



**CITY GAS DISTRIBUTION PROJECT
ARC FOR PROCUREMENT OF INDUSTRIAL & COMMERCIAL METERS
TENDER NO. AGL/289/INDUSTRIAL AND COMMERCIAL METERS/11-18**

AAVANTIKA GAS LIMITED

(A JOINT VENTURE COMPANY OF GAIL & HPCL)

**CITY GAS DISTRIBUTION PROJECT IN
INDORE, UJJAIN, PITHAMPUR & GWALIOR**

ANNUAL RATE CONTRACT

FOR

**PROCUREMENT OF INDUSTRIAL & COMMERCIAL
METERS**

BID DOCUMENT

VOL. II OF II TECHNICAL

TENDER NO.: AGL/289/INDUSTRIAL AND COMMERCIAL METERS/11-18

OPEN DOMESTIC COMPETITIVE BIDDING

ISSUED DATE: 19.11.2018



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AAVANTIKA GAS LTD

CITY GAS DISTRIBUTION PROJECT

INTRODUCTION



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1.0 INTRODUCTION

AAVANTIKA GAS LTD. (AGL) plans to augment the PNG Network. It supplies natural gas to domestic & commercial consumers in the Indore GA and Gwalior GA including Indore, Ujjain, Pithampur and Gwalior city of Madhya Pradesh.

AGL is inviting bids for procurement of Commercial Meters with AMR, Data hosting and services for 5 years.

The present document covers the technical specifications for the enquiry.

2.0 TECHNICAL SPECIFICATIONS

The technical specifications for this present tender enquiry are as listed in Material Requisition



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AAVANTIKA GAS LTD.

CITY GAS DISTRIBUTION PROJECT

**MATERIAL REQUISITION FOR COMMERCIAL
METERS WITH AMR AND DATA HOSTING
SERVICES FOR 5 YEARS**



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A. DESCRIPTION OF GOODS AND/OR SERVICES

The scope of work shall cover design, engineering, manufacturing, testing, inspection, preparation for shipment and transportation of the Commercial Meters, EVC with inbuilt AMR and Data hosting and associated services for 5 years as per technical requirements/specification for City Gas Distribution project.

Sr. No	DESCRIPTION	QUANTITY
GROUP A: GAS METERS WITH EVC AND AMR CATERING PRESSURE REQUIREMENT BELOW 500 MILI BAR		
1.	GAS METER G-6	10 Nos.
2.	GAS METER G-10	05 Nos.
3.	GAS METER G-16	20 Nos.
4.	GAS METER G-25	20 Nos.
GROUP B : GAS METERS / RPD METERS WITH EVC, MODEM, POWER SUPPLY, COMMUNICATION CABLES, PULSE CABLES AND OTER AMR RELATED ACCESSORIES AS PER TECHNICAL DATA SHEET CATERING PRESSURE REQUIREMENT ABOVE 500 MILI BAR		
1.	GAS (RPD/other) METER G-16	25 Nos.
2.	GAS (RPD/other) METER G-25	15 Nos.
3.	GAS (RPD/other) METER G-40	19 Nos.
4.	GAS (RPD/other) METER G-65	5 Nos.
5.	GAS (RPD/other) METER G-100	3 Nos.
6.	GAS (RPD/other) METER G-160	3 Nos.

NOTES:

1. Accessories for Meter/Regulators shall be supplied as specified in the PTS attached with the material requisition.
2. Detail scope of data hosting services shall be as per the attached Service Agreement.
3. Commissioning and data hosting services cost to be included in the meter supply cost. No separate cost is envisaged for commissioning and data hosting services.
4. Bidder has to quote full quantity of quoted item mentioned above; partial quotation for the item shall be liable to rejection.



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A. REMARKS / COMMENTS

1.1 Supplier's Compliance

Supplier shall submit his bid in full compliance with the requirements of this MR and attachments.

Bidder shall include the following statement in his bid:

We certify that our bid is fully complying with your enquiry datedand referenced,

Compliance with this Material Requisition in any instance shall not relieve the Vendor of his responsibility to meet the specified performance.

1.2 Compliance with Specification

The supplier shall be completely responsible for the design, materials, fabrication, testing, and Inspection, preparation for shipment & transfer of above material to nominated delivery point strictly in accordance with the MR & all attachments thereto.

1.3 Supplier's Scope

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

1.4 Applicable Documents

General descriptions, requirements and information are listed in Annexure "C" of this Material Requisition.

1.5 Supplier's Documents

Supplier shall supply the documentation as listed under Annexure "D" of this Material Requisition.

All documents shall be supplied in English language.



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B. LIST OF ATTACHMENTS

The table below lists the documents which are integral part of this Material Requisition. The applicable revision index of each document is mentioned in the column below the current Material Requisition revision index.

When the Material Requisition revision index is "A" or "1", all listed documents are attached. For other Material Requisition revision index, only modified or new documents are attached.

DOCUMENTS	DOCUMENT NO.	REVISION OF DOCUMENTS		
Material Requisition	AGL/MR/111819	0		
Technical Specification	AGL/TS/111819	0		
Service Agreement	AGL/SA/111819	0		
Quality Assurance Plan	AGL/QAP/111819	0		
Quality Assurance Plan	AGL/QAP/111819	0		



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C. DOCUMENTS & DATA REQUIREMENTS

- 1.1 The table hereunder specifies the quantities & nature of the documents to be submitted by the SUPPLIER to COMPANY.
- 1.2 The documents required at the inquiry stage to be included in the bid are listed under column A.
- 1.3 The documents required after award of the AGREEMENT and subject to the written approval of the COMPANY are listed under column B.
- 1.4 The final & certified documents are listed under column C.
- 1.5 Any document even when preliminary shall be binding and therefore duly identified & signed by the SUPPLIER. It shall bear the COMPANY's project reference, the MR number and identification number.
- 1.6 THE DOCUMENTS ARE FULLY PART OF THE SUPPLY WHICH SHALL BE COMPLETE ONLY IF AND WHEN THE DOCUMENTS COMPLYING FULLY WITH THE MATERIAL REQUISITION REQUIREMENTS RECEIVED BY THE ENGINEER.

Item	Documents and Data	A	B		C	
		Number of copies	Number of copies	Required date	Number of copies	Required date
1.	Data sheet, catalogue, etc. documents submittal schedule	3	4	1 week	4	1 week
2.	Detail GA Drawing, Fabrication, testing and delivery schedule (per item) and for all accessories.		4	1 week	4	1 week
3.	Pressure drop calculations, Capacity sizing calculations	3	4	1 week	4	1 week
4.	Code compliance certificate		4	1 week	4	1 week
5.	Detailed QA/QC program	3	4	1 week	4	1 week
6.	Meter index format and regulator tag/nameplate format		4	1 week	4	1 week
7.	Material certificate EN 10204, Cert. 3.2		4	2 weeks	4	1 week
8.	List of special test equipment/tools required for maintenance		4	1 week	4	1 week
9.	2 years operation Spare part list		4	1 week	4	1 week
10.	Inspection and test procedures	3	4	1 week	4	1 week



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Item	Documents and Data	A	B		C	
		Number of copies	Number of copies	Required date	Number of copies	Required date
11.	Test / Calibration/Inspection certificates/reports		4	1 week after test	4	1 week
12.	Installation, operation and maintenance manuals, catalogues with part list for meters and regulators along with software CD and calibration reports.		4	2 weeks before shipping	4	1 week
13.	Painting system description	3	4	1 week	4	1 week
14.	Packing/shipping list w/weights and dimensions. (Note-5)		4	2 weeks before shipping	4	
15.	Final technical file (containing all final drawings and documents listed in column 'c')		4	2 weeks before shipping		
16.	Type approval from weights & measures	1	2	1 week	4	1 week
17.	ATEX approval certificates	1	2	1 week	4	1 week

NOTES:

1. Duration in column B (required date) are weeks after purchase order date (=T0).
Duration in column C (required date) are weeks after document approval.
Due date of each document may be proposed.
2. Final technical file shall be supplied in hard copy as indicated, and in electronic format (pdf acrobat) on two (2) CD-ROMS.
3. The selected Vendor shall provide Calibration certificates of each meter.
4. The packing boxes for each flow meter, regulator, EVC etc. (Each Item which is been packed independently) shall carry the item calibration certificate within the packing box.

