

Certificate No : **624202202274** ✓Date : **February 27, 2022** ✓**API STANDARD 624 TEST CERTIFICATE****Type Testing of Rising Stem Valves Equipped with Graphite Packing For Fugitive Emissions**

This is to certify that the below mentioned valve has been inspected by Plasma & Vacuum Technologies and found to be satisfactory in accordance with the requirements of API 624, First Edition 2014.

Manufacturer:	Fluid-O-Mech Controls Inc. ✓
Address:	14/1A, Pancharatna Industrial Estate, Near Ramol Bridge, Vatva G.I.D.C, Ahmedabad – 382 445. Gujarat. India.
Location of Test:	Plasma & Vacuum Technologies, Plot No.17, Road 1-A, GIDC Kathwada, Ahmedabad 382430, India.

Product :	Valve Details:	Gate Valve, 4" 300# ✓
	Design Standard:	API 600 ✓
Packing :	Make: New Empire Gaskets, Model: Seal-It. ✓	
Body/Bonnet Material :	ASTM A216 Gr. WCB ✓	
Stem Material :	ASTM A276 TP410 ✓	
GA Drawing No:	FMC/100X300#/GTV/FE/00 ✓	
Test Fluid :	Methane (>97 % Purity) ✓	
Test Pressure :	41.4 barG (~600 psiG) ✓	
Test Temperature :	At Ambient and 260°C (~ 500°F) ✓	
Mechanical Cycle :	310 Cycles over 3 Thermal Cycles ✓	
Maximum Leakage :	42.4 ✓	ppmv
Average Leakage :	26.3 ✓	ppmv
Acceptance Criteria :	< 100	ppmv maximum
Test Result :	PASS	
Test Report No :	PVT/SD/FETR/202202/25 ✓	
Test Start Date :	February 23, 2022 ✓	
Test End Date :	February 25, 2022 ✓	

Valve Qualified : All valves of the same basic design as the test valve may be deemed to have been type tested, subject to the following additional limitation. For API 600 Valves, 4" (DN 100) Class 300 test valve qualifies all smaller valves and up to 6" (DN 150) in pressure class 150 and 300. ✓

Test Conducted by

Venkat N. Ramani
ASNT Level III (LT) 183918
Plasma & Vacuum Technologies



Test Witnessed By

Witnessed
27/02/2022
VERITAS (INDIA) PRIVATE LIMITED
SURVEYOR AT
AHMEDABAD

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API STANDARD 624 FUGITIVE EMISSIONS TEST REPORT

F/CR/10.2
RevNo.00

Report No :	PVT/SD/FET/R/202202/25 ✓	Report Date :	27 February 2022 ✓
Manufacturer :	Fluid-O-Mech Controls Inc.	Valve Stem Type :	Rising Stem
Valve - Type, Size, Class :	Gate Valve, 4" 300# ✓	API / ASME Design Standard:	API 600
Packing Description :	Number of Rings : 10 nos OD : 38.4 mm, ID : 25.6 mm Thickness : 6.4 mm Stack Height : 64 mm Stuffing box depth : 70 mm		
Make: New Empire Gaskets, Model: Seal-It.	Body / Bonnet Gasket Connection: SPW SS316 + Graphite Filler.		
Packing Manufacturer :	New Empire Gaskets		
Gland Follower Exposed Length:20mm	Body-Bonnet connection : Bolted.		
Gland Nut recommended torque:60Nm	Gland Follower Insertion Depth: 6mm	Body/Bonnet Nut recommended torque: 280Nm	
Test Start Date :	23 February 2022 ✓	Valve Selection : by Manufacturer; Selection Date:17.02.2022 ✓	
Test Completion Date :	25 February 2022 ✓	Selected by : QA/QC Dept. Fluid-O-Mech Controls Inc. Ahmedabad.	

