



CENTRAL UP GAS LIMITED

(CITY GAS PROJECT IN KANPUR & BAREILLY)

**BID DOCUMENT FOR THE PROCUREMENT OF
COMMERCIAL GAS METERS WITH INTEGRATED AMR, DATA
HOSTING AND SERVICES FOR 5 YEARS FOR KANPUR,
UNNAO, BAREILLY & JHANSI**

BID DOCUMENT NO: CUGL/C&P/TEN2122/21,229,004

E-TENDER NO. :50564

LIMITED DOMESTIC COMPETITIVE BIDDING

TECHNICAL DOCUMENTATION

TECHNICAL, VOI - II OF II

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MATERIAL REQUISITION

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1. DESCRIPTION OF GOODS AND / OR SERVICES

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

S.NO	DESCRIPTION	QUANTITY	REMARKS
GROUP A – Diaphragm Gas Meters with AMR/Smart Meter			
1.	Gas Meter, G - 4, 6 m3/hr	20 Nos.	
2.	Gas Meter, G - 6, 10 m3/hr	20 Nos.	
3.	Gas Meter, G - 10, 16 m3/hr	45 Nos.	
4.	Gas Meter, G - 16, 25 m3/hr	15 Nos.	
GROUP B – RPD Gas Meters with EVC and AMR			
1.	Gas Meter, G - 10, 16 m3/hr	1 Nos.	
2.	Gas Meter, G - 16, 25 m3/hr	2 Nos.	
3.	Gas Meter, G - 250, 400 m3/hr	1 Nos.	
4.	Gas Meter, G - 400, 650 m3/hr	1 Nos.	

NOTES:

- Accessories for Meter shall be supplied as specified in the Specifications attached with the material requisition.
- Detail scope of data hosting services shall be as per the attached Service Agreement.
- 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.
- Bidder has to quote full quantity of quoted item mentioned above; partial quotation for the item shall be liable to rejection.

2. REMARKS / COMMENTS

2.1 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.

2.2 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 thereato.

2.3 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.

2.4 Applicable Documents

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

2.5 Supplier’s Documents

Supplier shall supply the documentation as listed under this Material Requisition.

All documents shall be supplied in English language.

3. 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.

4. DOCUMENTS & DATA REQUIREMENTS

1. The table hereunder specifies the quantities & nature of the documents to be submitted by the Supplier to Company
2. The documents required at the inquiry stage to be included in the bid are listed under column A.
3. 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.
4. 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
		Number of copies

1.	Data sheet, technical specifications, catalogue, sizing calculations etc. of the offered model	1
2.	Detail GA Drawing, of the offered model (commercial meter)	1
3.	Pressure drop calculations, pressure drop curve, accuracy/error curve etc.	1
4.	Code compliance certificates	1
5.	Detailed QA/QC program	1
6.	Inspection and test procedures	1
7.	Type approval from weights & measures	1
8.	ATEX approval certificates	1
9.	No deviation certificate	1
10.	Copy of the tender document duly signed and stamped	1

NOTES:

1. Final technical file shall be supplied in hard copy as indicated.
2. The selected Vendor shall provide Calibration certificates of each meter.

**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

ITRON – ITR
RAYCHEM - RAY
INEL – INE

**STANDARD SPECIFICATION
FOR
Commercial Gas Meter with AMR**

ABBREVIATION

AMR	Automatic Meter Reading
ATEX	Atmospheres Explosibles
ANSI	American National Standards Institute
EVC	Electronic Volume Corrector
FAT	Factory acceptance Test
IEC	International Electrotechnical Commission
ISO	International Organization for Standardization
MAOP	Maximum Allowable Operating Pressure
MIU	Meter Interface Unit
NACE	National Association of Corrosion Engineers
NPT	Nominal Pipe Thread
NRV	Non Return Valve
OEM	Original Equipment Manufacturer
PNGRB	Petroleum and Natural Gas Regulatory Board
RF	Radio Frequency
RO	Restriction Orifice
SAT	Site Acceptance Test
SS	Stainless Steel

TPIA Third Party Inspection Agency

WPC Wireless Planning & Coordination Wing

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1.0 SCOPE

This Standard Specification, together with the data sheets attached herewith, establishes the minimum technical and functional requirements for design, engineering, materials, fabrication, painting, inspection and testing, documentation, marking, packing and shipping of gas meters used in commercial and industrial applications in CGD industry.

2.0 DEFINITIONS

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

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.
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 / Supplier.

3.0 REFERENCE DOCUMENTS

3.1 Codes & Standards

The related standards referred to herein and mentioned below shall be of the latest editions prior to the date of the Purchaser's enquiry.

EN 1359 + A1 Latest	Gas Meters - Diaphragm Meters
OIML R137	Gas Meters
ATEX	94/9/EC Directive
EN 12480	Gas meters - Rotary Displacement Gas Meters
AGA Report No.7	Measurement of Natural Gas by Turbine Meters
AGA Report No.8	Compressibility factor of Natural Gas and other related Hydrocarbon gases
ISO 27001	Information security standards
BS 4161	Specification for diaphragm meters of 6 cubic meters
IEC 60529	Degree of Protection Provided by Enclosures (IP Code)
ASME B1.20.1	Pipe Threads, General Purpose (Inch)
ASME B16.5	Pipe Flanges and Flanged Fittings
EN12405-1 + A1	Electronic Volume Calculator
IEC 60529	Degree of Protection Provided by Enclosures (IP Code)
IEC 60079	Electrical apparatus for explosive gas atmospheres
PNGRB T4S	PNGRB Technical Standards and Specifications

3.2 Order of Precedence

In the event of conflict between specifications, data sheets, related standards, codes etc., and the order of precedence shall be as follows:

- a. Material Requisition;
- b. Data sheets;
- c. Job Specifications;
- d. Standard Specifications;
- e. Codes and Standards.

Vendor shall refer the matter to the Purchaser for clarification and only after obtaining the approval in writing, the same should proceed with the manufacture of the items in question.

4.0 DESIGN CRITERIA

4.1 General

All gas meters shall be designed for continuous operation in the given site conditions with the following design criteria:

- Ease of operation and maintenance;
- Suitability for applicable environmental conditions;
- Suitability for operation in the designated classification of hazardous areas;
- State of art proven technology and instrumentation;
- Safety to operating and maintenance personnel;
- Safety to connected equipment;
- High Redundancy with high reliability (high MTBF and low MTTR) and no single point of failure;
- Minimum cost of ownership.