ANNEXURE-I
SERIAL NUMBERING FORMAT FOR METERS

FIRST 3 ALPHABETS OF VENDOR			ITEM SERIAL NUMBER (FROM MANUFACTURER)								MONTH & YEAR OF MANUFACTURE				
A	B	C	1	2	3	4	5	6	7	8	/	M	M	Y	Y

EXAMPLE

I	T	R	12345678								/	0	7	1	5
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PTS FOR COMMERCIAL METERS



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1.0 SCOPE

The scope of work shall cover design, engineering, manufacturing, testing, inspection, preparation for shipment and transportation of the Commercial Meters, EVC with integral or external AMR, Regulators, Data hosting and associated services for 5 years as per technical requirements/specification for City Gas Distribution.

Functional requirement of Gas Meters shall be in line with following points:

- a) Meter reading counters and housing assembly should be tamper proof should be break open type and attempt to tamper with the counters/ housing assembly should lead to stoppage of gas flow through the meter or break open the meter body.
- b) Meter reading counters should be non-reversible type.
- c) Instead of external housing, the metering display housing should be integral part of the Meter
- d) Metering types may be Diaphragm type/ Thermal Mass Flow/ RPD / Ultra Sonic type.
- e) Commercial Meters should be SMART METERS having Automatic Meter Reading (AMR) facility based on GSM/GPRS technology and reading data should be accessible on Cloud with secure login credentials.
- f) Meters should be designed to display the corrected reading in SCM (Standard Cubic Meters) or should be equipped with the required provisions for the same.

2.0 GENERAL

2.1. DEFINITIONS

Subject to the requirements of the context, the terms (hereafter listed in alphabetical Order) used in this specification are given the following meaning:

AGREEMENT	Designates the agreement concluded between the CLIENT and the CONTRACTOR, under which the latter undertakes to the former the GOODS and/or SERVICES according to the stipulations which are agreed and specified in the form of an order.
CLIENT	Designates the purchaser of the GOODS and/or SERVICES, which are the subject of the AGREEMENT



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CONTRACTOR / SUPPLIER	Designates the individual or legal entity with whom the order has been concluded by the CLIENT. The term "CONTRACTOR/SUPPLIER" may be used indifferently for a supplier, a manufacturer, an erection CONTRACTOR/SUPPLIER, etc.
DAYS-WEEKS-MONTHS	Specify the number of calendar days, weeks or months and not of working days, weeks or months.
CLIENT'S REPRESENTATIVE	Designates the individual or legal entity to which the CLIENT has entrusted various tasks in relation with the carrying out of his PROJECT
GOODS AND/OR SERVICES	Designate, depending on the case, all or part of the drawings or documents, substances, materials, materiel, equipment, structures, plant, tools, machinery, to be studied, designed, manufactured, supplied by the CONTRACTOR/SUPPLIER under the AGREEMENT, including all the studies, tasks, works and services specified by the order. The Terms GOODS or SERVICES may be indifferently used one for the other as required by the context
PROJECT	Designates the aggregate of GOODS and/or SERVICES to be provided by one or more CONTRACTOR/SUPPLIERS.

2.2. REVIEW AND/OR APPROVAL

Whenever CLIENT and/or CLIENT'S REPRESENTATIVE'S review and/or approval is requested on a document to be submitted by the CONTRACTOR/SUPPLIER or before an action is implemented by the CONTRACTOR/SUPPLIER, such review and/or approval shall always be requested in writing by the CONTRACTOR/SUPPLIER to the CLIENT and/or the CLIENT'S REPRESENTATIVE before any action subject of this review and/or approval is taken.

CLIENT and/or CLIENT'S REPRESENTATIVE approval shall always be given in writing.

3.0 CODES & STANDARDS

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 the following standards.



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Description	Standard	Edition
European Economic Community	EEC	Latest Edition
Gas Meters, Rotary Displacement Gas meters	EN 12480	2015
Gas Meters, Diaphragm Meters	EN 1359 +A1	1999 + 2006
Degree of Protection Provided by Enclosures (IP Code)	IEC 60529	2001
Diaphragm Type Gas Displacement Meters (under 500 Cubic Feet Per Hour Capacity)	ANSI B109.1	2000
Pipe Threads, General Purpose (Inch)	ASME B1.20.1	2013
Pipe Flanges and Flanged Fittings	ASME B16.5	2013



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Compressibility	AGA 8	1992
Electronic Volume Calculator	EN12405-1 + A1	Latest

REQUIREMENTS APPLICABLE TO ALL FLOW METERS

- Availability of importing license for flow meters (applicable if imported)
- ATEX / PESO certification.
- Weights & Measures, EN and ATEX marking on the flow meters.
- Model approval certificate from Legal Metrology, Govt. of India
- Type approval/compliance/examination certificate which conforms to the governing standard

Offered Gas flow meters shall be certified for custody transfer (Weight & Measurement) of natural gas complying to relevant standard and codes by internationally recognized certification agencies.

All meters with EVC & Regulators shall compulsorily comply with the requirements of Petroleum and Natural Gas Regulatory Board (Technical Standards and Specifications including Safety Standards for City or Local Natural Gas Distribution Networks) Regulations, 2008+ Amendment notification dated 24th November, 2016. In case of dispute between PNGRB standard and other codes, PNGRB standard shall prevail.

4.0 FUNCTIONAL REQUIREMENT FOR AMR

Commercial Gas Meters shall be provided with GPRS based AMR solution. The meters shall be installed in strategic locations as designated by AGL. The AMR system of each meter shall be supplied with GPRS modem and SIM cards to record Gas consumption and diagnostics from the meters. The meter reading data collected through AMR system shall be uploaded to BIDDER's cloud server.

The cloud server shall store the meter reading historical data for a period of 6 months. The cloud server shall provide secured and encrypted platforms for Owner through web services using https protocols.

The SIM cards shall be supplied by the BIDDER in the name of AGL. Monthly charges of the SIM shall be included in supply.



