



HPOIL GAS PRIVATE LIMITED
(A JOINT VENTURE OF HPCL & OIL)

**TENDER FOR SUPPLY OF NATURAL GAS METERS & PRESSURE REGULATORS
FOR INDUSTRIAL & COMMERCIAL CONNECTIONS AT KOLHAPUR & AMBALA-
KURUKSHETRA GA**

TECHNICAL VOLUME

**TENDER NO. HOGPL/2026-27/C&P/025
DATE: 07.09.2026**

MATERIAL REQUISITION:

Design, Detail Engineering, Manufacturing, Assembly, Supply, Factory Testing, Factory Inspection (as defined in specification), TPIA Inspection of Commercial Natural Gas Meters/Regulators, including Marking, Packing, Forwarding, Transit Insurance, Handling, Transportation, Loading at Vendor Manufacturing Plant/Store Yard & Unloading at HOGPL Sites/ Designated Store, Documentation. The above activities are complete in all aspects, as per Technical Specification.

SR No	Product	Quantity
		(Nos)
PART A: COMMERCIAL DIAPHRAGM NATURAL GAS METER AT KOLHAPUR GA		
1	Commercial Meter G10 (Design Pressure up to 500mbar) for left side inlet & right outlet side along with inlet & outlet connectivity brass adaptor.	10
2	Commercial Meter G16 (Design Pressure up to 500mbar) for left side inlet & right outlet side along with inlet & outlet connectivity brass adaptor.	20
3	Commercial Meter G25 (Design pressure up to 500mbar) for left side inlet & right outlet side along with inlet & outlet connectivity brass adaptor.	20
PART B: COMMERCIAL RPD NATURAL GAS METER WITH EVC AT KOLHAPUR GA		
4	Commercial Meter G-16 RPD Meter with EVC	6
5	Commercial Meter G-25 RPD Meter with EVC	10
6	Commercial Meter G-40 RPD Meter with EVC	10
7	Commercial Meter G-65 RPD Meter with EVC	4
PART C: COMMERCIAL NATURAL GAS REGULATOR AT KOLHAPUR GA		
8	Commercial Regulators 16 SCMH 300 mbar (Design Pressure- 6bar) Along with NPT Threaded Inlet & Outlet Connectivity Brass Adaptor.	2
9	Commercial Regulators 25 SCMH 300 mbar (Design Pressure- 6bar) Along with NPT Threaded Inlet & Outlet Connectivity Brass Adaptor.	5
10	Commercial Regulators 16 SCMH 440 mbar (Design Pressure- 6bar) Along with NPT Threaded Inlet & Outlet Connectivity Brass Adaptor.	8
11	Commercial Regulators 25 SCMH 440 mbar (Design Pressure- 6bar) Along with NPT Threaded Inlet & Outlet Connectivity Brass Adaptor.	15
12	Commercial Regulators 40 SCMH 440 mbar (Design Pressure- 6bar) Along with NPT Threaded Inlet & Outlet Connectivity Brass Adaptor.	20
13	Commercial Regulators 40 SCMH 1 Bar (Design Pressure- 6bar) Along with Flange End Inlet & Outlet Connectivity.	3
14	Commercial Regulators 40 SCMH 1.5 bar (Design Pressure- 6bar) Along with Flange End Inlet & Outlet Connectivity.	3

15	Commercial Regulators 50 SCMH 500 mbar (Design Pressure- 6bar) Along with NPT Threaded Inlet & Outlet Connectivity Brass Adaptor.	2
16	Commercial Regulators 50 SCMH 1 bar (Design Pressure- 6bar) Along with Flange End Inlet & Outlet Connectivity.	4
17	Commercial Regulators 50 SCMH 1.5 bar (Design Pressure- 6bar) Along with Flange End Inlet & Outlet Connectivity.	4
18	Commercial Regulators 65 SCMH 500 mbar (Design Pressure- 6bar) Along with NPT Threaded Inlet & Outlet Connectivity Brass Adaptor.	2
19	Commercial Regulator 65 SCMH 1 bar (Design Pressure- 6bar) Along with Flange End Inlet & Outlet Connectivity.	4
20	Commercial Regulator 65 SCMH 1.5 bar (Design Pressure- 6bar) Along with Flange End Inlet & Outlet Connectivity.	4
21	COMMERCIAL GAS REGULATOR: FLOW - 100 SCMH INLET PRESSURE - 2 BAR(G) TO 4 BAR(G) OUTLET PRESSURE - 1 BAR (Design Pressure- 6bar) Along with Flange End Inlet & Outlet Connectivity.	2
22	COMMERCIAL GAS REGULATOR 100 SCMH 1.5 Bar (Design Pressure- 6bar) Along with Flange End Inlet & Outlet Connectivity.	2
PART D: COMMERCIAL RPD NATURAL GAS METER WITH EVC AT AMBALA-KURUKSHETRA GA		
23	Commercial meter G25 RPD with EVC	5
24	Commercial meter G40 RPD with EVC	1
25	Commercial meter G65 RPD with EVC	1

Note:

Bidders to note that, Third Party Inspection is to be included in the quoted prices. Arranging Third Party Internationally recognized Inspection agencies like Lloyds, ABS, SGS, TUV, DNV, BV, Engineers India Limited, or any other Third-Party Inspection agency only with prior approval of HPOIL Gas, for witnessing inspection and testing at the works of the manufacturer is in the scope of the bidder.

GENERAL TERMS:

1. COMPLIANCE WITH SPECIFICATION

The vendor shall be completely responsible for the design, materials, fabrication, testing, inspection, preparation for shipment and transport of above equipment strictly in accordance with the Material Requisition and all attachments thereto.

2. VENDOR'S SCOPE

Vendor scope of work includes the equipment with all internals and accessories shown on the data sheets, specifications and all unmentioned parts necessary for satisfactory operation and testing except those which are indicated to be out of the Vendor's supply.

3. INSPECTION

Vendor shall appoint anyone of the following TPIA/PNGRB TPIA for inspection purpose after approval by purchaser:

- a) Lloyd Register of Industrial Services
- b) Technische Ulierwachungs Verein (TUV) SUD South Asia
- c) International Certification Service Pvt. Ltd
- d) TQ Services

- e) Moody International (India) Pvt. Ltd
- f) Bureau Veritas (India) Pvt. Ltd
- g) SGS
- h) Quality Services and Solutions Pvt. Ltd.
- i) Velosi Certification Services
- j) Certification Engineers International Ltd
- k) Edlipse

Apart from inspection by TPIA, inspection shall also be performed by HPOIL Gas delegate, as set out and specified in the codes and particular documents forming this MR.

4. APPLICABLE DOCUMENTS

General prescriptions, requirements and information are listed in Annexure of this Material Requisition.

5. VENDOR'S DOCUMENTS:

Vendor shall supply the documentation listed under Documents & Data Requirements of Material Requisition. All documents shall be supplied in English language.

SCOPE OF SUPPLY:

The Scope of SUPPLY shall be as set out at Material Requisition, Data Sheet and Technical Specifications given in Technical Tender Document and supplemented by all stipulation in the total tender document.

Seller's scope shall include:

- (a) Design, Detail Engineering, Manufacturing of items as per Material Requisition technical Specifications,
- (b) Preparation of Quality Assurance / Quality control program.
- (c) Obtaining Owner's approval;
- (d) Arranging Inspection and testing certification;
- (e) Inspection by Purchaser's/ Agency Designated by Purchaser, as applicable as per bid document and obtaining Inspection Release Note;
- (f) Obtaining dispatch clearance;
- (g) Packing;
- (h) Loading on truck/ trailer and Unloading of Gas Meters/Regulators at HOGPL Sites/ Designated Store; Providing all related services as detailed in the technical specification.