4.2 Environmental Conditions

The equipment considered and the complete installation shall be suitable for continuous operation under the ambient conditions prevailing at site.

4.3 EMC Compliance

All gas meters and accessories shall be immune to Radio Frequency Interference (RFI) and Electro Magnetic Interference (EMI). The design and installation of all electrical / electronic equipment shall meet the RFI/EMI requirements according to IEC 61000, emission (IEC61000-6-4) and immunity (IEC-61000-6-2) requirements for an industrial environment.

4.4 Hazardous Area Certification

Gas meters shall be certified for use in designated areas when installed in hazardous area classified zones as per IEC 60079.

4.5 Ingress Protection

Gas meters shall have ingress protection to IP 54 or better in accordance with IEC 60529.

5.0 TECHNICAL REQUIREMENTS

Gas meters shall be installed at commercial and industrial applications in order to meter the gas consumed by the Customers. Gas meter type shall be decided based on flow capacity, pressure rating and accuracy requirements. These meters shall be designed to operate on clean and dry natural gas.

This document specifies all types of gas meters used for commercial and industrial applications in CGD industry. However, the exact requirement shall be as defined in Material Requisition and Datasheets.

5.1 Diaphragm Meter

Diaphragm meter shall be suitable for measurement of low gas flows in domestic and light commercial metering applications.

Diaphragm meter shall be designed in accordance to EN 1359:1999 + A1 Amendment 2006 or latest and shall be suitable for outdoor / indoor installations, tamper proof and corrosion resistance for a life period of 10 years.

Diaphragm meters fall into the positive displacement category as they have well defined measurement compartments that alternately fill and empty as the meter reciprocates or rotates. The meter will indicate volumetric flow based on the gear ratio, number of revolutions and fixed volume displaced in each meter revolution.

Diaphragm meter shall have an accuracy class of 1.5 and rangeability of 150:1 or better. Pressure drop across the meter shall be less than 2 mbar at Q_{max} .

Ingress protection of meter shall be IP 54 or better.

Material of construction of meter shall be steel with suitable coating on inside and outside for corrosion protection of casing. Diaphragm material shall be polyester fabric coated with rubber for an endurance life cycle of 80,000 cum. Meter shall be in accordance with EN 1359.

Diaphragm meter shall have 8 digit mechanical index (As per EN1359 – Units in m^3). Index shall be provided with sealing arrangement to avoid tampering.

Back-run stop is to be provided to prevent the meter from running backwards in case of tampering or back flow condition. Transmission system shall be tamperproof non- magnetic with transmission rate of $0.01 m^3 / rotation$ for G4 & G6 and $0.10 m^3 / rotation$ for G10 - G25.

Meter shall be provided with a device in the outlet to prevent reverse flow. Over flow protection device (Restriction Orifice) shall be provided at the downstream of meter. Material of construction of restriction orifice shall be PTFE and shall be suitable for natural gas application.

Vendor shall provide brass adaptor with 1" inlet / outlet connection. Washer shall be of PTFE material of construction and provided along with restriction orifice.

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 Vendor is not in line with the end connections mentioned in the data sheets, the Vendor shall supply suitable adaptors to suit the desired end connections. Companion flanges with bolts if supplied shall be enclosed within the meter packing box.

Vendor to provide the type approval certification for meter as per EN 1359 and certification from Weights & Measures Department, India with Model & Make details included. 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. Diaphragm meter shall be provided with Automatic Meter Reading (AMR) and either integral or external Electronic Volume Corrector (EVC). Refer meter and EVC datasheet for exact specifications.

5.2 Thermal Mass Meter

Thermal mass meter shall be suitable for measurement of low gas flows in commercial and light industrial metering applications.

Thermal mass flow meter offers high sensitivity at low flow rates, high reliability due to no moving parts, high accuracy, high turndown ratio and easy installation. However, the suitability of thermal mass flow meter with the fluid measured is to be checked prior to usage of this meter.

Thermal mass flow meter shall be designed in accordance to latest version of OIML R137 and ISO 14511 and shall be suitable for outdoor / indoor installations, tamper proof and corrosion resistance for a life period of 10 years.

Thermal mass flow meter measures gas mass flow directly without need for pressure and temperature correction.

These meters measure the amount of heat transfer between two temperature sensors placed symmetrically in a heated flow sensor. The amount of heat transfer is directly proportional to mass flow rate.

The amount of power in the form of heat to the sensor shall be very low, permitting the use of this technology in natural gas and flammable gas applications.

Thermal mass meter shall have an accuracy class of 1.5 and rangeability of 150:1 or better. Pressure drop across the meter shall be less than 2 mbar at Q_{max} .

Material of construction of meter shall be steel with suitable coating on inside and outside for corrosion protection of casing. Sensor material of construction shall be in accordance with OIML R137.

Ingress protection of meter shall be IP 54 or better. Meter shall be provided with integral LCD digital display.

Thermal mass flow meters shall be tamper proof and shall provide all diagnostic information to end user.

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 Vendor is not in line with the end connections mentioned in the data sheets, the Vendor shall supply suitable adaptors to suit the desired end connections. Companion flanges with bolts if supplied shall be enclosed within the meter packing box.

Vendor to provide the type approval certification for meter as per OIML R137 and certification from Weights & Measures Department, India with Model & Make details included. 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.

Thermal mass meter shall be provided with in-built Automatic Meter Reading (AMR) with encrypted communication capability via all available technologies except RF technology and integral antenna.

Driver software and communication cable is to be submitted with each meter.

Suitable communication protocol adaptor with 2.5 meters of communication cable along with driver software to communicate with Meter compatible for Windows7 and Windows10 based laptops shall be supplied with each meter with USB port.

Meter shall be powered by lithium-ion battery. The life of battery shall be optimum with respect to the performance and communication capability of the meter.

Refer EVC Datasheet for detailed specifications.

5.3 Ultrasonic Meter

Ultrasonic meter shall be suitable for measurement of low gas flows in commercial and light industrial metering applications.

Ultrasonic flow meter offers excellent sensitivity at low flow rates, high reliability due to no moving parts, high accuracy, high turndown ratio and easy installation. However, the suitability of ultrasonic flow meter with the fluid measured is to be checked prior to usage of this meter.

Ultrasonic meter shall be designed in accordance to latest version of OIML R137 and shall be suitable for outdoor / indoor installations, tamper proof and corrosion resistance for a life period of 10 years.

