Section:4

Scope of Work/Services

TECHNICAL SPECIFICATION FOR METERING & REGULATING STATION (MRS)

This document describes in detail technical scope of work, scope of supply and responsibilities of Bidder for procurement of Metering & Regulating station inside a cabinet arrangement (Dual stream) skid for Haridwar Natural Gas, Haridwar.

Scope covers Engineering design, Manufacturing, Installation and commissioning along with necessary documents.

- **Scope of Supply**

1. Design, Engineering, Fabrication, Testing, commissioning and transportation of Metering Regulating Skid with metal sheet canopy (Gas filter vessel, Pressure Reduction Skid, Main line full bore ball valve, Pipe, Flanges and fittings, NRV, Transition fitting, CRV etc.) testing and commissioning as per scope and specification mentioned in document. Refer P&ID for more details.

2. Inspection of skid as per EN 10204- 3.1 Certification

3. Supply of RPD Meter with EVC (Electronic Volume Corrector) & separate AMR Hardware with the 5 year Data Hosting Services with cloud. (As per Process Parameter)

- **Codes and Standards**

Design and terminology shall comply, as a minimum, with the latest edition prior to the date of bid enquiry of following codes, standard practices and publications:

- PNGRB Technical Standard for CGD network

- IGE/TD/13
- ANSI B 1.20.1 – Pipe Threads
- ASME B 16.5 – Steel pipe flanges and flanged fittings
- ASME B 31.8 – Gas transmission and distribution piping systems
- DIN – 43760 Temperature Vs Resistance curve for RTDs
- IEC 801 – Electromagnetic compatibility for industrial process measurement and control equipment

- BS EN-50054 – Electrical apparatus for the detection and measurement of combustible Gases General requirements and test methods

- NEMA 4 & 7 – National Electrical Manufacturer's association

- ISO 6967/GPA2145-GPA2172 Natural Gas – Calculation of Calorific Value, Density and Relative Density
- ISO 170125-Calibration of all primary and secondary instruments.

- ISO 6974/6975 – Natural Gas-determination of composition with defined uncertainty by gas chromatography & Natural gas & extended analysis – gas chromatographic method.
- ISO6124/6143 -Traceability of calibration gas of gas chromatograph.

- EN 334- European Standard for Gas pressure regulators up to inlet of 100 bar

- EN 14382-European Standards for Safety systems.
- AGA – American Gas Association, Gas measurement committee.

- AGA Report No. 10 Speed of sound in Natural Gas & other Related Hydrocarbon Gases.
- AGA Report No. 8 Compressibility and Super-compressibility for Natural Gas and other Hydrocarbon Gases. Transmission Measurement.
- AGA Report No. 5 Energy Calculations in Natural gas

Typical Quality Assurance Plan:

Vendor shall submit QAP for review and approval, Typical QAP is attached for reference. Inspection of SKID as per EN 10204- 3.1 Certification.

General Specifications:

- The installation should be designed to pass the maximum designed gas flow rate at the lowest expected inlet pressure and the designed outlet pressure.
- The meter and governing components should be designed not in isolation, but as a single installation. Normally both should be sized for the same load and consideration must be given to the effect that each may have on the other.
- Gas velocities in pipe work must not exceed 20 meters / second up to the inlet of the filter and 30 metres / second downstream of filter, when the maximum flow rate occurs at the lowest expected inlet pressure. Wall Thickness shall be calculated as per PNGRB Standard.
- The noise level at a distance of 1 meter from the MRS should not exceed 80 dBA, and materials selected should be suitable to prevent erosion at high velocities.
- Valves body, bonnet, cover and / or end flanges components made of cast iron and / ductile iron (as per ASTM A395) shall not be used.
- Each stream shall have the capacity to supply 100% of the flow at the minimum available inlet pressure. The impurities that are likely to occur and may be carried over with the gas are filtered in this block. Normally, the Degree of filtration shall be 5 micron @ 99.8% efficiency.
- In case of RPD meter conical filter size shall be installed at the upstream of meter. Provision should be made in the design of pipe work to enable removal of strainer for cleaning and inspection.
- Meter should have adaptability to Electronic Volume Converters (EVC) Devices.
- Meter body: Corrosion resistant Steel or Aluminum or other suitable material for pressure requirement and outdoor installation.

Meter shall be registered manufacturer with Director of Legal Metrology, Government of India. In case the bidder is importing the offered model of RPD meter from overseas (i.e., from outside India),

- the bidder shall furnish a copy of import license issued by Indian authorities, along with the technical bid. Bidder shall submit the type approval stamped and verified from Legal Metrology for RPD meter with EVC.
- The material used for manufacturing of the above components shall be fully killed. Components made of cast iron/ ductile iron shall not use in manufacturing.
- Pipe work and fittings (including flanges) shall be of seamless type and as per API 5L Gr.B (latest) and ASTM A234 Gr.WPB (latest) & ASTM A105 (latest).
- All the welded joints should be 100% radio graphically examined and acceptance criteria should comply with

ASME BPV Code, Section VIII (latest) / API 1104.

- Minimum Dry Film Thickness (DFT) after specified dry time shall be 80-150 microns.

- A protecting cabinet should be provided to cover the MRS and to avert the ingress of water. It should be constructed with durable, corrosion resistant and non-inflammable materials and should have adequate strength so that it should not get damaged / deformed during handling, transportation and installation. Colour of Canopy shall be finalized during detailed engineering and same shall be finalized by HNGPL.

