Commission
BS	British Standards
IEEE	Institute of Electrical and Electronics Engineers
NEMA	National Electrical Manufacturers Association
OISD	Oil Industries Safety Directorate
CCE	Chief Controller of Explosive
DGMS	Director General Mines Safety
IE Rules	Indian Electricity Rules
CPRI	Central Power Research Institute
GI	Galvanized Iron
MS	Mild Steel

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1.0 SCOPE

1.1 This specification defines the requirements for the supply of earthing and lightning protection materials and installation of the earthing and lightning protection systems.

2.0 REFERENCE DOCUMENTS

2.1 The work shall be carried out in the best workman like manner in conformity with this specification, consultant installation standards, layout drawings, the latest edition of relevant specifications, codes of practice of Bureau of Indian standards and OISD standards listed below:

SP: 30 (BIS):	Special Publication-National Electrical Code
IS: 2309:	Protection of buildings and allied structures against lightning.
IS: 3043:	Code of practice for earthing.
IS: 7689:	Guide for control of undesirable static electricity.
OISD 110:	Recommended practices on static electricity
OISD 147:	Inspection and safe practice during electrical installation.

2.2 In addition to the above it shall be ensured that the installation conforms to the requirements of the following as applicable:

- a. Indian Electricity Act and Rules.
- b. Regulations laid down by CEA/Electrical Inspectorate.
- c. Regulations laid down by OISD/PESO (as applicable).
- d. The petroleum rules (Ministry of Industry Government of India).
- e. Any other regulations laid down by central/state/local authorities and Insurance agencies.

3.0 DEFINITIONS

For the purpose of this document, the words and expressions listed below shall have the meanings assigned to them as follows:

OWNER / COMPANY	OWNER of the particular Project (Project Specific).
CONSULTANT	The party which is doing engineering, procurement, construction, pre-commissioning and assistance for commissioning, monitors and controls the overall project management.
BIDDER / SUPPLIER / VENDOR	The party(s) which manufactures and / or supplies material, equipment, technical documents / drawings and services to perform the duties specified by Contractor.

4.0 MATERIALS

4.1 MATERIAL SPECIFICATIONS

- 4.1.1 All materials and hardware's to be supplied by the contractor shall be new, unused and of best quality and shall conform to the specifications given here under and to latest Specifications of Bureau of Indian Standards. Contractor shall bring material samples to site and get it approved by engineer-in-charge before installation.
- 4.1.2 The main earth grid conductor shall be hot dip galvanized M.S. flat unless otherwise specified. Sizes for main conductors shall be as indicated on the earthing layout drawing. Amount of galvanizing shall be 610gm per sq. meter. Earth electrodes and Earth plate shall be as per job specification.

5.0 DESIGN

5.1 EARTHING NETWORK

- 5.1.1 This consists of main earth conductor (grid conductor) forming a closed ring network with required number of earth electrodes connected to it to provide a common earth for electrical devices and metallic structures. From each earth electrode two distinct connections shall be made to the main earth conductor. The earth plates shall be used for taking multiple earth connections to two or more equipment.
- 5.1.2 The earth conductor shall be laid along cable trays/cable trench/pipe racks as indicated on the earthing layout drawing. Where lined cable trenches are available, the earth conductor shall be laid in the trenches and shall be firmly cleated to the sidewall of concrete trenches using GI clamps at interval of 400 mm to 500 mm and near to the termination end. The earthing conductor shall run along one of the cable trays along a cable route. The earthing conductor shall be suitably cleated and electrically bonded to all the other cable trays on the same cable route at a regular interval of 25 to 30 meter. The earthing for equipment shall be tapped from the main earth conductor and not from cable tray support structure. Earth conductor when laid underground shall be at a depth of 500mm below finished grade level.
- 5.1.3 Joints and tapping's in the main earth loop shall be made in such a way that reliable and good electrical connections are permanently ensured. All joints below grade shall be welded and shall be suitably protected by giving two coats of bitumen and covering with hessian tape. Earth strip laid above ground shall be welded across straight through joints and joints shall be suitably protected by giving two coats of bitumen to avoid oxidation and insulation film formation of the strip surface. When two earth strips are to be joined by means of welding, lap welding with an overlapping of strip equivalent to double the width of the strip and all four sides shall be continuously welded. All joints at tapping's above ground shall be by means of connector/lugs. A minimum of two bolts of adequate size shall be used for this purpose. Earthing strip joints at earth plate and equipment shall be through GI bolts, nut etc.

6.0 INSTALLATION

6.1 INSTALLATION OF EARTH ELECTRODE

- 6.1.1 Earth Electrode shall be installed as shown on installation standard and layout drawings. The location shown on the layout drawings are indicative.
- 6.1.2 The exact location of earth electrodes in the field shall be determined by contractor in consultation with the Engineer-in-charge, depending on the soil strata and resistivity. Earth electrodes shall be located avoiding interferences with road, building foundation, column, pipelines etc. The civil area drawings shall be referred for this. The distance between two electrodes shall not be less than twice the depth of electrode.
- 6.1.3 Electrodes shall preferably be located in a moist soil which has a fine texture, grain size and distribution. Wherever practicable the soil shall be dug up, all lumps broken and stones removed from the immediate vicinity of the electrodes and soil packed by watering and ramming as tight as possible.
- 6.1.4 The electrodes shall have a clean surface, not covered by paint, enamel, grease or other materials of poor conductivity.
- 6.1.5 All earth electrodes shall be tested for earth resistance by means of standard earth test meter. The tests shall take place in dry months, preferably after a protracted dry spell.
- 6.1.6 The disconnect facility shall be provided for the individual earth electrode to check its earth resistance periodically.
- 6.1.7 Location of earth electrodes shall be marked by permanent markers for easy identification. All earth Electrodes shall be serial numbered and also marked on `As Built' drawing for future reference.
- 6.1.8 Individual earth electrodes shall be provided for each lightning arrestor and flood light mast.
- 6.1.9 Earthing system provided for concrete paved area by other agency where applicable; shall be connected to the plant earthing system below ground by minimum two earth connections.

6.2 CONNECTION

- 6.2.1 The earth system connections shall generally cover the following:
 - a. Equipment earthing for personnel safety
 - b. System neutral earthing
 - c. Static and lightning protection
 - d. System neutral
 - e. Current and potential transformer secondary neutral
 - f. Metallic non-current carrying parts of all electrical apparatus such as transformers, switchboards, bus ducts, motors, neutral earthing resistors, capacitors, UPS, battery charger panels, welding receptacles, power sockets, lighting/power panels, control

- stations, lighting fixtures etc.
- g. Steel structures/columns, rail loading platforms etc.
 - h. Cable trays and racks, lighting mast and poles
 - i. Storage tanks, spheres, vessels, columns and all other process equipment.
 - j. Fence and Gate for electrical equipment (e.g., transformer, yard etc.)
 - k. Cable shields and armor.
 - l. Flexible earth provision for Wagon, Truck
 - m. Shield wire
- 6.2.2 Conductor size for branch connection to various equipment shall be as per consultant Installation Standards unless otherwise stated on earthing layout drawings.
- 6.2.3 All process pipelines shall be bonded and earthed at the entry and exist points of battery limit of hazardous area. Earth continuity conductors across pipe line flanges shall not be provided as per OISD 110.
- 6.2.4 Steel pipe racks in the process units and offsite area shall be earthed at every 24 meters.
- 6.2.5 Equipment / street light pole etc. located remote from main earth network may be earthed by means of individual earth electrode and earth conductor unless otherwise stated in Job Specifications.
- 6.2.6 Lightning protection shall be provided for the equipment, structures and buildings as shown on layout drawing. Self-conducting structures shall not require separate aerial rod and down conductors. These shall however be connected to the earthing system at two or more points as shown on layout drawing. An independent earthing network shall be provided for lightning protection and this shall be bonded at least at two points with the main earthing network below ground. Lightning down conductor shall be brought to earth electrode in shortest straight path as feasible to minimize surge impedance.
- 6.2.7 The main earthing network shall be used for earthing of equipment to protect against static electricity.
- 6.2.8 All medium and high voltage equipment (above 250V) shall be earthed by two separate and distinct connections with earth.
- 6.2.9 Plant instrument system clean earthing, UPS system clean/safety earth shall be separate from the electrical earthing system.
- 6.2.10 All paint, scale and enamel shall be removed from the contact surface before the earthing connections are made.
- 6.2.11 All earthing connections for equipment earthing shall be preferably from the earth plate mounted above ground wherever provided.
- 6.2.12 Equipment foundation bolts shall not be used for earthing connection.
- 6.2.13 Earth connections shall be made through compression type cable lugs/by welded lugs.

6.2.14 All hardware used for earthing installation shall be hot dip galvanized or zinc passivated. Spring washers shall be used for all earthing connections and all connections adequately locked against loosening.

6.2.15 Lighting fixtures and receptacles shall be earthed through the extra core provided in the lighting circuit/cable for this purpose.

6.2.16 The reinforcements of sub-station building and the sub-station floor shall be connected to main earth grid.

7.0 INSPECTION AND TESTING

7.1.1 Field inspection, testing and commissioning of electrical installation shall be done as per specification no.00004-PL-EL-SP-21-R0. Earthing systems/connections shall be tested as follows:

7.1.2 Resistance of individual earth electrodes shall be measured after disconnecting it from the grid by using standard earth test meggar.

7.1.3 Earthing resistance of the grid shall be measured after connecting all the earth electrodes to the grid. The resistance value of an earth grid to the general mass of earth shall be as follows:

- a. For the electrical system and equipment, a value that ensures the operation of the protection device in the electrical circuit but not in excess of 4 ohm. However, for generating stations and large sub-systems the value shall not be more than 1 ohm.
- b. For lightning protection, the value of 5ohms as earth resistance shall be desirable, but in no case, it shall be more than 10 ohms.

7.1.4 The resistance to earth shall be measured typically at the following points.

- a. At each electrical system earth or system neutral earth.
- b. At each earth provided for structure lightning protections.
- c. At each point on earthing system used to earth electrical equipment enclosures.
- d. At one point on earthing system used to earth wiring system, enclosures, such as metal conduits and cable sheaths or armor.
- e. At one point on fence enclosing electrical equipment.

7.1.5 All earthing layout drawing shall be marked by contractor for 'AS BUILT STATUS' and two sets of copies shall be submitted to consultant.



Energising Quality

VCS Quality Services Pvt Ltd

STANDARD SPECIFICATION FOR LIGHTING INSTALLATION

VCS – SS – EL - 4026

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ABBREVIATION

BIS/IS	Bureau of Indian standards
IEC	International Electro-Technical Commission
BS	British Standards
IEEE	Institute of Electrical and Electronics Engineers
NEMA	National Electrical Manufacturers Association
OISD	Oil Industries Safety Directorate
CCE	Chief Controller of Explosive
DGMS	Director General Mines Safety
IE Rules	Indian Electricity Rules
CPRI	Central Power Research Institute
AC	Alternating Current
DC	Direct Current
CP	Cathodic Protection
SCADA	Supervisory Control And Data Acquisition
FRP	Fiber Reinforced Plastic
TPN	Triple Pole Neutral
MCB	Miniature Circuit Breaker
ELCB	Earth Leakage Circuit Breaker
MDB	Main Distribution Board
HPMV	High Pressure Mercury Vapor
HPSV	High Pressure Sodium Vapor
PVC	Poly Vinyl Chloride
GI	Galvanized Iron
HRC	High Rupturing Capacity
MS	Mild Steel
CFM	Cubic Flow Meter

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1.0 SCOPE

- 1.1 This specification defines the requirements for the supply of equipment; materials, installation, testing and commissioning of the lighting system (lighting fixtures, lighting power distribution, telephone wiring etc.).

2.0 REFERENCE DOCUMENTS

- 2.1 The work shall be carried out in the best workmanlike manner, in conformity with this specification, and the relevant specifications/codes of practice of the bureau of Indian standards.
- 2.2 In addition to the above it shall be ensured that the installation conforms to the requirements of the following as applicable:
- a. Indian Electricity Act and Rules.
 - b. Regulations laid down by CEA/Electrical Inspectorate.
 - c. Regulations laid down by OISD/PESO (as applicable).
 - d. The petroleum rules (Ministry of Industry Government of India).
 - e. Any other regulations laid down by central/state/local authorities and Insurance agencies.

3.0 DEFINITION

For the purpose of this document, the words and expressions listed below shall have the meanings assigned to them as follows:

OWNER / COMPANY	OWNER of the particular Project (Project Specific).
CONSULTANT	The party which is doing engineering, procurement, construction, pre-commissioning and assistance for commissioning, monitors and controls the overall project management.
BIDDER / SUPPLIER / VENDOR	The party(s) which manufactures and / or supplies material, equipment, technical documents / drawings and services to perform the duties specified by Contractor.

4.0 FABRICATION (EQUIPMENT SPECIFICATION)

All materials, fittings and appliances to be supplied by the contractor shall be new, unused and of the best quality and shall conform to the specifications given hereunder. These shall be manufactured in accordance with the latest revision of the specifications of Bureau of Indian 'Standards/International Standards. In the absence of any specifications for a particular item contractor shall bring material samples along with proven track record to site and get the same, approved by Engineer-in-Charge/Owner before installation.

4.1 Lighting and Power Panels

4.1.1 Lighting and power panels (general purpose panels for safe area) shall be made of 1.6mm thick sheet steel and shall be dust and vermin proof. All metal surfaces shall be cleaned free of rust, given a coat of red-oxide primer and finished with two coats of epoxy-based paint of shade 632 of IS 5. Panels shall be indoor/outdoor type as specified. Indoor type panels shall have IP42 degree of protection and shall be suitable for surface or flush mounting on wall surface as specified. Lighting and power panels located outdoor shall be IP55 weather protected and shall also preferably have integral canopy for additional weather protection. The canopy shall be made of 2mm thick galvanized sheet steel or FRP where these are separate from the equipment.

4.1.2 Lighting and Power panels shall have TPN incoming feeder and single phase outgoing feeders. Lighting circuit feeders shall be rated for 10 amps and power circuit feeders shall have current rating of 16Amps. In power panels for window Air conditioning units, power circuit feeder shall be rated for 20 amps. Panels shall be equipped with phase and neutral bus bars of required current carrying capacity. The outgoing feeders shall be provided with single pole miniature circuit breakers (MCBs) for safe areas and double pole MCBs for hazardous areas. The incomer shall be with MCB and ELCB unit unless otherwise specified. Miniature circuit breakers shall be mounted in such a way that the operating levers project outside the front Bakelite covers plates for ease of operation. A hinged door to cover the operating knobs shall be provided. In addition, a circuit diagrams indicating incomer details and outgoing details viz. Circuit number, circuit rating, and load connected and details of the load shall be pasted inside the panel. Also a laminated copy of the diagram shall be provided inside the panel in a suitably designed pocket. Two external earthing studs for connection to the plant earthing grid shall be provided on the panel. Further, the panel shall be provided with an earth bus bar with terminal studs for connection to the third core of each outgoing circuit. Each circuit phase and neutral shall be given ferrule numbers. Complete wiring inside the panel, shall be neatly bunched with PVC tape and button. Sufficient terminals shall be provided in the terminal block so as to ensure that not more than one wire (core) is connected to a terminal. The panel shall have knock out holes or removable gland plate for the entry of incoming and outgoing conduits or cables. The panels shall be complete with requisite number of cable glands as specified.

4.1.3 The Main distribution board (MDB) where used, shall be made of 2mm thick sheet steel panel, dust and vermin proof similar-in construction to Lighting and Power panels but with TPN MCB incoming and TPN outgoing (MCB with ELCB units and MCB without ELCB unit as applicable) of required numbers as specified.

4.1.4 All MCBs shall be of M9 category as per IS 8828 and sensitivity of ELCBs shall be 100 mA unless otherwise specified.

4.1.5 Wherever the size of incoming cable to lighting, power panels/MDB is more than 35 sq.mm a suitable cable adapter box shall be provided and attached to the panel. The incoming cable leads shall be connected to terminal block (bolted type terminals) of required size. This terminal block shall be connected to TPN incomer unit through separate PVC insulated copper conductor wires/bus bars. Sufficient space shall be provided (200 to 250mm) between gland plate and the bottom of terminal block for easy termination.

4.2 Lighting fixtures

The types, Makes and catalogue numbers of various types of lighting fixtures shall be as given in Fixture schedule job Data Sheet. HPMV/HPSV lighting fixtures shall be complete with ballast, starters and capacitor, as required. Control gears shall be integral or non-integral as specified in lighting layout drawings. Unless otherwise specified all fixtures shall be supplied complete with lamps. Ballast for fixture shall be copper wound or electronic type. The fixtures shall be of high power factor type i.e. at least 0.9 or more.

4.3 Switches

Switches, manufactured in accordance with IS: 13947 shall be used for non-hazardous areas. Switches in areas where concealed wiring has been adopted, shall be flush mounting piano type unless otherwise specified. For surface conduit wiring, piano type switches in surface mounted box shall be provided. Industrial Type switches (Weather protected) shall be used for outdoor areas.

4.4 Receptacles

Three pin type 5A/15A receptacles manufactured in accordance with IS:1293 shall be used for non-hazardous areas. The receptacles and the controlling ON/OFF switch shall be mounted in the same enclosure box but these shall be in separate units to facilitate replacement by parts. Flush mounting type receptacles shall be used in areas where concealed wiring has been adopted and surface type shall be used in other areas. For exhaust fans and wall mounted air circulators, socket and switch enclosures shall be separate. In buildings such as sub-station, D.G. shed, Workshop, maintenance shop etc. industrial type metal clad socket outlets and plugs shall be provided. These sockets shall be supplied complete with plugs.

4.5 Outlet Boxes

The outlet boxes used as point outlets shall be prefabricated type 65mm deep junction boxes. Outlet boxes custom fabricated for sockets, switches, fixtures and fan regulators etc. shall be made of M.S. Sheet having minimum thickness of 1.6mm. Outlet boxes shall be galvanized after fabrication. These shall be complete with terminal block suitable for connection of wires up to 4 sq. mm Front cover plate shall be of 3mm thick bakelite/PE sheet. The color shall suit the shade of the walls or shall be white if the shade of the walls is not finalized. The sheet shall extend at least 2 cm on all sides of outlet box. Cover plate shall be fixed by cadmium plated brass screws and cup washers. Outlet boxes shall be provided with adequate number of knock outs on all the sides for ease of wiring either with conduits or without conduits.

4.6 Conduit and Accessories

Conduits for Electrical installations shall conform to IS:9537. The type of conduit (steel/GI/PVC) shall be as specified on drawing. Black enameled-steel or GI conduit shall be of 1.6mm thick and the minimum wall thickness of PVC conduit shall be 1.6mm. Generally, PVC conduits shall be used in concealed wiring and for surface wiring GI conduit (in plant buildings) and black enameled steel conduit (in-non plant buildings) shall be used.

4.7 Lighting Poles

Lighting poles shall be fabricated from ERW steel tubular pipes of specified section, with joints, swaged together when hot and beveled on outside edges. Poles shall be coated with bituminous preservative solution on the ground portion of the outside surface. Remainder of the outside surface shall be given one coat of red oxide primer and finished with two coats of aluminum paint. The pole shall have, a marshalling, box near the bottom to contain HRC fuses, a neutral link earth stud and terminal block.

4.8 Lighting HIGH Mast

Lighting HIGH masts (Lattice tower) where used. They shall be complete with 2 nos. MS flats provided at the base plate for connection to the plant earthing grid. A ladder, platform, handrail, a weather protected TPN switch (at 1500mm from ground-level) and ;a weather protected distribution board fabricated out of sheet steel shall be provided at the top of mast. The TPN Switch and the distribution board shall also have a canopy for additional weather protection. The TPN switch shall be suitable for looping one more lighting high mast from the same incoming, power supply. The distribution board shall have TP & N bus bars of 30 Amps. rating and 12 Nos. outgoing circuits each with a 6A single pole MCB. The distribution board shall have cable entries from bottom. Necessary space provision and suitable mounting arrangement shall be made on top of the tower for mounting of ballast (choke) and condensers for all the circuits and the lighting fixtures. The high masts shall GI coated or painted one coat of red oxide primer and two coats of aluminum paint. Distribution board shall he fabricated out of 2mm thick sheet steel and shall be painted with two coats of enamel over a basecoat of red oxide.

Unless otherwise specified the flood lighting high masts shall be telescopic type.

4.9 Wires

Wires shall be PVC insulated and shall be of 660 Volts grade as per IS694. Conductor shall be of stranded copper and size shall be minimum 1.5 Sq. mm for lighting, 2.5 Sq. mm for 15A power socket circuits and 4 sq. mm for split A/C power socket circuits. Red/Yellow/blue wires for phases, black wire for neutral and green wire for earth shall be used (size of earth wire shall be same as for phase and neutral size). Wire size for air conditioning circuit feeders shall be as indicated in the panel schedule.

4.10 Ceiling Fan/Exhaust Fan

Ceiling fans shall be of 1200mm sweep unless otherwise specified with double ball bearing and regulator. The suspension down rod shall be sturdy mild steel rod of adequate diameter and of minimum length of 300mm with shakles suspension arrangement as per IS. For exhaust fans, the sweep dia. and air CFM shall be as specified in job specification. Exhaust fans for battery room shall be with anticorrosive blades suitable for use in acidic fumes.

4.11 Decorative switches and sockets

Decorative lighting switches and sockets where specified, shall be modular in design. All these items shall fit into the same frame with overall standard dimensions. Frames shall be suitable for surface and flush mounting in brick / concrete wall. The frames shall be

suitable for conduit entry from all the sides. Switches and sockets shall match colors of the frame and cover plates to obtain a combination which shall match decor of the interiors of Control Room, Administrative buildings, offices rooms etc.

5.0 INSTALLATION

Lighting system installation shall be as per follows.

5.1 General

- 5.1.1 The lighting fixtures in the plant shall be fed from lighting panel. All outdoor lighting shall be group controlled manually or through synchronous timer or photocell. Lighting wiring between panel and lighting fixtures shall be done with PVC insulated 3core (phase, neutral and earth) copper conductor armored cable for hazardous areas. Wiring in the building shall be done by means of 3core copper, conductor. PVC insulated, un-armored cables, or PVC insulated copper conductor wires in conduit/Metsec channel as specified. All joints of conductors in Switch boards/JBs Fittings shall be made only by means of approved mechanical connectors (nylon/PVC connectors). Bare twisted joints shall not be permitted anywhere in the wiring system.
- 5.1.2 The lighting layouts furnished by Owner will indicate approximate locations of lighting fixtures. The electrical contractor shall determine, with approval of Engineer-in-Charge, The exact location of each fixture in order to avoid interference with the piping or other mechanical equipment and also with a view to obtain as much uniform illumination as practicable, and to avoid objectionable shadows. Conduits shall be laid out by the contractor to suit field conditions and as per directions of the Engineer-in-Charge.
- 5.1.3 On walkways, platforms and other outdoor area, lighting fixtures shall be located nearer to landing of stairs or ladders, gauges, flow meters, panel boards and other equipment to provide proper illumination.
- 5.1.4 The minimum height of any lighting fixture shall be preferably not less than 2.5 meters above the floor level.
- 5.1.5 All outdoor cable terminations to outdoor junction boxes, panels, socket outlets etc. shall be through bottom or from side. Top entries for cables shall be avoided to avoid water entry. All cable glands for outdoor terminations shall be double compression type and the gland shall be covered with PVC or rubber boot shroud. All unused cable entries shall be plugged with suitable blanking plugs.
- 5.1.6 Mounting height of equipment shall be as under: -
- | | |
|--------------------------------|---|
| a. Top of Switch Box | 1200 mm from FFL(Finished floor level) |
| b. Top of Lighting/Power Panel | 1800mm from FFL |
| c. 5/15 Amp. Receptacle | 300mm from FFL unless otherwise specified
(1200 mm for process areas and industrial sheds) |
| d. Lighting fixture | As indicated in layout drawing |
| e. Exhaust fan | in the cutout provided / as indicated in Layout drawings. |

- 5.1.7 Fixtures shall be firmly supported from the structures. Support (clamps etc. may be bolted or welded to the existing steel work or metal inserts. In case of concrete, structures, where metal inserts are not available, fixtures shall be suspended from concrete surfaces with the help of anchor fasteners. In such cases special care shall be taken to see that anchoring is firm. In places where ceiling fans are provided, lighting fixtures shall be suspended below the level of fan to avoid shadow effect.
- 5.1.8 Circuit cables in a group shall be cleated to structure by using galvanized strip clamps or cable run in cable trays wherever trays are available. Spacers and cleats shall be of required size to accommodate the cables. All hardware shall be galvanized or zinc passivated. Underground lighting cables (in paved areas), shall be taken in suitable G I sleeves buried at a minimum depth of 300 mm from FFL. GI pipe sleeves shall be extended to 300mm above. FFL Exact termination/layout of pipes (for protection of cables) shall be decided at site as per site convenience in consultation with Engineer-in charge.
- 5.1.9 Wiring for all outlet sockets shall be done with 3 cores of equal sizes for, phase, neutral and earth. The terminals of switch sockets shall be suitable to receive the size of wire specified.
- 5.1.10 All lighting fixtures shall be provided with terminal block with required terminals suitable for connection of wire up to 2.5 sq mm copper conductor.
- 5.1.11 The cable shall be straightened after unwinding it from the drum. All cables be clamped/laid in straight run without any sag and link.
- 5.1.12 For location where fan points are shown, fan hooks with junction box during concreting.
- 5.1.13 Where fan hooks and JB's are provided separately JB shall be located within a distance of 300mm from hook for mounting of ceiling rose.
- 5.1.14 Industrial type plug sockets with 20A MCB or rating as per job specification shall be provided at a height of 500mm from FFL for window AC units.
- 5.1.15 Socket outlets and plugs for installation in Substation building, DG shed, workshop, and maintenance shop etc. shall be of industrial metal clad type.
- 5.1.16 Wiring for exhaust fans shall be terminated in receptacles as specified in layout drawing and the connection from receptacle to the exhaust fan shall be by means of a flexible cord equivalent in size to the main run of wires. Switch for exhaust fan shall be located in a separate switch board along with other switches.
- 5.2 Conduit System
- 5.2.1 Surface or concealed conduit system of wiring shall be adopted, as specified in the drawings. Required number of pull boxes shall be used at intervals to facilitate easy drawing of wires. Separate conduit shall be run for lighting and power circuits. Further, conduits for Normal lighting/Emergency lighting/DC critical lighting shall be separate. Conduit layout shall be decided at site as per site conditions. Drop conduits for switch boards shall be decided by contractor as per wall locations shown in Architectural drawings. All exposed run of conduits on surface, shall be vertical or horizontal.

-
- 5.2.2 Only threaded type conduit fittings shall be used for metallic conduit system. Pin grip type or clamp type fittings are not acceptable. Conduit ends shall be free from sharp edges or burrs. The ends of all conduits shall be reamed and neatly bushed.
- 5.2.3 Conduit shall be of minimum 25mm dia. Maximum number of wires permissible in a conduit shall be seven/nine for wire size of 2.5 sq mm/1.5 sq mm. respectively.
- 5.2.4 The exposed outer surface of the conduit pipes, including all accessories forming part of the conduit system, shall be adequately protected against rusting. In all cases, bare threaded portion of conduit pipe shall not be exposed unless such bare threaded portion is treated with anti-corrosive preservative or covered with approved plastic compound.
- 5.2.5 Conduit connection to outlet boxes shall be by means of screwed hubs or check nuts on either side. Where concealed wiring is done, junction boxes (65mm deep) shall be used so as to rest on shuttering properly. Conduits shall be laid above reinforcement. All conduit connections shall be properly screwed and Junction box covers shall be properly fitted so as to avoid entry of concrete slurry.
- 5.2.6 Conduit pipes shall be fixed by 1.6mm thick G.I. saddles on 3mm thick G.I. saddle bars of required width in an approved manner at intervals of not more than 50cms for straight run. At places near junction boxes, bends, or similar fittings, saddle and bars shall be provided on either side.
- 5.2.7 Where concealed wiring is to be adopted, conduits shall be laid in time before concreting of the slab. Pull wire (GI or steel) shall be provided inside conduit for the ease of wire pulling. The contractor shall coordinate his work with other agencies involved in the civil works in, such a way, that the work of the other agencies is not hampered or delayed. Vertical conduit runs shall be made in wall before plate ring is done so as to avoid chasing. Where chases are made for conduit run contractor shall fill these chases or any other openings made by them after completing the work and patch the surface. During installation, care shall be taken to see that proper covers are provided to prevent rusting of conduits. Locations of all point outlets, junction boxes shall be marked with brick powder or sand so that these are easily identified after shuttering removal. As built conduit layout drawing shall be submitted by contractor after completion of the work.
- 5.2.8 All junction boxes, bends and other accessories shall be of the same material as that of conduit and shall have the same protective coatings.
- 5.2.9 After erection, the entire conduit system shall be tested, for mechanical and electrical continuity and shall be permanently connected to earth by means of approved type of earthing clamps.
- 5.3 Hazardous Area Installation
- 5.3.1 Wiring in hazardous area shall be done by using minimum 2.5mm copper conductor armored cable. Circuit wiring feeding hazardous areas shall be controlled by two pole switches/MCBs (for phase as well as neutral isolation).
- 5.3.2 Correct type of lighting equipment (fixtures and JBs) with regard to hazardous protection as specified in the drawing shall be installed for the areas classified as Zone 1, Zone 2 etc.

- 5.3.3 The terminations in the junction boxes and the lighting fittings shall be done avoiding possibility of loose connections due to vibrations. After the terminations are made the cover of the junction boxes and the lighting fittings shall be closed properly with all bolts and hard wares in correct position, retaining its explosion and weather protections. In fixtures having double cable entries, both the entries shall be used for looping in and looping out connection, thus minimizing the use of separate junction box wherever separate control gear boxes (C.G. box) are provided looping in and looping out, connections shall be through CG-box, thus avoiding the use of an additional junction box. All unused cable entries shall be sealed with suitable plugs.
- 5.3.4 Circuit cables shall be firmly cleated in a group along, columns/ beam/ladders/side channels/platform using 1.6 mm thick GI saddles on, 25x3 mm GI saddle bar at intervals of 400mm to 500mm for straight run and on either side close to bending and at both termination ends as per the direction of Engineer-in-charge. Where required 3 or more of cables may be taken in slotted channel tray after getting the approval of Engineer-in-charge. Cables shall not be routed along hand rails.
- 5.3.5 Where fire proofing column/structures are encountered, all cabling shall be taken in GI pipes of required size and both ends shall be sealed, well before fire proofing is done. Similarly, equipment such as lighting fixture, control gear box, lighting/ power panels, field call stations, junction-boxes etc. shall be installed on suitable steel mounting frame/distance bracket, thereby direct contact with the concrete used for fire proofing.
- 5.3.6 Cable glands for terminating cable on flameproof equipment shall be of double compression FLP type. Any material/equipment specified to be supplied by contractor for installation in hazardous areas, shall be tested by CMRI and duly approved by C.C.E. Nagpur or DGMS Dhanbad or any other applicable statutory authority. All indigenous FLP equipment shall also have valid BIS license as required by statutory authorities.
- 5.4 Building Lighting
- 5.4.1 The type of wiring system shall comprise surface/concealed conduit system or cable wiring as specified on layout drawings.
- 5.4.2 Mounting details of fixtures shall be indicated on the drawings. If specified on the drawings, a group of fluorescent lighting fixtures which are to be mounted end to end shall be fixed to mild steel cold Trolled sections of 50mm x 50mm and of 1.2mm thick (Metsec channel). The entire assembly shall be fixed to the ceiling with necessary number of supports which may be by means of steel conduit or chromium plated chain link as required. The 'Metsec' Channel shall run continuous in suitable sections from one end to other end of wall. The complete channel shall be spray painted, with approved color as per the directions of Engineer-in-Charge. All wires inside channel shall be neatly bunched by nylon tape & buttons.
- 5.4.3 Wiring in areas above false ceiling shall be done in Surface Conduit (25mm die GI conduit) suitably clamped to the true ceiling. Vertical drops from true ceiling for panels, switches, receptacles etc. shall be taken in 25mm die PVC conduit concealed in walls up to switchboards/panels. Lighting fixtures shall be supported from true ceiling. Exact location of fixtures shall be finalized in co-ordination with air-conditioning duct-diffuser layout, panels layout and false ceiling grid layout. To facilitate easy maintenance Looping

back system' of wiring shall be followed throughout. Accordingly supply tapping's and other interconnections including for earthing are made only at fixture connector blocks or at switch boards. Required number of junction boxes shall be used at intervals for wire pulling and inspection.

- 5.4.4 All wires in conduit shall be color coded as specified. Each circuit shall have independent phase neutral and earth wire. However when group of circuits are run in a single conduit the earth wire can be common.
- 5.4.5 Building conduit lighting system of wiring where measurement is done on point wiring basis generally consists of two parts. The first part is the circuit wiring which includes the work necessary from lighting panel up to switch box and from switch box to another switch box. The second part is the point wiring which shall include the work necessary from tapping point in the switch box up to various fixtures or fan outlets/ceiling roses.
- 5.4.6 In no case, two different sources or two different phases of supply shall be combined in one switchboard.
- 5.4.7 Switches for light fixtures/exhaust fans in battery room shall be provided outside the Battery room.
- 5.4.8 Lighting layouts for non-plant buildings (such house, cement go down, gate house, workshop, service building, rest room, etc.) shall be prepared by installation contractor.
- 5.4.9 The following basic data/document for layouts will be provided to the contractor.
- f. Architectural drawings
 - g. Illumination level required
 - h. Type of lighting fixture
 - i. Type of wiring (concealed/surface conduit/cable wiring etc.)
- 5.4.10 Based on the above input, contractor shall prepare and submit lighting layout drawings, panel schedules, conduit layout drawings for concealed wiring, design calculations wherever required, for review by purchaser before erection work is started. The lighting layout drawing shall show the location, type and mounting details of lighting fixtures, receptacles, junction boxes, layout of circuit indicating number of wires etc. The number of points in a circuit shall not exceed ten and the load in each circuit shall be less than 1000 Watts.
- 5.4.11 The panel schedule shall include rating of incoming and outgoing feeders, number of outlets, load for each outgoing circuit, etc.
- 5.4.12 All drawings shall be prepared preferably in AO and AI size. Panel schedules shall be in A4 size drawings (Final submission of drawings shall be in soft copies and in bound volumes together with one transparency of each document).
- 5.5 Street Lighting

- 5.5.1 Street lighting poles to be located on road side shall be installed at a minimum distance of 300mm from the edge of the walkway of the road (road berm). Size of wires from marshalling box up to fixture shall be 1.5mm²/2.5mm², copper conductor PVC insulated.
- 5.5.2 Each pole shall be earthed at two points by connecting to the plant earth grid as shown on Installation standards.
- 5.5.3 Street lighting fixture shall be mounted on steel tubular poles as per standard drawings. The foundation for the street lighting poles will be made by electrical contractor Street lighting poles shall be supplied with a base plate.
- 5.5.4 The poles shall be numbered as per the drawings/ directions of Engineer-in-charge.

5.6 HIGH Mast Lighting

- 5.6.1 The lattice structure high masts shall be installed on concrete foundations with the base plate bolted on to the anchor bolts. The lattice structure shall be GI coated or painted with a coat of primer and two coats of aluminum paint, the second coat to be given just before handing over to the owner. The high masts shall be numbered as per drawings. The high masts shall be connected to the plant earth grid at two points.
- 5.6.2 The main feeder up to the distribution board of lighting high Mast shall be through PVC insulated armored cable of size as specified in the respective drawing. Wiring from Distribution Board to each flood-light fixture shall be by means of a 3core 2.5sqmm, copper conductor PVC insulated armored cable. All the cables shall be neatly clamped to the structure at intervals not exceeding 25 cms.
- 5.6.3 Exact orientation of flood lighting fixtures shall be decided at site to achieve optimum utility of these fixtures.

5.7 Telephone Wiring

- 5.7.1 Conduits for telephone wiring in buildings shall be of 1.6mm thickness. 25mm dia black enameled steel conduit/PVC as per IS 9537, installed on wall surface or concealed or as specified in job specification.
- 5.7.2 Conduit installation system shall comply to the requirements given in conduit system. Required number of pull boxes shall be provided at interval for easy drawing of wires. The telephone wiring shall be done with 0.63mmdiaannealed copper conductor PVC insulated 660V grade, twin flat wire, unless otherwise specified in Job Specification. One telephone socket outlet shall be provided for connection to telephone instrument.

6.0 INSPECTION & TESTING

- 6.1 Lighting installation shall be tested and commissioned by installation contractor as per Specifications. Pre commissioning checks and tests shall include but not be limited to the following:
- 6.1.1 The insulation resistance of each circuit without the lamps (load) being in place shall be measured and it should not be less than 500,000 ohms. (Between phases, phases to neutral, phase/neutral to earth).

- 6.1.2 Current and voltage of all the phases shall be measured at the lighting panel bus bars with all the circuits switched on with lamps. If require load shall be balanced on the three phases.
- 6.1.3 The earth continuity for all socket outlets shall be checked. A fixed relative position of the phase and neutral connections inside the socket shall be established for all sockets.
- 6.1.4 After inserting all the lamps and switching on all the circuits, minimum and maximum illumination level shall be measured in the area and recorded.
- 6.1.5 It shall be ensured that switch provided for ON/OFF control of point (light/fan/socket) is only on LIVE side.
- 6.1.6 Operation of ELCB's shall be checked
- 6.2 Contractor shall duly fill in all the above test results and submit the test reports to Engineer-in-Charge in triplicate.
- 6.3 All lighting layout drawings shall be marked by contractor for 'AS BUILT STATUS' and two sets of copies shall be submitted to the consultant.



Energising Quality

VCS Quality Services Pvt Ltd

STANDARD SPECIFICATION FOR FIELD INSPECTION, TESTING AND COMMISSIONING OF ELECTRICAL INSTALLATION

VCS – SS – EL - 4027

02	09.03.2022	SP	RD	AA	HK
01	16.10.2019	MG	VV	AD	SK
00	05.07.2017	MG	RD	AD	SK
Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By

UNCONTROLLED COPY	:	If printed
CONTROLLED COPY	:	If in soft and signed

REVISION RECORD						
Rev.	Revision Date	Prepared by	Checked by	Approved by	Authorized by	Revision Description
00	05.07.2017	MG	RD	AD	SK	Issued for use as Standard
01	16.10.2019	MG	VV	AD	SK	New revision system updated
02	09.03.2022	SP	RD	AA	HK	New revision system updated

ABBREVIATION

CEA	Central Electricity Authority
CCE	Chief Controller of Explosive
DC	Direct Current
DGMS	Director General Mines & Safe
GI	Galvanised Iron
OISD	Oil Industries Safety Directorate
AFC	Approved For Construction
DCS	Distributed Control System
ECS	Emergency Control System
HV	High Voltage
MV	Medium Voltage

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1.0 SCOPE

1.1 This Specification covers the requirements for the field inspection, testing and commissioning of electrical equipment and installation, forming part of electrical power distribution and utilization system.

2.0 REFERENCE DOCUMENTS

2.1 The field inspection, testing and commissioning of electrical equipment shall be carried out in line with this Specification and the latest edition of following Indian Standards and OISD standards.

SP-30(BIS)	National Electrical Code
IS-7816	Guide for testing Insulation resistance of rotating machines.
IS 1255	Code of practice for installation and maintenance of power cables up to & including 33 kV rating.
IS 10810(Part 43)	Method of Test for cables; Part 43 Insulation resistance.
IS 10810(Part 45)	Method of Test for cables; Part 45 High voltage test.
OISD 137	Inspection of Electrical Equipment.
OISD 147	Inspection and safe practice during electrical installation.

2.2 In addition to the above it shall be ensured that the installation conforms to the requirements of the following as applicable:

- a. Indian Electricity Act and Rules.
- b. Regulations laid down by CEA / Electrical Inspectorate.
- c. Regulations laid down by Tariff Advisory Committee/Loss prevention council.
- d. Regulations laid down by OISD/PESO (as applicable).
- e. The petroleum rules (Ministry of Industry Government of India).
- f. Any other regulations laid down by central / state / local authorities / insurance agencies.

3.0 DEFINITIONS

For the purpose of this document, the words and expressions listed below shall have the meanings assigned to them as follows:

OWNER / COMPANY	OWNER of the particular Project (Project Specific).
CONSULTANT	The party which is doing engineering, procurement, construction, pre-commissioning and assistance for commissioning, monitors and controls the overall project management.

BIDDER / SUPPLIER / VENDOR	The party(s) which manufactures and / or supplies material, equipment, technical documents / drawings and services to perform the duties specified by Contractor.
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4.0 FIELD INSPECTION, TESTING AND COMMISSIONING

- 4.1** Contractor shall carry out complete field inspection, testing and commissioning of electrical equipment as per Inspection Test plans.
- 4.2** Before the completed installation or an addition to the existing installation is put into service, inspection / pre-commissioning checks and tests shall be carried out by contractor. In the event of defects being found out, the same shall be rectified and the installation retested as applicable.
- 4.3** The pre-commissioning inspection among other requirements shall include visual inspection, checking the workmanship of the installation, the rating of equipment, safety clearances, sizes of cables installed, conformance to the AFC document, soundness of switchgear bus connections, wiring properly dressed and labeled, sealing of unused cable entries, checking of all safety interlocks, control/interface functions as per requirement etc.
- 4.4** Visual inspection for soundness of bus bar connections of bus ducts, terminal connections of equipment/motor shall be carried out. It shall be ensured that no foreign materials are present inside bus duct and equipment terminal boxes. After the visual inspection, all the covers of terminal boxes, inspection chambers shall be refitted with gaskets, bolts & nuts as per equipment manufacturer's instructions.
- 4.5** Pre-commissioning tests shall include but not be limited to the following:
- a. Continuity test for each winding and power and control circuits.
 - b. Insulation test for each winding and power and control circuit
 - c. High voltage test for cables
 - d. Dielectric strength test on transformer oil.
 - e. Checking the correctness of wiring schemes, control circuit interlocks for intended functioning.
 - f. Verification of phase sequence.
 - g. Testing of all types of relays/releases for required operation. Testing of measuring instruments for proper functioning Earth continuity test for all circuits.
 - h. Checking of safety features for correctness of operation etc.
 - i. Checking of all wired interface contacts (analog, digital input/output contacts) for, DCS and ECS interface, at panel and equipment terminal chambers as applicable.
 - j. (Electrical contractor shall co-ordinate with other agencies involved for the above and, provide support services for checking interfaces of electrical equipment and the intended functioning)

- k. Earth resistance measurement for each earth electrode, and the earthing system as a whole.
 - l. Lighting installation shall be tested for correct illumination levels, with the fittings installed. Fittings shall be operated only with specified type of a lamp or tube.
- 4.6** After the above tests and inspection are completed, control circuits shall be tested for correct operation under all operating combinations and proved correct before applying power to main circuits.
- 4.7** Plant Communication, Fire alarm, telephone and security system shall be checked for correct operation and intended function.
- 4.8** A close visual inspection of electrical equipment in hazardous areas shall be made to ensure that equipment is suitable for the classified zone and gas group and correctly installed, with all covers, bolts, nuts and hardwares intact and there is no physical damage mark seen on the enclosure.
- 4.9** Site Acceptance Test procedure for specific equipment shall be furnished by the respective equipment Vendor. The contractor shall provide necessary assistance to the equipment Vendor to perform site acceptance testing to enable the equipment Vendor to perform the same.
- 4.10** All pre-commissioning checks and tests shall be carried-out as per the directions of Engineer in-charge. In addition to the equipment manufacturer's instructions, pre-commissioning check requirements shall also be complied. All tests shall be carried out by contractor in the presence of Consultant /Owner's representatives
- 4.11** The contractor shall bring to site all required tools, tackles, and testing instruments for carrying out field testing. Contractor shall use only calibrated measuring and test instruments and shall maintain calibration records.
- 4.12** The Insulation Resistance test values for various electrical equipment shall be as below.

4.12.1 Cables

The insulation resistance test values for cables shall be as per following table:

Rated voltage of the Cable	DC Voltage Volts	Test in	Minimum Insulation resistance in Mega ohms
Lighting and power circuit Wiring	250		1
650/1100 V grade cables	1000		1
1,900/3, 300V grade cables	1000		200
3,800/6,600V grade cables	1000		200
6,350/11,000V grade cables	5000		200
8,700/115,000V grade cables	5000		200
12,700/22 000V grade cables	5000		200
19,000/33000V grade cables	5000		200

4.12.2 HV, MV and miscellaneous switchboards

The insulation resistance test values for the switchboards shall be as per following table:

Rated voltage of the Switchboard	DC Voltage Volts	Test in	Minimum Insulation resistance in Mega ohms
33,000V	5,000		200
11,000V	5,000		200
6,600V	1,000		200
3,300	1,000		200
415V	1,000		100
240V	500		10
110V	500		10

4.12.3 Generators and motors

The insulation resistance test values for the Generators and Motors shall be as per following table:

Rated voltage of the Generators and Motors	DC Test Voltage in	Minimum Insulation resistance in Mega 40 °C
11,000V	5,000	120
6,600V	1,000	80
3,300V	1,000	50
415V	1,000	15
240V	500	12

4.12.4 Transformers

The insulation resistance test values for the Transformers shall be as per following table:

Rated Voltage of the Transformer	DC Test Volt in volts	Minimum Insulation resistance in Mega ohms at 40°C
Up to 600V	1,000	100
601 to 5000V	2,500	1,000
5001 to 15,000V	5,000	5,000
15001 to 35,000V	5,000	10,000

It shall be ensured that during insulation tests; electronic devices and components that are liable to get damaged on applied test voltage shall be disconnected from circuit. The instructions of equipment/panel manufacturer shall be followed strictly in this regard.

4.12.5 High-voltage testing

D.C. high voltage test shall be conducted as per following table on all H. V. feeder cables and also on 1100 V grade cables where straight through joints have been made.

Rated Voltage of Cable (kV)	TEST VOLTAGE (kV) BETWEEN		Duration (Minutes)	
	U_o / U*	Conductor and Metallic sheath/ Screen/Armour		Conductor to Conductor (For Unscreened Cables)
0.65/1.1		3	3	5
1.9/3.3		5	9	5
3.3/3.3		9	9	5
3.8/6.6		10.5	18	5
6.6/6.6		18	18	5
6.35/11		18	30	5
11/11		30	30	5
12.7/22		37.5	-	5
19 / 33		60	-	5

* U_o: Phase Voltage U: Line Voltage

The cable cores must be discharged on completion of DC high voltage test and cable shall be kept earthed until it is put into service.

DC test voltage for old cables shall be 1.5 times rated voltage or less depending on the age of cables, repair work or nature of jointing work carried out, etc. In any case, the test voltage shall not be less than the rated voltage.

All protective relays including thermal overload relays shall be tested by secondary injection current. Primary injection tests shall be carried out for differential protection, restricted earth fault protection at full/reduced current to ensure correctness of complete wiring.

Before energizing any equipment, 'COMMISSIONING CLEARANCE FORM' as per standard format shall be, duly filed in by contractor and submitted to Consultant / Owner.

It shall be ensured that the electrical inspectorate approval is available before energizing the equipment.

5.0 RECORDS

Contractor shall keep up-to-date records of all activities carried out and test results. Field inspection / test reports shall be submitted to Consultant / Owner by the contract in bound volume (triplicate copies).



ENERGISING QUALITY

VCS QUALITY SERVICES PRIVATE LIMITED

DATA SHEET FOR SERVO CONTROLLED STABILIZER

VCS – DS – EL - 096

00	18.01.2021	ISSUED AS STANDARD	MG	RD	AD	SK
Rev. No	Date	Purpose	Prepared By	Checked By	Approved By	Approved By



Specification: Oil Filled Servo Voltage Stabilizer Copper Wound Outdoor Type

Rated Capacity	_____KVA Note: Separate datasheet to be filled up for each rating of stabilizer (60kVA & 300 kVA)
Input Voltage Range	320-500V AC Phase voltage 3Ph 50Hz, UNBALANCED SUPPLY
Output Voltage Ranges	415V +/- 1% (Adjustable between 390V-420V)
Load Power Factor	0.80
Control Power Supply	<i>External control supply will not be made available.</i>
Cooling	Oil /Air Cooled
Control Type	Digital Microcontroller Based. Each phase to be separately controlled to provide balanced output voltages
Ambient temperature	45°C
Temperature Rise (max):	45°C Above ambient temp.
Voltage Correction	Step less with no overshooting or hunting during automatic operation.
Correction Speed	60 V/Sec or better
Output Voltage Regulation	+/-1% from No-load to Full-load.
Winding	Copper wound vacuum impregnated
Location/Mounting	Outdoor/floor mounting.
Trip and Restart	Auto System
Overload Capacity	200% for 20 seconds
Protection/Switching	<ul style="list-style-type: none"> • Input and Output MCCB with O/L and S/C protection • Manual Bypass with contactor • High/Low input voltage cut-off • Protection against phase failure/phase reversal.
Duty Cycle	100% Continuous
Frequency	50 Hz
Waveform Distortion	Nil
Effect of Load PF	Nil
Mounting	On Unidirectional Wheel
Audio-Visual Alarm	For tripping condition
Reset	Manual / Auto reset with time delay and programmable
Transient Suppression	Above 270 V 1ph & 450 V 3ph
System	Unbalanced 4 wire R Y B N
Connection	Star
System Construction	As per IS:9815-1994
Terminations	As per IS:3347



**DATA SHEET
FOR
SERVO CONTROLLED STABILIZER**

**DOCNO: VCS-DS-EL-096
Rev No : 00**

ENERGISING QUALITY

Efficiency	Above 98%
Environment	For outdoor Continuous Operation
Provision for Cabling	Input and output terminations with provisions for fixing Cable Glands
Start	Manual and Auto start facility
Response time	Less than 100ms
Earthing	With Earthing terminals
Digital Metering Display Type:	Following shall be provided for input and output: A. Input phase to neutral. B. Input phase to phase. C. Output phase to neutral. D. Output phase to phase. E. Load current in all phases. F. Frequency. G. Indicating Lamps
Insulation	Class F
Testing	Voltage stabilizer shall be tested at site for 6 hours with available voltage and the load
Guaranteed/warranty	Stabilizer shall carry a guaranty/warranty of 24 months from the date of installation, against manufacturing defects.

Other Required Features:

- 1) Electronic over and under voltage trip with time delay for input and output.
- 2) Electronic overload protection and Short circuit protection through MCB/MCCB (35kA).
- 3) Manual Bypass arrangement. By means of On load changeover switch
- 4) Phase reversal protection and Cut off.
- 5) Single Phase Prevention and Cut off.
- 6) Neutral failure protection.
- 7) Frequency cut-off protection.
- 8) Earth neutral voltage cut-off protection.
- 9) Including first filling of cooling oil.
- 10) Compatible to Generator Supply.
- 11) Supplier should undertake to support the product for a minimum period of 5 years (post-warranty).
- 12) **Pre Dispatch/Installation Inspection:** The designated officials of VCS/Client will inspect the stabilizer to their satisfaction before actual supply of the product.

Acceptance Test Requirements

- Acceptance Tests as per conditions mentioned in Clause 11.15 of IS 9815(Part-1) /1994 (Reaffirmed 2004).
- Servo motors, auto transformer, MCB, MCCB & meters etc fitted should be of approved make and meters should be of accuracy class-1.5 .
- Out put voltage test shall be done by direct loading for ratings up to 5 KVA. For ratings above 5KVA impedance voltage shall be measured by short circuiting the out put terminals and full load current shall be passed through the short circuited out put and corresponding input voltage shall be measured as impedance voltage(variac of servo LVC shall be at the minimum input voltage position of SLVC).Output voltage shall be checked at no load with an input voltage = minimum of input voltage range of servo



**DATA SHEET
FOR
SERVO CONTROLLED STABILIZER**

**DOCNO: VCS-DS-EL-096
Rev No : 00**

ENERGISING QUALITY

LVC - impedance voltage , and the out put voltage obtained shall be with in specified limits.

TECHNICAL COMPLIANCE STATEMENT TO BE FILLED IN BY THE VENDOR

TECHNICAL REQUIREMENTS	COMPLIED YES/NO
Rated Capacity	_____ KVA Note: Separate datasheet to be filled up for each rating of stabilizers (60kVA & 300kVA)
Input Voltage Range	320-500V AC Phase voltage 3Ph 50Hz, UNBALANCED SUPPLY
Output Voltage Ranges	415V +/- 1%(Adjustable between 390V-420V)
Load Power Factor	0.80
Cooling	Oil/Air Cooled
Control Type	Digital Microcontroller Based. Each phase to be separately controlled to provide balanced output voltages
Ambient temperature	45°C
Temperature Rise (max):	45°C Above ambient temp.
Voltage Correction	Step less with no overshooting or hunting during automatic operation.
Correction Speed	60 V/Sec or better
Output Voltage Regulation	+/-1% from No-load to Full-load.
Winding	Copper wound vacuum impregnated
Mounting	Outdoor floor mounting.
Trip and Restart	Auto System
Overload Capacity	120%
Protection/Switching	<ul style="list-style-type: none"> • Input and Output MCCB with O/L and S/C protection • Bypass with contactor • High/Low input voltage cut-off • Protection against phase failure/phase reversal.
Duty Cycle	100% Continuous
Frequency	50 Hz
Waveform Distortion	Nil
Effect of Load PF	Nil
Mounting	On Unidirectional Wheel
Audio-Visual Alarm	For tripping condition
Reset	Manual / Auto reset with time delay and programmable
Transient Suppression	Above 270 V 1ph & 450 V 3ph
Connection	Star



**DATA SHEET
FOR
SERVO CONTROLLED STABILIZER**

**DOCNO: VCS-DS-EL-096
Rev No : 00**

ENERGISING QUALITY

System Construction	As per IS:9815-1994	
Terminations	As per IS:3347	
Efficiency	Above 98%	
Environment	For Outdoor Continuous Operation	
Provision for Cabling	Input and output terminations with provisions for fixing Cable Glands	
Start :	Manual and Auto start facility	
Response time	Less than 100ms	
Earthing	With Earthing terminals	
Digital Metering Display Type:	Following shall be provided for input and output: H. Input phase to neutral. I. Input phase to phase. J. Output phase to neutral. K. Output phase to phase. L. Load current in all phases. M. Frequency. N. Indicating Lamps	
Insulation	Class F	
Testing	Voltage stabilizer shall be tested at site for 6 hours with available voltage and the load	
Guaranteed/warranty	Stabilizer shall carry a guaranty/warranty of 24 months from the date of installation, against manufacturing defects.	

Signature & Seal of the Supplier



Energising Quality

STANDARD DATASHEET
FOR UNINTERRUPTED POWER SUPPLY

DOC NO: VCS-SS-EL-4031
Rev. No : 02



Energising Quality

VCS Quality Services Pvt Ltd

**STANDARD DATASHEET
FOR
UNINTERRUPTED POWER SUPPLY

VCS-SS-EL-4031**

		<i>Henry Paday</i>		<i>Henry Paday</i>	<i>Henry Paday</i>
02	05.03.2022	SP	RD	AA	HK
01	16.10.2019	MG	VV	AD	SK
00	05.07.2017	MG	RD	AD	SK
Rev. No	Date	Prepared By	Checked By	Approved By	Authorized By

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CONTROLLED COPY	:	If in soft and signed



Energising Quality

STANDARD DATASHEET
FOR UNINTERRUPTED POWER SUPPLY

DOC NO: VCS-SS-EL-4031
Rev. No : 02

PURCHASER'S DATA FOR UPS		
1. INPUT POWER SUPPLY		
1.1.	Voltage/freq./ phase:	415 V (+) 10% & (-) 15%, TPN, 50 Hz \pm 5% with healthy Phase selector switch
1.2.	System fault level	10 kA for 1 Sec
2. SITE CONDITION		
2.1.	Design Maximum / Minimum temperature	50 ^o C/2 ^o C
2.2.	Max. Relative Humidity	95%
2.3.	Altitude	Below 1000.0 MM SL
3. OUT PUT REQUIREMENT		
3.1.	Voltage/ Phase	230V \pm 1% AC, Single phase 2 wire
3.2.	Output waveform & frequency	Pure Sinusoidal Wave
		50 Hz \pm 0.1%
		Voltage distortion (THD): Less than 3% for linear loads & Less than 5% for non-linear loads.
4. SYSTEM REQUIREMENTS		
4.1.	Rating KVA	2 kVA
4.2.	Type of inverter	The inverter circuit should be IGBT based, fully microprocessor controlled with PWM Technology or Latest proven technology
4.3.	Overload capacity	125% of the rated output for 10 minutes & 150% for 1 minute.
4.4.	Mode of operation	Single Online UPS With Bypass
4.5.	Inverter efficiency	>85% at 100% of load and >80% at 25% of load
4.6.	Installation	Floor Mounted
4.7.	Type of enclosure	Minimum IP-42
4.8.	External Cable Connection	From Bottom
4.9.	Internal protection	All live parts shrouded
4.10.	Earthing	Doubly Earthed (Two distinct terminals to be made available)
4.11.	Cooling	Forced ventilation with fans



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4.12.	Noise Level	<ul style="list-style-type: none"> <65 dB at full Load from 1 mtr distance (for UPS of rating 5kVA, 7.5kVA & 10kVA) <75 dB at full Load from 1 mtr distance (for UPS of rating 15kVA & 20kVA)
4.13.	Crest Factor	≥3:1
4.14.	Input Power Factor	> 0.95
4.15.	Load Power Factor	0.8 (with variation between 0.6 to 1.0)
4.16.	Overall efficiency	> 80%
4.17.	Harmonics	As per IEEE 519 (Total demand distortion not more than 5.0%)
5. Rectifier/Charger		
5.1.	Input voltage	230V AC single phase (voltage range-160V AC to 270V AC) (As per SOR).
5.2.	Automatic phase selection device	As per SOR
5.3.	Output DC voltage/Load	As per Manufacturer Design
5.4.	Input Power factor	> 0.95 at rated load
5.5.	Input current THD (Total Harmonic Distortion) at nominal load	≤ 5 %
5.6.	Overload Capability	125% minimum for 10 min. 150% minimum for 1 min
5.7.	Inrush current	Limited by soft-start circuit
5.8.	Output voltage tolerance	+/- 1%
5.9.	DC voltage ripple	<1% With battery connected <2% Without battery connected
5.10.	Rectifier	IGBT based
5.11.	Filter	Input side line filter
5.12.	Harmonics	As per IEEE-519 (Voltage THD <5%, largest single voltage harmonics <3%, Input Current THDi <5%)
5.13.	Charging	Automatic Float and Boost charging (selection as per battery charging state (voltage level))
6. Bypass		
6.1.	Manual/Maintenance Bypass	Shall be provided



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6.2.	Overload on bypass	125% minimum for 10 min. 150% minimum for 1 min.
7. Battery Bank		
7.1.	Type of Battery	SMF VRLA Battery
7.2.	Battery Arrangement	1x100%
	Battery end cell voltage	As per specification
	Battery stand formation	As per vendor standard
	Battery backup time	As per SOR
	De-rating factor	(i) Ageing -- 0.8 (ii) State of Charge -- 0.88 (iii) Temp. Correction -- 0.95 The rectifier/charger output current & voltage shall be limited to the battery supplier's recommendation
8. Alarms, Indications and LCD Display		
8.1.	Single line Power Flow Diagram (Mimic diagram) with LED indications of UPS status (i.e. Mains present, Battery charging & discharging, Low battery Voltage and unit on bypass).	
8.2.	Digital panel Meter with LCD display (touch screen / touch pad) shall be provided for monitoring viz.	a) Input AC Voltage, current, frequency b) Output AC Voltage, current, frequency. c) Battery current and voltage d) Total run time e) Mains ON/OFF/TRIP, Mains Over/Under voltage, Phase fail f) Inverter ON/OFF, Inverter Over/Under voltage, inverter overload, over heat & load in % on inverter. g) Battery voltage low, Battery AH in % h) Battery Operation Boost Charge, Float Charge with of status - "in charge" or "discharge" i) Load on bypass or inverter. Detailed UPS Status with Operation/faults history
8.3.	Audible Alarms With LCD play-	a) Mains Failure b) Battery Low c) UPS fault (Continuous) d) Inverter Under-voltage e) Over Temperature (Continuous) f) Inverter Overload (Continuous)
9. Protective Features		
9.1.	Input	Mains Over voltage, under voltage, phase failure



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9.2.	Inverter	Over voltage, short circuit, overload, over temperature
9.3.	Battery	Under voltage at battery terminal, Battery over charge, Battery Over current
9.4.	Rectifier & Battery charger	Maximum current limiting Over temp. Trip Boost charging and float charging current limiting with backup protection against overcharging.
10. Distribution boxes		
10.1.	Distribution Board Details	(As per tender drawings) (1)ACDB 230V, Single Phase (1 No.): Incomer: 32A MCB (As per UPS capacity 2KVA. Outgoing: As per SOR/ Block Diagram. (The rating of above-mentioned feeders may change during detail engineering; Bidder shall provide all required feeders as per requirement without any financial implications.)
11.	UPS communication	Ethernet / preferably Modbus RS 485 (To be decided during detailed engineering)
12.	Selector switch	For Auto manual switch for Float and boost selection



TECHNICAL DATA FROM MANUFACTURER (To be filled up by the Tenderer)		
1.	INVERTER	
1.1.	Manufacturer's Model No. (Enclose catalogue)	
1.2.	Rating (at specified ambient) / no. of phases	
1.3.	Applicable codes/standards	
1.4.	Steady state output volt/freq (230 V \pm 1%) (50 Hz \pm 0.1%)	
1.5.	Input voltage - DC	
1.6.	Synchronization (inv. phase locked with main) inpercentage	
1.7.	Synchronization manually adjustable in steps of	
1.8.	Deleted	
1.9.	Harmonics distortion for linear & non-linear loads	
1.10.	Mode of operation	Single Online UPS with static bypass as specified in Block diagram.
1.11.	Deleted	
1.12.	Recovery time to reach steady state after abovedisturbance (not more than 100m Sec)	
1.13.	Overload capacity (125% minimum for 10 min. 150% minimum for 1 min.)	
1.14.	Short circuit capacity and duration (in % and msec.)	
1.15.	Noise Level (dB at 1 m) <ul style="list-style-type: none"> • <65 dB at full Load from 1 mtr distance (for UPS of rating 5kVA, 7.5kVA & 10kVA) • <75 dB at full Load from 1 mtr distance (for UPS of rating 15kVA & 20kVA) 	
1.16.	Type of control circuit	
1.17.	Output voltage & phase angle (for 3 Phase only)	



	a) For 30% unbalance load b) For 40% unbalance load c) For 50% unbalance load d) For 100% unbalance load	
1.18.	Crest Factors	
2. BATTERY CHARGER		
2.1.	Rating (Amp.) / MAKE (Enclose back up calculation).	
2.2.	Type of charger (Basic configuration)	
2.3.	Output volt under float/boost charging condition	
2.4.	Volt. Accuracy under specified input ($\pm 1\%$)	
2.5.	Max. Ripple content on DC side (% RMS) (notmore than 2% without battery & 1% with batteryconnected)	
2.6.	Efficiency at 100%/75%/50 % of load	
2.7.	Mode of Change over from float to boost and vice-versa	
3. BATTERY		
3.1.	Make	
3.2.	Type (Enclose catalogue)	
3.3.	AH rating (Enclose back up calculation)	
3.4.	End cell voltage at specified discharge rate (V/cell)	
3.5.	Output (Nominal) volts	
3.6.	Nos. of battery banks	
3.7.	Nos. of cells in each banks	
3.8.	Battery charging requirements (V/ cell) (iv) Volts/Cell/Nominal (v) Float Boost	
3.9.	Voltage variation from fully charged battery todischarged battery (volts)	
3.10.	Charging time (Hrs.)	
3.11.	Max. Permissible ripple content (% RMS)	
3.12.	Overall dimension (L*W*H)	
3.13.	Container type	
3.14.	Accessories for battery as per specification included	Cell testing Voltmeter, Pair of Gloves, Insulated Spanner, ExtraElectrolyte, Hydrometer, Thermometer etc.



