

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

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

**ANNEXURE 'A'**

**Material** SKID MOUNTED 6" & 8" METER RUNS  
**Tender Enquiry No** PROC-FB/CB/PROD-4908/2020  
**Due Date**  
**Evaluation Criteria** FULL


**SCHEDULE OF REQUIREMENT**

Sr No	Description	Unit	Quantity	Unit Price (FOB)	Total Price (FOB)	Unit Price C & F BY SEA	Total Price C & F BY SEA	Deviated From Tender Spec. If Any
1	AGA3 COMPLIANT SKID MOUNTED 6" & 8" METER RUNS WITH SENIOR ORIFICE ASSEMBLIES. DETAIL SPECIFICATIONS ARE ATTACHED AT ANNEX-Z.	Number	2					

**Note:** (1) TENDER DOCUMENTS AVAILABLE ON OGDCL'S WEBSITE UNDER TENDER TAB "Master Set of Foreign Tender Document (Press-Single Stage Two Envelop) - Updated". (2) BID BOND AMOUNTING TO USD 3,200/- OR EQUIVALENT PAK RUPEES (AS PER Ts & Cs OF TENDER DOCUMENTS) TO BE SUBMITTED WITH TECHNICAL BID. (3) DELIVERY PERIOD IS SIXTEEN (16) WEEKS ON CFR BY SEA KARACHI BASIS AFTER ESTABLISHMENT OF LETTER OF CREDIT.

**TECHNICAL SPECIFICATIONS**

**TENDER DOCUMENT FOR  
DESIGN, FABRICATION &  
SUPPLY OF  
  
AGA-3 COMPLIANT  
SKID-MOUNTED  
METER RUNS**

0	10-10-2020	In house study	Faisal Qayyum	Abida Parveen	Fasih Akhtar
<b>Rev</b>	<b>Date</b>	<b>Description</b>	<b>Prepared by</b>	<b>Checked by</b>	<b>Approved by</b>
	Oil & Gas Development Company Ltd. Islamabad PAKISTAN			Project: AGA-3 COMPLIANT METER RUN	
Petroleum Engineering and Facilities Department				DOC. No. MR-TOGH-01	REV (0)



# SKID MOUNTED METER RUN

---

## CONTENTS

No.	DESCRIPTION	PAGE
1	CODES & STANDARDS.....	3
2	GENERAL .....	6
3	SERVICE CONDITIONS & DESIGN DATA.....	7
4	PRIMARY MEASUREMENT.....	9
5	BILL OF MATERIAL.....	19
6	SHIPPING, STORAGE & PROTECTION OF EQUIPMENT.....	22
7	WARRANTY.....	23
8	INSPECTION & TESTING.....	24
9	TERMS & CONDITIONS.....	26

## 1.0 Codes and Standards

### 1.1 Definitions

For all purposes of this Specification Document, except as is otherwise expressly provided herein, words and phrases defined in this section shall have the meanings ascribed thereto by this section:

“**AGA**” means the American Gas Association

“**API**” means the American Petroleum Institute

“**Company**” means Oil & Gas Development Company Limited – OGDCL

“**GSA**” Gas Sales Agreement between OGDCL and SNGPL

“**Isolating Flow Conditioner**” means a mechanical, in-line device that isolates the orifice plate from any upstream disturbance and produces a pseudo fully developed flow axis-symmetrical velocity profile free of swirl

“**Orifice Meter**” shall mean the most commonly used differential measuring device as per AGA-3 or latest revisions thereof which are widely accepted for, use of measuring volumes of Gas.

“**Standard Conditions**” means at a reference temperature of 60 deg. F and a reference pressure of 14.73 Psia

“**Standard Cubic Foot (scf)**” when applied to natural gas shall mean the quantity of natural gas which at a temperature of 60 deg. F and a pressure of 14.73 Psia occupies one cubic foot

“**Supplier**” means vendor who will design, fabricate, test and supply the gas quality measurement system



## 1.2 Units of Measurement

The units of measurement to be used on this project shall be as listed below:-

•	Mass	pounds	(lb)
•	Pressure	pounds per square inch gauge	(psig)
•	Differential Pressure	Inches of Water Column	(in H <sub>2</sub> O)
•	Temperature	degrees Fahrenheit	°F
•	Mass flow	pounds per hour	(lb/h)
•	Gas flow	million std. cubic feet per day	(MMSCFD)
•	Density	pounds per cubic foot	(lb/cu ft.)
•	Viscosity	centipoises	(cP)
•	Length	mile, feet, inches	(m, ft, in)
•	Pipe Diameter	inch	In
•	Time	Seconds Hours day	(s) (h) (d)
•	Heating Value	British thermal unit / Stand. Cubic Feet	(BTU/Scf)
•	Gas Composition	Mole %	Mole %

**1.3** The skid-mounted Meter Run will be designed to meet the requirements of the following codes and standards and other requirements in accordance with this Agreement:

**AGA 3** Compressibility and Super Compressibility for Natural Gas and other Hydrocarbon gases, Detail Composition Method

**API MPMS** (Manual of Petroleum Measurement Standards)

**Chapter 14.1** Natural Gas Sampling

**Chapter 14.3** Orifice Metering of Natural Gas and Related Hydrocarbons;

**Part 1:** General Equations and Uncertainty Guidelines

**Part 2:** Specification and Installation Requirements

**Part 3:** Natural Gas Applications (also referred to as AGA Report Number 3 and GPA 8185-90)

**GPA 2145** Table of Physical Constants of Paraffin Hydrocarbons and Other Components of Natural Gas;

**GPA 2166** Obtaining Natural Gas Samples for Analysis by Gas Chromatography

**1.4** Dates of issue of standards, to be followed, shall be the latest editions as revised from time to time, and as accepted by the Company.