- Regulator vents should protrude through the side cabinet wall only and terminate with Brass Flapper.

- Adequate cut-out should be provided at appropriate location on the cabinet such that the readings of the counter of the Meter as well as the reading of the Pressure Gauge are easily visible from outside.

- HYDRO TESTING - Hydro testing of the MRS/PRS shall be carried out using water as the testing medium. The test pressure shall be 1.5 times the design pressure. The holding time for the test shall be 4 hours.

- Tightness test of the MRS/PRS shall be carried out at operating pressure, the test medium shall be air for up to 7 bar. The holding time for the test shall be 2 hours. Further Tightness is to be checked using NG with the incremental pressure of 7 barg stage wise. A minimum 30 minutes of holding time is to be kept at each stage.

- Full inspection by radiography shall be carried out on all butt weld joints. The acceptance criteria shall follow API 1104.

- The copper jumper (flat of 3 to 4 mm thickness and appropriate width) shall be provided at each flange connections. Ends of copper jumper shall be such that it will be removed only after opening the studs provided. The inlet and outlet matching flanges/ companion flange/ Restriction Orifice plate/ Transition fitting (as the case may be) with blind, stud, nut and gaskets shall be provided.

- Manufacturer shall furnish the details of foundation and anchoring/ grouting pockets requirement. Suitable hole shall be provided for anchoring/ grouting the Skid. Anchor fasteners/ foundation bolts of adequate strength shall be supplied by the bidder. Bidder shall supply additional anchor fasteners bolts-nuts set (25% extra) along with shipment.

- PERFORMANCE GUARANTEE /warranty period -18 months from the date of delivery or 12 months from the date of commissioning, whichever is earlier.

- The spare parts required in the warranty period (18 months from the date of delivery or 12 months from the date of commissioning, whichever is earlier) should be supplied free of cost.

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PROCESS PARAMETER

Group	Category	Reference P&ID Number	Flow Rate (SCMD)	Inlet Pressure (Kg/cm2g)	Outlet Pressure (Kg/cm2g)	Type of Flow Meter	Qty.
A	RPD Meter Based Metering Skid	P&ID- 1	Refer P&ID	4	2	RPD Meter with EVC	As per SOR

Note: P&ID is given in tender is indicative. However, Sizing is to be done by bidder and submit during tender bid submission.

- **Metering Skid shall be designed as per T4S standard.**
- **Evaluation shall be done Item wise.**

Note: The successful bidder will be required to supply the material in the quantity as mentioned in the above table or as per Annual Rate Contract order (ARC order) in case of splitting of quantities during the contract period. However, the quantities are indicative and may be interchanged in more or less proportion depending upon requirement and as per the instruction of HNGPL within the overall limit of the contract value at same rate, terms and conditions.

Bidder Seal & Sign

DATASHEETS,

PIPING AND INSTRUMENTATION DIAGRAM

&

QUALITY ASSURANCE PLAN

Bidder Seal & Sign

DATASHEET OF RPD METER	
Subject	**Description**
Meter Type	Rotary Positive Displacement Type Meter
Service	Natural Gas
Make & Model	To be specified by Vendor
Qty	Vendor to Specify
Maximum Operating Pressure	Refer P&ID
Normal Operating Pressure	Refer P&ID
Working Temperature Range	5 Deg C to 55 Deg C (Ambient & Gas Temp.)
Rangeability	1:100 or Better
Accuracy	±2% (Qmin to 0.2 Qmax) ±1% (0.2 Qmax to Qmax)
Maximum Index reading:	999999.99
Repeatability	Better than +/- 0.5%
Unit	Cubic Meter
Reverse flow Restrict	Essential. If not in-built non return valve to be supplied
Casing	As per applicable codes, Tamper proof & corrosion resistant Aluminium or Steel suitable for Indoor/outdoor installations
Connection Orientation	Multi Position
Meter Internals (Impellers, Impeller Shaft, Bearing, Gears (Timing & Reduction, Magnetic / Inductive coupling, O-rings / Gaskets)	Non-Corrosive, tested low noise, friction less, endurance for minimum 20 years life & external tamper proof. Plastic components not to be used in Meter.

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Installation	Suitable for Outdoor Installation, Tamper proof, water weather proof and corrosion resistant for a life period of 20 years.
Ingress Protection	IP 65 or Higher
Safety Approval	ATEX
Area Classification	Zone 1, Group IIA / II B, T3
End Connections	Class 150 in accordance with ASME B 16.5
Flange to Flange Dimension	Vendor to Specify
Approved to	EN-12480 or equivalent The meters shall be approved by India Metrological Department (Model Approval)
Pulse Output	Vendor to Specify
Pressure tapping & Temperature Element	Inbuilt Pressure Tapping & Temperature Element
Volume Correction	EVC can be inbuilt with RPD meter

Note:

1. The selected meter shall be suitable for Custody Transfer. Vendor to submit Custody transfer approval certificate from laboratory which can provide the same or MID certificate

2. The meters shall be type approved by weights and measures department and Vendor shall furnish Legal Metrology Certificate issued by Weights & Measures, India along with certified calibration curve of individual meters.

3. Bidder to provide Calibration Certificate and Accuracy at atmospheric pressure with air for the following flow rates: Qmin, 0.2 Qmax, 0.5 Qmax, 0.70 Qmax and Qmax. It can be vary based on Manufacture requirement.

