

**Annexure-8: Equipment Datasheet for Custody transfer meter Unit
(Turbine Flow Meter, Gas Flow Meter & Flow Conditioner)**

(A) Data Sheet: Custody Transfer Turbine System	
Application	
Service:	Custody transfer of dry natural gas
Flow Rate:	7000 SCMD (~291.7 SCMH)
Operating Pressure:	8 barg max
Line Size:	2" ANSI 150# piping
Quantity:	2 No's
Technical Specification	
Parameter	Specification
Meter Type	Turbine Flow Meter- Custody Grade
Model & Make	Vendor to specify
Size & Rating	2" NB, ANSI 15# RF Flanged
Flow Range	150-400 SCMH (5.0-13.2 SCFM)
Accuracy	± 0.5 %. For 0.2 Qmax – Qmax and ± 1% For Q min-0.2 Qmax
Repeatability	±0.1%
Linearity	±0.5% over calibrated range
Body Material	Carbon steel/equivalent
Rotor Material	Aluminum
Bearings	SS 316
Pressure tap on meter body	1/2" NPT
Local counter (mechanical)	5-point standard air calibration at atmospheric pressure
Output Signal	High frequency pulse no HF sensor required on meter body.
Temperature Range	-20 ° C to + 60 °C
Pressure Rating	Up to 19 barg (suitable for 150# flange)
Straight Lengths	10D upstream, 5D downstream (as per AGA 7)
Certifications	OIML R137, MID, ISO 5168, PNGRB compliant, EN12261
Calibration	NABL traceable, 5-point standard air calibration at atmospheric pressure
Accessories	Flow conditioner, isolation valves & necessary Tubing & fittings
Mounting Orientation	Horizontal
Rangeability	1:20
Integrated Thermowell	No
Warranty	18 months from the date of supply or 12 months from date of commissioning
Flow Conditioning Requirement	
Parameter	Specification
Flow Straightener Type	Tube bundle / honeycomb / perforated plate (vendor selectable)
Material	SS304 / SS316
Installation Location	Upstream of turbine meter (integrated or standalone)
Compliance	AGA 7 / ISO 9951 / OIML R137M
Meter Running Requirements	10D upstream, 5D downstream OR certified flow conditioner
Documentation Requirements	
Technical Data Sheet	
NABL Calibration certificate	
Installation and O&M manual	
Warranty certificates (OIML,MID,ISO, EN12261 complaint)	
FAT report (If Applicable)	

(B) Data Sheet: Field mounted flow computer (FC) Type certified for custody transfer turbine metering applications		
SN	Specification	Gujarat Energy's requirement
1.	Flow Measurement of Natural Gas with turbine meters for custody transfer application	Bidder to submit custody transfer gas metering approval certificate for AGA-3 & AGA7, AGA8 with combination of standards ISO-6976, GPA-2172, ISO5167 Latest.
2.	Hazardous area certification	Bidder to submit Class 1 Division 1(conforming to IS/IEC/EN 60079 Standards -AS PER OMR NOTIFICATION ACT 2017) certificate for flow computer electronics with display & integral GP sensor and its enclosure as a single integrated unit.
3.	Processor	A 32-bit or better microprocessor based electronic computer system as per AGA-3, AGA7 & AGA-8-Version (latest version) Computation of Gas Flow Rate (SCM/hr), Energy Flow Rate (KCal/hr), totalizers for flow and energy. Real-time clock with accuracy of min. 60 seconds/year. Flow computer shall have built-in watchdog Timer.
4.	Built-in communication port	<ul style="list-style-type: none"> • 1-RS-232, 2- RS-485, 1-ethernet required as minimum for host communications port for SCADA, GPRS Modem and for online GC interface. • Flow computer Should accept the data from On-Line Gas Chromatograph for Energy measurement through communication port/GPRS Modem. • Flow computer Should have the provision for entering the fixed values of C1, C2, C3, IC4, NC4, IC5, NC5, C6+,Co2, N2 and Specific gravity for calculating the flow. • Flow computer shall be able to connect remotely using host Laptop over GPRS Modem.
5.	Supporting communication protocols	Modbus slave (ASCII or RTU), Modbus TCP/IP protocol (master and slave)
6.	Enclosure	<ul style="list-style-type: none"> • The flow computer must be a weather-tight NEMA 4 powder-coated aluminum enclosure suitable for outdoor installation. • The flow computer with its enclosure shall have min. 4 nos. of cable Entries for adequate cable terminations. • The flow computer with its enclosure should be Class 1 Division 1 certified to house the processor circuit board with built-in I/O. The flow computer with its enclosure shall be Class 1, Division 1, Group C,D Certified by PESO/CCOE/CSA/ATEX/UL/FM(conforming to IS/IEC/EN 60079 Standards -AS PER OMR NOTIFICATION ACT 2017).
7.	Power Supply	10 to 24 VDC - should work for complete range of power provided with 100% functionality