## **2.0 GENERAL**

### **2.1 PROJECT BACKGROUND AND DESCRIPTION**

Oil & Gas Development Company Limited (OGDCL) intends to procure & install two Skid Mounted Meter Runs for the measurement of sale gas quantities as per AGA-3 with latest revision.

Each Meter Run shall consist of 1 x 100% orifice flow meter stream complete with inlet and outlet headers. The system shall be designed to meet the MPMS/ AGA / ISO standards for the custody transfer metering of natural gas.

In this connection, sealed Bids are hereby invited for Design, Fabrication, & Supply of two skid-mounted Meter Runs (Complete in all aspects).

### **2.2 DELIVERY PERIOD**

The timely delivery shall be the essence of the Contract, as OGDCL has to meet for completion of the Project. Accordingly, the Packager/ Manufacturer is required to complete the Design, Fabrication and Supply of Skid mounted Meter Runs within **16 weeks** after establishment of L/C. Failure to comply the delivery period time will lead to rejection of bid.

### 3.0 SERVICE CONDITIONS & DESIGN DATA

#### 3.1 Environmental Conditions

The maximum and minimum ambient temperatures range from **-5°C to 55°C** and relative humidity is 58%.

Maximum Temperature	<b>55 °C</b>
Minimum Temperature	<b>-5 °C</b>
Maximum Rainfall	<b>50 mm/hr. for 3 hours.</b>
Relative Humidity in Summer	<b>20% - 80%</b>
Relative Humidity in Winter	<b>45% - 60%</b>
Frost in Winter	<b>During December and January</b>

#### 3.2 Process Data:

<b>Product</b>	<b>Value for 6"</b>	<b>Value for 8"</b>
Max. operating pressure	1100 psig	1200 psig
Operating temperature	0-260 Deg. F	0-260 Deg. F
Minimum flow rate (Inlet of metering)	15 MMSCFD	15 MMSCFD
Normal flow rate (Inlet of metering)	35 MMSCFD	70 MMSCFD
Maximum flow rate (Inlet of metering)	45 MMSCFD	85 MMSCFD
Specific Grav. at Operating Conditions	0.60-0.65	0.60-0.65

#### 3.3 Design Data for sizing purposes

	<b>For 6" Meter Run</b>	<b>For 8" Meter Run</b>
Process Fluid	<b>Natural Gas</b>	<b>RAW Gas</b>
Volume (Normal flow).	35 MMSCFD	70 MMSCFD
Volume (Maximum flow)	50 MMSCFD	90 MMSCFD
Volume (Minimum flow)	15 MMSCFD	15 MMSCFD
Minimum operating pressure	600 Psig	600 Psig
Normal operating pressure	1200 Psig	1200 Psig
Maximum operating pressure	2000 Psig	2000 Psig
Operating Temperature	0-250 °F	0-250 °F
ANSI Pressure rating class	600	600
Meter Run Size	6 Inch, Class 600, Sch-80	8 Inch, Class 600, Sch-80
Calculated Gross Heating Value	900-1200 BTU/Cu.ft	900-1200 BTU/Cu.ft
Flow Compensation Computation	AGA# 3 with latest revisions	AGA# 3 with latest revisions



### 3.5 Sales Gas Composition

The following is the gas specification ranges at Sales Gas Pipeline:-

<b>Composition</b>	<b>Mole %</b>
N2	1.3907
CO2	0.697
C1	93.5009
C2	2.6683
C3	0.953
iC4	0.2846
nC4	0.2561
iC5	0.1094
nC5	0.0716
Hexane +	0.0684
H2S	Nil
<b>Total</b>	<b>100</b>
S.G of Gas	0.6029
Net BTU/SCF	1046.27

## **4.0 PRIMARY MEASUREMENT**

Gas measurement shall be made by means of circular, concentric, flange-tapped orifice plate meters, designed in accordance with API CHAPTER 14.3, Part 2, "Specification and Installation Requirements". Meter tubes and orifice plates shall be designed and constructed with dimensions and mechanical tolerances, as defined in the above standard, such that the minimum uncertainty in the meter discharge coefficient is achieved.