4. In case of RPD meter conical filter size shall be installed at the upstream of meter. Provision should be made in the design of pipe work to enable removal of strainer for cleaning and inspection.

6. 500 ml of suitable Oil with each Meter and all necessary accessories
7. The Meter shall be indelibly marked with details of Max. Flow, Pressures range, direction of flow, name of the manufacturer, model, unique serial number, Date of manufacturing etc.
8. The Vendor shall submit, along with the offer, the manufacturing standards, Model number, performance curves, and approvals of the statutory bodies and technical details of the model offered. Successful Vendor shall submit following documents during Supply of material. a) Dimensional outlet with mounting details with model number, part list and technical literatures. b) Connection by purchaser (piping, Electrical etc.) c) Installation, Operation and Maintenance Instruction Manual. d) Testing and Inspection procedure. e) Original Calibration curve of each RPD meter f) Certificate from statutory bodies Certificate
9. Superior quality Flange nuts and bolts, required mounting accessories etc. are to be supplied

DATASHEET OF ELECTRONIC VOLUME CORRECTOR	
Subject	**Description**
Type	Microprocessor based, internal battery-operated Electronic Volume corrector with integral pressure transmitter and temperature sensor suitable for mounting in the field location. EVC may be separately mounted on yoke or inbuilt with RPD
Make & Model	To be specified by Vendor
Qty	One for each meter
Approval	Custody transfer approval
Function	To measure actual gas volume, pressure and temperature and calculates compressibility factors of the gas, Meter error and based on which calculates standard volume of gas. The unit shall be complete in all respects to achieve this functionality.
Installation	Suitable for Outdoor Installation, Tamper proof, water- weather proof and corrosion resistant for a life period of 20 years.
Ingress Protection	IP 65 or Higher
Safety Approval	Atex & PESO
Hazardous area	Certified intrinsically safe for area classification Zone 1, Group IIA / II B, T3. Copy of certification of the product to be provided.
Working Temperature Range	5 Deg C to 55 Deg C (Ambient Temp.)
Inputs	LF / HF Pulse signal from meter and complying with EN12480
Output	1. One no. port for Connectivity to PC/Laptop for EVC configuration. Communication cable with adaptor for connecting the EVC with laptop.
Calculations standard	i. Volume Flow calculations: AGA7 (Latest). ii. Compressibility: AGA 8 (Latest) - User selectable Detailed / Gross I / Gross II Methods (Default: Detailed).

Alarms	a) Battery Low b) Flow Over Range c) Fault-in Measurements
Displays	Alphanumeric large character LCD with selectable decimal, Displaying all units, messages, alarms etc shall be in English.The display can be configured by the user or retain the standardconfiguration as follows:a) Time & Date b) Uncorrected flow rate – m3/hr c) Corrected flow rate: Sm3/hr d) Corrected Totalised volume : Sm3 e) Uncorrected Totalized Volume : m3 f) Corrected Flow Yesterday: SCM g) Uncorrected flow Yesterday CM h) Corrected Flow Today: SCM i) Uncorrected flow today: CM j) Pressure : Kg/cm²g k) Temperature :°C l) PTZ Correction factor m) Battery Voltage) Alarms
Output Measurement	a) Un-corrected flow rate in actual cubic meter per hour (ACMH) b) Corrected flow rate c) Temperature d) Pressure e) Alarms output for unit malfunctioning f) Corrected Volume g) Correction factor h) Compressibility
Power supply	No separate power supply will be provided

DATASHEET OF ELECTRONIC VOLUME CORRECTOR	
Subject	**Description**
Internal Battery Life	Internal Battery along with mounting hardware, if any Lithium (5 years minimum life) Battery pack should be intrinsically safe and replaceable in Field itself, without memory loss
Accuracy of the system	+ / - 0.5 (Vendor shall categorically indicate the system accuracy i.e. overall accuracy considering RPD meter, Pressure sensor & temperature sensor etc.)
Configuration Setup	To be done in factory for all EVC fully taking into account the process conditions, sensor & flow meter's characteristics and calibrations for direct on-site operations.
Features	a) Built in diagnostics to detect proper functioning.b) Data security through password/key-lock facility and volume conversion and configuration to be sealed.c) Parameters and programmed constants shall be stored in EEPROM / non-volatile memory.d) Facility for entry and accessing live and stored data through external Laptop/ PC.e) Shall have to store at least 120 days data (on Daily &hourly basis) for flowing pressure, temperature, uncorrected flow and corrected flow with date and time stamping.f) Storing of Audit trail and alarm summary.g) The stored data above shall be retrievable by using Laptops. Suitable port shall be available for Laptop's connection. Software required shall be supplied. All cables, software required for calibrating, configuring, retrieving the data to be supplied.h) Modbus facility for any third-party software with Modbus registers address changing facility
Mounting	EVC can be either inbuilt with RPD meter or mounted on meter. In case EVC is mounted on RPD meter, Vendor shall supply all necessary cables, SS tubing, manifold etc which all are required for integrating RPD meter with EVC along with suitable Mounting frame/arrangement.
Accessories to be supplied	1. In case EVC is mounted on RPD meter, Vendor shall supply all necessary cables, SS tubing, manifold etc which all are required for integrating RPD meter with EVC along with suitable Mounting frame/arrangement. 2. Software and its license for retrieving the stored data, Calibration and programming the EVC using portable PC (Laptop), remote software