Since, the Supply requirement is immediate HPOIL GAS will accept the items from Ex stock, provided Materials will meet the tender technical specifications.

QUALITY ASSURANCE/ QUALITY CONTROL:

The Contractor shall "prepare a detailed quality assurance plan for the execution of Contract for various facilities, which will be mutually discussed and agreed to.

The Contractor shall establish document and maintain an effective quality assurance system outlined in recognized codes.

The Purchaser while agreeing to a quality assurance plan shall mark the stages where they would like to witness the tests; review any or all stages of work at shop/site as deemed necessary for quality assurance.

SCOPE OF SUPPLY & TECHNICAL SPECIFICATIONS FOR COMMERCIAL REGULATORS

1.0 SCOPE OF WORK/ SUPPLY

Supplier's scope of work shall include Design, Detailed Engineering, Manufacturing, Assembly, Factory Testing, Inspection (as applicable as per bid document), Calibration, Marking & Packaging, Supply of Meters/Regulators, Handling, Transportation, Loading at Vendor Manufacturing Plant/Store Yard & Unloading at HOGPL Sites/ Designated Store, Documentation etc. & commissioning spares.

2.0 REFERENCE STANDARDS

Unless otherwise specified, the latest edition of the standards mentioned herein this specification, including all addenda and revisions, shall apply. All pressures mentioned in this specification are gauge pressures. The vendor shall furnish (along with the technical bid) a copy of the approval documents, certificates (in English language only) for each of the offered model, for compliance to the requirements of Standard & Specifications as per PNGRB T4S & OISD.

Commercial Regulators: EN88/EN334 (Compliance to EN88/EN334 standard shall be confirmed for all commercial gas regulators. Leak test for all regulators shall be performed complying to EN 13611)

3.0 PERFORMANCE REQUIREMENT AND STANDARD FEATURES

- a) Satisfactory Operation of Regulator for the inlet & outlet pressure as specified in the data sheet.
- b) **Inlet/ Outlet Connection for the 300mbar/440mbar/500mbar Regulators** (to be specified by the vendor) has to be approved by HPOIL GAS/its TPIA and should be of screwed type as per ISO 7 Part 1: 1994 or any other type of connection (only with prior approval of HPOIL GAS/ its TPI) Along with NPT Threaded Inlet & Outlet Connectivity Brass Adaptor with suitable washers.
- c) Inlet and outlet **Connection for the 1.0 bar/1.5Bar Regulators** shall be **2" Flanged type**, conforming to **ASME B16.5**, with flange rating **ASME Class 150** (or as specified in the piping class). Flange facing shall be **Raised Face (RF)** unless otherwise specified. The flange material shall be suitable for natural gas service and shall comply with the applicable material and piping specifications. The vendor shall specify the flange size, rating, facing and material in the technical datasheet with complying the PNGRB T4S Standards & Specifications or any other type of connection (only with prior approval of HPOIL GAS/ its TPI).
- d) Suitable for use with Natural Gas at nominal specific gravity of 0.65 & operating in ambient temperature of up to 60 Deg.C.
- e) For Regulator: Over Pressure Shut off (OPSO) device to protect against downstream over pressure and creep relief valve to protect against downstream over pressure at low flows or in the event of valve seat malfunction, as indicated in the data sheets.
- f) For Regulator: Under Pressure Shut off (UPSO) device to protect against downstream under pressure with a pressure setting indicated in the data sheet.
- g) The Regulator shall be also capable of operating either in the vertical or horizontal plane & shall be constructed to be fully resistant to corrosion when installed in outdoor locations in the environment of Kolhapur GA.
- h) Variant design (if any) offered by the party has to be duly approved by HPOIL GAS/its TPI. For specific requirements, refer data sheets.
- i) HPOIL GAS/its TPI shall approve the Regulators type & model to be supplied & full technical details shall be supplied along with the technical bid.

4.0 MARKING & PACKAGING

The regulator body shall be clearly marked with the following details:

Regulators:

- Capacity of the Regulator
- Inlet Pressure Range
- Outlet/Set Pressure Range
- CRV Set Pressure
- OPSO
- UPSO
- Cf
- Regulation Accuracy
- Direction of flow
- Name of the manufacturer and the name of the model
- Serial number of the regulator
- Month and year of manufacturing

Each Regulator shall be sealed properly before dispatch, such that the factory setting cannot be changed on site. Each Regulator (along with the instruction manual) is to be individually packed in a transparent plastic cover (of adequate thickness) to protect the Regulator from ingress of dirt and water, and the same shall be packed in an individual box. The description of the contents of each of these boxes shall be clearly mentioned on each of the individual box.

Regulators: A set of these individual boxes (2-10 Nos., as the case may be) shall be packed in a larger box; and the description of the contents of the larger box shall also be clearly mentioned on the box.

The quantity of the regulators in the larger box shall be such that the box can be easily handled and stored, and it does not get damaged during the same.

5.0 QUALITY ASSURANCE

The Supplier will provide details of their quality assurance procedures during the assembly of the units and for final inspection following testing.

HPOIL GAS/ its TPI reserves the right to visit the Supplier's facilities without prior notice, and inspect test records and witness assembly and testing in progress.

6.0 TECHNICAL EVALUATION REQUIREMENTS

- a) The Supplier is required to submit to HPOIL GAS/ its TPI the details of the regulator to be supplied, including the manufacturing standards, compliance to EN standard (type test certificate), model number, performance curve i.e., outlet pressure v/s flow at different inlet pressures, accuracy specifications, capacity at maximum and minimum inlet pressures, technical catalogues along with bid for our technical evaluation of bid. All the technical documents/ catalogues, etc., to be submitted along with technical bid shall be in English Language only.
- b) Any deviations from the specification should be highlighted and vendor may also quote advanced/ latest models to reduce overall cost asana ternate.
- c) The data sheet should be filled up completely and should be enclosed with the Technical Bid.
- d) Compliance with Technical Specifications will be taken for granted if deviations are not specifically mentioned.
- e) Quality assurance Plan (QAP) format of the items quoted shall be submitted by bidder along with technical bids.

7.0 INSPECTION PLAN

Testing & Inspection shall be carried out as per the Technical Specifications of HPOIL GAS / its TPI, EN 88/ EN 334 for all Commercial Regulators.

- i) At the works of the manufacturer as per approved QAP.
- ii) Inspection as per approved QAP shall be carried out on each lot by a reputed third-party

