VCS Quality Services Private Limited

CITY GAS DISTRIBUTION PROJECT OF NORTH GOA GAS

RATE CONTRACT FOR SUPPLY OF GAS METERS FOR INDUSTRIAL & COMMERCIAL UNITS

TENDER NO. GNGPL/C&P/T 59
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Issued Date: 15.09.2023

Goa Natural Gas Pvt.Ltd.
A Joint Venture of GAIL Gas Ltd & BPCL

GOA NATURAL GAS PRIVATE LIMITED (GNGPL)

PMC

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Rate Contract for supply of Gas Meters for Industrial & Commercial Units

INTRODUCTION

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1. INTRODUCTION

M/s Goa Natural Gas Pvt. Ltd. is a Joint Venture (JV) of Bharat Petroleum Corporation Limited (BPCL), A Govt. of India Enterprise and GAIL Gas Limited, a fully owned subsidiary company of GAIL (India) Limited, has been set up to provide PNG (piped Natural Gas) to industrial, domestic, commercial sectors and CNG to automobile sector in North Goa GA.

VCS Quality Services Pvt. Ltd. (VCS has been appointed as Project Management Consultant for providing consultancy services for CGD Expansion Project for PNG & CNG in North Goa (hereinafter referred as Consultant), by GNGPL.

The present document covers the technical specifications for the enquiry.

2. TECHNICAL SPECIFICATIONS

The technical specifications for this present tender enquiry are as listed in Material Requisition (Ref. No.1023-CD-IC-MR-001 Rev.C1).

Energising Quality	**MATERIAL REQUISITION**	Goa Natural Gas Pvt Ltd

MATERIAL REQUISITION FOR COMMERCIAL & INDUSTRIAL GAS METER				**TOTAL SHEETS**	08
DOCUMENT NO	1023	CD	IC	MR	001

GOA NATURAL GAS PVT. LIMITED

RATE CONTRACT FOR SUPPLY OF GAS METERS FOR INDUSTRIAL & COMMERCIAL UNITS

MATERIAL REQUISITION FOR COMMERCIAL & INDUSTRIAL METERS

REV	DATE	DESCRIPTION	PREP	CHK	APPR
C1	15.09.2023	ISSUED FOR BID	MR	RA	KNC

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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, Regulators as per technical requirements/specification attached in tender for City Gas Distribution project.

Sl. No.	Description	Unit	Quantity
GROUP-A			
1	G-4 COMMERCIAL DIAPHRAGM GAS METER WITHOUT EVC & AMR.	Nos.	15
2	G-6 COMMERCIAL DIAPHRAGM GAS METER WITHOUT EVC & AMR.	Nos.	15
3	G-10 COMMERCIAL DIAPHRAGM GAS METER WITHOUT EVC & AMR.	Nos.	10
4	G-16 COMMERCIAL DIAPHRAGM GAS METER WITHOUT EVC & AMR.	Nos.	05
5	G-25 COMMERCIAL DIAPHRAGM GAS METER WITHOUT EVC & AMR.	Nos.	10
GROUP-B			
6	G-10 RPD METER WITHOUT EVC & AMR.	Nos.	15
7	G-16 RPD METER WITHOUT EVC & AMR.	Nos.	5
8	G-25 RPD METER WITHOUT EVC & AMR.	Nos.	5
9	G-100 RPD METER WITHOUT EVC & AMR.	Nos.	5
10	G-40 RPD METER WITH INBUILT EVC & WITHOUT AMR	Nos.	5
11	G-65 RPD METER WITH INBUILT EVC & WITHOUT AMR.	Nos.	5
12	G-100 RPD METER WITH INBUILT EVC & WITHOUT AMR.	Nos.	5
13	EVC (COMPATIBLE FOR ALL TYPES OF LF/HF METERS) FOR EXISTING RPD METER.	Nos.	25

NOTES:

1. Accessories for Meter/Regulators shall be supplied as specified in the Specifications attached with the material requisition.
2. 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 dated ……and 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 thereto.

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.

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.