	based on Windows 8(or latest) shall be supplied preferably in the form of Pen drive. 3. The Modbus communication protocol and message structure details to be used for SCADA shall be supplied. 4. Communication cable for communicating EVC with laptop (1 between a lot)
Documentation	Following drawings/documents shall be supplied:· EVC Configuration and calibration records· Catalog/product data sheet· Instruction, Operation & Maintenance manual in soft and hard copy.· Warranty certificate· Documentation including product literature, software/hardwaremanual, operating manual, maintenance instructions, Certificates etc. shall be supplied one each with all EVCs.·
1) For each EVC – Windows based Software (with media) of latest version - for retrieving the stored data, programming the volume corrector using Laptop shall be supplied with valid license.	
2) Sets of Volume corrector documentation including product literature, software/hardware manual, operating manual, maintenance instructions, Certificates etc. shall be supplied.	
3) EVC shall have Weights & Measures Type approval. If it is not available with the Vendor, Vendor has to submit an undertaking along with the bid that in the event of any purchase order placed on them, EVC will be supplied along with W&M approval.	
4) Following features shall be available in volume corrector: - 1. Flash memory with non-volatile copy of program code. 2. Programmable peripheral chip with EEPROM contains boot ladder code. 3. SRAM with copy of program code and data/exact logs. 4. Flash memory preservation shall be achieved by 5-year data unpowered retention. 5. SRAM memory preservation shall be backed by Lithium Cell / Super capacitors.	
5) Vendor/Supplier shall configure and update records in Volume Corrector as per technical requirement and data sheet before Final Inspection call. The process parameter and the required measuring units are already specified in Data sheets/ tender documents and it shall be made available in Volume Corrector. All the specified function and features shall be demonstrated during the Final inspection.	
6) The EVC shall transfer data to SCADA and shall be possible to read data from the SCADA (by wireless connection). SCADA, wireless connectivity and connection to the SCADA will be provided by Bidder's.	

TECHNICAL SPECIFICATION	
DATA SHEET OF AMR hardware for MRS	
Make	Vendor to specify
Model	Vendor to specify
Certification	Certified to use in Zone 1 hazardous locations Atex required
Inputs	From EVC
Description	Corrected & Uncorrected flow, Pressure
Serial port / Fast barrier	Full Duplex, Asynchronous Serial Port, Data Rate – 9600 bps
GSM Modem	Inbuilt in data logger
Antenna	Inbuilt in data logger (optional external antenna)
Sim card	User replaceable simcard with 2G & 3G / 4G both network **Sim Card Supply by the Contractor**
Frequency	900 MHz, 1800 MHz 1900 MHz Internal/External Antenna
Data storage	Non-volatile. Data storage 2000 profile readings and 50 index readings
Clock	Synchronises clock to local network at regular intervals
Battery supply	Typical battery life 5 years (daily transmission) Internally powered by a single user replaceable lithium battery Configuration and data retained during battery replacement
Recording	Interval programmable between 1 minute and 1 hour in defined increments Rotating store data storage
Alarm Dial-Out	Programmable daily consumption alarms Alarm on temper detection Low battery alarm
IP Rating	IP56

DATASHEET OF BALL VALVES (800#)		
Sr. No.	**Subject**	**Description**
1	Valve Manufacturer	Vendor to Specify
2	Valve Size (NB), mm (inch)	less than 2"
3	Design Standard	BS EN ISO 17292: 2004
4	Connecting Pipeline Design Pressure	19 Kg/cm2
5	Design Temperature, °C	0°C to +65°C
Valve Construction Design		
6	Configuration	Full Bore
7	End Connections	Socket Welding End
8	Ball Mounting	Floating Ball valves
9	Valve Operator	Lever operated
10	Valve type / Design	Ball Valve, 1 Piece Construction / Bolted 2 Piece Construction
Valve Material Specification		
11	Body	ASTM A 105
12	Ball	ASTM A 182 Gr. F6 / F 304
13	Stem	ASTM A 182 Gr. F6 / F 304
14	Stem Seals	PTFE
15	Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H
16	Fire Resistant Design Requirement	API 607: 2005
Others Requirements		
17	Ball Position Indicator	Open / Close Indicator, Required

18	Mechanical Stops	For Open / Close Limits, Required
19	Stem Design	Anti-Blow Out Type
20	Anti-Static Design	Yes

DATASHEET OF BALL VALVES		
Sr. No.	**Subject**	**Description**
1	Valve Manufacturer	Vendor to Specify
2	Valve Size (NB), mm (inch)	1" and above
3	Design Standard	API 6D: 2008
4	Connecting Pipeline Design Pressure	19 Kg/cm2
5	Design Temperature, °C	0°C to +65°C
Valve Construction Design		
6	Configuration	Full Bore
7	End Connections	Flanged End
8	Flanges (wherever applicable)	Raised Flange
9	Ball Mounting	Floating Ball / Trunnion Mounted Trunnion mounted ball valves are applicable only if size of valve is 4"X300# and above
10	Valve Operator	Lever Operated
11	Valve type / Design	Ball Valve, 1 Piece Construction / Bolted 2 Piece Construction
Valve Material Specification		
12	Body	A 216 Gr. WCB
13	Ball	ASTM A 182 Gr. F6 / F304
14	Stem	ASTM A 182 Gr. F6 / F304
15	Stem Seals	PTFE

