

## Purchase Requisition for Rashdiya Dry Gas Metering Skid

### First: General

The gas flow metering system shall be designed to facilitate the full range of flow rates and operating conditions (min, normal and max), min/max design conditions & composition for the dry gas, meeting within the allowable uncertainty limits at any time.

The gas flow metering system shall indicate standard volume and actual volume flow rates together with temperature, pressure, Chemical Composition, molecular weight, compressibility, density, etc.

The Gas metering system shall consist of three major sub-systems:

1. The field mounted gas flow metering skid consisting flow meters, piping, flow straighteners, secondary instruments, changeover valves.
2. Metering Control System which includes Flow Computers, PLC and Supervisory computer to perform the below listed functions:
  - Calculations
  - Generation daily, weekly and monthly reports
  - The execution of calibration process and creating relevant calibration reports
  - Monitoring
  - Diagnostic (Condition based) for UFM
  - Remote control of electrical valves
3. Pressure Reduction Control Valves, which shall be installed downstream of the dry gas flow meters.

The gas flow metering system instrumentation and operating system shall have self-diagnostic feature. On equipment failure, the operator shall be alerted of the status by the flow metering system, considering one duty stream plus one standby stream/master connected in Z configuration, at 100% of flow capacity for each flow stream, as per given process conditions to meet the required accuracy and repeatability.

### Second: Scope of Work

The scope of work shall include but not limited to

1. Design, fabrication, assembly, installation, commissioning, FAT, SAT, and all other services that assure accurate operation of the metering system for the export gases of Eastern Baghdad field/Rashdiya, in accordance with AGA5, AGA6, AGA8-1, AGA8-2, AGA9, AGA10 and ISO 17089:2019.
2. Documentation and preparation of relevant reports.
3. Providing the required training.
4. Providing all required country of origin certificates and calibration certificates.
5. (365) day Warranty.

### Third: Instruments and Equipment

No	Item	Unit	QTY	Unit Price	Sub Total Price
1	<b>Dry Gas Flow Meter</b> i. General Service Dry gas measurement, custody transfer applications Meter Type, Orientation Inline Ultrasonic, Horizontal Direction of Measurement Uni-Directional Principle of Measurement Ultrasonic, Transit Time Accuracy $\pm 0.3\%$ of reading (for master meter) $\pm 0.6\%$ of reading (for duty meter) Overall Uncertainty $\pm 0.5\%$ (for master meter) $\pm 1\%$ (for duty meter) No. of Paths 4 bath at least Line Size & Schedule 6 inch, Sch.80 Meter Size [inch] 6 Process Connection RF, Cl.300 as per ASME B16.5 Country of Origin USA, England, Germany, Switzerland, Italy ii. Materials Measuring Tube, Meter Body, Flanges Carbon Steel ASTM A350 LF2 or Carbon Steel ASTM A352 Gr LCC Titanium Transducers iii. Process Data Process Fluid Dry gas (refer to Note 11, gas composition) Operating Flow Rate [MMSCF/D]: Min 6 Nor 13 Max 20 Operating Temperature [°C] 0 - 40 (Winter) 5 - 50 (Summer) Operating Pressure [Kg/cm <sup>2</sup> (g)] Min 20 Nor 30 Max 38 iv. Flow Transmitter Display LCD Measured and displayed values Line#1: Volume Flow Rate, Line#2: Totalising Volume Language of Display English Mounting Version Compact Output Signal 4-20mA HART + Impuls Supply Voltage 24 DC V Registration Unit MMSCF Material Body Stainless Steel 304 Carbon Steel ASTM A350 Gr.LF2 Ingress Protection, Certification IP 65 or Higher, Ex "d" Calibration Certificate Required	Piece	2		
2	<b>On-Line Gas Chromatograph Analyzer</b> Carrier gas Helium Gas analysis components Refer to Note 11 below Analysis cycle time < 3 min Accuracy $\pm 0.25\%$ of reading for Reading Supply Voltage 24 DC V, 50 Hz Ingress Protection, Certification IP65, Ex "d" Calibration Certificate Required Country of Origin USA, England, Germany, Switzerland, Italy	Piece	1		

No	Item	Unit	QTY	Unit Price	Sub Total Price
3	<b>Flow Computer</b> Input Signal 4-20 mA Hart/ Pulses (Pulse per Kg, Pulse Per Litter) Output Signal 4-20 mA Communication Modbus RTU Protocol RS485, Modbus TCP/IP Supply Voltage 24 DCV Flow rate and Proving Calculations AGA6, AGA9 Gas Property Calculations AGA5, AGA8 Part 1, AGA8 Part 2, AGA10 Country of Origin USA, England, Germany, Switzerland, Italy	Piece	2		
4	<b>Pressure Transmitter</b> Accuracy $\pm 0.1\%$ of span (or better) Pressure Range [Kg/cm <sup>2</sup> (g)] 0 - 60 Display LCD Unit Bar Ingress Protection, Certification IP 65 or Higher, Ex "d" Supply Voltage 24 DC V Calibration Certificate Required Country of Origin USA, England, Germany, Switzerland, Italy	Piece	4		
5	<b>Temperature Transmitter</b> Accuracy $\pm 0.1\%$ of span (or better) Temperature Range [°C] 0 ... 100 Display LCD Ingress Protection, Certification IP 65 or Higher, Ex "d" Supply Voltage 24 DC V Calibration Certificate Required Country of Origin USA, England, Germany, Switzerland, Italy	Piece	4		
6	<b>Pressure Gauge</b> Accuracy 1% of span Pressure Range [barg] 0 ... 60 Dial Size [mm] 150 Ingress Protection IP 65 or Higher Calibration Certificate Required Country of Origin USA, England, Germany, Switzerland, Italy	Piece	2		
7	<b>Temperature Gauge</b> Accuracy 1% of span Temperature Range [°C] 0 ... 100 Dial Size [mm] 150 Ingress Protection IP 65 or Higher Calibration Certificate Required Country of Origin USA, England, Germany, Switzerland, Italy	Piece	2		
8	<b>Isolation valve</b> Size [Inch] 6" ANSI Class 300, Sh.80 Type Ball Valve End Connection Flanged, RF as per ASME B16.5 Valve Operator Motorised Manual Operated Required, by hand wheel Function On/off Application Dry gas measurement, custody transfer applications Operating Temperature [°C] 0 - 50 Operating Pressure [barg] 10 - 38 Supply Voltage 1 $\Phi$ , 220V AC, 50 Hz Ingress Protection, Certification IP 65 or Higher, Ex "d" Country of Origin USA, England, Germany, Switzerland, Italy	Piece	5		