SUMMARY OF FUGITIVE EMISSIONS TEST DATA

Test Segment	Cycle	Methane Pressure (barG)	Temperature at Body (°C)	Temperature at Stem (°C)	Static Leak Measurement (ppmv)	Dynamic Leak Measurement (ppmv)	Remarks
Ambient Temperature T(a) = RT, P(a)=41.4 barG	0	41.4	28	28	11.1	14.6	OK
	50	41.4	30	30	13.7		
Elevated Temperature T(e) = 260°C, P(e) = 41.4 barG	51	41.4	264	265	17.7	24.9	OK
	100	41.4	266	268	23.0		
Ambient Temperature T(a) = RT, P(a)=41.4 barG	101	41.4	30	31	18.1	28.4	OK
	150	41.4	33	33	26.7		
Elevated Temperature T(e) = 260°C, P(e) = 41.4 barG	151	41.4	262	260	21.2	36.1	OK
	200	41.4	262	260	33.9		
Ambient Temperature T(a) = RT, P(a)=41.4 barG	201	41.4	25	25	17.0	38.2	OK
	250	41.4	27	27	33.4		
Elevated Temperature T(e) = 260°C, P(e) = 41.4 barG	251	41.4	263	265	33.1	42.4	OK
	300	41.4	263	265	40.4		
Ambient Temperature T(a) = RT, P(a)=41.4 barG	301	41.4	40	40	20.1	30.9	OK
	310	41.4	40	40	28.4		

Valve Serial Number: FMCI-116 (Heat No.: Body: M60, Bonnet: M51) ✓

Running Torque - First Cycle : 18 Nm, Last cycle : 14 Nm

FINAL REMARK : Pass (✓)

Pre-test Preparations & Adjustments : 1) Gland bolting, Body/Bonnet and Valve open-close torques were verified; 2) The air in the valve cavity was evacuated and purged with Helium prior to starting the testing; 3) The stem orientation was kept vertical; 4) External valve heating was designed, with heating coils and wrapped by Alumina wool; 5) Electrical Operation using wheel was set for cycling (opening and closing) the valves.

Notes : 1) The test valve was randomly selected; 2) The test medium was methane with purity > 97%; 3) The test was conducted in a safe, well ventilated and protected environment; 4) No packing adjustment was done during test. Running torques at the start and end were measured and recorded; 5) Methane Detector (Model TVA 2020, Thermofisher) was used for ambient monitoring; 6) Methane Detector (Model TVA 2020, Thermofisher) was used for methane leakage at gland and body / bonnet joint. The Probe was calibrated prior to each measurement using an external calibration gas with known Methane concentration. T(a)= Ambient Temperature, T(e)= Elevated Temperature, P(a)= Ambient Pressure & P(e)= Elevated Pressure, RT=Room Temperature

Test Witnessed by

Test Conducted by

Test Witnessed By

Venkat N. Ramani
ASNT Level III (LT)

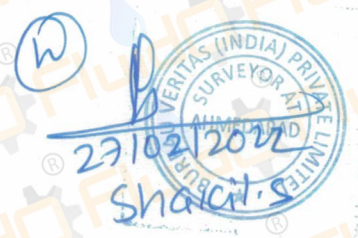
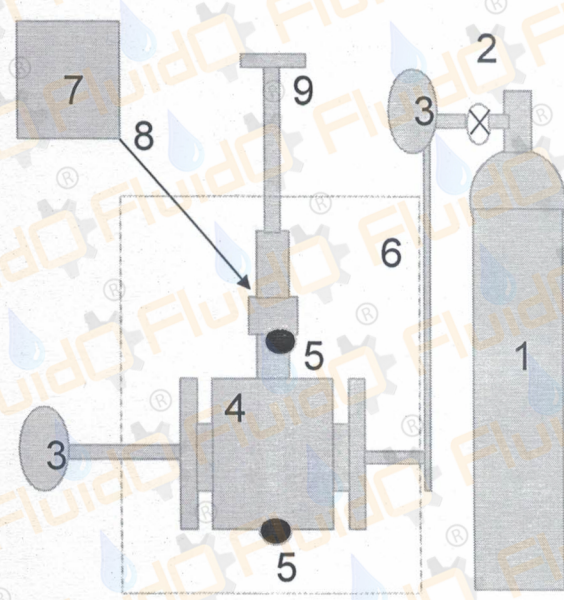