16	Stud Bolts/ Nuts	ASTM A 193 Gr. B7/ A194 Gr. 2H
17	Fire Resistant Design Requirement	Type test as per API 607 for Floating Ball Valve Type test as per API 6FA: 2008 for Trunnion Mounted Ball Valve
Others Requirements		
18	Ball Position Indicator	Open / Close Indicator, Required
19	Mechanical Stops	For Open / Close Limits, Required
20	Stem Design	Anti-Blow Out Type
21	Anti-Static Design	Yes

DATASHEET OF PG		
Sr. No.	**Subject**	**Description**
1	Make	Vendor to Specify
2	Type/Model	Vendor to Specify
3	Standard	BS EN 837
4	Type	Direct
5	Mounting	Local
6	Dial Size	150 mm
7	Window material	Shatter proof glass
8	Pressure Element	Bourdon tube
9	Element material	SS316
10	Socket material	SS316
11	Accuracy	±1% OF FSD
12	Color	White with black numerals.
11	Case Material	Die-cast Aluminium
12	Range	0 to 10 Bar (Inlet) and 0 to 4 Bar (Outlet) or other may be suitable

DATASHEET OF DPG		
Sr. No.	**Subject**	**Description**
1	Make	Vendor to Specify
2	Type/Model	Vendor to Specify
3	Accuracy	±2% OF FSD
4	Type	Piston
5	Mounting	Local
6	Dial Size	150 mm
7	Window material	Shatter proof/Toughened glass
8	Pressure Element	Piston
9	Element material	SS304
10	Socket material	SS304
11	Accuracy	±1% OF FSD
12	Color	White with black numerals.
11	Case Material	Die-cast Aluminium/SS-304
12	Range	0 to 1000 mbar

DATASHEET OF FILTER		
Sr. No.	**Subject**	**Description**
1	Make	Vendor to Specify
2	Type/Model	Vendor to Specify
3	Filter	Cartridge
4	Type	Horizontal / Vertical
5	Design Temperature, °C	0°C to +65°C
6	Particle / Mesh Size	5 Micron
7	Maximum Working Pressure	6 Bar
8	Design Pressure	19 Bar
9	Efficiency	99%
10	Design Code :	ASME SEC-VIII DIV-1 (LATEST EDITION)

Pipe Works and Fittings		
1	Pipe work	API 5L OR ASTM A 106 Gr. B
2	Fittings	ASTM A 234 GR WPB, ASTM A105
Painting		
1	Specifications	BS 4800 CANARY YELLOW FINISH
Noise Level		
1	Specifications	<= 80 dBA @1 Metre length

DATA SHEET – CRV		
1	Tag No	CRV
2	Type Of CRV	Direct Acting Spring Diaphragm type
3	Process Con. / Rating	150#
4	Service	OVER PRESSURE RELIEF- Natural Gas Service
5	Standard	As per Back Pressure Relief Valve
6	Model No.	*
7	Fluid / State	Natural Gas (G)
8	Inlet Pr.(Min/Opr/Max)	**
9	Outlet Pr.(Min/Opr/Max)	**
10	Temp. (Min/Opr/Max)	**
11	DP Sizing	*
12	Set Pressure	*
13	Set Pressure Range	*
14	Design Factor	*
15	Max. Capacity	Designed for 1% of skid flow
16	Predicted Noise dBA at 1 M	85
17	Impulse Connection	*
18	Impulse Size	*
19	Leakage Class	ANSI CLASS VI
20	IBR Certification	NO
21	Body	*
22	Plug	*

23	Diaphragm	Nitrile/ Synthetic rubber Any compatible to service
24	Actuator / Spring Casing	SS304 / SS316
25	Spring	SS304 / SS316
26	Set Screw	SS304 / SS316
Note:		
1.'**' As Per P & Id, '*' Vendor Shall Furnish a Schematic Indicating all the Impulse Line Connections, Locations, Min. Distant and Sizes to the CRV.		
2. Vendor Shall Furnish the Sizing Calculations along with offer		

DATA SHEET - SLAM SHUT DOWN VALVE (VALVES INTEGRAL WITH PRESSURE CONTROL)		
UNITS: Flow > Liquid - m*3/hr, Gas-SCMH, Steam - kg/hr. Pressure -> kg/cm 2(g), Temperature-°C, Level/ Length-> mm		
1	Line Size/Schedule	*/*
2	Service	Natural Gas
3	Type of Valve-Actuator	Self-Actuated pressure control valve
4	Standard	EN 14382 (SSV) and EN334 for PCV
5	Failure Position	Fail to Close Type
6	Design Class	150#
7	End Conn: Flgd. Size & Rating	FLANGED ENDS ANSI 150 #, (rating same as upstream pipe), RF 125 AARH
8	Body & Cover Material	ASTM A 216 Gr. WCB Charpy test at 0 degree Or suitable any other material for withstanding the pressure requirement and Compatible to Natural gas service / as per EN 334
9	Seat /Disc Material	SS 316 or Any compatible to service and withstanding the pressure requirement (As per EN 334)
10	Impulse Connection	Vendor to Specify
11	Accuracy	As per EN 14382
12	Other Wetted Parts	SS 316 or Any compatible to service and withstanding the pressure requirement (As per EN 334)
13	ANSI Leakage Class	ANSI -CLASS VI / EN14382
14	Failure Position for Regulator	Fail to Open
15	Manual Reset	Required
16	Position Indicator	Required