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5.0 DATA SHEET FOR COMMERCIAL DIAPHRAGM METERS

Sl.No	Meter Type	Min / Max. Flow (At Actual Conditions)	Centre to Centre Distance	Design Pressure	Pressure Drop
1.	G-4	0.04/6.0 m ³ /hr	110±2 mm	500 mbar	<2 mbar
2.	G-6	0.06/10.0 m ³ /hr	250±2 mm	500 mbar	<2 mbar
3.	G-10	0.10 / 16.0 m ³ /hr	250±2 mm	500 mbar	<2 mbar
4.	G-16	0.16 / 25.0 m ³ /hr	280±2 mm	500 mbar	<2 mbar
5.	G-25	0.25 / 40.0 m ³ /hr	335±2 mm	500 mbar	<2 mbar

COMMERCIAL DIAPHRAGM METERS	
Meter Type	Diaphragm Type
Service	Natural Gas
Governing Standard	EN 1359:1999 + A1 Amendment 2006 or latest
Approval	Type approval certificate as per EN 1359:1999 + A1 Amendment 2006 or latest
Accuracy	±3% (Q _{MIN} to 0.1Q _{MAX}) ±1.5% (0.1Q _{MAX} to Q _{MAX})
Accuracy Class	1.5
Installation	Suitable for outdoor/ indoor installations, tamper proof and corrosion resistance for a life period of 10 years.
Index	8 Digit mechanical index – As per EN1359 – Units in m ³ . Index shall be provided with sealing arrangement to avoid tampering.
Back-run Stop	Provided to prevent the meter from running backwards in case of tampering or back flow condition.
Transmission Rate	0.01 m ³ / rotation for G4 & G6 and 0.10 m ³ / rotation for G10-G25



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COMMERCIAL DIAPHRAGM METERS	
Transmission System	Tamperproof non-magnetic
Environment Protection	Mechanical Environment M2 & Electrical Environment E2
Operating Temperature	-10° to 55°C
Body Casing	Steel with suitable coating on inside and outside for corrosion protection of casing.
Colour	Light grey RAL7035
Ingress Protection	IP 54 or better
End Connections	<p>Threaded,</p> <p>I) For G-4 Series: DN 20 / 3/4" NPT conforming to ANSI B1.20.1</p> <p>II) For G-6 Series: DN 25 / 1" NPT conforming to ANSI B1.20.1</p> <p>III) For G-10 series: DN 40 / 1 1/2" NPT conforming to ANSI B1.20.1</p> <p>IV) For G-16 series: DN 40 / 1 1/2" NPT conforming to ANSI B1.20.1</p> <p>V) For G-25 Series: DN 50 / 2" NPT conforming to ANSI B1.20.1</p> <p>All above meters shall be provided with brass adaptors with Free Loose Nut & PTFE washer (2mm) for covering the port size to 1"NPTM for inlet/outlet end connection. 5 pairs of spare washer shall be provided with each meter.</p>
Diaphragm Material of construction	Polyester fabric coated with rubber for an endurance life cycle of 80,000 cum.
Other Internal Parts	All meter internals shall be non – metallic to prevent from tampering like magnet.
Reverse flow restriction	Meter shall be provided with a device in the outlet to prevent reverse flow.
Over-flow protection device	Required at the downstream of meter, Restriction Orifice (PTFE), Material of Restriction orifice shall be suitable for Natural Gas.



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COMMERCIAL DIAPHRAGM METERS	
Automatic Meter Reading (AMR)	<p>The meters quoted should be supplied with EVC with inbuilt AMR solution and GPRS module with SIM cards for uploading the meter data into cloud server.</p> <p>SIM cards for GPRS module shall be supplied by the BIDDER.</p> <p>Geo-tagging accurate up to 5 decimal points to be configured for all the meters.</p>
Cables & Connectors	<p>Vendor shall provide cables (2.5 Meter length) along with cable connectors required between meters & EVC device.</p>
Volume Correction	<p>Volume correction through EVC module. Integral type EVC is not acceptable.</p> <p>Refer EVC data sheet for detail requirements of volume correction.</p>

NOTES:

1. BIDDER shall provide Brass adaptor with 1" inlet/outlet connection, washer shall be of PTFE and provided along with Restriction orifice.
2. BIDDER to ensure the type approval for meter with Model & Make certified from Weights & Measures shall be provided.
3. Overflow protector (Restriction Orifice) shall be provided with each meter.
4. The calibration certificate (original + soft copy) shall be provided to AGL H.O. One copy of the certificate shall be provided within the packing box of each meter.

6.0 DATA SHEET FOR ROTARY POSITIVE DISPLACEMENT METERS

COMMERCIAL RPD METERS WITH NRV, EVC AND AMR					
SR. NO.	METER TYPE	MAX. FLOW (AT ACTUAL CONDITIONS)	SIZE / RATING	FLANGE TO FLANGE (MM)	RANGEABILITY
1.	G-16	25.0 CU. M/HR	DN50 / 150#	171	1:50 or better
2.	G-25	40.0 CU. M/HR	DN50 / 150#	171	1:50 or better



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3.	G-40	65.0 CU. M/HR	DN50 / 150#	171	1:100 or better
4.	G-65	100.0 CU. M/HR	DN50 / 150#	171	1:100 or better
5.	G-100	160.0 CU. M/HR	DN80 / 150#	171	1:100 or better
COMMERCIAL RPD METERS WITH NRV AND WITHOUT EVC & AMR					
6.	G-160	250.0 CU. M/HR	DN80 / 150#	241	1:100 or better
7.	G-250	400.0 CU. M/HR	DN80 / 150#	241	1:100 or better
8.	G-400	650.0 CU. M/HR	DN100 / 150#	241	1:100 or better
9.	G-650	1000.0 CU. M/HR	DN150 / 150#	450	1:100 or better
10.	G-1000	1600.0 CU. M/HR	DN200 / 150#	600	1:100 or better

ROTARY POSITIVE DISPLACEMENT METERS	
Meter Type	Rotary Positive Displacement (With Mechanical Counter)
Service	Natural Gas
Governing Standard	EN 12480 or latest
Maximum Operating Pressure	4 Bar
Design pressure	1.5 times Maximum Operating Pressure
Allowable pressure drop	3 mbar
Operating Temperature Range	-10 to 55°C
Accuracy	±2% (Q _{MIN} TO 0.1 Q _{MAX}) and ±1% (0.1 Q _{MAX} TO Q _{MAX})



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ROTARY POSITIVE DISPLACEMENT METERS	
Index	<p>a) 8 Digit mechanical index – The meter shall include integral, non-resettable and non-volatile means (index) of recording volume of gas measured.</p> <p>b) Auto reset is allowed only after maximum counter value is reached.</p> <p>c) Index with housing with facility to rotate to improve ergonomics as per site conditions. The rotation angle shall not exceed 359°</p>
Reverse flow restriction and Orifice	Non return valve and Restriction Orifice to be supplied with each meter. Scheme for flanged configuration shall be detailed out by the bidder. Drop across NRV, RO & Meter in unison shall be calculated and provided with the bid. Overflow protection shall be 120% of Maximum flow.
Casing	Tamper proof, corrosion resistant suitable for INDOOR / OUTDOOR installations.
Meter Internals	Non-corrosive tested low noise, friction less, endurance for 20 years life & external tamper proof. Aluminium Body shall be provided.
Ingress Protection	IP65 or better
Area Classification	Zone-1, Gr IIA/IIB,T3
Electric Protection / Certification	Eex'ia' (Intrinsic Safe)
Output	<p>1 LF (low frequency) pulse is Mandatory, Second Output can be either LF or HF (High frequency) and additional 1 AT (anti tampering) output shall be provided.</p> <p>All pulse generators shall be provided with means of plugging and sealing arrangement against unauthorized interference.</p>
Spares	In additional to first fill, Lubricating oil (500 ml) along with feeding accessories to be supplied with each meter. The bottle (200 ml) shall be included in each meter box packing.



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ROTARY POSITIVE DISPLACEMENT METERS	
Accessories	1. Conical filter at the inlet of meter [bidder to recommend]. 2. Non-Return valve 3. Restriction Orifice 4. Gaskets 5. CS companion flanges (WNRF) for RPD meter p to G-100 6. Spare gaskets for meter & NRV 7. Flange bolts
Installation	Horizontal / Vertical
Temperature Sensing	Meter shall be provided with temperature tapping (1No) with SS316 Thermowell of size 1/4 "NPTF with suitable fittings to fix the RTD. Bore diameter of thermowell shall be suitable for 6 mm RTD probe insertion.
Pressure Sensing	Meter shall be provided with Pressure sensor tapping (1No). Tapping size shall be 1/4" NPTF.
Cables & Connectors	Vendor shall provide cables (2.5 Meter length) along with cable connectors required between RPD meters & EVC device.
Automatic Meter Reading (AMR)	The meters quoted should be supplied with AMR solution and GPRS module with SIM cards for uploading the meter data into cloud server. SIM cards shall be supplied by the BIDDER. Geo-tagging accurate up to 5 decimal points to be configured for all the meters.
Volume correction	Volume correction through EVC module. Integral type EVC is not acceptable. Refer EVC data sheet for detail requirements of volume correction.

