

Sr. No.	Description	Qty. Required
01	Volumetric Flowmeter for Secondary side of FCTL Technical specification attached at Annexure-B	01 (No.)
02	Mass Flowmeter for Primary side of TMO Technical specification attached at Annexure-C	01 (No.)
03	Volumetric Flowmeter for Secondary side of TMO Technical specification attached at Annexure-D	01 (No.)
04	Volumetric Clamp on Ultrasonic Flow Meter Technical specification attached at Annexure-E	01 (No.)
05	Leak Detector Technical specification attached at Annexure-F	01 (No.)

Flowmeters Technical Specifications

1. Volumetric Flowmeter Vortex Flowmeter Inline type

S. No.	Description	Parameters	Qty.
1.	Type	Vortex Flowmeter Inline Type	01
2.	Working Fluid	Liquid Demineralized water	
3.	Flow Rate Range	1-20 Lit/s	
4.	Measuring unit	Lit/s	
5.	Mounted Pipe size/material	03" Sch-40s/ SS-304	
6.	Wetted part and casing material	SS-304	
7.	Location	Indoor	
8.	Local display	Digital	
9.	Design Temperature	66 °C	
10.	Design Pressure	1.1 MPa	
11.	Operating Temperature	5 to 20 °C	
12.	Operating pressure	0.6 MPa	
13.	Sensor cable connection	1/2" NPT or any suitable type	
14.	Connection	Flanged (RF Standard Flange)	
15.	Flange rating / Material	ANSI 150# / SS-304	
16.	Accuracy	± 0.5 % FS	
17.	Output signal	4 – 20 mA	
18.	DC Power supply	24 Volt	
19.	Standard	ISO 12764:2017 (E)	
20.	Ingress protection	IP 66/67 for sensors & transmitters	
21.	Certification	Installation manual, calibration certificates, hydrostatic test certificate, third party inspection certificate and operation manual	
22.	Make	USA/Japan/Europe or equivalent	

2. Mass flowmeter Ultrasonic Inline Type

S. No.	Description	Parameters	Qty.
1.	Type	Ultrasonic Type(Transit time)	01
2.	Working Fluid	R134a (Liquid)	
3.	Location	Indoor	
4.	Flow Rate Range	0 – 0.8 kg/s	
5.	Measuring unit	kg/s	
6.	Design Temperature	150 °C	
7.	Design Pressure	5 MPa	
8.	Operating Temperature (range)	20 to 120 °C	
9.	Operating Pressure (range)	1.5 to 3 MPa	
10.	Mounted Pipe size/material	1/2" Sch-40s/ SS-304	
11.	Transducer type	Inline type	
12.	Type of path	Multipath	
13.	Wetted part and casing material	SS-304	
14.	Local display	Digital	
15.	Non Linearity and Hysteresis	± 0.1 % FS or less	
16.	Accuracy	± 0.1 % FS or less	
17.	Repeatability	< ± 0.05 %	
18.	Output Signal	4-20 mA	
19.	Power Supply	24 Volt DC	
20.	Sensor cable connection	1/2" NPT or any suitable size	
21.	Connection	Flanged (RF Standard Flange)	
22.	Flange Pressure class/ Material	ANSI 600# / SS-304	
23.	Certification and standards	OIML R-117 and API MPMS 5.8-2011	
24.	Ingress protecting rating	IP 66/67 for sensors and transmitters	
25.	Calibration	According to ISO 17025	
26.	Certification	Installation manual, calibration certificate, hydrostatic test certificate, third party inspection certificate and operation manual	
27.	Make	USA/Japan/Europe or equivalent	