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3.15.	Type/Formation of battery stand	
4. MANUAL TRANSFER DEVICES		
4.1.	Rating (Amp.).	
4.2.	Make/Type	
5. AC DISTRIBUTION BOARD		
5.1.	Nos. of feeder/rating	
5.2.	Cable entry from (Bottom)	
5.3.	Max. Rating of outgoing feeders possible for fault clearance by UPS with and without supply back up (as percentage of UPS rating) not less than 25% a) With fast acting semi conducting fuses	
6. Indications and Alarm		
7. Metering		
8.	UPS Dimension (L x W x H) except Battery: (Including inverter, charger, rectifier, bypass stabilizer, ACDB etc.)	
9.	OVERALL EFFICIENCY OF UPS SYSTEM	
9.1.	Ratio of output load to input drawn from mains when inverters are on and synchronized with bypass. a) At 100% load a) At 75% load b) At 50% load	
10.	RELIABILITY a) Safety factor used for selecting electronic components/ other electrical components (not less than 200%/ 125% respectively) b) MTBF / MTFR c) Availability factor	
11.	DEGREE OF PROTECTION OF THE PANEL	
12.	Heat loss for total system (W)	
13.	Potential free contracts (for duplicating of fault status in remote panel).	
14.	Fault status shall be compatible to hook-up with Owner's PC through Ethernet/ preferably RS 485 interface (To be decided during detailed engineering).	

CHECK LIST (To be submit along with Datasheets)


Sl. No	Description	REMARKS
1.	Deviation from specification	
2.	Charger sizing calculation enclosed	
3.	Battery sizing calculation enclosed	
4.	Battery catalogue enclosed	
5.	UPS Panel Catalogue enclosed	
6.	Confirm compliance to Block diagram	
7.	Confirm Inspection for UPS and battery as per specification	
8.	Dimension for UPS Panel, rectifier and Battery Bank enclosed.	
9.	Break up for two years operation & maintenance spares enclosed for UPS & Rectifier	

LIST OF TWO-YEAR OPERATION & MAINTENANCE SPARES

Sl No.	Description	UoM	Quantity
1.	IGBT (2 KVA)	Sets	1
2.	Rectifier/ Charger Card*	Sets	1
3.	Inverter Card*	Sets	1
4.	Power supply card*	Sets	1
5.	DC-DC Converter card*	Sets	1
6.	MCB's & MCCB's (consist of one no.of each rating MCB & MCCB) **	Sets	2
7.	Fuse of all ratings**	Sets	2
8.	Cooling fan	Nos.	2

Note: Prices of 02-year O&M spares are inclusive of prices quoted by the Bidder.

1. * 1 Set=One of card of each rating/type
2. ** 1 Set= 10% of each rating (minimum one number)

 Energising Quality	CONTRACTOR	QUALITY ASSURANCE PLAN FOR ELECTRICAL ITEMS	CLIENT:	HOGPL
	ORDER NO. & DATE		PROJECT:	City Gas Distribution Project
	SUB-CONTRACTOR		PACKAGE NO.	
	ORDER NO. & DATE		PACKAGE NAME	Electrical WORKS

INSTRUCTIONS FOR FILLING UP : 1. A separate QAP should be submitted for each piece of equipment, detailing the assembly, sub-assembly, and part/component breakdown, or for a group of equipment with the same specifications. 2. Use the specified numerical codes to indicate the extent of inspections, tests, and the submission of test certificates and documents. Additional codes and descriptions may be included as required for the plant and equipment. 3. When equipment with the same specifications is grouped together but belongs to different facilities, a unique identification number and quantity should be specified for each piece of equipment. 4. The weight in tonnes (T) must be noted in column 5 for each item. If actual weights are unavailable, estimated weights should be provided.	CODES FOR EXTENT OF INSPECTION, TESTS, TEST CERTIFICATES & DOCUMENTS: <table border="1" style="width: 100%;"> <tr> <th style="width: 25%;">Description</th> <th style="width: 25%;">Description</th> <th style="width: 25%;">Description</th> <th style="width: 25%;">DOCUMENTS</th> </tr> <tr> <td>1. Dimensional</td> <td>8. Type test as per relevant IS/& other standard</td> <td>17. Tank Pressure Test</td> <td>D1. Approved GA drawings</td> </tr> <tr> <td>2. Visual</td> <td>9. Impulse Test</td> <td>18. Short time rating</td> <td>D2. Approved single line/ schematic diagram</td> </tr> <tr> <td>3. Physical Test (Sample)</td> <td>10. Partial Discharge Test</td> <td>19. Operational & functional check</td> <td>D3. Approved data sheet</td> </tr> <tr> <td>4. Fitment & Alignment</td> <td>11. Heat run rise test/tempr</td> <td>20. Over Speed Test</td> <td>D4. Approved bill of materials</td> </tr> <tr> <td>5. Measurement of IR Value A) Before HV Test B) After HV Test</td> <td>12. Enclosure Protection Test</td> <td>21. Flame Proof Marking/ Labelling</td> <td>D5. Unpriced P.O. copy</td> </tr> <tr> <td>6. High Voltage test/Dielectric test</td> <td>13. Calibration</td> <td>22. Clearance and creepage Distance</td> <td>D6. Calibration Certificate of all measuring instruments and gauges</td> </tr> <tr> <td>7. Routine test as per relevant IS & other standard</td> <td>14. Noise & Vibration</td> <td>23. Acceptance Test</td> <td></td> </tr> <tr> <td></td> <td>15. Paint shade verification</td> <td>24. Harmonics measurement</td> <td></td> </tr> <tr> <td></td> <td>16. Test certificates for bought out components</td> <td></td> <td></td> </tr> </table>	Description	Description	Description	DOCUMENTS	1. Dimensional	8. Type test as per relevant IS/& other standard	17. Tank Pressure Test	D1. Approved GA drawings	2. Visual	9. Impulse Test	18. Short time rating	D2. Approved single line/ schematic diagram	3. Physical Test (Sample)	10. Partial Discharge Test	19. Operational & functional check	D3. Approved data sheet	4. Fitment & Alignment	11. Heat run rise test/tempr	20. Over Speed Test	D4. Approved bill of materials	5. Measurement of IR Value A) Before HV Test B) After HV Test	12. Enclosure Protection Test	21. Flame Proof Marking/ Labelling	D5. Unpriced P.O. copy	6. High Voltage test/Dielectric test	13. Calibration	22. Clearance and creepage Distance	D6. Calibration Certificate of all measuring instruments and gauges	7. Routine test as per relevant IS & other standard	14. Noise & Vibration	23. Acceptance Test			15. Paint shade verification	24. Harmonics measurement			16. Test certificates for bought out components		
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ABBREVIATIONS USED : CONTR CONTRACTOR MFR MANUFACTURER																																									

Sl. No.	Description (With equipment heading, place of use, and Brief Specifications)	Identification No.	Quantity		Manufacturer's Name and Address	Expected schedule of Final Inspection	INSPECTION AND TESTS						Test Certificates & documents to be submitted to V C S	Acceptance Criteria Standards /IS/ BS/ASME/ Norms and Documents	REMARKS / SAMPLING PLAN	
			No/M	T			Raw Material and in-process stage inspection			Final Inspection/Test by						
							MFR	CONTR	V C S	MFR	CONTR/ TPI	V C S/ CLIENT				
1.	Main Electric Distribution Board		Set				1,2,3,4,19,22	-	-		1,2,4,7,15, 19,22	1,2,4,7,15, 19,22	1,2,4,7,15, 19,22	D1, D2, D3, D4, D5, D6, 16, 7,8*,11	Tech. Specification, Approved Drawings & Data Sheets, IS, Test certificates	8* for similar rating
2.	LT Power and Control Cable		Mt.				-	-	-		2,5,6,7,8, 23	1,2,5,6,7, 23	IWC	7,8,23 D3, D5, D6,	Tech. Specification, Approved Drawings & Data Sheets, IS, Test certificates	8* for similar rating. Inspection to be done by TPI
3.	Distribution Transformer and Servo Stabilizer.		No.				1,2,3,4, 17,22	-	-		1,2,5,6, 7	1,2,5,6,7,15 22	1,2,5,6,7 15,19,22	7,8,16 D3, D5, D6	Tech. Specification, Approved Drawings & Data Sheets, IS, Test certificates	8* for similar rating. Inspection to be done by TPI
4.	UPS-System		No				1,2,3,4, 19,22	-	-		1,2,4,7, 15,19,22	1,2,4,7,15, 18,19,22	1,2,4,5,6 7,11,15, 18,19,22, 23,24	D1, D2, D3, D4, D5, D6, 16, 7,8*,11	Tech. Specification, Approved Drawings & Data Sheets, IS, Test certificates	11* Heat Run test upto temp stability.

5.	Battery Set-UPS		Set			1,2,3,4, 19,22	-	-	1,2,4,7, 8,23	1,2,23	IWC	D1, D3, D4, D5, D6, 7,8	Tech. Specification, Approved Drawings & Data Sheets, IS, Test certificates	7,8 Document to be reviewed by V C S
6.	Gas/DG Set & AMF Panel		Set			1,2,3,4, 19,22,23	-	-	1,2,4,7, 11,19	1,2,4,7, 11,19	1,2,4,5, 6,7, 11,15,19	D1,D2,D3,D4, D5,D6, 16,7,8	Tech. Specification, Approved Drawings & Data Sheets	11 is applicable for Gas Gen Set only.

SOLAR SYSTEM

7.	Solar Array with complete hardware (PV Modules, JBS, Mounting Structure, Cables etc)		Set			1,2,3,4, 24, 27	-	-	1,2,3,12, 13, 29	1,2,3,12, 28, 29	IWC	D1, D2, D3, D4, D5, D6, 20, 12,13,17,29	Tech. Specification, Approved Drawings, IEC: 61215 & 60904 & Data Sheets	12, 13 Document to be reviewed by V C S
8.	Solar charge controller/Grid Charger/ Inverter/ PCU		Set			1,2,3,4, 24, 27			1,2,3,12, 16, 22, 23,24,27	1,2,3,12, 16, 22, 23,24,27	1,2,3,12, 16, 22, 23,24,27,	D1, D2, D3, D4, D5, D6, 20, 12,13	Tech. Specification, Approved Drawings & Data Sheets	(*) 12 hour heat run test 12, 13 Document to be reviewed by V C S
9.	Battery Set-Solar system		Set			1,2,3,4, 24,27	-	-	1,2,3,12, 13	1,2,28	IWC	D1, D3, D4, D5, D6, 12,13,20	Tech. Specification, Approved Drawings & Data Sheets Test certificates	12, 13 Document to be reviewed by V C S

For Manufacturer (Stamp & Signature) <div style="border: 1px solid black; width: 50px; height: 30px; margin: 10px auto;"></div>	For CONTR (Stamp & Signature) <div style="border: 1px solid black; width: 50px; height: 30px; margin: 10px auto;"></div>	For V C S (Stamp & Signature) <div style="border: 1px solid black; width: 50px; height: 30px; margin: 10px auto;"></div>	<table border="1" style="width: 100%;"> <tr> <td colspan="2" style="text-align: center;">Q.A.P. NO.</td> </tr> <tr> <td colspan="2" style="text-align: center;">VCS/EL/HOGPL/QAP/01</td> </tr> <tr> <td style="text-align: center;">SHEET 1</td> <td style="text-align: center;">OF 1 R-0</td> </tr> </table>	Q.A.P. NO.		VCS/EL/HOGPL/QAP/01		SHEET 1	OF 1 R-0
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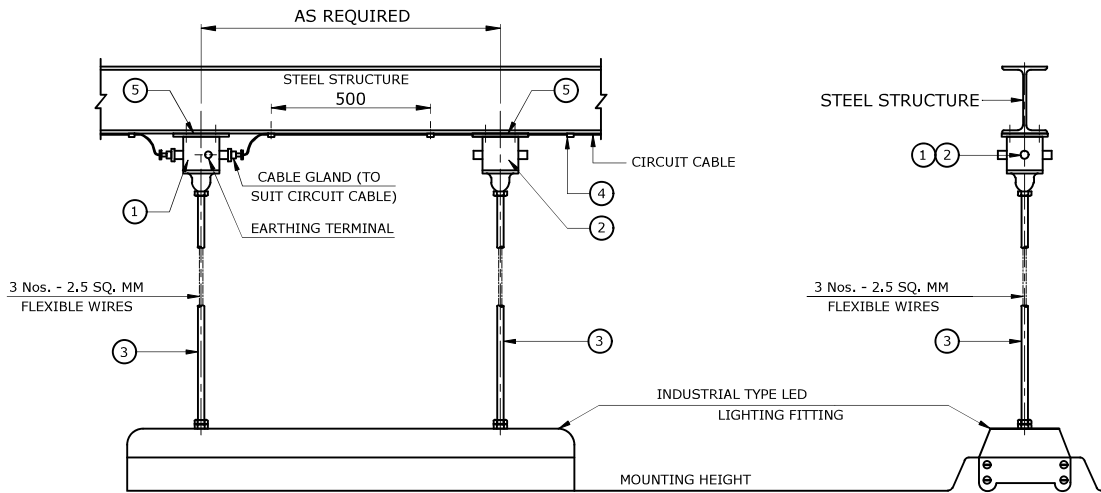
IWC- shall be issued based on TPI's IRN, Inspection Reports & other test reports.



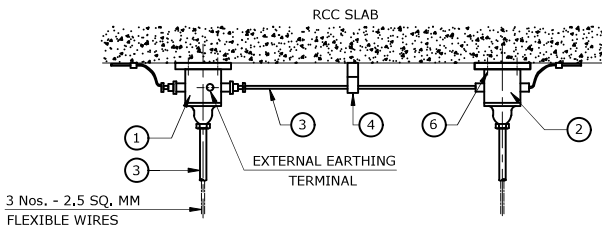
GENERAL NOTES:

1. ENTIRE ELECTRICAL INSTALLATION SHALL BE CARRIED OUT STRICTLY IN ACCORDANCE WITH THE ELECTRICALLY RULES, OISD REGULATION ISI CODES, FIRE INSURANCE AND OTHER APPLICABLE CODES AND REGULATIONS.
2. EXCEPT AS SPECIFICALLY APPROVED BY THE CLIENT/CONSULTANT AT SITE INSTALLATION OF LIGHTING FITTING SHALL BE TAKEN ONLY AFTER ALL MAJOR SERVICE SUCH AS EQUIPMENT ERECTION, PIPING ETC. IN THAT PARTICULAR AREA HAVE BEEN COMPLETED.
3. ALL CABLES FROM LIGHTING PANEL TO LIGHTING FITTING SHALL BE IDENTIFIED WITH STAINLESS STEEL STRIP TAGS GIVING CIRCUIT REFERENCE NUMBER.
4. WIRING TO LIGHTING FITTING INSIDE PLANT AREA SHALL BE CARRIED OUT BY NEANS OF 3c x 2.5 SQ. MM YWY CABLES. FOR EARTHING OF LIGHTING FITTING AND JUNCTION BOX THIRD CORE SHALL BE USED.
5. GENERALLY IN PLANT AREA, THE LIGHTING FITTING SHALL BE DIRECTLY CONTROLLED FROM NINIATURE CIRCUIT BREAKERS PROVIDED IN THE LIGHTING DISTRIBUTION BOARD. HOWEVER, LOCAL CONTROL SWITCHES SHALL BE PROVIDED WHEREVER NECESSARY. i.e. FOR CONTROLLING LIGHTING FITTINGS IN TOILET BLOCK/OFFICE/STORE ROOM/SUB-STATION/CABLE CELLAR ENTRANCE ETC.
6. EXCEPT AS NOTED, MOUNTING HEIGHT OF BOTTOM LINE OF VARIOUS EQUIPMENT FROM FINISHED FLOOR LEVEL SHALL BE AS FOLLOWS:
 - A) SUB-LIGHTING DISTRIBUTION BOARD : 1200mm
 - B) LIGHTING CONTROL SWITCHES : 1200mm
 - C) RECEPTACLE WITH SWITCH : 800mm
7. EXCEPT AS SPECIFIED, CABLES FOR STREET LIGHTING SHALL BE DIRECTLY BURIED IN GROUND OR ROUTED IN CABLE TRENCH/DUCTS AS THE CASE MAY BE.
8. LIGHTING CABLES SHALL BE TAKEN THROUGH HIME PIPE BURIED IN GROUND AT SUITABLE DEPTH AT ALL ROAD CROSSING.
9. SINGLE PHASE SWITCHED SOCKET OUTLETS INCLUDING 10A & ABOVE SHALL BE FED AND CONTROLLED FROM PANEL (PP).
10. LIGHTING WIRING IN CONDUIT SHALL BE CARRIED OUT BY USING 19/25mm DIA. HEAVY GAUGE STEEL RIGID CONDUIT AND COPPER CONDUCTOR PVC FLEXIBLE WIRE SHALL BE USED :
 - A) LIGHTING FITTING & 6/16 AMPS. COMMERCIAL TYPE SWITCHED : 2.5 SQ.MM
 - B) 16/32A METAL CLAD INDUSTRIAL SWITCH SOCKET OUTLETS : 4.0 SQ.MM
 - C) FOLLOWING COLOUR WIRE SHALL BE USED :
 1. FOR 'R' PHASE : RED COLOUR COPPER CONDUCTOR PVC FLEXIBLE WIRE
 2. FOR 'Y' PHASE : YELLOW COLOUR COPPER CONDUCTOR PVC FLEXIBLE WIRE
 3. FOR 'B' PHASE : BLUE COLOUR COPPER CONDUCTOR PVC FLEXIBLE WIRE
 4. FOR 'N' PHASE : BLACK COLOUR COPPER CONDUCTOR PVC FLEXIBLE WIRE
 5. FOR EARTH : GREEN COLOUR 1.5 SQ. MM COPPER CONDUCTOR PVC FLEXIBLE WIRE
12. ALL SITE FABRICATED STEEL ASSEMBLIES SHALL BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT AND TWO COATS OF EPOXY PAINTS.
13. ALL HARDWARE SHALL BE OF STAINLESS STEEL.

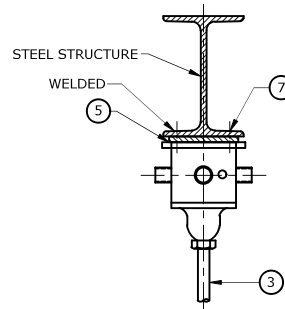
02	29.01.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



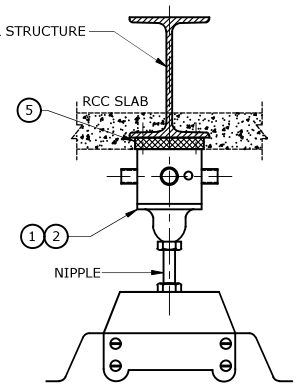
TYPICAL MOUNTING ARRANGEMENT OF LED LIGHTING FITTING ON STRUCTURE STEEL & WIRING WITH PVC INSULATED CABLE MOUNTING TYPE : SM1



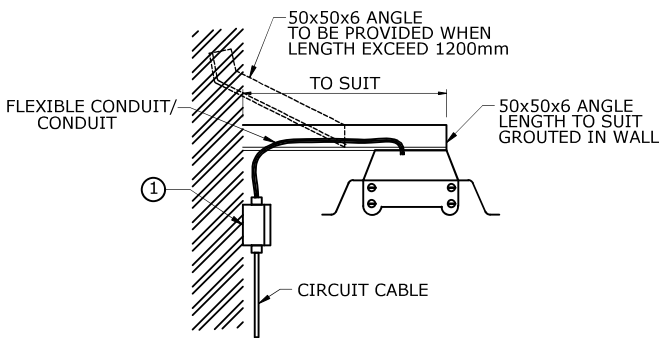
TYPICAL MOUNTING ARRANGEMENT OF LED LIGHTING FITTING ON R.C.C. SLAB & CONDUIT WIRING



TYPICAL MOUNTING DETAILS OF J.B. ON STRUCTURAL STEEL



MOUNTING TYPE : CM1

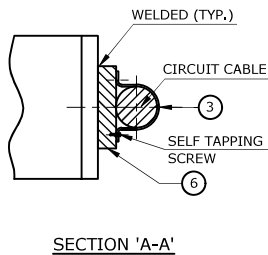
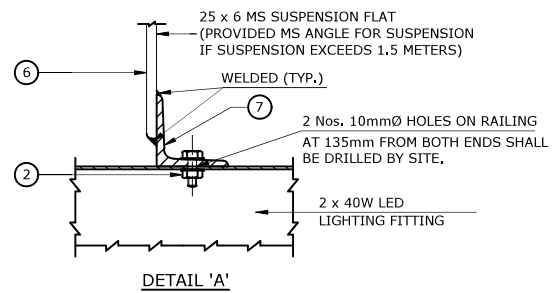
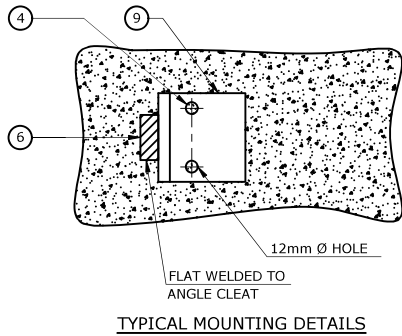
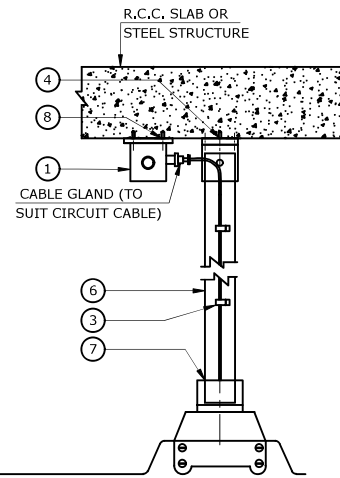
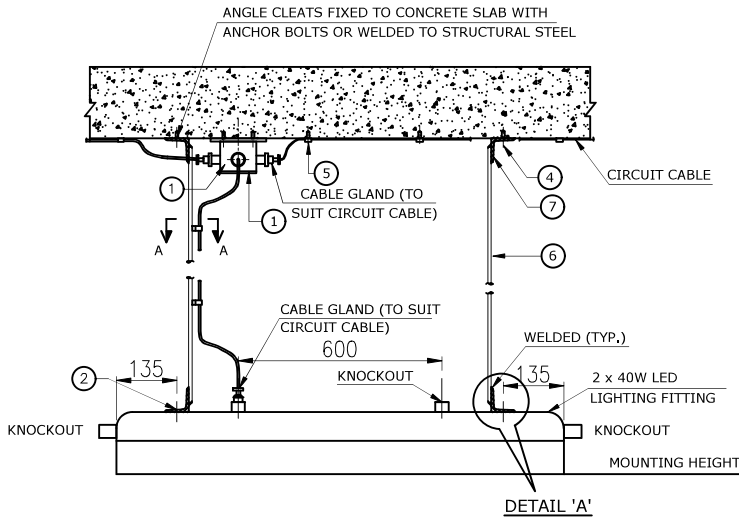


BRACKET MOUNTING ON WALL/COLUMN MTG. TYPE : BM1

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	JUNCTION BOX WITH COME COVEER, BALL & SOCKET WITH TERMINAL BLOCK.	1 NO.	
2	DUMMY JUCTION BOX WITH DOME COVER, BALL & SOCKET WITHOUT TERMINAL BLOCK.	1 NO.	
3	19mm Ø HEAVY GAUGE CONDUIT WITH BOTH END CHECK NUTS LENGTH TO SUIT MOUNTING HEIGHT (MAXIMUM LENGTH 2 Mtrs.)	2 NOS.	
4	G.I. SADDLE/CLEAT ALONG WITH SUITABLE SIZE OF FIXING SCREW TO SUIT FOR CIRCUIT CABLE/CONDUIT.	AS REQUIRED	
5	25 x 6 THK, M.S, FLAT 200mm LONG FOR JUNCTION BOX MOUNTING ON STEEL STRUCTURE.	2 NOS.	
6	COUNTER SUNK SCREW WITH RAWAL PLUG FOR RCC SLAB OR SELF TAPPING COUNTER SUNK SCREW FOR STEEL STRUCTURE.	4 NOS.	
7	SELF TAPPING SCREW WITH WASHER FOR FIXING OF JUNCTION BOX ON 25 x 6mm MS FLAT.	AS REQUIRED	

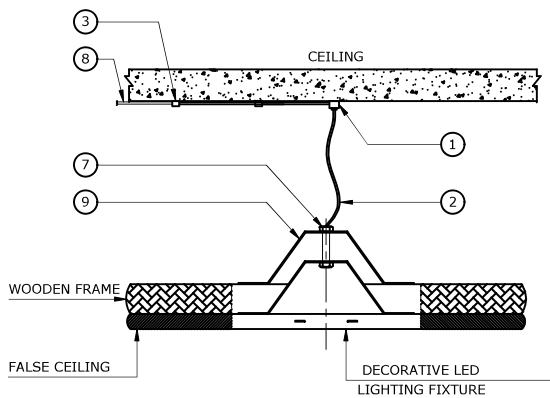
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01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



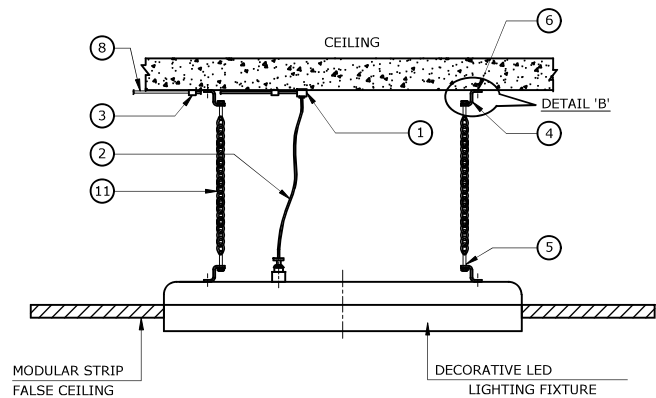
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	4WAY-100mm DIA ROUND JUNCTION BOX WITH TERMINAL BLOCK.	1 NO.	
2	M8-40mm LONG BOLT WITH NUT AND PLAIN WASHER	2 NOS.	
3	G.I. SADDLE/CLEAT ALONG WITH SUITABLE SIZE OF FIXING SCREW & NUT TO SUIT FOR CIRCUIT CABLE.	AS REQUIRED	
4	M10-68mm LONG ANCHOR STUD WITH BOLT & PLAIN WASHER	4 NOS.	
5	SADDLE/CLEAT WITH FIXING SCREW OR M8-68mm LONG STUD, NUTS & LOCK WASHERS FOR CIRCUIT CABLE	AS REQUIRED	
6	25 x 6mm THK. M.S. FLAT (LENGTH TO SUIT)	2 NOS.	
7	ISA 50 x 50 x 6 THK.-75mm LONG ANGLE CLEAT WITH 10 Ø HOLES	4 NOS.	
8	10mm Ø 35 LONG COUNTER SUNK SCREWS WITH RAWAL PLUG	2 NOS.	
9	ISA 50 x 50 x 6 THK.-150mm LONG ANGLE CLEAT WITH 2 NOS. 12 Ø HOLES	2 NOS.	

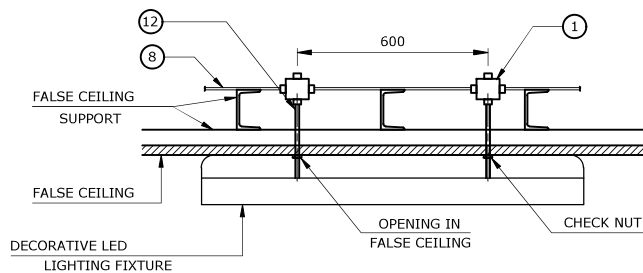
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY
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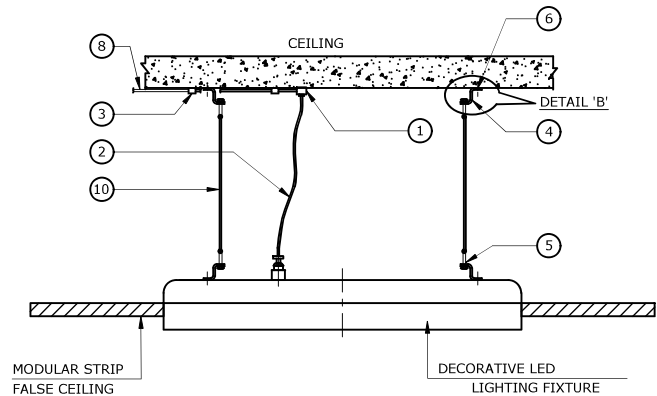
RECESSED MOUNTING FIXTURE
SUPPORTED ON WOODEN FRAME
TYPE : RM1



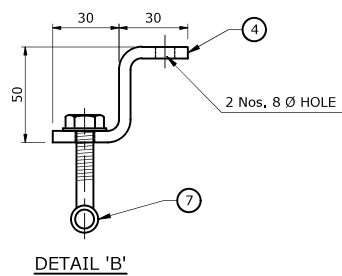
RECESSED MOUNTING FIXTURE
SUPPORTED ON CHAIN
TYPE : RM1



FIXTURE MOUNTED BELOW
FALSE CEILING
TYPE : RM2



RECESSED MOUNTING FIXTURE
SUPPORTED WITH G.I. WIRE
TYPE : RM1



DETAIL 'B'

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	JUNCTION BOX WITH DOME COVER	1 NO.	
2	19 mm DIA PVC FLEXIBLE PIPE WITH 2 Nos. PVC STRAIGHT ADAPTOR	AS REQUIRED	
3	G.I./PVC SADDLE CLEAT WITH SUITABLE SCREWS	AS REQUIRED	
4	32 x 6mm THK, 110 mm LONG M,S, FLAT BEND 'Z' SHAPE	4 NOS.	
5	M6-30mm LONG G.I. EYE BOLT & NUT WITH WASHER	4 NOS.	
6	M6-35mm LONG ANCHOR STUD WITH NUT AND WASHER	2 NOS.	
7	M6-30mm LONG BOLT WITH SWING NUT AND 2 Nos. PLAIN WASHER	2 NOS.	
8	19mm DIA CONDUIT (AS SPECIFIED)	AS REQUIRED	
9	BRACKET MADE OUT OF 25 x 3mm THK, M,S, FLAT	2 NOS.	
10	10 SWG, G.I. WIRE (LENGTH TO SUIT)	2 NOS.	
11	SUPPORTING CHAIN (LENGTH TO SUIT)	2 NOS.	
12	19mm Ø CONDUIT WITH THREAD AT BOTH END AND NUT	2 NOS.	

02	29.01.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL DETAIL OF CONCEALED CONDUIT
WIRING

STANDARD DRAWING NO.

VCS-STD-EL-4005

SHEET NO.

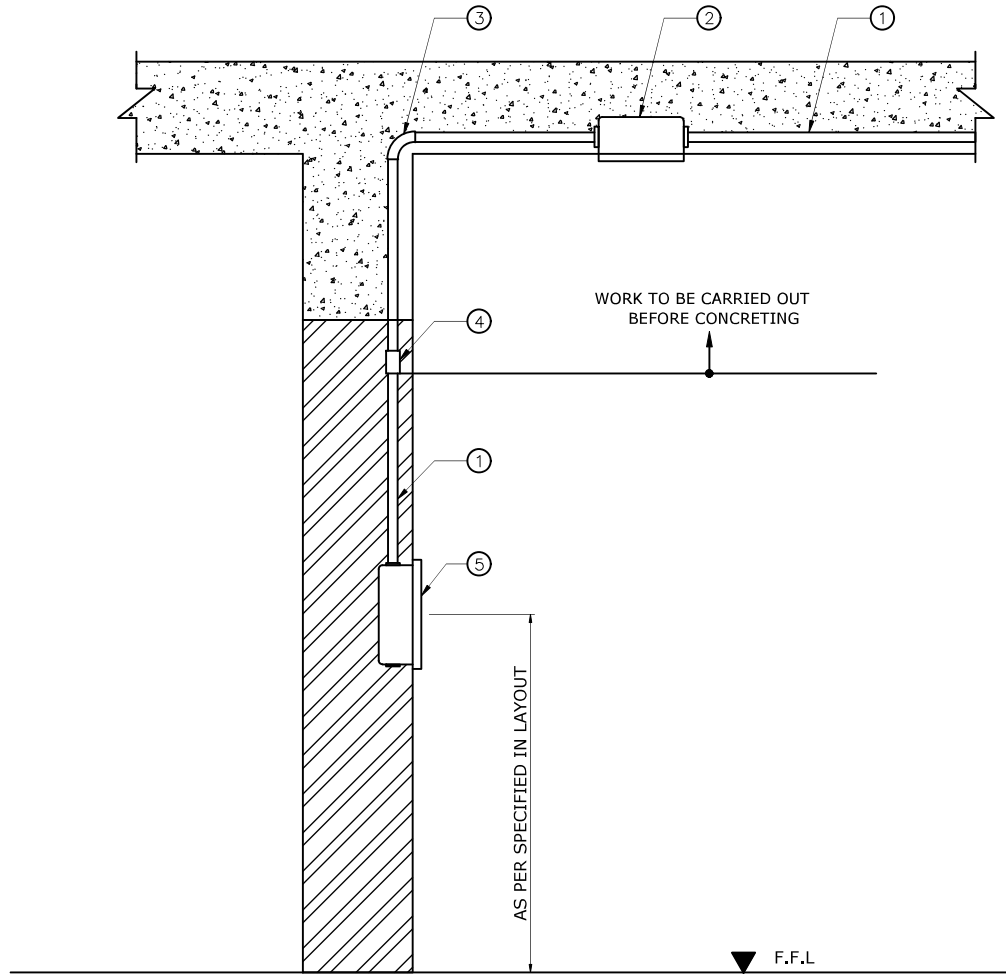
1 OF 1

REV.

02

SIZE

A4



TYPICAL INSTALLATION DETAIL OF CONDUIT ENTRY
FROM R.C.C SLAB INTO THE BRICK WALL

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	PVC/G.I. CONDUIT SIZE AS REQUIRED	AS REQUIRED	
2	WIRE PULL BOX WITH FLAT COVER	AS REQUIRED	
3	PVC/G.I. 90° BEND SIZE AS REQUIRED	AS REQUIRED	
4	PVC/G.I. COUPLING SIZE AS REQUIRED	AS REQUIRED	
5	SWITCH BOARD, SOCKET OUTLET ETC.	AS REQUIRED	

02	29.01.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



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VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL CEILING MOUNTING DETAILS OF
INDUSTRIAL TYPE FIBERGLASS REINFORCED
LED LIGHTING FITTING

STANDARD DRAWING NO.

REV. SIZE

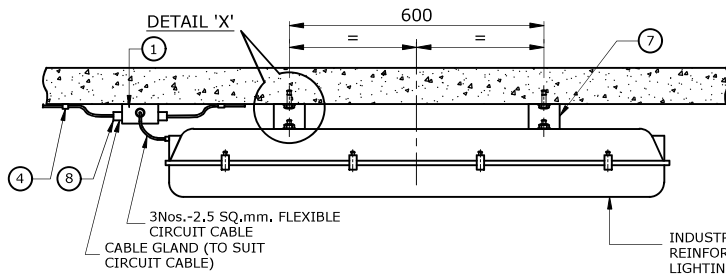
VCS-STD-EL-4006

02

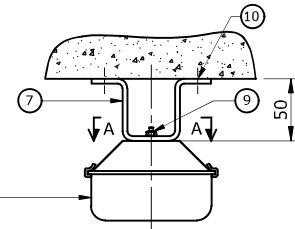
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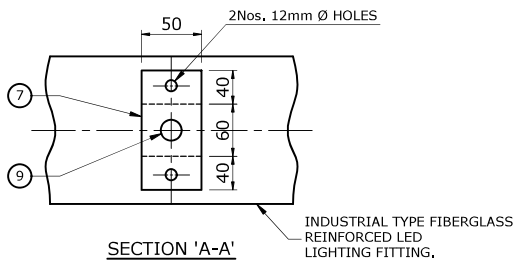
1 OF 1



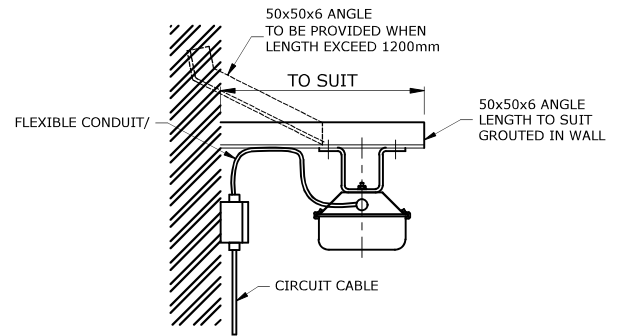
FRONT VIEW
MOUNTING TYPE : CM3



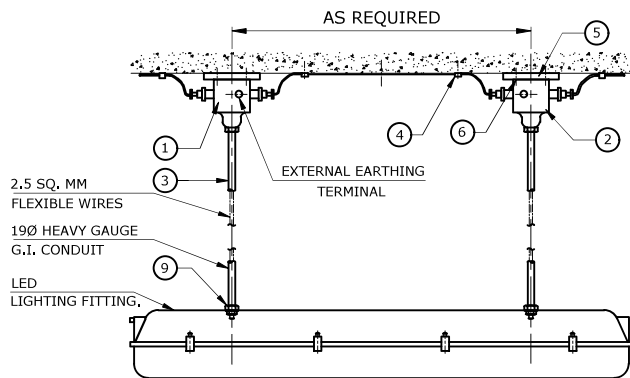
END VIEW



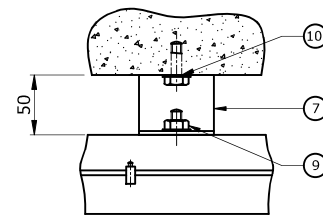
SECTION 'A-A'



BRACKET MOUNTING ON
WALL/COLUMN MTG. TYPE : BM3



FRONT VIEW
MOUNTING TYPE : SM3

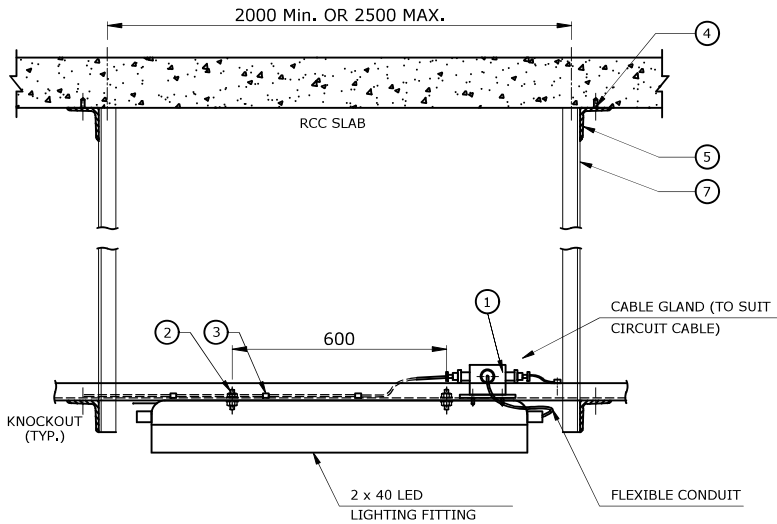


DETAIL 'X'

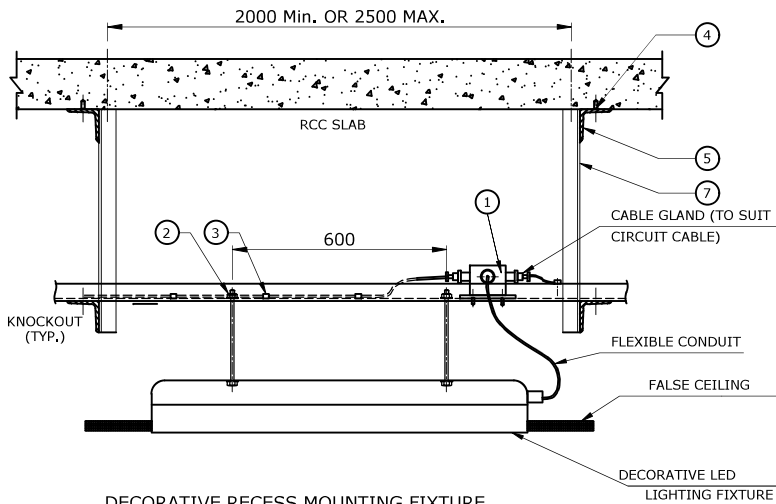
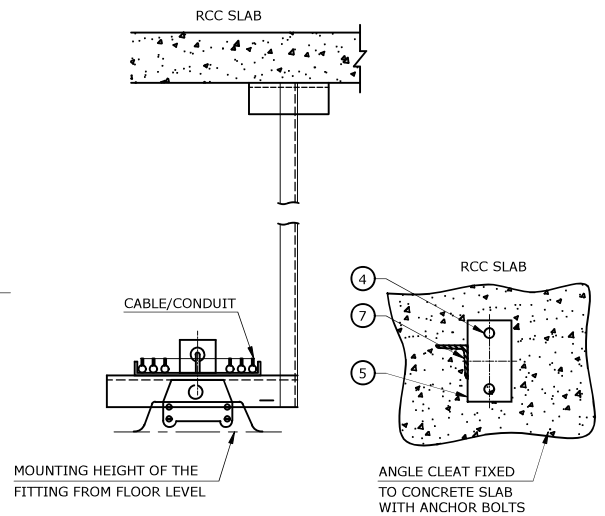
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	4WAY-100mm DIA ROUND JUNCTION BOX WITH TERMINAL BLOCK.	1 NO.	
2	DUMMY JUNCTION BOX WITH DOME COVER, BALL & SOCKET WITHOUT TERMINAL BLOCK.	1 NO.	
3	19mm Ø HEAVY GAUGE CONDUIT WITH BOTH END CHECK NUTS LENGTH TO SUIT MOUNTING HEIGHT (MAXIMUM LENGTH 2 Mtrs.)	2 NOS.	
4	G.I. SADDLE/CLEAT ALONG WITH SUITABLE SIZE OF FIXING SCREW TO SUIT FOR CIRCUIT CABLE/CONDUIT.	AS REQUIRED	
5	25 x 6 THK, M.S. FLAT 200mm LONG FOR JUNCTION BOX MOUNTING ON SLAB/STEEL STRUCTURE.	2 NOS.	
6	COUNTER SUNK SCREW WITH RAWAL PLUG FOR RCC SLAB OR SELF TAPPING COUNTER SUNK SCREW FOR STEEL STRUCTURE.	4 NOS.	
7	240 x 50 x 6 THK, M.S. BRACKET FOR MOUNTING OF LIGHTING FITTING	2 NOS.	
8	M10-40mm LONG SCREW WITH RAWAL PLUG FOR MOUNTING OF M.S. BRACKET TO CEILING	4 NOS.	
9	M6-40mm LONG BOLT WITH NUT & WASHER	2 NOS.	
10	M10-68mm ANCHOR BOLT FOR MOUNTING OF JUNCTION BOX TO CEILING	2 NOS.	
11	M8-25mm G.I. BOLT WITH 2 Nos. PLAIN AND 1 No. SPRING WASHER TO ANGLE	2 NOS.	

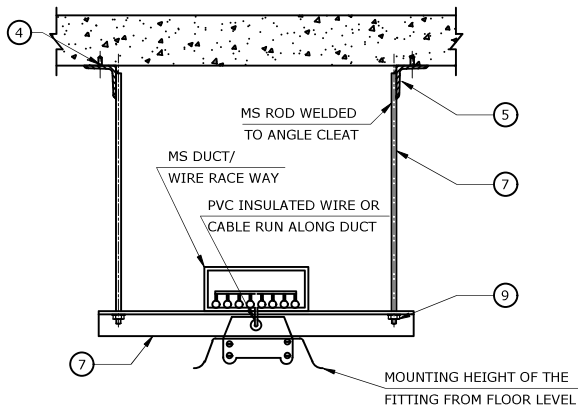
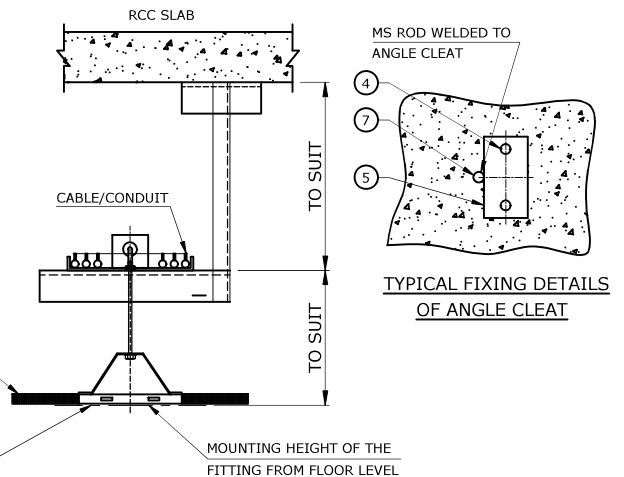
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01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



INDUSTRIAL SUSPENSION MOUNTING FIXTURE
MOUNTING TYPE : SM4



DECORATIVE RECESS MOUNTING FIXTURE
MOUNTING TYPE : RM4



MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	4WAY-100mm DIA ROUND JUNCTION BOX WITH TERMINAL BLOCK.	1 NO.	
2	19mm DIA CHECK NUT	4 NOS.	
3	G.I. SADDLE ALONG WITH SUITABLE SIZE OF FIXING SCREW & NUT TO SUIT FOR CIRCUIT CABLE/CONDUIT.	AS REQUIRED	
4	M10x68mm LONG ANCHOR STUD WITH BOLT & PLAIN WASHER	AS REQUIRED	
5	ISA 50x6mm THK, 100mm LONG ANGLE CLEAT.	AS REQUIRED	
6	150mm OR 300mm WIDE PERFORATED CABLE TRAY OR DUCT/ WIRE RACE WAY CHANNEL.	AS REQUIRED	
7	ISA 25 x 25 x 6mm THK, ANGLE WELDED TO ANGLE OR 8mm DIA MS ROD WITH THREAD AT BOTTOM END	AS REQUIRED	
8	19mm DIA G.I. PIPE/CONDUIT	AS REQUIRED	
9	NUT SUITABLE FOR M8 BOLT WITH PLAIN WASHER	AS REQUIRED	

NOTES:

1. ALL FABRICATED STEEL STRUCTURE SHALL BE PAINTED WITH TWO COATS OF ANTI CORROSIVE PAINT AND TWO COATS OF EPOXY PAINT OF APPROVED SHED.
2. ALL HARDWARE SHALL BE STAINLESS STEEL.

02	29.01.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL HANDRAIL PIPE MOUNTING DETAILS
OF LED HPMV/HPSV LIGHTING
FITTING ON PLATFORM

STANDARD DRAWING NO.

REV. SIZE

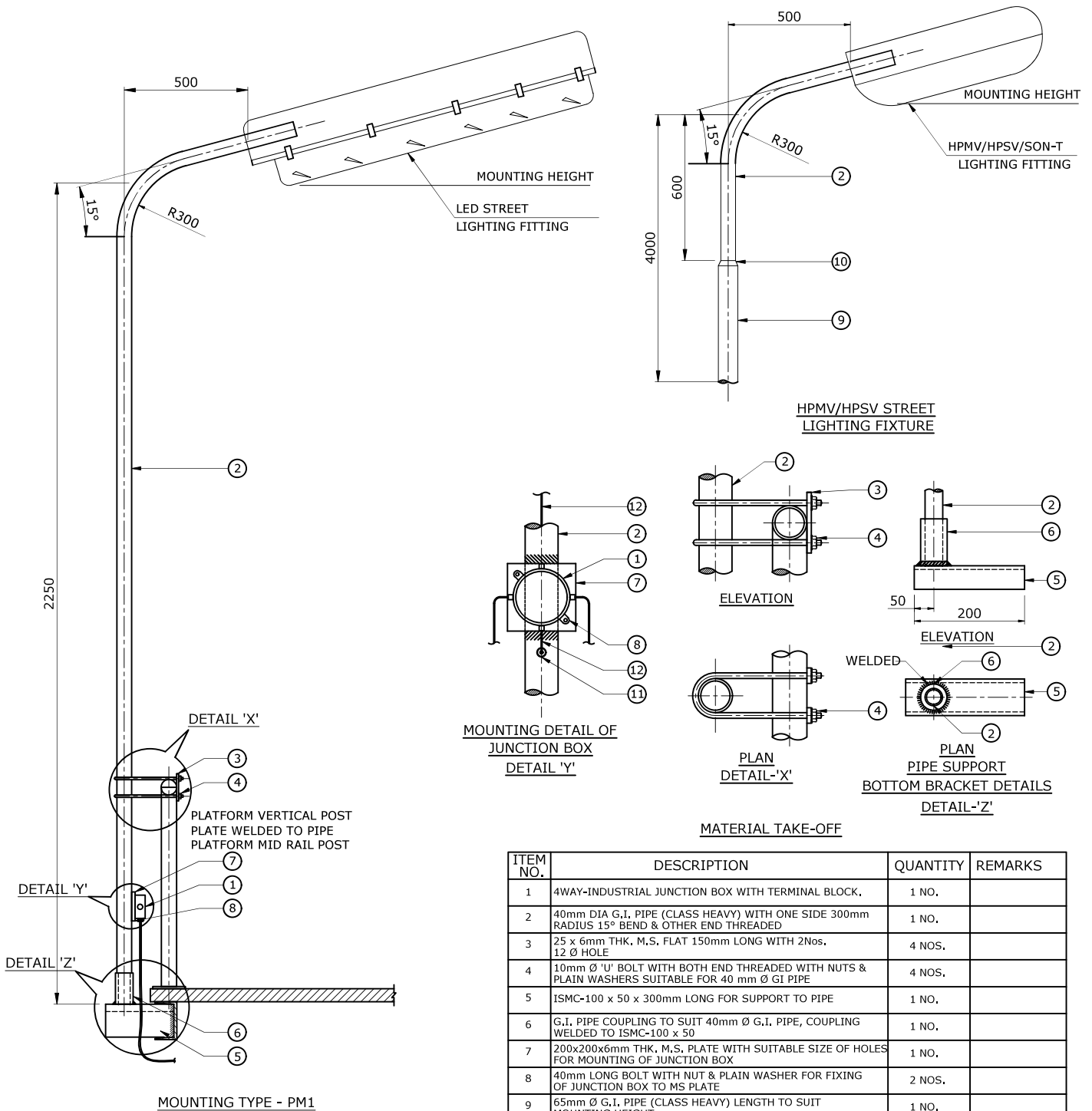
VCS-STD-EL-4008

02

A4

SHEET NO.

1 OF 1



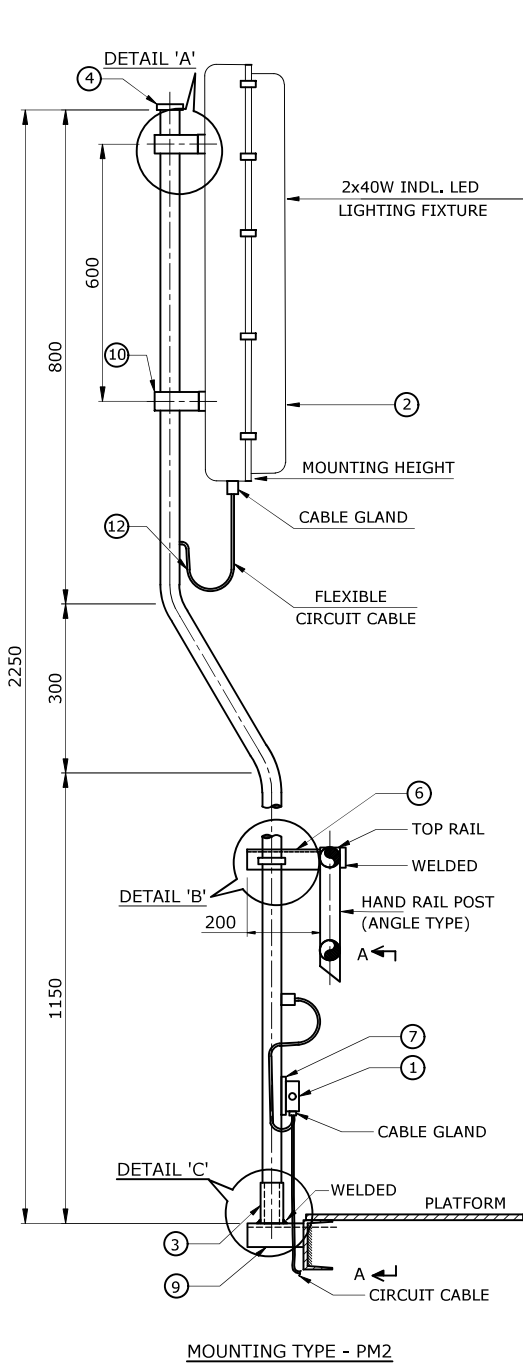
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	4WAY-INDUSTRIAL JUNCTION BOX WITH TERMINAL BLOCK,	1 NO.	
2	40mm DIA G.I. PIPE (CLASS HEAVY) WITH ONE SIDE 300mm RADIUS 15° BEND & OTHER END THREADED	1 NO.	
3	25 x 6mm THK. M.S. FLAT 150mm LONG WITH 2Nos, 12 Ø HOLE	4 NOS.	
4	10mm Ø 'U' BOLT WITH BOTH END THREADED WITH NUTS & PLAIN WASHERS SUITABLE FOR 40 mm Ø GI PIPE	4 NOS.	
5	ISMC-100 x 50 x 300mm LONG FOR SUPPORT TO PIPE	1 NO.	
6	G.I. PIPE COUPLING TO SUIT 40mm Ø G.I. PIPE, COUPLING WELDED TO ISMC-100 x 50	1 NO.	
7	200x200x6mm THK. M.S. PLATE WITH SUITABLE SIZE OF HOLES FOR MOUNTING OF JUNCTION BOX	1 NO.	
8	40mm LONG BOLT WITH NUT & PLAIN WASHER FOR FIXING OF JUNCTION BOX TO MS PLATE	2 NOS.	
9	65mm Ø G.I. PIPE (CLASS HEAVY) LENGTH TO SUIT MOUNTING HEIGHT	1 NO.	
10	65 x 10mm G.I. REDUCER	1 NO.	
11	RURDER GROMMET	1 NO.	
12	2,5 Sq. mm PVC COPPER CONDUCTOR FLEXIBLE CABLE	AS REQUIRED	

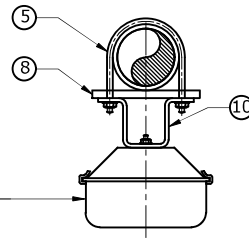
NOTES:

1. MOUNTING HEIGHT SHALL NOT EXCEED 4 MTRS. FROM THE TOP OF PLATFORM,
2. LIGHT FITTING SHALL BE WITH ONE EXTERNAL EARTH CONNECTION AND USE THIRD CORE OR PVC FLEXIBLE CABLE FOR INTERNAL EARTHING, EARTH JUNCTION BOX WITH TWO EXTERNAL EARTH CONDUCTORS,
3. CABLE GLANDS USED FOR TERMINATION OF FLEXIBLE CABLE SHALL BE DOUBLE SEAL WITH CONE GRIP TYPE,
4. PLUG ALL UNUSED ENTRIES OF LIGHTING FITTING AND JUNCTION BOX WITH THREADED STOPPING PLUGS,
5. WHEN MOUNTING HEIGHT IS MORE THEN 2,25M THEN 65 Ø G.I. PIPE WITH REDUCER SHALL BE USED,

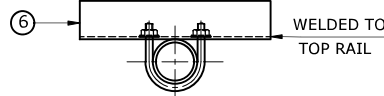
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REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



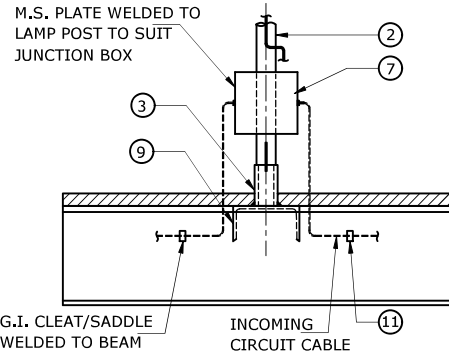
MOUNTING TYPE - PM2



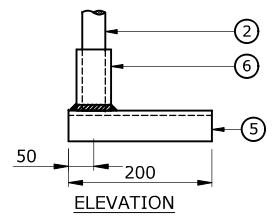
DETAIL 'A'



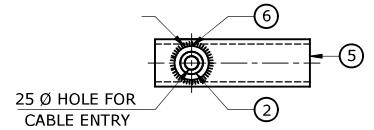
DETAIL 'B'



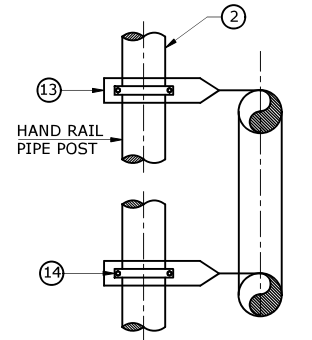
SECTION 'A-A'



ELEVATION



PIPE SUPPORT
BOTTOM BRACKET DETAILS
DETAIL 'C'



ALTERNATIVE ARRANGEMENT
FOR PIPE RAILING

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	JUNCTION BOX	1 NO.	
2	40mm DIA G.I. PIPE 2500mm LONG	1 NO.	
3	G.I. PIPE COUPLING TO SUIT 40mm Ø PIPE	1 NO.	
4	G.I. PIPE CAP TO SUIT 40mm Ø G.I. PIPE	1 NO.	
5	M10 'U' BOLT TO SUIT 40NB G.I. PIPE THREADED AT BOTH THE ENDS WITH NUTS AND WASHERS	2 EACH	
6	50 x 50 x 300mm GALVANIZED MILD STEEL ANGLE	1 NO.	
7	150 Sq. x 6mm THK, M.S. PLATE	1 EACH	
8	50 x 6mm M.S. FLAT - 100mm LONG	1 NO.	
9	ISMIC-100 x 50 x 6mm THK. -200mm LONG	AS REQUIRED	
10	BRACKET TO BE MADE OUT OF 25 x 6mm M.S. FLAT	2 NOS.	
11	G.I. CLEAT, SADDLE WITH SUITABLE SIZE SCREW	AS REQUIRED	
12	RURDER GROMMET	2 NOS.	
13	75 x 10mm THK, G.I. FLAT - 300mm LONG	2 NOS.	
14	G.I. SADDLE/CLEAT TO SUIT 40mm Ø G.I. PIPE WITH G.I. SCREWS AND WASHERS	AS REQUIRED	

NOTES:

1. ALL NUTS, BOLTS & WASHERS SHALL BE GALVANISED OR ZINC PASSIVATED.
2. ALL SHARP EDGES AND BURR SHALL BE REMOVED.
3. SITE FABRICATION STEEL SHALL BE PAINTED IN ACCORDANCE WITH THE CONTRACT SPECIFICATION.
4. ALL DUMMIES TO GALVANISED FINISHED SHALL BE CLEANED AND APPLIED WITH 2 COATS OF ANTI-CORROSIVE PAINT AND ZINC RICH PAINT.
5. WHERE POSSIBLE LOCATE LAMP POST ADJACENT TO HANDRAIL POST.