NOTES:

1. Type approval for meter with Model & Make certified from weights & measures shall be provided.
2. Bidder to provide adaptor or spool to meet above specified meter flange to flange dimensions. Companion flanges shall be provided at each end of the meter.
3. Sealing arrangement shall be provided for all the valves with steel wire to avoid tampering/mishandling.
4. Flow Direction shall be clearly marked on the Meter body.



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5. Five points calibration shall be done. The calibration certificate (original + soft copy) shall be provided to AGL HO. One copy of the certificate shall be provided within the packing box of each meter.

6.1. TECHNICAL REQUIREMENT FOR NRV AND RESTRICTION ORIFICE

Type	: Swing Check Valve
Size	: According to the size of the meter as specified
Pressure Rating	: Min. 150#
End Connection	: As per meter end connection specified above
Material:	
Body/Cover/Hinge	: ASTM A216 Gr.WCB or equivalent
Disc/Seat/Hinge Pin	: Alloy20
Gasket	: PTFE
Application	: Natural Gas
Allowable pressure drop	: 50 mbar
Accessories	: CS companion flanges and spare gaskets
Restriction orifice	: Upstream of NRV, SS316

7.0 DATA SHEET FOR BATTERY OPERATED ELECTRONIC VOLUME CORRECTOR

ELECTRONIC VOLUME CORRECTOR	
Standard	According to EN12405-1+A1 or latest
Accuracy	Typical accuracy better than $\pm 0.2\%$ (As per governing standard)
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.
Quantity	One No. per Flowmeter
Function	To measure actual gas volume, pressure and temperature and calculates compressibility factors of the gas and based on which calculates standard volume of gas. The unit shall be complete in all respects to achieve this functionality.
Inputs	a) LF Pulse from flowmeter is compulsory. HF pulse output from flowmeter can be optional.
	b) Temperature signal from RTD element (Supply of RTD element is in scope of vendor for both integral and external) measured value PT100 / 1000. All interconnecting cable shall be screened and armoured. Temperature sensing Cable (2.5Meters) and cabling



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ELECTRONIC VOLUME CORRECTOR	
	accessories to be supplied by the supplier.
	c) Pressure sensor shall be directly mounted on the meter and wired to EVC with a range of 0–10 kg/cm ² or Bar. Pressure sensors to be individually calibrated and characteristics stored within the volume corrector. The tubing and tube fitting accessories to be supplied by supplier. Proper sealing arrangement shall be provided for the pressure sensor. Cable (2.5 Meters) and cabling accessories to be supplied by the BIDDER.
Outputs	a) Corrected flow rate in standard cubic meter per hour (SCMH)
	b) Corrected totalized volume (Sm ³)
	c) Temperature
	d) Pressure
	e) Correction Factor
	f) Uncorrected flow rate
	g) Uncorrected volume
Automatic Meter Reading (AMR)	The EVC quoted should be supplied with AMR solution and GPRS module with SIM cards for uploading the meter data into BIDDER's cloud server. SIM cards shall be supplied by the BIDDER.
	Following are the requirement if AMR is not inbuilt with EVC: 1. Bidder to submit details of Make, Model, required Approvals for the evaluation of the bid.
Isolation	All inputs, outputs and power supply shall be individually isolated.
Display	2 line 16 large character LCD display with selectable decimal, displaying all units, messages, alarms (Battery Low, Pressure out of range, Temp. out of range, flow over range, fault in measurement) etc. shall be in English. By default display shall be configured for corrected and uncorrected totalizer.
Units of display	a) Corrected flow rate: Sm ³ /hr.
	b) Corrected Totalized volume: Sm ³
	c) Pressure: Kg/cm ² or Bar a / g
	d) Temperature: °C
	e) Uncorrected flow rate: m ³ /h
	f) Uncorrected volume: m ³
Power supply	Lithium battery along with mounting hardware. Battery life shall be not less than 5 years if replaceable if not replaceable battery



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ELECTRONIC VOLUME CORRECTOR	
	life shall be 10 years. Battery capacity shall be sufficient for 54 hr. continuous operation with all the equipment powered. One spare battery shall be supplied in addition to the battery inside the EVC.
Configuration Setup	To be done in factory for all volume corrector fully considering the process conditions, sensor & flowmeter's characteristics and calibrations for direct on site operations.
Calculations / Corrections	Compressibility: AGA8 (Detailed method), NX-19, S-GERG
Features	a) Built in diagnostics to detect proper functioning.
	b) Data security through password / key-lock facility and volume conversion and configuration to be sealed. Hardware and software seals are required.
	c) Parameters and programmed constants shall be stored in EEPROM / non-volatile memory.
	d) Conduit connection of 1/2" NPTF with plugs shall be provided for output.
	e) Facility for entry and accessing live and stored data through Keypad / Laptop / SCADA system.
	f) RS 232/485 serial port for SCADA facility for PC/Laptop connectivity shall be provided with USB 2.0/3.0 port. Suitable communication protocol adaptor with 2.5Mt of communication cable shall be supplied along with driver software to communicate with EVC and Laptop (Windows7 and Windows10 based).
	g) The communication speed of RS232/485 (for SCADA) serial communication port for volume corrector shall be configurable up to 9600 bps.
	h) Alarm Outputs for unit malfunctioning.
	i) The EVC has a large and configurable database and can store hourly, daily and monthly data with date & time stamp for pressure, temperature and corrected flow & consumption up to 1500 records or better.
	j) The EVC can store monthly data of Minimum 24 Months.
	k) The stored data above shall be retrievable by using portable PCs. Suitable dedicated port shall be available on the volume corrector for portable PC connection. Each EVC shall be provided with communication cable.
l) Shall have addressing facility for identification by its address.	



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ELECTRONIC VOLUME CORRECTOR	
Area of Classification	IEC ZONE 1 GR IIA/IIB, T3
Site conditions	Temperature 0 – 55°C, Hot, Humid, tropical, saline environment.
Enclosure	Explosion proof as per IEC, Zone – 1, GR IIA /IIB, T3 and IP65
Mounting	Required mounting accessories to be considered by the bidder. Required cables provided shall of minimum 2.5 Meters.
Software	Suitable communication protocol adaptor with 2.5Mt of communication cable shall be supplied along with driver software to communicate with EVC and Laptop (Windows7 and Windows10 based).
Fittings	Pressure Sensor: 1/4" NPTM Temperature Sensor: 1/4" NPTM (RTD diameter max 6mm)
Canopy	Pre-fabricated FRP canopy with required installation accessories shall be provided with each EVC and with AMR if it is not inbuilt with EVC.

NOTES:

1. 5 sets of Volume corrector documentation including product literature, software / hardware manual, operating manual, maintenance instruction, Certificates etc. shall be supplied.
2. The communication protocol and message structure details to be used on the RS 232/485 serial communication port (for SCADA) shall be supplied by BIDDER after placement of order.
3. EVC shall be certified for type test from NMI/PTB or equivalent Independent International Laboratories as per EN Standards (Measurement of CANADA).
4. The calibration certificate for RTD, PT & EVC (original + soft copy) shall be provided to AGL HO INDORE. One copy of the certificate shall be provided within the packing box of each meter.