- inspection agency like Lloyds, ABS, SGS, TUV, DNV, BV, EIL, or any other Third-Party Inspection agency approved by PNGRB with prior approval of HPOIL GAS/ its TPI.
- iii) HPOIL GAS/ its TPI representative appointed by HPOIL GAS/ its TPI, if any may again carry out inspection during manufacturing/ final inspection at the works of the manufacturer.
 - iv) Third Party Inspection shall be included in the quoted prices of all the bidders irrespective of Indian or Indian with foreign manufacturing facility or foreign bidders. Arranging Third Party Internationally Recognized Inspection agencies like Lloyds, ABS, SGS, TUV, DNV, BV, Engineers India Limited, or any other Third-Party Inspection agency with prior approval of HPOIL GAS/its TPI, for witnessing inspection and testing at the works of the manufacturer is in the scope of the bidder.
 - v) Vendor shall furnish all the material test certificates, internal test / inspection reports as per the Approved QAP at the time of inspection of each supply lot of material.
 - vi) Review of Performance Test Certificates for all Regulators at the time of inspection, i.e., used for checking and testing, along with the Master calibration certificate of the measuring instruments from which the instruments is calibrated.
 - vii) All Regulators should be wired up and sealed properly by the manufacturer after final inspection clearance and before dispatch. Regulators found in an unsealed condition will not be accepted at HPOIL GAS stores.
 - viii) Even after third party inspection, HPOIL GAS/its TPI reserves the rights to select a sample of Regulators randomly from each manufacturing batch & have these independently tested for compliance with HPOIL GAS/its TPI Technical Specifications like dimensional tolerances, leakage testing, performance, accuracy, etc. Should the results of these tests fall outside the limits specified in HPOIL GAS/ its TPI technical specification, then HPOIL GAS/ its TPI reserves the rights to reject all production supplied from the batch.
 - ix) If the performance of any of the sample Regulators is not in compliance with the acceptance norms of the respective standards, then that lot of regulators will be rejected.
 - x) The Inspection cover the test listed in EN 334 or Equivalent Standard for Regulators shall not be limited to the following:
 - a) Visual: Facia Plate marking, Arrow marking, Meter Index reading, Seal, Construction & Workmanship, Colour & appearance.
 - b) Dimensional: Regulator Size, End connections (threading), Centre to centre distance of inlet & outlet connection, Powder coating thickness
 - c) Fitment & alignment
 - d) Functional & Operational tests: Pressure (max. Pressure & operation pressure), Max. Flow, OPSO, UPSO, CRV.
 - e) Leak Test: Body Leak Test
 - f) Physical properties / Chemical analysis: Body & internal parts
 - g) Enclosure protection: IP certification for Regulator
 - h) Approvals: Fire resistance type approvals

8.0 DOCUMENTS TO BE FURNISHED WITH SUPPLY (Minimum 3 sets):

Following is the list of documents required to be sent to HPOIL GAS/ its TPI along with the first lot of regulators:

- a) Performance Specification and Factory Inspection/Test certificates, Warranty Certificate (100%, for each of the Regulators and TPIA Certificate of 4% qty. of Supplied Quantity or As per Approved QAP).
- b) GA & Construction Drawings, Material Specifications and Technical data sheets, QAPs. (In English language only).
- c) Installation, operation, maintenance, recommendations and instruction manual in detail.
- d) Any other relevant documents required by HPOIL GAS/TPI.

DETAILS TO INCLUDED IN FINAL DOCUMENT BOOK

- a) Manufacturing Data Book (internal factory QC issued) containing all test certificates of components, raw materials, stage manufacturing tests and inspections, final tests & inspection documents.
- b) All raw material test certificates must be correlated to subject project and evidence to which they relate by clear noting on the certificates. Release Note and Packing List.
- c) Spares (if recommended) the details including assembly drawings, part numbers, delivery, and prices and ordering information shall be provided.
- d) Catalogues/leaflets of sub-Bidders/suppliers of various bought out components highlighting the components actually supplied correlated to P.O. Item Numbers.
- e) Operating and maintenance instructions shall include lubrication schedules with details of suppliers for procurement by OWNER for subsequent needs.

9.0 TECHNICAL SPECIFICATIONS:

NATURAL GAS REGULATORS/COMMERCIAL REGULATORS (300Mbar/440Mbar/500Mbar)		
GENERAL	Service	Natural Gas
	Qty	As per SOR/ Material Requisition of Tender
	Design	Direct acting spring control pressure regulator with in-built two stage pressure reducing valve type balance regulating unit to ensure a constant outlet pressure having excess pressure slam shut device, in sufficient downstream pressures Slam shut device & relief valve.
	Connections Orientation	Inline Inlet and Outlet connection.
	Installation	Suitable for Outdoor Installation, Tamper proof and corrosion resistance for a life period of 20 years.
	Installation position	Horizontal/ Vertical.
FLOW, PRESSURE, TEMPERATURE	Capacity	16/25/40/50 ACMH/SCMH
	Inlet Pressure	0.5 to 4.0 bar(g)- for 300mbar outlet pressure regulator
		1.0 to 4.0 bar(g)- for 440mbar outlet pressure regulator
		1.0 to 4.0 bar(g)- for 500mbar outlet pressure regulator
	Design Pressure	6 bar(g).
	Outlet pressure set point	1- 300mbar(g) (Factory Set Point) (Will be confirmed during detailed engineering) (selected set value between 30% to 70% of the spring range). Bidder shall necessarily submit the performance curve & spring range) 2- 440 mbar(g) (Factory Set Point) (Will be confirmed during detailed engineering) (selected set value between 30% to 70% of the spring range). Bidder shall necessarily submit the performance curve & spring range) 3- 500 mbar(g) (Factory Set Point) (Will be confirmed during detailed engineering) (selected set value between 30% to 70% of the spring range). Bidder shall necessarily submit the performance curve & spring range)
	Over pressure cut off point	Required (Set Point will be confirmed during detailed engineering/Vendor to confirm & Furnish Spring range)
	Under pressure cut off point	Required (Set Point will be confirmed during detailed engineering/Vendor to confirm & Furnish Spring range)
	Creep Relief Valve	Required (Factory Set Point will be confirm during detailed engineering) (the position of the atmospheric venting shall not be towards vertically top to avoid entry of foreign material into the regulator). (Furnish spring range)
	Operating Temperature	0°C to 55°C, Design 60°C
	Casing	Casing and Body of Die Cast Aluminum/ Ductile Iron/ Steel Conforming to ASTM A216 WCB and water-weatherproof IP 65 / corrosion resistant for outdoor installation.
	End Connections	Inlet- 1" NPT (Female Loose nut with suitable washers)
		Outlet- 1" NPT (Female loose nut with suitable washers) outlet confirming to ANSIB1.20.1 All the end connections/ fittings including loose nuts, etc. shall be of Brass material.

		In case of end connection size are differing bidder to provide suitable adaptors, fittings, etc. of Brass as per IS:319 of approved Quality to meet the specified end connections.
	Fire Resistance	As applicable
INTERNAL	Diaphragm	Synthetic Rubber
	Internals	Internal Parts shall be Stainless Steel, Brass Seal of Nitrile Rubber or Aluminum.
	Filter	Essential (Inbuilt) (if not in-built, same shall be supplied separately)
OTHERS	Accuracy Class (%)	AC 5/ RG 5 or AC 10/ RG 10 complying to EN 334 (or) Equivalent
	Closing (lockup) pressure	SG 10 or SG 20 Complying to EN 334 (or) Equivalent
	Failure Position	Closed
	Type of Reset	Manual/ Auto (Vendor to confirm)
Notes:		
1	The regulator body shall be indelibly and clearly marked with Max. Flow, Inlet & Outlet Pressure Range, Accuracy, Flow Direction, Manufacturer Name & Model, Serial No., Manufacturing Month & Year, etc.	
2	The Vendor shall submit, along with the offer, the manufacturing standards, Model number, performance curves, approvals of the statutory bodies and technical details of the model offered. Successful Vendor shall submit following documents during detail engineering / supply of material.	
	a) Regulator data sheet with make & model number and technical literatures	
	b) GA dimensional drawing with mounting details, model number, part list.	
	c) Performance curve	
	d) Testing and Inspection procedure	
	e) Test, calibration and certificate from statutory bodies.	
3	SS tubing of appropriate size for impulse connection of regulator and slams hut valve to be supplied with suitable connectors wherever applicable.	
4	End Connections shall be provided by Plastic Caps.	
5	Flow capacity in SCMH shall be calculated considering Maximum Outlet Pressure & Operating Temperature	