Annexure 1 : SET UP

Report No.:

PVT/SD/FET/R/202202/ 25

Report Date: 27 February 2022



- 1 : Methane Gas Cylinder; 2 : Isolation Valve; 3 : Pressure Gauge;
4 : Valve under Test; 5 : Temperature Sensor; 6 : Hot Zone;
7 : Methane Leak Detector; 8 : Sniffer Probe; 9 : Valve operation-Rising Stem.

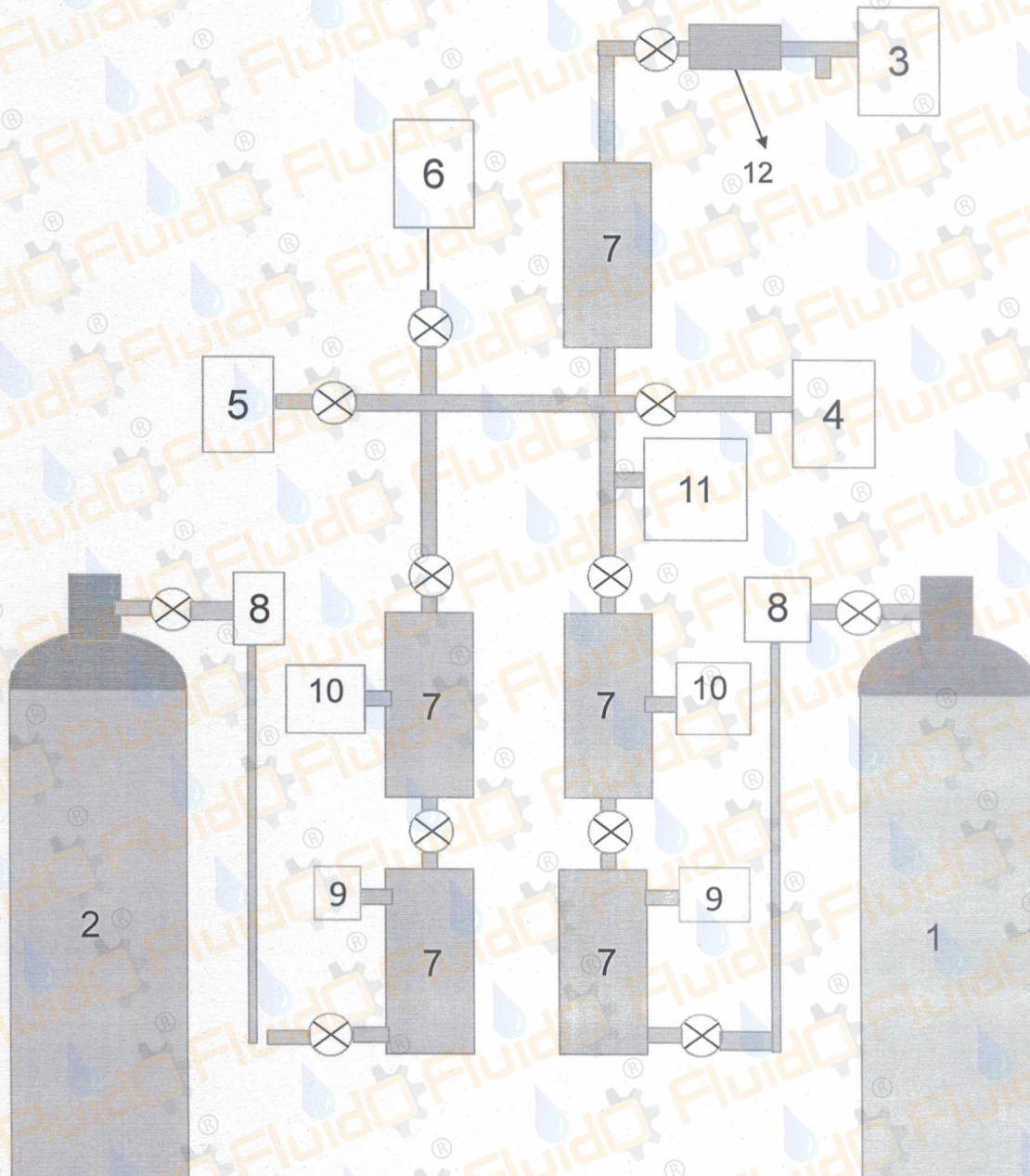
Annexure 2

Schematic of Probe Calibration Set up

Report No.:

PVT/SD/FET/R/202202/ 25

Report Date: 27 February 2022



1 : Methane Gas Cylinder; 2 : Zero Gas / Helium Cylinder; 3,4,5 : Positions of Methane Leak Detector. For Calibration, EPA21 Calibration and Zeroing respectively; 6 : Vacuum Pump; 7 : Reservoir; 8, 9, 10, 11: Pressure Gauges; 12 : Methane Calibrated Leak.

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ANNEXURE 3 : TEST REPORT - HELIUM LEAK TESTING

Report No :	PVT/SD/FET- HLT/R/20202-25	Report Date :	February 23, 2022 ✓
Client :	Fluid-O-Mech Controls Inc.	Testing Equipment :	HLD ASM 310 ADIXEN
Manufacturer :	Fluid-O-Mech Controls Inc.	Calibrated Leak(s) :	PVT/CD/SL/03, PVT/CD/SL/04