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8.0 DATA SHEET FOR COMMERCIAL REGULATORS

Sl. No.	Flow (At Actual Condition)	Regulator Outlet Set Point (Factory Set)	End Connection Inlet port/ Outlet port	Flange to Flange dimension (mm)	Cut Off Pressure
1.	50 m3/hr	300 mbar(g)	1"x1.5" , 150# , Flanged	400	OPSO – 399±5 mbar, UPSO – 195±5 mbar CRV set point – 363±5 mbar
2.	50 m3/hr	500 mbar(g)	1"x1.5" , 150# , Flanged	400	OPSO – 665±5 mbar, UPSO – 325±5 mbar CRV set point – 605±5 mbar
3.	50 m3/hr	2.0 bar(g)	1"x2" , 150# , Flanged	400	OPSO – 2.3 bar UPSO –1.7 bar CRV Set Point – 2.4 bar
4.	100 m3/hr	2.0 bar(g)	1"x2" , 150# , Flanged	400	OPSO – 2.3 bar UPSO –1.7 bar CRV Set Point – 2.4 bar
5.	150 m3/hr	2.0 bar(g)	1"x2" , 150# , Flanged	400	OPSO – 2.3 bar UPSO –1.7 bar CRV Set Point – 2.4 bar
6.	250 m3/hr	2.0 bar(g)	1"x2" , 150# , Flanged	400	OPSO – 2.3 bar UPSO –1.7 bar CRV Set Point – 2.4 bar

Notes :

1. The above-mentioned set points shall be verified by the bidder, sizing calculation of regulators shall be submitted by bidder which shall cover the cut-off set-point limits as well.



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COMMERCIAL REGULATORS:			
Type	All Pressure Regulators shall be of direct acting type with Integral Slam shut valve system. (If required actual flow rates given for regulators may be converted in SCMH based on downstream pressure for selection of regulators).		
Service	Natural Gas		
Standard	EN 334/ BS EN 13785/ EN 14382 (Latest)		
Design	Direct acting pressure regulator with spring control & diaphragm with in-built pressure balance regulating unit to ensure a constant outlet pressure. Pressure sensing shall be internal, external sensing is not acceptable.		
Inlet Pressure Range	1.0 to 4.0 bar-g (for regulators with outlet pressure up to 500 mbar)		
	2.5 to 4 bar (g) (for regulators with outlet pressure 2 bar)		
Outlet Pressure range	300mbar	500mbar	2bar
Flow capacity	50m ³ /h	50m ³ /h	50m ³ /h, 100m ³ /h, 150m ³ /h & 250m ³ /h (applicable for G65 RPD meters)
Outlet Pressure set range	For regulator with pressure of 2 bar - 1.8 to 2.2 bar(g), 300 mbar - 275 mbar to 325 mbar(g), 500 mbar - 475 mbar to 525 mbar(g) (Variable spring regulator shall be sized considering minimum inlet pressure and maximum outlet pressure).		
Type of Reset	Manual		
Operating Temperature	0 to 60°C		
Installation Position	Suitable for installation in both Horizontal / Vertical orientation		
Installation Location	Outdoor (Suitable for Outdoor Locations)		
Filter	Inbuilt		
Material of Construction	Casing and body shall be of cast Aluminum alloy or WCB (or as per EN 334), internal parts of stainless steel and brass, Seals of Nitrile rubber, diaphragm of synthetic rubber and water proof/Corrosion resistant for Outdoor Installation.		
Accuracy Class	AC10 complying to EN 334 or equivalent		
Closing pressure	SG10 complying to EN 334 or equivalent		
Failure position	Closed. Direct acting regulator is fail-to-open type as per requirements and definition in EN334 standard; however, when equipped with integrated slam shut-off valves, it is treated as fail-to close due to presence of SSV.		
Sealing of Set-point adjustment device	Proper sealing of Set-point adjustment device is required. (Vendor to recommend the sealing options)		
Shut-off class	Class V or better as per FCI70.2 No leakage is permitted from the body of the regulator including threads. Vendor shall provide documentary evidence/test certificate for the same.		



8.1. CONSTRUCTION

The regulators are meant for installation at various clients' premises, where space availability is the main constraint. The model shall be selected in such a way that it is compact and robust to suit the site conditions. AGL has right to reject any model, proposed by the bidder, considering the size and shape of the regulator offered by them. All regulators shall be direct acting type and with internal sensing of pressure.

If external filter is supplied, then filter should not cause a pressure loss of more than 5% of line pressure.

8.2. Essential Features

The regulators shall essentially have the following features:

- Over Pressure shut-off
- Under Pressure Shut off
- Creep Relief Valve
- Integral Filter

Supplier shall indicate the set range for OPSO, UPSO and relief pressures. The regulators shall be factory-set to the pressures indicated in the respective data sheets.

9.0 INSPECTION

- Type approval certificates (from weights & measures) shall be provided for all meters during pre-award stage along with type approval certificate for each make & model from ex
- Inspection shall be carried out as per approved Quality Assurance Plan and AGL Technical Specification.
- Supplier shall furnish all the material test certificates, proof of approval/ license from specified authority as per specified standard, if relevant, internal test/ inspection reports as per AGL Technical Specification and specified code for 100% material, at the time of final inspection of each supply lot of material.
- Supplier shall hire Third Party Inspection Agency (to be approved by the Client) to perform inspection work. This agency shall inspect all the equipment/material and issue all inspection certificates/reports as per specifications and codes.



- Even after third party inspection, AGL reserves the right to select a sample randomly from each manufacturing batch and have these independently tested. Should the results of these tests fall outside the limits specified in AGL Technical specification, then AGL reserves the right to reject all production supplied from the batch.

10.0 TESTING

The meters shall be tested as per governing standards. Supplier shall submit detailed Quality Assurance Plan for approval by AGL before commencing production. Leak testing shall be carried out by pressurizing the body with air at 1.5 MAOP of the meter, immersed in water for observance of leakage.

The Supplier shall carryout calibration for 100% quantity

3 Point calibration for Diaphragm and 5 Point Calibration for RPD meters.

Diaphragm Meters:

- Qmax.

- Qmin.

- 0.1Qmax

RPD Meters.

- Qmax

- 0.7 Qmax

- 0.5Qmax

- 0.1Qmax

- Qmin

The regulators shall be tested as per EN334 and relevant international standards. Supplier shall submit detailed Quality Assurance Plan (QAP) for approval by AGL before commencing the production. Testing shall be carried out as per approved QAP.



11.0 MARKING

11.1. FOR DIAPHRAGM METERS:

Each gas meters shall be marked in legible characters, which are permanently visible in accordance with BS/EN 1359:1999+A1 Amendment 2006 or latest.



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- Type approval number issued by primary lab which has issued the type approval certificate.
- Manufacturer's name & Identification mark
- Serial number and year of manufacture
- Flow rate Max. (Q_{MAX}) & Min. (Q_{MIN}) – (m^3/h)
- Maximum working pressure
- Flow direction
- Nominal value of cyclic volume, V (dm^3)
- Number and date of EN standard
- Ambient temperature range ($^{\circ}C$)
- Gas temperature range ($^{\circ}C$)
- Accuracy class of meter, e.g., Class1.5
- Month & Year of manufacture
- Type approval number issued by Department of Legal Metrology (W&M) (Government of India)
- AGL logo on each meter.
- AGL unique serial no. of on each meter as per AGL standard format provided with the tender.

11.2. FOR POSITIVE DISPLACEMENT METERS

Each gas meters shall be marked in legible characters, which are permanently visible.

