

OIL & GAS DEVELOPMENT COMPANY LIMITED
PROCUREMENT DEPARTMENT, ISLAMABAD
FOREIGN SECTION E

(To be completed, filled in, signed
and stamped by the principal)

ANNEXURE 'A'

Material ELECTRONIC GAS FLOW COMPUTERS & ACCESSORIES
Tender Enquiry No PROC-FE/CB/PE&FD-4838/2020
Due Date
Evaluation Criteria FULL

SCHEDULE OF REQUIREMENT

Sr No	Description	Unit	Quantity	Unit Price (FOB)	Total Price (FOB)	Unit Price C & F BY AIR	Total Price C & F BY AIR	Deviated From Tender Spec. If Any
1	SOLAR POWERED FIELD MOUNTED ELECTRONIC GAS FLOW COMPUTER FOR GAS MEASUREMENT, DETAILED SPECIFICATIONS ARE ATTACHED AT ANNEXTURE-Y	Number	30					
2	CONFIGURATION MACHINE WITH LATEST SPECIFICATION INCLUDING LICENSED PROGRAMMING TOOLS, CONFIGURATION AND O & M SOFTWARE WITH DATA CABLE & ACCESSORIES. DETAIL SPECIFICATIONS ARE ATTACHED AT ANNEXURE-Z	Number	7					

Note:

- 1. Bid bond Amount:** - US\$ 4,800/- (USD Four Thousand and Eight Hundred only) or equivalent in Pak Rupees should be submitted with the technical bid.
- 2. Evaluation Criteria:** FULL CONSIGNMENT WISE ON CPT BY AIR BASIS KARACHI under Single Stage –Two Envelope Bidding Procedure
- 3. Terms and conditions:**-Bidders are advised to carefully read all the terms and conditions of the Tender Document available at OGDCL website in the Master Set of Foreign Tender Document (Press-Single Stage Two Envelope)-Updated
- 4. Delivery Period:** 05 Months from the date of L/C establishment

Annexure- X

Distribution list of Online gas Flow Computers

S.No	Wells/Blocks/Fields	FC required	configuration machines required	Located at (Province)
1	Wells Sand-1 & Sand-2, KNR West-2, PD West-2 TAY SW	05	01	Sindh
2	Sinjhora low pressure permeate gas	01	--	Sindh
3	Nur Bagla low pressure permeate gas.	01	---	Sindh
4	Maru,Retti	01	---	Sindh
5	Qadir pur (QP 50,53,59,HRL 4,5)	05	01	Sindh
6	Bitrism, Chabaro, and gathering area	03		
7	Nim 1,Noori Jagir, Daru-1, Magerio and for low pressure gas	04	01	Sindh
8	Bhambra,Thal East,Thal West,gathering area	05	01	Sindh
9	Togh, Togh Bala	02	01	KPK
10	Mela allocation metering at Nashpa	01	---	KPK
11	Dhoke Hussain, Siab-1	02	01	KPK
	<u>TOTAL</u>	<u>30</u>	<u>07</u>	


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OIL & GAS DEVELOPMENT COMPANY LIMITED

TENDER DOCUMENT FOR PROCUREMENT & COMMISSIONING OF SOLAR POWERED FIELD MOUNTED
ONLINE ELECTRONIC GAS FLOW COMPUTERS

AUGUST-2020

SCOPE & SPECIFICATIONS



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1. General

For the Electronic Gas Measurement system (30) Nos. of Solar Powered Field mounted Gas Flow Computers are required for various fields at Custody transfer points for fiscal metering.

The basic function of Gas Flow Computer is to compute instantaneous flow rates in accordance with AGA 3 latest edition through receiving inputs / Process variable (PVs) i.e. Differential pressure (DP), Static Pressure (SP) from primary source i.e. orifice assembly and direct input from RTD for gas temperature measurement and receiving inputs i.e. electrical/ live signals from external multiple type sources like online Gas chromatograph (GC), Moisture Analyzer and from Dew point analyzer for HDCP etc.