02	29.01.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL MOUNTING DETAILS
OF STREET LIGHTING FITTING
(WALL/COLUMN MOUNTED)

STANDARD DRAWING NO.

REV. SIZE

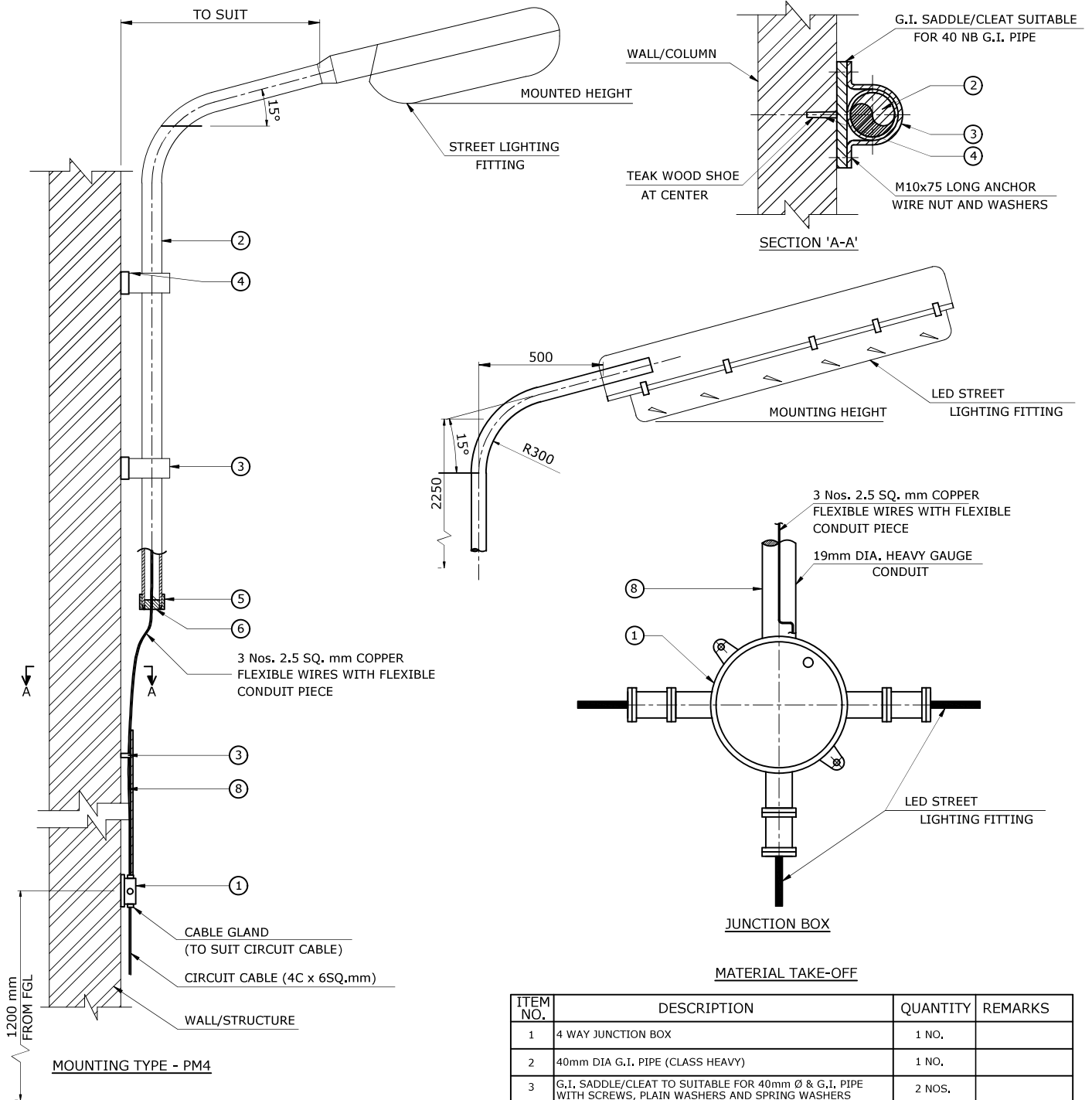
VCS-STD-EL-4010

02

A4

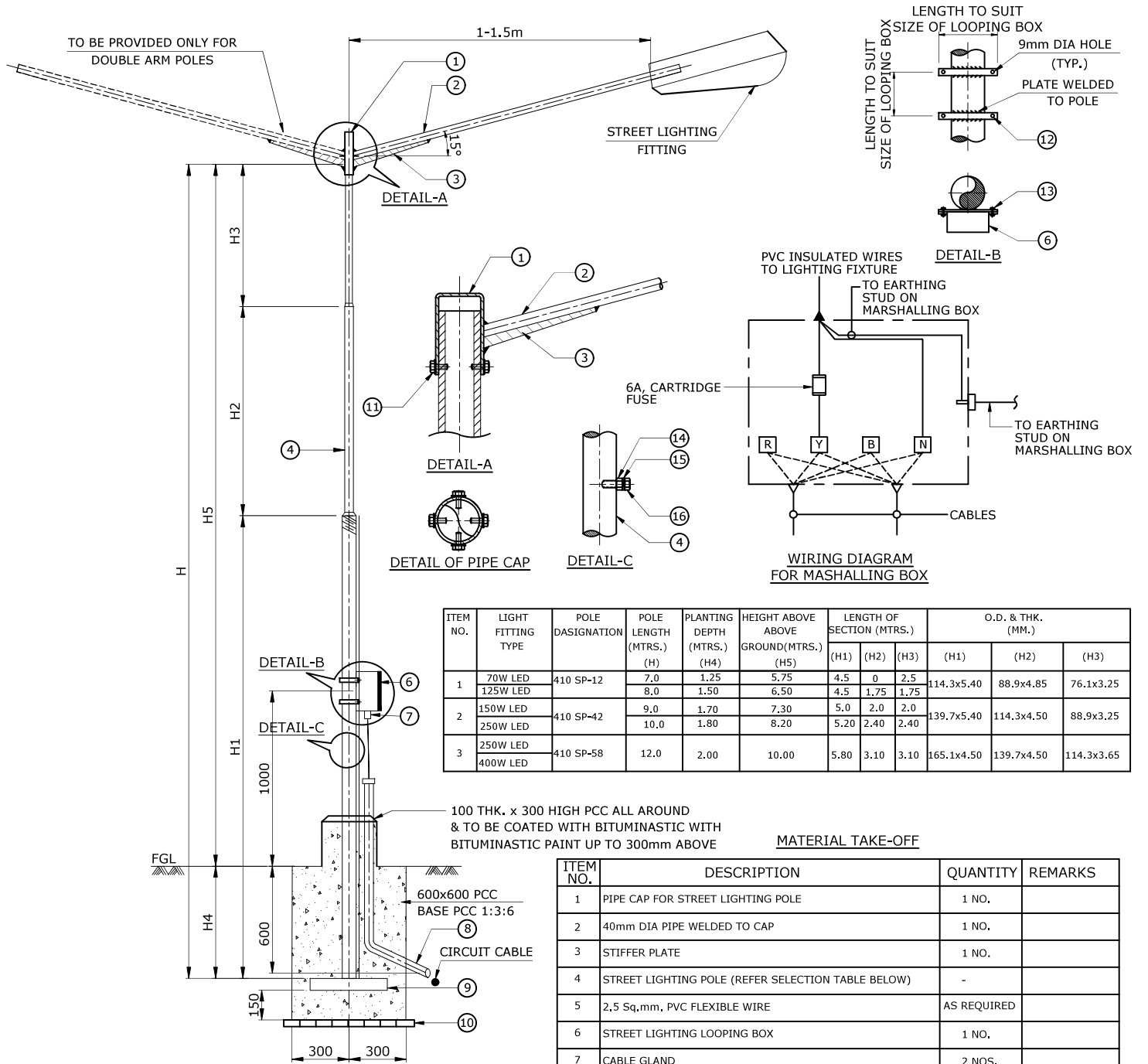
SHEET NO.

1 OF 1



ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	4 WAY JUNCTION BOX	1 NO.	
2	40mm DIA G.I. PIPE (CLASS HEAVY)	1 NO.	
3	G.I. SADDLE/CLEAT TO SUITABLE FOR 40mm Ø & G.I. PIPE WITH SCREWS, PLAIN WASHERS AND SPRING WASHERS	2 NOS.	
4	15mm THK. TEAK WOOD SHOE WITH BITUMINOUS PAINT	1 BLOCK	
5	G.I. PIPE COUPLING (TO SUIT 40mm Ø G.I. PIPE)	1 NO.	
6	RURDER GROMMET (TO SUIT 40mm Ø G.I. PIPE)	1 NO.	
7	50mm DIA G.I. PIPE SLEAVE	1 NO.	
8	19mm DIA G.I. HEAVY GAUGE CONDUIT	AS REQUIRED	
9	10A, 250V D,P WEATHER PROOF LIGHTING SWITCH WITH BOTTOM ENTRY	1 NO.	
10	SCREW WITH PLAIN WASHER AND RAWAL PLUG FOR FIXING JB & LIGHTING SWITCH	8 NOS.	

02	29.01.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



100 THK. x 300 HIGH PCC ALL AROUND & TO BE COATED WITH BITUMINASTIC WITH BITUMINASTIC PAINT UP TO 300mm ABOVE

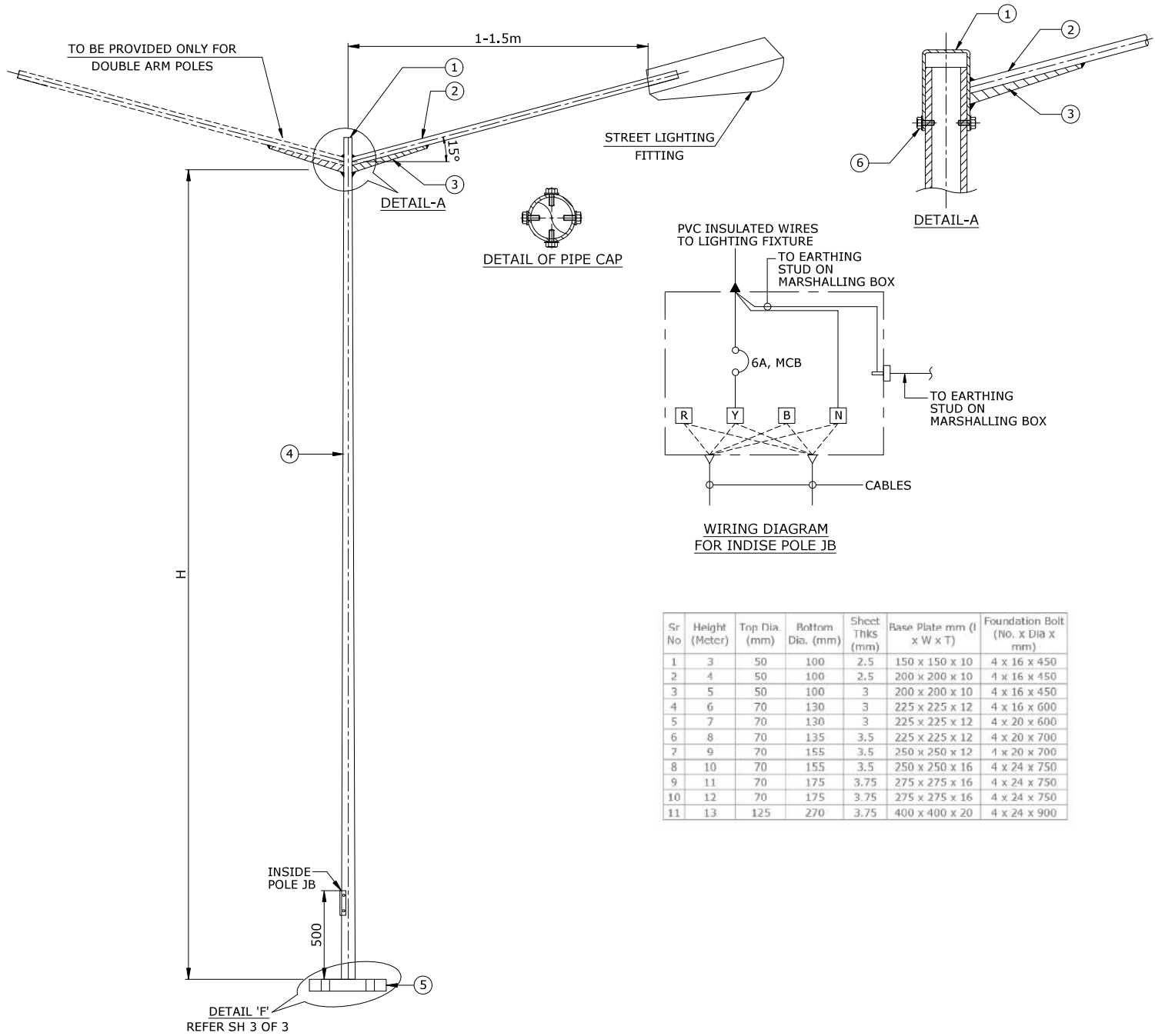
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	PIPE CAP FOR STREET LIGHTING POLE	1 NO.	
2	40mm DIA PIPE WELDED TO CAP	1 NO.	
3	STIFFER PLATE	1 NO.	
4	STREET LIGHTING POLE (REFER SELECTION TABLE BELOW)	-	
5	2,5 Sq.mm, PVC FLEXIBLE WIRE	AS REQUIRED	
6	STREET LIGHTING LOOPING BOX	1 NO.	
7	CABLE GLAND	2 NOS.	
8	80 NB G.I. PIPE FOR CABLES	AS REQUIRED	
9	250 x 250 x 6mm THK, BASE PLATE	1 NO.	
10	BRICK SOLING (SIZE 230x115x75mm)	15 NOS.	
11	M10 x 30mm LONG FULL THREADED BOLT	8 NOS.	
12	50x8mm THICK G.I. STRIP WELDED TO POLE	2 NOS.	
13	M8 x 30mm LONG THREADED BOLT, NUT & WASHER	4 NOS. EACH	
14	M10, NUT WELDED TO LIGHTING POLE	2 NOS.	
15	PLAIN AND SPRING WASHER SUITABLE FOR M10 BOLT	2 NOS. EACH	
16	M10 FULL THREADED BOLT 40mm LONG	2 NOS.	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. POLE MATERIAL SHALL BE G.I. OR M.S AS PER PROJECT CONTRACT REQUIREMENTS .
3. AFTER INSTALLATION THE ASSEMBLY IS TO BE PREPARED, PRIMED AND PAINTED IN ACCORDANCE WITH THE PROJECT PAINTING SPECIFICATION IF MATERIAL IS M.S.
4. LIGHT FITTING FIXING DETAILS TO BE FURNISHED BY SITE.
5. EARTHING TERMINAL ARE LOCATED DIAMETRICALLY OPPOSITE.
6. ALL NUTS, BOLTS AND WASHERS SHALL BE GALVANISED AND ZINC PASSIVATED.
7. MOUNTING DETAILS OF CONTROL GEAR BOX AND LOOPING BOX REFER INSTALLATION DETAILS.
8. ALL SHARP EDGES AND BURRS SHALL BE REMOVED.
9. POLE SHALL BE MADE FROM TUBULAR STEEL PIPES SWAGED AND WELDED CONFORMING TO DESIGNATION AS MENTIONED IN ABOVE TABLE- AS IS-2713 (PART III) - 1980.
10. DOUBLE ARM SHALL BE EITHER AT 180° OR 30° AS PER THE LOCATION OF THE LIGHTING FITTING & SITE REQUIREMENT.

02	02.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



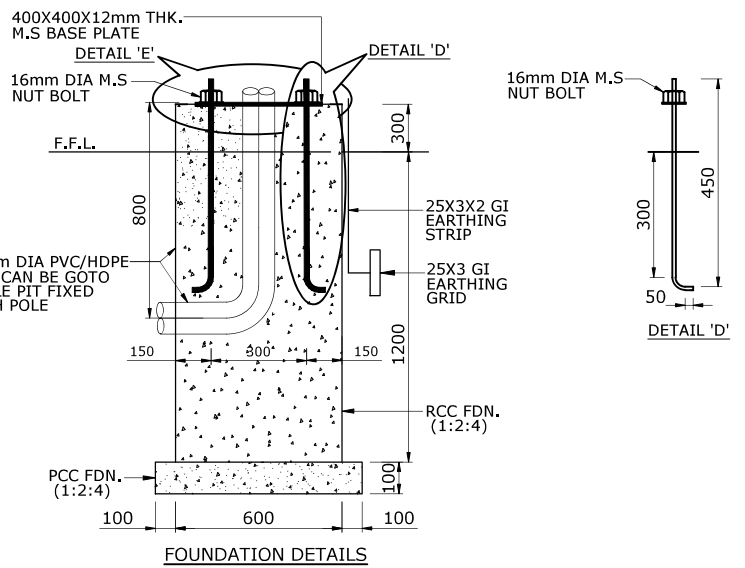
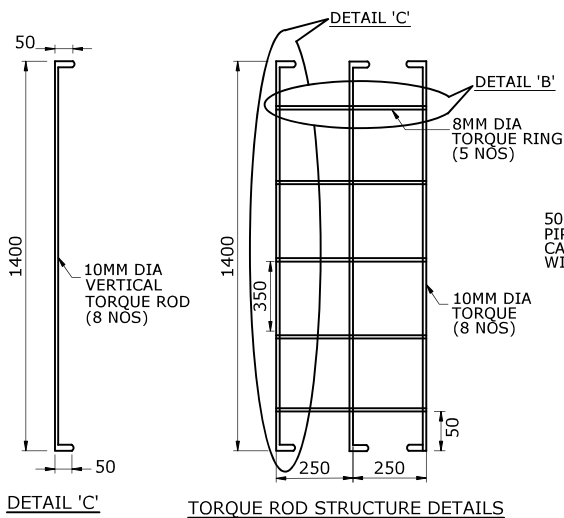
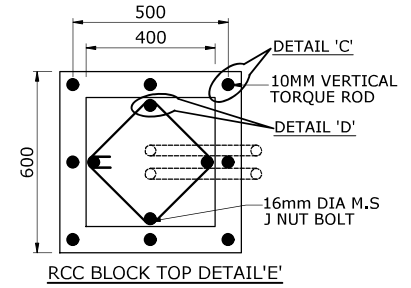
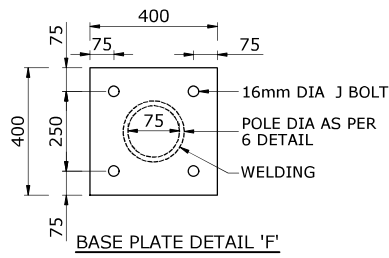
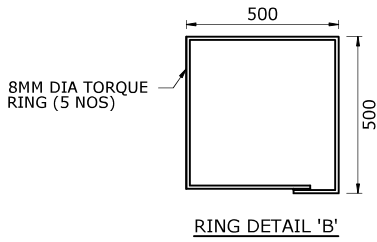
NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS.
- LIGHTING POLE SHALL BE GI COATED.
- LIGHT FITTING FIXING DETAILS TO BE FURNISHED BY SITE.
- EARTHING TERMINAL ARE LOCATED DIAMETRICALLY OPPOSITE.
- ALL NUTS, BOLTS AND WASHERS SHALL BE GALVANIZED AND ZINC PASSIVATED.
- MOUNTING DETAILS OF CONTROL GEAR BOX AND LOOPING BOX REFER INSTALLATION DETAILS.
- ALL SHARP EDGES AND BURRS SHALL BE REMOVED BEFORE GI COATING.
- POLE SHALL BE HEXAGONAL MADE FROM TUBULAR STEEL MATERIAL CONFORMING TO DESIGNATION AS MENTIONED IN ABOVE TABLE- AS IS-2713 (LATEST)
- DOUBLE ARM SHALL BE EITHER AT 180° OR 30° AS PER THE LOCATION OF THE LIGHTING FITTING & SITE REQUIREMENT.

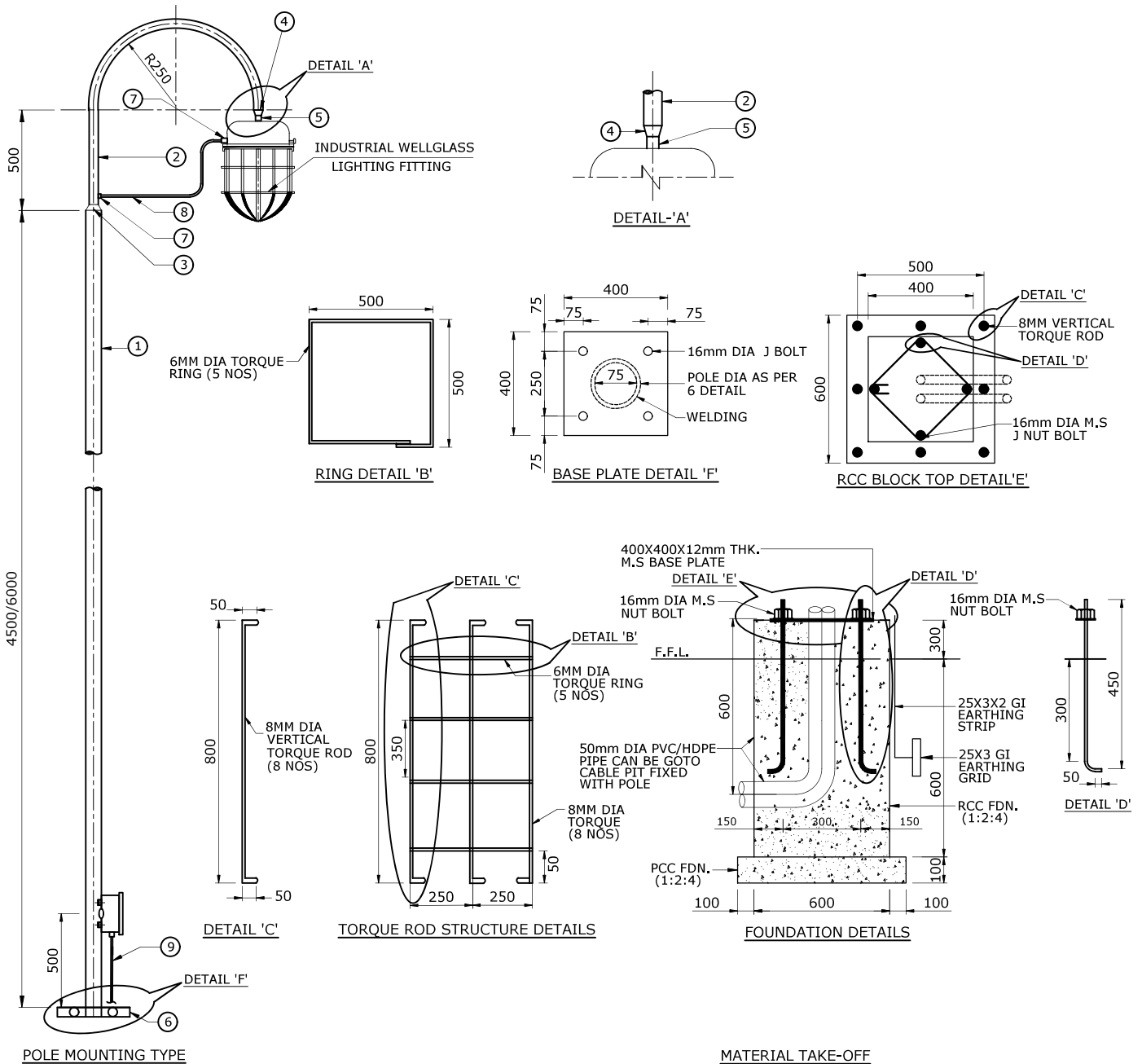
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	PIPE CAP FOR STREET LIGHTING POLE	1 NO.	
2	40mm DIA PIPE WELDED TO CAP	1 NO.	
3	STIFFER PLATE	1 NO.	
4	STREET LIGHTING POLE (REFER SELECTION TABLE BELOW)	-	
5	400x400x12mm THK, M.S. PLATE WITH 1 Nos. 20mm Ø HOLES	1 NO.	
6	M10 x 30mm LONG FULL THREADED BOLT	4 NOS.	

02	02.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



02	02.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



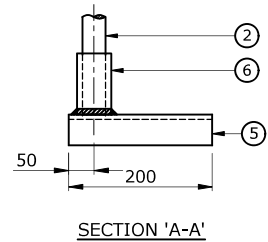
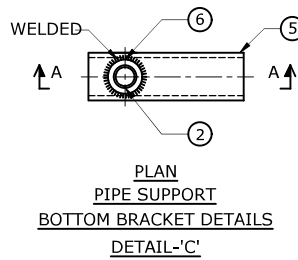
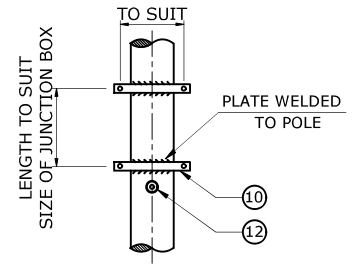
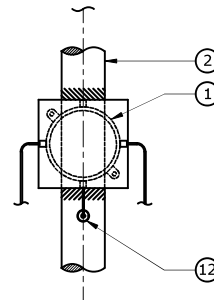
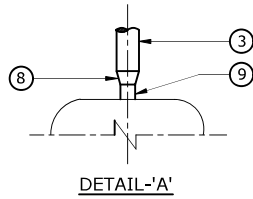
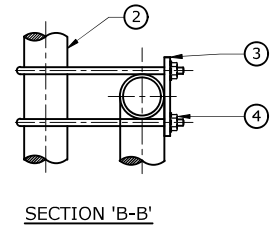
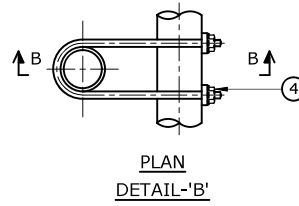
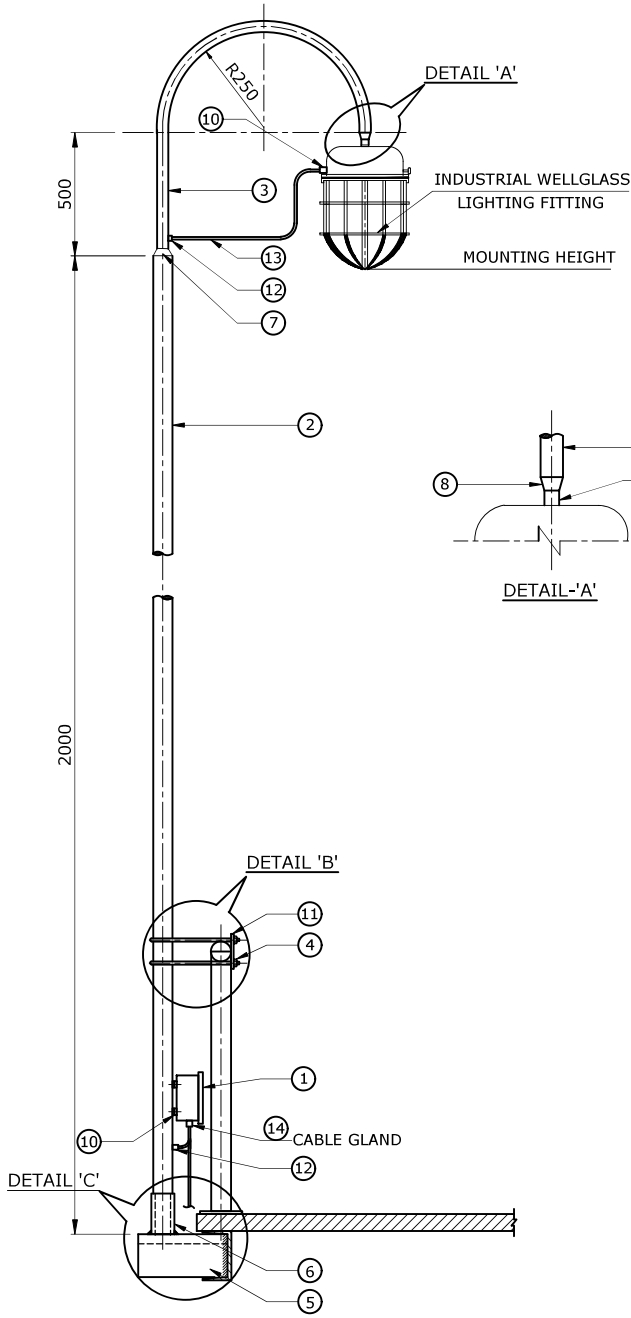
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	75/100mm Ø G.I. PIPE (CLASS HEAVY) FOR 4.5/6Mtr.	1 NOS.	
2	40mm Ø G.I. PIPE (CLASS HEAVY) WITH ONE END SWAN NECK 250mm RADIUS 180° BEND & BOTH END THREADED, MAX. 1Mtr.	1 NOS.	
3	G.I. REDUCER - 75 x 40	1 NOS.	
4	G.I. REDUCER - 40 x 19	1 NOS.	
5	G.I. NIPPLE THREADED AT BOTH END	1 NOS.	
6	400x400x10mm THK. M.S. PLATE WITH 1 Nos, 20mm Ø HOLES	1 NOS.	
7	RURDER GROMMET TO SUIT FLEXIBLE WIRE	2 NOS.	
8	2,5 Sq. mm SQ. FRLS FLEXIBLE CABLE	1 NOS.	
9	25 x 3 G.I. FLAT CONNECTION	1 NOS.	

NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS.
- CABLE GLAND USED FOR TERMINATION OF FLEXIBLE CABLE SHALL BE DOUBLE SEAL WITH CONE GRIP FOR BRADING.
- PLUG ALL UNUSED ENTRIES OF LIGHTING FITTING AND JUNCTION BOX WITH THREADED STOPPING PLUGS.
- ALL NUTS, BOLTS AND WASHERS SHALL BE GALVANISED.
- ALL SHARP EDGES AND BURRS SHALL BE REMOVED. SITE FABRICATED STEEL SHALL BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT AND TWO COATS OF EPOXY PAINTS.
- ALL DAMAGE TO GALVANISED FINISHED SHALL BE MADE GOOD WITH ZINC RICH PAINT.

REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY
02	02.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK



MOUNTING TYPE - PM5

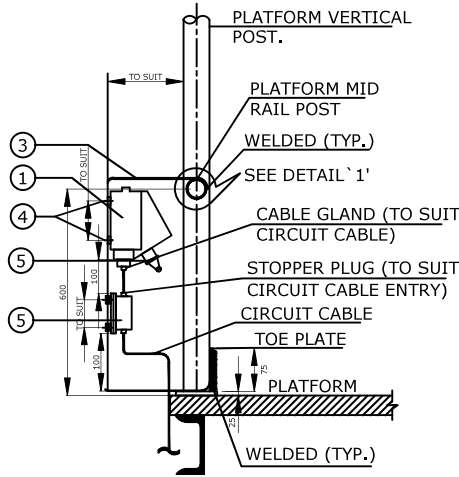
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	JUNCTION BOX OR CONTROL GEAR BOX	1 NO.	
2	65mm Ø G.I. PIPE (CLASS HEAVY) WITH BOTH SIDE THREADING MAX. LENGTH 3.0 Mtrs.	1 NO.	
3	40mm Ø G.I. PIPE (CLASS HEAVY) WITH ONE END SWAN NECK 250mm RADIUS 180° BEND & BOTH END THREADED. MAX. 1Mtr.	1 NO.	
4	10mm Ø 'U' BOLT SUITABLE FOR 65mm Ø PIPE WITH BOTH END THREADED WITH NUTS 2Nos. PLAIN & 1NO. SPRING WASHER SUITABLE	4 NOS.	
5	ISMC-100 x 50 x 350mm LONG	1 NO.	
6	G.I. COUPLING SUITABLE FOR 65mm Ø G.I. PIPE	1 NO.	
7	G.I. REDUCER - 60 x 40	1 NO.	
8	G.I. REDUCER - 40 x 19	1 NO.	
9	G.I. NIPPLE THREADED AT BOTH END	1 NO.	
10	150x150x6mm THK. M.S. PLATE WITH 2 Nos, 12mm Ø HOLES OR 50x6x300 LONG G.I. FLATE WITH 2 Nos, 12mm Ø HOLES,	1 NO./2 Nos.	REFER VIEW -A'
11	50 x 6 x 150mm LONG G.I. FLAT WITH 2 Nos, 12mm Ø HOLES,	4 NOS.	
12	RURDER GROMMET TO SUIT FLEXIBLE WIRE	2 NOS.	
13	2.5 Sq. mm SQ. FLEXIBLE CABLE	3,5Mtrs. MAX.	
14	CABLE GLAND SUITABLE FOR ITEM NO. 13	2 NOS.	

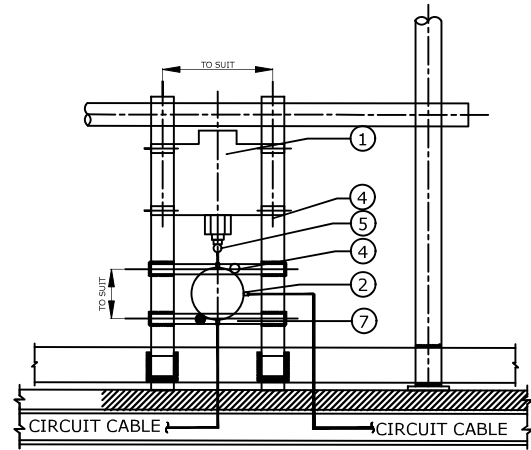
NOTES:

- ALL DIMENSIONS ARE IN MILLIMETERS.
- MOUNTING HEIGHT SHALL NOT EXCEED 2.5M FROM THE PLATFORM.
- CABLE GLAND USED FOR TERMINATION OF FLEXIBLE CABLE SHALL BE DOUBLE SEAL WITH CONE GRIP FOR BRADING.
- PLUG ALL UNUSED ENTRIES OF LIGHTING FITTING AND JUNCTION BOX WITH THREADED STOPPING PLUGS.
- ALL NUTS, BOLTS AND WASHERS SHALL BE GALVANISED.
- ALL SHARP EDGES AND BURRS SHALL BE REMOVED. SITE FABRICATED STEEL SHALL BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT AND TWO COATS OF EPOXY PAINTS.
- ALL DAMAGE TO GALVANISED FINISHED SHALL BE MADE GOOD WITH ZINC RICH PAINT.
- WHERE POSSIBLE LOCATE LAMP POST ADJACENT TO HANDRAIL POST.

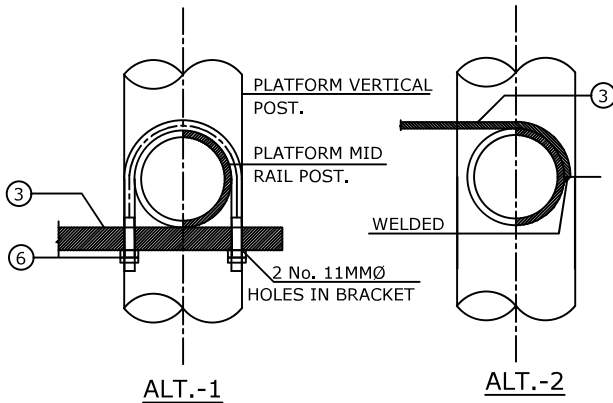
02	02.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



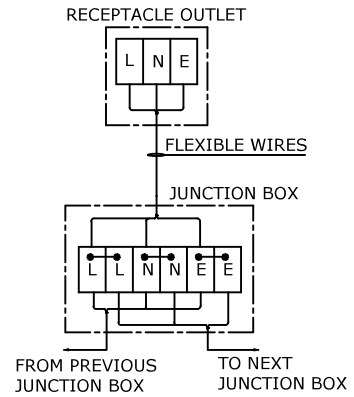
SIDE VIEW



FRONT VIEW



ALTERNATE ARRANGEMENT FOR FIXING
OF BRACKET TO MID RAIL POST
DETAIL-` 1`



WIRING DIAGRAM FOR JUNCTION
BOX TO RECEPTACLE

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1.	SMALL POWER SOCKET OUTLET	AS REQUIRED	
2.	JUNCTION BOX WITH TERMINAL BLOCK	AS REQUIRED	
3.	50 x 6mm THK, (LENGTH AS REQUIRED) MS FLAT FOR FIXING FOR POWER SOCKET OUTLET	3 MTRS.	
4.	M6 x 40mm LONG MS BOLT WITH NUT & WASHER FOR FIXING OF JUNCTION BOX ON BRACKET	8 NOS.	
5.	PLUG TO SUIT SMALL POWER SOCKET OUTLET	AS REQUIRED	
6.	M10 'U' BOLT OF SUITABLE TO MD HANDRAIL POST WITH THREADED BOTH THE SIDE WITH NUT, LOCK NUT & WASHER	2 NOS.	
7.	50 x 6mm THK, (LENGTH AS REQUIRED) MS FLAT FOR FIXING JUNCTION BOX	2 NOS.	

NOTES:

- ALL DIMENSION ARE IN MM.
- DRILLING OF ITEM 3 AND 7 TO BE DETERMINED BY FABRICATOR TO THE SOCKET OUTLET AND JUNCTION BOX.
- JUNCTION BOX, RECEPTACLES AND ACCESSORIES SHALL BE CALLED UP ON THE RELEVANT LAYOUT DRAWING MATERIAL LIST AS REQUIRED.
- ALL CABLE AND GLANDS SHALL CALLED UP ON DISTRIBUTION BOARD SCHEDULE.
- AFTER FABRICATION THE ASSEMBLY IS TO BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT AND TWO COATS OF EPOXY PAINT.
- ALL NUTS, BOLTS, WASHERS SHALL BE GALVANISED OR ZINC PASSIVATED.
- RECEPTACLES AND JUNCTION BOX SHALL BE CERTIFIED FOR THE HAZARDOUS AREA IN WHICH THEY ARE TO BE LOCATED.

02	02.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES PRIVATE LIMITED

TYPICAL MOUNTING DETAILS OF INDUSTRIAL WELLGLASS LIGHTING FITTING WITH BUILT-IN CONTROL GEAR BOX

STANDARD DRAWING NO.

VCS-STD-EL-4014

SHEET NO.

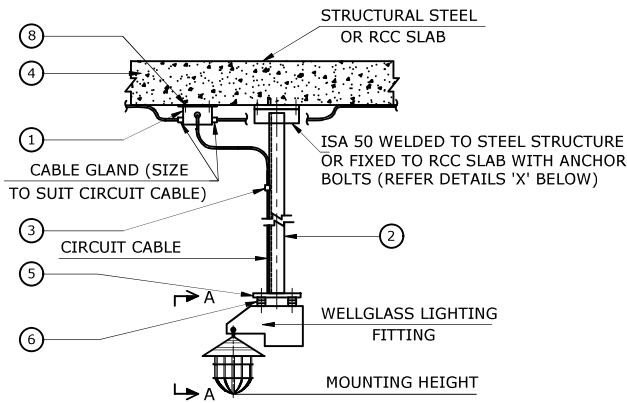
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REV.

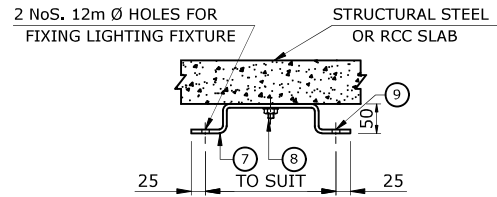
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SIZE

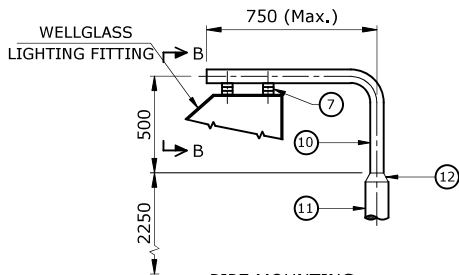
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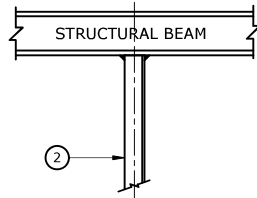
SUSPENSION MOUNTING MOUNTING TYPE-SM5



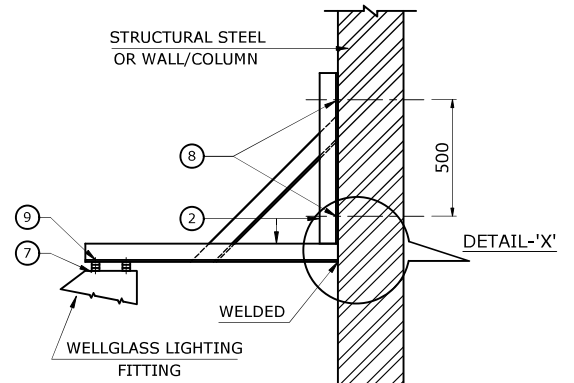
CEILING MOUNTING MOUNTING TYPE-CM5



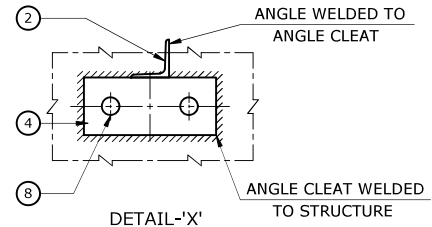
PIPE MOUNTING MOUNTING TYPE-PM3



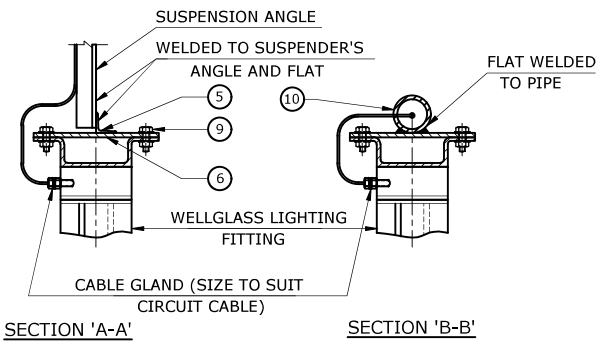
MOUNTING ON STRUCTURE OR BEAM MOUNTING TYPE-SM5



BRACKET MOUNTING MOUNTING TYPE-BM5



DETAIL-'X'



SECTION 'A-A'

SECTION 'B-B'

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	4WAY ROUND JUNCTION BOX	1 NO.	
2	ISA 50 x 50 x 6mm THK. -MAX. LENGTH 3500mm	1 NO.	
3	G.I. SADDLE/CLEAT LONG WITH SCREWS TO SUIT CIRCUIT CABLE	AS REQUIRED	
4	50 x 50 x 6 x 150 LONG ANGLE CLEAT WITH 2 Nos, 12 Ø HOLES (REFER DETAIL - 'X')	1 NO.	
5	25 x 25 x 6 x 300 LONG ANGLE CLEAT	1 NO.	
6	32 x 6 x 200 LONG G.I. FLAT WITH 3 Nos, 12 Ø HOLES	2 NOS,	
7	50 x 6 x 200 LONG G.I. FLAT WITH 2 Nos, 12 Ø HOLES	1 NO.	
8	M10 x 40mm LONG ANCHOR STUD WITH PLAIN AND SPRING WASHERS	1 NO.	
9	M10 x 30mm LONG G.I. BOLT WITH NUT, 2 PLAIN AND SPRING WASHERS	4 NOS,	
10	40mm Ø G.I. PIPE - CLASS HEAVY WITH MAX. LENGTH OF 1.5 Mtrs. WITH THREADED AT BOTH SIDES.	1 NO.	
11	65mm Ø G.I. PIPE - CLASS HEAVY WITH MAX. LENGTH OF 13.0 Mtrs. WITH THREADED AT BOTH SIDES.	1 NO.	

NOTES:

- ALL WELDED POINT SHALL CLEANED AND APPLY TWO COAT OF ANTI-CORROSIVE PAINT AND TWO COATS OF ZINC RICH PAINT.

REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY
02	03.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK

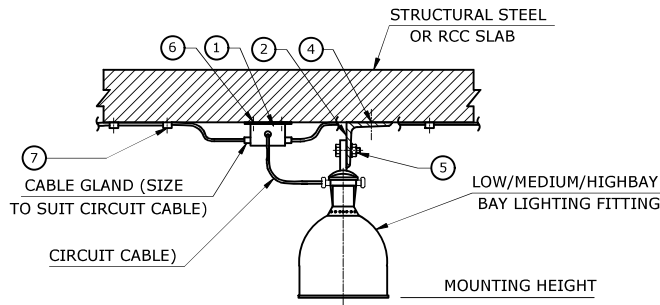


Energising Quality

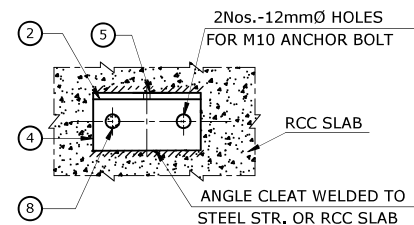
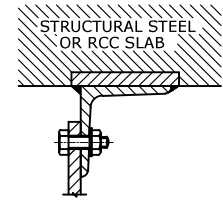
VCS QUALITY SERVICES PRIVATE LIMITED

TYPICAL DETAIL OF CEILING/SUSPENSION MOUNTED HIGHBAY LIGHTING FITTING

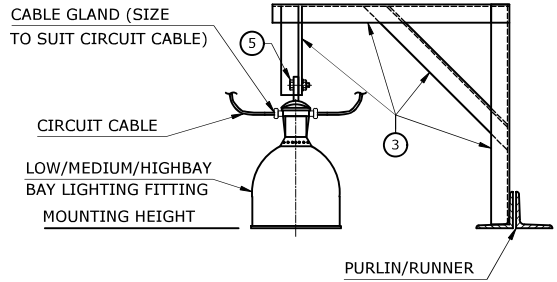
STANDARD DRAWING NO.		REV.	SIZE
VCS-STD-EL-4015		02	A4
SHEET NO.	1 OF 1		



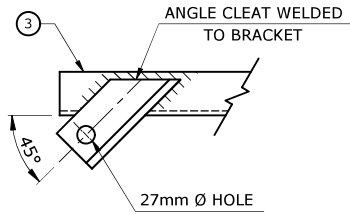
CEILING MOUNTED LIGHTING FITTING - CM6



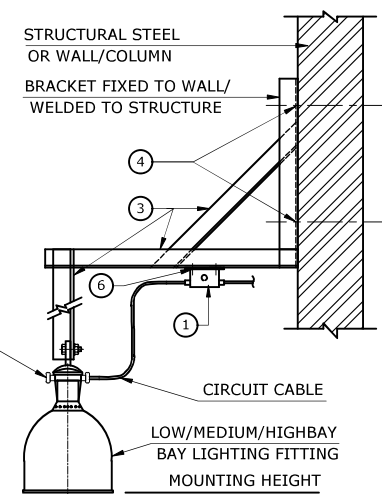
PLAN MOUNTING DETAIL ON R.C.C. SLAB



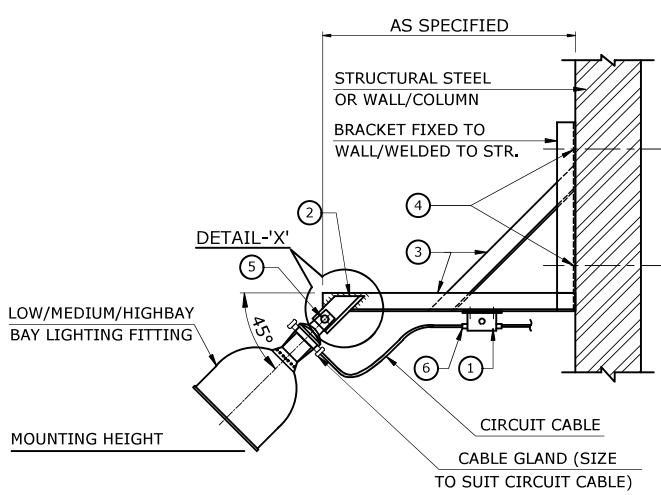
BRACKET MOUNTED ON PURLIN MOUNTING TYPE-BM6



DETAIL-'X'



BRACKET MOUNTING MOUNTING TYPE-BM6

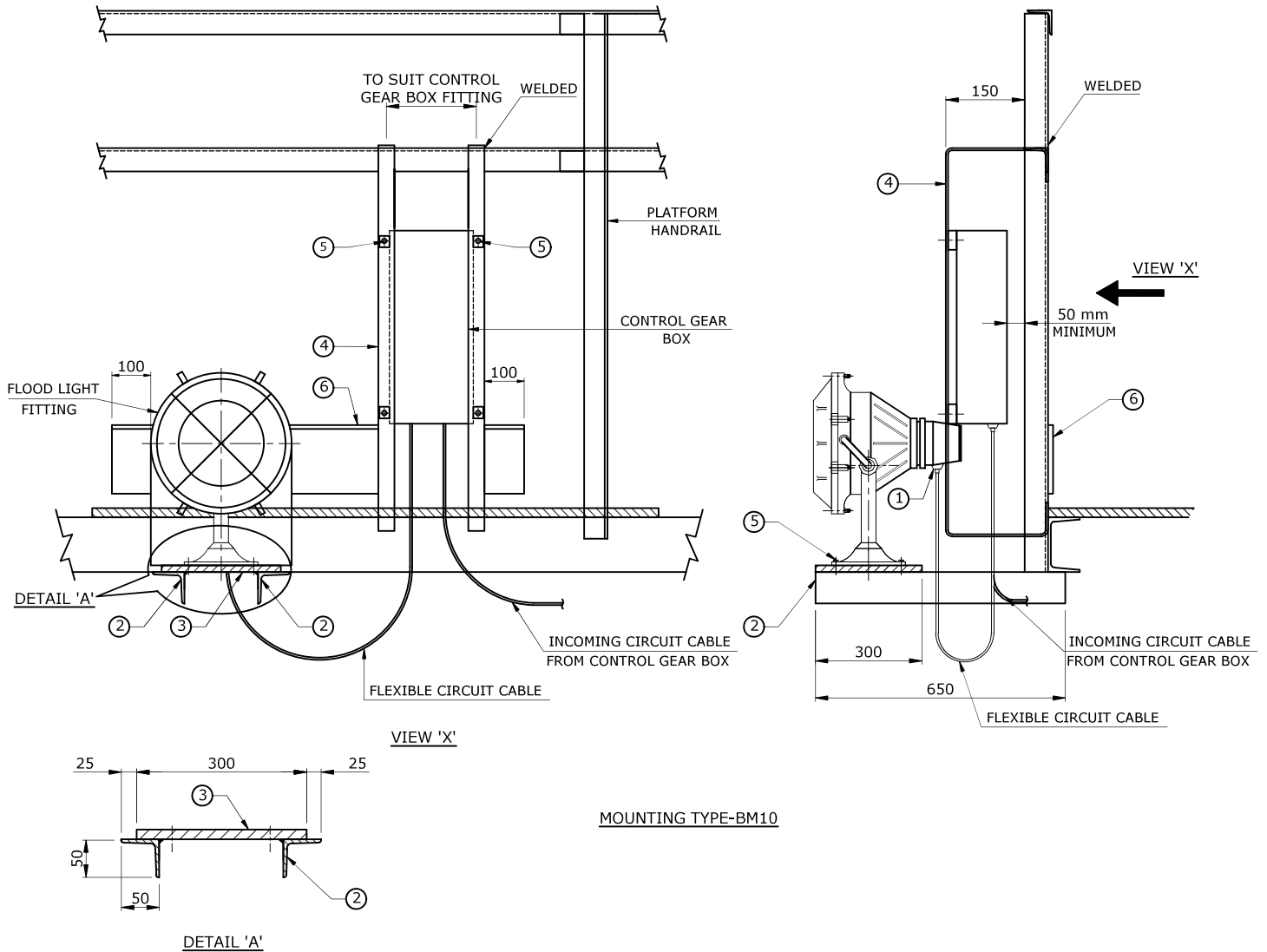


BRACKET MOUNTED 30° OR 45° MOUNTING TYPE-BM6

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	4WAY ROUND JUNCTION BOX	1 NO.	
2	ISA 50 x 50 x 6mm THK. 160mm LONG ANGLE CLEAT WITH 2 Nos. 12mm Ø HOLES	1 NO.	
3	ISA 50 x 50 x 6mm THK. LENGTH TO SUIT MTG. HEIGHT OR BRACKET SUSPENSION MOUNTING TYPE TO SUIT HEIGHT	1 NO.	
4	M10-68mm LONG ANCHOR STUD WITH LOCK WASHERS AND NUTS FOR FIXING OF ISA IN RCC SLAB	2 NOS.	
5	M25-40mm LONG BOLT WITH NUT AND PLAIN WASHERS	1 NO.	
6	M10-40mm LONG BOLT WITH NUT AND PLAIN WASHERS FOR MOUNTING OF LIGHTING FITTING	2 NOS.	
7	SADDLE/CLEAT ALONG WITH SUITABLE SIZE OF ANCHORING FIXING SCREWS TO SUIT FOR CIRCUIT CABLE SADDLE.	AS REQUIRED	

02	03.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



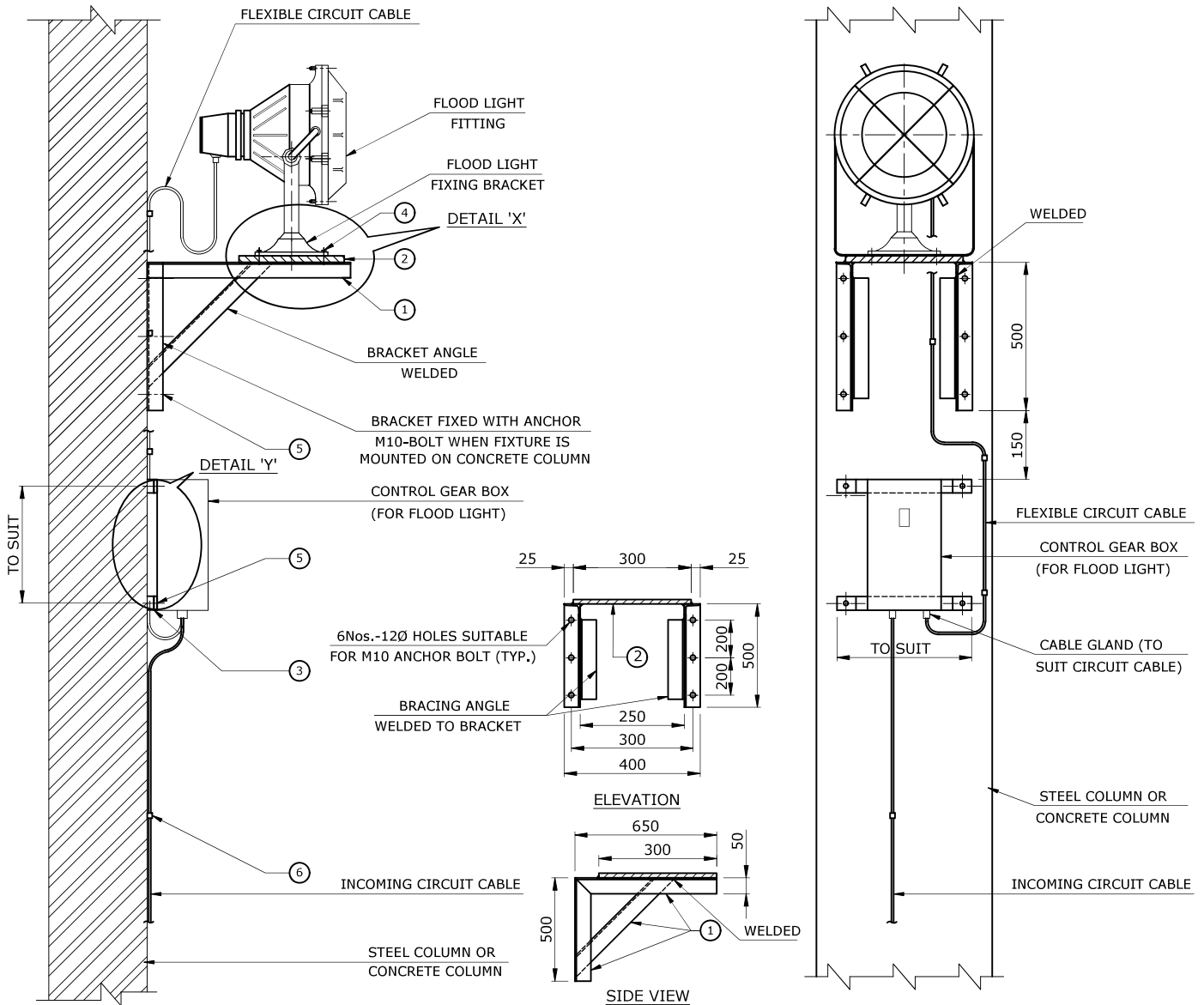
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	CABLE GLAND (SIZE TO SUIT CIRCUIT CABLE)	AS REQUIRED	
2	50 x 50 x 6mm THK, 650mm LONG M,S, ANGLE	2 NOS,	
3	300 x 300 x 6mm THK, MILD STEEL FLAT	AS REQUIRED	
4	50 x 6mm THK, MILD STEEL FLAT (LENGTH TO SUIT)	AS REQUIRED	
5	M10 x 50 LONG M.S. BOLT WITH NUT & WASHER	AS REQUIRED	
6	3 mm THK, KICK PLATE (SIZE TO SUIT AT SITE)	AS REQUIRED	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. AFTER INSTALLATION THE ASSEMBLY IS TO BE PREPARED, PRIMED AND PAINTED.