- Type of the meter and the number of the type examination/compliance/approval certificate.
- Name and number of the design standard.
- Serial number and year of manufacture
- Accuracy class of meter, e.g., Class1.5
- Maximum Flow Rate: $Q_{MAX} = \dots$
 m^3/h
- Minimum Flow Rate: $Q_{MIN} = \dots m^3/h$
- Operating pressure range $P = \dots$
 $\dots Bar/Kg/cm^2$
- Maximum allowable pressure range $PS = \dots Bar/Kg/cm^2$
- Design temperature range $TS = \dots$
 $\dots ^{\circ}C$
- The volume of the meter $V = \dots L$
- Nominal value of the cyclic volume, V_{cyc} (dm^3)
- Operating temperature range $t = \dots$ to $\dots ^{\circ}C$
- Volume per pulse
- output.
- Type approval number issued by Department of Legal Metrology (W&M) (Government of India)



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- AGL logo on each meter.
- AGL unique serial no. of on each meter as per AGL standard format provided with the tender

12.0 PACKING & SHIPMENT

Supplier / Vendor shall provide a detailed packing list for all the items been supplied. Necessary accessories supplied shall be packed in the main package box for which accessories are been supplied. The calibration certificates of each



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item (such as flow meter, regulator, EVC etc) shall be enclosed within the package box. Each package box shall be tagged with the purchase order number (unique identification is required). The package box shall be suitable for INLAND transport or seaworthy (if imported). Necessary precautions and pre-requisites shall be considered by supplier for package delivery to the concern client site / location / workshop.

13.0 OTHERS

- Necessary clamps/ fixtures shall be provided in case the EVC is external.
- The end connection of the meters shall be protected with plastic caps. In case of Flange ends, companion flanges with Bolts shall be provided in each end. In case the end connections of the meters proposed by the bidder is not in line with the end connections mentioned in the data sheets, the Bidder shall supply suitable adaptors to suit the desired end connections. Companion flanges with Bolts if supplied shall be enclosed within the Meter packing box.
- All accessories along with meter shall be supplied in a single package along with the meter along with the packing list on each package. In every package a copy of calibration certificate shall be enclosed.
- Supplier shall mention the model no. that is being offered along with the catalogue in English along with the bid.

14.0 DOCUMENTS TO BE SUBMITTED AT THE TIME OF BIDDING

The bidder shall submit following documents

- Detailed technical catalogue in English from the manufacturer of the Item shall be provided along with offer.
- Weights & measures approval certificate.
- Type approval/compliance/examination certificate which conforms to the governing standard
- Datasheets along with sizing calculations.
- Pressure drop calculations.
- Performance curves
- Deviations from technical specification, if any, with proper justification
- Supplies against major orders for Natural gas application (PTR)

15.0 DOCUMENTS TO BE SUBMITTED ALONG WITH DESPATCH OF THE MATERIAL

The bidder shall submit following documents along with the material: (Please refer to Material requisition for exhaustive list)

- Material test certificates for physical properties and chemical composition.
- Calibration certificates. (Hard copy of original with Soft copy (CD) shall be supplied to AGL and a copy of calibration certificate shall be enclosed within packing box of supplied items)



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- Testing reports.
- Catalogue and technical literature of commercial meters in English



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- Operational Manual.
- Dimensional and sectional drawing with material of construction
- Recommended frequency of calibration of the flow meter(s).

16.0 LIST OF THIRD PARTY INSPECTION AGENCIES

Third Party Inspection shall be done by the AGL appointed agencies in India.
For imported materials Third Party Inspection shall be in bidder's scope.

- Lloyd Register
- TUV NORD
- TUV SUD
- DNVGL
- ABS
- Vincotte
- Bureau Veritas (BV)
- Tata Projects Ltd.
- Certification Engineers International Ltd.
- Dalal Mott MacDonald



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**DATA HOSTING AND SERVICES AGREEMENT
FOR 5 YEARS**

**AAVANTIKA GAS LTD CITY GAS
DISTRIBUTION PROJECT IN INDORE GA
AND GWALIOR GA**



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1.0 INTRODUCTION

AAVANTIKA Gas limited (AGL) is supplying Piped Natural Gas (PNG) to Domestic, Commercial and Industrial consumers and Compressed Natural Gas (CNG) to automobiles.

AGL intends to procure Commercial Meters, EVC with inbuilt AMR, Regulators for PNG projects. For Commercial Meters AGL required data hosting and associated services for 5 years as per technical requirements/specification attached with the requisition.

2.0 DEFINITION

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

AGREEMENT	Designates the agreement concluded between the CLIENT and the CONTRACTOR, under which the latter undertakes to the former the GOODS and/or SERVICES according to the stipulations which are agreed and specified in the form of an order.
CLIENT/OWNER/PURCHASER	Designates the purchaser of the GOODS and/or SERVICES, which are the subject of the AGREEMENT.
VENDOR/ BIDDER/ CONTRACTOR / SUPPLIER	Designates the individual or legal entity with whom the order has been concluded by the CLIENT. The term "CONTRACTOR/SUPPLIER" may be used indifferently for a supplier, a manufacturer, an erection CONTRACTOR/SUPPLIER, etc.
DAYS - WEEKS – MONTHS	Specify the number of calendar days, weeks or months and not of working days, weeks or months.
CLIENT'S REPRESENTATIVE	Designated individual or legal entity to which the CLIENT has entrusted various tasks in relation with the carrying out of his PROJECT
GOODS and/or SERVICES	Designate, depending on the case, all or part of the drawings or documents, substances, materials, materiel, equipment, structures, plant,



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tools, machinery, to be studied, designed, manufactured, supplied by the CONTRACTOR/SUPPLIER under the AGREEMENT, including all the studies, tasks, works and services specified by the order. The Terms GOODS or SERVICES may be indifferently used one for the other as required by the context.

PROJECT	Designates the aggregate of GOODS and/or SERVICES to be provided by one or more CONTRACTOR/SUPPLIERS.
CUSTOMER	Party or Individual that engages owner for PNG supply service.
ASSET	Gas meters with AMR (Diaphragm and RPD meters).

3.0 PURPOSE

This document defines the minimum scope for Commercial and Industrial meter reading data hosting in VENDOR's cloud server and associated services for 5 years. The document specifies the terms and conditions which VENDOR shall adhere to during the entire tenure of contract.

4.0 BRIEF SCOPE OF SUPPLY/SERVICES

Following are the minimum scope and responsibilities of the VENDOR in terms of data hosting and the services required by AGL.

1. Grid independent battery packs for powering of EVC/Sensor/Modem.
2. Data transmission by GSM/GPRS.
3. Mode of communication should be one way(SIMPLEX).
4. Data transmission cost includes SIM card and monthly charges.
5. Hardware for server. Server should be OPC compliant. Cloud server is accepted.
6. BIDDER shall commission the gas meters within 5 days after AGL's intimation of completion of meter installation. Commissioning cost to be included in the meter supply cost, data hosting cost, no separate cost is envisaged for commissioning& and data hosting. Installation of the gas meters is in AGL's scope.
7. Configuration of ASSET ID for each meter after commissioning (ASSET ID shall



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- be provided by AGL).
8. BIDDER shall establish and demonstrate the signal communication between gas meters and BIDDER's cloud server to AGL/TPI.
 9. BIDDER shall be responsible for hosting of meter reading data in BIDDER's cloud server for 5 years from the date of FOI.
 10. On billing days i.e., on 1st and 16th of every month, BIDDER has to ensure 100% availability of meter reading.
 11. Maintain hourly logs of gas consumption of each meter i.e., 24 logs per day for each meter, upload to AGL dashboard once in a day and store historical data for at least 6 months in BIDDER's cloud server.
 12. BIDDER to provide data analytics access through dash boards to AGL personnel via secured and encrypted platforms through web services using https protocols.
 13. BIDDER to provide real time alarms to AGL in case of any malfunction/tampering to AGL. The alarm SMS shall be sent to 3 AGL designated phone number and simultaneously email to 3 designated email IDs.
 14. Update any firmware or software required for proper functioning of the complete system is in BIDDER's scope.
 15. Attend to AGL's demands regarding report abnormality or absence and provide justification / rectification against any mismatch or issue raised within prescribed time frame as decided by AGL.
 16. In case of failure of automatic reading collection, reading should be collected manually and submit to AGL on 1st and 16th of every month.