NATURAL GAS REGULATORS/COMMERCIAL REGULATORS (I/ P- 2.0- 4.0 bar to O/P- 1.0Bar)		
GENERAL	Service	Natural Gas
	Qty	As per SOR/ Material Requisition of Tender
	Design	Direct acting spring control pressure regulator with in-built single stage (Fail to Close type) pressure reducing valve type balance regulating unit to ensure a constant outlet pressure and with pressure slam shut device for insufficient downstream pressure & relief valve.
	Connections Orientation	Inline Inlet and Outlet connection.
	Installation	Suitable for Outdoor Installation, Tamper proof and corrosion resistance for a life period of 20 years.
	Installation position	Horizontal/ Vertical.
FLOW, PRESSURE, TEMPERATURE	Capacity	40/50/65/100 ACMH/SCMH
	Inlet Pressure	2.0 to 4.0 bar(g).
	Design Pressure	6.0 bar(g).
	Outlet pressure set point	1.0bar(g) (Factory Set Point) (Will be confirmed during detailed engineering) (selected set value between 30% to 70% of the spring range). Bidder shall necessarily submit the performance curve & spring range)
	Over pressure cut off point	Required (Set Point will be confirmed during detailed engineering/Vendor to confirm & Furnish Spring range)
	Under pressure cut off point	Required (Set Point will be confirmed during detailed engineering/Vendor to confirm & Furnish Spring range)
	Creep Relief Valve	Required (Factory Set Point will be confirm during detailed engineering) (the position of the atmospheric venting shall not be towards vertically top to avoid entry of foreign material into the regulator). (Furnish spring range)

	Operating Temperature	0°C to 55°C, Design 60°C
	Casing	Casing and Body of Die Cast Aluminum/ Ductile Iron/ Steel Conforming to ASTM A216 WCB and water-weatherproof IP 65 / corrosion resistant for outdoor installation.
	End Connections	Both inlet and outlet shall be 2" Flanged type , conforming to ASME B16.5 , with flange rating ASME Class 150 (or as specified in the piping class). Flange facing shall be Raised Face (RF) unless otherwise specified. The flange material shall be suitable for natural gas service and shall comply with the applicable material and piping specifications. The vendor shall specify the flange size, rating, facing and material in the technical datasheet with complying the PNGRB T4S Standards & Specifications. Set of Gaskets complying ASME B16.20 Spiral-wound metal gaskets and metal jacketed gaskets for use with raised face and flat face flanges. And Set of Zinc Coating (Hot-Dip) on Iron and Steel (ASTM A153) Stud and Nut complying ASTM A193 and ASTM A194
	Fire Resistance	As applicable
INTERNAL	Diaphragm	Synthetic Rubber
	Internals	Internal Parts shall be Stainless Steel, Brass Seal of Nitrile Rubber or Aluminum.
	Filter	Essential (Inbuilt) (if not in-built, same shall be supplied separately)
OTHERS	Accuracy Class (%)	AC 5/ RG 5 or AC 10/ RG 10 complying to EN 334 (or) Equivalent
	Closing (lockup) pressure	SG 10 or SG 20 Complying to EN 334 (or) Equivalent
	Failure Position	Closed
	Type of Reset	Manual/ Auto (Vendor to confirm)
Notes:		
1	The regulator body shall be indelibly and clearly marked with Max. Flow, Inlet & Outlet Pressure Range, Accuracy, Flow Direction, Manufacturer Name & Model, Serial No., Manufacturing Month & Year, etc.	
	The Vendor shall submit, along with the offer, the manufacturing standards, Model number, performance curves, approvals of the statutory bodies and technical details of the model offered. Successful Vendor shall submit following documents during detail engineering / supply of material.	
	a) Regulator data sheet with make & model number and technical literatures	
	b) GA dimensional drawing with mounting details, model number, part list.	
	c) Performance curve	
	d) Testing and Inspection procedure	
	e) Test, calibration and certificate from statutory bodies.	
2	f) Installation, Operation and Maintenance Instruction Manual.	
3	SS tubing of appropriate size for impulse connection of regulator and slams hut valve to be supplied with suitable connectors wherever applicable.	
4	End Connections shall be provided by Plastic Caps.	
5	Flow capacity in SCMH shall be calculated considering Maximum Outlet Pressure & Operating Temperature	

NATURAL GAS REGULATORS/COMMERCIAL REGULATORS (I/P- 2.0- 4.0bar to O/P- 1.5Bar)

GENERAL	Service	Natural Gas
	Qty	As per SOR/ Material Requisition of Tender
	Design	Direct acting spring control pressure regulator with in-built single stage (Fail to Close type) pressure reducing valve type balance regulating unit to ensure a constant outlet pressure and with pressure slam shut device for insufficient downstream pressure & relief valve.
	Connections Orientation	Inline Inlet and Outlet connection.
	Installation	Suitable for Outdoor Installation, Tamper proof and corrosion resistance for a life period of 20 years.
	Installation position	Horizontal/ Vertical.
FL	Capacity	40/50/65/100 ACMH/SCMH

	Inlet Pressure	2.0 to 4.0 bar(g).
	Design Pressure	6.0 bar(g).
	Outlet pressure set point	1.5bar(g) (Factory Set Point) (Will be confirmed during detailed engineering) (selected set value between 30% to 70% of the spring range). Bidder shall necessarily submit the performance curve & spring range)
	Over pressure cut off point	Required (Set Point will be confirmed during detailed engineering/Vendor to confirm & Furnish Spring range)
	Under pressure cut off point	Required (Set Point will be confirmed during detailed engineering/Vendor to confirm & Furnish Spring range)
	Creep Relief Valve	Required (Factory Set Point will be confirm during detailed engineering) (the position of the atmospheric venting shall not be towards vertically top to avoid entry of foreign material into the regulator). (Furnish spring range)
	Operating Temperature	0°C to 55°C, Design 60°C
	Casing	Casing and Body of Die Cast Aluminum/ Ductile Iron/ Steel Conforming to ASTM A216 WCB and water-weatherproof IP 65 / corrosion resistant for outdoor installation.
	End Connections	Both inlet and outlet shall be 2" Flanged type , conforming to ASME B16.5 , with flange rating ASME Class 150 (or as specified in the piping class). Flange facing shall be Raised Face (RF) unless otherwise specified. The flange material shall be suitable for natural gas service and shall comply with the applicable material and piping specifications. The vendor shall specify the flange size, rating, facing and material in the technical datasheet with complying the PNGRB T4S Standards & Specifications. Set of Gaskets complying ASME B16.20 Spiral-wound metal gaskets and metal jacketed gaskets for use with raised face and flat face flanges. And Set of Zinc Coating (Hot-Dip) on Iron and Steel (ASTM A153) Stud and Nut complying ASTM A193 and ASTM A194
	Fire Resistance	As applicable
INTERNAL	Diaphragm	Synthetic Rubber
	Internals	Internal Parts shall be Stainless Steel, Brass Seal of Nitrile Rubber or Aluminum.
	Filter	Essential (Inbuilt) (if not in-built, same shall be supplied separately)
OTHERS	Accuracy Class (%)	AC 5/ RG 5 or AC 10/ RG 10 complying to EN 334 (or) Equivalent
	Closing (lockup) pressure	SG 10 or SG 20 Complying to EN 334 (or) Equivalent
	Failure Position	Closed
	Type of Reset	Manual/ Auto (Vendor to confirm)
Notes:		
1	The regulator body shall be indelibly and clearly marked with Max. Flow, Inlet & Outlet Pressure Range, Accuracy, Flow Direction, Manufacturer Name & Model, Serial No., Manufacturing Month & Year, etc.	
2	The Vendor shall submit, along with the offer, the manufacturing standards, Model number, performance curves, approvals of the statutory bodies and technical details of the model offered. Successful Vendor shall submit following documents during detail engineering / supply of material.	
	a) Regulator data sheet with make & model number and technical literatures	
	b) GA dimensional drawing with mounting details, model number, part list.	
	c) Performance curve	
	d) Testing and Inspection procedure	
	e) Test, calibration and certificate from statutory bodies.	
3	f) Installation, Operation and Maintenance Instruction Manual.	
3	SS tubing of appropriate size for impulse connection of regulator and slams hut valve to be supplied with suitable connectors wherever applicable.	
4	End Connections shall be provided by Plastic Caps.	
5	Flow capacity in SCMH shall be calculated considering Maximum Outlet Pressure & Operating Temperature	

SCOPE OF SUPPLY & TECHNICAL SPECIFICATIONS FOR COMMERCIAL METERS

1.0 INTRODUCTION

This technical specification covers the requirement of commercial gas Meters (Diaphragm & RPD Meters) for City Gas Distribution Network at KOLHAPUR & AMBALA-KURUKSHETRA GA.