02	03.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



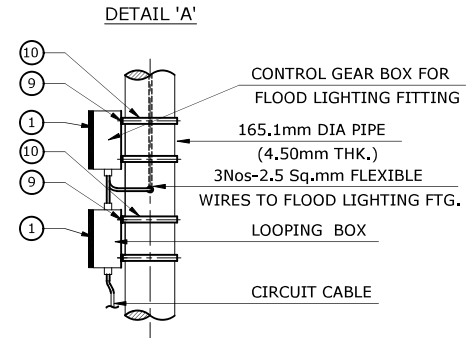
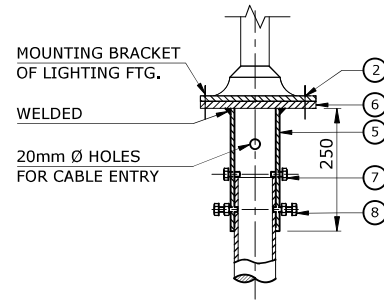
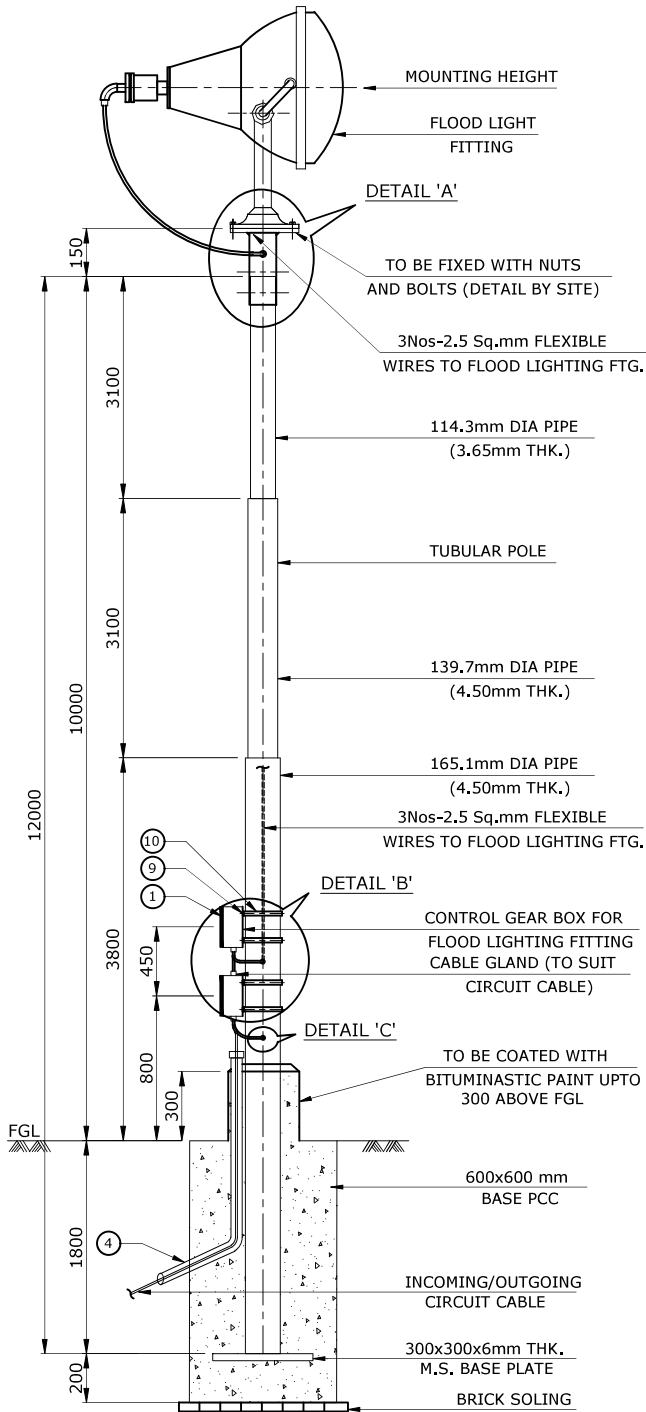
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	50 x 50 x 6mm THK, M.S. ANGLE (AS PER DETAIL-'X')	AS REQUIRED	
2	300 x 300 x 6mm THK, MILD STEEL PLATE FOR FIXING FLOOD LIGHT FITTING	1 NO.	
3	50 x 6mm THK, MILD STEEL FLAT (AS PER DETAIL-'Y')	2 NOS.	
4	M10-50mm LONG BOLT WITH LOCK NUT & WASHER FOR FIXING FLOOD LIGHT FITTING	4 NOS.	
5	M10-68mm LONG STUD WITH NUT & LOCK WASHER FOR FIXING BRACKET	10 NOS.	
6	SADDLE/CLEAT (TO SUIT CABLE SIZE) WITH SUITABLE SIZE FIXING ANCHOR BOLTS LOCK WASHER 7 NUTS,	AS REQUIRED	

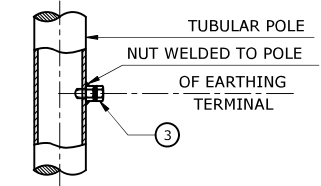
NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. AFTER INSTALLATION THE ASSEMBLY IS TO BE PAINTED WITH TWO COATS OF ANTI-CORROSIVE PAINT AND TWO COATS OF EPOXY PAINTS.

02	03.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



DETAIL 'B'



DETAIL 'C'

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	STREET LIGHTING LOOPING BOX	1 NO.	
2	M8 x 40mm LONG BOLT WITH NUTS & PLAIN WASHER FOR FIXING FLOOD LIGHT	AS REQUIRED	
3	EARTHING TERMINAL M10-40mm LONG BOLT WITH NUTS, 2Nos. SPRING WASHERS & 2Nos. PLAIN WASHERS	1 NO.	
4	75mm NB G.I. PIPE SLEAVE	2 NOS.	
5	M.S PIPE CAP TO SUIT 114,30mm DIA PIPE	1 NO.	
6	300 x 300 x 10mm THICK M.S. PLATE	1 NO.	
7	M10-40mm LONG BOLT TO BE USED AS STOPPER	3 NOS.	
8	M10 x 40mm LONG BOLT WITH LOCK NUT TO BE USED AS HOLDER	3 NOS.	
9	M8-40mm LONG BOLT WITH NUTS & PLAIN WASHER FOR FIXING OF CONTROL GEAR BOX & LOOPING BOX	8 NOS.	
10	BRACKET/CLAMP MADE OUT FROM 25x6mm THK. M.S. FLAT FOR FIXING OF CONTROL GEAR BOX & LOOPING BOX	4 NOS.	

NOTES:

- LIGHTING FITTING FIXING DETAILS TO BE FURNISHED BY SITE.
- EARTHING TERMINALS ARE LOCATED DIAMETRICALLY OPPOSITE.
- ALL NUTS, BOLTS AND WASHER SHALL BE GALVANISED OR ZINC PASSIVATED.
- MOUNTING DETAILS OF CONTROL GEAR BOX & LOOPING BOX REFER INSTALLATION DETAILS.
- ALL SHARP EDGES AND BURRS SHALL BE REMOVED.
- POLE SHALL BE MADE FROM TUBULAR STEEL PIPES SWAGED AND WELDED CONFORMING TO DESIGNATION 410TP-60 AS PER IS-2713 (PART II) - 1980.

02	03.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL MOUNTING DETAIL OF 2 NOS.
INDUSTRIAL TYPE FLOOD LIGHTING FITTING

STANDARD DRAWING NO.

REV. SIZE

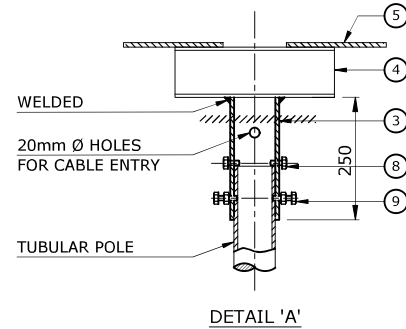
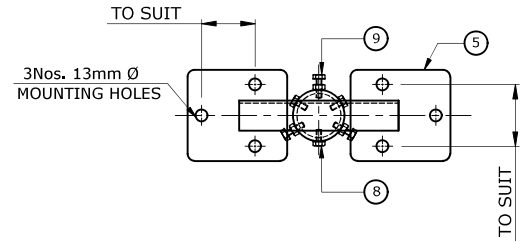
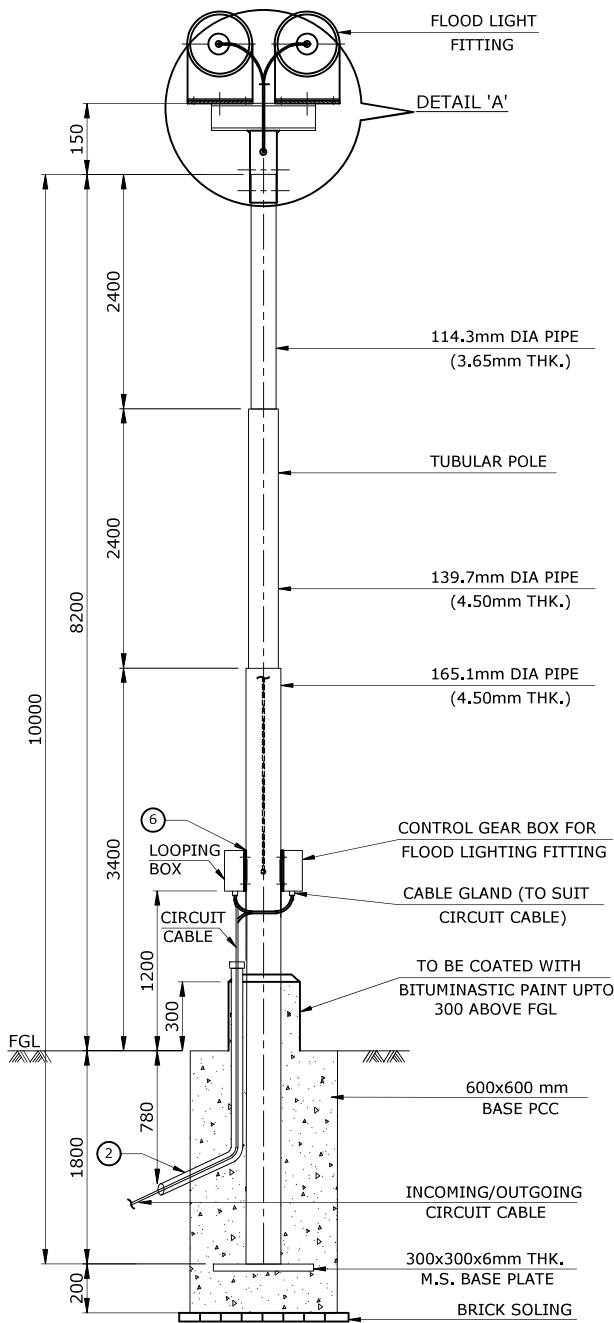
VCS-STD-EL-4019

02

A4

SHEET NO.

1 OF 1



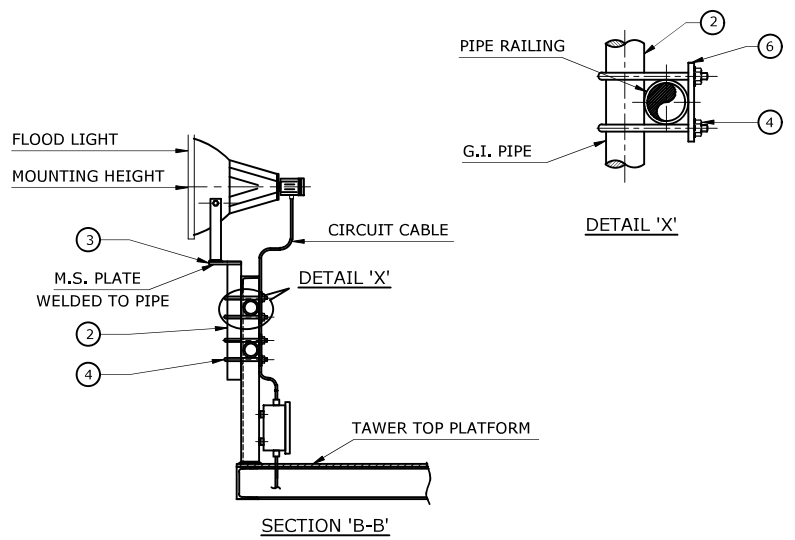
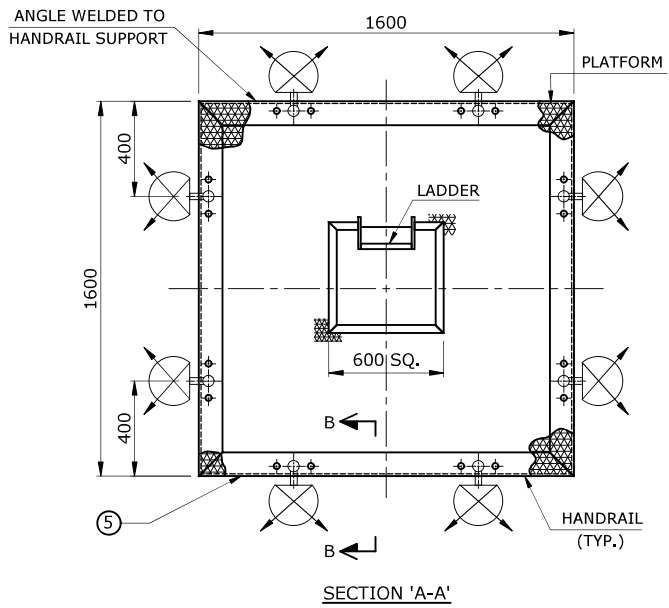
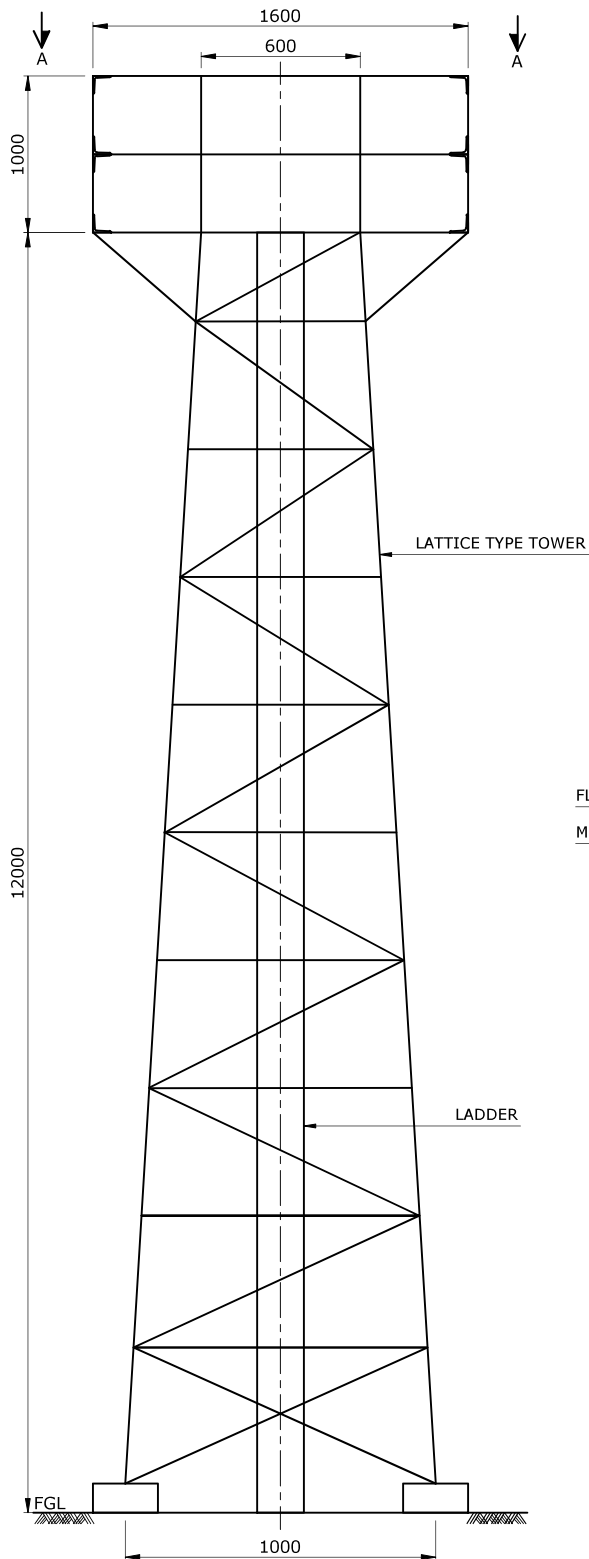
MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	STREET LIGHTING LOOPING BOX	-	
2	75mm NB G.I. PIPE SLEEVE	2 NOS.	
3	M.S PIPE CAP (TO SUIT 1114,30mm DIA PIPE)	1 NO.	
4	100 x 50 x 6mm THK, M.S. CHANNEL (LENGTH TO SUIT)	AS REQUIRED	
5	300 x 300 x 6mm THICK M.S. PLATE	2 NOS.	
6	50 x 6mm THICK M.S. FLAT (LENGTH TO SUIT)	AS REQUIRED	
7	M10-30mm LONG BOLT WITH NUT, WASHER FOR FIXING FLOOD LIGHT	AS REQUIRED	
8	M10 BOLT (TO BE USED AS STOPPER)	3 NOS.	
9	M10 BOLT WITH LOCK NUT (TO BE USED AS HOLDER)	3 NOS.	

NOTES:

1. FIXING DETAILS TO BE FURNISHED BY SITE.
2. EARTHING TERMINALS ARE LOCATED DIAMETRICALLY OPPOSITE.
3. 2 Nos. 20mm Ø HOLES LOCATED DIAMETRICALLY OPPOSITE.
4. MOUNTING DETAILS OF CONTROL GEAR BOX & LOOPING BOX TO BE FIXED BY SITE.
5. FOR INCANDESCENT LAMP, FLEXIBLE CABLE TO GO DIRECTLY TO FITTING.
6. ALL SHARP EDGES AND BURRS SHALL BE REMOVED.
7. ALL NUTS, BOLTS AND WASHER SHALL BE GALVANISED OR ZINC PASSIVATED.
8. POLE SHALL BE MADE FROM TUBULAR STEEL PIPES SWAGED AND WELDED CONFORMING TO DESIGNATION 410TP-60 AS PER IS-2713 (PART II) - 1980.

REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY
02	04.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK



MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	CONTROL GEAR BOX	AS REQUIRED	
2	40mm Ø G.I. PIPE (CLASS HEAVY) LENGTH TO SUIT	AS REQUIRED	
3	150 x 250 x 6mm THK, M.S. PLATE	AS REQUIRED	
4	M10 'U' BOLT OF SUITABLE SIZE (THREADED AT BOTH ENDS) WITH NUT AND WASHER	4 NOS.	
5	75 x 75 x 6mm THK, M,S, ANGLE (LENGTH TO SUIT)	AS REQUIRED	
6	25 x 6mm THICK M,S, FLAT (LENGTH TO SUIT)	AS REQUIRED	

NOTES:

02	04.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL MOUNTING DETAIL OF 8 NOS.
FLOOD LIGHTING FITTING ON LATTICE
TYPE TOWER

STANDARD DRAWING NO.

REV. SIZE

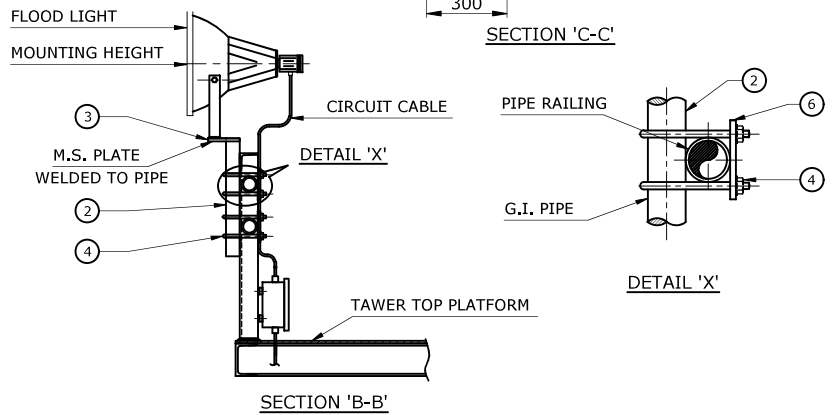
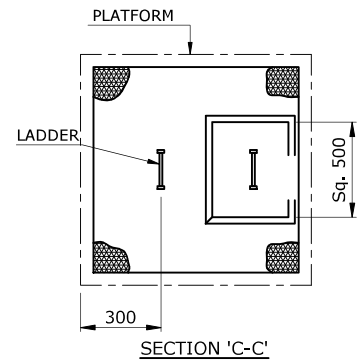
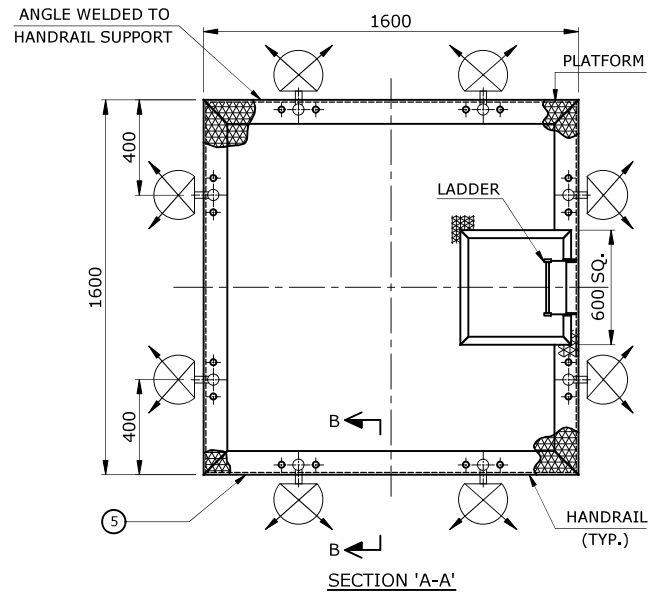
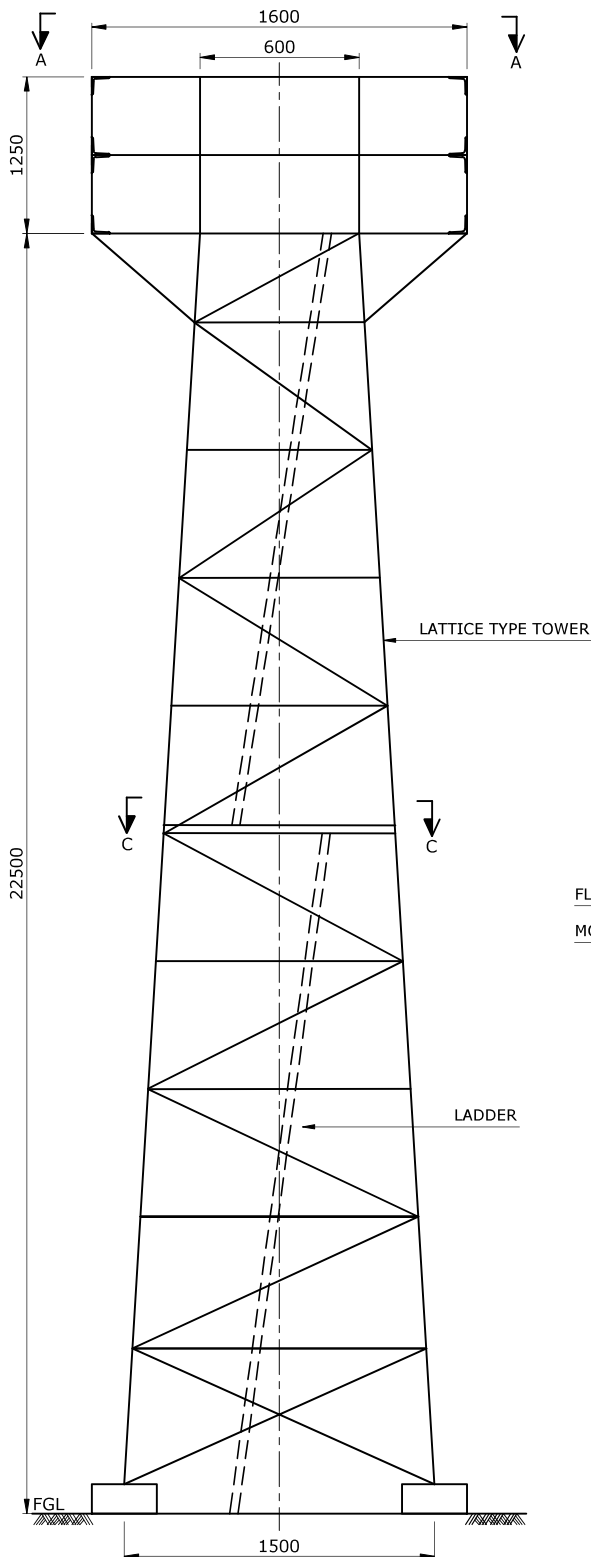
VCS-STD-EL-4021

02

A4

SHEET NO.

1 OF 1

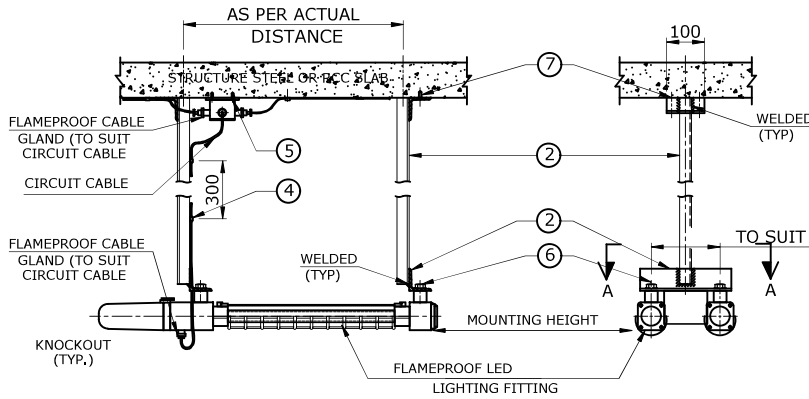


MATERIAL TAKE-OFF

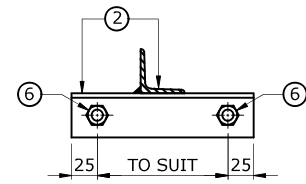
ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	CONTROL GEAR BOX	AS REQUIRED	
2	40mm Ø G.I. PIPE (CLASS HEAVY) LENGTH TO SUIT	AS REQUIRED	
3	150 x 250 x 6mm THK, M,S, PLATE	AS REQUIRED	
4	M10 'U' BOLT OF SUITABLE SIZE (THREADED AT BOTH ENDS) WITH NUT AND WASHER	2 NOS.	
5	75 x 75 x 6mm THK, M,S, ANGLE (LENGTH TO SUIT)	AS REQUIRED	
6	25 x 6mm THICK M,S, FLAT (LENGTH TO SUIT)	AS REQUIRED	

NOTES:

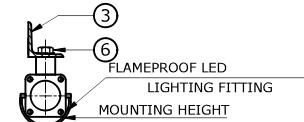
02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



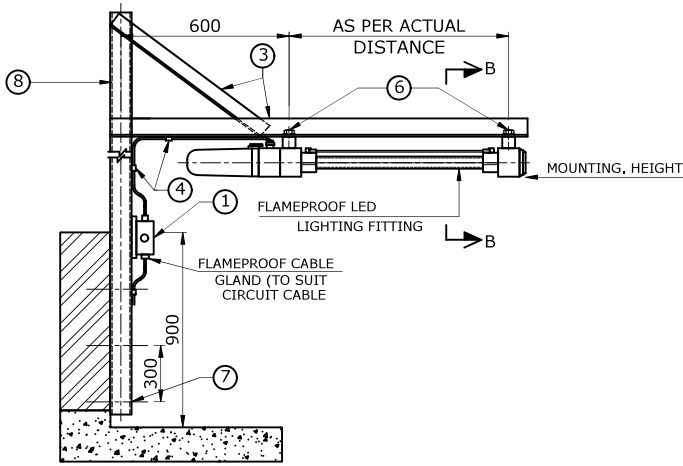
DETAIL FOR SUSPENSION MOUNTING
MOUNTING TYPE : SM9



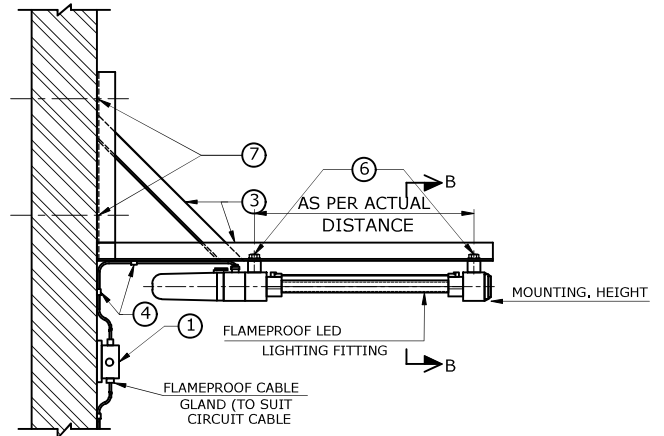
SECTION 'A-A'



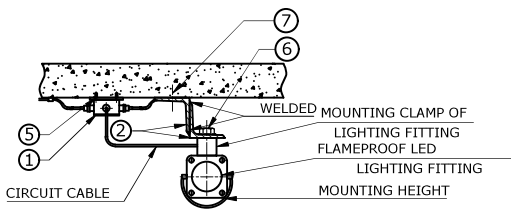
SECTION 'B-B'



DETAIL FOR ROOF/TERRACE MOUNTING
MOUNTING TYPE : BM9



DETAIL FOR BRACKET MOUNTING
MOUNTING TYPE : BM9



DETAIL FOR CEILING MOUNTING
MOUNTING TYPE : CM9

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY			REMARKS
		CM	SM	BM	
1	FLAMEPROOF JUNCTION BOX WITH TERMINAL BLOCK.	1 NO.	1 NO.	1 NO.	
2	ISA 50 x 50 x 6mm THK. (LENGTH TO SUIT)	AS REQD.	AS REQD.	-	
3	BRACKET MADE OUT FROM ISA 75 x 75 x 6mm THK. (LENGTH TO SUIT).	-	-	AS REQD.	
4	SADDLE/CLEAT ALONG WITH SUITABLE SIZE OF FIXING SCREWS TO SUIT FOR CIRCUIT CABLE.	AS REQD.	AS REQD.	AS REQD.	
5	M8-68mm LONG STUD ANCHOR WITH NUT & LOCK WASHER FOR JUNCTION BOX FIXING TO CEILING/WALL.	2 NOS.	2 NOS.	2 NOS.	
6	M10x40mm LONG BOLT NUT & PLAIN WASHER.	2 NOS.	4 NOS.	4 NOS.	
7	M10-68mm LONG STUD ANCHOR WITH NUT & LOCK WASHER FOR FIXING OF ISA TO CEILING/WALL.	2 NOS.	4 NOS.	4 NOS.	
8	ISMC -150 (LENGTH TO SUIT)	-	-	AS REQD.	

NOTES:

02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL SUSPENSION/CEILING/PIPE/BACKET
MOUNTING DETAILS OF FLAMEPROOF
WELLGLASS LIGHTING FITTING

STANDARD DRAWING NO.

REV. SIZE

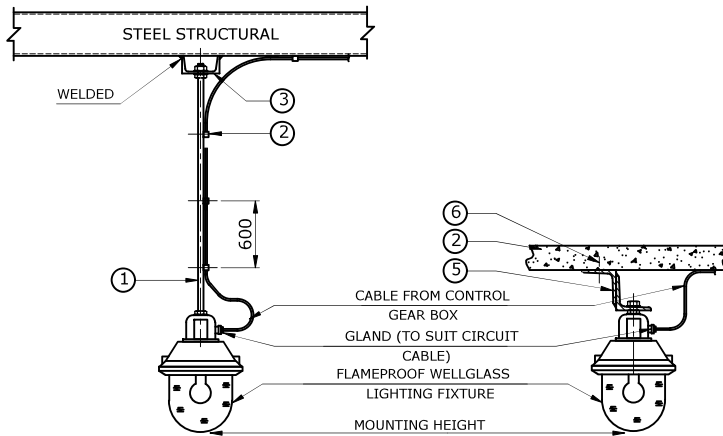
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02

A4

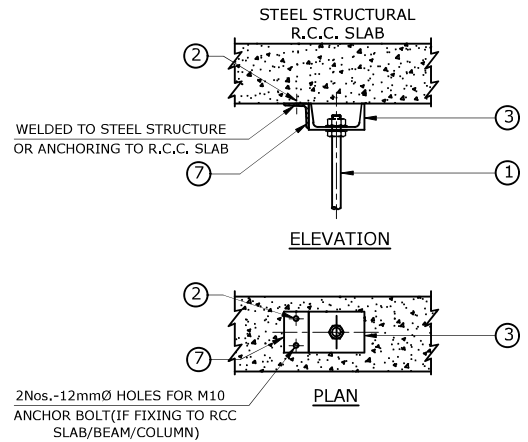
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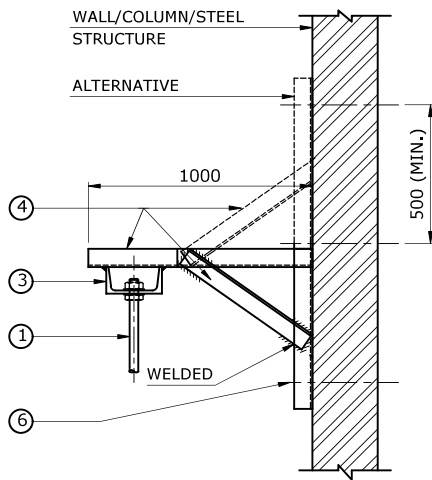


SUSPENSION MOUNTING
MOUNTING TYPE : SM8

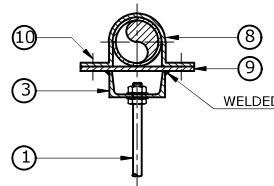
CEILING MOUNTING
MOUNTING TYPE : CM8



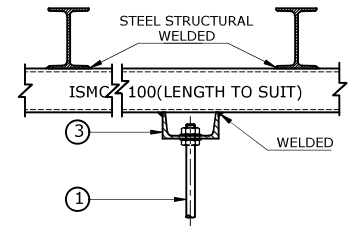
MOUNTING DETAIL ON R.C.C. SLAB



WALL/COLUMN BRACKET
MOUNTING TYPE : BM8



TUBULAR TRUSS
MOUNTING TYPE : PM8



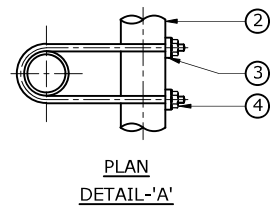
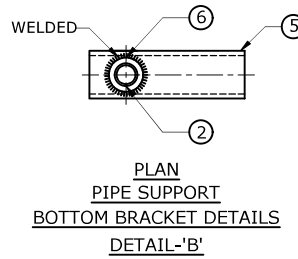
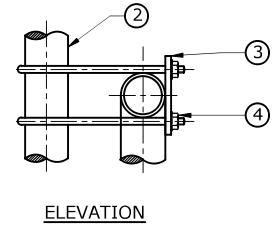
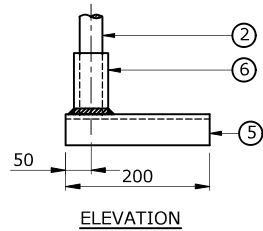
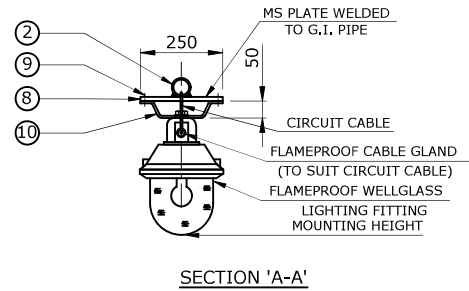
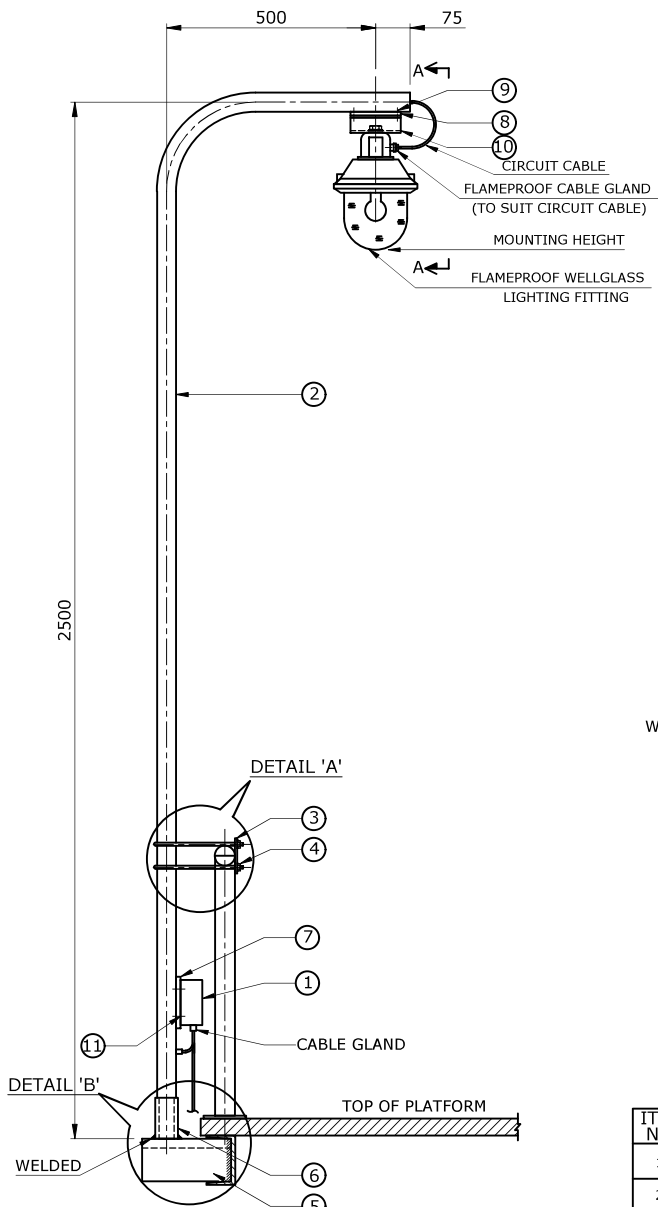
SUSPENSION FROM STEEL STRUCTURE
MOUNTING TYPE-SM8

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	19mm Ø M.S. ROD (LONG AS REQUIRED) THREADED WITH BOTH ENDS WITH 2 Nos. NUTS, 2Nos. PLAIN/SPRING WASHERS	2 NOS.	
2	SADDLE/CLEAT ALONG WITH SUITABLE SIZE OF FIXING SCREWS. TO SUIT FOR CIRCUIT CABLE.	AS REQUIRED	
3	ISMC 100 x 50 - 75mm LONG (OR MORE LONG AS REQUIRED)	1 NO.	
4	BRACKET MADE OUT FROM ISA 50 x 50 x 6mm THK.	AS REQUIRED	
5	ISMC 75 x 40 - 50mm LONG (OR MORE LONG AS REQUIRED)	1 NO.	
6	M10-40mm LONG ANCHOR BOLT FOR MOUNTING OF PLATE/ BRACKET/ISMC TO WALL/COLUMN/CEILING	AS REQUIRED	
7	ISA 50 x 50 x 6mm THK, WITH 2 Nos.-Ø12mm HOLES	AS REQUIRED	
8	CLAMP/SADDLE (TO BE MADE OUT OF 50 x 6mm M.S. FLAT) WITH FIXING SCREWS. (CLAMP TO SUIT SIZE OF TRUSS/PIPE)	1 NO.	
9	50 x 6mm THK. M.S. FLAT (FOR SADDLE/CLAMP FIXING) LENGTH TO SUIT SIZE OF TRUSS/PIPE	1 NO.	
10	M10-40mm LONG BOLT WITH NUT & WASHER FOR CLAMP/ SADDLE BOLTED	2 NOS.	

NOTES:

02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	FLAMEPROOF CONTROL GEAR BOX	1 NO.	
2	40mm Ø G.I. PIPE (CLASS HEAVY) WITH ONE SIDE 300mm RADIUS 90° BEND & OTHER END THREADED	1 NO.	
3	CLAMP MADE OUT FROM 25x6mm THK, M.S. FLAT 150mm LONG FOR FIXING WITH 'U' BOLT	4 NOS.	
4	10mm Ø 'U' BOLT SUITABLE WITH BOTH END THREADED WITH NUTS & PLAIN WASHER SUITABLE FOR 40mm Ø G.I. PIPE	4 NOS.	
5	ISMC-100 x 50 x 200mm LONG FOR SUPPORT TO PIPE	1 NO.	
6	G.I. PIPE COUPLING TO SUIT 40mm Ø G.I. PIPE, COUPLING WELDED TO ISMC-100 x 50	1 NO.	
7	150 x 150 x 3mm THK, M.S. PLATE WITH SUITABLE SIZE OF HOLES FOR MOUNTING OF JUNCTION BOX	1 NO.	
8	25 x 6mm THK.-250 LONG M.S. FLAT WELDED TO G.I. PIPE	1 NO.	
9	M10-40mm LONG BOLT WITH NUT & PLAIN WASHER FOR FIXING OF BRACKET TO FLAT	2 NOS.	
10	BRACKET/CLAMP MADE OUT FROM 25 x 6mm THK, M.S. FLAT 325mm LONG FOR LIGHTING FITTING FIXING	1 NO.	
11	M6-40mm LONG BOLT WITH NUT & PLAIN WASHER FOR FIXING OF JUNCTION BOX TO MS PLATE.	2 NOS.	

NOTES:

1. MOUNTING HEIGHT SHALL NOT BE EXCEED 4M FROM THE PLATFORM.
2. CABLE GLAND USED FOR TERMINATION OF FLEXIBLE CABLE SHALL BE DOUBLE SEAL WITH CONE GRIP FOR BRADING.
3. PLUG ALL UNUSED ENTRIES OF LIGHTING FITTING AND JUNCTION BOX WITH THREADED STOPPING PLUGS.

02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL CEILING/SUSPENSION MOUNTING
DETAILS OF FLAMEPROOF BULK HEAD
LIGHTING FITTING

STANDARD DRAWING NO.

REV. SIZE

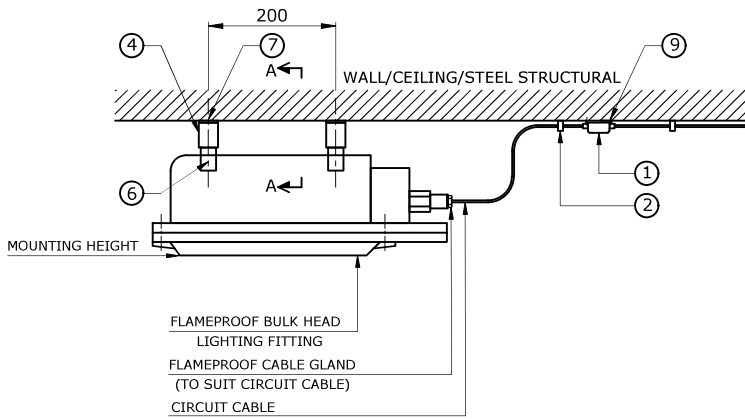
VCS-STD-EL-4025

02

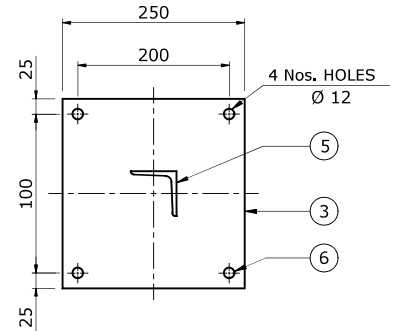
A4

SHEET NO.

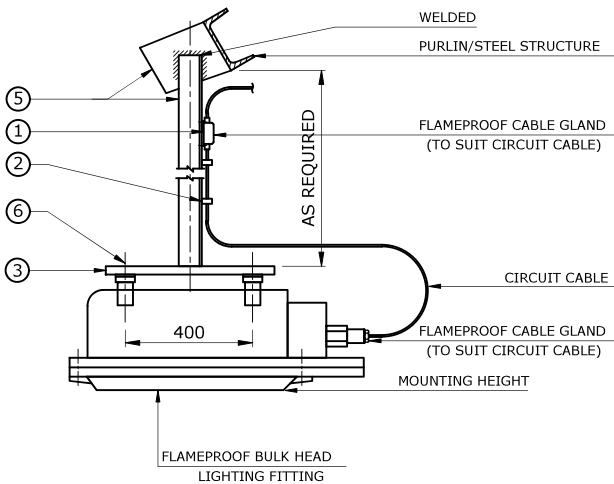
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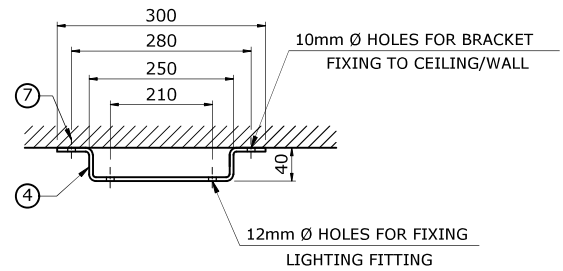
CEILING/WALL MOUNTED BULK HEAD
FITTING MOUNTING TYPE : CM7



MOUNTING DETAILS OF PLATE



PENDENT (SUSPENSION) MOUNTING BULK HEAD
LIGHTING FITTING (ON PURLIN)
MOUNTING TYPE : SM7



SECTION 'A-A'

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY		REMARKS
		CM7	SM7	
1	FLAMEPROOF CONTROL GEAR BOX	1 NO.	1 NO.	
2	SADDLE/CLEAT WITH FIXING SCREWS/ANCHOR STUD, NUTS & LOCK WASHERS FOR CIRCUIT CABLE.	AS REQD.	AS REQD.	
3	250 x 250 x 8mm THK, M,S, PLATE	-	1 NO.	
4	MOUNTING BRACKET/CLAMP (TO MADE OUT FROM 25 x 6mm THK FLAT) FOR LIGHTING FITTING.	2 NOS.	-	
5	ISA 50 x 50 x 6mm THK, (LENGTH TO SUIT)	-	AS REQD.	
6	M10-40mm LONG BOLT WITH NUT & WASHER FOR BOLTING FITTING TO BRACKET	4 NOS.	4 NOS.	
7	M10-68mm LONG STUD WITH NUT & LOCK WASHER FOR BRACKET MOUNTING TO CEILING	4 NOS.	-	
8	M8-40mm LONG BOLT WITH NUT & WASHER FOR BOLTING JUNCTION BOX TO ANGLE	-	2 NOS.	
9	M8-68mm LONG ANCHOR STUD WITH NUT & LOCK WASHER FOR JUNCTION BOX MOUNTING TO CEILING	2 NOS.	-	

NOTES:

1. ALL DIMENSIONS ARE IN MILLIMETERS.
2. ALL SHARP EDGES AND BURRS SHALL BE REMOVED.
3. ALL NUTS, BOLTS AND WASHERS SHALL BE GALVANISED OR ZINC PASSIVATED.

REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY
02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL DETAILS OF BULKHEAD LIGHTING
FITTING MOUNTED ON HANDRAILS

STANDARD DRAWING NO.

REV. SIZE

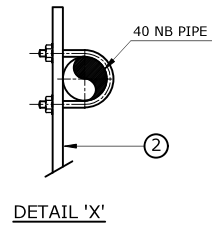
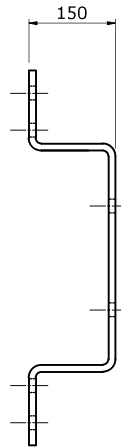
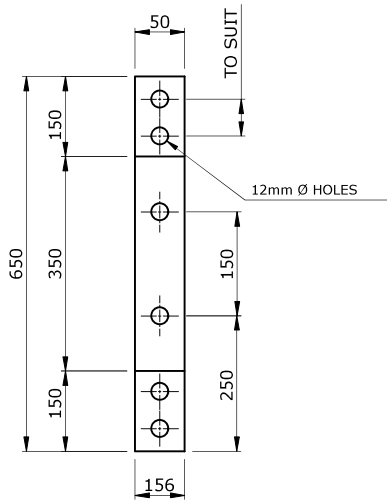
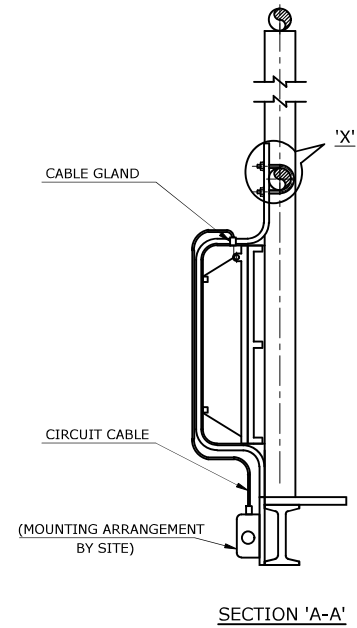
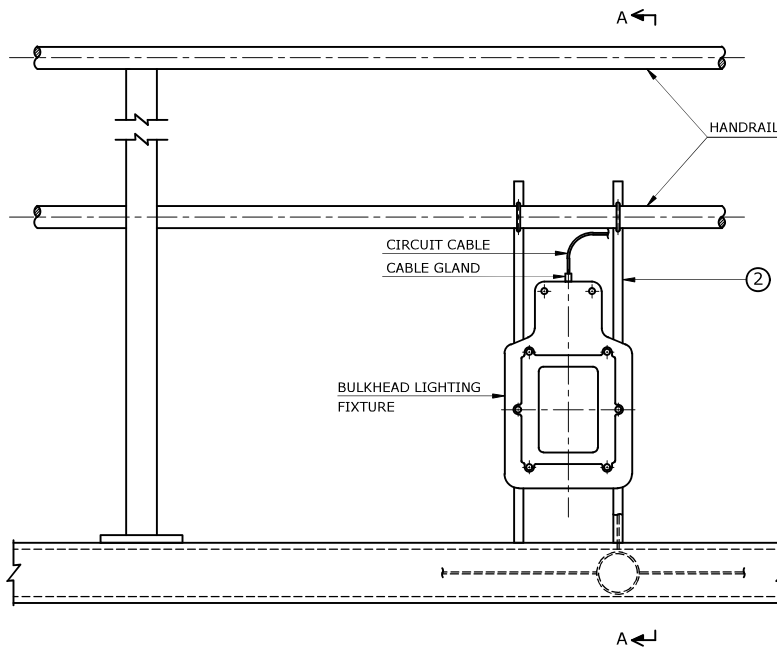
VCS-STD-EL-4026

02

A4

SHEET NO.

1 OF 1



MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	JUNCTION BOX	1 NO.	
2	FIXING BRACKET MADE OUT OF 32 x 6mm M,S, FLAT	2 NOS.	
3	10mm 'U' BOLT SUITABLE SIZE (BOTH END THREADED) WITH NUTS WASHERS.	AS REQUIRED	

NOTES:

02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES PRIVATE LIMITED

TYPICAL MOUNTING DETAILS OF VESSEL LIGHT GLASS LIGHTING FITTING

STANDARD DRAWING NO.

VCS-STD-EL-4027

SHEET NO.

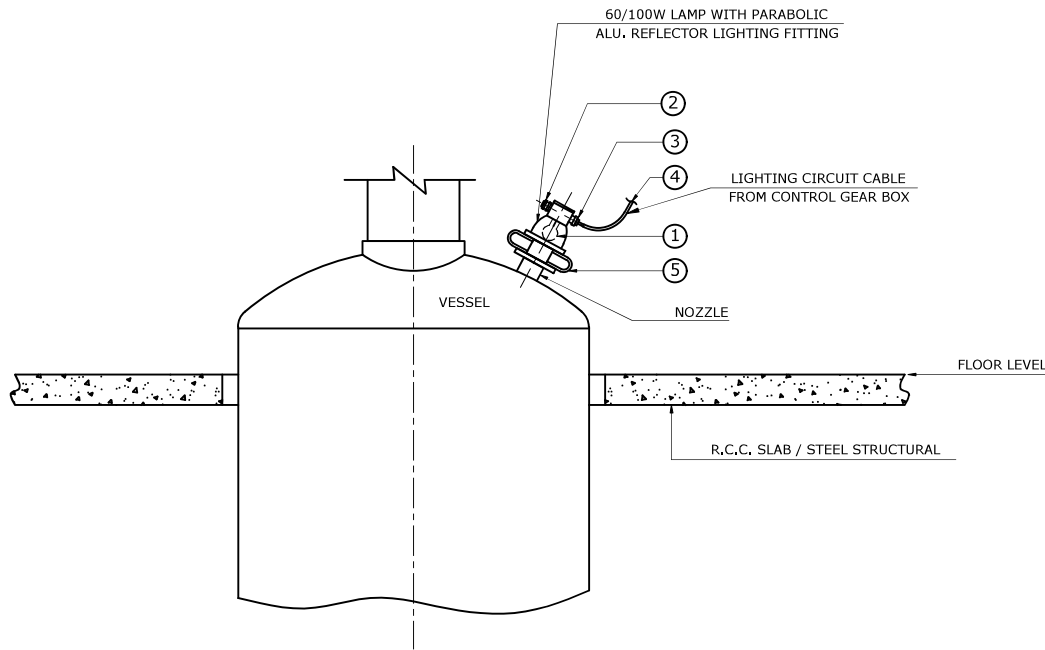
1 OF 1

REV.

02

SIZE

A4



MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1	60/100 W LAMP & PARABOLIC ALUMINUM REFLECTOR	1 NO.	BY PURCHASER
2	PLUG	1 NO.	BY PURCHASER
3	CABLE GLAND (TO SUIT CIRCUIT CABLE)	AS REQUIRED	BY PURCHASER
4	CIRCUIT CABLE	AS REQUIRED	BY PURCHASER
5	6mm THK, M.S, MOUNTING BRACKET (SIZE TO SUIT)	1 NO.	BY PURCHASER

NOTES:

- LONGER CABLE ROUTE SHALL BE SELECTED TO KEEP EXTRA LENGTH OF CABLE FOR REGLANDING IF NECESSARY.

02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY

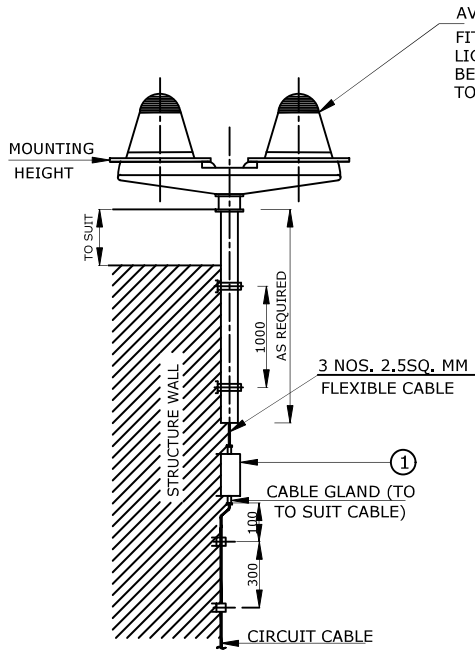


Energising Quality

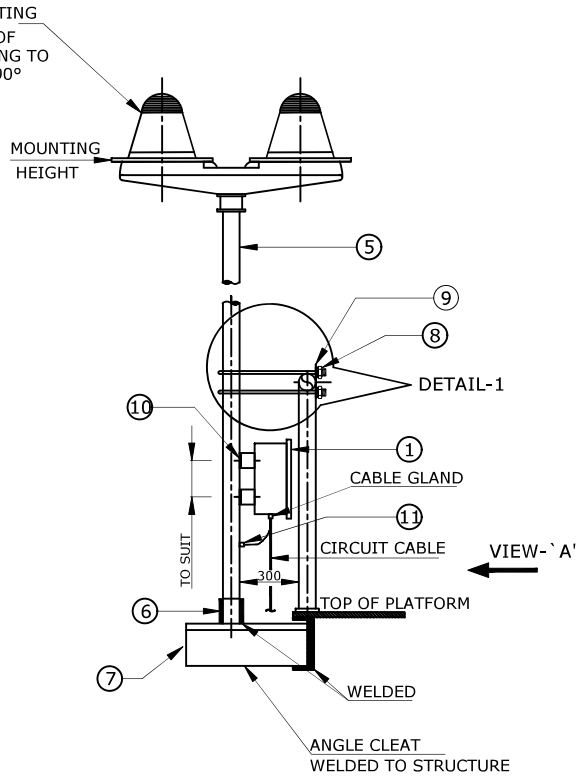
VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL MOUNTING DETAILS OF DOUBLE
OBSTRUCTION LIGHT FOR AVIATION
LIGHTING FITTING

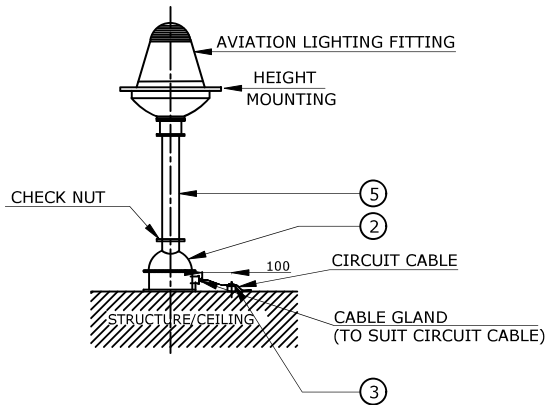
STANDARD DRAWING NO.		REV.	SIZE
VCS-STD-EL-4028		02	A4
SHEET NO.	1 OF 1		



FITTING MOUNTED ON SIDE
SUPPORT TO STRUCTURE/ WALL
MOUNTING TYPE-PM11



FITTING MOUNTED ON PLATFORM
MOUNTING TYPE-PM11



FITTING DIRECTLY MOUNTED
ON STRUCTURE/ CEILING MOUNTING TYPE PM-11

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1.	JUNCTION BOX WEATHER PROOF TYPE	1 No.	
2.	JUNCTION BOX WEATHER PROOF WITH DOME COVER TO SUIT 40 MM DIA G.I. PIPE.	1 No.	
3.	SADDLE/CLEAT WITH FIXING M.S. 66MM LONG SCREWS/ STUCS, NUTS & LOCK WASHER FOR CIRCUIT CABLE.	AS REQUIRED	
4.	SADDLE/CLEAT WITH FIXING M.S. 66MM LONG SCREWS/ STUCS, NUTS & LOCK WASHER FOR 40 MM DIA PIPE.	AS REQUIRED	
5.	40 MM DIA G.I. PIPE (LENGTH AS REQUIRED) WITH BOTH ENDS THREADED & CHECK NUTS.	1 No.	
6.	G.I. COUPLING SUITABLE FOR 40 MM DIA G.I. PIPE.	1 No.	
7.	ISMC-100x50x350 MM LONG.	1 No.	
8.	10 MM DIA 'U' BOLT SUITABLE FOR 40 MM PIPE WITH BOTH ENDS THREADED WITH NUTS 2NO. PLAIN AND 1NO. SPRING WASHERS WITH SUITABLE LENGTH.	4 No.	
9.	50x6x150MM LONG G.I. FLAT WITH 2NO. 12 MM DIA HOLES	4 No.	
10.	150X150X6 THICK M.S. PLATE WITH 2NO. 12MM DIA HOLES OR 50x6x300 LONG G.I. FLAT WITH 2NO. 12MM DIA HOLES	1 No.	
11.	RURDER GROUMENT TO SUIT FLEXIBLE WIRE.	2 No.	

NOTES:

1. WEIGHT OF FITTING 5,5 KG.
2. USE FLEXIBLE WIRE FOR CONNECTION TO LIGHTING FROM JUNCTION BOX.
3. MOUNTING HEIGHT OF THE AVIATION LIGHTING FITTING SHALL BE AT HIGHER ELEVATION THAN THE STRUCTURE ON WHICH FITTING IS TO BE MOUNTED.

02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL DETAILS OF LOOPING BOX FOR
STREET LIGHTING FITTING

STANDARD DRAWING NO.

VCS-STD-EL-4029

SHEET NO.

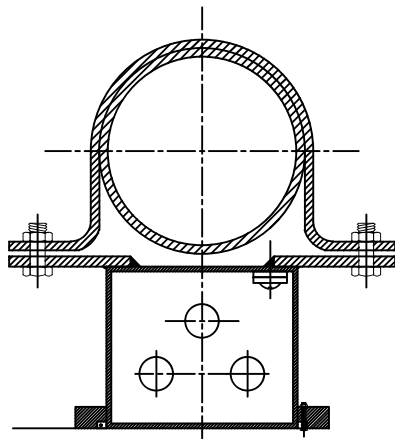
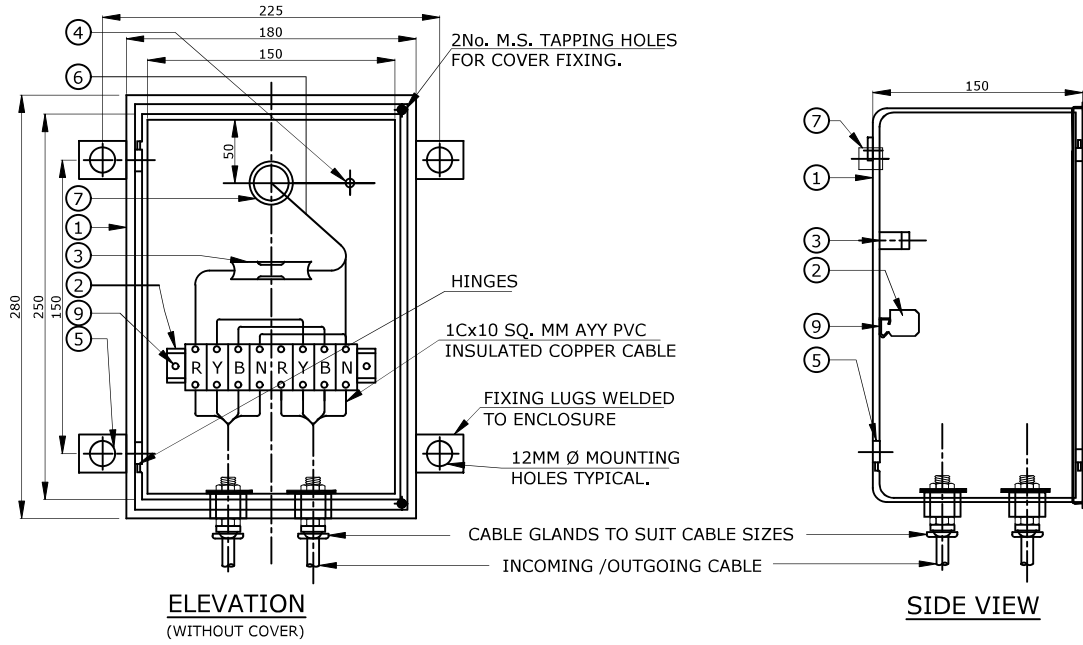
1 OF 1

REV.