Ultrasonic gas meter shall be based on single path ultrasonic sensors. The meter shall be configurable to provide temperature and fixed factor pressure conversion on the measured gas volume.

Temperature and pressure in line shall be measured by sensors located within the gas meter in order to obtain converted volume. Fixed factor pressure conversion shall not be allowed.

The measuring element shall comprise of a flow tube fitted between an inlet chamber and outlet chamber. One ultrasonic transducer shall be fitted on the upstream and one on the downstream end of the flow tube.

Material of construction of meter casing shall be either steel or die-cast aluminium with suitable coating on inside and outside for corrosion protection of casing. Sensor material of construction shall be in accordance with OIML R137.

Ingress protection of meter shall be IP 54 or better. Meter shall be provided with integral LCD digital display.

Ultrasonic flow meters shall be tamper proof and shall provide all diagnostic information to end user.

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 Vendor is not in line with the end connections mentioned in the data sheets, the Vendor shall supply suitable adaptors to suit the desired end connections. Companion flanges with bolts if supplied shall be enclosed within the meter packing box.

Meter shall be powered by lithium-ion battery. The life of battery shall be optimum with respect to the metrological performance of the meter.

Vendor to provide the type approval certification for meter as per OIML R137 and certification from Weights & Measures Department, India with Model & Make details included. 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.

The gas meter shall provide a pulse output interface to external monitoring device such as automatic meter reading unit to transmit gas volume flow rate information.

Ultrasonic meter shall have provision to integrate with Automatic Meter Reading (AMR) and either integral or external Electronic Volume Corrector (EVC), with encrypted communication capability via various communication options.

Driver software and communication cable is to be submitted with each meter.

Suitable communication protocol adaptor with 2.5 meters of communication cable along with driver software to communicate with Meter compatible for Windows7 and Windows10 based laptops shall be supplied with each meter with USB port.

AMR and EVC shall be powered by lithium-ion battery. The life of battery shall be optimum with respect to the performance and communication capability of the AMR.

Refer EVC Datasheet for detailed specifications.

5.4 RPD Meter

The in line Positive Displacement Meters (PD meters) with its associated systems shall be designed for natural gas flow measurement required for both custody transfer and non-custody transfer applications. And it shall be field proven and no prototype shall be offered.

RPD meter shall be designed in accordance to EN 12480 or latest and shall be suitable for outdoor / indoor installations, tamper proof and corrosion resistance for a life period of 10 years.

Positive Displacement flow meters measure the volume or flow rate of a moving fluid or gas by dividing the media into fixed, metered volumes. These devices consist of a chamber that obstructs the media flow and a rotating or reciprocating mechanism that allows the passage of fixed-volume amounts. The number of parcels that pass through the chamber determines the media volume. The rate of revolution or reciprocation determines the flow rate.

There are two basic types of positive displacement flow meters. Sensor-only systems or transducers are switch-like devices that provide outputs for processors, controllers, or data acquisition systems. Complete sensor systems provide additional capabilities such as an integral display and/or user interface. For both types of positive displacement flow meters, performance specifications include operating pressure, temperature range, maximum material density, connection size, and percent accuracy. Suppliers shall indicate whether devices are designed to move fluid or gas.

RPD meter shall have an accuracy of +/- 2 % in Q_{min} to $0.1 Q_{max}$ and +/-1 % in $0.1Q_{max}$ to Q_{max} . Rangeability shall be 100:1 or better.

Material of construction of meter casing shall be either steel or die-cast aluminium with suitable coating on inside and outside for corrosion protection of casing. Meters

internal parts material of construction shall be SS/ aluminium alloy. RPD meter shall be tamper proof. Ingress protection of meter shall be IP 65 or better.

There are several metering technologies for Positive Displacement Flow Meters. Gear meters have two rotating gears with synchronized, close-fitting teeth. Oval, spur and helical gears are often used because shaft rotation can be monitored to obtain specific flow rates.

Typically, the frequency is proportional to the material velocity. Nutating disc meters use media pressure to rock a disc in a circulating path without causing the disc to rotate about its own axis. A pin that extends from the disc is connected to a counter that monitors the disc's rocking motions. Meters that measure incremental volumes of flow with a piston are also available.

The straight length (if required) of calibrated pipe forming the upstream and downstream parts of the meter tubes shall be cut from one piece of pipe without any intermediate girth weld.

Meters shall be marked with the direction of the flow on the meter and the marking shall be clearly visible.

The meters design shall also ensure protection against damage due to hydraulic shock which may be caused by quick opening / closing of upstream / downstream valves.

Temperature and pressure in line shall be measured by sensors located within the meter in order to obtain converted volume. Meter shall be provided with temperature tapping (1 No.) with SS316 Thermowell of size 1/4 "NPTF and suitable fittings to fix the RTD. Bore diameter of thermowell shall be suitable for 6 mm RTD probe insertion. Pressure sensor tapping (1 No.) shall be 1/4 "NPTF.

Meter shall be provided with non-return valve (NRV) and restriction orifice (RO) in order to prevent reverse rotation and meter over run. Pressure drop across NRV, RO and meter shall be calculated by Vendor. Over flow protection shall be 20% of maximum flow.

Vendor to provide the type approval certification for meter as per OIML R137 and certification from Weights & Measures Department, India with Model & Make details included. 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.

RPD meter shall provide a pulse output interface to external monitoring device such as automatic meter reading unit to transmit gas volume flow rate information.

RPD meter shall have provision to integrate with Automatic Meter Reading (AMR) and either integral or external Electronic Volume Corrector (EVC), with encrypted communication capability via various communication options.

Driver software and communication cable is to be submitted with each meter.

Suitable communication protocol adaptor with 2.5 meters of communication cable along with driver software to communicate with Meter compatible for Windows7 and Windows10 based laptops shall be supplied with each meter with USB port.

AMR and EVC shall be powered by lithium-ion battery. The life of battery shall be optimum with respect to the performance and communication capability of the AMR.

Refer EVC Datasheet for detailed specifications.

5.4.1 Non Return Valve and Restriction Orifice

Non return valve (NRV) shall be swing type check valve and shall be provided downstream of RPD meter in order to prevent meter reverse rotation. Check valve shall be suitable for natural gas application.

Check valve size, pressure rating and end connections shall be in accordance with the meter supplied. Valve accessories such as carbon steel companion flanges and spare gaskets shall be provided by Vendor.