Item :	Gate Valve, 4" 300#	Ref. Code(s) :	ASME Sec V, Art 10, Detector Probe Technique
Reference:	Prior to API624 Test of valve	Qualification:	Helium Leakage Rate : <1.0x10 ⁻⁶ mbar l/s at Body-Bonnet and Gland joints at 41.4 barG pressure (10% of Helium + 90% Nitrogen). ✓

Leak Detector and Probe Calibration

Standard Leak Value			Observed Leak Value		Instrument Sensitivity		
A	2.48 x 10 ⁻⁸	mbar l/s	~ 2.5 x 10 ⁻⁸	mbar l/s	better than	10 ⁻⁹	std cc/s
B	1.13 x 10 ⁻⁶	mbar l/s	~ 1.1 x 10 ⁻⁶	mbar l/s	CF = 1.0	Response	< 5 s
	Stage	Test Date	Body		Gland Joint		Remarks
			Leak Rate (mbar l/s)		Leak Rate (mbar l/s)		
1	Prior to API624 Test	Feb 23, 2022 ✓	5.8 x 10 ⁻⁷ ✓		7.7 x 10 ⁻⁷ ✓		Leak Tightness is OK

Test Witnessed by

Fluid-O-Mech Controls Inc.

Test Conducted by

Venkat N. Ramani
ASNT Level III (LT)
Plasma&Vacuum Technologies

Test Witnessed By

W B
23/02/2022
Shahib S.

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Annexure 4 CALIBRATION DATA AND METHANE LEAKAGE EVALUATIONS