02

SIZE

A4

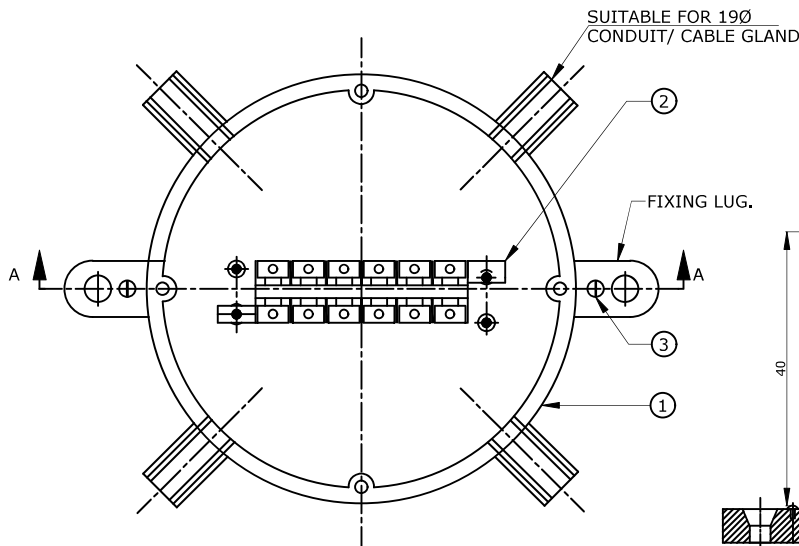


MATERIAL TAKE-OFF

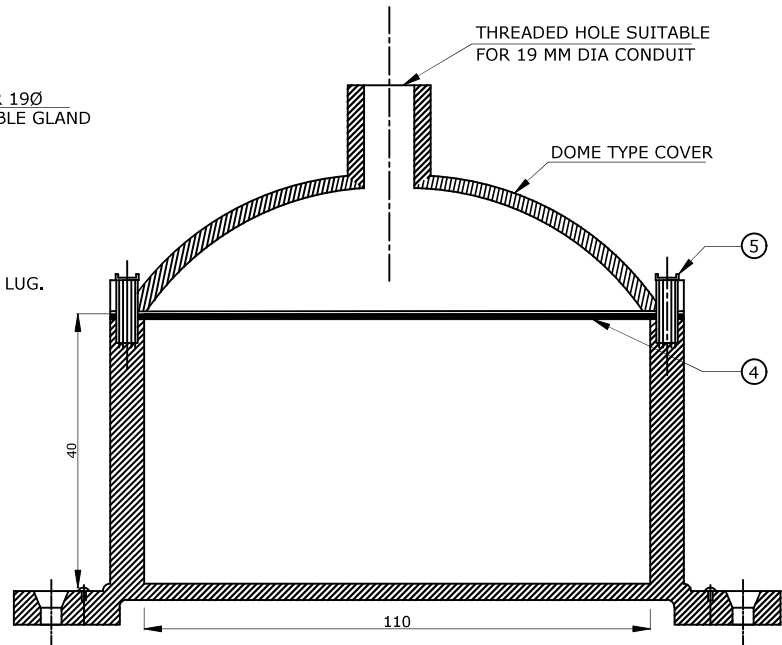
ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1.	2 MM THICK SHEET STEEL ENCLOSURE WITH COVER	1 No.	
2.	6 No. 30A, TERMINAL CONNECTOR SUITABLE FOR TERMINATING OF 4Cx16 SQ. MM CABLE (CHANNEL MFG.)	1 No.	
3.	4A, HRC FUSE	1 No.	
4.	M4x20 MM LONG ROUND HEAD EARTHING SCREW WITH 2 No. PLAIN WASHER & 1 No. SPRING WASHER.	2 No.	
5.	25x3 MMx70 MM LONG MS FLAT WITH 12 MM Ø HOLE WELDED TO ENCLOSURE LOGS FOR MOUNTING	4 No.	
6.	3Cx2.5 SQ. MM PVC FLEXIBLE WIRES.	AS REQUIRED	
7.	20 MM Ø -25 MM LONG G.I. PIPE WELDED TO ENCLOSURE	1 No.	
8.	M10x40 MM LONG BOLTS WITH NUT , LOCK NUT & PLAIN WASHERS FOR ENCLOSURE FIXING.	4 No.	
	MOUNTING CHANNEL SUITABLE FOR 6 No. 30A, TERMINAL CONNECTOR (LENGTH AS REQUIRED)	1 No.	

NOTES:

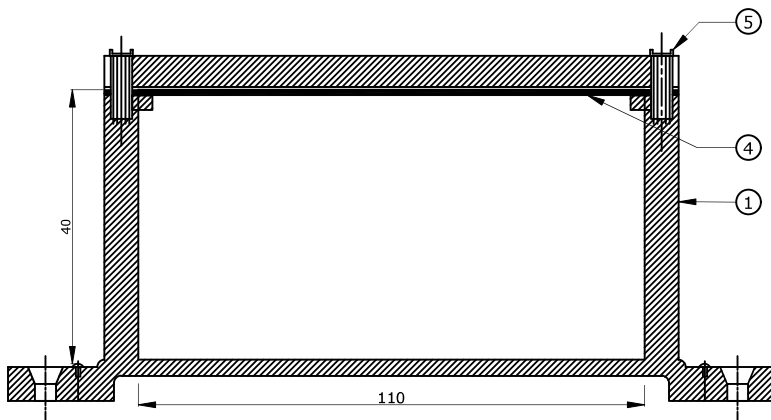
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01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



VIEW WITH COVER REMOVED



JUNCTION WITH DOME COVER
SECTION 'A-A'



JUNCTION WITH PLANE COVER
SECTION 'A-A'

MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1.	JUNCTION BOX (CAST ALUMINIUM)	AS REQUIRED	
2.	30A, 4 WAY, TERMINAL BLOCK	1 No.	
3.	8 MM LONG BRASS SCREW WITH 2 No. PLAIN AND SPRING WASHER FOR INTERNAL AND EXTERNAL EARTHING TERMINAL.	2 No.	
4.	DISC TYPE NEOPRENE GASKET.	1 No.	
5.	COVER FIXING G.I. SCREWS WITH WASHER	4 No.	

NOTES:

02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES PRIVATE LIMITED

TYPICAL MOUNTING DETAILS OF SINGLE PHASE SOCKET OUTLET ON HANDRAIL

STANDARD DRAWING NO.

VCS-STD-EL-4031

SHEET NO.

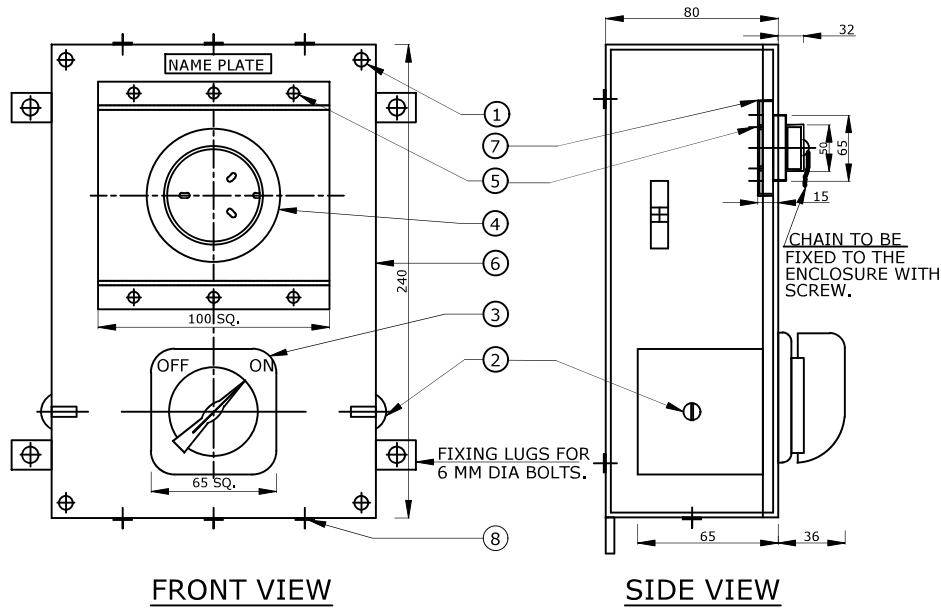
1 OF 1

REV.

02

SIZE

A4



MATERIAL TAKE-OFF

ITEM NO.	DESCRIPTION	QUANTITY	REMARKS
1.	5 MM DIA M/C SCREWS.	4 No.	
2.	5 MM DIA EARTHING SCREW WITH 2 No. PLAIN 1 No. SPRING WASHER.	2 No.	
3.	16A, 2 POLE, ON-OFF ROTARY SWITCH.	1 No.	
4.	10A, 1Ø AND EARTH METAL CLAD SOCKET OUTLET	1 No.	
5.	3 MM ,DIA M/C SCREWS	6 No.	
6.	14 SWG M.S. BOX WITH COVER FOR MOUNTING OF SWITCH AND SOCKET OUTLET	1 No.	
7.	14 SWG M.S. SHEET FIXED TO COVER PLATE FROM INSIDE FOR MOUNTING OF SOCKET	1 No.	
8.	19 MM DIA KNOCKOUT	6 No.	

NOTES:

- SIMILAR ARRANGEMENT CAN BE EMPLOYED FOR 20A, SP & E, 30A, TP & E, SD WITH 30A, DP & 63A, TP SWITCH RESPECTIVELY.
- EPOXY BASED PAINT OF SPECIFIED SHADE SHALL BE APPLIED.
- REAR ENGRAVED PERSPEX OF LAMINATED PLASTIC NAME PALTE WITH APPROPRIATE INSCRIPTION SHALL BE FIXED ON COVER WITH OR SUITABLE ADHESIVE.

02	26.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	02.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



GENERAL NOTES:

1. ENTIRE EARTHING INSTALLATION SHALL COMPLY WITH THE REQUIREMENT OF IS-3043 INDIAN ELECTRICITY RULES OISD REGULATION AND OTHER APPLICABLE STATUTORY REGULATIONS AND SAFETY CODES IN THE LOCALITY OF THE INSTALLATION.
2. PIPE ELECTRODE SHALL BE USED FOR EARTH ELECTRODES. THE EARTH ELECTRODES SHALL BE KEPT SUFFICIENTLY AWAY FROM STRUCTURE TO CLEAR FOUNDATIONS, FOOTING ETC. SPACING OF MINIMUM 6 METERS SHALL BE KEPT BETWEEN ADJACENT EARTH ELECTRODES.
3. RESISTANCE OF EARTHING STATION SHALL BE MEASURED AT EACH EARTH ELECTRODE AFTER ITS INSTALLATION BY MEANS OF AN EARTH MEGGER. RESISTANCE OF EARTHING GRID SHALL BE MAINTAINED WITHIN 1 OHM (BY ADDITION OF EARTH ELECTRODE IN PARALLEL, IF NECESSARY).
4. THE MAIN EARTH LOOP (MEL) IN PLANT AREAS SHALL BE GENERALLY ROUTED UNDERGROUND. EARTH CONDUCTORS TO INDIVIDUAL EQUIPMENT SHALL BE RUN ALONG WITH POWER AND CONTROL / LIGHTING CABLES. WHEN EQUIPMENT ARE LOCATED AWAY FROM M.E.L. , SUITABLE SUB LOOPS MAY BE RUN UP TO THEM FOR DERIVING CONNECTIONS FOR INDIVIDUAL EQUIPMENT.
5. ALL ELECTRICAL EQUIPMENT SHALL BE EARTHED AT TWO DISTINCT POINTS WITH EARTH CONDUCTOR.
6. PROCESS/ UTILITY PIPE RACK COLUMN SHALL BE EARTHED AT EVERY 25 mtr. AT NEAREST AVAILABLE EARTHING NETWORK AS PER IS : 3043.
7. ALL STRUCTURE STEEL WORK TO BE CONNECTED TO EARTHING SYSTEM.
8. FOR CONDUIT WIRING OF LIGHTING CIRCUITS, FOR EARTHING OF LIGHTING FITTINGS, JUNCTION BOXES 14 SWG
9. THE LIGHTNING PROTECTION SYSTEM SHALL BE DESIGNED IN ACCORDANCE WITH IS :62305` CODE OF PRACTICE FOR PROTECTION OF BUILDING AND ALLIED STRUCTURES AGAINST LIGHTNING'.
10. EARTH SYSTEM AND LIGHTNING PROTECTION SHALL BE BONDED TO EACH OTHER TO PREVENT SIDE FLASH OVER, IF ADEQUATE CLEARANCE BETWEEN THE TWO SYSTEM CAN NOT BE MAINTAINED.
11. WHEN EQUIPMENT DO NOT HAVE EXTERNAL EARTHING TERMINAL ELECTRICAL CONTRACTOR SHALL PROVIDE THE SAME ON EQUIPMENT. SIZES OF EARTH CONDUCTORS SHALL GENERALLY AS PER REQUIREMENTS.

02	01.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

GENERAL NOTES-EARTHING

STANDARD DRAWING NO.

VCS-STD-EL-4101

SHEET NO.

2 OF 2

REV.

02

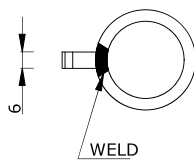
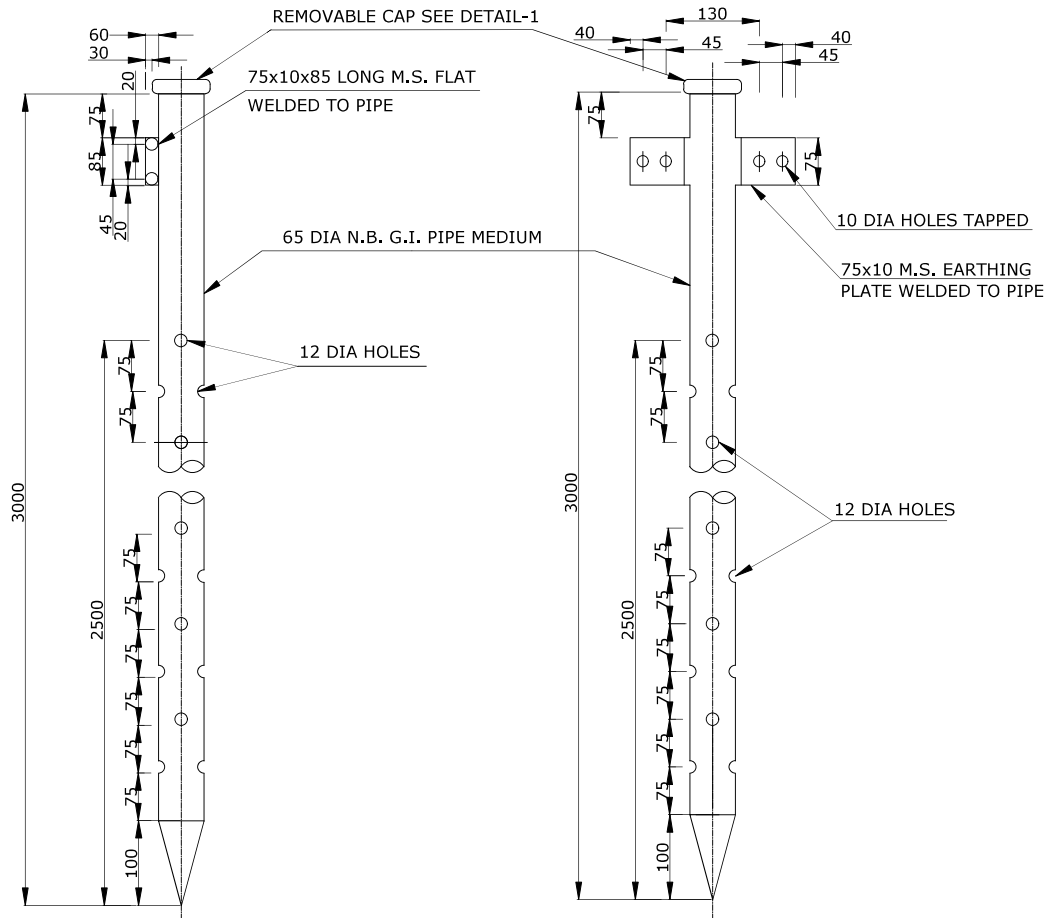
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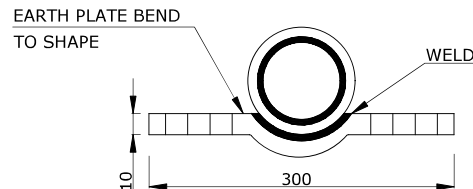
EQUIPMENT EARTHING SCHEDULE

TYPE OF EQUIPMENT	EARTHING CONDUCTOR SIZE (SEE NOTE-1)
MOTORS UPTO & 3.7 kW	8 SWG SOLID G.I. WIRE
MOTORS FROM 5.5kW TO 30kW & WELDING RECEPTACLES	10mm (3/8*) DIA G.I. WIRE ROPE
MOTORS ABOVE 30kW INCLUDING HV MOTORS	16mm (5/8*) DIA G.I. WIRE ROPE/ 40x5 mm G.I. STRIP
BUILDING COLUMNS	40x5 mm G.I. STRIP
STORAGE TANKS (VERTICAL & HORIZONTAL)	40x5 mm G.I. STRIP
LOADING RACKS	40x5 mm G.I. STRIP
VESSELS & HEAT EXCHANGERS	40x5 mm G.I. STRIP
SMALL EQUIPMENT & INSTRUMENTS	8 SWG SOLID G.I. WIRE
LIGHTING, POWER & INSTRUMENT PANEL	10mm (3/8*) DIA G.I. WIRE ROPE
MAIN EARTH BUS / MV & HT SWITCH GEAR INTERCONNECTIONS / POWER TRANSFORMER	AS SPECIFIED
EHV & HV SUB-STATION	AS SPECIFIED
PUSH BUTTON STATION	8 SWG SOLID G.I. WIRE
STREET LIGHTING POLES	10mm (3/8*) DIA G.I. WIRE ROPE
LIGHTING TRANSFORMER	16mm (5/8*) DIA G.I. WIRE ROPE
PIPE RACK	40x5 mm G.I. STRIP
BONDING OF PIPE	25 SQ. mm INSULATED FLEXIBLE CU. CABLE
LIGHTNING PROTECTION	25x3 mm G.I. EARTH STRIP

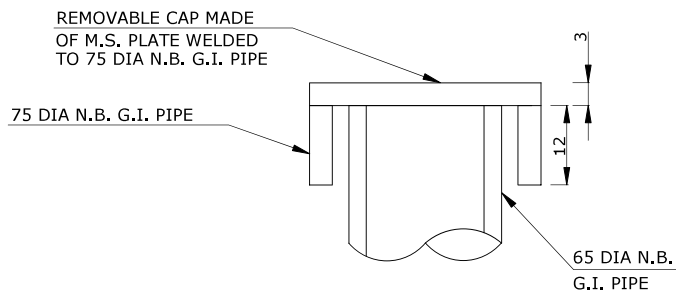
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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



TYPE-1



TYPE-2

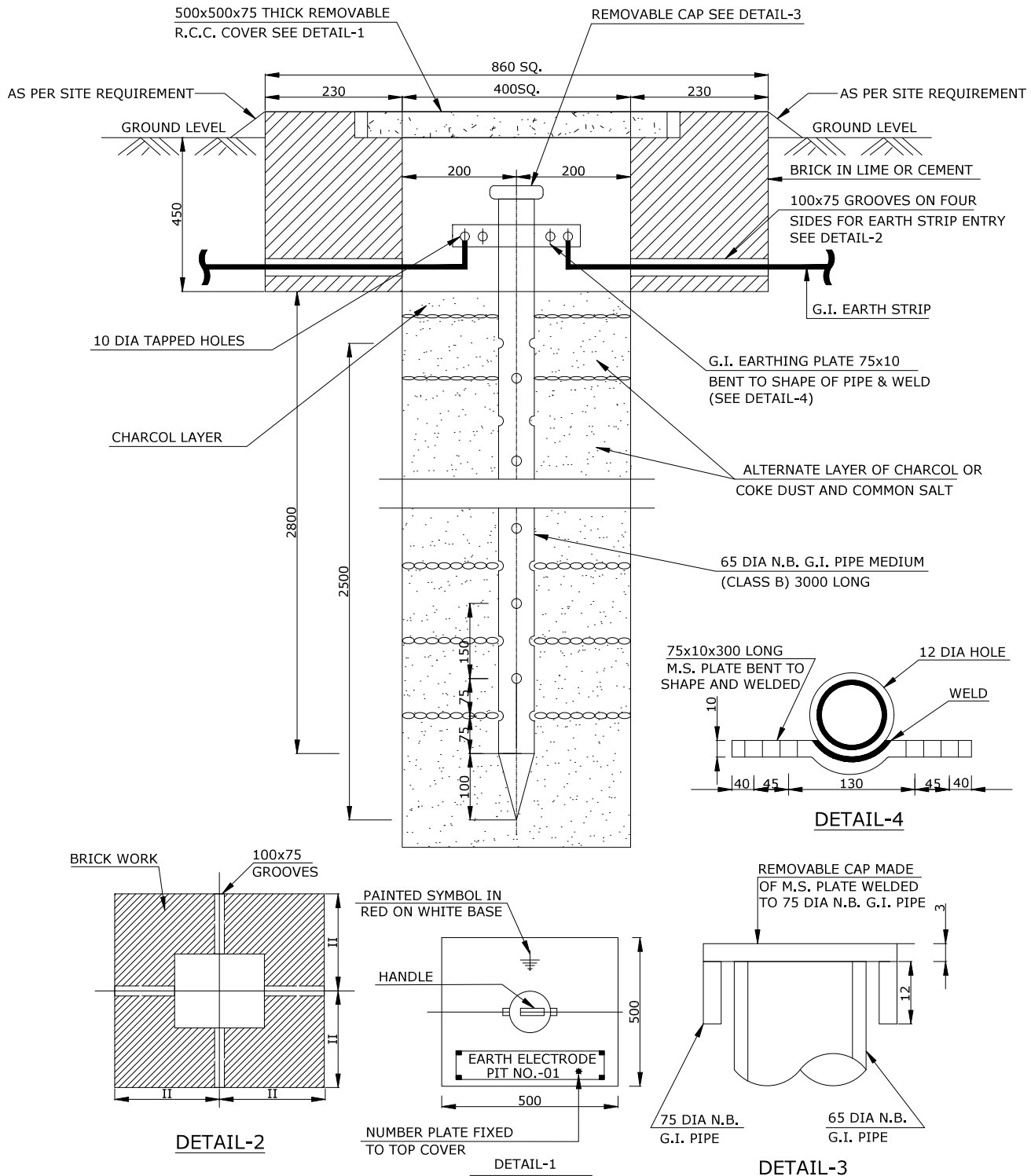


DETAIL-1

NOTES:

1. THE PIPE ASSEMBLY SHALL BE HOT DIP GALVANISED AFTER FABRICATION.
2. UNLESS STATED OTHERWISE ON PLAN DRAWINGS, ONLY TYPE-2 SHALL BE USED.

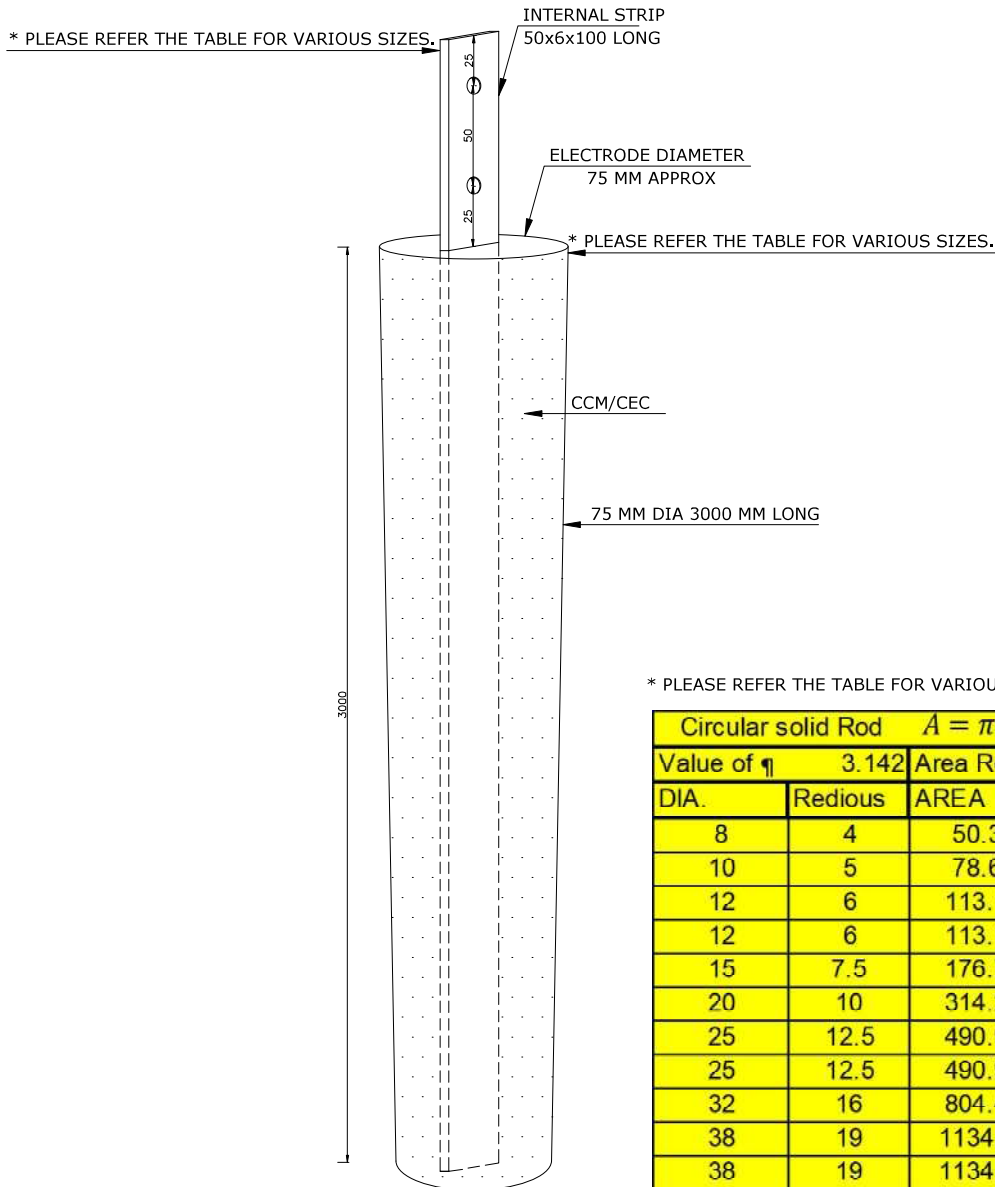
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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



NOTES:

1. THE PIPE ASSEMBLY SHALL BE HOT DIP GALVANISED AFTER FABRICATION.
2. BRICK WORK SHALL BE DONE AFTER COMPACTING THE SOIL.

02	01.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



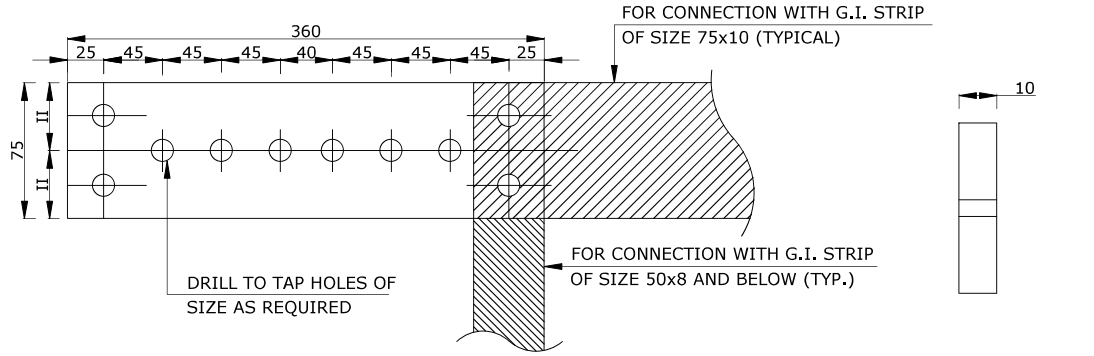
* PLEASE REFER THE TABLE FOR VARIOUS SIZES.

Circular solid Rod		$A = \pi r^2$	A = L X W		Earthing Strip		
Value of η		3.142	Area Rod	Area Strip	Earthing strip		
DIA.	Redious	AREA	AREA	Length	Width	Nos	
8	4	50.3	50	20	2.5	1	
10	5	78.6	75	25	3	1	
12	6	113.1	125	25	5	1	
12	6	113.1	128	32	4	1	
15	7.5	176.7	192	32	6	1	
20	10	314.2	300	50	6	1	
25	12.5	490.9	500	50	10	1	
25	12.5	490.9	520	65	8	1	
32	16	804.4	750	75	10	1	
38	19	1134.3	1200	100	12	1	
38	19	1134.3	1200	75	8	2	

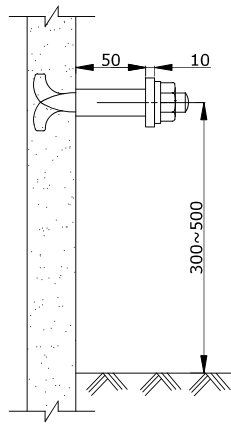
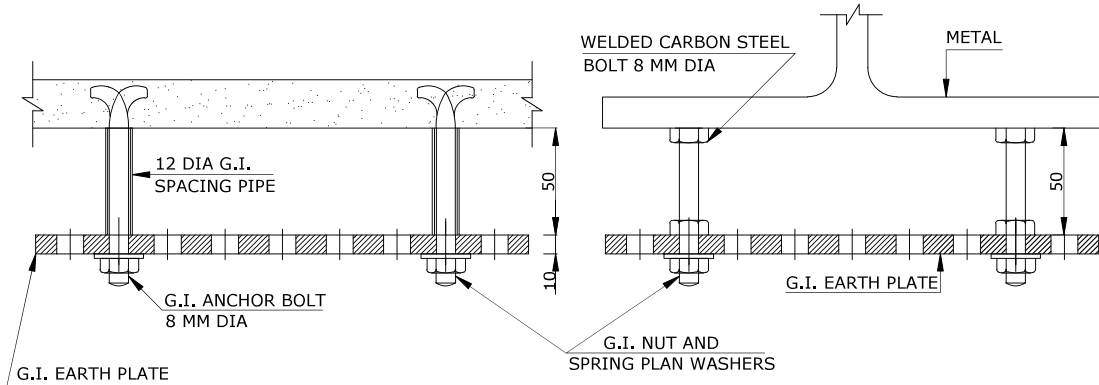
NOTES:

1. CCM-CRYSTALLINE CONDUCTIVE MATERIAL / CEC-CHEMICAL EARTHING COMPOUND.
2. IT'S SUPERIOR CONDUCTIVE MATERIAL THAT SOLVES TOUGHEST GROUNDING PROBLEMS & MAKES CONDUCTIVITY LAYER CONTACTING WITH A ELECTRODE CLOSELY.
3. THE CCM/CEC NATURAL FEATURES OF STRONG ABSORBENT & MOISTURE RETENTION KEEP THE SOIL MOIST FOR A LONG TIME AND REDUCE SURROUNDING SOIL RESISTANCE.
4. CCM/CEC ENHANCING COMPOUND IS ENVIRONMENT FRIENDLY AND DOES NOT HARM GROUND WATER & NO HAZARDOUS CHEMICAL.
5. CCM/CEC CONTAINS CORROSION INHIBITOR TO PROTECT THE ELECTRODES AND PIPES.
6. CCM/CEC IS HIGHLY CONDUCTIVE & HANDLE ANY CLIMATIC CONDITION.
7. GI STRIP SHALL BE HOT DEEP GALVANIZE ZINK OXIDE.
8. CCM/CEC SHALL BE GRAPHITE,ALUMINUM SILICATE,IRON OXIDE,NATURAL EARTH MINERALS.
9. EARTHING SHALL BE COMPLY TO LATEST IS-3043.

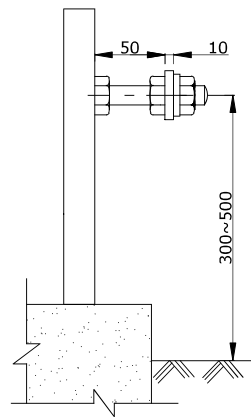
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REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



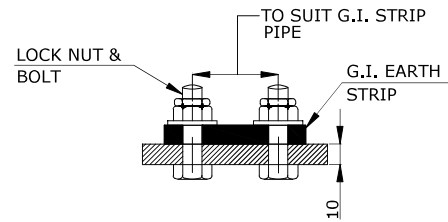
G.I. EARTH PLATE



TYPICAL INSTALLATION OF EARTH PLATE ON R.C.C. STRUCTURES



TYPICAL INSTALLATION OF EARTH PLATE ON STEEL STRUCTURES



TYPICAL FIXING DETAIL OF G.I. EARTH STRIP TO EARTH PLATE

NOTES:

1. WHERE FIRE PROOFING OF STEEL STRUCTURES ARE ENCOUNTERED LENGTH OF CARBON STEEL BOLT SHALL BE INCREASED FOR FIXING OF EARTH PLATE.
2. ALL CONNECTIONS WITH EARTH PLATE SHALL BE MADE WITH G.I. BOLT, NUT, SPRING AND PLAIN WASHERS.

02	01.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL EARTHING FOR MOTOR

STANDARD DRAWING NO.

VCS-STD-EL-4105

SHEET NO.

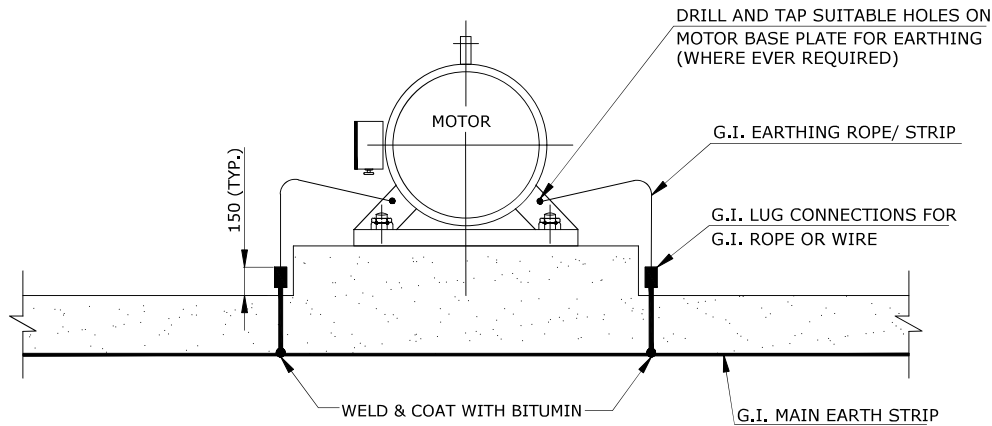
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REV.

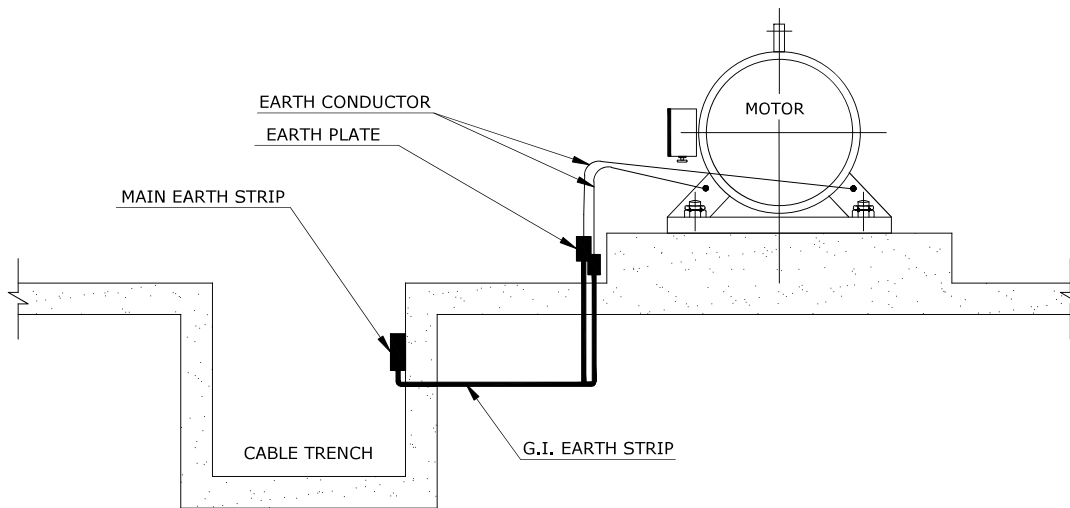
02

SIZE

A4



DETAIL-1
REMOTE EARTH PLATE

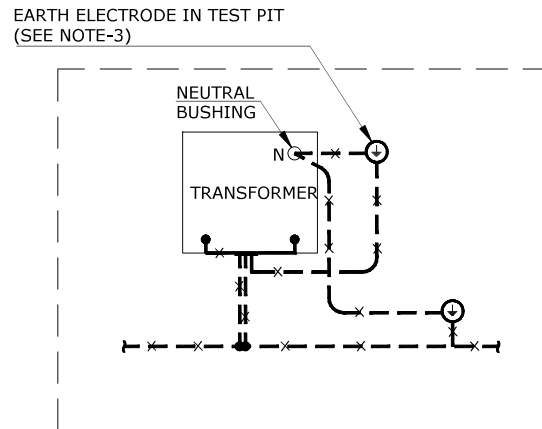
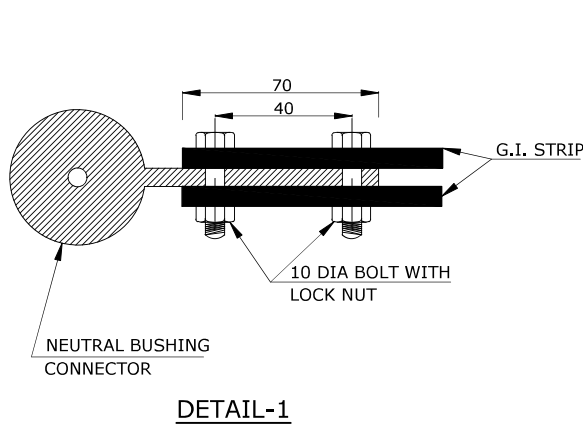
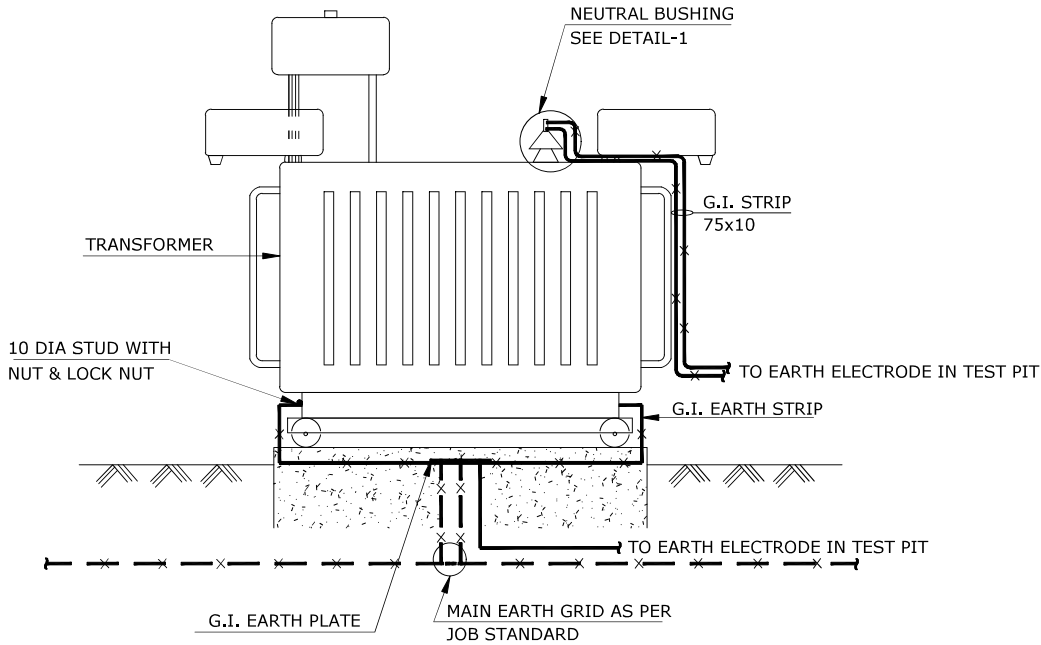


DETAIL-2
LOCAL EARTH PLATE

NOTES:

1. MOTOR FOUNDATION BOLT SHALL NOT BE USED FOR EARTHING.

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01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



NOTES:

1. WHEREVER SEPERATE NEUTRAL BUSHING FOR EARTHING IS NOT PROVIDED THE NEUTRAL EARTHING SHALL BE DONE FROM BUS DUCT.
2. EARTH ELECTRODE IN TEST PITS SHALL BE SO LOCATED THAT DISTANCE BETWEEN TWO PITS SHALL BE MINIMUM 6 METER.
3. WHERE TRANSFORMERS NEUTRAL EARTHING IS DONE THROUGH N.G.R. THE CONNECTIONS BETWEEN NEUTRAL AND N.G.R. SHALL BE THROUGH CABLE. THE OTHER END END OF N.G.R. SHALL BE CONNECTED TO EARTH ELECTRODE.

02	01.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

TYPICAL EARTH CONNECTION FOR
PUSH BUTTON STATION

STANDARD DRAWING NO.

VCS-STD-EL-4107

SHEET NO.

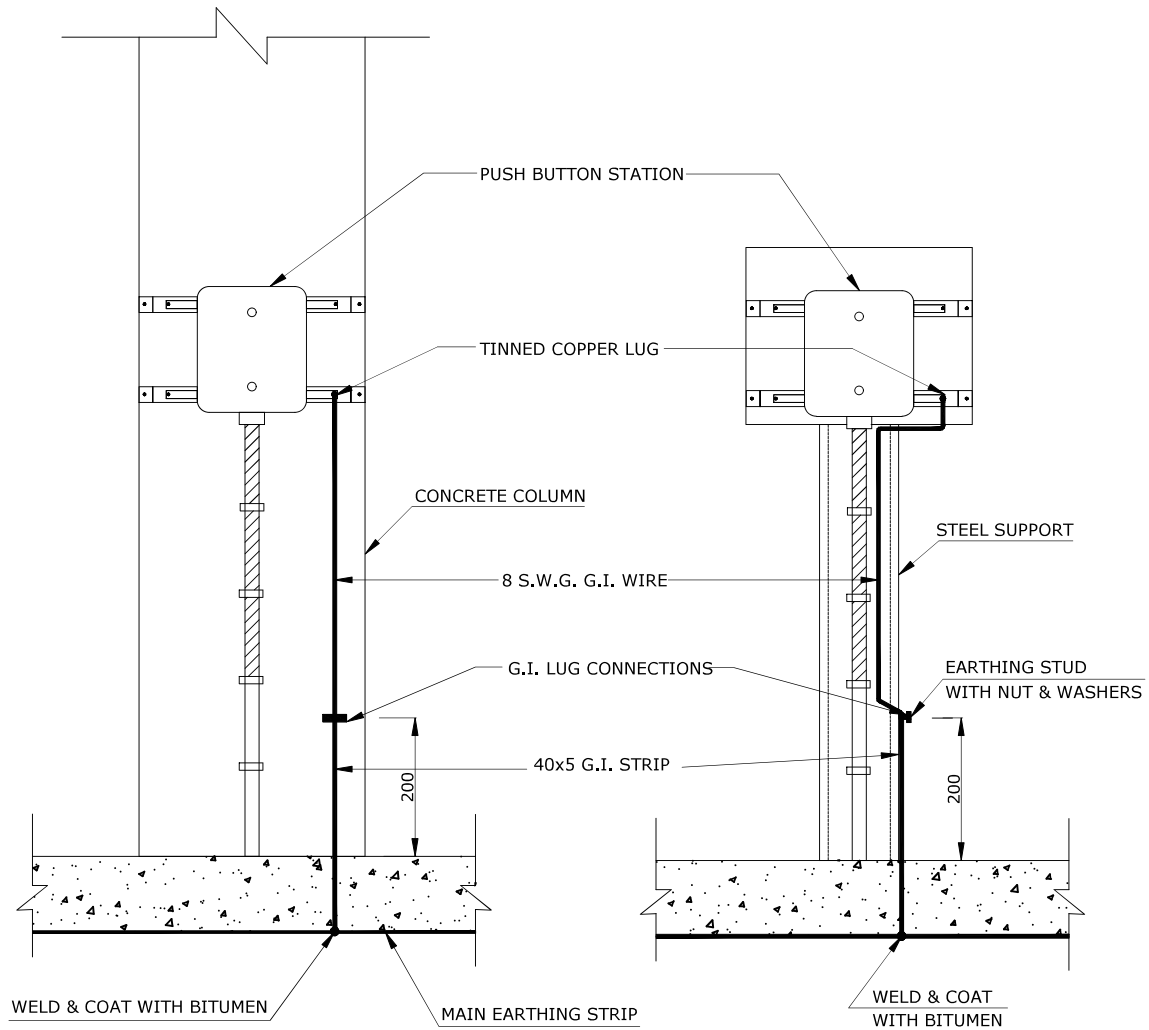
1 OF 1

REV.

02

SIZE

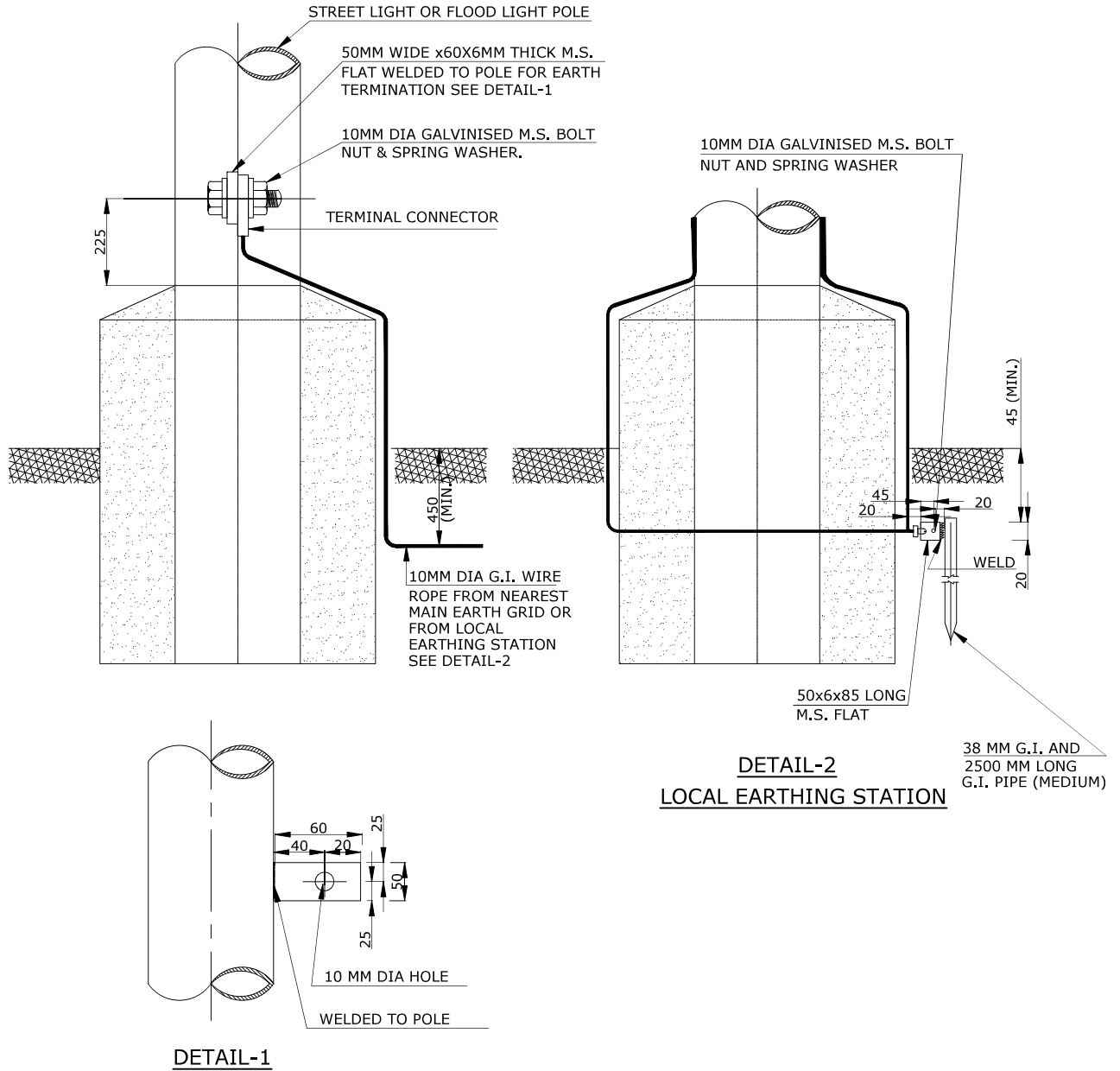
A4



NOTES:

1. ALTERNATIVELY CONNECTION SHALL BE TAKEN FROM THE NEAREST AVAILABLE EARTH PLATE.

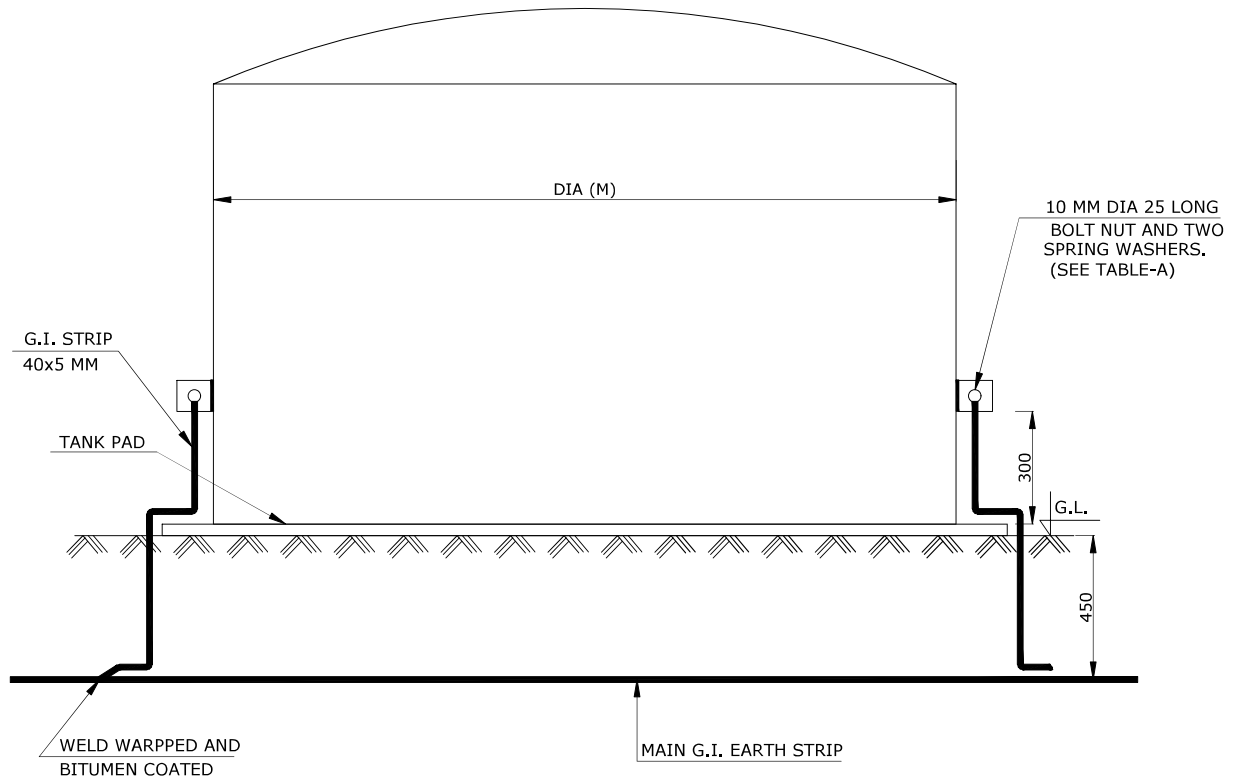
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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



NOTES:

1. USE TWO EARTH WIRES IF VOLTAGE IN THE POLE JUNCTION BOX IS 415 VOLTS.

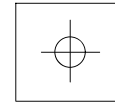
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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



DETAIL-1 (TANK)

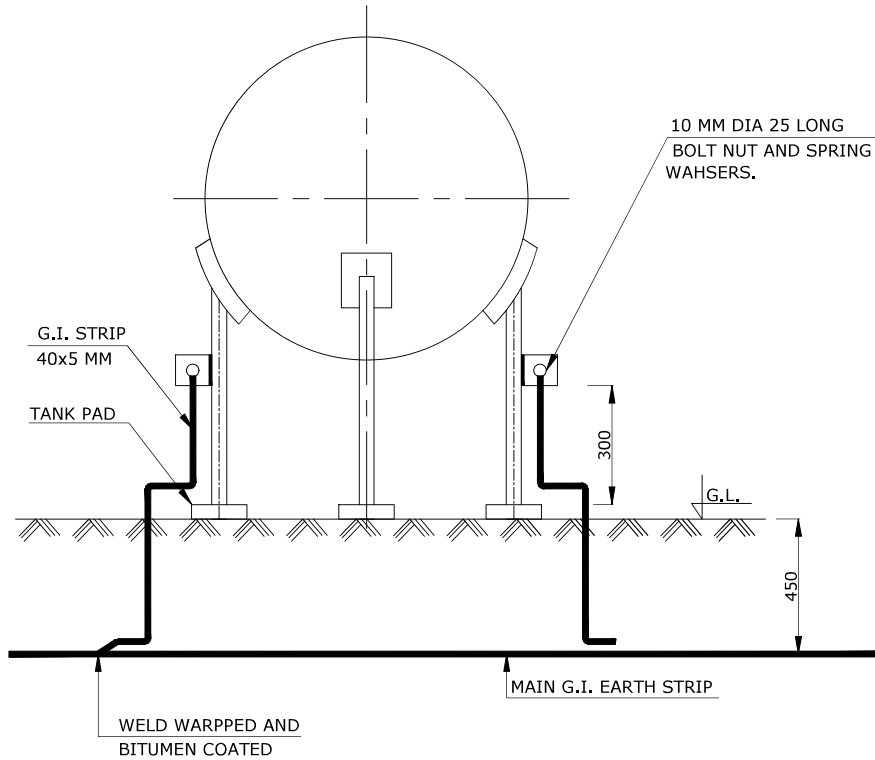
TABLE-A

TANK DIAMETER (M)	EARTHING CONNECTION
<5	1
<20	2 AT 180°
<30	3 AT 120°
>40	4 AT 90°
>50	5 AT 72°
>60	6 AT 60°
>70	7 AT 51.43°
>80	8 AT 45°
>90	9 AT 40°

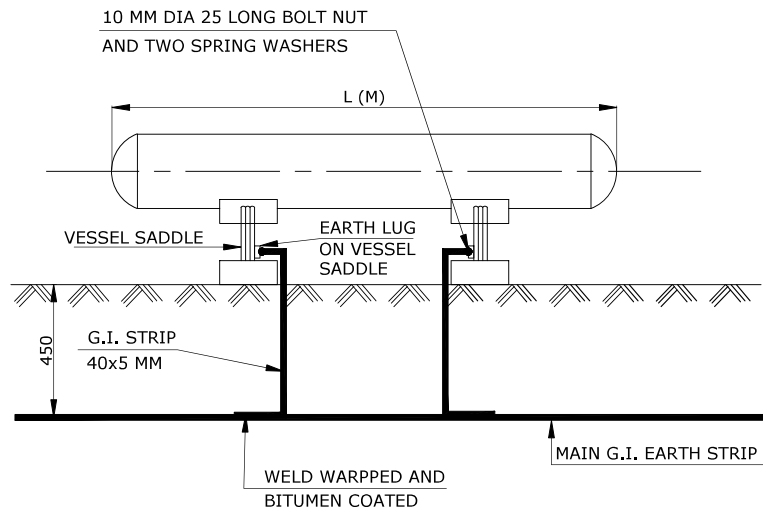


EARTH LUG ON TANK

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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



DETAIL-3 (SPHERE)



DETAIL-2 (HORIZONTAL VESSEL)

NOTES:

1. TWO NOS. OF EARTHING LUGS WILL BE AVAILABLE ON LEG SUPPORTS (DIAMETRICALLY OPPOSITE) OF EQUIPMENT FOR PROVIDING EARTH CONNECTION.
2. ALL VESSELS, SPHERES AND COLUMNS SHALL HAVE TWO EARTH CONNECTIONS IN GENERAL.
3. HORIZONTAL VESSEL OF LENGTH MORE THAN 20 METERS:-
TWO EARTH LUGS ARE PROVIDED ON EACH SADDLE OF HORIZONTAL VESSELS.
AS SUCH THERE SHALL BE TWO EARTH CONNECTIONS TO THE EARTH GRID FROM EACH SADDLE.

02	02.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES PRIVATE LIMITED

TYPICAL EARTHING OF CABLE TRAY AND ELECTRIC MOTOR

STANDARD DRAWING NO.

REV. SIZE

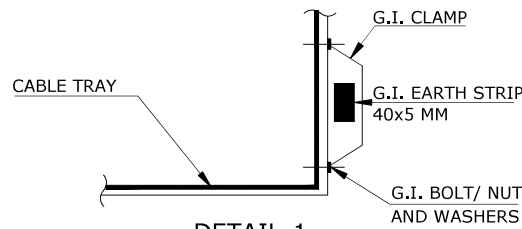
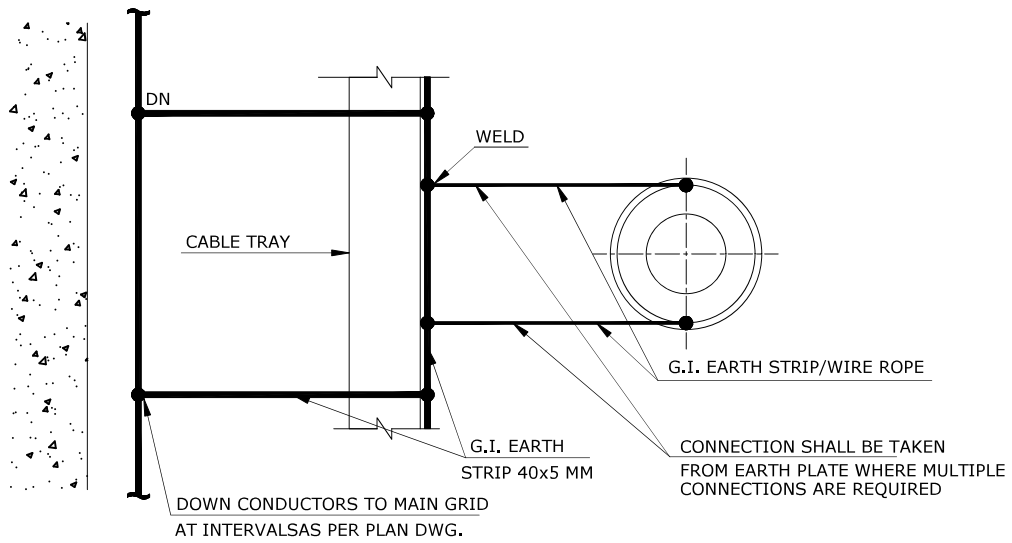
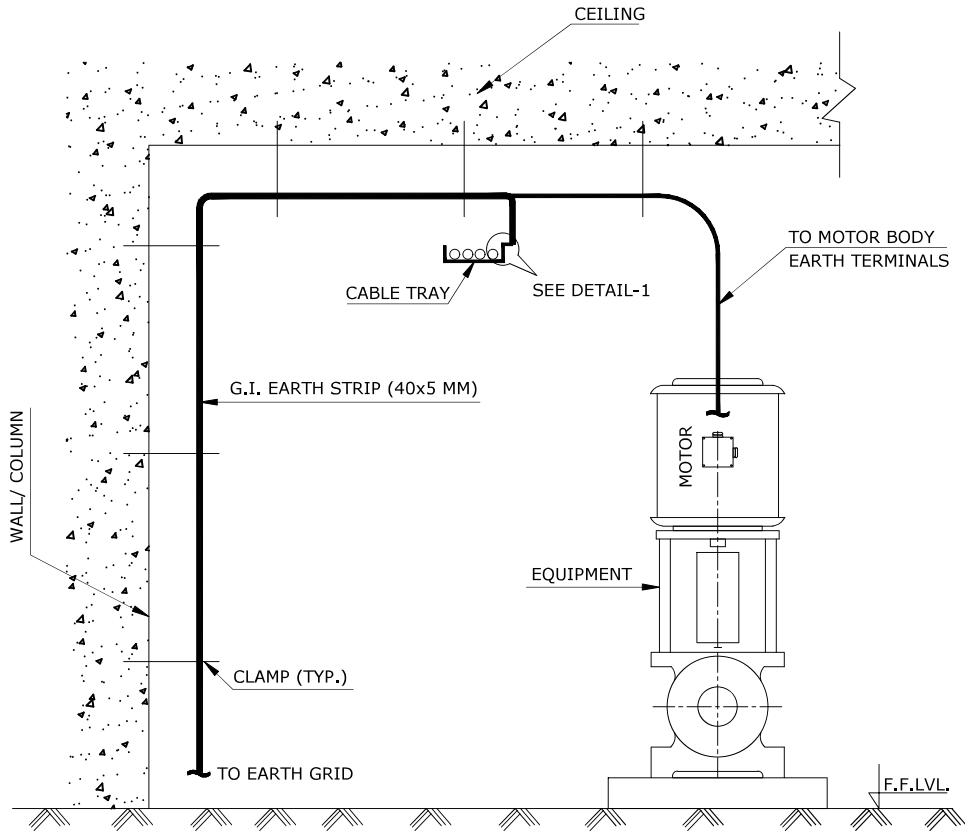
VCS-STD-EL-4110

02

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SHEET NO.