Maximum allowable pressure drop across the valve shall be 50 mbar.

Material of construction (MOC) of body, cover and hinge shall be ASTM A216 Gr.WCB or equivalent. MOC of disc, seat and hinge pin shall be Alloy 20/ SS316 and gasket shall be PTFE.

Restriction orifice (RO) shall be provided between meter and NRV in order to prevent meter over run. Material of construction (MOC) of RO shall be SS 316.

5.5 Automatic Meter Reading and Electronic Volume Corrector (EVC)

The AMR system of each meter shall be supplied with integral / external EVC, all available technologies except RF technology 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.

Electronic Volume Corrector (EVC) with built-in pressure and temperature sensors shall be used to convert measured gas volume from operating conditions to reference pressure and temperature conditions.

Electronic Volume Corrector (EVC) with integral battery, modem and data logging capability shall be provided with gas meter.

Vendor shall supply the EVC installed on the suitable mounting frame / arrangement as per CUGL site requirements. Pressure inputs shall be connected using suitable SS tube fitting and the other end of the tubing will be terminated in a 2-way manifold valve.

Driver software and communication cable is to be submitted with each meter.

Suitable communication protocol adaptor with 2.5 meters of communication cable along with driver software to communicate with Meter compatible for Windows7 and Windows10 based laptops shall be supplied with each meter with USB port.

Bidder to ensure compatibility of gas meter, EVC and modem and their performance shall be demonstrated in presence of Client.

Gas meters along with EVC & Modem shall be commissioned in presence of meter supplier service engineer only. Bidder shall ensure his presence at time of commissioning and shall include all cost in their rates. Bidder will ensure presence of their representative for technical assistance during commissioning of skid and no extra cost will be payable to Bidder.

Bidder shall supply software for remote data monitoring through GSM modem. The software shall be installed in CUGLoffice / control room and actual performance of

software for remote data monitoring shall be carried out by Bidder. All necessary arrangement required to perform software operation shall be done by Bidder at no extra cost.

The SIM cards shall be supplied by the Bidder providing service for five years. Monthly charges of the SIM shall be included in supply.

For Data Hosting details, refer attached “Data Hosting and Service Agreement”. Refer EVC data sheet for detail requirements of volume correction.

5.6 Materials

All the wetted parts including actuating mechanism shall be suitable for the fluid being handled. Material of construction of meter casing shall be either steel or die-cast aluminium with suitable coating on inside and outside for corrosion protection of casing in line with the applicable governing standards.

In case of diaphragm meters, diaphragm material shall be polyester fabric coated with rubber for an endurance life cycle of 80,000 cum. Other Internal parts shall be non – metallic to prevent from tampering like magnet.

Vendor shall use suitable material parts, provide proper surface finish, hardness and clearances, wherever possibilities of galling exists.

For corrosion service, the material selected shall be in compliance with the requirements of NACE MR-0175 / ISO-15156 latest editions.

5.7 Name plate

Each gas meter shall be marked in legible characters, which are permanently visible in accordance with BS EN 1359 / OIML R137 or latest:

- a. Type approval mark and number;
- b. Manufacturer’s name and Identification Mark;
- c. Serial Number, Model Name and Model Number;
- d. Flow Rate – Max (Qmax) & Min (Qmin) - (m³/h);
- e. Maximum Working Pressure pmax (bar);
- f. Flow Direction;
- g. Nominal value of the cyclic volume, V (dm³);
- h. Number and date of EN Standard;
- i. Ambient temperature range (°C);
- j. Gas temperature range (°C);
- k. Accuracy class of the meter, e.g. Class 1.5;
- l. Month & Year of Manufacture.

Type approval number shall be issued by Department of Legal Metrology (W&M) (Government of India). ATEX Marking shall be as per directive 94/9/EC on the electrical / electronic device or module certified.

Owner unique serial number shall be marked on the meter as per the standard procedure followed by Owner, which will be communicated to the successful bidder.

6.0 FABRICATION AND PAINTING

Vendor shall obtain approval in writing from the Purchaser before start of fabrication of diaphragm meter. Vendor shall submit the required Specification, drawings & documents for approval. Also Vendor shall refer the relevant codes and standards for manufacturing herein.

Painting shall be such that there is no rust formation on the Meter when exposed continuously to the corrosive atmosphere. All carbon steel bolting shall be hot dip galvanized or cadmium plated and bi-chromated.

Aluminum components shall be anodized then coated with epoxy paint.

The Supplier's painting standard will be considered as an alternative offer provided it meets or exceeds the preceding requirements.

7.0 INSPECTION AND TESTING

Vendor shall perform all inspection and testing as per project specification requirements and as per relevant codes, prior to shipment. The inspection and testing for diaphragm meters shall be carried out as per approved Inspection and Test Plan (ITP).

Vendor shall submit the Inspection and Testing Plan for proprietary items / special items for approval. Vendor shall submit the test certificates to the Company for the tests conducted during the manufacturing process hazardous area certification test and calibration test.

For any control, test or examination required under the supervision of TPIA / Owner / Owner's representative later shall be informed in writing one (1) week in advance by vendor about inspection date and place along with production schedule.

The Supplier shall provide calibration certificate and accuracy at MAOP of the diaphragm meter for the following flow rates:

Q_{MIN}

$0.1Q_{MAX}$

Q_{MAX}

Owner will provide Third Party Inspection Agency to perform inspection work for location in India only. For foreign country inspection, supplier shall hire own approved third party for inspection and submit the inspection reports to owner for approval. This agency shall inspect all the equipment/material and issue all inspection certificates/reports as per specifications and codes.

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, accuracy test report for individual meter, as per technical specification and specified code for 100% material, at the time of final inspection of each supply lot of material.

Vendor to provide calibration certificates for review of 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.

All meters shall be sealed properly by the Manufacturer after final inspection clearance and before dispatch. Meters found in an unsealed condition shall not be accepted.

If the performance of any of the sample meter is not in compliance with the acceptance norms of the respective standards then that the lot of respective item will be rejected.

Vendor should follow the QAP provided in this tender and in line with applicable standards mentioned in the datasheet.

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

7.1 Visual Inspection

A visual inspection and physical check shall be made for compliance of the material with requirements of the specifications of the original Purchase Order and all subsequent change orders including the relevant attachments and with Manufacturer's catalogue description and certified drawings furnished. Included are:

- a. Check for satisfactory workmanship, materials compliance and freedom from surface defects and broken glass;
- b. Check for compliance with certified drawings including dimensions;
- c. Check for all accessories on Purchase Order;
- d. Check for required cable length, if any
- e. Check paint for imperfections.