8.	Built-in LCD display	4 lines 20 characters LCD display with backlit required to view user configured display parameters for reading at night.
9.	Display Parameters	The flow computer shall have the capability to display the following parameters: Uncompensated volume flow rate, Compensated volume flow rate, mass flow rate, Integrated volume (corrected and not corrected), Density/Specific gravity, Pressure, Temperature, Energy rate & total energy, Complete gas composition, Calculated parameters (compressibility factor etc.), Current accumulation, previous day accumulation, Data entry, Error codes, Selected parameter codes, Alarms (process and systems) including diagnostic message, Engg. units as per selected parameter, Other standard displays available. Custody transfer flow computers shall have audit trail, All the above data shall also be made available by vendor in the serial links to RTU.
10.	Keypad	Keypad for easy navigation of local Display and/or parameter configuration
11.	Firmware	<p>1) AGA-3(2012), AGA-7(2006) & AGA 8(1994) or latest, ISO5167 Latest, API 14.3, API 21.1 (latest version of standards shall be used) flow calculations for a gas, field selectable Detailed, Gross I & Gross II methods.</p> <p>2) Calculation of Calorific value as per GPA 2172 and ISO6976 standard (User selectable)</p> <p>3) Calculation of compressibility factor as per AGA-8 detail method.</p> <p>4) Energy flow rate and integrated energy (user configurable in kcal, MJ & MMBTU).</p> <p>5) Minimum to memory log 240 alarms and 240 events</p> <p>6) Archival of data for up to 15 history points for 60 days. Audit Trail shall be as per API 21.1 compliant.</p> <p>7) Averaging technique should be in accordance to API Chapter 21.1</p> <p>8) Generation of reports for totalised volume & energy at daily (6 a.m), monthly intervals, flow rate, pressure, temperature, compressibility factor, alarms etc. shall be user configurable</p> <p>9) Apart from prepaid metering, flow computer shall have inbuilt Nomination functionality. Alarm/Output of Nomination shall be provided to valve/SCADA Host. All the above data shall also be made available through GPRS enabled GSM modem to SCADA as well as remotely connected host Laptop.</p>
12.	Security	Password protection provision required to avoid unintended parameter changes
13.	Diagnostics	Flow computers shall have elaborate and sufficient on-line diagnostics to ascertain accurate and proper functioning of the flow computer. Results of diagnostics/checking shall be displayed. Facility for easy testing of the accuracy shall be provided. Provision for high and low limit check for each input, sensor break, saturation, battery voltage monitor, external voltage monitor, SRAM battery status and alarms shall be provided.
14.	Environmental	
15.	Operating Temperature	0 to 70 °C
16.	Storage Temperature	0 to 85 °C

17.	Operating Humidity	5 to 95%, non-condensing
18.	Gas Composition	Keypad/direct GC input/SCADA writing provision required (it should be user configurable as per requirement).
19.	Built-in RTD input - Temperature Range (4-wire RTD) -10 deg C to 60 deg C	Vendor should have built-in 01 number of 4 wire RTD input with accuracy of $\pm 0.1^{\circ}\text{C}$ or better, 24-bit Resolution(min) & Scan time shall be 1 sec(min)
20.	Integral GP sensor	Design Data: <ul style="list-style-type: none"> • Pressure Range :8 barg • Temperature Range:0 to 100 Deg C • Base pressure :1.0332 Kg/cm² • Base temperature :15.56 Deg C • Process connection : 1/2" NPTF • Material of sensor : SS316 Integral GP Sensor with accuracy of $\pm 0.1\%$ of Span (max) (includes linearity, hysteresis, repeatability effects) for measuring gauge pressure inputs from a Turbine meter.
21.	Data Modes and calibration	Shall have the following modes of operation: a) Normal mode b) Calibration mode, wherein flow computer continues using last value of the live inputs, and also allow the computer to be calibrated.
		Data mode – wherein the flow computer data is fed, and the computer should continue the calculations during this mode. All the above modes shall be secured / accessible with software password / mode switches
		Flow computer should provide 5-point calibrations for all input to ensure better accuracy.
22.	Certificate / Approval for custody metering application	Bidder is required to submit type approval certificate such as NMI/Measurement Canada/PTB, etc for offered flow computer model.
23.	Warranty	18 months from the date of supply or 12 months from date of commissioning
24.	Quantity	02 Nos.
25.	Product manufacturing Year	2026 or latest as per requirement
26.	Ram Battery	Long lasting RAM battery with Life expectancy of 5—7 years to be provided as standard supply (installed inside FC as per OEM recommendation). Data retention period in memory shall be min. 12 months (unpowered).
27.	Audit trail	Audit Trail shall be as per API 21.1 compliant. Bidder to provide type approval certificate for API 21.1 compliance of offered flow computer. Recording facility should be available to record any parameter change/modification.
28.	Event log	Event log facility for a period of 60 days or 1000 entries in FIFO manner
29.	Daily log	minimum 60 days daily log required

30.	Hourly log	minimum 96 hours hourly log required
31.	Minutely log	minimum 360 minutes hourly log required
32.	Installation clamps/fittings	Necessary mounting clamps and fittings to install the flow computer on 2 INCH dia Pipe stand to be provided with each flow computer
33.	Operation Manual	Required in English(in CD-ROM)
34.	Communication cable	01 number to be provided with each flow computer
35.	Software CD for communication /configuration/ calibration/ maintenance/ trouble shooting	1 nos. of Licensed software to be provided in between 02 nos. of Flow computer.
* External RTD is in bidder's scope		