Report No.: **PVT/SD/FET/R/202202/ 25**

Report Date: **27 February 2022**

Test Segment	Cycle	Condition	Ambient Leak Rate Value (ppmv)	Calibration Leak Rate Value (ppmv)	Detector Sensitivity	Observed Leak Rate (ppmv)	Measured Leak Rate (ppmv)
Ambient Temperature T(a) = RT, P(a)=41.4 barG	0	Static	2.3	75.4	1.02	13.2	11.1
	50	Static	4.2		1.05	17.3	13.7
	50	Dynamic				18.1	14.6
Elevated Temperature T(e) =260°C, P(e) = 41.4barG	51	Static	5.1	75.8	1.05	21.9	17.7
	100	Static	7.6		1.09	28.6	23.0
	100	Dynamic				30.4	24.9
Ambient Temperature T(a) = RT, P(a)=41.4 barG	101	Static	2.8	76.3	1.01	20.6	18.1
	150	Static	5.2		1.05	30.7	26.7
	150	Dynamic				32.3	28.4
Elevated Temperature T(e) =260°C, P(e) = 41.4barG	151	Static	8.0	76.7	1.08	27.5	21.2
	200	Static	3.4		1.02	36.7	33.9
	200	Dynamic				38.9	36.1
Ambient Temperature T(a) = RT, P(a)=41.4 barG	201	Static	7.0	74.9	1.10	22.5	17.0
	250	Static	2.1		1.02	34.7	33.4
	250	Dynamic				39.4	38.2
Elevated Temperature T(e) =260°C, P(e) = 41.4barG	251	Static	7.7	75.4	1.10	37.8	33.1
	300	Static	5.9		1.07	43.6	40.4
	300	Dynamic				45.4	42.4
Ambient Temperature T(a) = RT, P(a)=41.4 barG	301	Static	8.4	75.9	1.10	26.6	20.1
	310	Static	2.8		1.02	30.7	28.4
	310	Dynamic				33.1	30.9
Average Value:						26.3	
Calibrated Leak used (ml/m) : SL					0.072		
Flow Rate at Methane Leak Detector (lpm) : FR					0.966		
Estimated PPM value (PPMv) = (SL/FR)x1000					74.53		

Leakage at Body-Bonnet Connection

Cycle Number	Body Temperature (°C)	Pressure (barG)	Ambient Leak Rate Value (ppmv)	Calibration Leak Rate Value (ppmv)	Detector Sensitivity	Observed Leak Rate Value (ppmv)	Measured Leak Rate Value (ppmv)
0	28	41.4	2.3	75.4	1.02	15.7	13.7
310	40	41.4	2.8	75.9	1.02	37.2	35.1

$$\text{Measured Leak Rate} = (\text{Observed Leak Rate} - \text{Ambient Leak Rate Value}) \times [\text{Estimated PPM value} / (\text{Calibration Leak Rate Value} - \text{Ambient Leak Rate Value})]$$

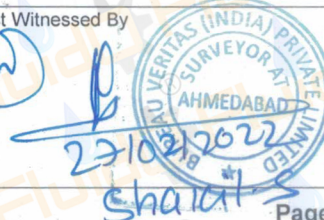
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Test Conducted by

Test Witnessed By

Fluid-O-Mech Controls Inc.

Venkat N. Ramani
ASNT Level III (LT)
Plasma&Vacuum Technologies



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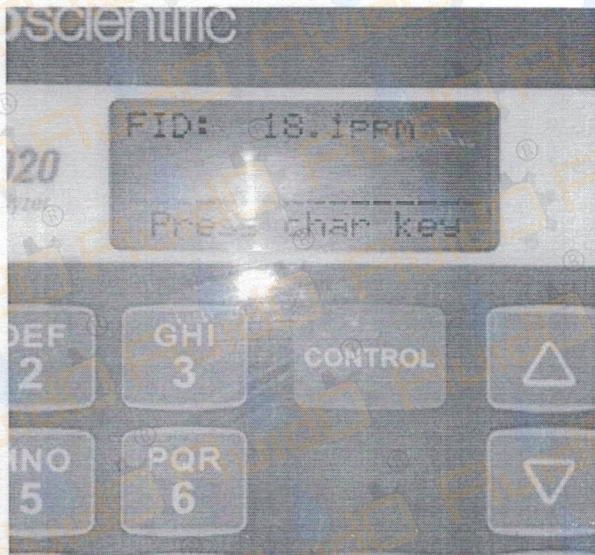
Website : www.plasmavac.com