Verify that each component has a tag of corrosion resistant material permanently fastened to the unit and stamped with information. Verify that all terminals for interconnecting wiring between units are accessible for connecting and checking. Terminal blocks should be numbered and where 2 or more are present, should have block identification. Interconnecting cables shall be colour coded or numbered.

All electrical wiring shall be checked for continuity and insulation test.

7.2 Functional Testing

Each gas meter shall be accurately calibrated and tested by the Manufacturer at the normal working conditions specified in the attached data sheet. All test equipment used for testing shall have traceability to national standards.

7.3 Installation, Testing & Commissioning

The Supplier shall assist during erection, testing and commissioning of gas meters at site. The bidders shall indicate separate pricing for this purpose in their offers, if applicable.

7.4 Guarantee / Warranty

Vendor shall guarantee that the complete scope of supply shall be safely and reliably meet all of the requirements of this Company Specification.

Generally the Vendor shall provide warranty support for a period of 12 months from the date of supply or 18 months from the date of manufacturing. Warranty shall apply to defective material workmanship and facility design. The cost of correction / replacement of any warranty items shall be borne by the Vendor.

The job specifications / data sheets shall be referred for any specific warranty / guarantee.

8.0 MARKING, PACKING AND SHIPMENT

Vendor responsible for gas meter and its accessories shall ensure that all equipment, associated materials and accessories are designed properly packed, and secured for transit to site without damage.

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 item 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.

Vendor shall provide and submit his standard "Marking, Packing and Shipping Procedures" for review by Client.

Vendor shall specify any conditions, normal or special, to be verified in intermediate storage and during transport.

Equipment shall be suitably packed including any dismantling, transit fastening and bracing necessary to prevent distortion or damage during transit.

Adequate protection shall be provided to prevent mechanical damage and atmospheric corrosion in transit and at the job site.

Preparation for shipment and packing will be subject to inspection and rejection by Company's inspectors. All costs occasioned by such rejection shall be to account of the Vendor.

9.0 SPARES AND ACCESSORIES

The following spare philosophy shall be followed in case it is not covered in Job Specification.

The Vendor shall include with the bid, recommended spare parts list for start-up, pre-commissioning and two year operation as per following:

- a. Itemized recommended spare parts list for start-up and pre-commissioning;
- b. Itemized recommended spare parts list for two years operation.

In case of RPD meters, spare gaskets for meter, NRV and RO installation shall be provided by Vendor.

In case of RPD meters, lubricating oil (500 ml) along with feeding accessories shall be supplied with each meter.

Vendor shall submit recommended accessories and special tools required for operation and maintenance of gas meters for Company's review.

All the spare parts furnished by Vendor shall be wrapped and packaged to preserve an original as-new condition under normal conditions of storage. The same parts shall be properly tagged with stainless steel tags and coded so that later identification as to their intended equipment usage shall be clear.

All items supplied shall be packaged separately and clearly marked as "Spare Parts" and shipped with the equipment.

10.0 DOCUMENTATION

The following documentation requirements shall be fulfilled by the Vendor at various stages of bidding and execution of order.

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.

Documentation provided by Vendor shall be in English language only.

Client and/or Client's representative approval shall always be given in writing.

10.1 Documentation Required with Technical Bid

During bidding stage, Vendor shall submit in his offer the following documents as a minimum:

- a. Specification, Data Sheets along with sizing calculations;
- b. Bill of Materials including Vendor List, Details for third party items;
- c. Catalogues and manuals;
- d. Quality Assurance Plan;
- e. Weights & Measures Approval Certificate;
- f. Type approval / Compliance / Examination Certificate confirming to the governing standard;
- g. Pressure Drop Calculations;
- h. Performance Curves;
- i. Deviations from technical specification, if any, with proper justification;
- j. Supplies against major orders for natural gas application (PTR).

The Vendor shall provide at the time of tendering a complete detailed engineering package in accordance with the Purchaser's data requirement and shall include but not necessarily be limited to the same.

10.2 Documentation Required for Approval

Upon placement of Purchase Order, Vendor shall submit as a minimum the following drawings, documents and specifications for the Company's approval:

- a. Datasheets of meters and all accessories supplied;
- b. Bill of materials including Vendor list, details for third party items;
- c. Catalogue and Technical literature of commercial meters in English;
- d. Weights & Measures Approval Certificate;
- e. Type approval / Compliance / Examination Certificate confirming to the governing standard;
- f. Installation, Operation and Maintenance Manual;

- g. Sizing Calculations;
- h. Assembly drawings with overall dimensions;
- i. Detailed sectional drawings showing all parts with reference numbers and material specifications of meters and all accessories supplied;
- j. Welding, heat treatment, inspection and testing procedures;
- k. Painting Specification;
- l. Calibration Certificates;
- m. Material Test Certificates;
- n. Quality Assurance Plan;
- o. Any other documents.

Upon approval and completion of testing, full set of above documentation shall be submitted to Client in 2 sets of hardcopy format and soft copy (PDFs) format.