5.0 AMR REQUIRMENTS (IF NOT INBUILT WITH THE EVC)

1. BIDDER should submit the details of hardware such as Make, Model, Approval certificates and catalogues of all the hardware along with the unpriced bid for technical evaluation.
2. AMR system shall be compliant for Zone-1
3. PESO/CCoE Nagpur certification shall be provided.
4. Equipment type approval from concerned authorities like wireless Planning & Co-ordination wing WPC/WEEE/ROHS shall be provided.
5. Area classification as per IEC-79, Zone1, Group IIA/B, T3/T4
6. Site condition: Temperature 0°C to 50°C (Design), Hot humid, Tropical saline environment.



7. Enclosure: IP65 or better.
8. Necessary mounting supports shall be supplied by the Vendor.

6.0 EXCLUSIONS

- a) Installation of the meters. BIDDER's presence is required in the time of installation to verify the location to meet the GPRS signal availability in the site.
- b) Relocation of commercial meter.

7.0 DETAILED SCOPE OF SERVICES

Following are the detailed scope of services to be provided by the BIDDER. Failing to meet these services requirement, BIDDER shall be liable to pay penalties as per the clauses specified in the agreement.

- 1.1. COMMISSIONING: BIDDER shall commission the meters within 5 calendar days post installation intimation of the asset by AGL. BIDDER shall be responsible for providing geo-tagging for the meters installed in the format provided by AGL. BIDDER shall provide a report of the geo-tagged assets within 5 calendar days from the time of installation.

BIDDER shall verify and demonstrate the signal communication between gas meters and the BIDDER's cloud server to AGL/TPI. BIDDER shall also demonstrate the alarms features considered for the situation as mentioned in List of Alarms.
- 1.2. RECOMMISSIONING: There may be some cases where AGL need to relocate the gas meters. In such cases BIDDER to re-commission the meter and update the software/hardware in the system to put the meter in line for gas consumption reading without any cost implications to AGL.
- 1.3. DATA HOSTING: Gas consumption reading and other diagnostic/monitoring data shall be uploaded from AMR system through GPRS to BIDDER's cloud server in real time. BIDDER shall host the meter reading data in the BIDDER's cloud server. BIDDER to maintain the record of historical data for at least 6 months.
- 1.4. READING: BIDDER to upload the meter reading data every day at 6am to AGL's dash-board. BIDDER will be penalized in case failing to upload the reading data complete in all respect and on schedule as per penalty clause mentioned in clause 9.0 PENALTY.



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- 1.5. **REPORT:** BIDDER shall provide facility of viewing and extracting reports according to requirement and in the format desired by AGL through dash boards. BIDDER to support AGL to resolve any issues related in viewing and extracting report and modification of report layout in future as required by AGL without any cost implication.
- 1.6. **ADDITION/DELETION:** The system supplied by BIDDER shall be suitable to add or delete consumers as and when required by AGL. The changes required for addition/deletion in software/system shall be done by the BIDDER. The modification is to be done seamlessly without disturbing the dash-board of AGL.
- 1.7. **CLOUD SERVER:** The meter reading data shall be collected automatically through GPRS module with SIM card installed with each meter supplied by the BIDDER and the reading data shall be hosted in BIDDER's cloud server.
- BIDDER's server shall be subjected to audit conditions as prevailed in ISO 27001. BIDDER shall hire a third-party and shall conduct cloud server audit once in each financial year. Intimation of audit shall be conveyed to AGL to witness the audit. A random audit shall be conducted by AGL once in each financial year; AGL shall provide intimation of such a random audit to BIDDER in advance. A 15 days prior notice will be given to Bidder for this.
- 1.8. **AMR DATA AVAILABILITY:** Scan time of necessary values for AMR should be 1 hour or better.
- Data should be transmitted to centralized server on once in 24 hour basis.
- Data transmission between AMR and remote server shall be encrypted to prevent intruder access.
- Overall data security shall be ensured by BIDDER through suitable encryption to prevent intruder access.
- Number of user ID and password for logging on to server shall be as desired by AGL.
- 1.9. **AMR DATA STORAGE FACILITY:** Data security through password and hardware sealing.
- Parameters and programmed constants shall be stored in memory.
- The stored data should be retrievable by using laptops/centralized system.
- System should be capable to store hourly log, daily log and event logs for one year.
- 1.10. **SOFTWARE/FIRMWARE:** BIDDER shall be responsible to upgrade any software/firmware as and when required for optimum performance of the services without any cost to AGL. BIDDER shall take approval from AGL before performing such activity. Any interface issue arising due to such activity shall be under scope of



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Vendor. The software upgrade shall be seamless and shall not hinder the billing process. System shall be restored within 24 hrs of software or firmware upgrade.

- 1.11. CODE OF CONDUCT: Good conduct shall be maintained by BIDDER's personnel while having any interface with CUSTOMER/OWNER. BIDDER personnel shall always carry OWNER's provided Identification Card and also any Government of India issued ID card (e.g. Adhaar etc.) in support. AGL shall not be liable for any misconduct or mal-practices adventured by BIDDER's personnel during any operation.

8.0 DATA ANALYTICS

BIDDER shall provide the following features of data analytics to OWNER through dashboards.

Number of Concurrent Users of Dashboards	20
Types of Dashboards.	<ol style="list-style-type: none">1. Management dash board,2. Marketing dash board3. Operational team Dashboard
Data Analytics on Management Dash Board.	<ol style="list-style-type: none">1. Hourly consumption.2. Daily report.3. Fortnightly report.4. Monthly report.5. Same report shall be generated as consolidated reports for all customers.
Data Analytics on Marketing Dash Board.	<ol style="list-style-type: none">1. Hourly consumption.2. Daily report.3. Fortnightly report.4. Monthly report.5. Same report shall be generated as consolidated reports for all customers.
Data Analytics on Operation Dash Board.	<ol style="list-style-type: none">1. Hourly consumption.2. Daily report.3. Fortnightly report.4. Monthly report.5. Same report shall be generated as consolidated reports for all customers.



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Parameters required	Following data are required from all meters: <ol style="list-style-type: none">1. Pressure2. Temperature3. Uncorrected volume4. Corrected volume5. Yesterday's corrected volume (6:00AM to 6:00AM)6. Total corrected volume7. Conversion factor8. Time/Date
Reports	<ol style="list-style-type: none">1. Hourly, weekly, monthly reports as per AGL requirement.2. Daily exception report.3. Zero consumption report on daily basis.4. The software shall be capable of generating trends, alarms and graphics.5. Any updation/modification in reports/formats as per AGL requirement should be done by Vendor without any cost implication.
List of Alarms	<ol style="list-style-type: none">1. Any tampering of the gas meters.2. Reverse or back flow3. No flow4. Zero consumption for 5 consecutive days5. Communication failure6. Low battery

9.0 PENALTIES

If BIDDER fails to meet any of the following requirements AGL may levy following penalties on the contractor and deduct penalty amount during release of outstanding CPBG annually.

- 9.1. INR 500 per meter per day in case of delay in commissioning within 5 days of installation intimation by AGL.
- 9.2. INR 5000 penalty per event of server downgraded performance of 12 hrs in a 30-day



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cycle.