1 OF 1



DETAIL-1

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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES PRIVATE LIMITED

TYPICAL EARTHING ARRANGEMENT FOR PROCESS EQUIPMENT

STANDARD DRAWING NO.

VCS-STD-EL-4111

SHEET NO.

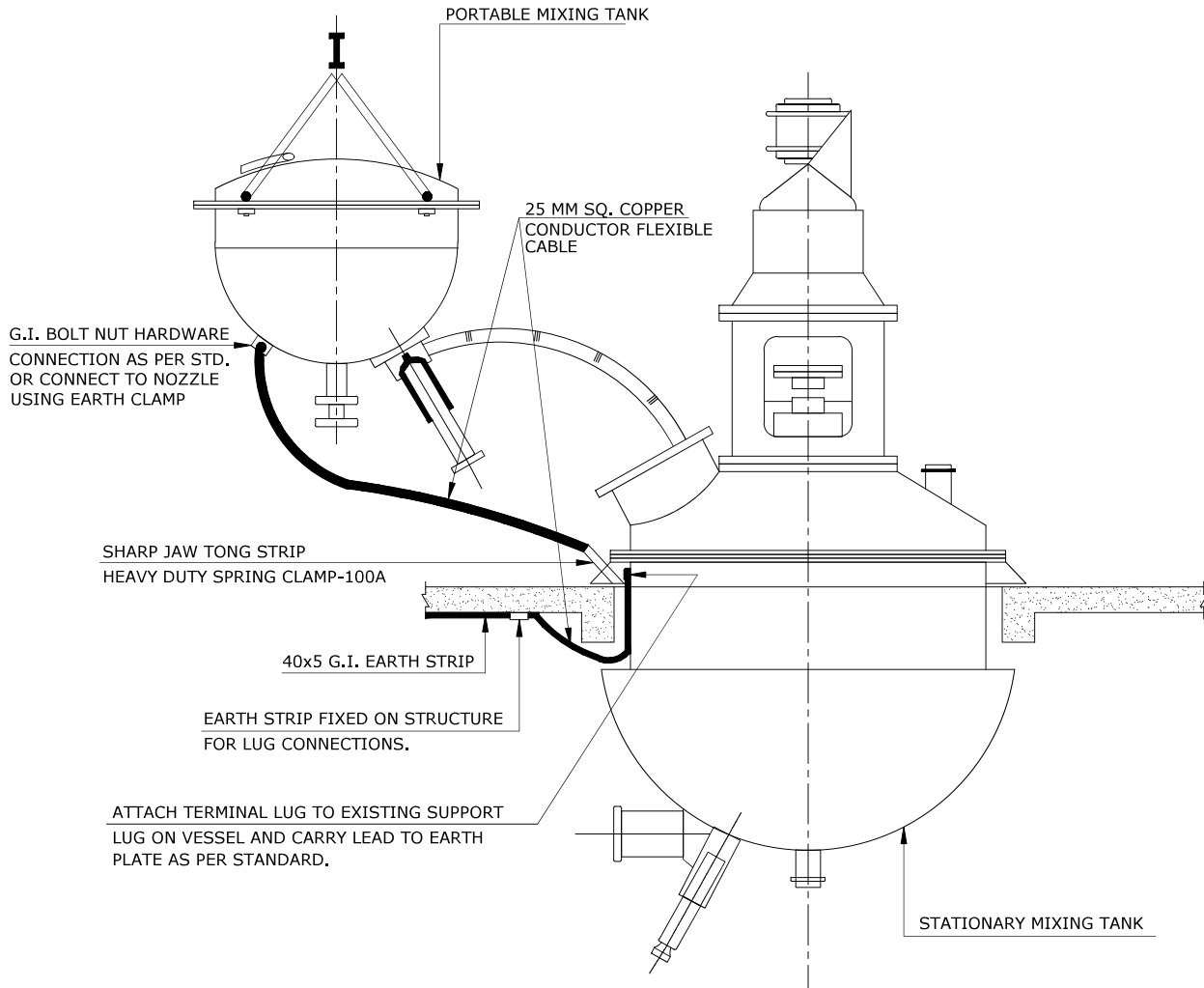
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REV.

02

SIZE

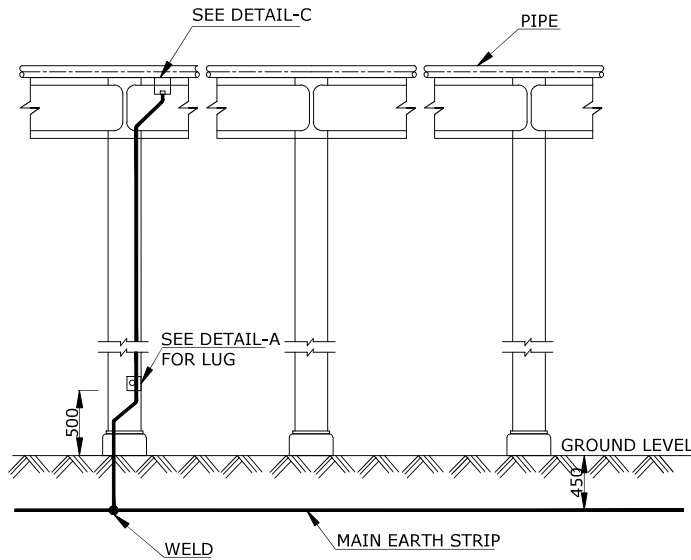
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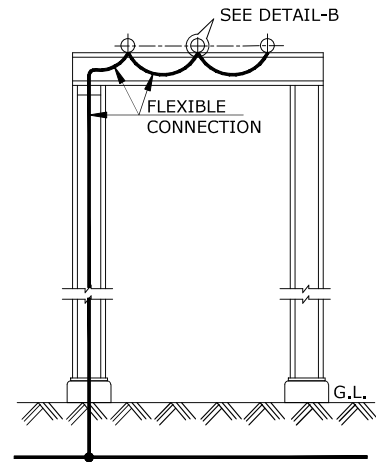
NOTES:

1. ALL PROCESSING EQUIPMENT SUCH AS MIXTURES, CHURNS, AUTOCLAVES, COLUMNS, CENTRIFUGES, FILTER PRESS PUMPS ETC. SHALL BE EARTHED IF NOT INDIRECT CONTACT WITH PROPERLY EARTHED STEEL MEMBERS.
2. ALL TEMPORARY EARTH CONNECTIONS SHALL BE MADE BEFORE OPENING THE VESSEL.

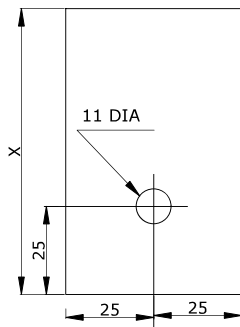
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REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



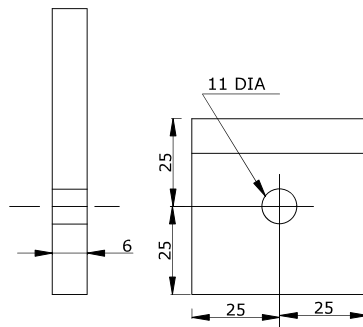
FRONT VIEW



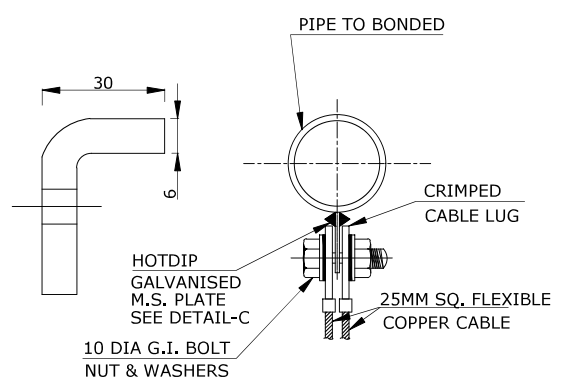
SIDE VIEW



DETAIL-C



DETAIL-A

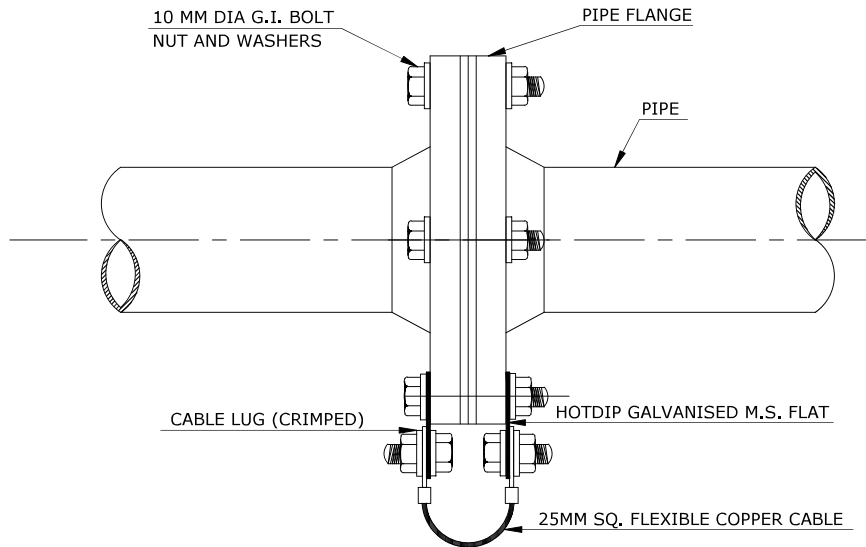


DETAIL-B

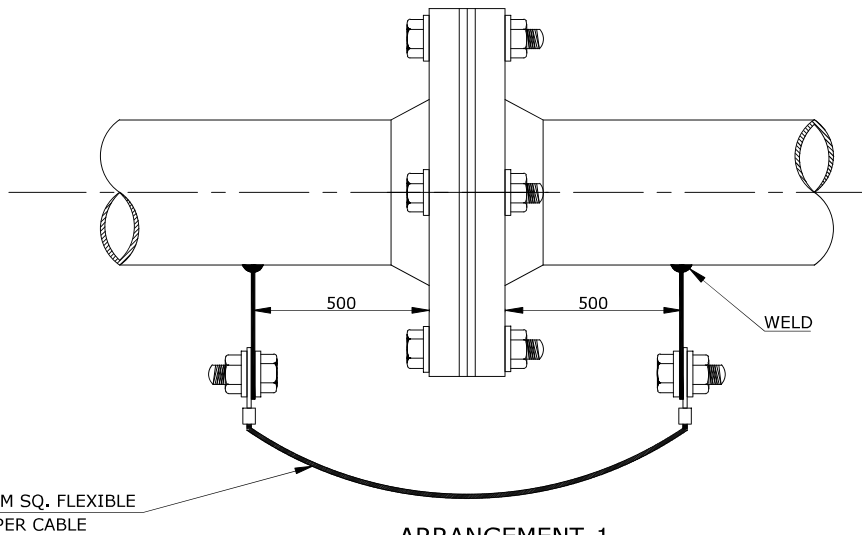
NOTES:

1. UNLESS MENTIONED OTHERWISE ON PLANS OR JOB SPECIFICATIONS, THE PIPELINES SHALL BE BONDED AND EARTHED AT THE ENTRY AND EXITS POINTS OF BATTERY LIMIT.
2. STEEL PIPE RACKS IN THE PROCESS UNIT AND OFFSITE AREA SHALL BE EARTHED AT EVERY 24 METRES.

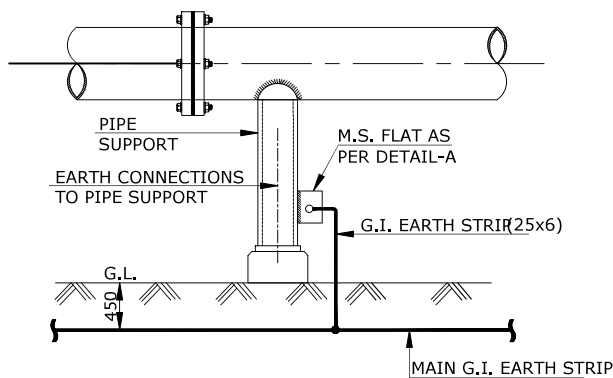
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01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



ARRANGEMENT-2



ARRANGEMENT-1

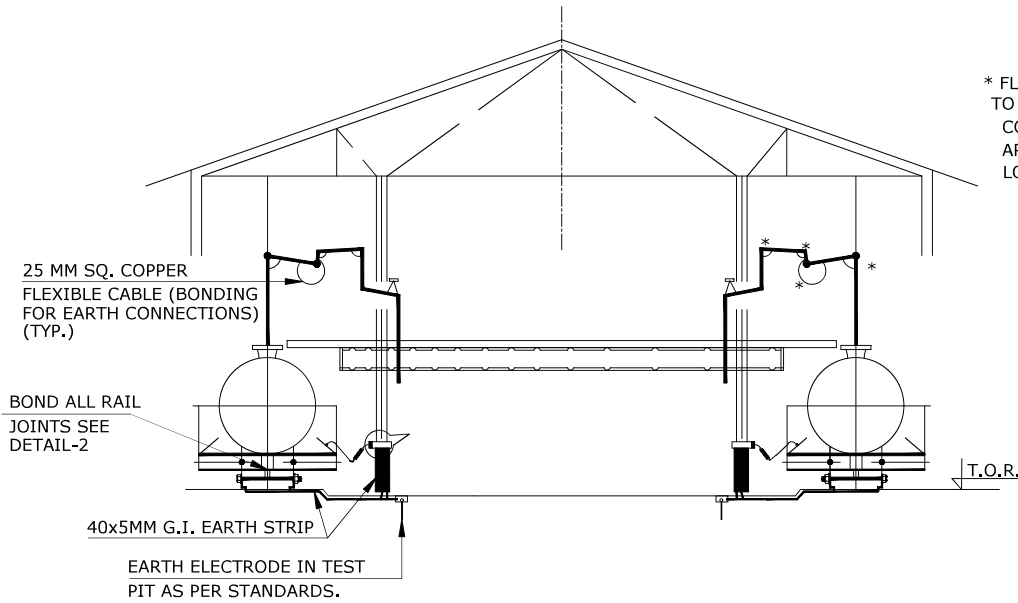


ARRANGEMENT-3

NOTES:

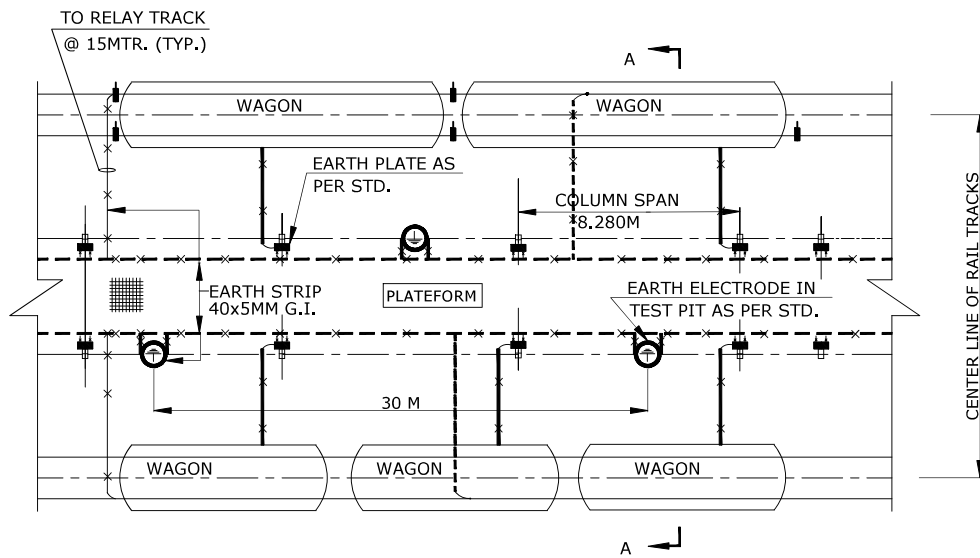
- HOT DIP GALVANISHED M.S. FLAT (50x 10x (x+50) WHERE x IS THE INSULATION THICKNESS) SHALL BE PROVIDED BY THE PIPING CONTACTOR.
- SUPPLY OF FLEXIBLE COPPER CABLE, LUGS, BOLTS, NUTS, WASHERS HARDWARE AND MAKING CONNECTIONS, SHALL BE DONE BY ELECTRICAL CONTACTOR.

02	07.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



* FLEXIBLE JUMPER CONNECTIONS ARE TO BE PROVIDED BY ELECTRICAL CONTRACTOR ONLY WHEN THE SAME ARE NOT SUPPLIED AS A PART OF LOADING ARM PACKAGES.

SECTION A-A

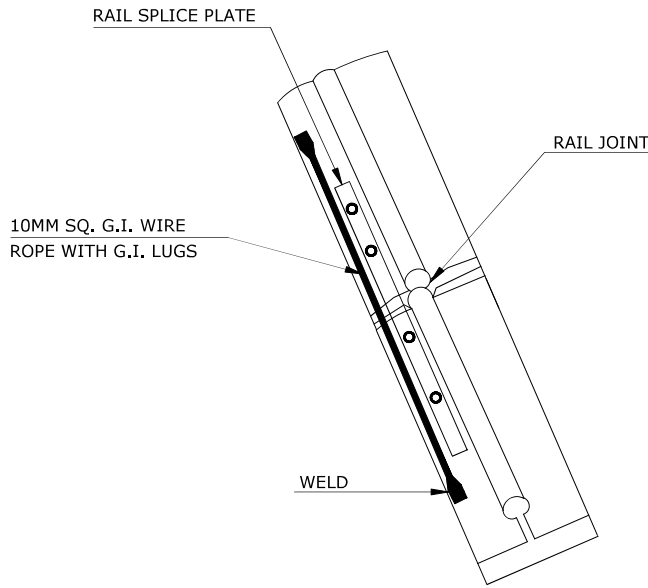


TYPICAL PART PLAN

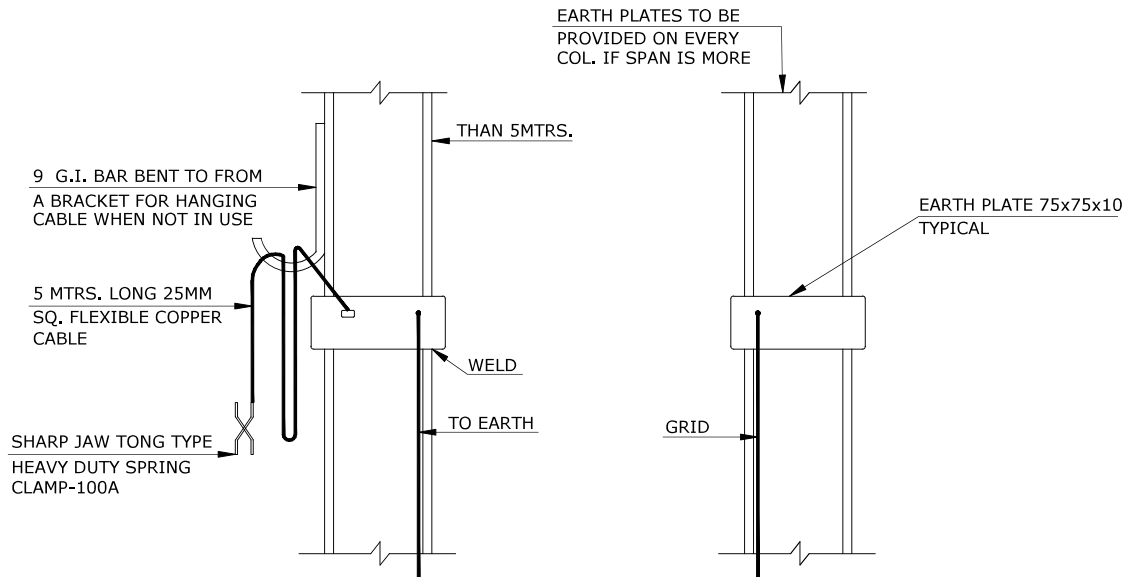
NOTES:

- SUPPLY OF FLEXIBLE CABLE AND SPRING CLAMPS BY ELECTRICAL CONTACTOR ARE NOT REQUIRED WHEN MONITORING OF EARTH SCHEME AND THE ABOVE MATERIAL ARE INCLUDED AS PART OF PLANT AUTOMATION PACKAGE.

02	07.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
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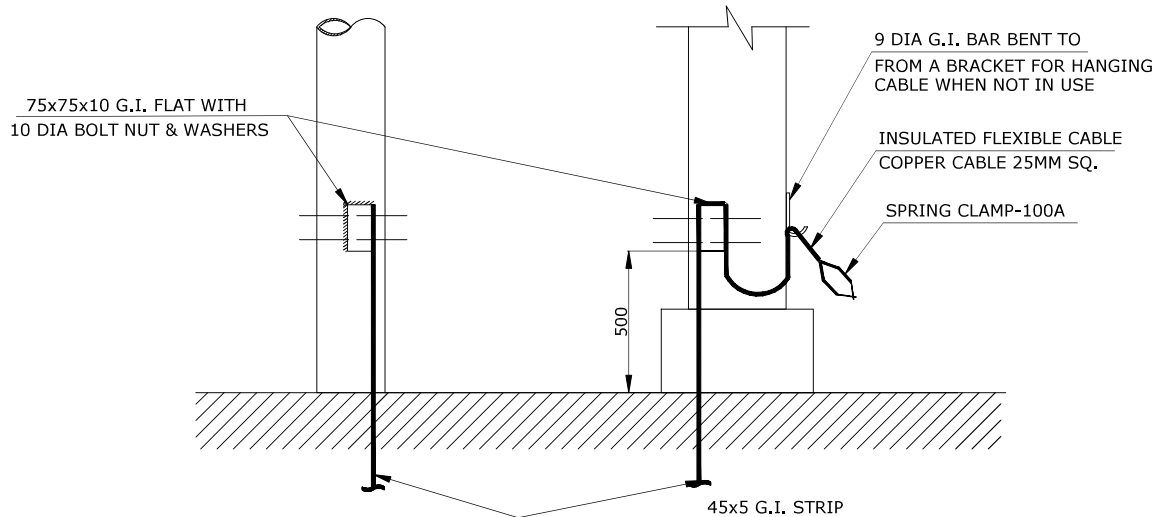
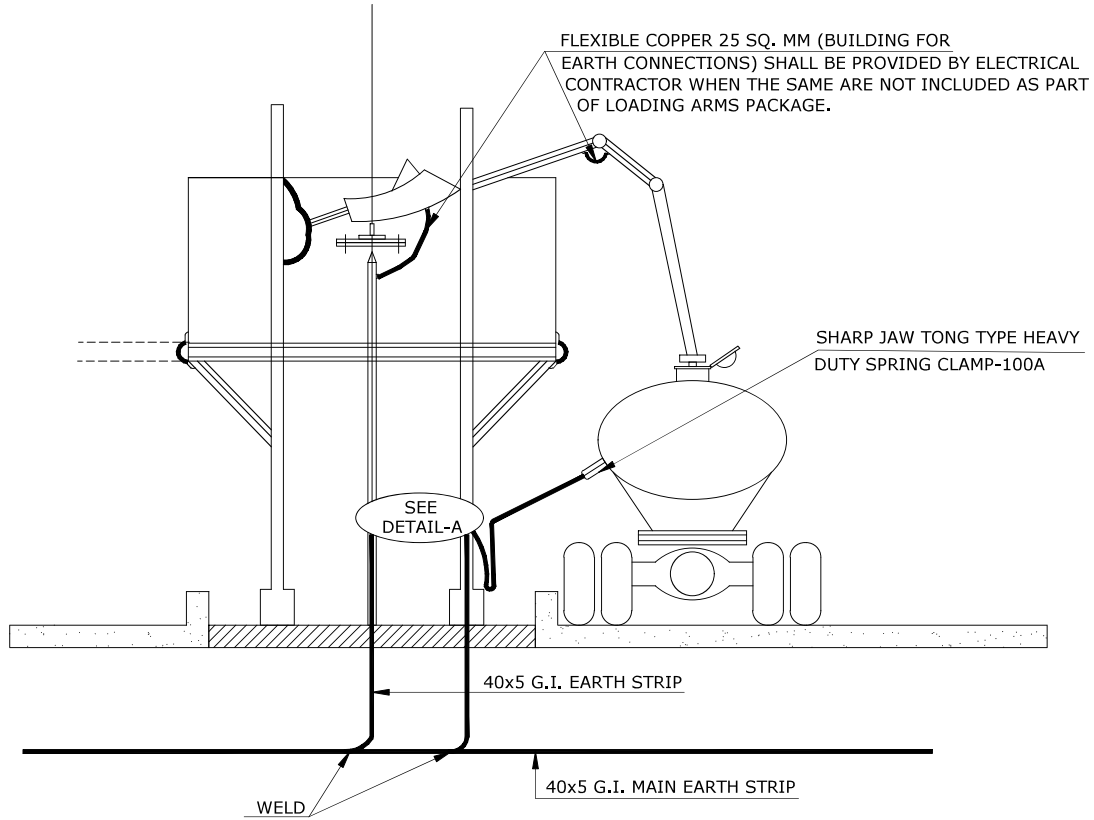


**BONDING OF SINGLE RAIL
DETAIL-2**



DETAIL-1

02	07.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



DETAIL-A

NOTES:

1. SUPPLY OF FLEXIBLE CABLE AND SPRING CLAMPS BY ELECTRICAL CONTACTOR ARE NOT REQUIRED WHEN MONITORING OF EARTH SCHEME AND THE ABOVE MATERIAL ARE INCLUDED AS PART OF PLANT AUTOMATION PACKAGE.

02	07.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

FENCE GATE EARTHING
(TRANSFORMER YARD)

STANDARD DRAWING NO.

VCS-STD-EL-4115

SHEET NO.

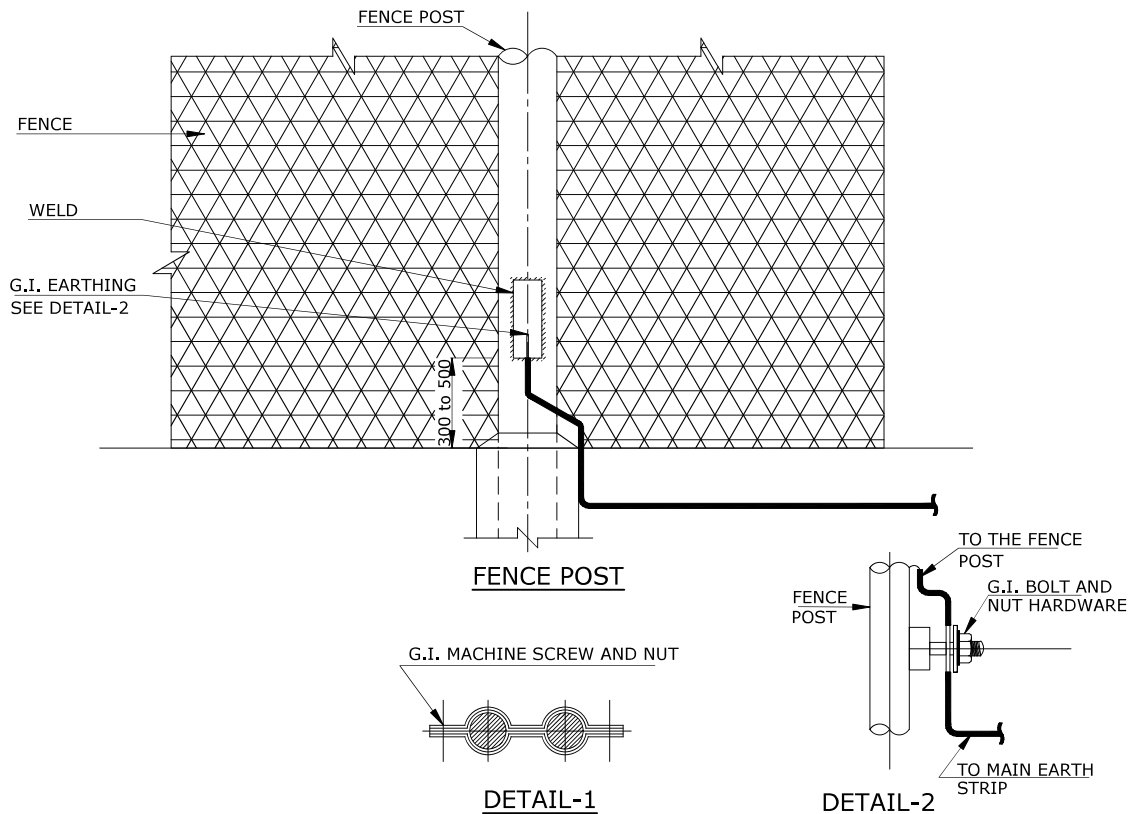
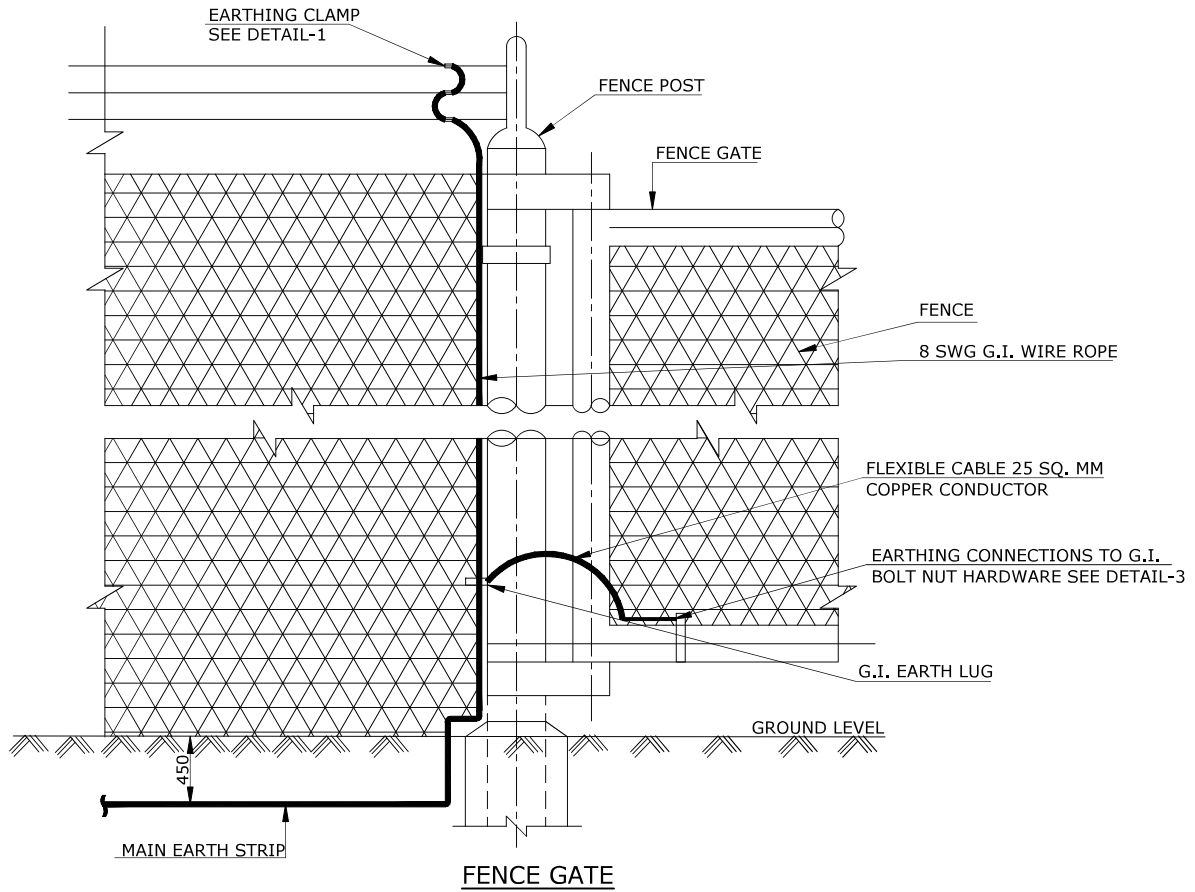
1 OF 1

REV.

02

SIZE

A4



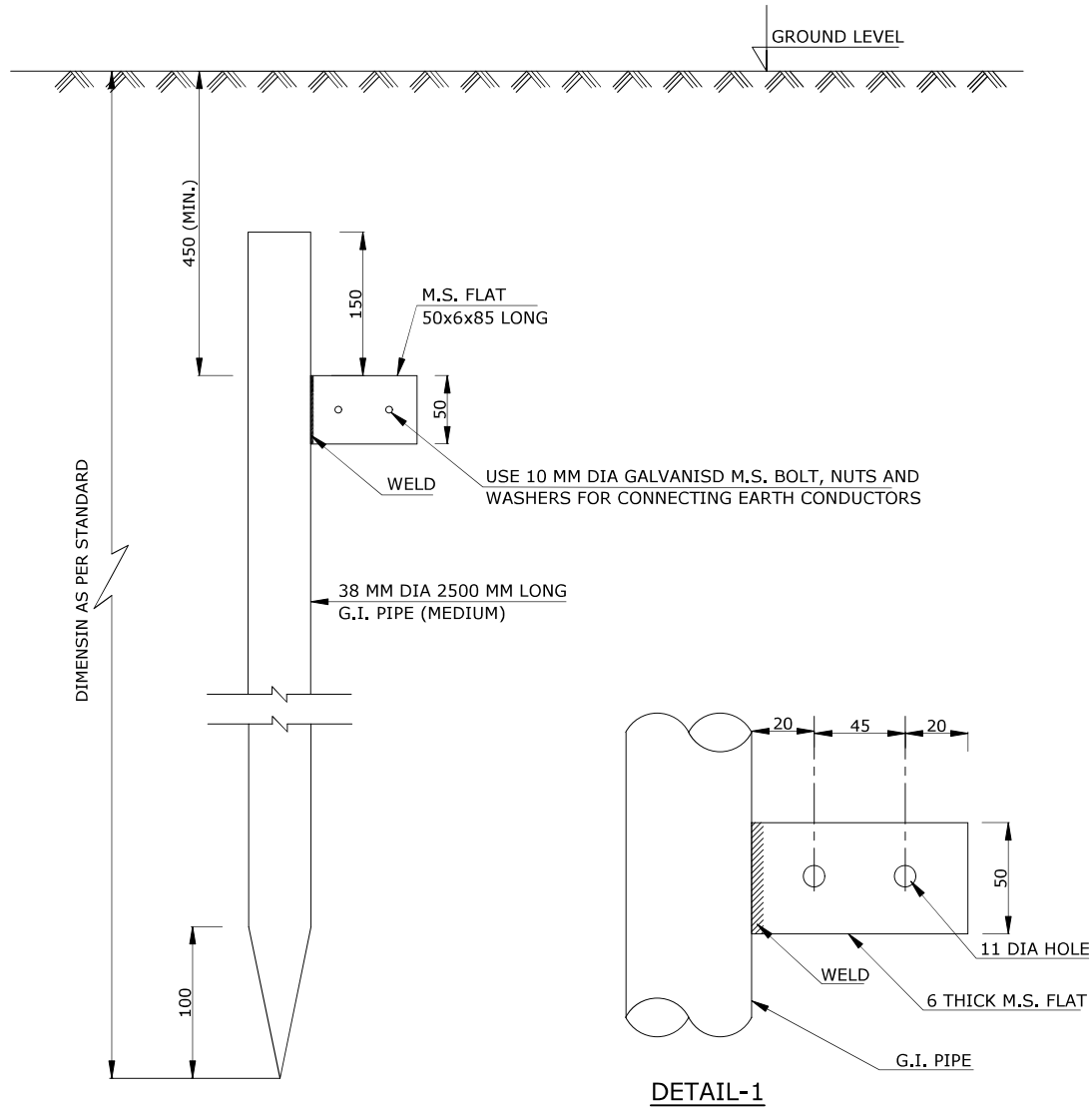
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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY

TYPE OF EQUIPMENT	BARE G.I. STRIP / G.I. WIRE ROPE OR G.I. WIRE
MOTOR UP TO 3.7KW	NO. 8 SWG SOLID
MOTOR 5.5KW TO 30KW & WELDING RECEPTACLES	10 MM (3/8") DIA WIRE ROPE
MOTOR ABOVE 37KW INCLUDING HV MOTORS	16 MM (5/8") DIA WIRE ROPE/40x5 MM G.I. STRIP
BUILDING COLUMNS	40x5 STRIP
STORAGE TANKS (VERTICAL & HORIZONTAL)	40x5 STRIP
LOADING RACKS	40x5 STRIP
VESSELS & HEAT EXCHANGERS	40x5 STRIP
SMALL EQUIPMENTS & INSTRUMENTS	NO. 8 SWG SOLID
LIGHTING, POWER & INSTRUMENT PANELS	10 MM (3/8") DIA WIRE ROPE
MAIN EARTH BUS/MV & HV SWITCH GEAR INTERCONNECTIONS/ POWER TRANSFORMER	AS CALCULATED
EHV & HV SUB-STATIONS	AS CALCULATED
PUSH BUTTON STATIONS	NO. 8 SWG SOLID
STREET LIGHT POLES	10 MM (3/8") DIA WIRE ROPE
LIGHTING TRANSFORMER	16 MM (5/8") DIA WIRE ROPE/40x5 MM
PIPE RACKS	25 SQ. MM

NOTES:

- EARTH CONNECTIONS TO INDIVIDUAL EQUIPMENT FROM NEAREST EARTH PLATE/LUG MAY ALSO BE DONE ALTERNATIVELY USING ALUMINIUM/COPPER CONDUCTOR PVC INSULATED CORE OF SIZE NOT LESS THAN HALF THE CROSS-SECTION OF RESPECTIVE POWER CABLE TO EQUIPMENT (MOTOR,PANEL ETC.). CONNECTIONS SHALL BE MADE USING CRIMP TYPE CABLE LUGS. GREEN COLOR SLEEVING (ABOUT 50 MM LENGTH) SHALL BE PROVIDED AT BOTH ENDS TO DENOTE EARTHING.

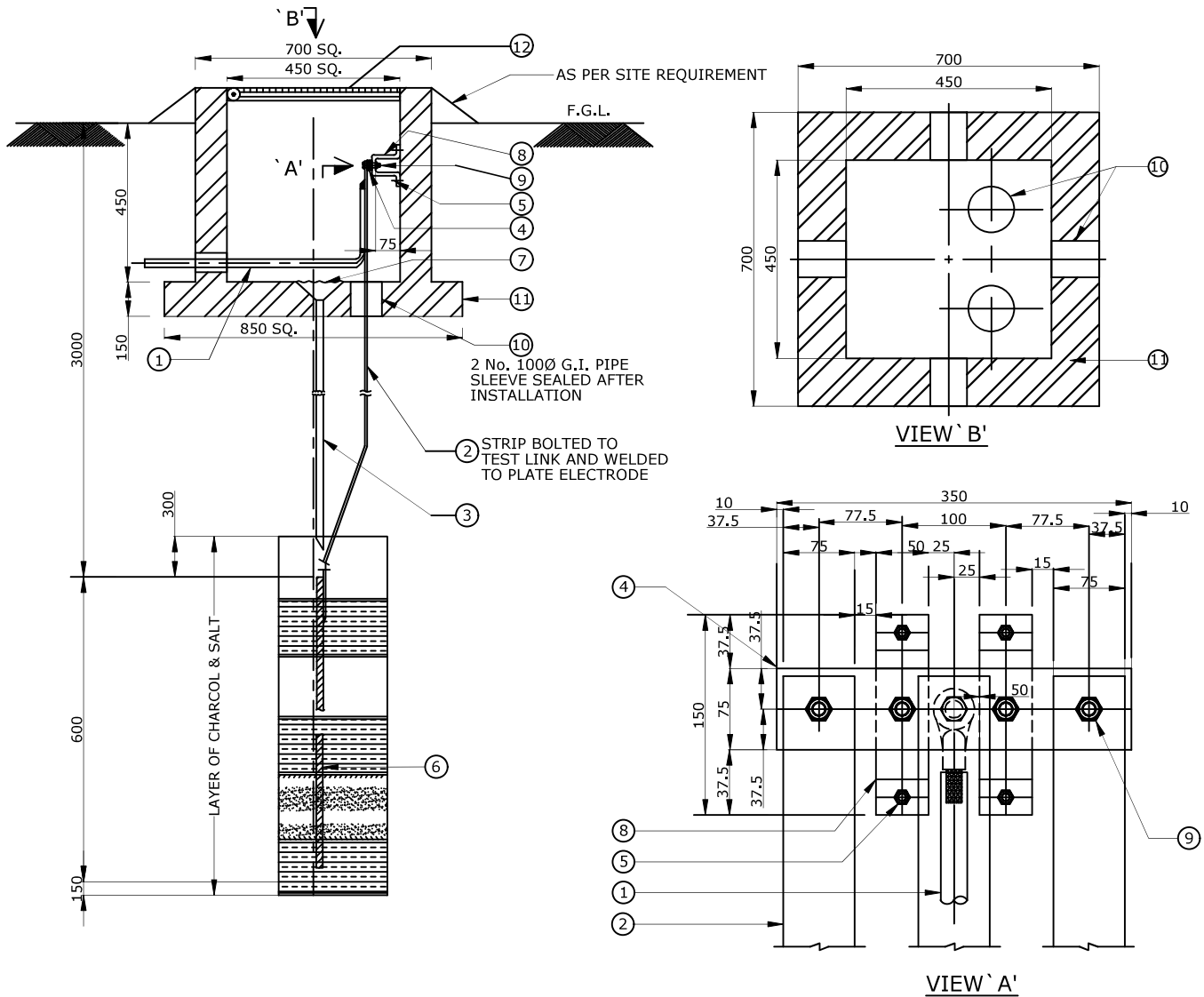
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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



NOTES:

1. ASSEMBLY SHALL BE HOT DIP GALVANISED AFTER FABRICATION.
2. THE ELECTRODE SHALL BE DRIVEN TO A DEPTH TO REACH PERMANENT MOIST SOIL.

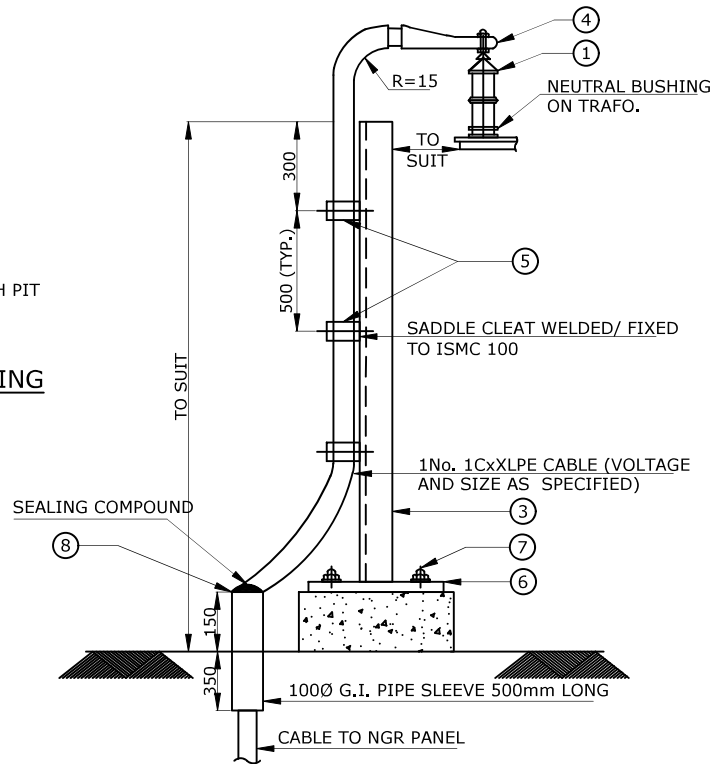
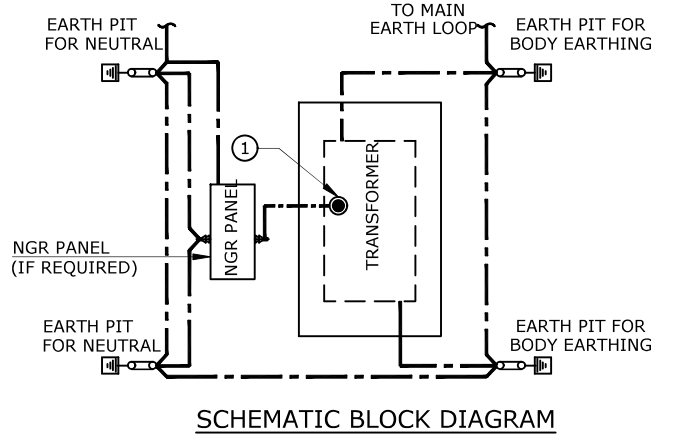
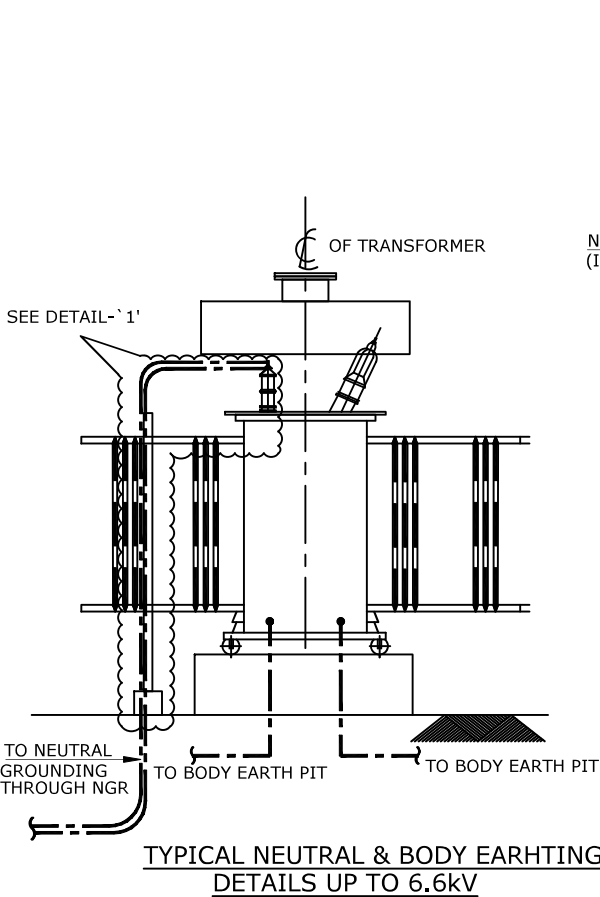
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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



MATERIAL TAKE-OFF

ITEM No.	DESCRIPTION	QUANTITY	REMARKS
1.	75x10mm G.I. STRIP/ 25x3mm COPPER STRIP/ 1C PVC INSULATED CABLES AS SPECIFIED IN CONTRACT DOCUMENTS.	AS REQUIRED	
2.	75X8mm G.I. STRIP/ 25x3mm COPPER STRIPS	2 No.	
3.	25Ø G.I. PERFORATED PIPE FOR WATERING.	1 No.	
4.	350x75x10 mm THICK G.I. TEST LINK	1 No.	
5.	MB STAINLESS STEEL ANCHOR STUD WITH BOLT AND WASHER	4 No.	
6.	600x600x10 mm THICK G.I./3mm THICK COPPER EARTH ELECTRODE.	1 No.	
7.	WIRE MESH	1 No.	
8.	50x6 mm THICK 350 LONG G.I. SADDLE.	2 No.	
9.	M10 STAINLESS STEEL BOLT WITH 2 No. PLAIN & 1 No. SPRING WASHERS.	5 No.	
10.	100Ø G.I. PIPE SLEEVE SEALED AFTER INSTALLATION.	6 No.	
11.	BRICK WATERING CHAMBER WITH PLASTER FINISH INSIDE & OUTSIDE	1 No.	
12.	C.I. REMOVABLE COVER HINGED TO CAST IRON FRAME.	1 No.	

02	08.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



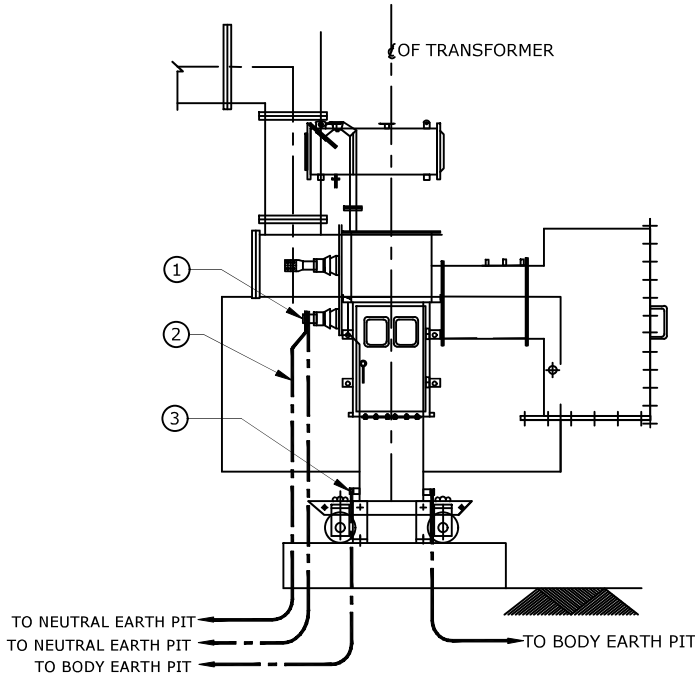
MATERIAL TAKE-OFF

ITEM No.	DESCRIPTION	QUANTITY	REMARKS
1.	NEUTRAL BUSHING	1 No.	
2.	NUT & SPRING WASHERS TO SUIT TRANSFORMER BODY EARTHING	2 No.	
3.	ISMC 100-LENGTH TO SUIT	1 No.	
4.	CABLE LUG SUITABLE FOR CABLE SIZE	1 No.	
5.	MS SADDLE/ CLEAT TO SUIT CABLE DIA.	AS REQUIRED	
6.	150x150x6mm THICK PLATE WITH 4 No. 12Ø HOLES.	1 No.	
7.	M10 ANCHOR STUD WITH PLAIN AND SPRING WASHERS.	4 No.	
8.	SEALING COMPOUND	AS REQUIRED	

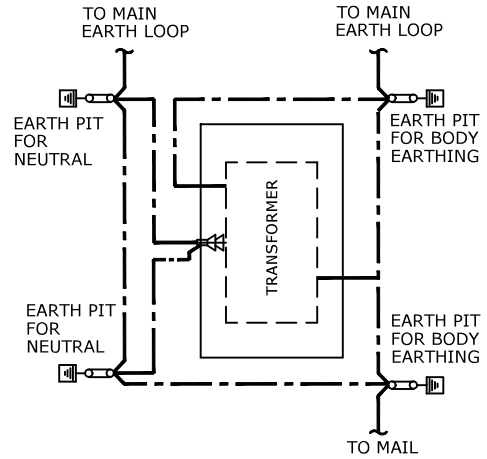
NOTES :-

- ALL HARDWARE SHALL BE OF STAINLESS STEEL.
- ALL STEEL STRUCTURE USED FOR ELECTRICAL INSTALLATION SHALL BE APPLIED TWO COATS OF ANTI CORROSIVE PRIMER AND EPOXY PAINT OF APPROVED SHADE.

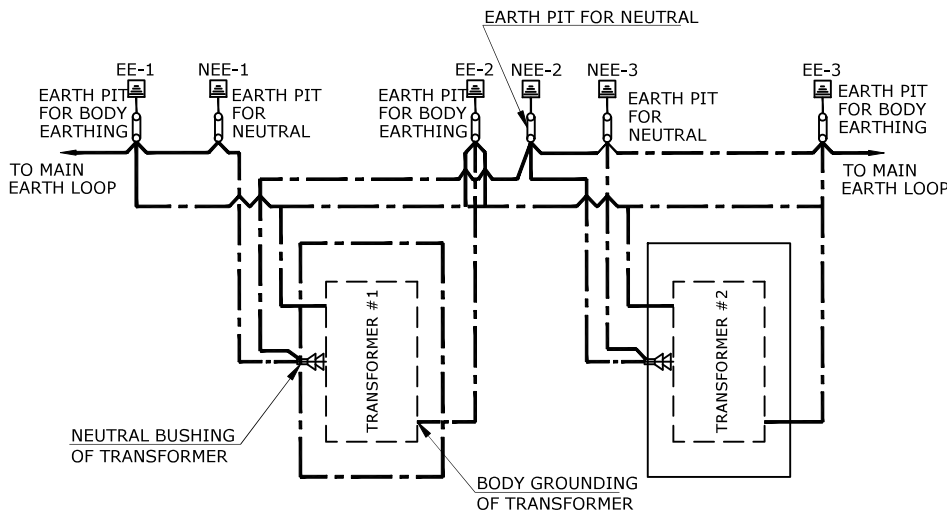
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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



TYPICAL NEUTRAL & BODY EARTHING
DETAILS UP TO 0.433kV



SCHEMATIC DIAGRAM
FOR SINGLE TRANSFORMER



SCHEMATIC DIAGRAM
FOR TWO TRANSFORMER

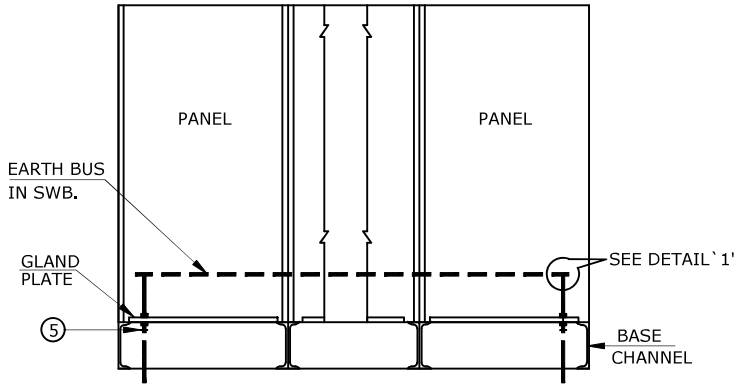
MATERIAL TAKE-OFF

ITEM No.	DESCRIPTION	QUANTITY	REMARKS
1.	NEUTRAL BUSHING BY TRANSFORMER VENDOR	-	
2.	G.I. EARTH STRIP	AS PER DRG.	
3.	EARTHING PAD WITH BOLT NUT & SPRING WASHERS BY TRANSFORMER VENDOR	-	

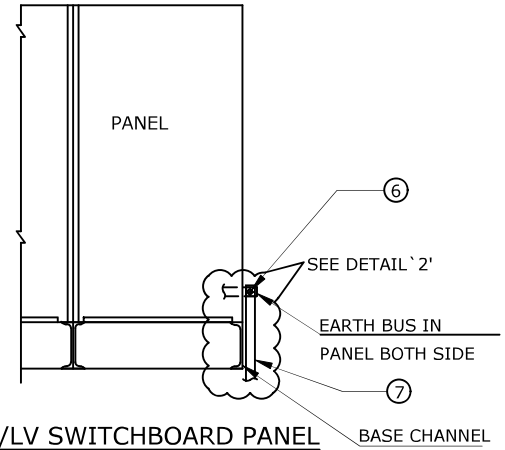
NOTES :-

1. ALL HARDWARE SHALL BE OF STAINLESS STEEL.
2. ALL DAMAGE TO GALVANISED FINISHES SHALL BE PAINTED WITH ZINC RICH PAINT.
3. ALL STEEL STRUCTURE USED FOR ELECTRICAL INSTALLATION SHALL BE APPLIED TWO COATS OF ANTI CORROSIVE PRIMER AND EPOXY PAINT OF APPROVED SHADE.

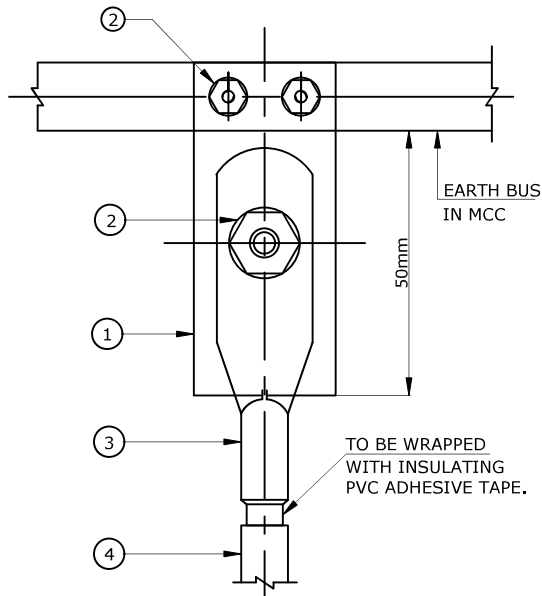
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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



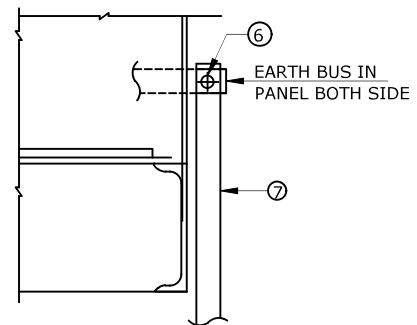
HV/LV SWITCHBOARD PANEL



HV/LV SWITCHBOARD PANEL



DETAIL '1'
EARTHING BY CABLE
ALTERNATIVE-1



DETAIL '2'
EARTHING BY G.I. STRIP
ALTERNATIVE-2

MATERIAL TAKE-OFF

ITEM No.	DESCRIPTION	QUANTITY	REMARKS
1.	COPPER/ALUMINUM ADAPTER PLATE.	2 No.	ALT.-1
2.	M10 STAINLESS STEEL BOLT WITH 2No. PLAIN & 1No. SPRING WASHERS.	6 No.	ALT.-1
3.	CABLE LUG AND SOLDER	2 No.	ALT.-1
4.	1C ALUMINUM PVC INSULATED CABLE, CABLE SIZE AS SPECIFIED IN CABLE SCHEDULE	AS REQUIRED	ALT.-1
5.	CABLE GLAND SUITABLE FOR ITEM No. 4	2 No.	ALT.-1
6.	M10 BOLTS WITH 2No. PLAIN & 1No. SPRING WASHERS.	2 No.	ALT.-2
7.	G.I. STRIP.	AS REQUIRED	ALT.-2

NOTES :-

- PETROLEUM CONDUCTING JELLY SHALL BE APPLIED TO ALL SURFACES TO BE JOINED.
- ALL STEEL STRUCTURE USED FOR ELECTRICAL INSTALLATION SHALL BE APPLIED TWO COATS OF ANTI CORROSIVE PRIMER AND EPOXY PAINT OF APPROVED SHADE.
- ALL HARDWARE SHALL BE OF STAINLESS STEEL.