3. Volumetric Flowmeter Ultrasonic Inline Type

S. No.	Description	Parameters	Qty.
28.	Type	Ultrasonic Type(Transit time)	01
29.	Working Fluid	Demineralized water (Liquid)	
30.	Location	Indoor	
31.	Flow Rate Range	0.5 – 10 Lit/s	
32.	Measuring unit	Lit/s	
33.	Design Temperature	66 °C	
34.	Design Pressure	1.1 MPa	
35.	Operating Temperature (range)	5 to 20 °C	
36.	Operating Pressure (range)	0.6 MPa	
37.	Mounted Pipe size / Material	2" Sch-40s / SS-304	
38.	Transducer type	Inline type	
39.	Type of path	multipath	
40.	Wetted part and casing material	SS 304	
41.	Local display	Digital	
42.	Non Linearity and Hysteresis	± 0.1 % FS or less	
43.	Accuracy	± 0.1 % FS or less	
44.	Repeatability	< ± 0.05 %	
45.	Output Signal	4-20 mA	
46.	Power Supply	24 Volt DC	
47.	Sensor cable connection	1/2" NPT or any suitable size	
48.	Connection	Flanged (RF standard flange)	
49.	Flange Pressure class / Material	ANSI 150# / SS-304	
50.	Certification and standards	API MPMS 5.8-2011	
51.	Ingress protecting rating	IP 66/67 for sensors and transmitters	
52.	Calibration	According to ISO 17025	
53.	Certification	Installation manual, calibration certificate, hydrostatic test certificate, third party inspection certificate and operation manual	
54.	Make	USA/Japan/Europe or equivalent	

4. Volumetric Clamp-on Ultrasonic Flow Meter

S. No.	Description	Parameters	Qty.
1.	Type	Ultrasonic Type (Transit time) Portable	01
2.	Working Fluid	Liquid(DM water/R134a)	
3.	Location	Indoor	
4.	Flow Rate Range	0 – 40 Lit/s	
5.	Measuring unit	Lit/s	
6.	Design Liquid Temperature in pipe	150 °C	
7.	Ambient Temperature	50 °C	
8.	Design Liquid Pressure in pipe	7 MPa	
9.	Mounted Pipe size	1/2 " to 4" (variable)	
10.	Transducer type	Clamp-on pipe surface	
11.	Local display	Digital	
12.	Non Linearity and Hysteresis	± 0.1 % FS or less	
13.	Accuracy	± 0.1 % FS	
14.	Repeatability	< ± 0.05 %	
15.	Power	Battery powered	
16.	Output Signal	4-20 mA	
17.	Power Supply	24 Volt DC	
18.	Sensor cable connection	1/2" NPT	
19.	Certification	OIML R-117 and API MPMS 5.8-2011	
20.	Calibration	According to ISO 17025	
21.	Softwares and cable connection required	Yes	
22.	SD card for data storage	Yes	
23.	Ingress protecting rating	IP 66/67 for sensors and transmitters	
24.	Certification	Installation manual, calibration certificates, third party inspection certificate and operation manual	
25.	Make	USA/Japan/Europe or equivalent	

5. Detailed Technical Specifications

Sr. #	Description	Qty.
1.	R-134a Leak Detector	01
	Working Refrigerant	
	R-134a (Liquid)	
	Ambient Temperature	
	50 °C	
	Leak Detection Capability	
	0.05 oz./year	
	Sensitivity Level	
	All three as: • Low • Medium • High	
	Response Time	
	Instantaneous	
	Calibration	
	Self /Automatic	
	Zeroing Function:	
	Both Automatic & Manual [Automatically zeroing after every 2 to 3 seconds, when no leakage found]	
	Filter:	
	Replaceable, Water-Proof	
	Sensor	
	Replaceable and not affected by temperature changes, smoke, humidity & air flow etc.	
	Battery	
	Fast chargeable, Ultra-compact	
	Battery Time	
	More than 12 hours	
	Charger Type	
	Wall Socket	
	Voltage/ Phase	
	220V/ 2Ph,3Ph	
	LCD Display Indication & Audible Alarm	
	• Leak Detection • Sensor Failure • Charging sign & status • Low battery warning	
	Flexible Probe length	
	15 inches or more	
	Carrying Box	
	Included	
	General Information	
	Applicable codes/Standards	
	SAE J1627	
	Certification Required:	
	• Calibration certificate • Third Party Inspection certification • Operating, Maintenance & Calibration Manuals required in English	
	Warranty	
	2 Years	
	Material of Construction	
	All wetted parts e.g. Probe Material	
	SS-304/ higher grades	
	Spares	
	05 years operational & consumable spares e.g.: • Sensors • Filters • Batteries • O-rings	