### **4.1 Meter Run Design Specifications**

- a. Each Meter run with **Class 600, Sch. 80, RTJ**, material conforming to **API 5L,X-52 (PSL-II**, Factory fabricated skid mounted Meter Run), **seamless with companion flanges, rings, studs & nuts**.
- b. The minimum upstream and downstream dimensions of each meter run shall be designed as per latest revisions of 2000 to ANSI 2530/API MPMS 14.3/ **AGA report # 3 Part 2 &** super compressibility factors requirements.
- c. Each Meter Tube shall be provided with Flow Conditioners (Flow Profiler) with AGA-3 compliance. The performance test data/results of the orifice meter must be accompanied with the quotation/bid, confirming the flow profiler location at different beta ratios for which acceptable performance has obtained
- d. Orifice plate thickness shall be ¼" or 3/16" inch in accordance with the 2000 revisions of AGA Report no. 3 Part-2.
- e. Proper Meter tube surface minimum roughness is required to assure accurate measurement, shall be in accordance with the latest revisions of 2000.
- f. All flanges shall be RTJ type.
- g. All pipes shall be seamless with acceptable industrial grade and material.
- h. The deformation of the orifice plate at maximum differential pressure shall be less than 1% (not exceeding flatness limit). When measure at flat surface, the flatness shall be within the 0.5%.
- i. The Packager/ Manufacturer shall verify the performance of the skid mounted Meter Runs for each of minimum, normal, and maximum design

flow rates by calculating the uncertainties of the mass flow rate measurement for the spread of flow conditions given.

- j. The meter tubes shall be manufactured and installed in a way, so that it can be disassembled for inspection and maintenance of the inner wall both upstream and downstream of the flow element.
- k. Flow Conditioner shall be designed in accordance with AGA # 3 standards for steady gas flow without turbulence and noise.
- l. The temperature of process gas must remain constant on upstream and downstream of flow element and an appropriate insulation shall be used to achieve this requirement.
- m. Meter run shall also be provided with vent system. Individual connection of this system shall be taken from downstream of orifice meter run at a distance, recommended in the AGA # 3 (or latest edition) report.
- n. Bolts and Nuts shall be the ISO metric threads, in accordance with ASTM **A193, grade B7 and ASTM 194, Grade 2H**, respectively. Bolts and nuts shall be cadmium plated and suitable for hydrocarbon service.
- o. Round washers shall conform to American Standard **B27-2 Type B** or equivalent for use with ISO metric bolts.
- p. All flanges and fittings shall be in accordance with **ANSI B31.3**.
- q. All piping material, valves, pipe fittings, instrumentation wetted parts shall conform to **NACE MR-0175/ ISO 1516 (Latest Edition)**.
- r. Spiral wound or corrugated metal gaskets shall be used everywhere. Asbestos gaskets are not allowed.
- s. The Packager/ Manufacturer shall submit all design calculations and drawings to the Company for approval prior to manufacture.
- t. Inlet & outlet header flanges shall be 8 inch RTJ, Class 600, Sch-80 with companion flanges, rings, studs & nuts. This will be used to connect the Meter Run with existing 8 inch pipeline.

It is mandatory that all aspects of the meter runs (including length) conform to the provisions of AGA-Report #3 for the case of 'zero additional uncertainty'.

## 4.2 Meter Run Piping:

Piping Class	600
Pipe Material	Seamless, API5L X 52 (PSL II) or better
Size	According to BOM, Schedule 80
Flanges	ANSI B 16.5 - ASTM A694 F52 - Flange Rating ANSI 600# RTJ
Fittings	ANSI B 16.9 - ASTM WPHY-52
Stud bolts / Nuts	ASTM A193 B7M / ASTM A194 2HM
Gaskets	Soft iron matching rings
Corrosion Allowance	0 mm
Piping Design Code	ASME B 31.3/31.8
Valve Body	Forged Carbon Steel
NACE MR-01-75 Compliant	Yes

All pipes shall be of seamless type. All flanges shall be **RTJ** type.

Each Meter Run shall be professionally fabricated in order to meet and exceed the stringent specifications of latest versions of AGA / API / ISO. Welding procedures must be in accordance with the applicable ASME Boiler and Pressure Vessel Codes. Manufacturer will ensure that all of NDT and stress relieving requirements are met with full documentation.

The 3-section assembly contains an inlet spool of the minimum length prescribed by the 14.3 standard. The second section begins with a concentric Flow Conditioner. The outer end of section 2 contains the orifice flange or fitting. The third or downstream section follows and contains branch connections for installation of field instruments (pressure/temperature transmitters & gauges). The upstream lengths are in compliance with API 14.3 table 2-8b and can be used in any piping configuration. Downstream sections are extra-long to allow for the addition of extra branch connections in the field. The standard meter tube has class 600# flanged outer ends.

#### 4.2b **FLOW CONDITIONER (PROFILER)**

Flow profiler should be CPA 55E NOVA or approved equal optimized for improved cross flow and swirl eliminated and lower noise levels. Bidder to clarify /specify offered model and confirm that performance test data provided supports the stated model of flow conditioned outlined in their proposal.