17	Closing Time	Less than 2 Sec / As per BS EN 14382 Or better
18	Provision for Limit Switch	Required (One each for Open/Close Position)
19	Fluid / State	Natural Gas / Vapour
20	Flow Liquid_Min	**
21	Flow Vapour_Min	**
22	Inlet Pr._Min	**
23	Outlet Pr._Min	**
24	Delta Pr. Shut Off	*
25	Temp. ° C Oper.	**
26	Maximum Flow Capacity	**
27	PCV Set Point	*
28	Predicted Sound Level DBA	As per PNGRB guideline
29	Inlet Velocity M/S	As per PNGRB guideline
Note:		
1.**' As Per P& Id and * - To Be Furnished By the Vendor		
2. Spring Shall Be Suitable To Adjust Outlet Pressure Range Of Skid Indicated In The P&ID. And Overpressure Spring Range To Be Decided During Detail Engg.		
3. Vendor Shall Furnish a Schematic.		
4. Vendor Shall Furnish the Sizing Calculations along with offer		
5. Vendor Shall Furnish Spring Ranges		
6. The Selected Size & Model Shall Be Such That The Valve Must Operate And Control Pressure at Both Min. And max. Flow Rate As Indicated With the Given Pressure Conditions.		

DATA SHEET – PRESSURE REGULATOR		
UNITS: Flow > Liquid - m*3/hr, Gas-SCMH, Steam - kg/hr. Pressure -> kg/cm 2(g), Temperature- °C, Level/ Length-> mm		
1	Line Size/Schedule	*/*
2	Service	Natural Gas / Vapour
3	End connection	FLANGED ENDS ANSI 150 #, (rating same as upstream pipe), RF 125 AARH
4	Body & Cover Material	ASTM A 216 Gr. WCB Charpy test at 0 degree Or suitable any other material for withstanding the pressure requirement and Compatible to Natural gas service (As per EN 334)
5	Internals	SS 316/ SS410/ Or suitable any other material for withstanding the pressure requirement and Compatible to Natural gas service (As per EN 334)
6	Material of Diaphragm	Nitrile or Synthetic Rubber or Any compatible to service and withstanding the pressure requirement (As per EN 334)
7	Regulator	EN 334: 2005
8	REGULATION ACCURACY	+/- 1% OF SET OUTLET PRESSURE (G) OR BETTER
9	COMPONENTS FOR GAS SUPPLY	SS 316/DIN 30690 PART-1 / DIN 30690 PART-2 (LATEST) OR EQUIVALENT
10	Impulse Connection and Size	External and *
11	Spring Range	*
12	LEAKAGE CLASS	AS PER EN 334
13	Provision-Limit Switches	YES REQUIRE, ONE EACH FOR OPEN / CLOSE POSITION

14	Provision for Limit Switch	Not Required
15	Manual Reset	Yes, Required
16	Failure Position	Fail to Open
17	Position Indicator	YES, REQUIRED
18	Closing Time	LESS THAN 2 SEC
19	Fluid & State	DRY NATURAL GAS
20	Temperature o C -Working/Design	** / **
21	Inlet Pressure: MIN / NORMAL / MAX	** / **
22	FLOW: MIN / NORMAL / MAXIMUM	** / **
23	Design Pressure	150 Class
24	Predicted Sound Level DBA	As per PNGRB guideline
25	Inlet Velocity M/S	As per PNGRB guideline
26	Regulator operated by	Self actuated mechanism
Note:		
1.**' As Per P&ID and * - To Be Furnished By the Vendor Shall Furnish A Schematic Indicating All The Impulse Line Connections, Locations, Min. Distant And Sizes To The Main Valve And To The Slam Shut Valves		
2. Vendor Shall Furnish the Sizing Calculations along with offer		
3. PCV Shall Be As Per EN 334/ Eqvt. Std		
4. Spring Shall Be Suitable To Adjust Outlet Pressure Range Of Skid Indicated In The P&ID. Set Point - By Vendor.		

AMR SYSTEM FOR MRS:

This specification covers the basic requirements for data hosting and associated services for Meter Regulating Stations (MRS) with RPD Meters, EVC with AMR.

Automatic meter reading (AMR) is envisaging for automatically collecting consumption, diagnostic, and status data from EVC and transferring that data to a central database for billing, troubleshooting, and analysing.

BRIEF SCOPE

1. Data logging & transmission by GSM/GPRS modem
2. OPC compliant Hardware Server / Cloud Server
3. Data uses charges including SIM card charge.
4. Supplier shall be responsible for hosting of meter reading data in Supplier's server for three years from the date of LOI.
5. Hourly log of data from each MRS and uploading to server once in a day. Historical data shall be maintained in Supplier server for at least six months for 180 readouts.
6. AMR system should be provided with different viewer. Data through Analysis viewer shall provide both tabular and geographical interfaces to display site communication status and data verification.
7. Supplier to provide data analytics access through dash boards to HNGPL personnel via secured platforms through web services (MIETY Compliant server).
8. Supplier shall provide access to immediate visualisation of sites, status, communications and performance through dashboard to HNGPL.
9. Supply of consumables, commissioning and spares for installation is in scope of supplier.
10. Supplier shall provide 03 no. user ID and password for logging on to supplier's server as desired by HNGPL.
11. Providing training to HNGPL's personnel pertaining to installation, programming, trouble shooting and analysis of Data & software.
12. All data shall be collected in real-time and is stored in a database. The HNGPL can view the data via a web application and can analyze the data using to verify their utility bill.
13. The system will generate an alarm for any tamper of the AMR installed on the site, and for volumes registered by the gas meter above and below the preset threshold values, and for any missing data in the hourly readings.
14. Supplier shall provide statistical access to data through dash boards to HNGPL personnel via secured and encrypted platforms through web services using https protocols. Supplier shall provide facility/ tools for viewing and extracting reports according to HNGPL's format.