Hence to achieve desired performance level in order to calculate accurate Gas Flow measurement; sealed Bids are hereby invited for Procurement, Supply, Commissioning and Testing of Online Gas Flow Computers. The Bidders will prepare and submit their Bids as per instructions given in this document.

2. Delivery Period

The timely delivery shall be the essence as per Purchase Order, as OGDCL has to meet for completion of the Projects. Accordingly, the Supplier is required to supply the online Gas Flow computer within Five (05) months after establishment of LC.

The prospective Bidder shall carefully study and examine the Tender Document and Instructions and comply with all requirements of preparation of the Bid. Failure to furnish all requirements as per Tender Document or submission of a Bid not substantially responsive to the Tender Document in every aspect may result in the rejection of the Bid.



Appropriate portions of the Technical Bid and Commercial Bid and addenda or selected sections of the Tender Document will be incorporated in the PO that will be executed with the successful bidder.

3. Technical Details

Bidder to submit Technical proposal shall contain following information/details and documents.

- Unpriced Data Summary Sheet.
- Equipment Data sheets.
- Detailed Technical specification and Technical literature for the quoted Gas Flow and associated systems being proposed as per requirements of Tender Document.
- Specific Make & Model, along with Country of Origin
- Ordering code with complete description of all characters of the code.
- Solar power consumption and calculation sheet.
- Guarantee/ Warrantee from Manufacturer/ L.C beneficiary of all quoted equipment.
- Total cost of full consignment including supply of material, Commissioning of all units and services.

Note: All documents, Data Sheets and detailed Technical Specification and literature must be provided on published documents.

4. Commercial Bid details:

The Bidder/ Supplier shall quote firm price (not formula based) with full responsibility for Supply, installation, successful Commissioning, commission spares, site services etc. of Flow Computer units.



The prices shall be for complete scope and obligations detailed in this Tender Document. The quoted prices shall be firm and fixed for the Material performance period and shall not be subject to escalation on any account.

5. Specifications

Field Mounted solar powered Online Gas Flow Computers shall have integral / Built-in multivariable sensor for measurement of Differential Pressure (D.P), Static Pressure (S.P) & Temperature (T) directly from primary Elements (Orifice assemblies). Integral multivariable sensor must provide digital values for measurement of D.P and S.P. Standard firmware supports calculations to calculate standard volume based on actual gas volume as per AGA-3 & AGA-7 1992/2013 (volume, mass/density, and mass/relative density) with actual pressure and temperature, compressibility factor per AGA-8 (detailed, Gross-I or Gross-II methods).

Flow Computer must have built-in Wi-Fi connection for wireless connection to Laptop / Configuration machines from distance of at least 10 meters minimum. This is for connecting Flow Computer with Laptop from safe area.

The basic functions of the gas Flow Computer is to compute instantaneous flow rates and to maintain cumulative non-resettable totals of:

- i. Volume MCF/hour
- ii. Volume (MMSCFD);


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- iii. Energy (MMBtu);
- iv. Produce data for current, hourly, daily and monthly reports;
- v. The FC shall be capable of accepting input from GC, Moisture Analyzer/ Dew point Analyzer and produce data/ reports of all associated systems;
- vi. Detect, enunciate and log alarms;
- vii. Transfer data to local printer / laptop computer;
- viii. Maintain cumulative contract month (batch) and daily totals;
- ix. Record data of pressure, differential pressure & Temperature and associated equipment connected with FC for monitoring and reporting purposes;
- x. Simple selection of Engineering units shall be user selectable between either U.S. or metric for each parameter;
- xi. Regarding gas composition, the flow computer shall communicate with a gas chromatograph (GC) to obtain updates using Serial or Ethernet, to get/record gas composition, Component Sum value, Heating value (BTU), Specific Gravity and Alarm status on a regular basis;
- xii. Flow Computer will have provision to set the deviation limits for component sum, high and low limits for Heating value and Specific Gravity and if any one of these data values found outside the set limits and GC in state of alarm; then flow computer will not use values coming from GC and will use either last good values or manually set values for calculations until data values coming from GC falls within the set limits. This function is mandatory required for using flow computers on custody transfer application to avoid calculation on false data from GC, if there is some problem in GC.
- xiii. Receive and use manual updates for gas composition through configuration software by using Laptop.
- xiv. Use a fixed gas composition through laptop;
- xv. Produce on demand a hard copy listing of the current constants and algorithms used by the FC;
- xvi. The FC system shall have the local display for displaying parameters;