2.0 SCOPE OF WORK/SUPPLY:

Bidder's scope includes design, engineering, manufacture, assembly, inspection, supply, testing of the Gas Meters complete in all respects and satisfactory stable operation of commercial gas meters (compatible for smart metering). Bidder's scope of work shall include the following: -

1. **Commercial Diaphragm Meters-** Design, engineering, manufacturing, assembly, factory testing, inspection (as defined in the specification), marking & packaging, supply of Commercial Natural Gas Meters having provision to install MIU/ AMR of any manufacturer and make compatible for Smart Metering including forwarding & packaging, insurance, handling, transportation, loading / unloading at sites / designated store, documentation.
2. **RPD Meters-** Design, Engineering, Manufacturing, Testing, Nameplate marking, Painting, Inspection (by TPI as defined in bid document), Packaging, Forwarding, Transportation, Shipment, unloading at GAIL Gas store, Calibration and Consumables as per Job specifications enclosed providing all related services conforming to respective data sheets enclosed with tender for Natural Gas Commercial/Industrial Meters. High-capacity G16, G25, G40, G65, G100 with External EVC and accessories such as conical strainer & RO as required for Commercial/Industrial consumers and providing all related services conforming to respective data sheets enclosed with tender, training, including inspection as per technical specification defined in tender. For supply of Commercial/Industrial Gas Meter for designed capacity. Gas Meter with Online Battery operated separate Electronic Volume Corrector along with its accessories Conical Strainer, Restriction Orifice, Lubricant, Meter bolts, gaskets, stud-nuts, tubes, fittings, valves, etc. As applicable and required for smooth metering operation as define in the tender specification.
3. **EVC-** The scope of work shall cover (but not limited to) Supply, design engineering, documentation, manufacturing, testing, inspection, preparation for shipment and transportation of the Commercial/Industrial Gas Meters with external EVC. This also including packaging, insurance, handling, transportation, loading / unloading at sites/ designated store, documentation etc. and providing all related services conforming to respective data sheets, this technical specification along enclosed with tender with National / International standards specified. All meters shall be supplied with external EVC, and temperature, pressure correction including supply of instruments for corrected flow measurement as required. Bidder must quote for all items including sub items of price schedule (SOR) and to be delivered as per Time schedule / completion schedule enclosed with bid. All information has to be provided at the time of bid. The bid shall be liable for rejection in case of change of the proposed manufacturer / location of manufacturing / change of proposed authorization & written agreement after submission of offer. The EVC must have ATEX certification for hazardous area installations / UL hazardous area certification for modules along with PESO/CCOE certification. The same should be provided by vendor. In case of non-availability of valid PESO certificate for EVC; bidder has to provide the undertaking on letter head to provide PESO certificate as and when required by the statutory authority.
4. **Inlet/Outlet Connection for RPD Meters** (to be specified by the vendor) has to be approved by HPOIL GAS/its TPIA and should be **flanged type**, conforming to **ASME B16.5**, with flange rating **ASME Class 150** (or as specified in the piping class). Flange facing shall be **Raised Face (RF)** unless otherwise specified. The flange material shall be suitable for natural gas service and shall comply with the applicable material and piping specifications. The vendor shall specify the flange size, rating, facing and material in the technical datasheet. Any deviation from the specified flange standard

or rating shall be subject to prior approval of **HPOIL GAS/TPIA**.

1. The RPD Meters shall be also capable of operating either in the vertical or horizontal plane & shall be constructed to be fully resistant to corrosion when installed in outdoor locations in the environment of Kolhapur GA.
2. HPOIL GAS/its TPI shall approve the Meter type & model to be supplied & full technical details shall be supplied along with the technical bid.
3. **Manufacture who is having following valid certificate; provide certificate for supplied meter:**
 - a) MID - D approval for the testing and manufacturing setup
 - b) MID – B approval for design
4. However, testing facilities must be evaluating and certified by traceable recognized calibration & testing agency / Third Party Inspection cum assessment agency as define in tender as per the OIML standard / EN12480/Equivalent compliance shall be provided by the manufacturer. During the inspection; all the test instruments / measuring instruments must have valid calibration certificate issued by NABL accredited lab / FCRI / traceable recognized calibration & testing agency with the accuracy better than meter to be calibrated / tested.
5. All meters shall be supplied with external EVC, and temperature, pressure correction including supply of instruments for corrected flow measurement as required. Bidder must quote for all items including sub items of price schedule (SOR) and to be delivered as per Time schedule / completion schedule enclosed with bid. All information has to be provided at the time of bid. The bid shall be liable for rejection in case of change of the proposed manufacturer / location of manufacturing / change of proposed authorization & written agreement after submission of offer.
6. The EVC must have ATEX certification for hazardous area installations / UL hazardous area certification for modules along with PESO/CCOE certification. The same should be provided by vendor. In case of non-availability of valid PESO certificate for EVC; bidder has to provide the undertaking on letter head to provide PESO certificate as and when required by the statutory authority.
7. For the proposed Manufacturer (Indian or Foreign) of Gas Meter, manufacturing facility/workshop / calibration facilities shall be certified by a reputed Inspection/ testing agency such as defined in tender for fabrication, assembly & testing of Natural Gas Meters. Documents shall be provided along with bid.
8. The supplier shall comply with local statutory regulations of Legal metrology of 2009 and Legal Metrology (Enforcement) rules, 2011. Such natural gas meters shall have compliance and tested in accordance with requirements of PNGRB, Technical Standards & specifications including Safety standards for City or Local Natural Gas Distribution Networks (also known as T4S), BS EN 1359: 2017 or the latest edition in force / OIML R 137-1 & 2 for Gas Meters standards and as per the requirements of this specification. The supplier shall comply with latest local statutory regulations of Legal metrology for Gas Meters.
9. For Indian Manufacturer Valid Model approval, Valid License for manufacturing, Valid License for Sales & Services certificates from Legal Metrology Department - Weights and Measures, India for Commercial/Industrial meters shall be submitted along with bid. All the weights and measures approval should also be valid for the period during which the meters are to be supplied. For Foreign Manufacturer Model approval & importing license for Commercial/Industrial meters import to India from W&M India shall be submitted along with bid. For the bidder; the name of the manufacturer / supplier / representative as mentioned in the W&M certificate shall be valid.
10. Bidder shall supply required mounting accessories.

11. Providing training to Purchaser's personnel pertaining to handling of meters.
12. The bidder shall comply with PNGRB, OIML, local statutory regulations of Legal metrology during contractual period.
13. All documentation including manuals & final as-built documents.
14. Hiring of Third-Party Inspection Agency (TPIA) for factory inspection as per approved QAP.

3.0 EXCLUSIONS

The Installation / erection of Meter are not under the scope of the Bidder.