FUNCTIONAL REQUIREMENT / DATA ANALYTICS

Dashboard will contain Hourly consumption, Daily training, Fortnightly report, Monthly report

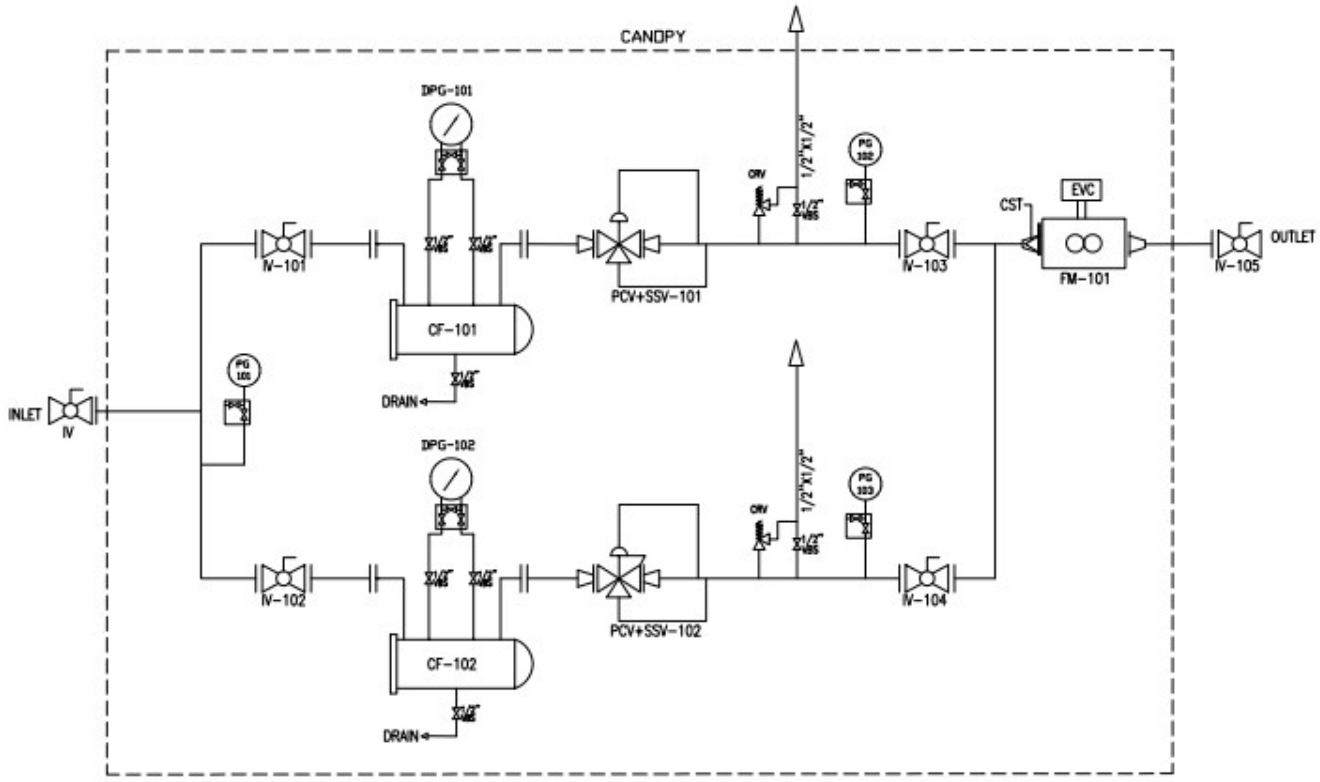
Data to be monitored

1. Uncorrected volume
2. Corrected volume

Reports:

1. Hourly, weekly, monthly reports as per HNGPL requirement.
2. Daily exception report.
3. Zero consumption report on daily basis.
4. The software shall be capable of generating trends, alarms and graphics.

PIPING AND INSTRUMENTATION DIAGRAM FOR MRS



FLOW RATE	1200 SCMH
INLET PRESSURE	4–6 Barg
OUTLET PRESSURE	2 Barg
DESIGN PRESSURE	19 Barg
WORKING TEMPERATURE	10 TO 45 C
DESIGN TEMPERATURE	60 ℃

VENDOR LIST

PRESSURE REGULATOR AND SLAM SHUT VALVE

1) M/s Emerson Process Management (Fisher / Tartarini)

2) M/s RMG-Regel Messtechnik / Bryan Donkin (Germany)

3) M/s Nirmal Industrial Controls (India)

4) M/s Gorter Controls (Netherlands)

5) M/s Gastech (Turkey)

6) M/s Dresser (USA)

7) M/s Pietro Fiorentini (Italy)

RPD METER

1) M/s Itron (Formerly, Actaris / Schlumberger).

2) M/s Elster-Instromet.(Honeywell)

3) M/s Smithmeter.

4) M/s Dresser

5) M/s Pietro Fiorentini

6) M/s Romet, Canada

7) M/s Honeywell

VOLUME CORRECTOR

1) M/s RMG Messtechnik Gmbh,Germany

2) M/s Elster-Instromet.(Honeywell)

3) M/s Daniel Flow Products inc.,USA

4) M/s Dresser, (Rockwin Flow Meter,India)

5) M/s Itron (Formerly, Actaris / Schlumberger).
6) M/s Barton Instruments, UK

7) M/s Romet,Canada.