Flow conditioner included should be isolating type. Isolating flow conditioners are defined in AGA-3 as Devices that effectively remove the swirl component from the flowing stream while redistributing the stream to produce flow conditions that accurately the orifice plate coefficient of discharge database values. As such meter runs incorporating flow straightening vanes designs are not acceptable.

Flow conditioner design will include three sets of pressure taps. There is one pressure tap for the upstream side of the flow conditioner, one on the downstream side and an additional pressure tap on one of the outer holes. These additional taps on the Flow Conditioner will allow us to connect a standard DP allowing it to act as a secondary check to a primary measurement device. This will be helpful for indication of any blockages, residue accumulation in the flow conditioner and helps know if the flow profile has been degraded by these.

### **4.3 SENIOR ORIFICE FITTING / METER**

AGA compliant dual chamber orifice flow meter which allows routine inspection without shutting down/depressurizing the system.

Dual Chamber orifice fitting/meters will incorporate double block & bleed (DBB) capabilities to improve operational safety without sacrificing the overall AGA-3, 2000 compliance requirements.

DBB orifice fittings must be designed after HSE 253 Cat 2 isolation and built to meet or exceed ASME/ANSI specifications as well as comply with latest editions of AGA-3/API 14.3 or ISO 5167

Isolation using two separate chambers with separate equalization and venting for the upper and middle chambers is to be provided to enhance operator safety in event of lower valve failure.

Pressure gauges complete with blowout preventers should be provided for upper and middle chambers to help operator access the equipment status including valve failure, vent blockages and other system malfunctions.

An automatic valve latch should be included on both of the valve operating shafts requiring a manual offset before the valve may be opened for addsers security for operator safety and awareness.

The DBB orifice fittings must support dual shaft operation so that the orifice fitting can be operated from either side without disassembly or re-assembly of the unit.

The orifice meter design must ensure that plate carrier is secured in a concentric position while in measurement mode and also support eccentricity adjustments from outside the fitting without disassembly.

Additional set of telemetry tap should be provided on each side of fitting for secondary devices such as flow recorders, etc.

The DBB design must support use of standard Universal plates with Elastomer, Teflon and SS seals meeting AGA 3 2000 edition requirements.

All fittings come standard with a documentation package including hydro-test, function test, inner valve seal test, quality control inspection and material test reports. The fittings must be in accordance the guidelines of ASME 16.34 and ASME 16.5. Radiography, stress relief & ultra-sonic tests must be performed with the



relevant report to be submitted to OGDCL during FAT/before shipment.

An AGA 2000 Inspection report is required for the following tests:-

- I.D. Bore Tolerance
- Tap Communication
- Orifice Eccentricity
- Instrument Tap Diameter
- Plate Seal Test
- Bore inside Diameter
- Instrument Tap Location
- Seal Protrusion
- Bore Roughness

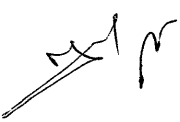
Higher differential pressure may be used where it is demonstrated that deformation and elastic deformation limits are not exceeded.

The deformation of the orifice plate at maximum differential pressure shall be less than **1%** (i.e. not exceeding flatness limit). When the flatness measured on a bench shall be within **0.5%**. The uncertainty in flow caused by elastic deformation of the orifice plate shall be less than **0.1%**.

The upstream and downstream pressure tapping shall be in the same axial plane in accordance with directions stated in **AGA-Report#3**.

Carrier for the orifice plate shall be designed so that the plate may be changed or removed for routine inspections easily. The Packager/ Manufacturer shall ensure that orifice plates in the measurement chamber are restrained against displacement (due to seal ring compression or any reason) as specified in **AGA-Report#3**.

The orifice fittings shall be welded flanged design. The Packager/ Manufacturer shall provide an acceptable method to assure concentric alignment of the mating meter tube downstream of the orifice meters.



#### **4.3a ORIFICE PLATE**

- (a) Orifice plate shall be sized based on AGA Report No.3, Orifice Metering of Natural Gas and Other related Hydrocarbon Fluids.
- (b) The primary flow element shall be concentric, square-edged orifice plates of a design to allow installation in a quick-change, dual-chambered double block bleed orifice fitting.
- (c) Orifice plate thickness shall be ¼ or 3/16 inch as per AGA-3 recommendations.
- (d) The minimum diameter **Beta ratio** ( $\beta$  ratio) shall not be less than **0.3** and the maximum allowable shall not exceed **0.7**.
- (e) No vent or drain hole shall be allowed in the orifice plate.
- (f) Orifice plate shall have a maximum surface roughness of 50 micro-inch RMS using a comparator.
- (g) Orifice plate shall be manufactured of 316 stainless steel.
- (h) Orifice plate shall be sized with maximum flow considering the bore size & inches of water column values.
- (i) The flow measurement error caused by elastic deformation of the orifice plate shall not exceed 0.1%.

Supplier shall supply total of **03 orifice plates** with each Meter Run.

#### **4.4 WELDING**

Weld Procedures will be in accordance with ASME IX and / or AWS D1.1

#### **4.5 INSTRUMENT CONNECTIONS**

Six 3/4 inch threadolet connections are required on each Meter run.