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- xvii. FC electronic boards shall be tropicalized by applying conformal coating and made environmentally compatible for all applications Class1, Div 2 Groups A, B, C, D, Temperature Code T4;
- xviii. IEC 61131 capability;
- xix. The FC shall have communication ports (Rs-232, Rs-485 & Ethernet communication) for local and remote monitoring & control;
- xx. Battery backup of RAM (rechargeable or non-rechargeable) shall be provided as an integral part of the FC to protect the loss of RAM contents in case of power supply fail;

(xx) The battery system is to have a 2-year life minimum;

6. Gas Flow & properties calculation options

- The firmware supports user selectable following gas Flow & properties calculation options AGA 3 1992/2013 or latest revision for volume, mass/density, and mass/relative API14.3, API14.9, API 5 with latest revisions.
- ISO 5167 1991/1998/2003 (orifice, Venturi, and nozzle)
- AGA 7 2006 (pulsed turbine, PD, and ultrasonic).
- AGA 11 2013 (Coriolis pulses)
- AGA 8 1994 (Detailed, Gross 1 and Gross 2)
- NX-19 1962, MOD, VDI/VDE 2040
- ISO 12213 2009 (parts 2 and 3)
- GPA standards / 2172 2009 (including saturated vapor calculation) and ASTM D3588.
- ISO 6976 1995 (Superior and Inferior, incorporating Technical Corrigendum 2 [1997] and 3 [1999]).

7. Operational Functions

- All totalizing and compensating functions other than field data input conversion, shall use digital (not analog) methods.

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- Loss of field analog signals by sudden excursion outside the operating range shall cause the gas flow computer to alarm and adopt the last good value, or previous 24 hours' average value or manually configured fault values.
- Totalize flow rate indicates the total mass and total volume on no resettable digital readout.
- Perform calculations including the computation of mass, volume flow rates and BTU total in accordance with AGA-Report 3, AGA-Report 8, AGA-Report 5, GPA standard and ASTM D3588.
- When a measured variable, for example pressure, is overridden by a fixed constant because of signal failure or manual entry, the override condition shall be evident from the process variable display.

8. Data Signals Input

Differential pressure, static pressure and flowing temperature input signals shall be scanned after at least every second. A check of ROM and RAM contents on a continuous basis is required.

Flow Computer shall have capability to accept normalized, gas molar composition characterized up to C9+ (inclusive of water vapor), Gross Real Heating Value, Molecular Weight and Relative Density) from the GC. Data transmission shall be via a MODBUS protocol serial link.

9. Computation

- FC shall be capable of computing gas compressibility from AGA-8 Detail Composition Method. And super compressibility using AGA-8.
- The overall measurement accuracy of analog to digital conversions (ADC), if used, shall be better than $\pm 0.03\%$ of input signal span. The accuracy of all calculations performed by a microprocessor shall be demonstrably



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better than $\pm 0.001\%$ of reading. Rounding errors should be demonstrably without bias and have no effect on the required accuracy.

- The FC's are required to store hourly averages of quantity, differential pressure, static pressure, flowing temperature and relative density inclusive of date and time. The hourly quantity transaction will begin and end at the end of each hour or any time a constant flow parameter is changed.
- The FC shall be providing with a Freezing mode of operation. It means when this mode is selected at the time of Calibration or when Orifice plate changing or maintenance purposes the Gas flow calculation and Totals during this process, shall be done on Freezed values of inputs.
- All alarms shall be shown on the front panel or laptop and must be printable.

10. Meter Run Operation

The gas flow computer shall be capable of performing the following meter run operations.