Annexure 5

Methane Leakage Measurements

Report No. : PVT/SD/FET/R/202202/ 25

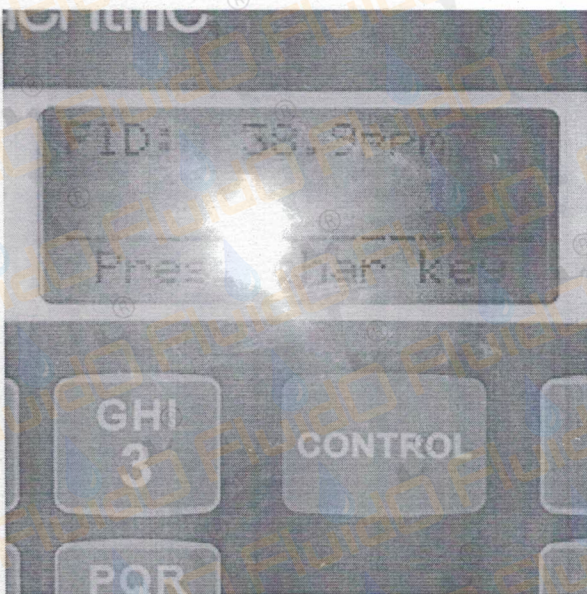
Report Date: 27 February 2022



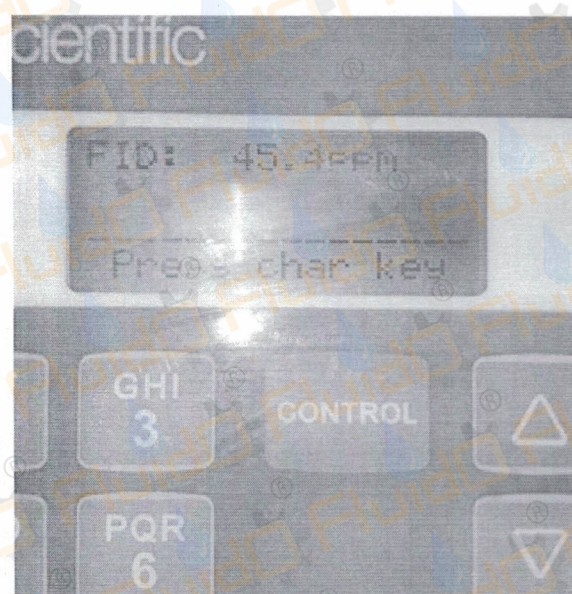
(a)



(b)

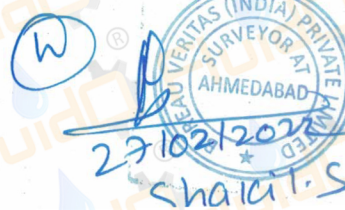


(c)



(d)

Methane leakage at : a) Ambient, Dynamic, 50 cycles; b) Elevated, Static, 51 cycles; c) Elevated, Dynamic, 200 Cycles ;
d) Elevated, Dynamic 300 Cycles ;