- 9.3. The BIDDER has to make 100% reading available on AGL billing days i.e. 1st and 16th of every month. Out of 100% readings, at least 95% readings shall be available through AMR in every AGL billing cycle. In case it is found that the performance level is below the committed levels for every 1% drop in SLA's, then a penalty of INR 500 shall be levied.
- 9.4. In case if meter readings are not available on hourly basis through AMR in AGL dash board. In this case, BIDDER can submit manual readings for maximum two AGL billing cycles to customer. If manual readings are submitted for more than two consecutive cycles for particular customer then a penalty of INR 500 per case per day shall be levied.
- 9.5. In case it is found that wrong readings / data are hosted by the Vendor (due to non-working / malfunctioning of AMR system) then AGL is liable to recover any loss of revenue from the Vendor.
- 9.6. The Vendor must provide 24 logs / day for each meter and upload to AGL dash-board once in a day for any particular customer. In case, the Vendor is unable to upload the data once within a day then a penalty of INR 500 per meter per day shall be levied.
- 9.7. In case of failure to provide real time alarm through SMS and Email consecutively for two instances, a penalty of INR 1000 shall be levied.
- 9.8. If any authorized representative / employee of BIDDER is involved in connivance with the consumers / indulged in mal-practice like deliberately forwarded wrong meter reading or is found to be manipulating the reading of customers or is tampering the software or in PNG meter or any AGL installation, bypassing of meter etc., penalty of INR 10,000 will be levied for each such case along with the criminal case shall be lodged against the Vendor or its representative. The above penalty is over and above the losses to AGL, which is to be recovered from the concern Vendor and legal action will be taken.

10.0 TRAINING

The BIDDER shall be required to hold training session at site as well as in AGL head office for approx. 20 personnel initially and thereafter every year during the contract period to facilitate the operation and to provide hands on training to the dealing staffs. The training shall include installation, programming, trouble shooting and analysis of data.



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The BIDDER shall provide requisite information and hard copies of manuals for reference.

AGL will not reimburse any charges for the training.

11.0 MANPOWER:

All manpower including engineers, technicians etc., associated with the project shall be required to wear protective gears such as safety shoes, helmets, goggles etc.

All manpower deputed at site for installation and commissioning of equipments shall be covered under statutory government compliances of PF, ESI, accident insurance, death, disability etc.

Bidder shall submit organogram towards the project team that shall be deputed for installation and commissioning and proposed location of his choice in Indore for his project office.

After successful commissioning of the project bidder shall provide dedicated team of three engineers in shift A&B and one engineer for shift C (each shift is of 8 hours) for operation and maintenance of the AMR system in AGL. Engineers deployed should be graduate engineers/diploma engineers in electrical/electronics/instrumentation field with minimum experience of 2 years for graduate engineers and 6 years for diploma engineers on similar system.

12.0 LANGUAGE & APPLICABLE LAW

The agreement shall be written in English language unless specified otherwise in the SCC. All correspondence and other documents pertaining to the Agreement which are exchanged by the parties shall be written in the same language. In case, any document/brochure etc. is written in any other language then its English translation shall govern. The CONTRACT shall be governed and interpreted in accordance with laws of India and Courts at Indore shall have exclusive jurisdiction.

QUALITY ASSURANCE PLAN FOR COMMERCIAL METERS

S.No	Components & Operations	Description of Test	Category	Extent of Check	Ref. Doc. & Cl.no.	Acceptance Criteria	Format of Record	Inspection		Remark
								Manufacturer	TPIA	
1	Body & internal parts	Material of Body & Trim	Physical properties/ Chemical composition	1 sample per heat	Approved data sheet	Applicable Material std.	Material test Reports	P	R	
2	Assembly	Dimension-Size,rating,end connection	visual	100%	Approved drwg/doc	Approved drawing/document	Inspection Format	P	R	
		Degree of protection	Test	10%	Approved data sheet	Applicable standard.	Test report	P	R	
		Body Hydro Test	Test	100%	Approved data sheet	No leakage	Test report	P	R/W	At least 10% to be witnessed by TPIA
		Calibration, accuracy	Test	100%	Approved data sheet	Approved data sheet	Test report	P	R/W	At least 10% to be witnessed by TPIA
		Functional test	Test	100%	Approved data sheet	Approved data sheet	Test report	P	R/W	At least 10% to be witnessed by TPIA

LEGENDS: R - Review, W - Witness, P - Perform, TPIA - Third Party Inspection Agency, R/W-Review and witness

- Notes: -
- 1) The above mentioned testing and acceptance criteria are minimum requirements, however, supplier shall ensure that the product also comply to the additional requirements as per technical specifications and data sheets.
 - 2) The supplier shall submit their own detailed QAP prepared on the basis of the above for approval of Owner / Owner's representative and TPIA.
 - 3) TPIA shall have right to inspect minimum 10% of all manufacturing activities on each day or as specified above.
 - 4) TPIA along with Owner / Owner's representative shall review / approve all the documents related to QAP / Quality manuals Drawings etc. submitted by supplier.
 - 5) TPIA shall also review the test certificates submitted by the manufacturer.
 - 6) Supplier shall in coordination with sub vendor shall issue detailed production and inspection schedule indicating the dates and the locations to facilitate Owner / Owner's representative to organize Inspection.
 - 7) Supplier shall submit their own Detailed QAP and meter index format Duly Signed and Stamped.
 - 8) TPIA shall review all the reports 100%.

QUALITY ASSURANCE PLAN FOR COMMERCIAL REGULATORS

S.No	Components & Operations	Description of Test	Category	Extent of Check	Ref. Doc. & Cl.no.	Acceptance Criteria	Format of Record	Inspection		Remark
								Manufacturer	TPIA	
1	Body & internal parts	Material of Body & Trim	Physical Properties/ Chemical composition	1 sample per heat	Approved data sheet	Applicable Material std.	Material test Reports	P	R	
2	Assembly	Dimension-Size,rating,end connection	visual	100%	Approved drwg/doc	Approved drwg/doc	Inspection Format	P	R	
		Degree of protection	Test	10%	Approved data sheet	Applicable standard.	Test report	P	R	
		Body Hydro Test	Test	100%	Approved data sheet	No leakage	Test report	P	R/W	At least 10% to be witnessed by TPIA
		Calibration, accuracy	Test	100%	Approved data sheet	Approved data sheet	Test report	P	R/W	At least 10% to be witnessed by
		Functional test	Test	100%	Approved data sheet	Approved data sheet	Test report	P	R/W	At least 10% to be witnessed by TPIA

LEGENDS: R - Review, W - Witness, P - Perform, TPIA - Third Party Inspection Agency, R/W-Review and Witness

Notes: -

- 1) The above mentioned testing and acceptance criteria are minimum requirements, however, supplier shall ensure that the product also comply to the additional requirements as per technical specifications and data sheets.
- 2) The supplier shall submit their own detailed QAP prepared on the basis of the above for approval of Owner / Owner's representative and TPIA.
- 3) TPIA shall have right to inspect minimum 10% of all manufacturing activities on each day or as specified above.
- 4) TPIA along with Owner / Owner's representative shall review / approve all the documents related to QAP / Quality manuals Drawings etc. submitted by supplier.
- 5) TPIA shall also review the test certificates submitted by the manufacturer.
- 6) Supplier shall in coordination with sub vendor shall issue detailed production and inspection schedule indicating the dates and the locations to facilitate Owner / Owner's representative to organise Inspection.
- 7) Supplier shall submit their own Detailed QAP and regulator tag/nameplate format Duly Signed and Stamped.
- 8) TPIA shall review all the reports 100%.