

Laboratory Fluid Control Research Institute, Kanjikode West, Palakkad, Kerala

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-7402 (in lieu of T-0027)

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Validity 31.05.2018 to 30.05.2020

Last Amended on 16.08.2018

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
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**FLUID FLOW TESTING**

<b>I.</b>	<b>LIQUIDS</b>			
<b>1.</b>	<b>Water</b>			
<b>a.</b>	<b>Domestic water Meter</b>	Hydrostatic pressure test Accuracy test Pressure loss test Temp. Suitability test Endurance test	{ IS 779 IS 6784 ISO 4064 OIML R 49 }	Upto 40 bar 0.005 m <sup>3</sup> /h to 50 m <sup>3</sup> /h Upto 1 bar Upto 70 °C 1 lakh cycles
<b>b.</b>	<b>Bulk water meter</b>	Hydrostatic pressure test Accuracy test Pressure loss test Endurance test	{ IS 2373 ISO 4064 OIML R 49 }	Upto 4 MPa 0.015 m <sup>3</sup> /h to 4500 m <sup>3</sup> /h Upto 100 KPa 1000 hours
<b>c.</b>	<b>Flow Meter (upto 600 mm size)</b>	Accuracy test & repeatability tests (prior to & after endurance test)	{ OIML R 117 OIML R 49 }	Upto 2500 m <sup>3</sup> /h
		Endurance test for 100 hr Pressure loss across meter		100 hours 1MPa
		Dry heat test Cold test Damp heat (cyclic) test		55 °C -25 °C -25°C to 55 °C , RH 95%
		Power voltage variation tests		230 V <sub>(+15 % / -15 %)</sub>
<b>d.</b>	<b>Control Valve</b>	Control Valve Capacity Test Inherent Flow characteristics	{ ANSI / ISA – 75.01 ANSI / ISA – 75.02 ANSI / ISA – 75.11 IS 10189 }	Valve size upto 1800 mm NB

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		Liquid Pressure Recovery Factor Test	{ ANSI / ISA – 75.01 ANSI / ISA – 75.02 ANSI / ISA – 75.11 IS 10189 }	Valve size upto 200 mm NB
e.	Valves	Fugitive emission test	{ ISO 15848–1 ISO 15848–2 ANSI ISO 93.00 }	Upto #1500 class -195 to 400 °C 29 MPa
		Hydrostatic seat leakage test, Pressure testing	{ ANSI B – 16.104 BS 5146 }	Valve size upto 1200 mm NB
		Cryogenic testing	BS 6364 BS 5146	Valve size up to 300 mm NB
f.	Butterfly valve	Butterfly valve proof of design testing	AWWA M49 BS 5155 IS 13095	Valve size up to 1200 mm NB
g.	Valve actuator	Valve positioner testing	ANSI/ ISA 75.13	Qualitative
II.	AIR & GAS			
a.	Blower / Fan / Air/Gas Flow Measurement In Large Diameter Ducts	Measurement of flow in ducts at labs or site by velocity traversing method using velocity measuring probes	{ Work Procedure No. WP-AT-09 Issue no.: 0 Issue date: 05.07.07 WP-AFW-T01 Issue no.: 00 Issue date: 01.01.14 IS 14973, ISO -3966 (Clauses 1 to 13, Annexure A,E,G) BS 848, Part 1 (Clauses 1 to 30) ISO 10780 (Clauses 6 to 10) ANSI/ AMCA 210 }	Velocity 0.1 to 80 m/s

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b.	Venting Devices/ Air Valve	Testing of Venting devices	{ Work Procedure No. WP-AT-05 Issue no.: 01 Issue date: 03.01.2000 Work Procedure No. WP-AFH-T05 Issue no.: 02 Issue date: 10.04.2014 API 2000 (Clauses 6,7) ANSI/AWWA C 512-92, IS 14845 (Clause 12) EN 1074 Part 1,2,4 }	Flow rate Upto 10,000m <sup>3</sup> /h
c.	Valve/Filter/ Control Device Air Valve	Flow capacity, Seat leakage, loss characteristics etc, Intake and delivery capacity of air valves in ambient condition	{ Work Procedure No. WP-AT-01,02,03,07 Issue no.: 01 Issue date: 03.01.00 Work Procedure No. WP-AFH-T01,T02,T03,T07 Issue no.: 02 Issue date: 10.04.14 IS/IEC 60534-2-3, ISA75.02,(Clauses 4, 5.2, 8, 9 & 10) BS 5793/2.3 ANSI/FCI 70-2 }	Pressure Upto 2000 kPa (g)  Flow rate Upto 10,000 m <sup>3</sup> /h
d.	Safety Relief Valves	Capacity, seat leakage, Blow down, lift	{ Work Procedure No. WP-AFH-T08 Issue no.: 02 Issue date:10.04.14 ASME PTC 25 (All clauses except 4-3, 4-5, 4-6, 4-8 & 4-10) }	Size : upto150 mm NB, Set pressure : upto1600 kPa