AMR			Rev.	
General	1	Meter Type	Gas Meters	
	2	Quantity	Refer Table below	
	3	Service	Natural Gas	
	4	Governing Standard	EN 1359:2000 (or latest) / OIML R137-2/ EN12480:2015 / AGA9	1
	5	Approval	Type approval certificate as per Governing Standard	
	6	Installation	Suitable for outdoor / indoor installations, tamper proof and corrosion	
	7	Environment Protection	Mechanical Environment M2 & Electronic Environment E2	
	8			
Process Condition	9	Flow (Min / Max)	Refer Table below	
	10	Accuracy Class	Class 1.5	
	11	Accuracy	$\pm 3\%$ (Qmin to 0.1Qmax) and $\pm 1.5\%$ (0.1Qmax to Qmax)	
	12	Rangeability	150:1 or better	
	13	Cyclic Volume	Minimum*	
	14	Operating Pressure	500 mbar	1
	15	Pressure Drop	Refer Note- 4	1
	16	Operating Temperature	-10° to 55°C	
	17			
	18			
Flow Meter	19	Meter Capacity	Refer table below	
	20	Body Casing	Steel/Cast Aluminum Alloy with suitable coating on inside and outside for corrosion protection	1
	21	Corrosion Protection	Suitable coating on inside and outside of casing	
	22	End Connections	Threaded *	
	23	Centre to Centre Distance	Refer Table below	
	24	Ingress Protection	IP-54 or better	
	25	Sensor MOC	For Diaphragm Meter : Polyester fabric coated with rubber for an endurance life cycle of 80,000 cum. For other type of Meter : MOC as per OIML R137	
	26	Other Internal Parts	All meter internals shall be non – metallic to prevent from tampering like magnet.	
	27	Back-run Stop	Required to prevent the meter from running backwards in case of tampering or back flow condition.	
	28	Transmission Rate	For Diaphragm Meter: 0.01 m ³ / rotation for G4 & G6 and 0.10 m ³ / rotation for G10-G25. For other types of Meter : Vendor to specify.	
	29	Transmission System	Tamperproof	
	30	Max. Index Reading	8 Digit index with auto reset facility	
	31	Unit of Measurement	M3 (Cubic Meter) at standard conditions (Pressure= 101.325 kPa & Temperature= 15 °C)	2
	32	Ingress Protection	IP-54 or better	
	33			
	34			
	35	Volume Correction	Volume correction through External / Internal EVC.	

	36	Cables & Connectors	Vendor shall provide cables (2-5 Meter length) along with cable			
	37	Operating / Design Temperature	0° to 45°C / 60°C			
	38	Ingress Protection	IP-65 or better			
	39	Communication between MIU and Remote Server	The meters quoted should be supplied with AMR solution along with any technology module except RF technology for uploading the meter data into cloud server. Geo-tagging accurate up to 5 decimal points to be configured for all the meters.			1
	40	Input Pulse Characteristic	Refer EVC data sheet for detail requirements			
	41	Power Supply				
	42	MIU Memory Capacity				
	43	Protocol				
	44	Transmission / Radiated Power				
	45					
	46					
Misc.	47	Reverse Flow Restriction	Meter shall be provided with a device in the outlet to prevent reverse flow.			
	48	Over-flow Protection Device	For Diaphragm Meter : Restriction Orifice (RO) required at downstream of meter. For other types of Meter : Vendor to specify.			
S No.	Meter Capacity		End Connections *	C-C Distance *	Min / Max. Flow (At Actual Conditions)	
1	G-4		DN 20 / 3/4" NPT	110±2 mm	0.04 / 6.0 m ³ /hr	
2	G-6		DN 20 / 3/4" NPT	250±2 mm	0.06 / 10.0 m ³ /hr	
3	G-10		DN 20 / 3/4" NPT	250±2 mm	0.10 / 16.0 m ³ /hr	
4	G-16		DN 20 / 3/4" NPT	280±2 mm	0.16 / 25.0 m ³ /hr	

1	Vendor to specify. *	
2	Type Approval Certificate and Weights & Measures Certificate along with Model & Make information shall be provided for meters supplied.	
3	Calibration certificate (original + soft copy) shall be provided to CUGL. One copy of the certificate shall be provided within the packing box of each meter.	
4	The following accessories to be provided: 1. For RPD type meter, the following accessories to be provided: conical filter, NRV, RO, companion flanges and bolts, lubricating oil (500 ml) with feeding accessories. 2. For thermal type meters, the following accessories to be provided: strainer, NRV, RO. 3. For diaphragm type meter, the following accessories to be provided: strainer, NRV, RO. 4. For ultrasonic type meter, the following accessories to be provided: strainer, NRV, RO. Pressure drop across complete meter assembly consisting of meter, NRV, RO, strainer, conical filter shall be less than 25 mbar. Overflow protection shall be 120% of max. flow.	1
5	Meters except RPD meter shall be provided with brass adaptors with free loose nut & PTFE washer (2mm) for converting the port size to 1" NPTM for inlet / outlet end connection. Spare washer (5 pairs) shall be provided with each meter For RPD meters end connections & material (MOC) Datasheet of Group B & Group C to be followed respectively.	
6	Vendor to provide detailed GAD, technical catalogue of meter supplied along with datasheet.	1
7	For meter supplied with external EVC: - Flow meter output shall be 1LF(Low frequency) pulse which is mandatory, second output can be either LF or HF(High frequency) and additional 1AT (anti tampering); - Pulse generators shall be provided with means of plugging and sealing arrangement against unauthorized interference. - Meters shall be provided with temperature and pressure readings to obtain corrected volume. Meters shall have temperature and pressure tapings on the meter body.	1
8	Suitable adaptors or spool pieces shall be provided to meet above specified dimensions.	1
	REV.	
	DATE	
	PRPD	
	CHKD	
	APPD	
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Group B - DATASHEET for RPD FLOW METER with AMR AND EVC

Rev .

General	1	Meter Type		Rotary Positive Displacement		
	2	Quantity		Refer Table below		
	3	Line No.	Line Size & Schedule	N/A		
	4	P&ID Number		N/A		
	5	Service		Natural Gas		
	6	Governing Standard		EN 12480 or Latest		
	7	Area Classification		Zone 1 Group IIA /IIB, T3		
	8	Installation	Orientation	Indoor / Outdoor	Horizontal / Vertical	
	9					
Process Conditions	10	Fluid and State		Natural gas		
	11	Max.Flow		Refer Table below		
	12	Operating Temperature		-10° to 55°C		
	13	Max. Operating Pressure		4 bar		
	14	Design Pressure		1.5 times Max. Operating Pressure		
	15	Molecular Wt.		*		
	16	Max. Allowable Pressure Drop		As per EN 12480 or Latest		
	17					
Flow Meter	18	End Connection	Type	Flanged *		
	19		Size and Rating	Refer Table below		
	20		Facing & Finish	*		
	21	Pulses / M3		LF & HF*		
	22	Flow Range		Refer Table below		
	23	Enclosure protection		Weather proof IP-65 as per IEC 60529		
	24	Cable Entry		*		
	25	Material	Body	Cast Aluminium Alloy		
	26		End Connections	ASTM A 105 Flanged or equivalent		
	27		Impeller & Shaft	High Grade alloy steel with Synthetic Elastomers		
	28		Meter Internals	Non-corrosive tested low noise, friction less, endurance for 20 years life and external tamper proof		
	29	Accuracy		+/- 2% (Qmin to 0.1Qmax) and +/-1% (0.1Qmax to Qmax)		
	30	Rangeability		1:100 or better		
	31					
	32	Type - 2 wire/ 3 wire		2 wire		
	33	Pre-amplifier location		Field		
	34	Power supply		24 VDC loop powered from flow computer		
	35	Cable Entry		1/2" NPT(F)		
	36	Enclosure		Weather proof IP-65 as per IEC 60529		
	37	Intrinsic safe		Ex'i'		
38	Mounting	Accessories	Integral with RPD flow meter	Required		
39	Power supply	Cable Entry	24 VDC loop powered from flow computer			
40	Output		1 LF, 1 LF/HF and 1 AT (Anti Tampering)			