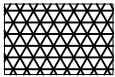
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01	05.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



NOTES:-

1. ALL DIMENSIONS ARE IN METERS UNLESS OTHERWISE MENTIONED.
2. THE AREA CLASSIFICATION CONFORM TO THE LATEST ISSUE OF IS : 5572. INDIAN PETROLEUM RULES OISD-STD-113. OIL MINES REGULATIONS/DGMS GUIDELINES (FOR PROJECTS UNDER DGMS JURISDICTION) & RECOMMENDATIONS OF PROCESS LICENSOR AND PROJECT DESIGN BASIS.
3. THE AREA WITHIN 1.5M (EXTENDING IN ALL DIRECTIONS) OF SAFETY VENTS, PRODUCT SAMPLING LOCATIONS, PROCESS WATER DRAINS, ONLY SEWERS VENTS, INSPECTION HATCHES, DISCHARGE ORIFICE OF FIXED LIQUID LEVEL GAUGES, ROTARY OR DIP GAUGES, FILLER OPENINGS SHALL BE CLASSIFIED AS ZONE-1. FURTHER AN AREA FROM 1.5M TO 3.0M (EXTENDING IN ALL DIRECTIONS) FROM VENTS SHALL BE CLASSIFIED AS ZONE-2. HOWEVER THE VENTS OR DRAINS BLANKED DURING NORMAL OPERATION AND USED ONLY WHEN THE PLANT IS DEPRESSURISED OR UNDER SHUTDOWN, SHOULD NOT BE REGARDED AS AN OPERATIONAL VENT OR DRAIN OR SOURCE OF HAZARD.
4. OPEN TRENCHES, PITS OR SUMP BELOW GRADE WITHIN ZONE-2 AREA SHALL BE CLASSIFIED AS ZONE-1 AREA.
5. IN CASE OF PIPELINE HANDLING FLAMMABLE MATERIAL, WHERE WELL MAINTAINED VALVES, FITTINGS AND METERS ARE INSTALLED IN WELL VENTILATED AREAS OR PIT, THE EXTENT OF ZONE-2 AREA ABOVE THE GROUND SHALL BE CONSIDERED AS 4.0M IN ALL DIRECTIONS FROM THE POSSIBLE SOURCE OF HAZARD, ALTHOUGH THE PIT ITSELF SHALL BE CLASSIFIED AS ZONE-1 AREA.
6. GAS GROUPS ARE AS PER IS: 9570.
7. ROADS FULLY/PARTLY COVERED UNDER HAZARDOUS AREA CLASSIFICATION SHALL BE BARRICADED FOR VEHICULAR MOVEMENT.

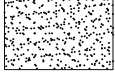
LEGENDS:-



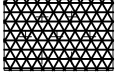
- ZONE-1, GAS GROUP IIA/IIB HAZAROUS AREA



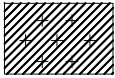
- ZONE-2, GAS GROUP IIA/IIB HAZAROUS AREA



- ADDITIONAL ZONE-2, GAS GROUP IIA/IIB AREA
(AREA SUGGESTED WHERE LARGE RELEASE OF
VOLTAGE PRODUCTS MAY OCCUR)



- ZONE-1, GAS GROUP IIC HAZAROUS AREA



- ZONE-2, GAS GROUP IIC HAZAROUS AREA



- SAFE AREA (NON HAZARDOUS)

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01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

REV.

SIZE

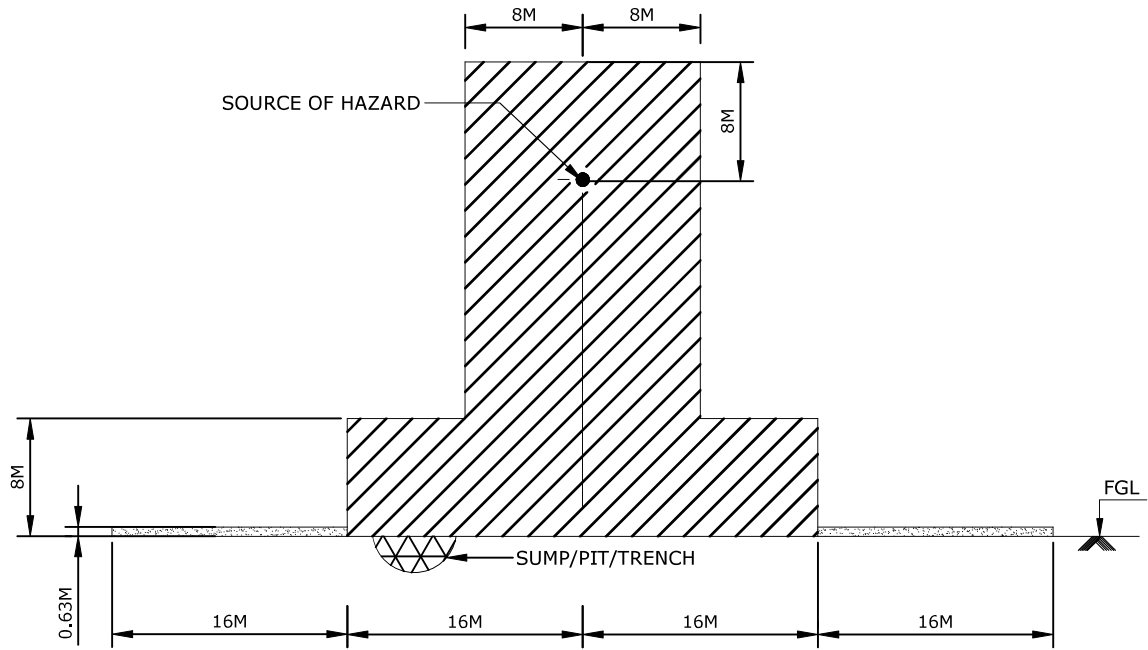
VCS-STD-EL-4402

02

A4

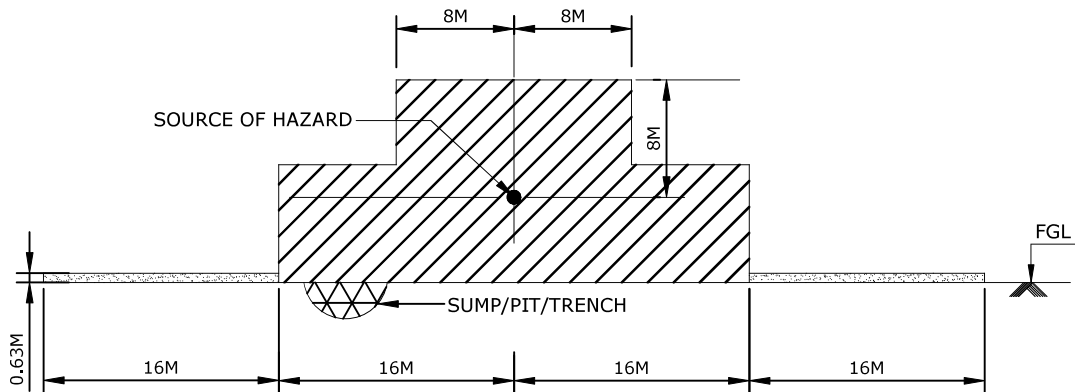
SHEET NO.

1 OF 1



DETAIL-1

FREELY VENTILATED PROCESS AREA
(HEAVIER THAN AIR GASES OR VAPOURS)
(SOURCE OF HAZARD LOCATED ABOVE GROUND LEVEL)

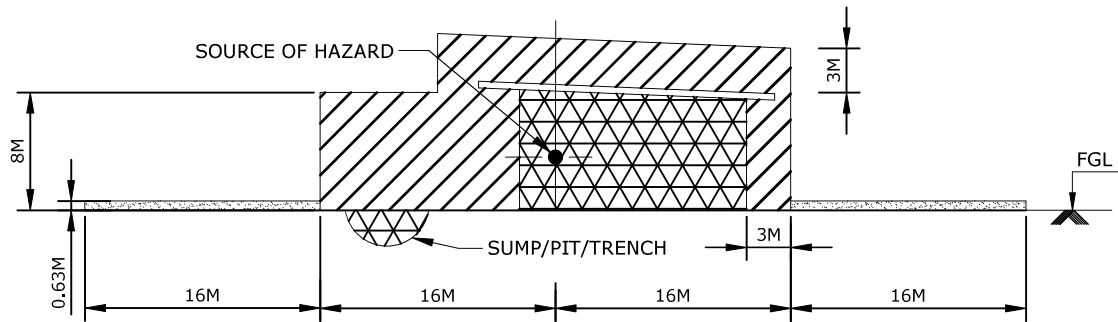


DETAIL-2

FREELY VENTILATED PROCESS AREA
(HEAVIER THAN AIR GASES OR VAPOURS)
(SOURCE OF HAZARD LOCATED NEAR GROUND LEVEL)

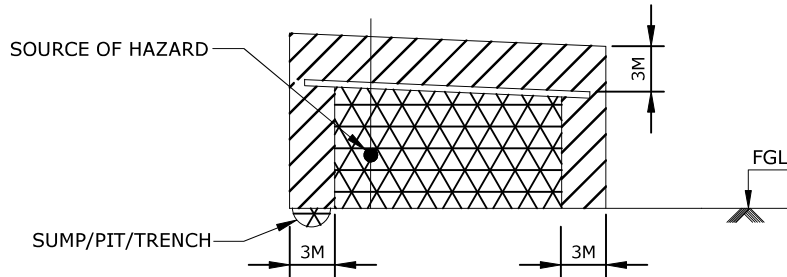
NOTES:

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01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



DETAIL-3

PROCESS AREA WITH RESTRICTED VENTILATION
(HEAVIER THAN AIR GASES OR VAPOURS)

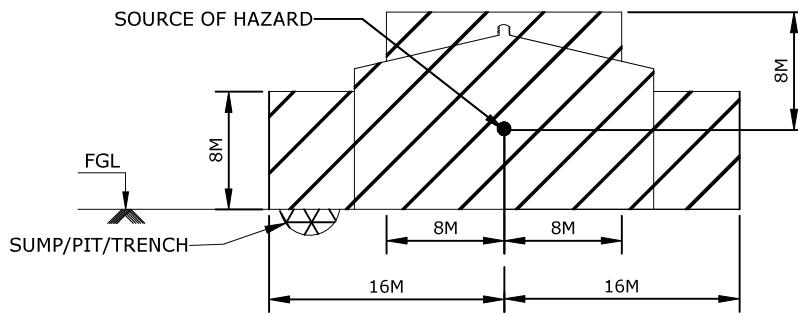


DETAIL-4

PROCESS AREA WITH RESTRICTED VENTILATION
(HEAVIER THAN AIR GASES OR VAPOURS)

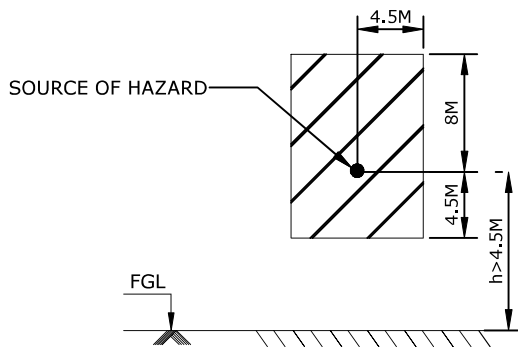
NOTES:

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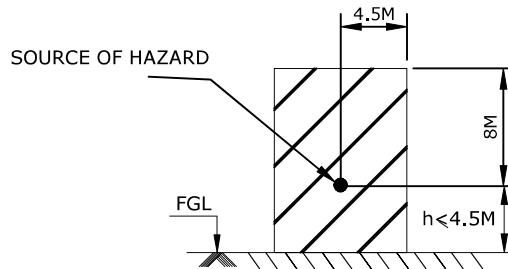


DETAIL-5

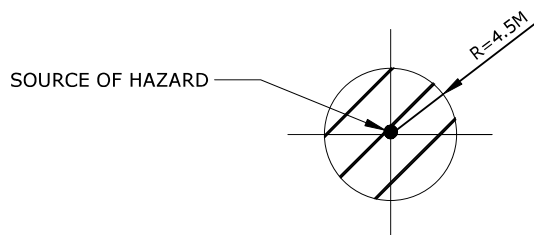
WELL VENTILATED INDOOR AREA
(HEAVIER THAN AIR GASES OR VAPOURS)



ELEVATION



ELEVATION



PLAN

DETAIL-6

(FREELY VENTILATED PROCESS AREA)
(FOR LIGHTER THAN AIR GASES OR VAPOURS)

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4405

SHEET NO.

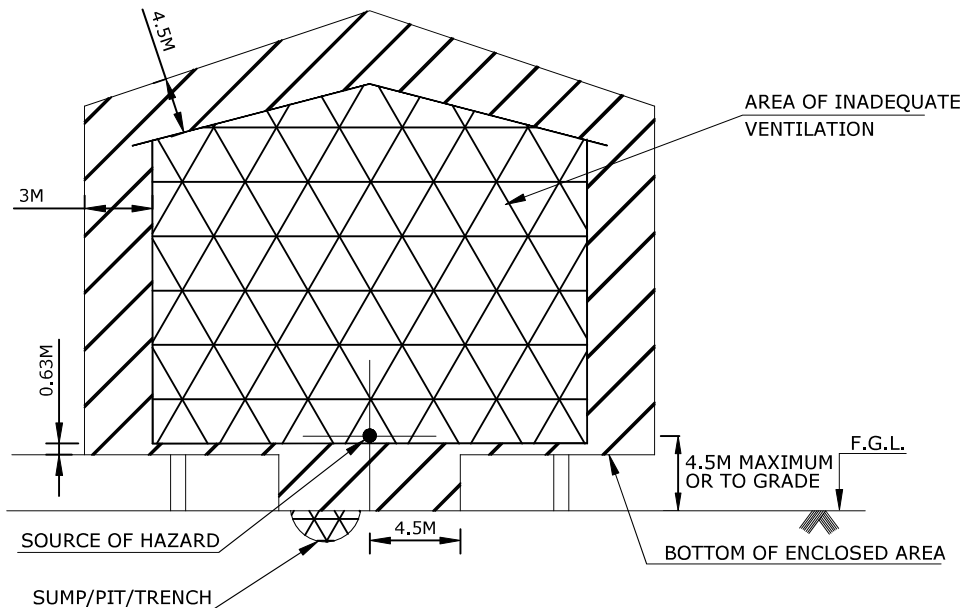
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REV.

02

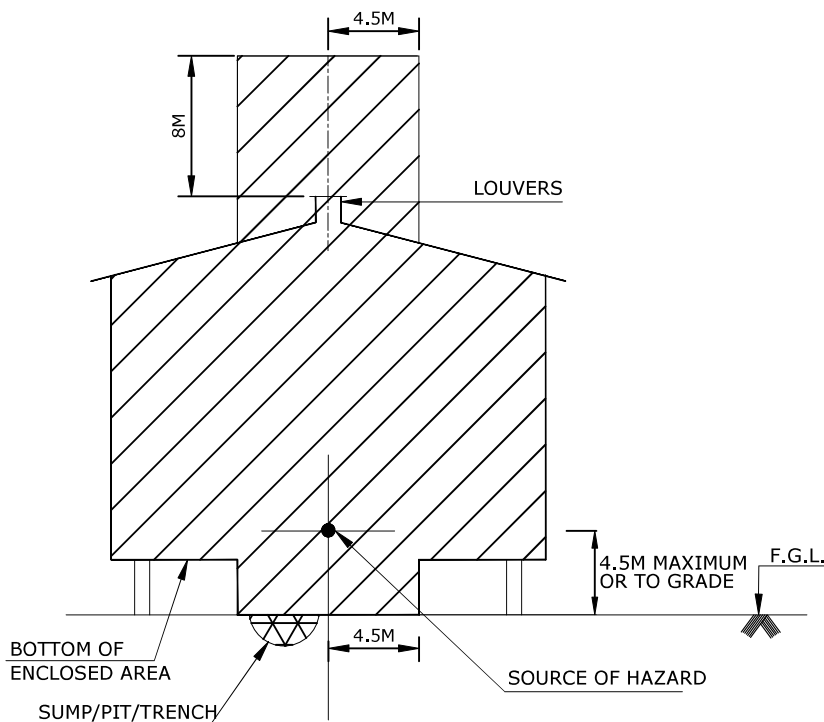
SIZE

A4



DETAIL-7

INADEQUATELY VENTILATED COMPRESSOR SHELTER
(LIGHTER THAN AIR GASES OR VAPOURS)



DETAIL-8

ADEQUATELY VENTILATED COMPRESSOR SHELTER
(LIGHTER THAN AIR GASES OR VAPOURS)

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



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PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4406

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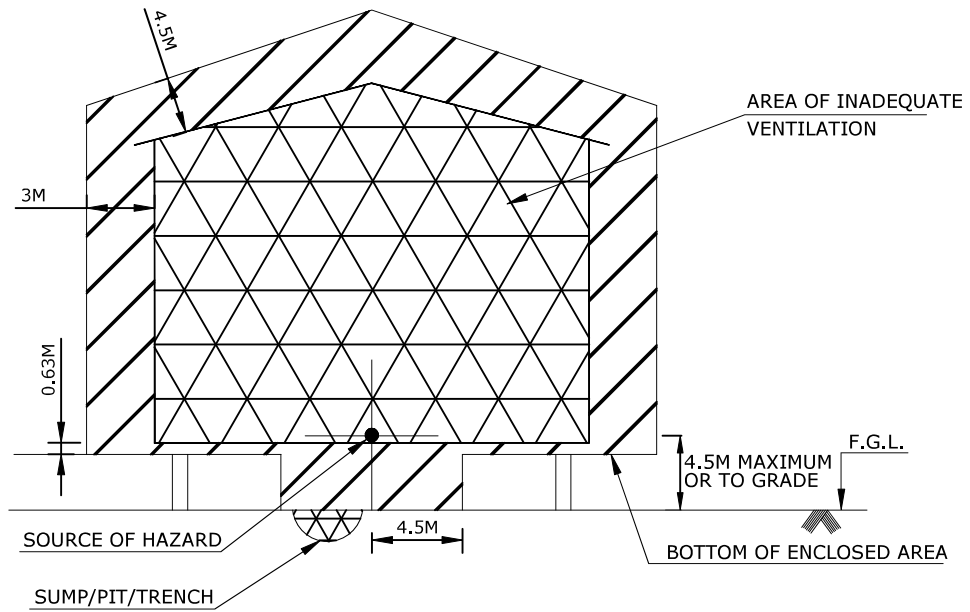
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REV.

02

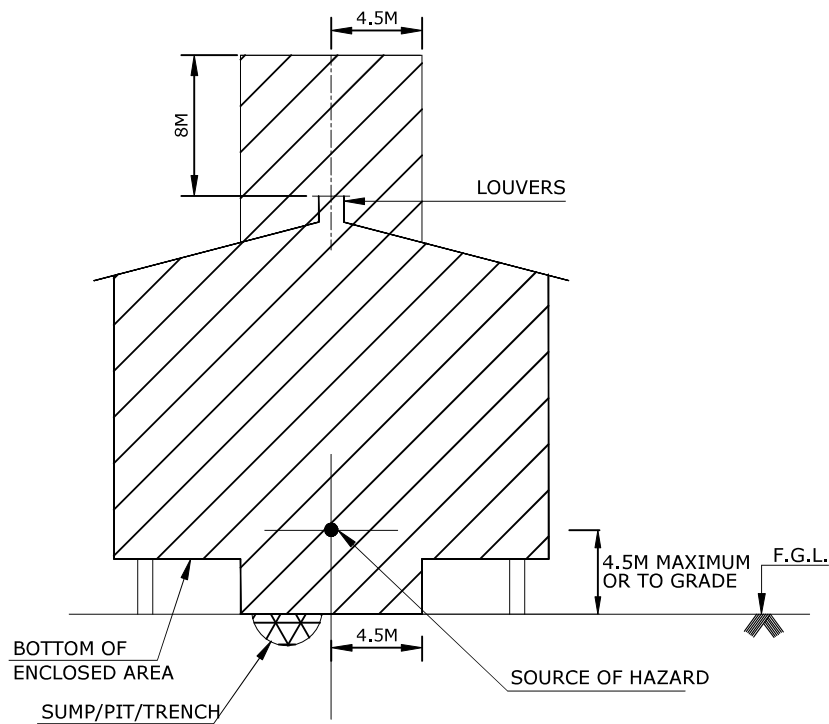
SIZE

A4



DETAIL-7

INADEQUATELY VENTILATED COMPRESSOR SHELTER
(LIGHTER THAN AIR GASES OR VAPOURS)



DETAIL-8

ADEQUATELY VENTILATED COMPRESSOR SHELTER
(LIGHTER THAN AIR GASES OR VAPOURS)

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
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PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4407

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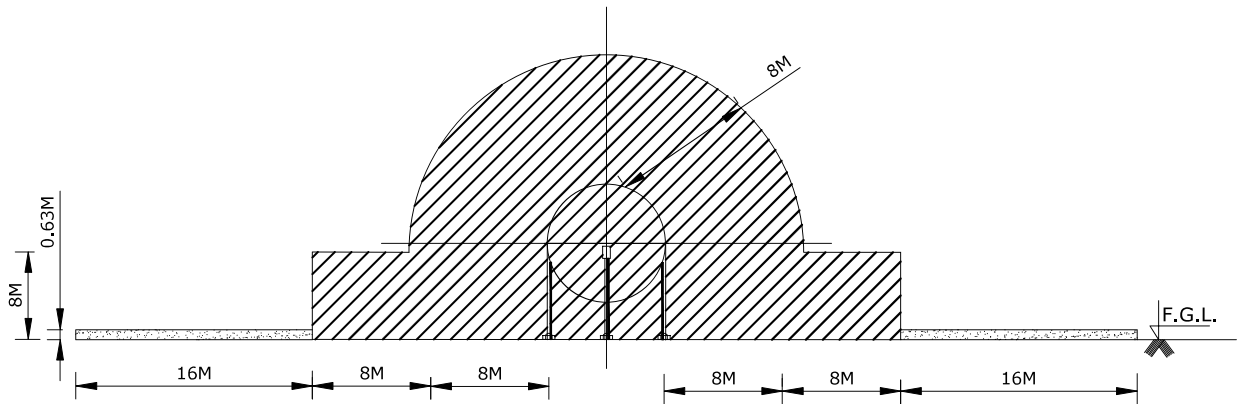
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REV.

02

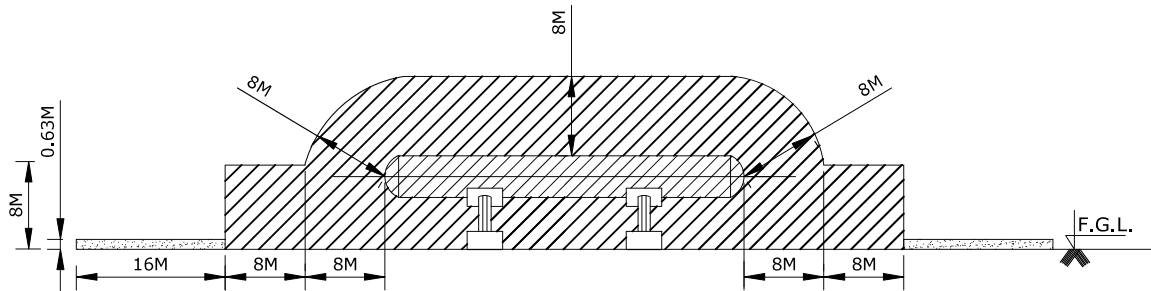
SIZE

A4



DETAIL-12 (SPHERE)

(HEAVIER THAN AIR GASES OR VAPOUR)



DETAIL-13 (BULLET)

(HEAVIER THAN AIR GASES OR VAPOUR)

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
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PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

REV. SIZE

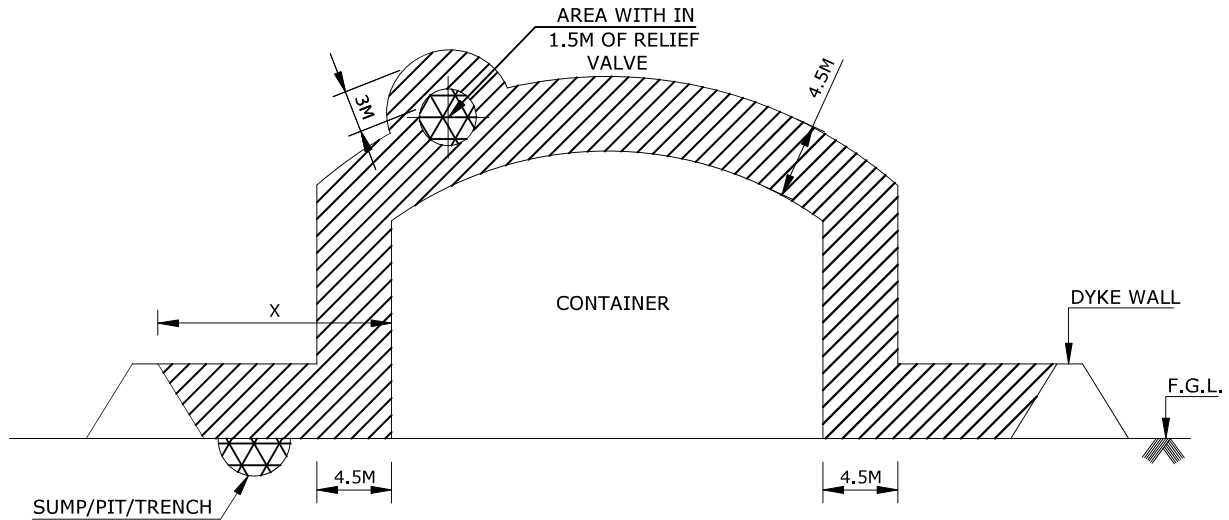
VCS-STD-EL-4408

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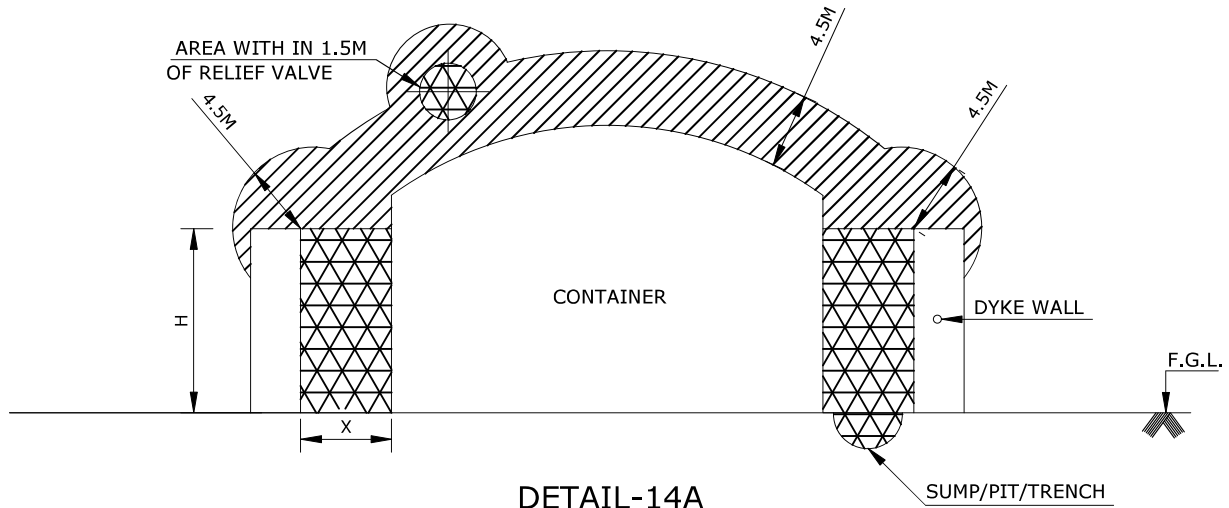
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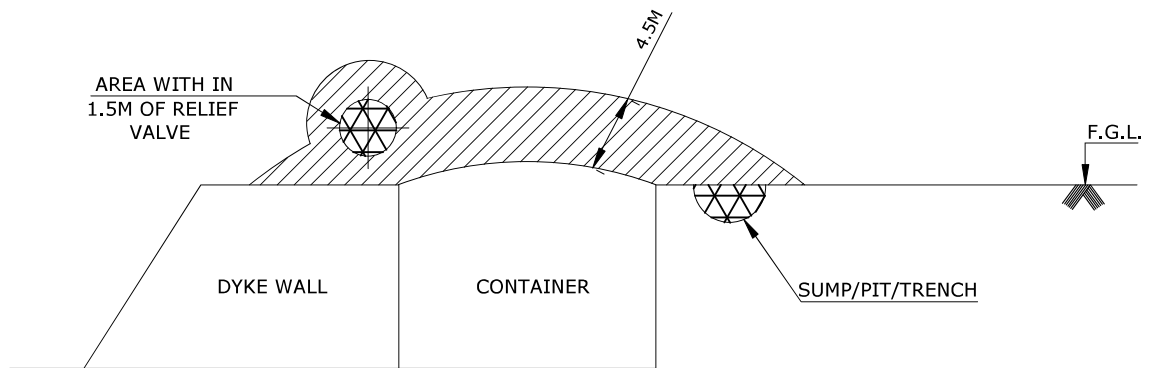
DETAIL-14A

DYKE HEIGHT LESS THAN DISTANCE FROM
CONTAINER TO DYKE (H LESS THAN X)



DETAIL-14A

DYKE HEIGHT LESS THAN DISTANCE FROM
CONTAINER TO DYKE (H GREATER THAN X)



DETAIL-14C (STORAGE BELOW GRADE)

NOTES:

STORAGE TANKS FOR CRYOGENIC LIQUIDS

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



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VCS QUALITY SERVICES
PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4409

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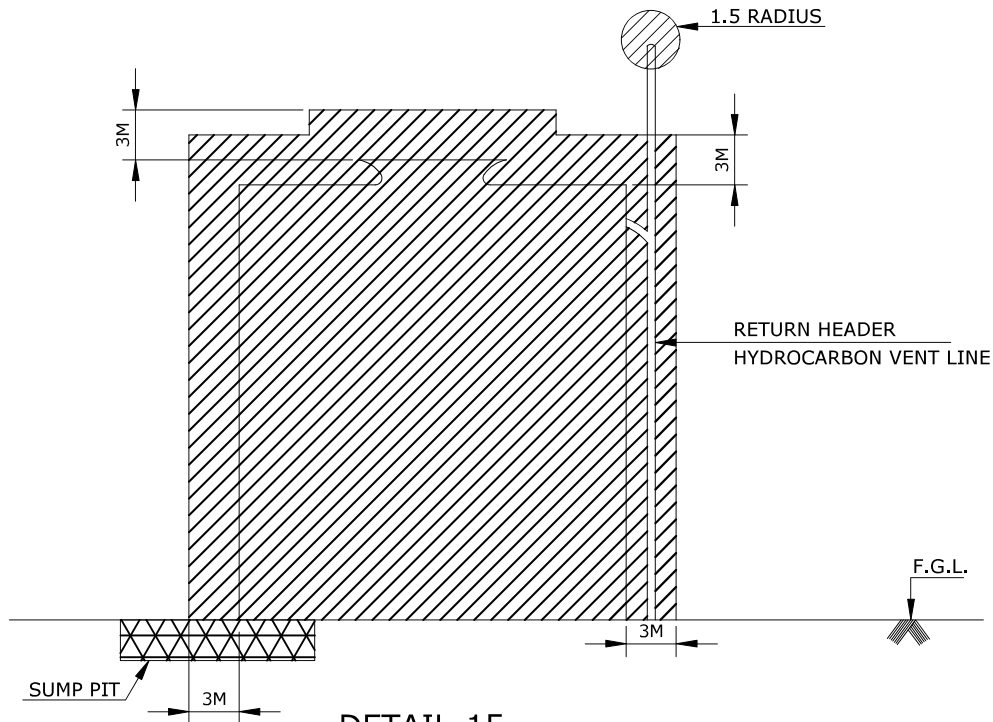
1 OF 1

REV.

02

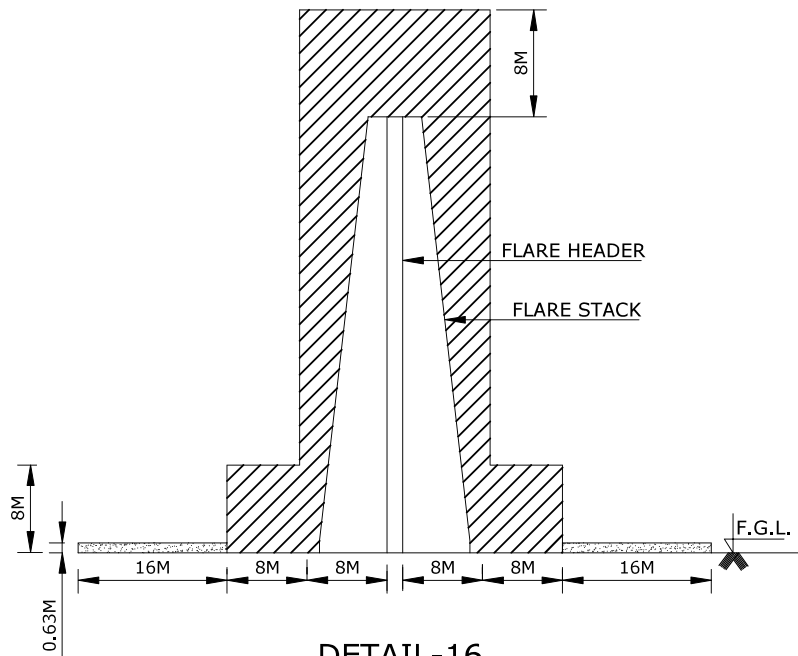
SIZE

A4



DETAIL-15

(HANDLING HYDROCARBON PROCESS COOLING WATER)

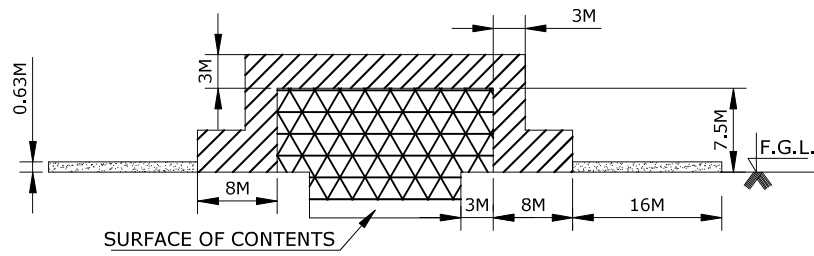


DETAIL-16

FLARE

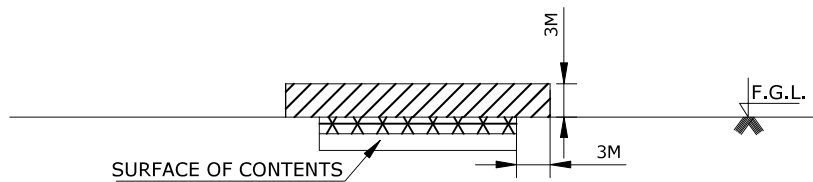
NOTES:

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REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



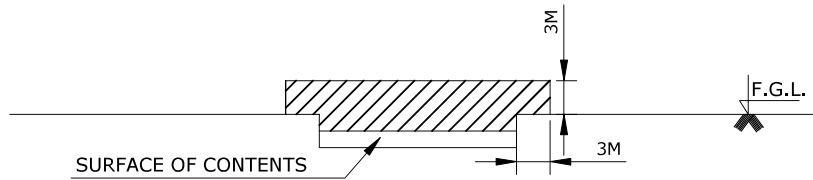
DETAIL-17

UNIT SEPARATORS, PRE-SEPARATORS AND SEPERATORS
(APPLICABLE FOR OPEN TANKS OR BASINS)



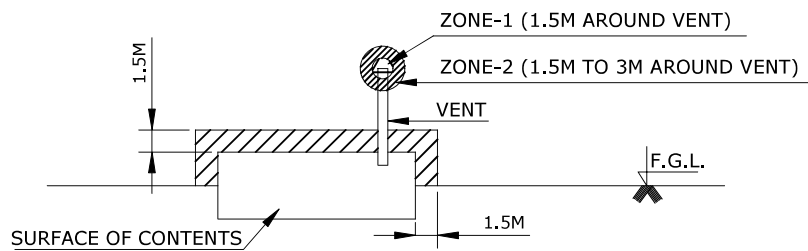
DETAIL-18

DISSOLVED AIR FLOATATION (DAF) UNITS
(APPLICABLE FOR OPEN TANKS OR BASINS)



DETAIL-19

BIOLOGICAL OXIDATION (BIOX) UNITS



DETAIL-20

UNDERGROUND COVERED SUMP OR OILY WATER SEPARATOR

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



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VCS QUALITY SERVICES
PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4411

SHEET NO.

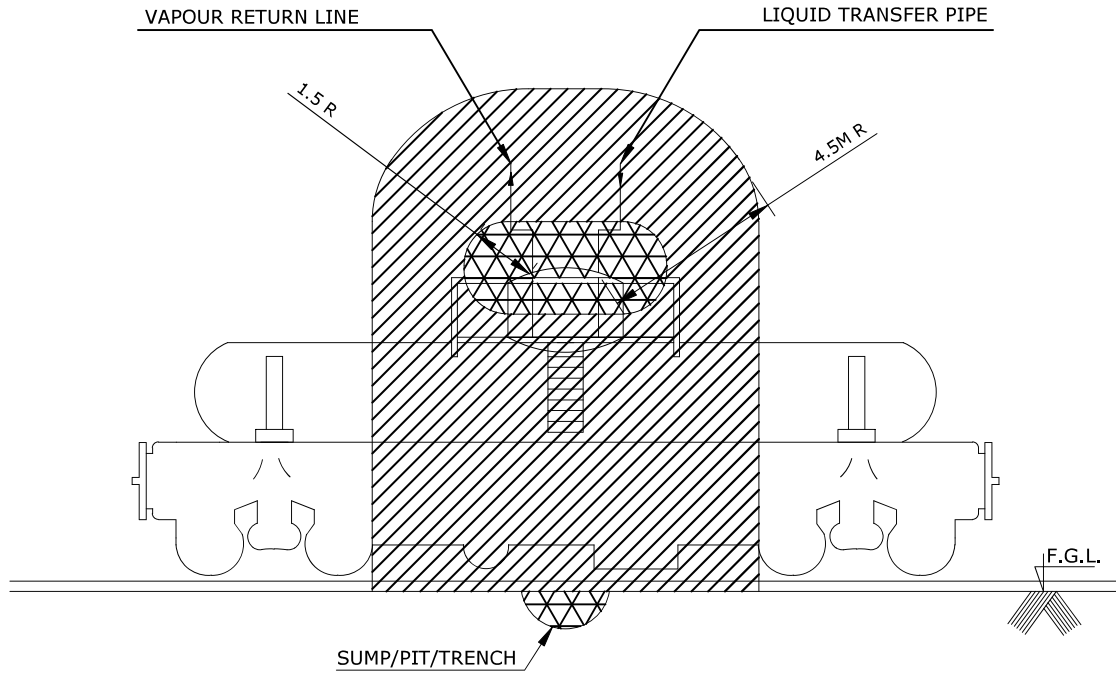
1 OF 1

REV.

02

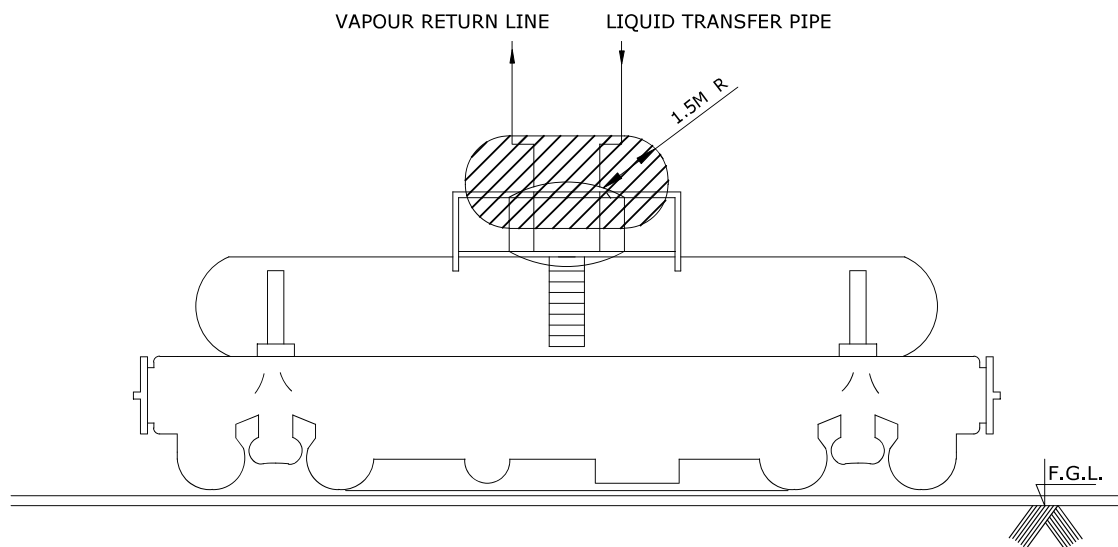
SIZE

A4



DETAIL-21

(MATERIAL: LIQUIFIED GAS/ COMPRESSED GAS/ CRYOGENIC LIQUID)
WAGON/TANK TRUCK LOADING AND UNLOADING VIA CLOSED SYSTEM.
PRODUCT TRANSFER THROUGH DOME ONLY



DETAIL-22

(MATERIAL: FLAMMABLE LIQUID)
WAGON/ TANK TRUCK LOADING AND UNLOADING VIA CLOSED SYSTEM.
PRODUCT TRANSFER THROUGH DOME ONLY

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4412

SHEET NO.

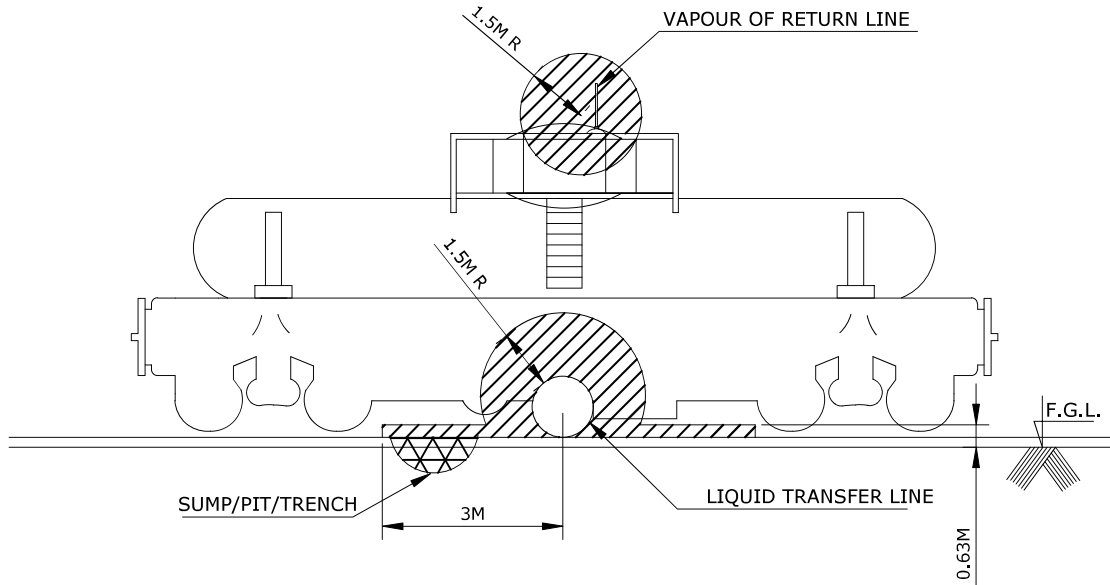
1 OF 1

REV.

02

SIZE

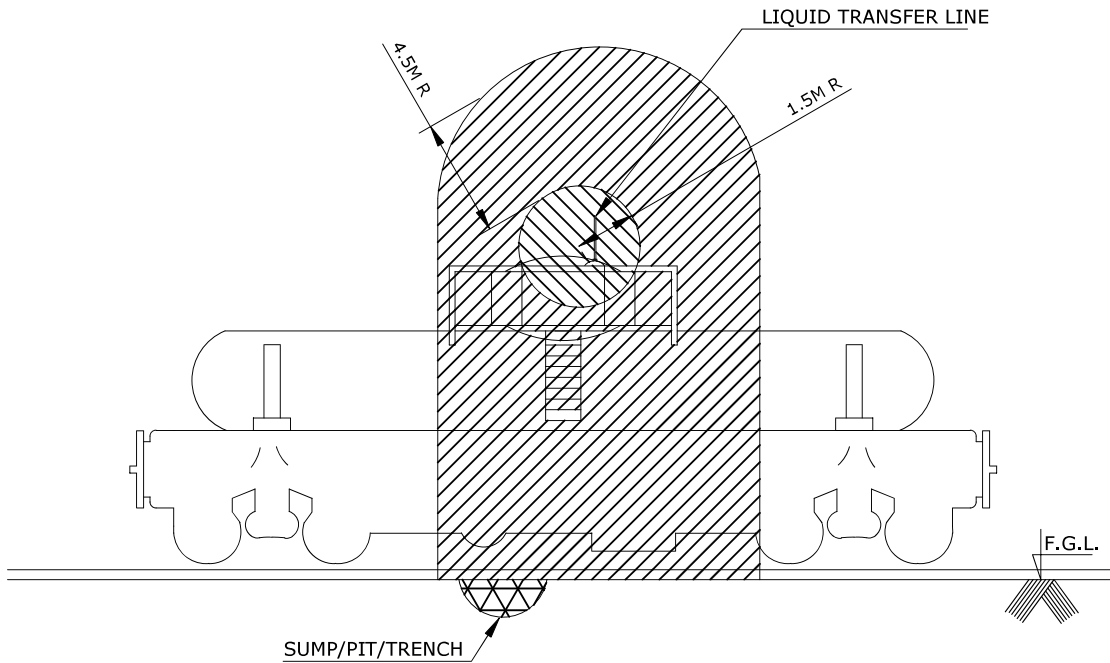
A4



DETAIL-23

(MATERIAL: FLAMMABLE LIQUID)

WAGON/TANK TRUCK LOADING AND UNLOADING VIA CLOSED SYSTEM.
BOTTOM PRODUCT TRANSFER ONLY



DETAIL-24

(MATERIAL: FLAMMABLE LIQUID)

WAGON/TANK TRUCK LOADING AND UNLOADING VIA OPEN SYSTEM.
TOP OR BOTTOM PRODUCT TRANSFER ONLY

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



VCS QUALITY SERVICES
PRIVATE LIMITED

Energising Quality

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4413

SHEET NO.

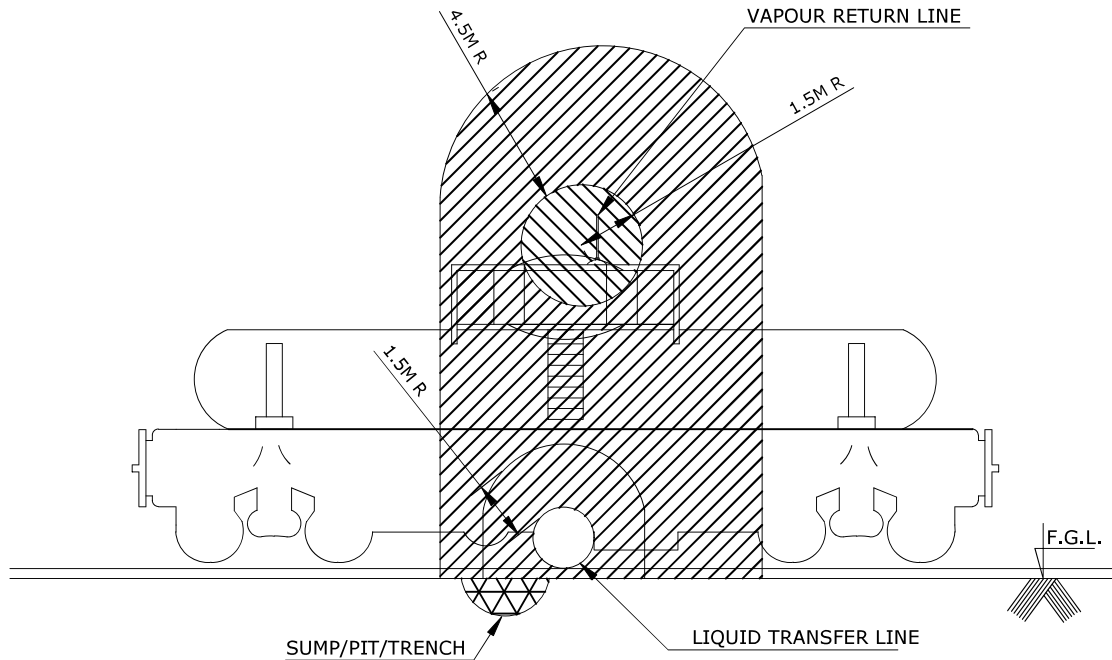
1 OF 1

REV.

02

SIZE

A4



DETAIL-25

(MATERIAL: LIQUIFIED GAS/ COMPRESSED GAS/ CRYOGANIC GAS)
WAGON/TANK TRUCK LOADING AND UNLOADING VIA CLOSED SYSTEM.
PRODUCT TRANSFER THROUGH BOTTOM ONLY

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



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VCS QUALITY SERVICES
PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4414

SHEET NO.

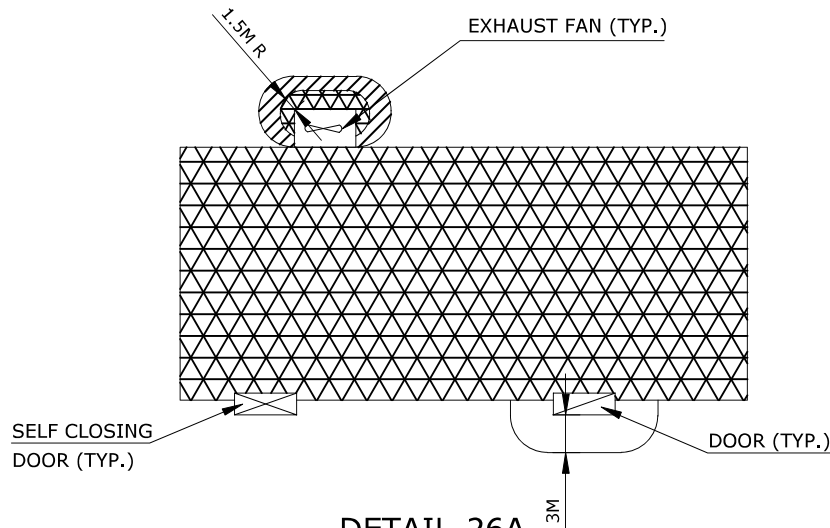
1 OF 1

REV.

02

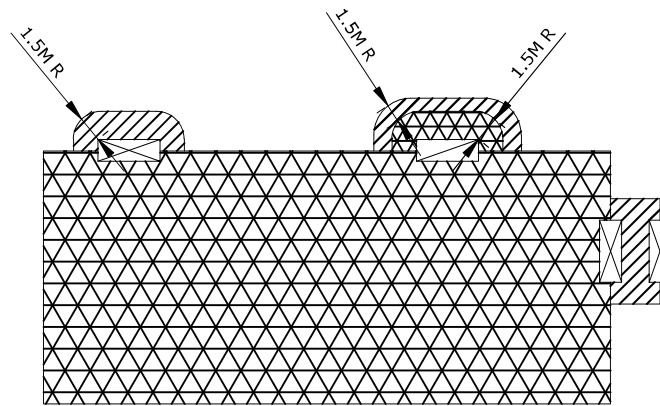
SIZE

A4



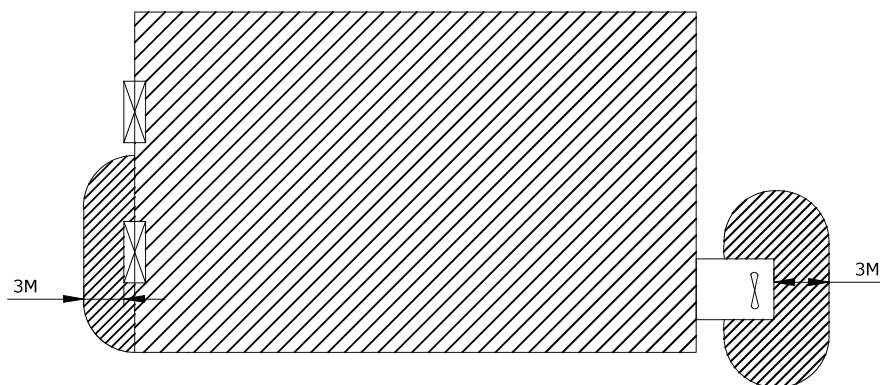
DETAIL-26A

FLAMMABLE SUBSTANCE RELEASED DURING NORMAL
OPERATION WITH INADEQUATE VENTILATION



DETAIL-26B

FLAMMABLE SUBSTANCE RELEASED DURING ABNORMAL SITUATION
OR INFREQUENT OPERATIONS WITH INADEQUATE VENTILATION



DETAIL-26C

FLAMMABLE SUBSTANCE RELEASED DURING ABNORMAL SITUATION
OR INFREQUENT OPERATIONS WITH ADEQUATE VENTILATION

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



VCS QUALITY SERVICES
PRIVATE LIMITED

Energising Quality

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4415

SHEET NO.

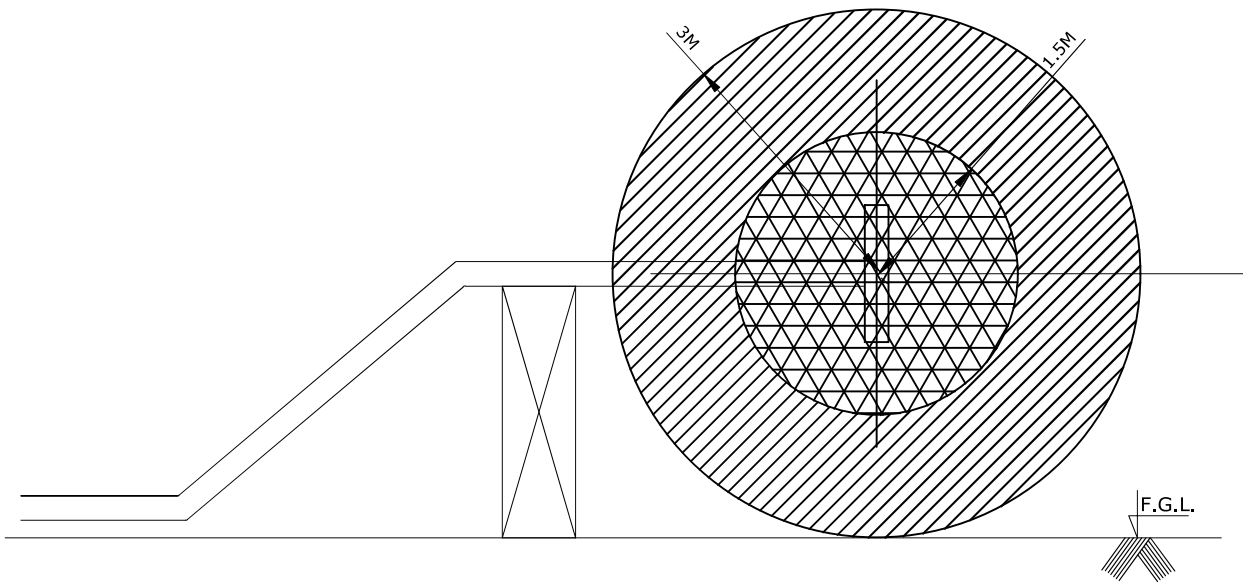
1 OF 1

REV.

02

SIZE

A4



DETAIL-27

BALL OR PIG LAUNCHING OR RECEIVING INSTALLATION
IN A NON-ENCLOSED, ADEQUATELY VENTILATED AREA

NOTES:

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

DETAILS FOR AREA
CLASSIFICATION (OIL/GAS INSTALLATION)

STANDARD DRAWING NO.

VCS-STD-EL-4416

SHEET NO.

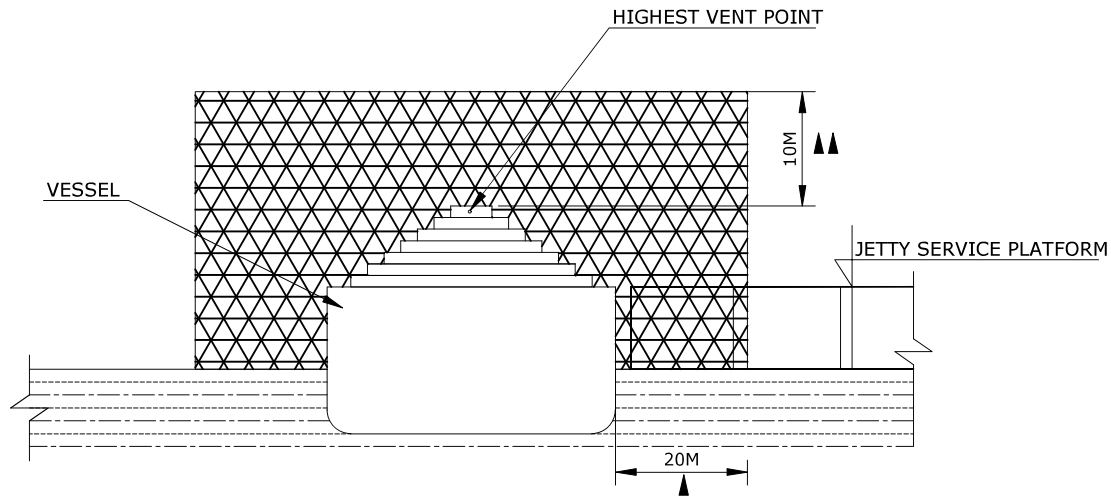
1 OF 1

REV.

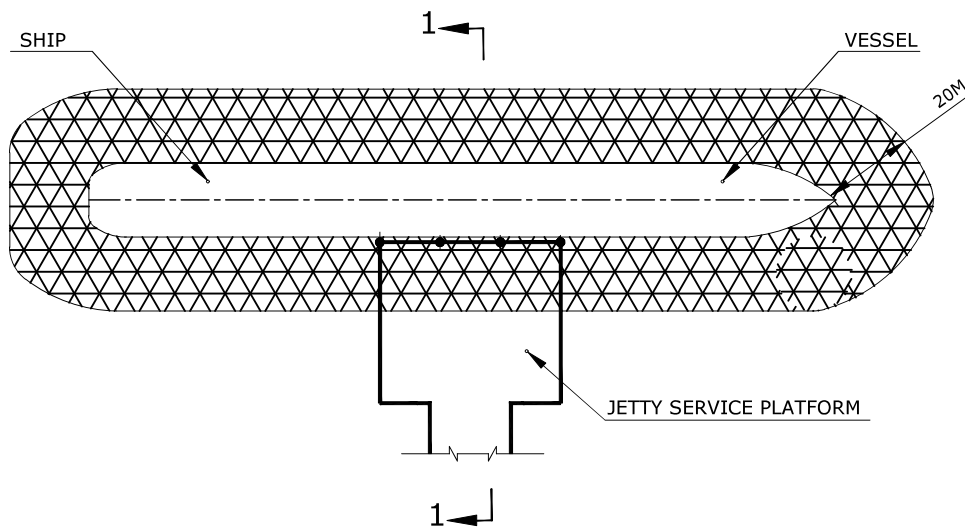
02

SIZE

A4



SECTION 1-1



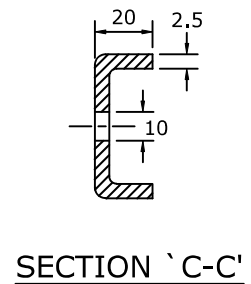
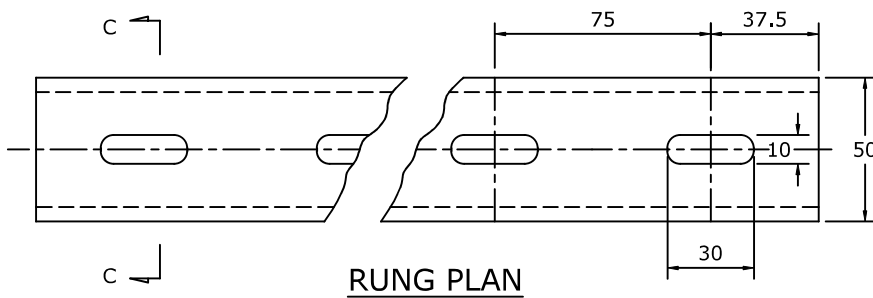
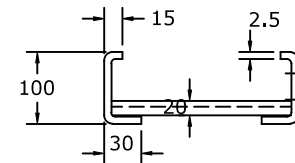
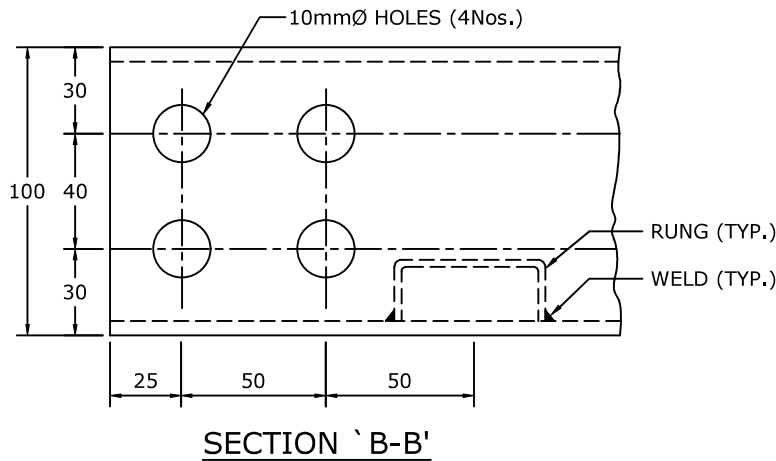
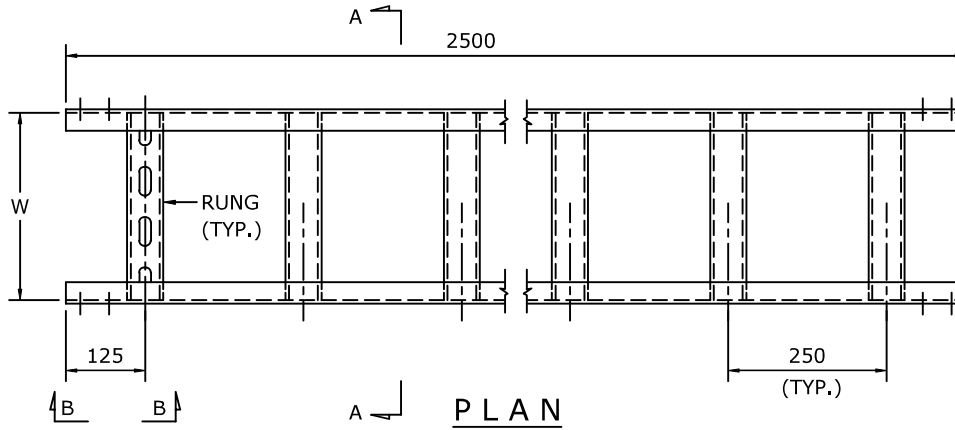
PLAN
DETAIL-28

JETTIES OR MARINE FACILITIES

NOTES:

- ▲ SHALL BE REDUCED TO 10M IN CASE OF VESSELS WITH LOADING OR DISCHARGES RATES $\leq 10M^3/MIN.$
- ▲▲ SHALL BE REDUCED TO 5M FOR LOADING RATES $\leq 10M^3/MIN.$

02	27.04.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	17.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



INSIDE TRAY WIDTH (W) - 150,300,450,600,800MM (AS PER MTO)
MATERIAL - 12 GAUGE (2.5MM) M.S.SHEET/G.S/AL/FRP (AS PER MTO)

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. M.S. SHEET SHALL CONFORM TO IS2062: 1992 OR EQUIVALENT INTERNATIONAL STANDARDS AND HOT DIP GALVANIZING SHALL BE DONE AS PER IS4759: 1996 OR EQUIVALENT INTERNATIONAL STANDARDS. CABLE TRAY SUPPLIED WITH OTHER MATERIALS SHALL CONFIRMED TO RELEVANT IS/INTERNATIONAL STANDARDS.
3. THE MATERIAL DIMENSIONAL DETAILS SHOWN ARE TYPICAL FOR GS STRESS.
4. EACH CABLE TRAY SHALL BE SUPPLIED COMPLETE WITH MATCHING COUPLER PLATES WITH REQUIRE HARDWARE AS PER DRG. No. SD-75-6706.
5. CABLE TRAYS SHALL DESIGN FOR 3000mm SUPPORT SPAN UNLESS NOTED OTHERWISE FOR SPECIFIED TRAY LOADING.