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e.	Gas Regulator	<p>Type approval tests for Constructional and Functional requirements Test details as per <u>EN 334</u></p> <p>Dimensional Check and Visual Inspection</p> <p>Verification of the strength of pressure containing parts and inner metallic partition walls</p> <p>Shell and inner metallic partition walls strength test</p> <p>External tightness test</p> <p>Check of internal sealing, setting, lock up pressure and simplified test method for accuracy class</p> <p>Determination of performance curves and verification of hysteresis band</p> <p>Determination of lock up pressure and verification of internal sealing</p>	<p>Work Procedure No. WP-AT-13 Issue no.: 1 Issue date:14.11.2011</p> <p>Work Procedure No. WP-AFH-T10 Issue no.:02 Issue date: 01.04.2016</p> <p>BS EN 334 (All Clauses except 7.7.7.4.6,7.7.8.1 &amp; 7.7.8.8)</p> <p>BS EN 88-1 (Clauses 7.1 to 7.8, 7.101.1 to 7.101.7, 9.1)</p> <p>BS EN 88-2 (Clauses 7.1 to 7.7)</p>	<p>Size : 80 mm NB Flow range: Upto 160 m<sup>3</sup>/h Pressure up to 2 MPa</p>

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		<p>Determination of accuracy class lock up pressure, class of lock up pressure zone, the maximum accuracy flow rate and the minimum flow rate related to given range of inlet pressure</p> <p>Operational check at limit temperatures of -20 degree C and 60 degree C</p> <p>Test details as per EN 88-1 &amp; EN 88-2 External and internal Leak Tightness Test (as per EN 88-1 &amp; EN 88-2)</p> <p>Torsion &amp; Bending (as per EN 88-1 &amp; EN 88-2)</p> <p>Rated Flow Rate Test (as per EN 88-1)</p> <p>Pressure Regulator performance (as per EN 88-1)</p> <p>Endurance Test (as per EN 88-1 &amp; EN 88-2)</p>	<p>Work Procedure No. WP-AT-13 Issue no.: 1 Issue date:14.11.2011</p> <p>Work Procedure No. WP-AFH-T10 Issue no.:02 Issue date: 01.04.2016</p> <p>BS EN 334 (All Clauses except 7.7.7.4.6,7.7.8.1 &amp; 7.7.8.8)</p> <p>BS EN 88-1 (Clauses 7.1 to 7.8, 7.101.1 to 7.101.7, 9.1)</p> <p>BS EN 88-2 (Clauses 7.1 to 7.7)</p>	<p>Size : 80 mm NB Flow range: Upto 160 m<sup>3</sup>/h Pressure up to 2 MPa</p>

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		Lock-up Pressure test (as per EN 88-1 & EN 88-2)  Safety-shut-off device Accuracy group test for overpressure (as per EN 88-2)  Safety shut off device test (as per EN 88-2)		
f.	<b>Diaphragm /Dry/ Domestic Gas Meters</b>	Initial accuracy test Starting flow rate External leak tightness Endurance test Impact test Vibration test Humidity test Ultraviolet radiation test Pressure absorption	Work Procedure No. WP-AT-11 Issue no.: 3 Issue date: 19.04.2018  BS EN 1359 (All clauses except 5.8, 6.2.2, 6.4.2, 6.4.3, 6.6.3, 6.6.6, 7.3.3, 7.3.4, B2.3, C.2)	0.0012 m <sup>3</sup> /h to 40m <sup>3</sup> /h 0.0012 m <sup>3</sup> /h to 40m <sup>3</sup> /h Up to 2 MPa g Up to 5000 hr 3 Joules & 5 Joules 10 Hz to 150Hz (10 to 95) % RH 275 to 300 Watts Up to 500 Pa
g.	<b>Hydrostatic Test of Spools, Flow Meters and Fittings</b>	Hydrostatic test and Pneumatic test	Work Procedure No. WP-AFH-T09 Issue no.: 02 Issue date: 10.04.2014  ASME B 16.5, ASME B 31.8	30 MPa

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<b><u>ELECTRONICS TESTING</u></b>				
1.	<b>ENVIRONMENTAL TEST FACILITY</b>			
1.	<b>IT Equipment /Domestic Electronic Appliances &amp; Accessories/ Power Supplies &amp; Stabilizers/Electronic Components &amp; Equipment Sub Assemblies/Medical, Electrical &amp; Mechanical Equipment</b>	Cold (Low Temperature)	IS 9000 (Part 2) MIL STD 810G QM333 RTCA DO-160G SAE J1455 JSS 55555 JSS 50101 GR-63 ETSI-300 019 - 2 - 1 ETSI-300 019 - 2 - 2 ETSI-300 019 - 2 - 3 ETSI-300 019 - 2 - 4 IEC 60068-2-1 ISO 16750-4	Ambient to (-) 40°C  Ramp rate : 3.0°C/Minute
		Dry Heat ( High Temperature)	IS 9000 (Part 3) IEC 60068-2-2 including Amend 1&2 MIL Std 810G QM333 RTCA DO-160G SAE J1455 JSS 55555 JSS 50101 GR-63 ETSI-300 019 - 2 - 1 ETSI-300 019 - 2 - 2 ETSI-300 019 - 2 - 3 ETSI-300 019 - 2 - 4 ISO 16750-4	Ambient to +180°C  Ramp rate: 3.0°C/Minute