DOCUMENTS	DOCUMENT NO.	REVISION OF DOCUMENTS		
Material Requisition	1023-CD-IC-MR-001	C1		
Annexure – 1	-	C1		
Standards Specification for Gas Meters	VPC-SPC-5601	C1		
Instrument Datasheets	1023-PL-IC-DS-001	C1		
Quality Assurance Plan for Gas Meters	1023-CD-IC-QAP-001	C1		
List of TPIA	-	C1		

4 DOCUMENTS & DATA REQUIREMENTS

1. The table hereunder specifies the quantities & nature of the documents to be submitted by the Supplierto Company.
2. The documents required at the inquiry stage to be included in the bid are listed under column A.
3. The documents required after award of the agreement and subject to the written approval of the Company are listed under column B.
4. The final & certified documents are listed under column C.
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.
6. The documents are fully part of the Supply which shall be complete only if and when the documentscomplying 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	1	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	1	4	1 week	4	1 week
4.	Code compliance certificate	1	4	1 week	4	1 week
5.	Detailed QA/QC program	1	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		4	1 week	4	1 week
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	1	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	*	4	1 week

NOTES:

1. Duration in column B (required date) are weeks after purchase order date (=T0).
2. Duration in column C (required date) are weeks after document approval.
3. Due date of each document may be proposed.
4. Final technical file shall be supplied in hard copy as indicated, and in electronic format (pdf) on two (2) CD-ROMS.
5. The selected Vendor shall provide Calibration certificates of each meter.
6. 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.
7. * Incase, the bidder is not having ATEX certificate, then Bidder shall submit undertaking at the time ofthe bid submission and first supply shall be done along with ATEX certificate.

ANNEXURE-1

(SERIAL NUMBERING FORMATS FOR GAS METER)

Serial No. should be defined as:

XXX-AABBBBCCCCCC = 16 Characters

Where XXX Means: First 3 Letters of Vendor Name (ITR for ITRON, RAY for Raychem, APS for APS Securities, TUL- TULIP, ANO- Anolytic Power etc.)

AA Means: First 02 Digits of Contract (76,77etc.)

BBBB Means: Last 04 Digits of Contract (4152,5210,4586,2130 etc.)

CCCCCC Means: Serial No. Series (0 to 999999)

Let us take an example:

Contract No. 7600000759 of M/s Anolytic Power

Then Serial Nos should be written as: ANO-760759000001

ENERGISING QUALITY

VCS QUALITY SERVICES PVT. LTD.

STANDARD SPECIFICATION
FOR
GAS METER

VCS-SPC-5601

Rev. No	Date	Purpose	Prepared By	Checked By	Approved By	Approved By
02	12.06.2019	RE-ISSUED AS STANDARD	AB	VB	KNC	AD
01	19.04.2019	RE-ISSUED AS STANDARD	KS	VB	KP	AD
00	10.12.2018	ISSUED AS STANDARD	ND	VB	KP	AD

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

CONTENTS

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 industrialapplications 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 Clientand 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 formof 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 monthsand 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 by indifferentlyused one for the other as required by the context.
Project	Designates the aggregate of Goods and/or Services tobe 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 latesteditions 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 (IPCode)
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 (IPCode)
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, codesetc., 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 obtainingthe approval in writing, the same should proceed with the manufacture of the items inquestion.

4.0 DESIGN CRITERIA

4.1 General

All gas meters shall be designed for continuous operation in the given site conditionswith 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 singlepoint of failure;
- Minimum cost of ownership.

4.2 Environmental Conditions

The equipment considered and the complete installation shall be suitable forcontinuous 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 gearratio, 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 Qmax.

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 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 Qmax.

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 be provided with Automatic Meter Reading (AMR) and either integral or external Electronic Volume Corrector (EVC). Refer meter and EVC datasheet for exact specifications.

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 suitablefor 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 thatallows the passage of fixed-volume amounts. The number of parcels that pass throughthe 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 Qmin to 0.1 Qmax and +/-1 % in 0.1Qmax to Qmax. Rangeability shall be 100:1 or better.

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

internal parts material of construction shall be SS/ aluminum 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 specificflow 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 offlow 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 shockwhich 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 i..e EVC such as automatic meter reading unit to transmit gas volume flow rate information.

RPD 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.

For meter supplied with external EVC: -

a) Flow meter output shall be 1LF (Low frequency) pulse which is mandatory, second output can be either LF or HF (High frequency) and additional 1 AT (anti tampering).

b) Pulse generators shall be provided with means of plugging and sealing arrangement against unauthorized interference;

RPD Meters shall be provided with temperature and pressure readings to obtain corrected volume. Meters shall have temperature and pressure tapping on the meter body.