8) M/s Pietro Fiorentini

PRESSURE SAFETY VALVES

1) M/s Keystone Valves (India) Pvt. Ltd. (Baroda)

2) M/s Sebim Sarasin Valves India (P) Ltd

3) M/s Tyco Sanmar Ltd. (New Delhi)

4) M/s Parcol SPA, Italy

5) M/s Tai Milano SPA, Italy

6) M/s Nirmal Industrial Controls (India)

7) M/s Emerson Process, Singapore

8) M/s Instrumentation Ltd., Palghat

PRESSURE GAUGES, D. P. GAUGES & TEMPERATURES GAUGES

1) M/s AN Instruments Pvt. Ltd.

2) M/s General Instruments Ltd.

3) M/S Precision Mass Products Pvt. Ltd.

4) M/s WIKA

5) M/s Forbes Marshall

6) M/s Dynamic

7) M/s Hirelkar

8) M/s Baumer

9) M/s GIC

10) M/s Precision Mass

JUNCTION BOXES AND CABLES GLANDS

1) M/s Ex-Protecta

2) M/s Flameproof Control Gears

3) M/s Baliga

4) M/s Flexpro Electrical

SS VALVES, SS TUBE & SS TUBE FITTINGS

1) M/s Parker (USA)/ M/s Swagelok (USA)/ M/s Hoke/ M/s SSP –SS fittings

2) M/s Sandvik, Sweden, M/s Tubacex –SS tubes

3) M/s Parker, M/s Swagelok –SS valves

4) M/s Arya – SS Fittings

5) M/s Heavy Metal tubes – SS Tubes

6) M/s Krystal – SS Tubes

BALL VALVE

1) M/s Hopkinsons Limited (UK)

2) M/s O.M.S. Saleri (Italy)

3) M/s Pibi Viesse SPA (Italy)

4) M/s Nuovo Pignone (Italy)

5) M/s Perar SPA (Italy)

6) M/s Larsen & Toubro Ltd. (Audco India Limited, Chennai)

7) M/s Microfinish Valves Ltd. (Hubli)

8) M/s Shiv Shakti Engineers (Ahmedabad)

9) M/s Raimondi Valve S.P.A. (Italy)

10) M/s Virgo Engineers (Pune)

11) M/s Petro valves

12) M/s Tormene Gas Technology S.P.A. Valvetalia Group, Italy

13) M/s. Hawa Valves

14) M/S Hina Valves

15) M/s Weir BDK Valves (A unit of Weir India Pvt. Ltd.)

16) M/s Steel Strong

GLOBE VALVE

1) M/s Weir BDK Valves (A unit of Weir India Pvt. Ltd.)

2) M/s Datre Corporation (Kolkota)

3) M/s L & T, New Delhi

4) M/s Neco Schubert & Salzer Ltd. (New Delhi)

5) M/s Niton valve (Mumbai)

6) M/s Ornate valves (Mumbai)

7) M/s Panchvati valves (Mumbai)

8) M/s Petro valves

9) M/S Hina Valves

10) M/s Shiv Shakti Engineers (Ahmedabad)

CHECK VALVES

1) M/s Malbranque (France)

2) M/s Mannesmann Demag (Germany)

3) M/s Petrol Valve (Italy)

4) M/s True Flow Rona (Belgium)

5) M/s AV Valves Ltd., Agra

6) M/s BDK Engineering India Ltd. Hubli, Karnataka / M/s Weir BDK Valves (A unit of Weir India Pvt. Ltd.)

7) M/s Neco Schubert & Salzer Ltd. New Delhi

8) M/s BHEL, OFE & OE Group New Delhi

9) M/s Precision Engg. Co., Mumbai

10) M/s Leader Valves Ltd., Jalandhar

11) M/s Niton Valves Industries (P) Ltd., Mumbai

12) M/s Larsen & Toubro Ltd. (Audco India Limited, Chennai)

13) M/s Aksons & Mechanical Enterprises, Mumbai

14) M/s Petro Valves

15) M/s Datre Corporation Ltd., Calcutta

16) M/s Advance Valves Pvt. Ltd., Noida

17) M/s Hina Valves

18) M/s Shiv Shakti Engineer (Ahmedabad)

FILTER

1) M/s Grand Prix Fab (Pvt.) Ltd. (New Delhi)

2) M/s Multitex Filteration Engineers Ltd. (New Delhi)

3) M/s Perry Equipment Corp. (USA)

4) M/s Siirtec NIGI SPA (Italy)

5) M/s Axsia Howmar Ltd. (UK)

6) M/s Faudi Filters Systems GmbH (Germany)

7) M/s Filtan Filter Anlagenbau GmbH (Germany)

8) M/s Plenty Filters (UK)

9) M/s IGCPL, Vadodara

10) M/s Ravi Techno Systems (Mumbai)

11) M/s Gujarat Otofilt (Ahmedabad)

12) M/s Nirmal Industrial Controls (India)

13) M/s Flash Point

14) M/s GFS

15) M/s Fil Sep Equipments Pvt. Ltd.

16) M/s Chemtrols Industries Ltd.

17) M/s Emerson Filters

18) M/s Forain S.r.l. (Italy)

Notes:

1) For items listed above, the successful bidders shall supply from the approved makes only.
2) Bidder shall submit list of Components/Equipments used in skid with technical specification/sizing calculation as mentioned in tender along with offer.