#### 4.6 METER TUBE VALVES

Meter runs shall be provided with full-bore ball valve upstream and a full bore ball valve downstream which will be in accordance with the Piping material. Matched bored upstream block valves may be considered as part of the upstream meter tube section (upstream of the flow conditioner), where it can be shown that the criteria given in API CHAPTER 14.3 for upstream meter tube are maintained. The system of valve and fittings shall also follow the recommendation in **AGA-Report#3**. Valves on meter run shall be equipped with manually operated hand wheels.

For meter run isolation, full bore Trunnion mounted Valves, manually operated are required at the following locations on the skid:

- DBB manual valve at header Inlet.
- DBB manual valve at header Outlet

Valve design, manufacturing and testing standards are as per ASME B 16.34, API 6D and BS 5351.

These standards cover Pressure / Temperature ratings, minimum shell thickness and bore diameter for each size / class. The valves are certified fire safe to API 607 / API 6 FA / BS 6755 Part II.

Construction	Full-bore Trunnion Mounted Ball Valve, 3 bolted pieces, side entry, double block and bleed, blow out proof stem, automatic internal relief, anti-static device
Type of valve operation	Manually operated bevel geared with hand wheel
Fire safe	According to BS 6755 part2
Design	According to API 6D and B16.34 - NACE MR 01-75 latest edition
Body & ends	A350 LF2
Ball	A350 LF2 + ENP75µm for diameter 6" and above
Trim	AISI 410
Seat insert	RTPFE / DEVLON V for class 600# and above
Bolts & nuts	A320 L7M / A194 Gr 7M
O-ring seals	VITON AED for class 600# and above
Fire seals	GRAPHOIL
Ball position indicator	Open & close indicator required

#### **4.7 INLET & OUTLET HEADER FLANGES**

Two 8"x6" Inlet & Outlet headers shall be supplied by the Packager/ Manufacturer for connection of 6" Meter Run with 8 inch existing pipeline. Similarly two 8" Inlet & Outlet headers shall be supplied by the Packager/ Manufacturer for 8" Meter Run. Inlet header length shall be doubled than Outlet header for provision of sampling gas to GC/Moisture Analyzer.

#### **4.8 SKID FRAME**

Meter runs will be mounted on steel structure skid base suitable for transportation on site and for proper support of equipment during the operation. All sharp corners or edges must be ground smooth and deburred. The skid shall be adequate in strength, neat in appearance & permits easy access for operation & maintenance.

Skid material shall be of carbon steel preferably of ASTM A-36. No equipment shall protrude over the edge neither of the base frame or below the underside. Skid length will be equal to the length of complete Meter run from reducer to reducer while its width will be minimum 8 feet.

The structural supporting members of the skid frames shall be sufficiently rigid to prevent any damage of permanent distortion or misalignment to the mechanical equipment and piping during fabrication, transportation and normal operation.

Skid will be equipped with 4 lifting lugs suitable for lifting the structure with relevant piping and accessories. Steel Structures will be welded as per AWS D1.1 using GMAW technique.

#### **4.9 OVERALL ACCURACY REQUIREMENTS**

The Meter Runs shall be designed to achieve an overall accuracy of readout within  $\pm 0.5\%$  or better as calculated in accordance with AGA-Report # 3 /latest revisions of 2000.

#### **4.10 CORROSION PROTECTION AND PAINTING**

Meter Run skids painting and protective coating and the procedures for preparation for painting shall be in accordance with **API** and **ASTM** standards.

In order to prepare the surface for painting, a sand blasting shall be accomplished in order to achieve a surface compliant with the degree **Sa 2 1/2**.

#### **4.11 EARTHING SYSTEM**

Meter Run skids will be provided with earthing system according to IEC code, upto No.2 BHT S.S plates, with 10 mm holes, located at the opposite corners and welded to the skid steel structure before painting works.



#### **4.12 NAMEPLATE IDENTIFICATION**

Structural skids shall be supplied with a permanent, weather resistant, stainless steel nameplate affixed to the skid, with the following details, as a minimum:

- Project title and number
- Owner name and location
- Equipment name & tag number
- Skid overall dimension data
- Skid weight data
- Inlet size (in inch) and Outlet size (in inch) with class rating
- Min/Normal/Max flow capacity in mmscfd

#### **4.13 DOCUMENTATION**

Following Certificates and Reports shall be supplied:-

- Raw Materials Quality Certificates / Material Test certificates
- Certificate of Conformity issued by manufacturer
- Welding Procedure Qualification Report
- Non Destructive Examination Reports
- Pressure Test Reports
- Instruments Calibration Reports
- Compliance of the Meter Run to the latest revision AGA Report # 3.
- Certificate of origin.

Manufacturer Data Book and Operation and Installation Manuals will also be supplied along with the delivery of the Package.