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 provideddownstream 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 / arrangementas per the 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/Windows10/Windows11 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 extracost will be payable to Bidder.

Bidder shall supply software for remote data monitoring through GSM modem. The software shall be installed in client office / 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.

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 aluminum 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 withrubber 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 / IS0-15156 latest editions.

5.7 Name plate

Each gas meter shall be marked in legible characters, which are permanently visible inaccordance 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 testand 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}

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.

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 instrumentsat 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 clearanceand 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 fromsurface 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 atmosphericcorrosion 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 theVendor.

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 spare parts list for two years 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 anoriginal 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 aminimum:

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 governingstandard;

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 notnecessarily be limited to the same.

10.2 Documentation Required for Approval

Upon placement of Purchase Order, Vendor shall submit as a minimum the followingdrawings, 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 governingstandard;

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 1 no. of CD in soft copy (PDFs) format.

GOA NATURAL GAS PRIVATE LIMITED

(GNGPL)

SUPPLY OF GAS METERS FOR COMMERCIAL &INDUSTRIAL UNIT

INSTRUMENT DATASHEETS

REV	DATE	DESCRIPTION	PREP	CHK	APPR
C1	20.05.23	ISSUE FOR CLIENT REVIEW	MR	RA	KNC

INDEX				Rev.
S.NO	**ITEM DESCRIPTION**	**SHEET NUMBER**	**REMARKS**	
1	Gas Meter	Sheet 3-4 of 11		C1
3	RPD Meter with EVC	Sheet 5-6 of 11		C1
4	RPD Meter without EVC	Sheet 7-8 of 11		C1
5	Electronic Volume Corrector	Sheet 9 of 9		C1

Energising Quality	CLIENT:	GOA NATURAL GAS PRIVATE LIMITED (GNGL)					
	PROJECT:	SUPPLY OF GAS METER FOR COMMERCIAL & INDUSTRIAL UNIT	C1	20.05.23	MR	RA	KNC
			REV.	**DATE**	**PRP**	**CHKD**	**APPD**

Datasheet for Gas Meter				Rev.
General	1	Meter Type	Diaphragm Type	
	2	Quantity	Refer Table below	
	3	Service	Natural Gas	
	4	Governing Standard	EN 1359:2000 (or latest) / OIML R137-2/ EN12480:2015	
	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	
	8			
Process Conditions	9	Flow (Min / Max)	Refer Table below	
	10	Accuracy Class	Class 1.5	
	11	Accuracy	± 3% (Qmin to 0.1Qmax) and ±1.5% (0.1Qmax to Qmax)	
	12	Rangeability	150:1 or better	
	13	Cyclic Volume	Minimum*	
	14	Operating Pressure	Refer Table below	
	15	Pressure Drop	Refer Note- 4	
	16	Operating Temperature	-10° to 55°C	
Flow Meter	17	Meter Capacity	Refer table below	
	18	Body Casing	Steel/Cast Aluminum Alloy with suitable coating on inside and outside for corrosion protection	
	19	Corrosion Protection	Suitable coating on inside and outside of casing	
	20	End Connections	Threaded *	
	21	Centre to Centre Distance	Refer Table below	
	22	Ingress Protection	IP-54 or better	
	23	Sensor MOC	For Diaphragm Meter: Polyester fabric coated with rubber for an endurance life cycle of 80,000cum. For other type of Meter: MOC as per OIML R137	
	24	Other Internal Parts	All meter internals shall be non – metallic to prevent from tamperinglike magnet.	
	25	Back-run Stop	Required to prevent the meter from running backwards in case of tampering or back flow condition.	
	26	Transmission Rate	For Diaphragm Meter: 0.01 m³ / rotation for G4 & G6 and 0.10 m³ / rotation for G10- G25.For other types of Meter : Vendor to specify.	
	27	Transmission System	Tamperproof non magnetic	
	28	Max. Index Reading	8 Digit index with auto reset facility	
	29	Unit of Measurement	M3 (Cubic Meter) at standard conditions (Pressure= 101.325 kPa &Temperature= 15 °C)	
	30	Over-Flow Protection Device	Required at the downstream of meter, Restriction orifice (PTFE), Material of Restriction orifice shall be suitable for Natural Gas	
	31	Color	Light grey RAL7035	