4.0 CODES AND STANDARDS

All meters shall comply with the requirements of PNGRB guidelines. In case of conflict between PNGRB and other codes, PNGRB guidelines shall prevail. Unless otherwise specified, the latest editions of the standards mentioned herein this specification, including all addenda and revisions, shall apply. The Bidder shall furnish (along with the technical bid) a copy of the approval documents, certificates (in English language only) for each of the offered model, for compliance to the requirements of following standards.

Diaphragm Gas Meters: EN1359 2017 or Latest and Weight & Measurement India (OIML- 137 for Manufacturing Outside of India)

RPD Meters: EN 12480 Latest and Weight & Measurement India (OIML- 137 for Manufacturing Outside of India)

EVC: EN 12405-1, PESO/ATEX Certification

4.1 Natural Gas Meter (Document shall be submitted along with the bid)

- a) Diaphragm Meters shall comply with EN-1359:2006 (or latest) and RPD Meters: EN 12480 Latest. Incompliance of the respective standards, the Bidder shall submit all the relevant documents / type evaluation certificates /reports.
- b) Model approval certificates from legal metrology - Weights and Measurement Department in India for the Natural RPD Gas Meters and Natural Diaphragm Gas Meters shall be produced.
- c) For imported natural gas meters, import reregisters at inform weights and measurement department of India to be submitted.
- d) IP Certificate of the natural gas meters.

5.0 DESIGN BASIS

Commercial gas meters shall have the facility / provision to install MIU / AMR of any manufacturer in the future and make the meter compatible for Smart Metering System.

6.0 TECHNICAL SPECIFICATION

A. NATURAL GAS METER

1. Natural gas meters shall be of compact size, confirm long term accuracy and reliability, robust, maintenance free.
2. Commercial gas meters shall be G10, G16 ,G25 diaphragm type and G16 ,G25,G40 and G65 RPD Meters suitable for commercial metering (meeting the requirement of flow, accuracy, range ability, pressure, etc. As per data sheet -Refer MR and Data sheets).
3. Meter Index shall be compatible for implementing automatic meter system and shall be factory fitted.
4. Metering equipment shall have physical seal to prevent tampering.
5. Meter shall have pulse generating mechanism compatible to AMR. The Pulse generating mechanism/ Meter reading not affected by an external magnet avoid missing pulse and deviation/

mis-match in index & billing data. Bidder shall furnish the confirmation. The same may be verified at any stage before/ during/ after installation of AMR in meter.

6. The meters shall have corrosion resistant powder coated (inside and outside) steel casing. Enclosure protection of all meters shall confirm to IP-54 or better.
7. Meters shall have in-built reverse counters tractor.
8. The meters shall be supplied with all mounting accessories i.e. tamper-proof seals, screws, wall-mounting brackets etc. End connection shall be protected by Plastic caps.
9. The life of the meter shall be at least 20years.

7.0 MARKING & PACKAGING:

Each device (Meter) shall be marked in legible characters which are permanently visible (stickers to be avoided) with at least the following information:

Diaphragm Meters

- Name and logo of the Manufacturer, along with the model
- Serial number
- Month and year of manufacture
- CE marking, EN-1359 or applicable standard Marking & W&M India Certification Number
- Maximum Flow Q max and minimum flow Q min (For Metering Units)
- Maximum operating pressure
- Accuracy class of the meter, e.g. Class1.5
- Direction of flow
- Name and Logo of the Client

RPD Meters:

- G-Type of the Meter
- Max. Flow Capacity
- Mim. Flow Capacity
- Design Pressure
- Max. Allowable Pressure
- Accuracy Class
- Direction of flow
- Name of the manufacturer and the name of the model
- Serial number of the Meter
- Month and year of manufacturing
- W&M India Number (In Diaphragm Meters)
- EN Standards

Each device shall be sealed properly before dispatch, such that the factory setting cannot be changed on site. Each meter (along with the instruction manual) is to be individually packed in a transparent plastic cover (of adequate thickness) to protect the meter from ingress of dirt and water, and the same shall be packed in an individual box. The description of the contents of each of these boxes including meters serial number shall be clearly mentioned on individual box. A set of these individual boxes (2-10 Nos., as the case may be) shall be packed in a larger box; and the description of the contents of the larger box's shall also be clearly mentioned on the box. The quantity of the meters in the larger box shall be such that the box can be easily handled and stored, and it does not get damaged during the same.

8.0 QUALITY ASSURANCE

The Supplier will provide details of their quality assurance procedures during the assembly of the units and for final inspection following testing.

The Bidders shall gets the QAP approved by the HPOIL GAS/ its TPI before the Inspection.

HPOIL GAS/ its TPI reserve the right to visit the Supplier's facilities without prior notice, and inspect test records and witness assembly and testing in progress.

9.0 TECHNICAL EVALUATION REQUIREMENTS

- a) The bidder is required to submit to HPOIL GAS/ITS TPI the details of the items to be supplied, including the manufacturing standards, model number, accuracy specifications along with bid for our technical evaluation. All the technical documents / catalogues etc., to be submitted along with technical bid shall be in English Language only.
- b) The data sheet should be filled up completely and should be enclosed with the Technical offer.
- c) Compliance with the Technical Specifications must be confirmed by the bidder.

10.0 INSPECTION PLAN

Testing & Inspection shall be carried out as per the Technical Specifications of HPOIL GAS / its TPI, 1359: 2017 or Latest (Commercial Diaphragm Meters) and EN 12480 (RPD Gas Meters) and EN 12405-1, PESO/ATEX Certification (EVC).

- i) Third Party Inspection is to be included in the quoted prices. Inspection as per approved QAP shall be carried out on each lot by a reputed third party inspection agency like Lloyds, ABS, SGS, TUV, DNV, BV, EIL, or any other Third Party Inspection agency with prior approval of HPOIL GAS/its TPI.
- ii) HPOIL GAS/its TPI representative or Third party inspection agency appointed by HPOIL GAS/its TPI, if any, may also carry out inspection again during manufacturing/ final inspection at the works of the manufacturer.
- iii) Bidder shall furnish all the material test certificates, internal test / inspection reports for 100% material at the time of inspection of each supply lot of material.
- iv) Each natural gas meter shall be calibrated for at least three point calibrations, in line with the requirement of EN-1359/OIML/ applicable standards and the test results shall be satisfactory in line with EN-1359 /OIML/ applicable standards.
- v) Review of Calibration certificates for all the measuring instruments at the time of inspection, i.e., used for checking and testing, along with the Master calibration certificate of the measuring instruments from which the instruments is calibrated.
- vi) All meters should be sealed properly by the manufacturer after final inspection clearance and before dispatch. Meters found in an unsealed condition will not be accepted at HPOIL GAS stores.
- vii) Even after third party inspection, HPOIL GAS/its TPI reserves the rights to select a sample of meter/MIU randomly from each manufacturing batch & have these independently tested for compliance with HPOIL GAS/its TPI Technical Specifications like dimensional tolerances, leakage testing, performance, accuracy, etc. Should the results of these tests fall outside the limits specified in HPOIL GAS/its TPI technical specification, then HPOIL GAS/its TPI reserves the rights to reject all production supplied from the batch.
- viii) If the performance of any of the sample meter/MIU is not in compliance with the acceptance norms of the respective standards, then that lot of respective item will be rejected.
- ix) The Inspection shall include the following tests/ reviews, but not limited to:
 - a) Visual: Facia Plate marking, Arrow marking, Meter Index reading, Seal, Construction & Workmanship, Color & appearance.
 - b) Dimensional: Meter Size, End connections (threading), Centre to centre distance of inlet & outlet connection, Powder coating thickness.
 - c) Fitment & alignment.
 - d) Calibration: 3 point calibration (Qmin, 0.2 Qmax, Qmax), Accuracy Testing
 - e) Functional & Operational tests: Total mean pressure absorption, Pressure (max. pressure & opr. pressure), Max. Flow, Meter Index, Valve, AMR compatibility.
 - f) Leak Test: Body Leak Test
 - g) Physical properties/ Chemical analysis: Body & internal parts

- h) Enclosure protection: IP certification for Meters
- i) Statutory Approvals: Fire resistance type approvals, W&M approval, PESO approval
- j) The inspection procedure (testing and reviewing procedures) for the above shall be finalized during approval of QAP.