## 5.0 Bill of Material

S #	Item Description				Unit	Qty
	Skid mounted 6" Meter Run. Details of following minimum BOM for each Meter Run is as under:-				Nos.	1
1	S #	Item	Specifications	Material	Qty	
	1	Upstream Tube for Flow Conditioner	API 5L / B31.3 / B31.8 / ASME B16.5 6600 Sch.80, ANSI-600	API 5L X-52 [PSL-II] tube / ASTM A694 F52	1	
	2	Upstream Tube for orifice fitting	API 5L / B31.3 / B31.8 / ASME B16.5 6600 Sch.80, ANSI-600	API 5L X-52 [PSL-II] tube / ASTM A694 F52	1	
	3	Downstream Tube	API 5L / B31.3 / B31.8 / ASME B16.5 6600 Sch.80, ANSI-600	API 5L X-52 [PSL-II] tube / ASTM A694 F52	1	
	4	Flange 6"	ANSI-600, RTJ, Sch.80	A105 LTCS	8	
	5	Flange 8"	ANSI-600, RTJ, Sch.80	A105 LTCS	2	
	6	Threadolet with S/S plugs	3/4" 3000#	A105	6	
	7	Concentric Reducer 8"x6" Inlet header	ASME B16.5 / B31.3/B31.8, Sch-80 RTJ Increased length than outlet header to accommodate sampling.	ASTM A216 WCB/ WCC / A105 CS	1	
	8	Concentric Reducer 8"x6" Outlet header	ASME B16.5 / B31.3/B31.8, Sch-80 RTJ	ASTM A216 WCB/ WCC / A105 CS	1	
	9	FULL BORE BALL VALVE 6" ANSI 600# RTJ CS/316 Trunnion FB	ASME B16.34 / API 6D / BS 5351 / BS 6755 Part II	Body & Ends: ASTM A350 LF2 CS, Ball: A350 LF2 + ENP75µm, Trim: ANSI 410, Fire Seal: Graphoil	2	
	10	DUAL CHAMBER DBB ORIFICE FITTING 6" 600#	ANSI-600, ISO 5156 / API MPMS 14.3.2 / AGA 3 2000e / GBT 21446-2008 Butt weld upstream, Flanged downstream	Body Material: A216WCB, Trim: Standard NACE MR-01-75,	1	

S #	Item	Specifications	Material	Qty
11	Orifice Plate, Class 600, SCH-80	3/16" to 1/4" thickness, ISO 5156 / API MPMS 14.3.2 / AGA 3 2000e / GBT 21446-2008	ANSI 316 SS	3
12	FLOW CONDITIONER Plate Type with single chamber housing	Plate having three sets of pressure taps. Flanged connections for housing. Allows easy inspection & replacement. AGA-3 compliance.	ANSI 316 SS	1
<b>2</b>	<b>Skid mounted 8" Meter Run.</b> Details of following minimum BOM for each Meter Run is as under:-			<b>No. 1</b>
S #	Item	Specifications	Material	Qty
1	Upstream Tube for Flow Conditioner	API 5L / B31.3 / B31.8 / ASME B16.5 6600 Sch.80, ANSI-600	API 5L X-52 [PSL-II] tube / ASTM A694 F52	1
2	Upstream Tube for orifice fitting	API 5L / B31.3 / B31.8 / ASME B16.5 6600 Sch.80, ANSI-600	API 5L X-52 [PSL-II] tube / ASTM A694 F52	1
3	Downstream Tube	API 5L / B31.3 / B31.8 / ASME B16.5 6600 Sch.80, ANSI-600	API 5L X-52 [PSL-II] tube / ASTM A694 F52	1
4	Flange 8"	ANSI-600, RTJ, Sch.80	A105 LTCS	10
5	Threadolet with S/S plugs	3/4" 3000#	A105	6
6	8" Inlet Header	ASME B16.5 / B31.3/B31.8, Sch-80 RTJ Increased length than outlet header to accommodate sampling.	ASTM A216 WCB / WCC / A105 CS	1
7	8" Outlet header	ASME B16.5 / B31.3/B31.8, Sch-80 RTJ	ASTM A216 WCB / WCC / A105 CS	1
8	FULL BORE BALL VALVE 8" ANSI 600# RTJ CS/316 Trunnion FB	ASME B16.34 / API 6D / BS 5351 / BS 6755 Part II	Body & Ends: ASTM A350 LF2 CS, Ball: A350 LF2 + ENP75µm, Trim: ANSI 410, Fire Seal: Graphoil	2

S #	Item	Specifications	Material	Qty		
9	DUAL CHAMBER DBB ORIFICE FITTING 8" 600#	ANSI-600, ISO 5156 / API MPMS 14.3.2 / AGA 3 2000e / GBT 21446-2008. Butt weld upstream, Flanged downstream	Body Material: A216WCB, Trim: Standard NACE MR-01-75,	1		
10	Orifice Plate, Class 600, SCH-80	3/16" to 1/4" thickness, ISO 5156 / API MPMS 14.3.2 / AGA 3 2000e / GBT 21446-2008	ANSI 316 SS	3		
11	FLOW CONDITIONER Plate Type with single chamber housing with companion flanges.	Plate having three sets of pressure taps. Flanged connections for housing. Allows easy inspection & replacement. AGA-3 compliance.	ANSI 316 SS	1		
3	1 Inspection & testing	Pre-shipment inspection & testing	-	-	Lot	1