Gas flow computer shall display following for its meter run:

- Totalized mass (Daily, Weekly, Monthly)
- Gross volume (Daily, Weekly, Monthly)
- Standard volume;
- Temperature (T) $^{\circ}\text{C}$
- Static Pressure (S.P) PSI
- Differential Pressure D.P (inches of W.C)
- Density;
- Flow rate (MMSCFD)
- GC data (Mol %)
- BTU values of the streams
- Moisture Analyzer / HCDP contents

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11. Fiscal Measurement

- The gas flow computer routines for fiscal measurement/ calculations shall comply with AGA-Report 3, GPA standard and ASTM D3588 for volumetric flow, mass flow and BTU calculations.
- The interval between the computer readings of process variables shall not exceed to one second.
- The interval between each cycle for computation of instantaneous flow rate and totalized flow shall be less than one second.
- A complete flow calculation cycle shall not exceed to two seconds.
- A complete AGA-Report 8 calculation cycles shall not exceed to ten seconds.
- Algorithm and rounding off error for computation of fiscal quantities shall be within $\pm 0.001\%$ of the computed value.

12. Calculations

12.1 Heating Value Calculation

All heating values measurement shall be based on GPA standard, AGA Report#5 and ASTM D3588.

12.2 Mass Flow Rate Calculation

All mass flow rate measurement shall be based on AGA-Report # 3 with latest revisions. The gas mass flow rate through the meter run shall be continuously computed from the measured data of the gas at flowing conditions. Flow computations shall be based on mass units, in accordance with AGA-Report # 3 with latest revisions.

12.3 Volumetric Flow Rate Calculation

In addition to providing a gas mass flow rate and total mass, the Gas Metering System shall also calculate volumetric flow rate in SCFD/ MMSCFD and total volume in ft^3 . The Supplier shall provide the formula for these two calculations.

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13. Power Source

Primary Power Source of Flow Computer should be solar power. The complete solar power system including charge controller, batteries etc. should be supplied by the vendor.

The battery shall be capable to power the FC under normal operating conditions without charging up to minimum 03 days.

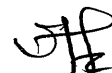
Power system must be able to provide power to flow computer while it is using all functions, including communication with gas chromatograph (flow computer being Modbus master), multivariable sensor input, RTD input, analog inputs / outputs, digital inputs / outputs, Ethernet communication, Wi-Fi communication and LCD display.

Solar Power System to be provided by vendor must include the following as minimum:

- Vendor recommended complete solution of Solar power including solar panel, charge controller, rechargeable battery and solar regulator etc.
- Battery will be mounted inside flow computer enclosure or external enclosure.
- External enclosure (if required) should be provided by Vendor.
- Battery enclosure should be weatherproof.
- System including battery, enclosure and solar regulator should be suitable for installation in Class I, Division 2 location.
- Power system must support backup for all above mentioned functions for at least 07 days.
- Vendor must submit power consumption calculations with the bid.

14. Configuration Machine

The Vendor/ Packager shall be responsible for the provision of configuration machines (Laptop) must be with latest specification at the time of delivery along with licensed configuration software for Flow Computer and all general purpose software shall be used for data communication, downloading/ uploading, maintenance, Calibration, troubleshooting etc.



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Note: The Vendor/ Packager shall be responsible for the provision of seven (07) nos. of configuration machines/ Laptops with all licensed software installed and on USB. Software including Configuration software, Operating system, Antivirus with protecting software tools, MS Office suit, Flow Computer Configuration software and all associates flash & utility software etc.

(Complete specifications of Configuration machine are placed at Annexure –Z)

15. Technical Services

15.1 Pre-Commissioning and Commissioning of Flow Computers

The Bidder/Supplier/ Vendor shall be responsible for the following activities:

- Installation supervision of all supplied units at various OGDCL field locations,
- Powering of all installed units
- To perform pre-commissioning / commissioning activities and to finalize with successful commissioning of all supplied equipment at various OGDCL sites.

Detail of OGDCL sites is attached at Annexure-X. (OGDCL reserve the right to change the site locations if required at the time of installation and commissioning of Flow Computer Unit)

15.2 Commissioning spares

It is mandatory that the Bidder/Supplier/ Vendor shall supply all spares/ material required at the time of Pre-Commissioning and commissioning of units.

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16. Site services

- Bidder/Supplier/ Vendor shall be responsible for training of the OGDCL personal at site.
- The training shall be both classrooms oriented as well as hands on training on the system for the operation and Maintenance personnel.
- The Supplier shall provide the custom designed training for personnel during commissioning phase.