	41	Enclosure	Weather proof IP-65 as per IEC 60529		
	42	Intrinsic safe	Ex'i'		
	43	Mounting	Integral with RPD flow meter		
Options	44	NRV	Required, 1 No.; MOC: WCB body and Alloy 20/SS 316 internals		
	45	Restriction Orifice	Required, 2 Nos.; MOC: SS316		
	46	Strainer	Size and Mesh	Required, 1 No.; Manufacturer Standard	
	47	Companion Flanges	Gaskets	Required; MOC: CS; WNRF; with bolts	Required, 2 Nos + 2 Nos spare
	48	Index	Required 8 Digit, Mechanical, non- resettable counter, Rotatable		
	49	Temperature Tap on Meter Body	Required, 1/4" NPT, Thermowell SS 316, RTD 6mm probe		
	50	Pressure Tap on Meter Body	Required, 1/4" NPT		
	51	Lubricator with accessories	Required		
	52	Radiography	100 % required for all welded joints		
	53				
	Misc	54	Make	*	
55		Model No.	*		
S No.	Meter Type		Size / Rating*	F-F Distance* (mm)	Max. Flow (At Actual Conditions)
1	G-10		2"/ 150#	171	16 m3 / hr
2	G-16		2"/ 150#	171	25 m3 / hr
3	G-25		2"/ 150#	171	40 m3 / hr
4	G-40		2"/ 150#	171	65 m3 / hr
5	G-65		2"/ 150#	171	100 m3 / hr
6	G-160		2"/ 150#	241	250 m3 / hr
7	G-250		2"/ 150#	241	400 m3 / hr
8	G-400		2"/ 150#	241	650 m3 / hr

Notes:						
1	Vendor to specify. *					
2	Vendor shall provide detailed GA drawing along with all parts name and MOC for the RPD meter along with data sheet.					
3	In addition to first fill, lubricating oil (500 ml) along with feeding accessories shall be supplied with each meter.					
4	Suitable adaptors or spool pieces shall be provided to meet above specified dimensions. Companion flanges shall be provided at each end.					
5	Type Approval Certificate and Weights & Measures Certificate along with Model & Make information shall be provided for meters supplied.					
6	Calibration certificate (original + soft copy) shall be provided to CUGL. One copy of the certificate shall be provided within the packing box of each meter.					
7	Pulse generators shall be provided with means of plugging and sealing arrangement against unauthorized interference.					
8	Meter casing shall be tamperproof, corrosion resistant suitable for indoor / outdoor installation.					
9	For RPD type meter, the following accessories to be provided: conical filter, NRV, RO, companion flanges and bolts. Pressure drop across complete meter assembly consisting of meter, NRV, RO and strainer shall be calculated and provided. Overflow protection shall be 120% of max. flow.					
		2	12.06.19	AB	VB	KNC
	PROJECT: SUPPLY OF COMMERCIAL GAS METERS	REV.	DATE	PRPD	VB	APPD
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DATA SHEEL FOR ELECTRIC VOLUME CORRECTOR				Rev.
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.: 0 - 55 degC, Hot, Humid, tropical, Saline environment		
4	Governing Standard	EN 12405-1+A1 or Latest	1	
5	Approval	Type Approval Certificate as per Governing Standard		
6	Area Classification	Zone 1 Group IIA /IIB T3 Ex 'd'		
7	Enclosure Protection	IP 65		
8	Quantity	As applicable	1	
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.		
10	Accuracy	Typical accuracy better than $\pm 0.5\%$ as per governing standard	1	
11				
12	Input	1.EVC input shall be either LF/ HF pulse		
13		2.Temperature signal form RTD measured value PT100/1000.All interconnecting cable shall be screened and armoured		
14		3.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 line LCD with 16 characters / 1 Line LCD with 8 characters	
24	Power Supply (Note 5)	Lithium battery along with mounting hardware.	
25	Calculations / Corrections	Compressibility : AGA8 (Detail method), NX-18,S-GERG	
26	Features	Built in diagnostics to detect proper functioning	
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.	
31		EVC can store hourly data for 60 days	1
32		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		Identification	Unique Addressing Facility
35	Communication Ports	1. RS 232/ 485 serial port for SCADA facility (configurable up to 9600 bps) along with required connector, convertor and cable for USB output.	1
36	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	
37	Automatic Meter Reading (AMR)	Required, In built AMR with compatible technology for Data transmission	
38	Mounting Accessories	Required	
39	Fittings	1. Pressure sensor : 1/4"NPTM 2. Temperature Sensor : 1/4" NPTM (RTD Diameter Max.6mm)	

	40	Cable Entry	1/2" NPTF		
	41	Canopy	Prefabricated FRP canopy with required installation accessories		
	42	Communication Cable	Required, 2.5 mtrs length		
	43				
	44	Make	*		
	45	Model	*		
Notes:					
	1	Vendor to specify. *			
	2	EVC shall be certified for type test 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 CUGL. 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 not less than 5 years if replaceable if not replaceable battery life shall be 10 years. Battery capacity shall be sufficient for 24 hr. continuous operation with all the equipment powered.			1
	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.			

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DATA HOSTING AND SERVICES AGREEMENT FOR 5 YEARS

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1. INTRODUCTION

Central U.P Gas limited (CUGL) is supplying Piped Natural Gas (PNG) to Domestic, Commercial and Industrial consumers and Compressed Natural Gas (CNG) to automobiles in Kanpur, Bareilly and Jhansi.

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

2. GENERAL

2.1 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 – Week - Month	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 Service	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 by 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 / Supplier.
Owner / Customer	Party or Individual that engages owner for PNG supply service.