S No.	Meter Capacity	Quantity	Design Pressure	End Connections *	C-C Distance *	Min / Max. Flow (At Actual Conditions)	
1	G-4	15	500 mbar	DN 20 / 3/4" NPT	110±2 mm	0.04 / 6.0 m³/hr	
2	G-6	15	500 mbar	DN 25 / 1" NPT	250±2 mm	0.06 / 10.0 m³/hr	
3	G-10	10	500 mbar	DN 40 / 1 ½" NPT	250±2 mm	0.10 / 16.0 m³/hr	
4	G-16	05	500 mbar	DN 40 / 1 ½" NPT	280±2 mm	0.16 / 25.0 m³/hr	
5	G-25	10	500 mbar	DN 50 / 2" NPT	335±2 mm	0.25 / 40.0 m³/hr	

Notes:		
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 GNGPL. One copy of the certificate shall be provided within the packing box of each meter.	
4	Vendor to provide detailed GAD, technical catalogue of meter supplied along with datasheet.	
5	Suitable adaptors or spool pieces shall be provided to meet above specified dimensions.	

Energising Quality	**CLIENT:**	GOA NATURAL GAS PRIVATE LIMITED					
	PROJECT:	SUPPLY OF GAS METER FOR COMMERCIAL & INDUSTRIAL UNIT	C1	20.05.23	MR	RA	KNC
			REV.	**DATE**	**PRPD**	**CHKD**	**APPD**

Document No. : 1023-CD-IC-DS-001

Datasheet for RPD Meter with EVC						REV.
General	1	Meter Type		Rotary Positive Displacement		
	2	Quantity		Refer Below Table		
	3	Line No.	Line Size & Schedule	N/A		
	4	P&ID Number		N/A		
	5	Service		Natural Gas		
	6	Governing Standard		EN 12480: 2015 or Latest / OIML R137-2		
	7	Area Classification		Zone 1 Group IIA /IIB, T3		
	8	Installation	Orientation	Indoor / Outdoor	Horizontal / Vertical	
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		1-4 bar		
	14	Design Pressure		1.5 times Max. Operating Pressure		
	15	Molecular Wt.		*		
	16	Max. Allowable Pressure Drop		As per EN 12480 or Latest		
Flow Meter	18	End Connection	Type	Refer Table below		
	19		Size and Rating	Refer Table below		
	20		Facing & Finish	Refer Table below		
	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 Aluminum 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 lifeand external tamper proof		
	29	Accuracy		± 2% (Qmin to 0.1Qmax) and ±1% (0.1Qmax to Qmax)		
	30	Rangeability		Refer Below table		
	32	Type - 2 wire/ 3 wire		2 wire		
	33	Preamplifier 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		
Meter Reading	44	Volume Correction		Volume correction through EVC and Preferably EVC shall be meter mounted type		
	45	Cables & Connectors		Vendor shall provide cables (2.5 Meter length) along with cable connectorsrequired between meters & EVC device if applicable.		
	46	Operating / Design Temperature		-10° to 55°C / 60°C		
	47	Ingress Protection		IP-65 or better		
	48	Input Pulse Characteristic		Refer EVC data sheet/Technical specification for detail requirements		
	49	Power Supply				
	50	MIU Memory Capacity				
	51	Protocol				
	52	Transmission / Radiated Power				
Options	53	NRV		Required, 1 No.; MOC: WCB body and Alloy 20/SS 316 internals		
	54	Restriction Orifice		Required,2 Nos.; MOC: SS316		
	55	Strainer	Size and Mesh	Required, 1 No.; Manufacturer Standard		
	56	Companion Flanges	Gaskets	Required; MOC: CS; WNRF; with bolts	Required, 2 Nos + 2 Nos spare	
	57	Index		Required 8 Digit, Mechanical, non- resettable counter, Rotatable		
	58	Temperature Tap on Meter Body		Required, 1/4" NPT, Thermowell SS 316, RTD 6mm probe		
	59	Pressure Tap on Meter Body		Required, 1/4" NPT		
	60	Lubricator with accessories		Required		
	61	Radiography		100 % required for all welded joints		
	62					
Misc.	63	Make		*		
	64	Model No.		*		

S No.	Meter Type	Quantity	Size / Rating*	Rangeability	F-F Distance* (mm)	Max. Flow (At Actual Conditions)	
1	G-40	5	DN 50 / 150# Flanged	1:100 or better	171	65 m3 / hr	
2	G-65	5	DN 50 / 150# Flanged	1:100 or better	171	100 m3 / hr	
3	G-100	5	DN 80 / 150# Flanged	1:100 or better	171	160 m³ / hr	