11.0 DOCUMENTS TO BE FURNISHED WITH SUPPLY (Minimum 3 sets)

Following is the list of documents required to be sent to HPOIL GAS/ its TPI along with the first lot of smart metering system:

- a) Performance specification and test certificates, calibration certificates (100% for each of the Meter).
- b) Technical data sheets, Testing & Inspection procedures, QAPs. (In English language only)
- c) Installation, operation, maintenance, recommendations and instruction manual in detail.
- d) Any other relevant documents required by HPOIL GAS/ its TPI.

12.0 TECHICAL SPECIFICATIONS

COMMERCIAL NATURAL GAS DIAPHRAGM METERS

GENERAL	Service	Natural Gas
	Type	Any technology suitable for Commercial metering of flow capacity / size / accuracy as defined in data sheet & MR
	Reference	Diaphragm Meters- Compliance as per EN-1359:2006 (or latest), PNGRB requirement (refer T4S) specification, OIML R 137-1 & 2 for Manufacturing Out of India.
	W&M India Certification	Required must be valid at the time of bid submission & valid till the contractual tenure
	Standard	As indicated in Clause 4.0-Codes and Standards
	Make & Model No.	Vendor to specify
	Installation	Suitable for outdoor/Indoor Installation, Hot and Humid ambient condition, tamper proof and corrosion resistant for a life period of minimum 10 years; suitable for smart meter by retrofitting AMR/MIU. (Bidder to confirm)
	Mounting	Wall/ Pole mounted.
	Mounting Accessories	Required. Shall be provided with the meter
	Flow/ Service	G10:Qmax: 16m ³ /hr, Qmin:0.10m ³ /hr, Qty. : As per MR
	Flow/ Service	G16:Qmax: 25m ³ /hr, Qmin:0.16m ³ /hr, Qty.: As per MR
	Flow/ Service	G25:Qmax: 40m ³ /hr, Qmin:0.25m ³ /hr, Qty.: As per MR
	Accuracy	Class1.5 [Qmin to 0.1Qmax±3%, 0.1 Qmax to Qmax±1.5%]
	Rangeability	150:1 or better
	Cyclic Volume	Minimum (Vender to specify)
	Normal Working Pressure	0.3 bar(g)
	Max. Working Pressure	0.5 bar(g)
	Design Pressure	0.5 bar(g)
	Max. Allow able pressure drop	Less than or equal to 3 mbar or as per EN-1359:2006 (or latest)
	Density Kg/ Sm ³	0.73 - 0.77
	Operating Temperature	0°C to 45°C Design 60°C or better
	Flow Direction	As per MR and to be marked on meter body.
BODY	Case work/ Body	Suitable for outdoor/ Indoor Installation, tamper proof and corrosion resistant powder coated steel casing.
	Corrosion protection	Suitable coating on inside and outside of casing.
	End Connections (Two- pipe version)	NPT (M) inlet and outlet confirming to ANSI B1.20.1 (bidder to provide set of suitable Adapters of Brass/Brass Union Connecters for end connections with suitable washer for each Meters)
IND EX	Fire resistance	Asper EN 1359/ equivalent
	Max. Index reading	999999.99 Index with auto reset facility
	Unit	CM (Cubic meter)
	Ingress protection	IP 54 or better

	Facility	Index should be compatible for installing AMR / MIU of any manufacturer and implementing smart metering system
	Pulse output type	Diaphragm Meters: Inductive/ Magnetic
INTERNALS	Diaphragm	Diaphragm Meter: Polyester fabric coated with rubber on either side of equipment for an endurance life cycle of 80,000 cum as per EN 1359: 2006 / EN 1359:2017 / or latest edition in force
	Valve between inlet and outlet	NA
	Power supply to valve	NA
	Centre to center distance between inlet and outlet connections	To be specified by vendor
	Other internals	All meter internals shall be non-metallic to prevent from tampering with magnet
OTHERS	Leak Testing	Meter pressurized with air at 1.5 MAOP of the meter, immersed in water for observance of leakage
	Sealing arrangement	Provision to be made by vendor
	Marking on the meter	Required
	EN/ MID marking on the meter	Required
	Reverse flow deterrents	Reverse count restrictor to be provided. Reverse rotation of index is not allowed.

13.0 Technical Specifications for RPD FLOW METER

COMMERCIAL NATURAL GAS RPD FLOWMETER						Rev
	1	Service	Governing standard	Natural Gas	EN 12480:2018 or Latest / MID Latest Standard/ OIML 137:1& 2 /AGA9/Equivalent/Latest, PNGRB requirement (refer T4S) specification. Approval from W & M department,	
Flow Meter	2	End connection	Size and Rating	Flanged End 2" x ANSI 150#		
	3	Facing & Finish		*		
	4	Pulses / M3		LF & HF/LF		
	5	Flow Range		*		
	6	Enclosure		Weather proof IP65 as per IEC 60529 / IS 2147		
	7	Cable Entry		*		
	8	F-F Distance* (mm)		*		
	9	Material	Body	Aluminum Alloy or steel or equivalent (Tamper proof, corrosion resistant) suitable for INDOOR / OUTDOOR installations		
	10		End Connections	Aluminium Flanged /ASTM A 105 Flanged or equivalent		
	11		Impeller & Shaft	High Grade Alloy Steel		
	12		Bearing	SS316 or equivalent		
	13		Other Wetted Parts	SS316		
	14	Accuracy		±2% (Qmin to 0.1Qmax) and ±1% (0.1Qmax to Qmax)		
	15	Rangeability		1:50 or better for G-16 & G-25		
				1:100 or better for G-40 & G-65		
				1:160 or better for G-100 & G-160		
Pre-Installation	16	Type - 2 wire/ 3 wire		2 wire		
	17	Preamplifier location		Field		
	18	Power supply		24 VDC loop powered from EVC		
	19	Cable Entry		1/2" NPT(F)		