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		Temperature Cycling Test	IS 9000 (Part 14) IEC 60068-2-14 JSS 55555 QM333	(-) 40°C to 180°C Ramp rate : 3.0°C/Minute
		Damp Heat (Steady State)	IS 9000 (Part 4) QM333 RTCA DO-160G SAE J1455 MIL STD 810G JSS 55555 JSS 50101 GR-63 ETSI-300 019 - 2 - 1 ETSI-300 019 - 2 - 2 ETSI-300 019 - 2 - 3 ETSI-300 019 - 2 - 4 IEC 60068-2-67 IEC 60068-2-78 ISO 16750-4	Temperature range: 20°C to 90°C, Humidity range: 10% to 95% RH
		Damp Heat (Cyclic)	IS 9000 (Part 5) IEC 60068-2-30 MIL Std 810G ASTM D2247 QM333 RTCA DO-160G SAE J1455 JSS 55555 JSS 50101 ETSI-300 019 - 2 - 1 ETSI-300 019 - 2 - 2 ETSI-300 019 - 2 - 3 ETSI-300 019 - 2 - 4 ISO 16750-4	Temperature range: 20 °C to 90 °C, Humidity range: 10 % to 95 % RH.



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		Composite Temperature & Humidity	IS 9000 (Part 6) RTCA DO-160G SAE J1455 MIL Std 810G ISO 16750-4 IEC60068-38	Temperature range: 20 °C to 90 °C, Humidity range: 10 % to 95 % RH.
		Vibration	IEC 60068-2-6 IS 9000 (Part 8) MIL Std 810G QM333 SAE J1455 IEC 60255-21-1 RTCA DO-160G JSS 55555, JSS 50101 GR-63 IEC 60068-2-64 ETSI-300 019 - 2 -1 ETSI-300 019 - 2 -2 ETSI-300 019 - 2 -3 ETSI-300 019 - 2 -4 ISO 16750-4 IEC 61373	Waveform type : Sine, Random, Discrete Sine, Sine on Random, Random on Random Freq Range: 5 to 2000 Hz Acceleration: Sine: upto80g pk, Random: upto 40 g- rms Displacement: upto 2.0 Inch pk-pk Velocity: upto1.4 m/s pk
		Shock & bump	IEC 60068-2-27 & 29 IS 9000 (Part 7) MIL Std 810 G RTCA DO-160G SAE J1455 IEC60255-21-2 JSS 55555, JSS 50101 ETSI-300 019 - 2 -1 ETSI-300 019 - 2 -2 ETSI-300 019 - 2 -3 ETSI-300 019 - 2 -4 IEC 60068-2-29	Pulse shape: Half Sine, Trapezoidal, Saw tooth  Pulse Amplitude: upto100g pk  Pulse width: 3 to 30 mSec

Iti Saxena  
Convenor

Alok Jain  
Program Manager

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			ISO 16750-4 IEC 61373	
		Determination of Sound Pressure/ Sound Power Level	IEC 534-8-1 ISA 75.07 ISO 1680 ISO 7779, ISO 11203, ISO 3745, ISO 3744	Lowest cut off frequency - 100Hz. Frequency range : One third octave mid band frequency between 100 and 20000 Hz Ambient Noise Level: 20 dBA
		IP tests (Dust & Water)	IP test as per IEC 610529  IP 5X, 6X  IP X3, X4  IP X5, IP X6, IPX7, IPX8	Chamber size: 800x800x800 mm  Maximum size 200x200x200 mm  --
2.	Rotating Electrical & Mechanical Machineries	Vibration Measurements	ISO 10816 Part 1 to 6	Frequency range : 2 Hz to 5000 Hz

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<b><u>ELECTRONICS TESTING</u></b>				
<b>AT-SITE</b>				
<b>I.</b>	<b>ENVIRONMENTAL TEST FACILITY</b>			
1.	<b>IT Equipment /Domestic Electronic Appliances &amp; Accessories/Power Supplies &amp; Stabilizers/Electronic Components &amp; Equipment Sub Assemblies/ Medical, Electrical &amp; Mechanical Equipment</b>	Determination of Sound Pressure/ Sound Power Level	IEC 534-8-1 ISA 75.07 ISO 1680, ISO 7779, ISO 11203, ISO 3744	Frequency range : One third octave mid band frequency up to 20000 Hz
2.	<b>Rotating Electrical &amp; Mechanical Machineries</b>	Vibration Measurements	ISO 10816 (Part 1 to 6)	Frequency range : 2 Hz to 5000 Hz