17. Warranty

- Bidder/Supplier/ Vendor shall be responsible for the performance of the Flow Computers
- The Supplier will have to provide the warranty/guarantee for one year (minimum 12 months) faultless functioning of the unit from the date of commissioning including free of cost repair maintenance / replacement in case of any hardware problem before and after commissioning of all units at site. till completion of Warrantee/ Guarantee period.,
- The Supplier shall clearly state how site support will be provided during the System warranty period (Min. 12 months from Commissioning).

18. Performance Tests / Specific Tests with Certification:

- Performance Tests / Specific Tests shall be conducted after successful commissioning of all units at sites The Performance Tests / Specific Tests shall be conducted in accordance with the Manufacturer's standard test procedures.
- The Packager/ Manufacturer shall be responsible for generating the Performance Tests / Specific Tests procedures.
- The pass/fail criteria shall be 100% correct performance otherwise the faulty item shall be rectified or replaced at the Packager/ Manufacturer's cost.
- These tests shall include the testing and acceptance of both hardware

and proprietary system software. All hardware diagnostic programs shall be run at the start of these tests.

- During performance testing Gas Flow Calculations must be verified through AGA-3 certified / 3rd Party AGA-3 certified Software.

19. Terms & Conditions

- i. Bidder/Supplier shall provide OEM Authority letter for supply/distribution.
- ii. Bidder/Supplier/ Vendor shall be responsible for the provision of all the technical data, detailed specification sheets and other related to the Online Flow computer in Hard/ Soft Copies.
- iii. Bidder/Supplier/ Vendor shall be responsible for full compliance of Tender document, Data sheet and all related annexures and Flags.
- iv. Bidder/Supplier/ Vendor shall be responsible for successful commissioning of all units of Flow Computer at OGDCL site locations.
- v. Bidder/Supplier/ Vendor shall provide list of all quoted equipment/ material associated to the Gas Flow Computer, Solar power system, Configuration machines, Technical and Site Services, Commissioning spares with Firm Price (not formula based).
- vi. Cost of full consignment shall be quoted as final Bid value.
- vii. Bidder/Supplier/ Vendor shall be responsible to provide certificates / OEM sureties to prove the Compliance to the latest revision AGA Report # 3 and associated calculations.
- viii. Successful Bidder/Supplier/ Vendor shall be responsible to provide testing and Calibration Certificates of FCs at the time of delivery.
- ix. Successful Bidder/Supplier/ Vendor shall be responsible to provide all licensed Operating system software, configuration, application software and backup configuration software of FC and Configuration machines



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- x. Bidder/Supplier/ Vendor shall be responsible to provide all types of commissioning spares and accessories required at the time of installation, pre-commissioning and commissioning of all units.
- xi. Bidder/Supplier/ Vendor shall be responsible to provide fully equipped configuration machines with latest specification as per annexure-Z along with latest version of Operating systems and all configuration software.
- xii. Bidder/Supplier/ Vendor shall be responsible to provide Certificate of origin.
- xiii. Bidder/Supplier/ Vendor shall be responsible to provide Test Certificates / Benchmark certificates,
- xiv. Bidder/Manufacturer shall have at least 10 years' experience in the supply / manufacturing of same type of material.
- xv. Bidder/Supplier/ Vendor shall be responsible for provision of OEM standard Warrantees / Guarantees of all equipment.
- xvi. Bidder/Supplier/ Vendor shall provide support for the hardware & software for a minimum period of 10 years.
- xvii. Bidder/Supplier/ Vendor shall be responsible to ensure the Delivery of full consignment within five (05) months.

- (END) -



Annexure- Z

Configuration machine / Laptop

Flow Computer Configuration Laptop	
Processor	Core i7 hexa Core or latest
Processor Generation	8 th Gen or Latest
RAM	16 GB
Storage	1TB HDD
Display	17" or more
Operating System	Windows 10 Pro (Licensed)
Office Tools	MS Office, Adobe PDF Reader (Licensed)
Warranty	1 Year



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