G size		DN MM/(Inch.)		Flow Capacity (m3/Hr.)		Flange to Flange Distance (In MM)	
G16		50 (2")		25		171	
G25		50 (2")		40		171	
G40		50 (2")		65		171	
G65		50 (2")		100		171	
G100		50 (2")		160		171	
	20	Enclosure		Weather proof IP65 as per IEC 60529 / IS 2147			
	21	Intrinsic safe		Ex'ia'			
	22	Mounting	Accessories	Integral with RPD flow meter		Required	
Pulser	28	Power supply	Cable Entry	*			
	29	Output		Pulses			
	30	Enclosure		Weather proof IP65 as per IEC 60529 / IS 2147			
	31	Intrinsic safe		Ex'ia'			
	32	Mounting		Integral with RPD flow meter			
	33	Local Counter		Required 8 Digit, Mechanical, non-resettable counter			
	34	Strainer	Size and Mesh	*			
	35	Temperature tap on meter body		Required, 1/4" NPT, Thermowell SS316, RTD 6mm probe.			
	36	Pressure Tap on Meter Body		Required			
	37	Lubricator with accessories		Required			
	38	Radiography		100 % required for all welded joints (As applicable)			
Service	39	Fluid and State		Natural gas			
	40	Flow (min/max) SCMH		Refer below table			
	41	Design Temp(°c)		-10 to 60 °c or Better			
	42	Design Pressure(barg)		19 barg			
	43	Area Classification		Zone 1 Group IIA /IIB as per IEC, T3			
Misc	49	Model No.		*			
	50	Make		*			
Notes:							
1	Vendor to specify. *						
2	Vendor to submit proper sizing calculations as per process parameters for review and approval.						
3	Vendor to refer P&ID for more information about process data.						
4	Vendor shall provide detailed GA drawing along with all parts name and MOC for the RPD meter along with data sheet.						
5	In addition to first fill, lubricating oil (500 ml) along with feeding accessories shall be supplied with each meter.						
6	Type Approval Certificate and Weights & Measures Certificate along with Model & Make information shall be provided for meters supplied.						
7	Calibration certificate (original + soft copy) shall be provided to Client. One copy of the certificate shall be provided within the packing box of each meter.						
8	Pulse generators shall be provided with means of plugging and sealing arrangement against unauthorized interference. Maximum Velocity through the RPD meter shall be less than 30 m/sec.						
9	Meter casing shall be tamperproof, corrosion resistant suitable for indoor / outdoor installation.						
10	Pressure drops across complete meter assembly consisting of meter, NRV, RO and strainer shall be calculated and provided. Over flow protection shall be 120% of max. flow.						
11	Tag plate (SS 316) stamped with instrument tag number and service in 10mm characters shall be attached via SS wire (1 mm)						
12	Spares/Accessories: Lubricating oil (for at least two fills) along with feeding accessories to be supplied with each meter. The bottle (200 ml each) shall be included in each meter box packing. Conical SS Strainer at the inlet of meter. 04 Nos. Spare Gaskets for meter Inlet & Outlet. SS Orifice Restriction Plate. GI Stud-But/Bolts for Installation and NRV.						

ELECTRONIC VOLUME CORRECTOR (EVC)			Rev
General	1	Type	Microprocessor based battery operated volume corrector with integral pressure transmitter and temperature sensor suitable for mounting in the field location and applicable for custody transfer
	2	Service	Natural Gas
	3	Site conditions	Temp.: -10 to 60 degC or Better, Hot, Humid, tropical, Saline environment
	4	Governing Standard	EN 12405-1+A1 or Latest
	5	Approval	Type Approval Certificate as per Governing Standard
	6	Area Classification	Zone 1 Group IIB /IIC T4 Ex ' ia'
	7	Enclosure Protection	IP 65
	8	Quantity	Required with all RPD meters
	9	Function	To measure actual gas volume, pressure, temperature and compressibility factors of the gas and based on which calculates standard volume of gas. The unit shall be complete in all respects to achieve functionality. Base parameters for calculation of corrected gas flow shall be as under or configurable Pressure: 1.01325 Bar, Temperature: 15.5 Deg. C. Pressure sensor shall be provided with EVC with a range of 0.8 – 6 kg/cm2/ Bar or above (absolute) with measurement error +/- 0.3% typical OR overall accuracy of EVC at reference conditions as +/-0.5%. Pressure sensors to be individually calibrated and characteristics stored within the volume corrector.
	10	Accuracy	Typical accuracy better than $\pm 0.5\%$ as per governing standard
Electronic Volume Corrector	11	Input	1.EVC input shall be either LF/ HF pulse
	12		2.Closed & Open Indication of Slam Shut Valve
	13		3.Temperature signal from RTD measured value PT100/1000. All interconnecting cable shall be screened and armoured
	14		4. Pressure sensor shall be directly mounted on the meter and wired to EVC with a range in accordance with max. working pressure and design pressure
	15	Output	1.Correct Flow rate in standard cubic meter per hour (SCMH)
	16		2.Correct Totalized volume (sm3)
	17		3.Temperature
	18		4.Pressure
	19		5.Correction factor
	20		6.Uncorrected flow rate
	21		7.Uncorrected volume
	22	Isolation	All Inputs, Outputs and power supply shall be individually isolated
	23	Display	2 or 1 Line LCD Alfa Numeric Display (all parameters should be displayed by scrolling)
	24	Power Supply (Note 5)	Lithium battery along with mounting hardware. (Refer Note: 7)
	25	Calculations / Corrections	Compressibility: AGA8 (Detail method), NX-18, S-GERG
	26		Built in diagnostics to detect proper functioning. EVC shall be capable of continuing with flow measurement even when downloading / uploading of data is going on.
	27		Data security to password / key-lock. Hardware and software seals required.
	28		Parameters and programmed constants shall be stored in EEPROM / non-volatile memory
	29		Conduit connection of 1/2" NPTF with plugs shall be provided for output.
	30		Alarm output for unit malfunctioning. No setup data should be lost while changing battery. It should be possible to change battery in field.
	31		EVC can store monthly data of minimum 24 months.

32	Features	Large and configurable database and can store hourly, daily, monthly data with date & time stamp for pressure, temperature and corrected flow and consumption up to 1500 records or better.	
33		Facility for entry and accessing live and stored data through Keypad / Laptop / SCADA system.	
34		EVC should be supplied with single SIM GSM/GPRS modem. Modem shall be powered by EVC battery. Polling frequency shall be once in a day. Vendor shall consider life of EVC battery accordingly. Modem shall be 3G/4G/LTE/Latest and upcoming technology compatible. This shall be an intelligent and running 24x7. IPsec encrypted VPN shall be supported.	
35	Identification	Unique Addressing Facility	
36	Communication Ports	1. RS 232/ 485 serial port for SCADA facility (configurable up to 9600 bps); 2. USB 2.0 / 3.0 port for PC/Laptop connectivity; 3. Optical port	
37	Software	Suitable communication protocol adaptor with 2.5 mtr of communication cable along with driver software to communicate with EVC and Windows 7 and Windows 10 based laptop shall be supplied with each EVC.	
38	Mounting Accessories	Required	
39	Fittings	1. Pressure sensor : Tapping from pipeline or RPD meter body as shown in P&ID 2. Temperature Sensor : 1/4" NPTM (RTD Diameter Max.6mm) from RPD meter body or from pipeline as shown in P&ID	
40	Cable Entry	*	
41	Canopy	Not applicable (EVC is mounted inside skid cabinet/canopy)	
42	Communication Cable	Required, 2.5 mtrs length	
Notes:			
1	Vendor to specify. *		

2	EVC shall be certified for type test and custody transfer from NMI / PTB or equivalent independent international laboratories as per EN standards.	
3	The Calibration certificate for RTD, PT and EVC (original + soft copy) shall be provided to Client/Owner. One copy of the certificate shall be provided within the packing box of each EVC.	
4	Vendor shall provide 5 sets of volume corrector documentation including product literature, software / hardware manual, operation manual, maintenance instruction, certificates etc.	
5	Battery life shall be minimum 5 year if replaceable considering polling once in a day and if not replaceable battery life shall be 10 years. Battery capacity shall be sufficient for 24 hr. continuous operation with all the equipment powered.	
6	The communication protocol and message structure details to be used on the RS 232 / 485 serial communication port (for SCADA) shall be supplied after placement of order.	
7	If any external power supply is required for EVC, other than Lithium battery. Vendor shall provide solar power systems along with inverters and batteries for powering the EVC.	
8	ATEX Certificate confirming to 2014/34/EU along with Weights & Measures Certificate shall be provided for EVC supplied.	
9	Tag Plate (SS 316) stamped with instrument tag number and service in 10mm characters shall be attached via SS wire (1 mm).	