Notes:		
01	Vendor to specify. *	
02	Type Approval Certificate and Weights & Measures Certificate along with Model & Make information shall be provided for meters supplied.	
03	Calibration certificate (original + soft copy) shall be provided to GNGPL. One copy of the certificate shall be provided within the packing box of each meter.	
04	Suitable adaptors or spool pieces shall be provided to meet above specified dimensions. Companion flanges shall be provided at each end.	
05	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. Pressure drop across complete meter assembly consisting of meter, NRV, RO and strainer shall be calculated and provided. Over flow protection shall be 120% of max. flow.	
06	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); - Meters shall be provided with temperature and pressure readings to obtain corrected volume. Meters shall have temperature and pressure tapping on the meter body. - Pulse generators shall be provided with means of plugging and sealing arrangement against unauthorized interference;	
07	Meter casing shall be tamperproof, corrosion resistant suitable for indoor / outdoor installation.	
08	Vendor to provide detailed GAD, technical catalogue of meter supplied along with datasheet.	

Energising Quality	**CLIENT:**	GOA NATURAL GAS LIMITED (GNGPL)					
			C2	08.06.23	MR	RA	KNC
	PROJECT:	SUPPLY OF GAS METER FOR COMMERCIAL & INDUSTRIAL UNIT	C1	20.05.23	MR	RA	KNC
			REV.	**DATE**	**PRPD**	**CHKD**	**APPRD**

Datasheet for RPD Meter without EVC						Rev.
General	1	Meter Type		Rotary Positive Displacement		
	2	Quantity		Refer Below Table		
	3	Line No.	Line Size & Schedule	N/A		
	4	P&ID Number		N/A		
	5	Service		Natural Gas		
	6	Governing Standard		EN 12480 : 2015 or Latest / OIML R137-2		
	7	Area Classification		Zone 1 Group IIA /IIB, T3		
	8	Installation	Orientation	Indoor / Outdoor	Horizontal / Vertical	
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		1-4 bar		
	14	Design Pressure		1.5 times Max. Operating Pressure		
	15	Molecular Wt.		*		
	16	Max. Allowable Pressure Drop		As per EN 12480 or Latest		
Flow Meter	18	End Connection	Type	Refer Table below		
	19		Size and Rating	Refer Table below		
	20		Facing & Finish	Refer Table below		
	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 Aluminum 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) for 1:50 and 1:100		
	30	Rangeability		Refer Below Table		
	32	Type - 2 wire/ 3 wire		2 wire		
	33	Preamplifier 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	Quantity	Size / Rating*	Rangeability	F-F Distance* (mm)	Max. Flow (At Actual Conditions)	
1	G-10	15	DN 50 / 150# Flanged	1:50 or better	171	16 m3 / hr	
2	G-16	5	DN 50 / 150# Flanged	1:50 or better	171	25 m3 / hr	
3	G-25	5	DN 50 / 150# Flanged	1:100 or better	171	40 m3 / hr	
4	G-100	5	DN 80 / 150# Flanged	1:100 or better	171	160 m^3 / hr	2

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 GNGPL. 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	meters without EVC, should be compatible with external EVC (LF/HF type).	2
9	Meter casing shall be tamperproof, corrosion resistant suitable for indoor / outdoor installation.	
10	For RPD type meter, the following accessories to be provided: conical filter, NRV, RO, companion flanges and bolts. Pressure drops across complete meter assembly consisting of meter, NRV, RO and strainer shall be calculated and provided. Over flow protection shall be 120% of max. flow.	

Energising Quality	CLIENT:	GOA NATURALGAS LIMITED (GNGPL)	C2	08.06.23	MR	RA	KNC
			C1	20.05.23	MR	RA	KNC
	PROJECT:	SUPPLY OF GAS METER FOR COMMERCIAL & INDUSTRIAL UNIT	REV.	DATE	PRPD	VB	APPD

DATA SHEET FOR ELECTRONIC VOLUME CORRECTOR				Rev.
General	1	Type	Microprocessor based battery operated volume corrector with integral pressure transmitter and temperature sensor suitable for mounting in the field location and applicable for custody transfer	
	2	Service	Natural Gas	
	3	Site conditions	Temp.: 0 - 55 deg.C, Hot, Humid, tropical, Saline environment	
	4	Governing Standard	EN 12405-1+A1 or Latest	
	5	Approval	Type Approval Certificate as per Governing Standard	
	6	Area Classification	Zone 1 Group IIA /IIB T3 Ex ' d'	
	7	Enclosure Protection	IP 65	
	8	Quantity	As per SOR	
	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 ±0.5% as per governing standard	
	11			
Electronic Volume Corrector	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 armored	
	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	
	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. 2. EVC shall have a GSM module compatible port for data communication.	
	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	
Misc.	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 GNGPL. 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.
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.