## **6.0 SHIPPING, STORAGE & PROTECTION OF EQUIPMENT**

- 6.1 The Metering skids shall be properly stored and protected from damage at all times in accordance with Industry practice.
- 6.2 Supplier shall be solely responsible for the adequacy of the preparations for shipment and for ensuring that materials and equipment arrive at their destination in undamaged condition.
- 6.3 Supplier shall supply a list of weights and sizes of shipment packages prior to dispatch, to ensure that there are adequate facilities available at the project site for safely unloading and placing the equipment in its designated location.
- 6.4 All shipping documents shall be in the English Language.
- 6.5 Meter Run skids shall be packed in export crating for shipment according to standard industry practices. All delicate and sensitive instruments to be packed in separate wooden crates to avoid damage during shipment and put it in container along with other loose components. Anticorrosion material should be applied and filled, wherever necessary in the package to avoid corrosion during shipment and storage.



## **7.0 WARRANTY**

- 7.1 Supplier shall have final and total responsibility for the design, fabrication, and performance of the skid-mounted Meter Runs as per tender specifications. Supplier shall warrant the materials, construction and performance of the Meter Runs.
- 7.2 The Supplier will have to provide the written warranty/guarantee for one year faultless functioning of the unit from the date of commissioning including free of cost repair maintenance, procurement and installations of parts.





## **8.0 INSPECTION & TESTING**

### **8.1 General**

The Meter Runs shall be subjected to rigorous testing programs at all stages of manufacture. Quality assurance and testing shall be designed to simulate as closely as possible local conditions. The programs shall outline methods, procedure and simulation facilities proposed based on ISA RP55.1.

All test and inspection data shall be legible including the name and signature of the Packager/ Manufacturer and where applicable the inspector.

All defects in materials detected as a result of testing shall be repaired or replaced by the Packager/ Manufacturer at no cost to the OGDCL. If the correcting of any error or defect involves serious alternations requiring replacement of parts, the approval of the OGDCL shall be obtained before proceeding with such corrections. Also if the correction of the error requires witnessing by the Inspector or a change in certificates issued by the Inspector the correction shall be properly corrected and signed by the Inspector.

If any part of the equipment is damaged after tests have been completed, retesting of the affected parts is mandatory. The method of repair shall be in accordance with the Packager/ Manufacturer s standard procedures.

### **8.2 Pre-shipment Functional & Performance Tests**

Pre-shipment Performance Tests shall be conducted at vendor's facility in accordance with the Packager/ Manufacturer's standard test procedures.

The Packager/ Manufacturer shall be responsible for generating the Performance 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. The Packager/ Manufacturer shall conduct Hydrostatic test of meter run & functional tests of secondary instruments in accordance with applicable design codes/specifications.

The Packager/ Manufacturer shall ensure dimensional calibration of meter tubes and certification of compliance with API / AGA guidelines. The meter tube piping within 2 nominal diameters upstream of the plate should be within 0.3% of the mean value of diameter.

Vendor will submit the detailed report & snapshots of Functional & Performance Tests to OGDCL before shipment.

### **8.3 CERTIFICATE OF ACCEPTANCE**

At the satisfactory conclusion of the Performance Tests / Specific Tests, an appropriate certificate of acceptance shall be provided by the Supplier.

Attached to this certificate shall be all test records and other pertinent documentation. These shall form part of the Manufacturer's Data Report (MDR). The OGDCL will review and approve these certificates.

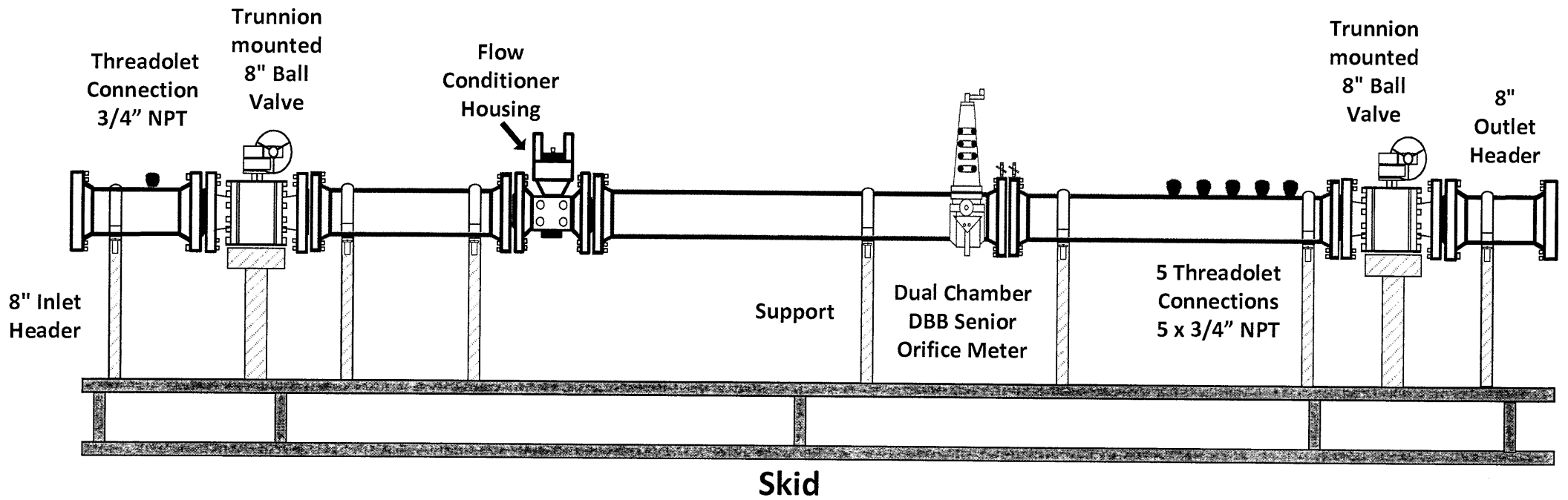
A handwritten signature in black ink, located in the bottom right corner of the page. The signature is stylized and appears to consist of several connected strokes.