3. 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. 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 CUGL:

1. Grid independent battery packs for powering of EVC / Sensor/Modem;
2. All available technologies shall be used for data transmission except for RF technology;
3. Mode of communication shall be one way;
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 CUGL'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 CUGL's scope;
7. Configuration of Asset ID for each meter after commissioning (Asset ID shall be provided by CUGL);
8. Bidder shall establish and demonstrate the signal communication between gas meters and Bidder's cloud server to CUGL
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 and storing of historical data for at least 6 months in Bidder's cloud server;

12. Bidder to provide data analytics access through dash boards to CUGL personnel via secured and encrypted platforms through web services using https protocols;
13. Bidder to provide real time alarms to CUGL in case of any malfunction / tampering to CUGL. The alarm SMS shall be sent to 3 CUGL 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 Owner's demands regarding report abnormality or absence and provide justification / rectification against any mismatch or issue raised within prescribed time frame;
16. In case of failure of automatic reading collection, reading should be collected manually and submit to CUGL on 1st and 16th of every month;

5. AMR REQUIREMENTS (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. 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. Commissioning: Bidder shall commission the meters within 5 calendar days post installation intimation of the asset by CUGL. Bidder shall be responsible for providing geo-tagging for the meters installed in the format provided by CUGL. 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 CUGL. Bidder shall also demonstrate the alarms features considered for the situation as listed below.

2. Re-commissioning: There may be some cases where CUGL 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.
3. Data Hosting: Gas consumption reading and other diagnostic / monitoring data shall be uploaded from AMR system though all available technologies except RF technology 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.
4. Reading: Bidder to upload the meter reading data every day at 6 AM to CUGL's billing system. Bidder will be penalized in case failing to upload the reading data complete in all respect and on schedule as per penalty clause.
5. Report: Bidder shall provide facility of viewing and extracting reports according to requirement and in the format desired by CUGL through dash boards. Bidder to support CUGL to resolve any issues related in viewing and extracting report and modification of report layout in future as required by CUGL without any cost implication.
6. Addition / Deletion: The system supplied by Bidder shall be suitable to add or delete consumers as and when required by CUGL. 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 billing system of CUGL.

7. Cloud Server: The meter reading data shall be collected automatically through all available technologies except RF technology installed with each meter supplied by the Bidder and the reading data shall be hosted in Bidder's cloud server.
8. 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 CUGL to witness the audit. A random audit shall be conducted by CUGL once in each financial year; CUGL shall provide intimation of such a random audit to Bidder in advance.
9. AMR Data Availability: Scan time of necessary values for AMR should be 1 hour or better.
10. Data should be transmitted to centralised server on once in 24 hour basis.
11. Data transmission between AMR and remote server shall be encrypted to prevent intruder access.
12. Overall data security shall be ensured by Bidder through suitable encryption to prevent intruder access.
13. Number of user ID and password for logging on to server shall be as desired by CUGL.
14. AMR Data Storage Facility: Data security through password and hardware sealing.
15. Parameters and programmed constants shall be stored in memory.
16. The stored data should be retrievable by using laptops / centralized system.
17. System should be capable to store hourly log, daily log and event logs for one year.
18. 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 CUGL. Bidder shall take approval from CUGL before performing such activity. Any interface issue arising due to such activity shall be under scope of 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.
19. 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. Owner shall not be liable for any misconduct or mal-practices adventured by Bidder's personnel during any operation.

7. DATA ANALYTICS

Bidder shall provide the following features of data analytics to Owner through dashboards.

Number of Concurrent Users of Dashboards	10
Types of Dashboards.	1. Management dash board; 2. Marketing dash board; 3. Operational team Dashboard.

Data Analytics on
Management Dash Board.

1. Hourly consumption;
2. Daily report;
3. Fortnightly report;
4. Monthly report;
5. Same report shall be generated as consolidated reports for all

DATA HOSTING AND SERVICE AGREEMENT

	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.
Parameters required	<p>Following data are required from all meters:</p> <ol style="list-style-type: none"> 1. Pressure; 2. Temperature; 3. Uncorrected volume; 4. Corrected volume; 5. Yesterday's corrected volume (6:00AM to 6:00AM); 6. Total corrected volume; 7. Conversion factor; 8. Time/Date.
Reports	<ol style="list-style-type: none"> 1. Hourly, weekly, monthly reports as per CUGL 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 CUGL requirement should be done by vendor without any cost implication.

	1. Any tampering of the gas meters;
List of Alarms	2. Reverse or back flow, if applicable; 3. No flow; 4. Zero consumption for 5 consecutive days; 5. Communication failure; 6. Low battery.

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8. PENALTIES

If Bidder fails to meet any of the following requirements CUGL may forfeit the CPBG as per the penalty clauses:

1. Delay in commissioning within 5 days of installation intimation by CUGL.
2. In the event of server downgraded performance of 12hrs in a 30-day cycle;
3. The Bidder has to make minimum 95% AMR readings available every billing cycle through CUGL dashboard.
4. Manual readings for a particular customer can be submitted for a maximum of two billing cycle. In case, the manual readings are submitted for more than two consecutive cycles for particular customer;
5. In case it is found that wrong readings are submitted by the vendor (due to non-working / malfunctioning of AMR system);
6. The vendor must provide the data logs of any particular customer on demand from CUGL. In case, the vendor is unable to provide the logs within the stipulated time lines or is unable to provide the logs;
7. 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 CUGL installation, bypassing of meter etc. In addition to penalties legal action may be initiated against the Bidder.

9. TRAINING

The Bidder shall be required to hold training session at site as well as in CUGL head office 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. The Bidder shall provide requisite information and hard copies of manuals for reference. CUGL will not reimburse any charges for the training.

10. 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 Kanpur for his project office.

11. 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 Kanpur shall have exclusive jurisdiction.

QUALITY ASSURANCE PLAN FOR GAS METERS								Project : City Gas Distribution Project in Kanpur, Unnao, Bareilly & Jhansi	
								Client : CUGL	
								Consultant :	
								QAP. No.:	
								Rev No.	
								Date 29.11.18	

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 stdard.	Test report	P	R	
		Body Hydro Test	Test	100%	Approved data sheet	No leakage	Test report	P	R/W	At least 5% to be witnessed by TPIA
		Calibration, accuracy	Test	100%	Approved data sheet	Approved data sheet	Test report	P	R/W	At least 5% to be witnessed by TPIA
		Functional test	Test	100%	Approved data sheet	Approved data sheet	Test report	P	R/W	At least 5% 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 apesified 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 meter index format Duly Signed and Stamped.8)TPIA shall review all the reports 100%.