Energising Quality

CLIENT:	GOA NATURALGAS LIMITED (GNGPL)						
PROJECT:	SUPPLY OF GAS METER FOR COMMERCIAL & INDUSTRIAL UNIT	C1	20.05.23	MR	RA	KNC
		REV.	**DATE**	**PRPD**	**CHKD**	**APPD**

Energising Quality

Goa Natural Gas Pvt.Ltd.
A Joint Venture of GAIL Gas Ltd & BPCL

QUALITY ASSURANCE PLAN FOR GAS METERS

Project : Supply Of Commercial Gas Meters
Client : GNGPL
Consultant : VCS Quality Services
QAP. No.: 1023-CD-IC-QAP-001-01 Rev: 0
Prepared By: ND CHK: VB Approved: KP
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 with 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%.

Energising Quality	**PROJECT:**	RATE CONTRACT FOR SUPPLY OF GAS METERS FOR INDUSTRIAL & COMMERCIAL UNITS
	CLIENT:	GOA NATURAL GAS PRIVAT E LIMITED (GNGPL)
	CONSULTANT:	VCS QUALITY SERVICES PVT. LTD.

Goa Natural Gas Pvt.Ltd.
A Joint Venture of GAIL Gas Ltd & BPCL

LIST OF RECOMMENDED THIRD PARTY INSPECTION AGENCY (TPIA)

SL. NO	NAME OF TPI	ADDRESS	PHONE NO	FAX NO
1	Tata Projects Ltd.	22,Sarvodaya Society,Nizampura,Baroda-390002	0265-2392863	0265-2785952
2	Bax counsel Insepection Bureau Pvt. Ltd.	303, Madhava,Bandra Kurla Complex, Bandra(E),Mumbai-400051	022-26591526,022-26590236	022-26591526
3	Germanischer Lloyd	4th Floor, Dakshna Building, Sec-11, Plot NO.2, CBD Belapur, Navi Mumbai 400 614	022-4078 1000	022-4024 2935
4	ABS Industrial Verification Ltd., Mumbai	404,Mayuresh Chambers,Sector-11,CBD Belapur(E),Navi Mumbai-400614	022-27578780 /1 /2	022-27578784 / 5
5	Certification Engineers International Ltd.	EIL Bhavan,5th floor,1,Bhikaji Camma Place,New Delhi-110066	011-26167539,26102121	011-26101419
6	Dalal Mott MacDonald	501, Sakar -II, Ellisbridge,Ahemedabad-380006	079-26575550	079-6575558
7	International Certification Systems	E-7,Chand Society, Juhu Road, Juhu, Mumbai-4000049	022-26245747	022-226248167
8	SGS	SGS India Pvt. Ltd.,SGS House,4B,A.S.Marg,Vikhroli(W),Mumbai-400083	022-25798421 to 28	022-25798431 to 33
9	Intertek Moody	9th Floor, Kanchenjunga Building, 18-Barakhamba Road, New Delhi-110001	011-4713 3900	011-4713 3999
10	TUV SUD South Asia	C-153/1, Okhla Industrial Ara, Phase-1, New Delhi-110020	011-3088 9611/9797	011-3088 9598
11	TUV Rheinland (India) Pvt. Ltd.	F-51, Kailash Complex GF, Veer Savarkar Marg, Vikhroli Park Site, Vikhroli(W), Mumbai-400079	022-4215 5435	022-4215 5434
12	Vincott International India Assessment Service Pvt. Ltd.	C-301, Mangalya Premises Cooperative Soc. Ltd, Off. Marol Maroshi Road, Andheri(E), Mumbai-400959	022-4247 4100	022-4247 4101
13	Meenar Global Consultants	Mr. Nitin Taneja (Project Manager)	M: +91-9711212783 T: +91-129-4072836	Web : www.meenaar.in Email : nitin.taneja@meenaar.in