## **9.0 TERMS & CONDITIONS**

- i) Packager/Manufacturer shall have at least **10** years' experience in the packaging & installation of similar meter runs/skids. List of such projects previously delivered by the bidder must be provided. Documentary evidence shall be provided for all projects in the list e.g. PO, Contract or Final Acceptance certificate etc.
- ii) Packager /Manufacturer shall be responsible for the performance Warrantees / Guarantees of all individual material/equipments & complete Metering skid.
- iii) Item wise cost (as mentioned in BOM vide clause 5.0) must be provided by the bidder in its financial bid. Bidder to submit written confirmation in technical bid that they have submitted item wise cost in financial bid as mentioned in BOM vide clause 5.0.
- iv) Packager/ Manufacturer is responsible to ensure the delivery of unit within 16 weeks after the establishment of L/C.
- v) Packager/Manufacturer to provide certificates to prove the Compliance of the metering skid to the latest revision AGA Report # 3.

Handwritten mark

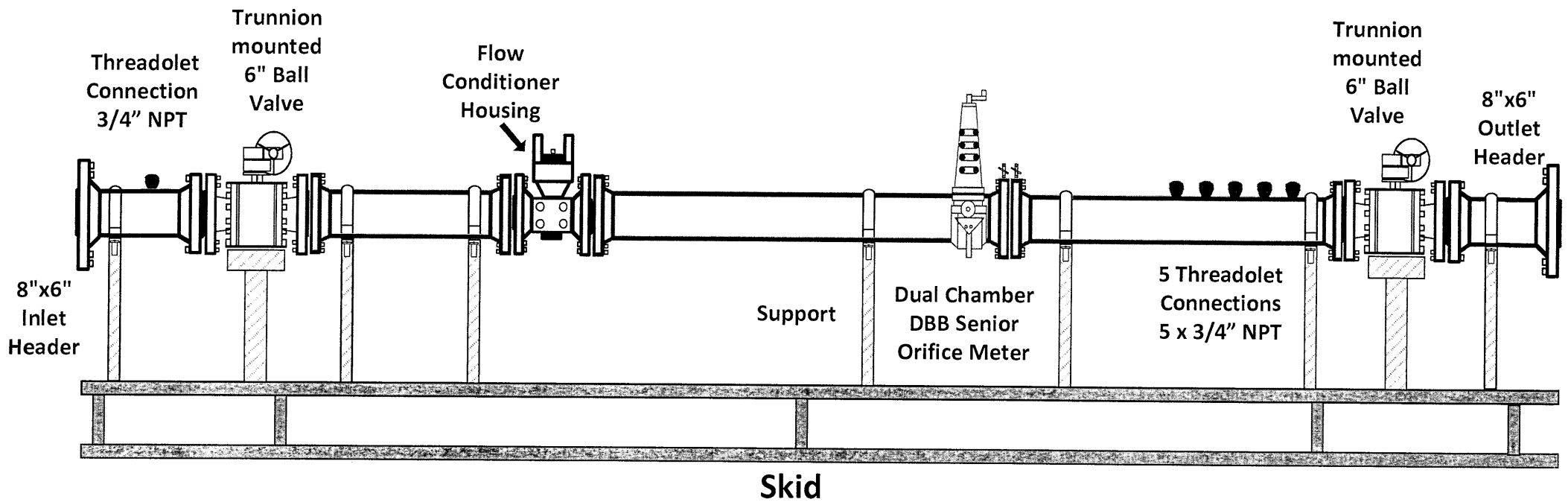
# Skid Mounted 8 Inch Meter Run



Compliance: Latest revision of AGA Report Number 3,  
Part 2 (API 14.3)

Handwritten initials or signature in the top right corner.

## Skid Mounted 6 Inch Meter Run



Compliance: Latest revision of AGA Report Number 3,  
Part 2 (API 14.3)