02	14.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	09.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

STANDARD DRAWING
PERFORATED TYPE CABLE TRAY

STANDARD DRAWING NO.

REV. SIZE

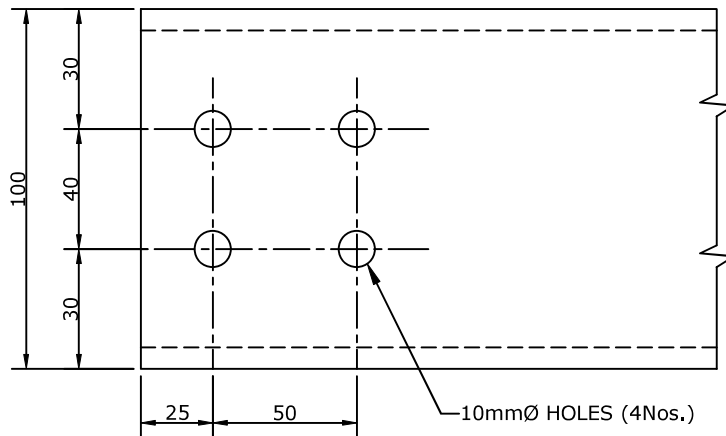
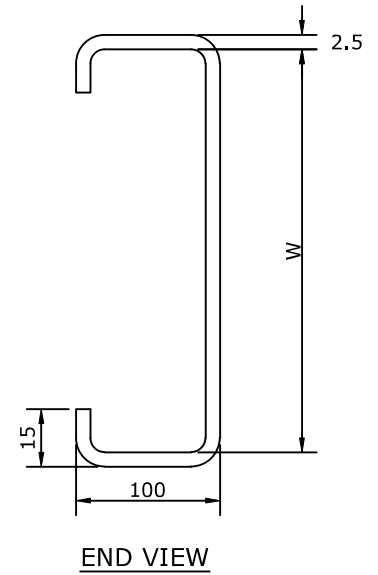
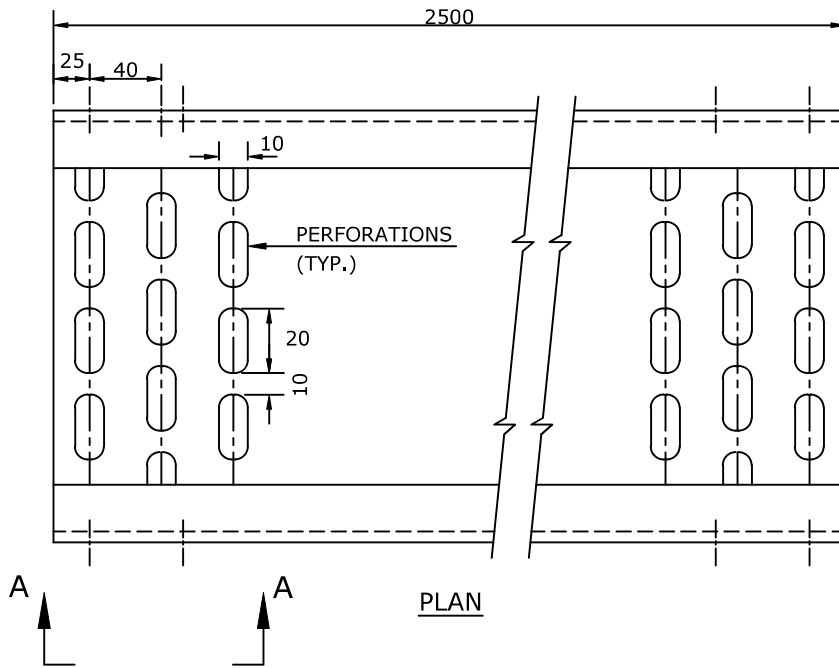
VCS-STD-EL-4202

02

A4

SHEET NO.

1 OF 1



SECTION 'A-A'

INSIDE WIDTH (W) - 100,150,300,450,600,800MM (AS PER MTO)
MATERIAL - 12 GAUGE (2.5MM) M.S.SHEET/G.S./AL/FRP (AS PER MTO)

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. M.S. SHEET SHALL CONFORM TO IS2062: 1992 OR EQUIVALENT INTERNATIONAL STANDARDS AND HOT DIP GALVANIZING SHALL BE DONE AS PER IS4759: 1996 OR EQUIVALENT INTERNATIONAL STANDARDS. CABLE TRAY SUPPLIED WITH OTHER MATERIALS SHALL CONFIRMED TO RELEVANT IS/INTERNATIONAL STANDARDS.
3. THE MATERIAL DIMENSIONAL DETAILS SHOWN ARE TYPICAL FOR GS STRESS.
4. EACH CABLE TRAYS SHALL BE SUPPLIED COMPLETE WITH MATCHING COUPLER PLATES WITH REQUIRED HARDWARE AS PER DRG. No. SD-75-6706.
5. CABLE TRAYS SHALL BE DESIGNED FOR 3000mm SUPPORT SPAN UNLESS NOTED OTHERWISE FOR SPECIFIED TRAY LOADING.

02	14.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	09.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

STANDARD DRAWING
CABLE TRAY COVER

STANDARD DRAWING NO.

REV.

SIZE

VCS-STD-EL-4203

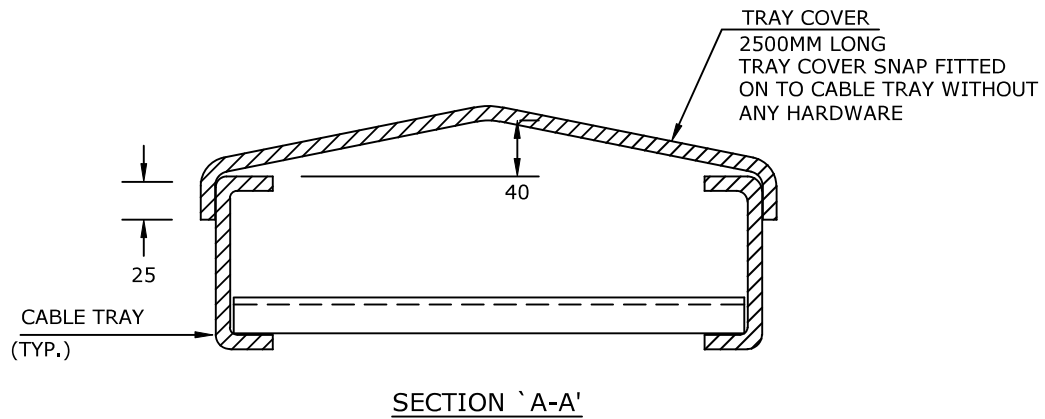
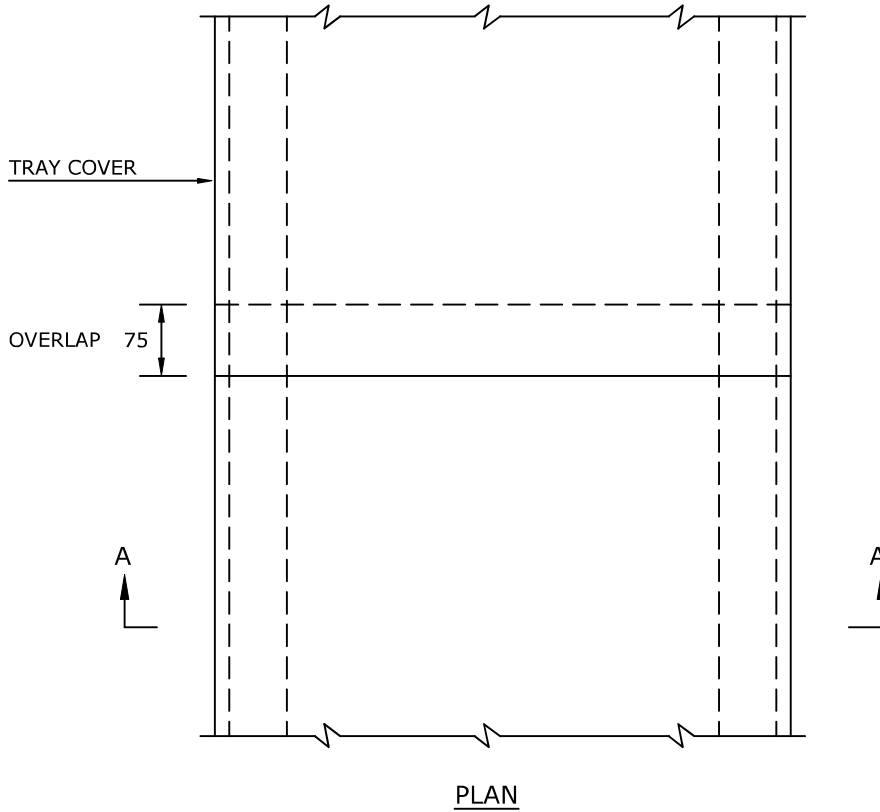
02

A4

SHEET NO.

1 OF 1

TYPICAL ARRANGEMENT OF COVERING CABLE TRAY

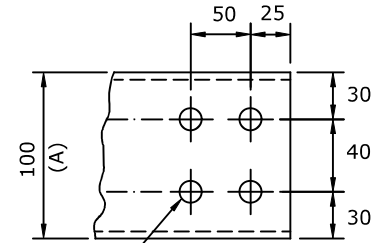
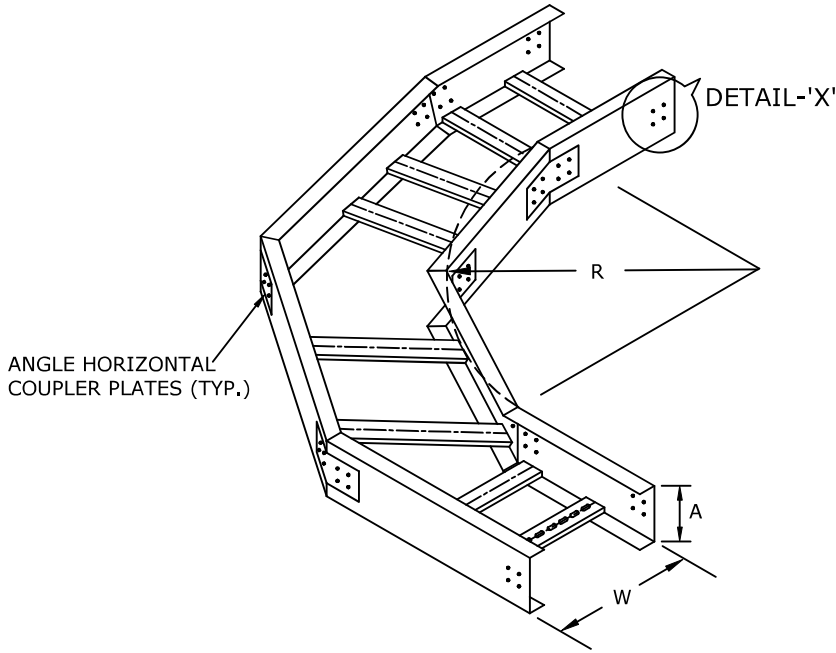


MATERIAL-16 GAUGE(1.7MM) M.S. SHEET/G.S./AL/FRP (AS PER MTO)
TRAY COVER MATERIAL SAME AS OF TRAY & TRAY WIDTH AS PER MTO

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. M.S. SHEET SHALL CONFORM TO IS2062: 1992 OR EQUIVALENT INTERNATIONAL STANDARDS AND HOT DIP GALVANIZING SHALL BE DONE AS PER IS4759: 1996 OR EQUIVALENT INTERNATIONAL STANDARDS. CABLE TRAY SUPPLIED WITH OTHER MATERIALS SHALL CONFORMED TO RELEVANT IS/INTERNATIONAL STANDARDS.

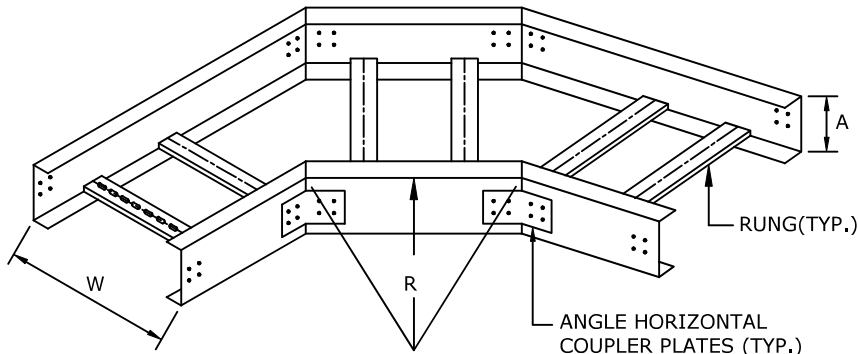
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01	09.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



10 Ø HOLES
(4 Nos.)

DETAIL-'X'

90° HORIZONTAL RADIUS ELBOW



45° HORIZONTAL RADIUS ELBOW

(W) INSIDE WIDTH OF TRAY - 150,300,450,600,800MM (AS PER MTO)

(A) DEPTH OF TRAY - 100MM UNLESS NOTED

(R) BENDING RADIUS (AS PER MTO)

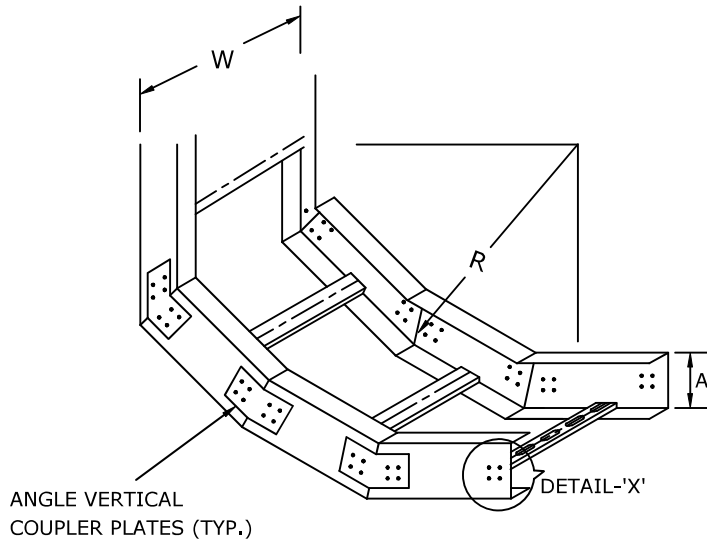
NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. MATERIAL - 12 GAUGE(2,5MM) M.S. SHEET/G.S/AL/FRP (AS PER MTO).
3. M.S. SHEET SHALL CONFORM TO IS 2062: 1992 OR EQUIVALENT INTERNATIONAL STANDARDS AND HOT DIP GALVANIZING SHALL BE DONE AS PER IS 4759: 1996 OR EQUIVALENT INTERNATIONAL STANDARDS. TRAY FITTINGS SUPPLIED WITH OTHER MATERIAL SHALL CONFORM TO RELEVANT IS/INTERNATIONAL STANDARDS.
4. EACH CABLE TRAY SHALL BE SUPPLIED COMPLETE WITH MATCHING COUPLER PLATES WITH REQUIRE HARDWARE AS PER DRG. No. SD-75-6706.
5. ALL TRAY FITTINGS SHALL BE SUPPLIED COMPLETE WITH MATCHING ANGLE HORIZONTAL COUPLER PLATES & HARDWARE. ALTERNATIVELY WELDED ASSEMBLY MAY BE SUPPLIED FOR G.S. CABLE TRAY FITTINGS.

02	14.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	09.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY

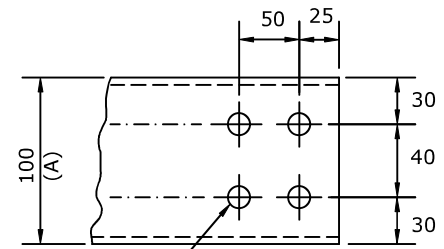


90° VERTICAL RADIUS ELBOW



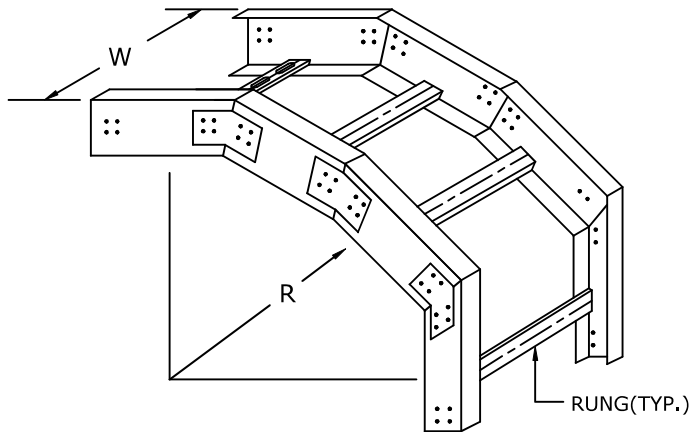
ANGLE VERTICAL
COUPLER PLATES (TYP.)

INSIDE



10 Ø HOLES
(4Nos.)

DETAIL-'X'



RUNG(TYP.)

OUTSIDE

(W) INSIDE WIDTH OF TRAY - 150,300,450,600,800MM (AS PER MTO).

(A) DEPTH OF TRAY - 100MM UNLESS NOTED.

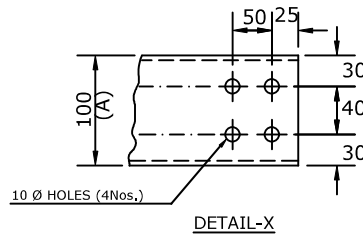
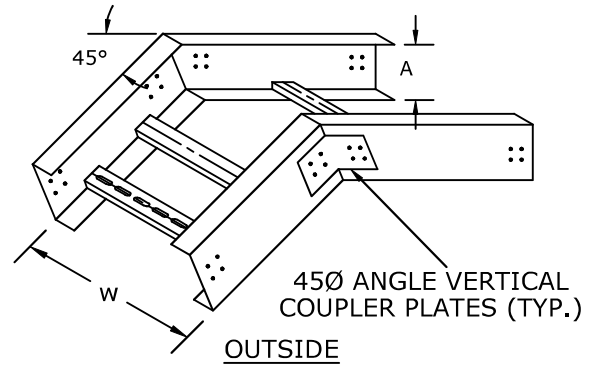
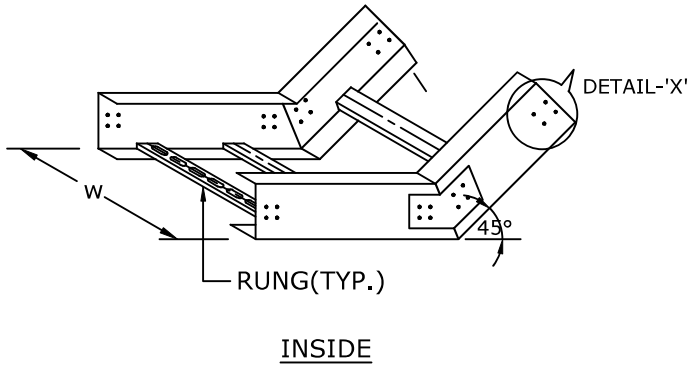
(R) BENDING RADIUS (AS PER MTO).

NOTES:

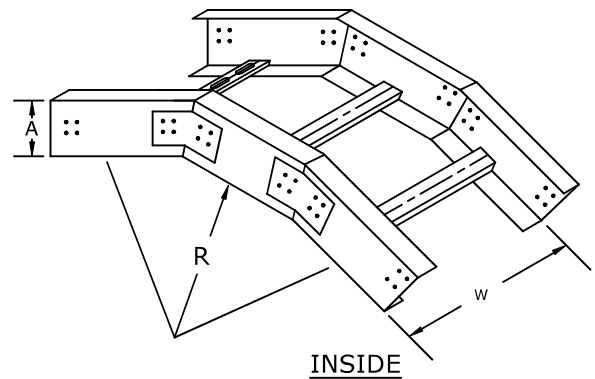
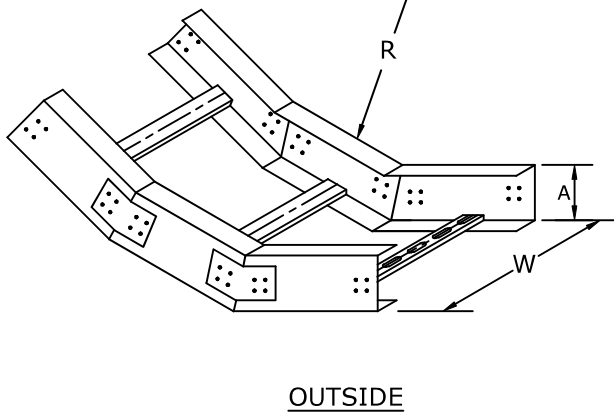
1. ALL DIMENSIONS ARE IN MM.
2. MATERIAL - 12 GAUGE(2.5MM) M.S. SHEET/G.S/AL/FRP (AS PER MTO).
3. M.S. SHEET SHALL CONFORM TO IS 2062: 1992 OR EQUIVALENT INTERNATIONAL STANDARDS AND HOT DIP GALVANIZING SHALL BE DONE AS PER IS 4759: 1996 OR EQUIVALENT INTERNATIONAL STANDARDS. TRAY FITTINGS SUPPLIED WITH OTHER MATERIAL SHALL CONFORM TO RELEVANT IS/INTERNATIONAL STANDARDS.
4. EACH CABLE TRAY SHALL BE SUPPLIED COMPLETE WITH MATCHING COUPLER PLATES WITH REQUIRE HARDWARE AS PER DRG. No. SD-75-6706.
5. ALL TRAY FITTINGS SHALL BE SUPPLIED COMPLETE WITH MATCHING ANGLE HORIZONTAL COUPLER PLATES AND HARDWARE. ALTERNATIVELY WELDED ASSEMBLY MAY BE SUPPLIED FOR G.S. CABLE TRAY FITTINGS.

02	14.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	09.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY

45° DIRECT VERTICAL ELBOW



45° VERTICAL RADIUS ELBOW



(W) INSIDE WIDTH OF TRAY - 150,300,450,600,800MM (AS PER MTO)

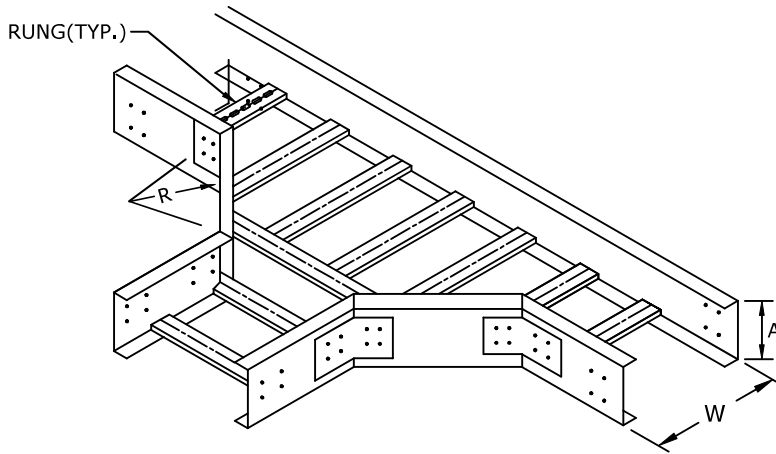
(A) DEPTH OF TRAY - 100MM UNLESS NOTED

(R) BENDING RADIUS (AS PER MTO)

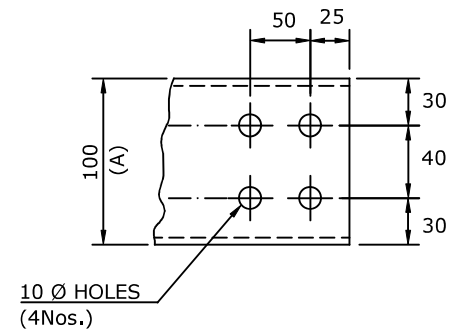
NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. MATERIAL - 12 GAUGE(2.5MM) M.S. SHEET/G.S/AL/FRP (AS PER MTO).
3. M.S. SHEET SHALL CONFORM TO IS 2062: 1992 OR EQUIVALENT INTERNATIONAL STANDARDS AND HOT DIP GALVANIZING SHALL BE DONE AS PER IS 4759: 1996 OR EQUIVALENT INTERNATIONAL STANDARDS. TRAY FITTINGS SUPPLIED WITH OTHER MATERIAL SHALL CONFORM TO RELEVANT IS/INTERNATIONAL STANDARDS.
4. EACH CABLE TRAY SHALL BE SUPPLIED COMPLETE WITH MATCHING COUPLER PLATES WITH REQUIRE HARDWARE AS PER DRG. No. SD-75-6706.
5. ALL TRAY FITTINGS SHALL BE SUPPLIED COMPLETE WITH MATCHING ANGLE HORIZONTAL COUPLER PLATES & HARDWARE. ALTERNATIVELY WELDED ASSEMBLY MAY BE SUPPLIED FOR G.S. CABLE TRAY FITTINGS.

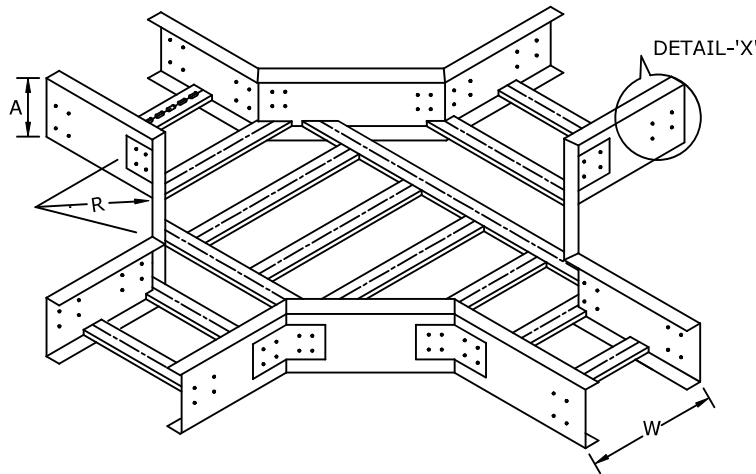
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01	09.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



HORIZONTAL RADIUS TEE



DETAIL-'X'



HORIZONTAL RADIUS CROSS

(W) INSIDE WIDTH OF TRAY - 150,300,450,600,800MM (AS PER MTO)

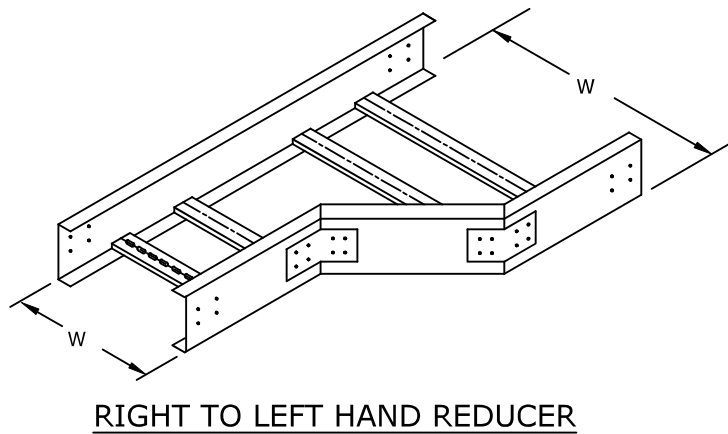
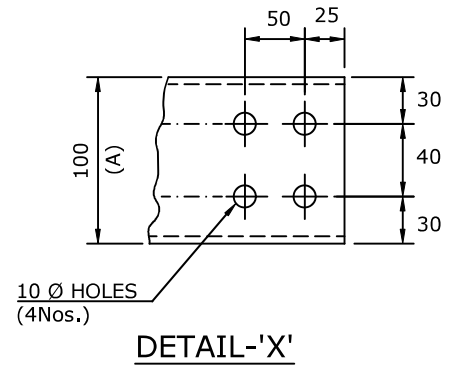
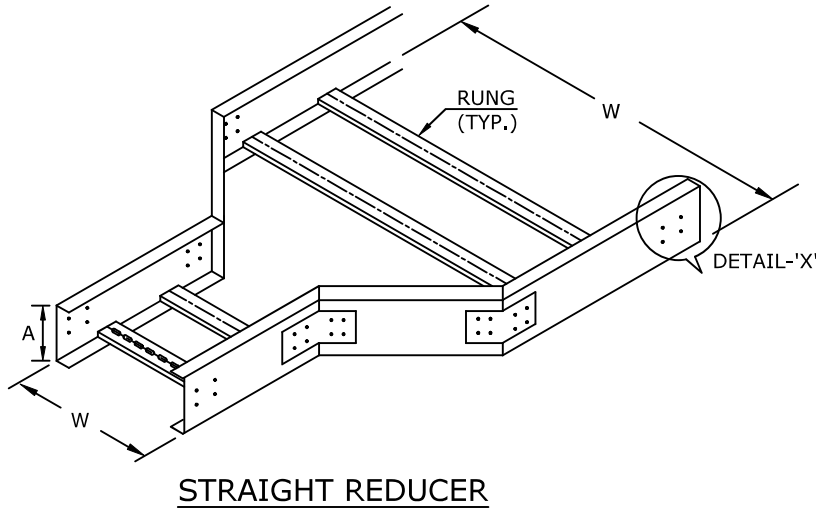
(A) DEPTH OF TRAY - 100MM UNLESS NOTED

(R) BENDING RADIUS (AS PER MTO)

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. MATERIAL - 12 GAUGE(2.5MM) M.S. SHEET/G,S/AL/FRP (AS PER MTO).
3. M.S. SHEET SHALL CONFORM TO IS 2062: 1992 OR EQUIVALENT INTERNATIONAL STANDARDS AND HOT DIP GALVANIZING SHALL BE DONE AS PER IS 4759: 1996 OR EQUIVALENT INTERNATIONAL STANDARDS. TRAY FITTINGS SUPPLIED WITH OTHER MATERIAL SHALL CONFORM TO RELEVANT IS/INTERNATIONAL STANDARDS.
4. EACH CABLE TRAY SHALL BE SUPPLIED COMPLETE WITH MATCHING COUPLER PLATES WITH REQUIRE HARDWARE AS PER DRG. No. SD-75-6706.
5. ALL TRAY FITTINGS SHALL BE SUPPLIED COMPLETE WITH MATCHING ANGLE HORIZONTAL COUPLER PLATES AND HARDWARE. ALTERNATIVELY WELDED ASSEMBLY MAY BE SUPPLIED FOR G.S. CABLE TRAY FITTINGS.

02	14.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	09.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



(W) INSIDE WIDTH OF TRAY - 150,300,450,600,800MM (AS PER MTO)

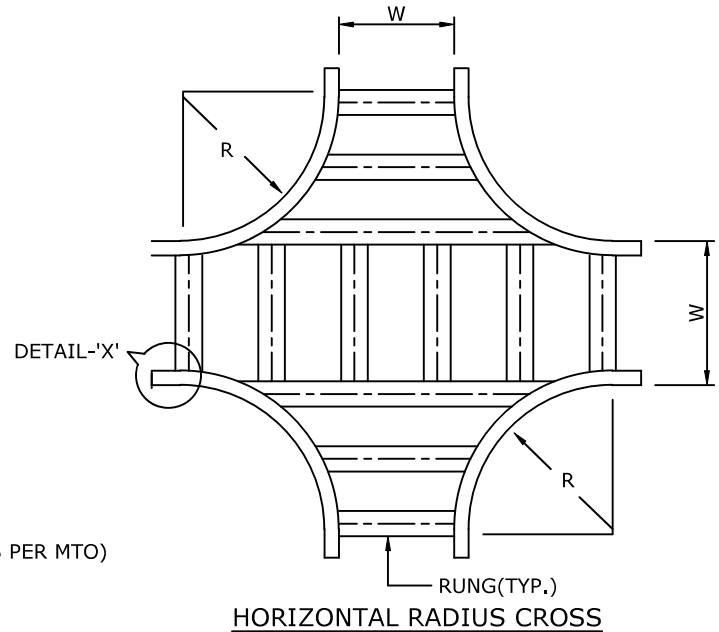
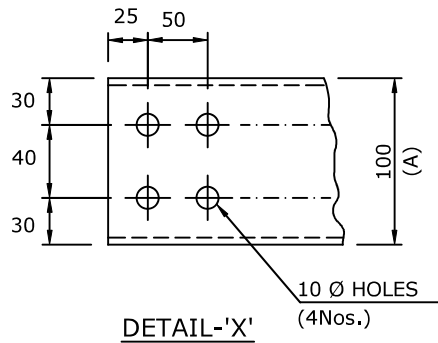
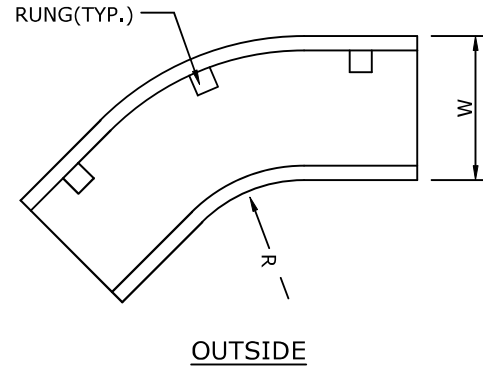
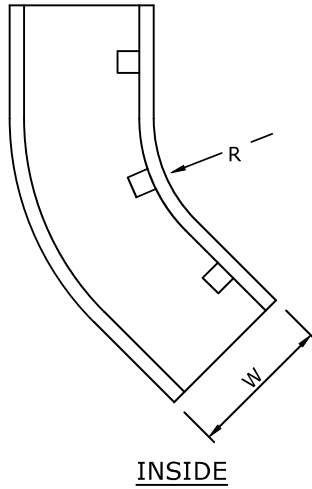
(A) DEPTH OF TRAY - 100MM UNLESS NOTED

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. MATERIAL - 12 GAUGE(2.5MM) M.S. SHEET/G.S/AL/FRP (AS PER MTO).
3. M.S. SHEET SHALL CONFORM TO IS 2062: 1992 OR EQUIVALENT INTERNATIONAL STANDARDS AND HOT DIP GALVANIZING SHALL BE DONE AS PER IS 4759: 1996 OR EQUIVALENT INTERNATIONAL STANDARDS. TRAY FITTINGS SUPPLIED WITH OTHER MATERIAL SHALL CONFORM TO RELEVANT IS/INTERNATIONAL STANDARDS.
4. EACH CABLE TRAY SHALL BE SUPPLIED COMPLETE WITH MATCHING COUPLER PLATES WITH REQUIRE HARDWARE AS PER DRG. No. SD-75-6706.
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02	14.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	09.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY

45° VERTICAL RADIUS ELBOW



- (W) INSIDE WIDTH OF TRAY - 150,300,450,600,800MM (AS PER MTO)
 (A) DEPTH OF TRAY - 100MM UNLESS NOTED
 (R) BENDING RADIUS (AS PER MTO)

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Energising Quality

VCS QUALITY SERVICES
PRIVATE LIMITED

STANDARD DRAWING CABLE TRAY
ACCESSORIES

STANDARD DRAWING NO.

REV.

SIZE

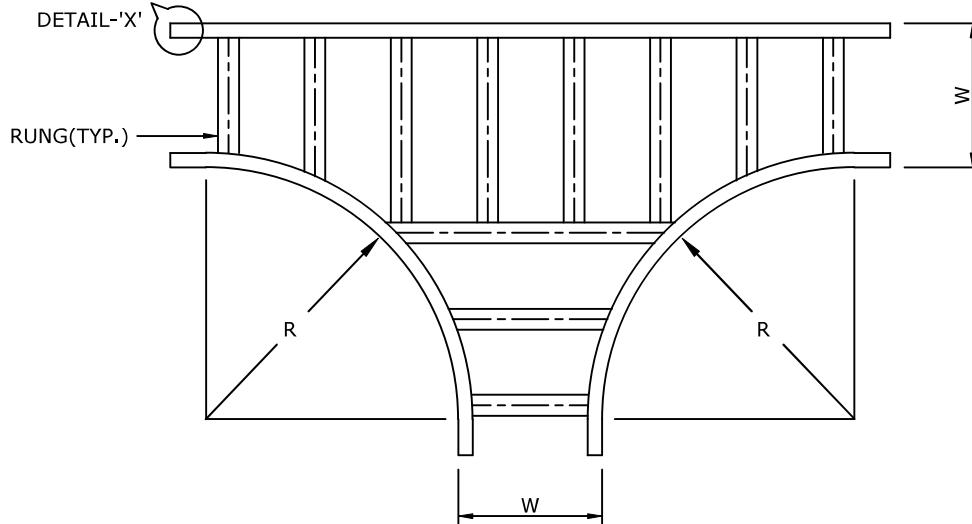
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02

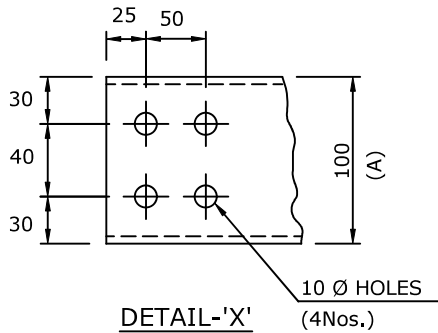
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SHEET NO.

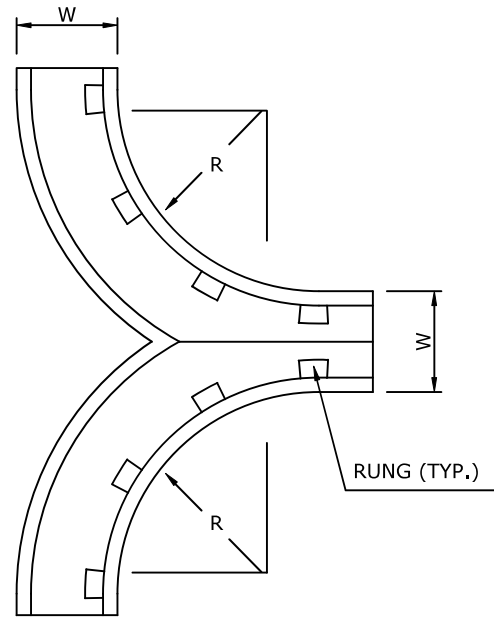
7 OF 7



HORIZONTAL RADIUS TEE



DETAIL-'X'
10 Ø HOLES
(4Nos.)



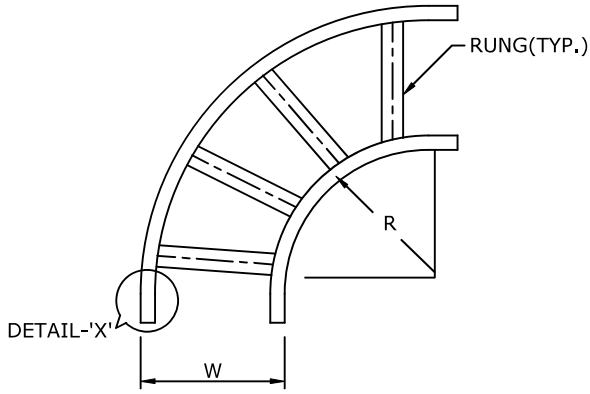
90° VERTICAL RADIUS TEE

- (W) - INSIDE WIDTH OF TRAY-150,300,450,600,800MM (AS PER MTO)
 (A) - DEPTH OF TRAY-100MM UNLESS NOTED
 (R) - BENDING RADIUS (AS PER MTO)

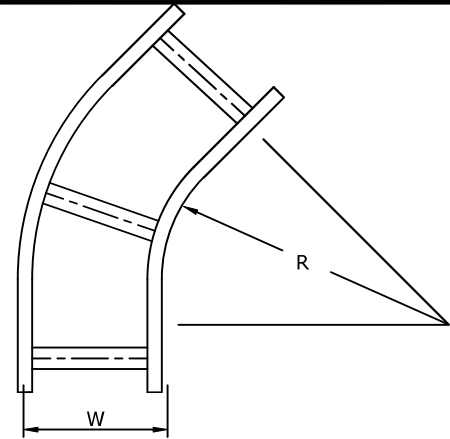
NOTES:

1. ALL DIMENSIONS ARE IN MM.
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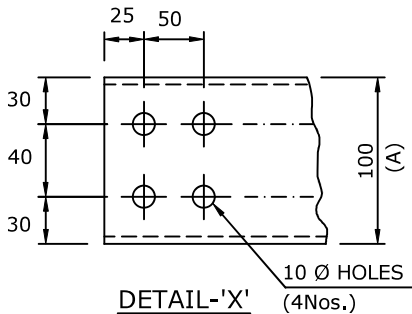
02	14.02.22	RE-ISSUED AS STANDARD DRAWING	SY	RD	AA	HK
01	09.12.19	RE-ISSUED AS STANDARD DRAWING	SY	VV	AD	SK
0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



90° HORIZONTAL RADIUS ELBOW



45° HORIZONTAL RADIUS ELBOW

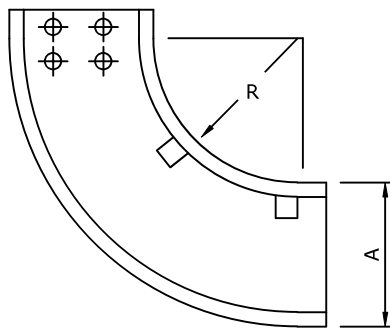


(W) INSIDE WIDTH OF TRAY - 150,300,450,600,800MM (AS PER MTO)

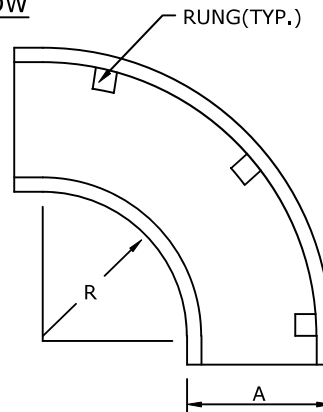
(A) DEPTH OF TRAY - 100MM UNLESS NOTED

(R) BENDING RADIUS (AS PER MTO)

90° VERTICAL MOULDED RADIUS ELBOW



INSIDE

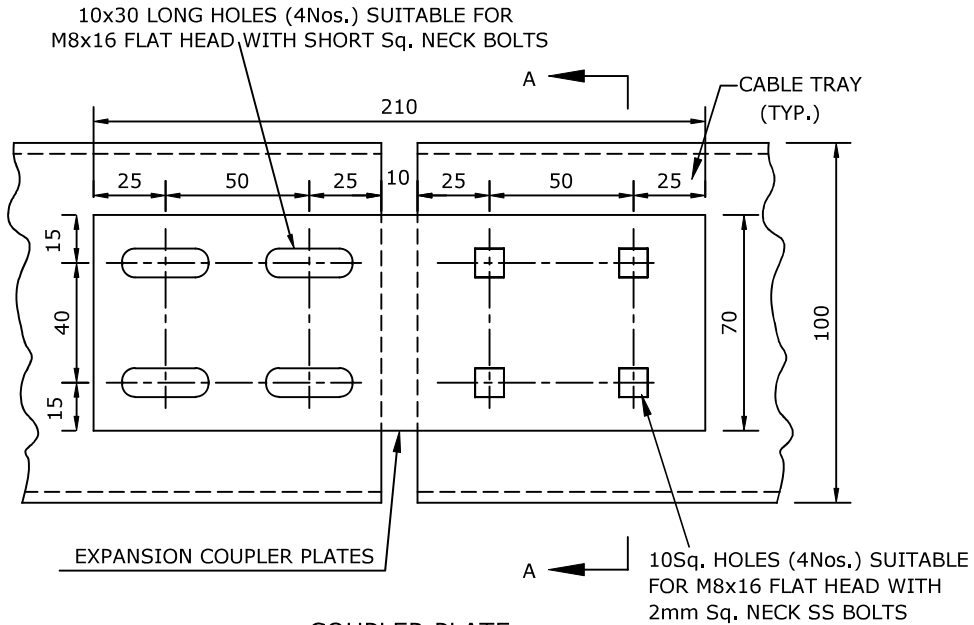


OUTSIDE

NOTES:

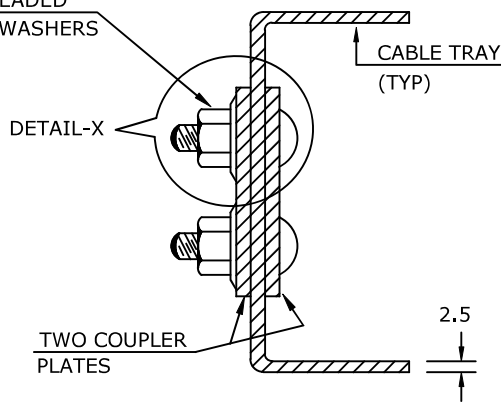
1. ALL DIMENSIONS ARE IN MM.
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REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY

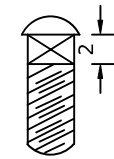


COUPLER PLATE
TYPICAL FOR LADDER TYPE.
AND PERFORATED TYPE TRAYS

8FLAT ROUND HEADED
SS BOLTS WITH WASHERS
& NUTS (TYP.)



SECTION 'A-A'

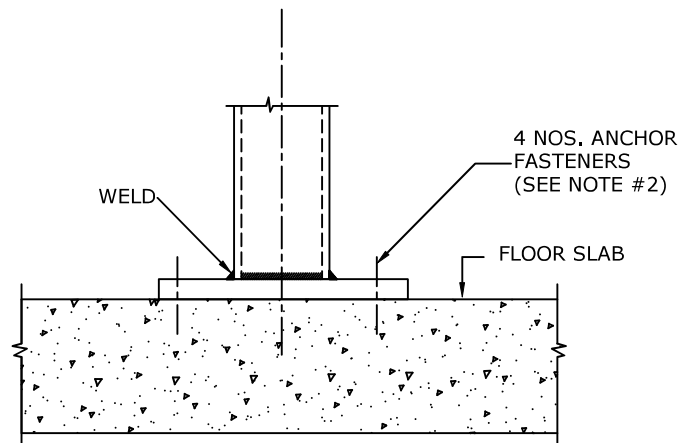
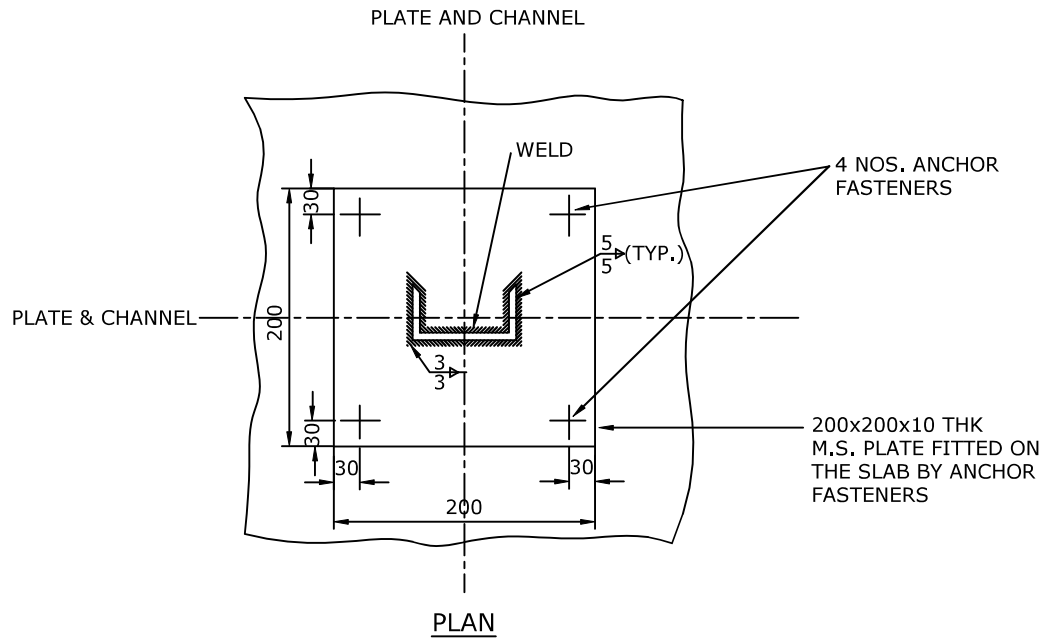


DETAIL-X

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. MATERIAL - 3MM M.S. SHEET/G.S/AL/FRP (AS PER MTO).
3. M.S. SHEET SHALL CONFORM TO IS 2062: 1992 OR EQUIVALENT INTERNATIONAL STANDARDS AND HOT DIP GALVANIZING SHALL BE DONE AS PER IS 4759: 1996 OR EQUIVALENT INTERNATIONAL STANDARDS. TRAY FITTINGS OF OTHER MATERIALS SHALL CONFORM TO RELEVANT IS/INTERNATIONAL STANDARDS.
4. NUTS/BOLTS/LOCKNUTS SHALL BE AS PER IS 1363(PART-1,2,3) : 1992/IS 1367(PART-5) : 1980 OR EQUIVALENT INTERNATIONAL STANDARDS.
5. WASHERS SHALL BE AS PER IS 2016 : 1967 OR EQUIVALENT INTERNATIONAL STANDARDS.

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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY

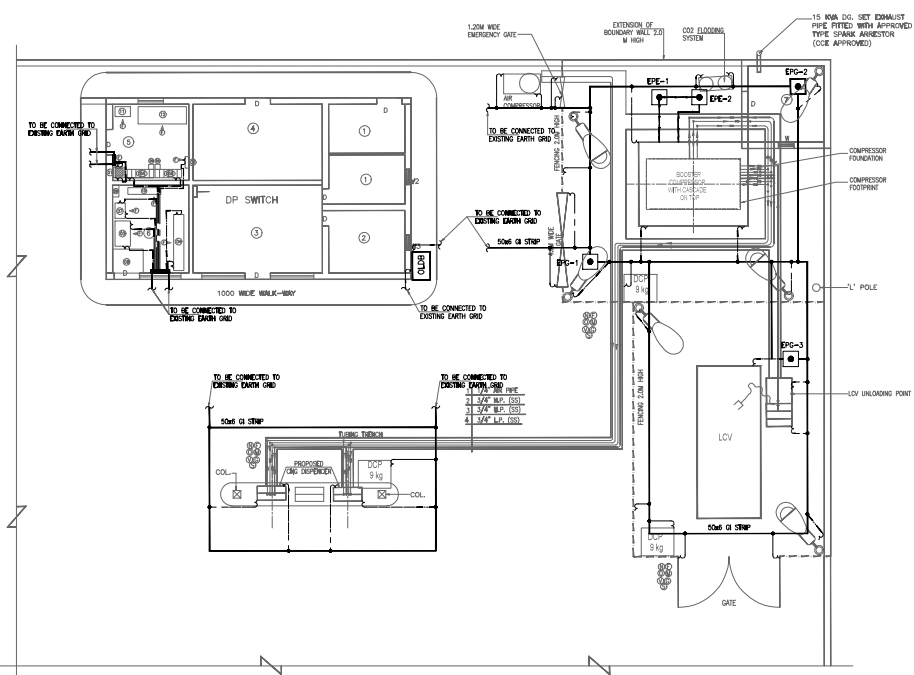


TYPICAL DETAIL OF FIXING M.S. PLATE TO FLOOR BY ANCHOR FASTENER
FOR WELDING TRAY SUPPORT. (WHEREVER EMBEDDED PLATES OR STRUCTURAL
BEAMS ARE NOT AVAILABLE).

NOTES:

1. ALL DIMENSIONS ARE IN MM.
2. THE ANCHOR FASTENER SHALL BE OF HEAVY DUTY TYPE, THE AXIAL HOLDING STRENGTH SHALL BE AS FOLLOWS
BOLT DIAMETER, 16mm -- 5000Kg
FOR ADEQUATE SAFETY FACTOR 25% OF THE ABOVE VALUE SHALL BE USED.
3. SAME DETAILS HOLD GOOD IF THE PLATE ARE FASTENED TO THE UNDERSIDE OF THE FLOOR SLAB.
4. STRUCTURAL STEEL SHALL BE AS PER IS 2062:1992.
5. WELDING SHALL BE DONE AS PER IS 816:1969.

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0	15.05.17	ISSUED AS STANDARD	SY	RD	AD	SK
REV NO.	DATE	PURPOSE	PREPARED BY	CHECKED BY	APPROVED BY	AUTHORIZED BY



OVERALL EARTHING LAYOUT
(SCALE 1:75)

PANEL DETAILS				
PANEL NO.	DESCRIPTION	WIDTH (MM)	DEPTH (MM)	INSTALLATION TYPE
01	UPS	400*	400*	FLOOR
02	UPS ACB	400*	1400*	WALL
03	SOFT STARTER	1000**	600*	FLOOR
04	ELECTRICAL DISTRIBUTION BOARD (EDB) (AT PANEL)	2200**	400*	FLOOR
CHARGE BATTERY BANK				
05	BATTERY JACKDOWN BOX	200*	200*	WALL
07	APFC CAPACITOR BANK *	600**	400**	FLOOR
08	COULDED (R.O.)	1200**	900**	WALL
09	MAIN BUS BAR (R.O.)	400*	250**	WALL
10	UPS (R.O.)	600**	400**	FLOOR
11	BATTERY BANK (R.O.)	1200**	900**	FLOOR

** SHALL BE FINISHED BY AFTER GETTING DETAIL INPUTS FROM VENDORS/CONTRACTOR
* SOFT STARTER & APFC CAPACITOR BANK WILL BE UNDER COMPRESSION PANELS.

REFERENCE DRAWING

NO.	DRAWING TITLE	DRAWING NO.
1		
2		
3		
4		

NOTES

1. ALL DIMENSIONS ARE IN mm & LEVELS ARE IN m.
2. FOLLOW WRITTEN DIMENSIONS ONLY. DO NOT SCALE.
3. EARTHING ROUTE IS SUGGESTIVE ONLY. MAY VARY TO SUIT AT SITE CONDITION.
4. THE MAIN EARTHING SHALL BE FORMED WITH 50mm GI FLAT BURIED AT THE DEPTH OF 600mm, AROUND THE BUILDING AT 1500mm AS A DISTANCE FROM THE OUTER WALL OF THE BUILDING.
5. THE MAIN GRID SHALL BE IN SINGLE LAYER TO ACHIEVE THE RESISTANCE LESS THAN 1 Ohm AS PER IS: 3043.
6. TO PROTECT THE WELDED JOINT BELOW THE GROUND LEVEL FROM CORROSION, TWO COATS OF BITUMEN COMPOUND AND ALITE COATING SHALL BE PROVIDED.
7. THE EARTH ELECTRODE SHALL BE 100mm ϕ , 3000mm LONG GI PIPE ELECTRODE SHALL BE INSTALLED INTO GROUND AND CONNECTED TO GROUND CONDUCTOR.
8. THE ABOVE GROUND CATHODICALLY UNPROTECTED PIPELINE FACILITIES SHALL BE CONNECTED TO STATION EARTHING SYSTEM.
9. ALL PANELS AND BOARDS SHALL BE EARTHED AT 2 POINTS.
10. MINIMUM GMR SHALL BE MAINTAINED TO AVOID THE CONTACT BETWEEN GI AND Cu. EARTHING STRIP.
11. ALL ELECTRICAL EQUIPMENT SHALL BE EARTHED AS PER IS: 3043.
12. ALL STEEL STRUCTURE/CABLE RACKS & TRAY/CABLE PIT/RISER SHALL BE SUITABLY CONNECTED TO EARTHING SYSTEM.
13. INSTALLATION AND TESTING OF THE EARTHING SYSTEM SHALL BE CARRIED OUT IN ACCORDANCE WITH IS: 3043.
14. THE INSTRUMENTATION EARTH ELECTRODE SHALL BE 600x600x3mm TH. Cu. PLATE EARTH ELECTRODE INSTALLED IN THE GROUND.
15. DISTANCE BETWEEN TWO EARTH PIT SHALL BE 6000mm AS A MINIMUM.
16. THE GROUND CONDUCTOR AT ROAD CROSSING SHALL BE LAID AT A DEPTH OF 1000MM (MIN.) BELOW GROUND LEVEL.
17. SUITABLE SLEEVES WITH ADEQUATE SPARES CAPACITY SHALL BE PROVIDED WHEREVER EARTHING STRIP CROSSES THE ROAD OR ENTERING THE BUILDING OR CROSSING FROM ONE ROOM TO ANOTHER ROOM.
18. SEALING SHALL BE PROVIDED IN SLEEVES TO PREVENT INGRESS OF WATER IN BUILDING.
19. QUANTITY OF EARTHING MATERIALS SHOWN IN THE TABLE ARE TENTATIVE ONLY & QTY. MAY VARY TO SUIT SITE CONDITION.
20. THIS DRAWING IS INDICATIVE AND FOR GUIDANCE ONLY.
21. ELECTRICAL EARTH PIT SHALL BE PROVIDED FOR TELECOM, UPS, PLC, INSTRUMENTATION AS PER IS: 3043.
22. ALL LIGHTING POLES SHALL BE EARTH BY 25x3 GI FLAT & CONNECTED TO NEAREST MAIN GRID.
23. EARTHING OF ELECTRICAL EQUIPMENT TO BE CONNECTED TO MAIN GRID.
24. TWO RISERS HAVE BEEN PROVIDED FOR TOP MOUNTED CASCADE. SAME SHALL BE CONNECTED TO CASCADE BY 25x3 GI STRIP.

LEGEND & BOM

SNO.	SYMBOL	QTY	DESCRIPTION	UNIT	QTY
1.		5000m	50mm GI STRIP	MM	130 Mts
2.		1000m	100mm x 3mm LING GI PIPE FROM ELECTRODE	MM	25 Mts
3.		3	EPE FOR ELECTRICAL EQUIPMENT	NO.	02 Nos.
4.		1	EPE FOR MAIN GRID	NO.	03 Nos.
5.		5000m	50mm GI STRIP	MM	---
6.		5000m	50mm GI STRIP	MM	50 Mts
7.		5000m	50mm GI STRIP	MM	75 Mts

TYPICAL EARTHING PLANE FOR CNG STATIONS

REV.	DATE	BY	CHKD.	APP.	REASON
01	01/11/2024

DATE	11/01/2024	SCALE	1:75	NO. OF SHEETS	1	TOTAL SHEETS	1
DRAWING NO.	C231104	PROJECT	X	REVISION	XXXXXX	DATE	11