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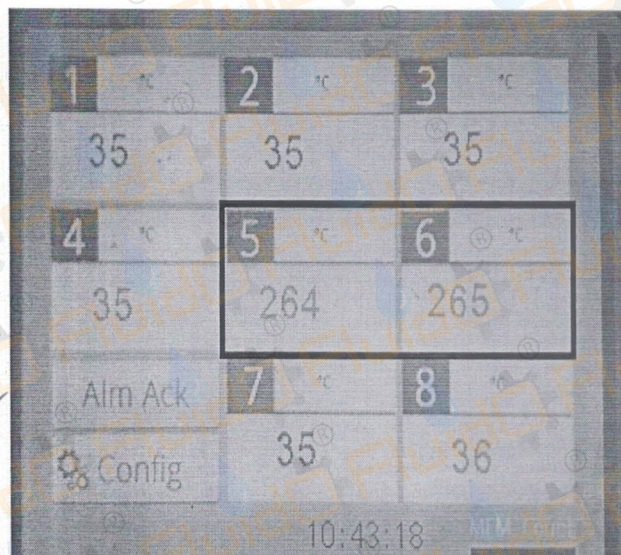
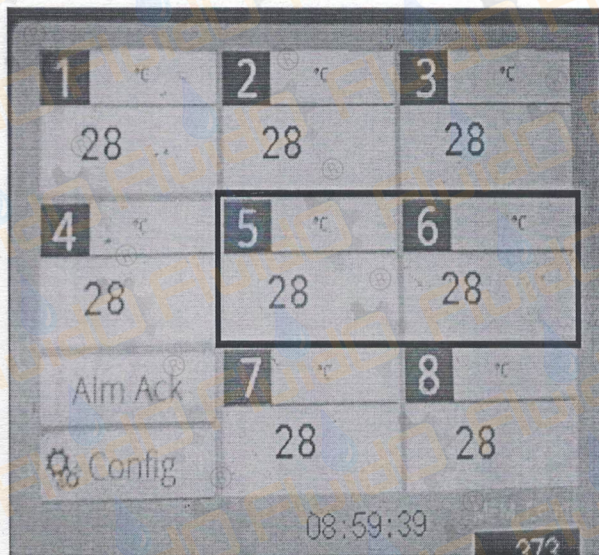
Website : www.plasmavac.com

Annexure 6

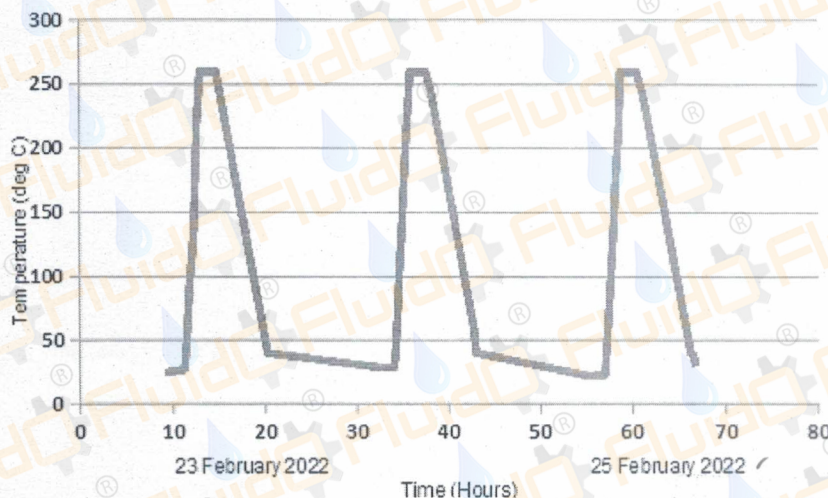
Temperature Measurements

Report No. : PVT/SD/FET/R/202202/ 25

Report Date: 27 February 2022



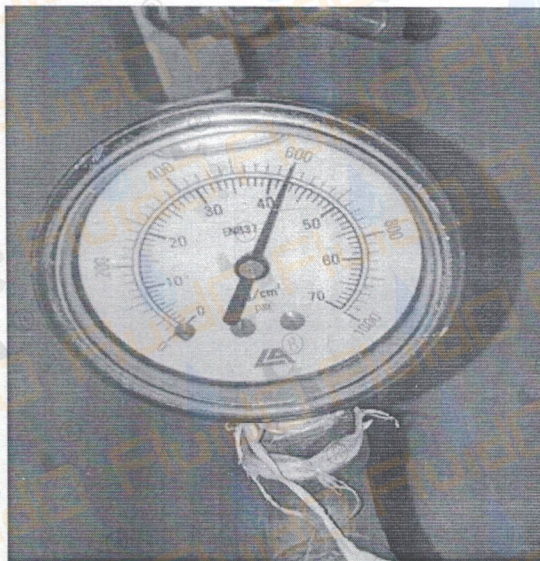
4 Inch 300# Gate Valve ; Fluid-O-Mech Controls Inc.
API 624 Test : Temperature Profile



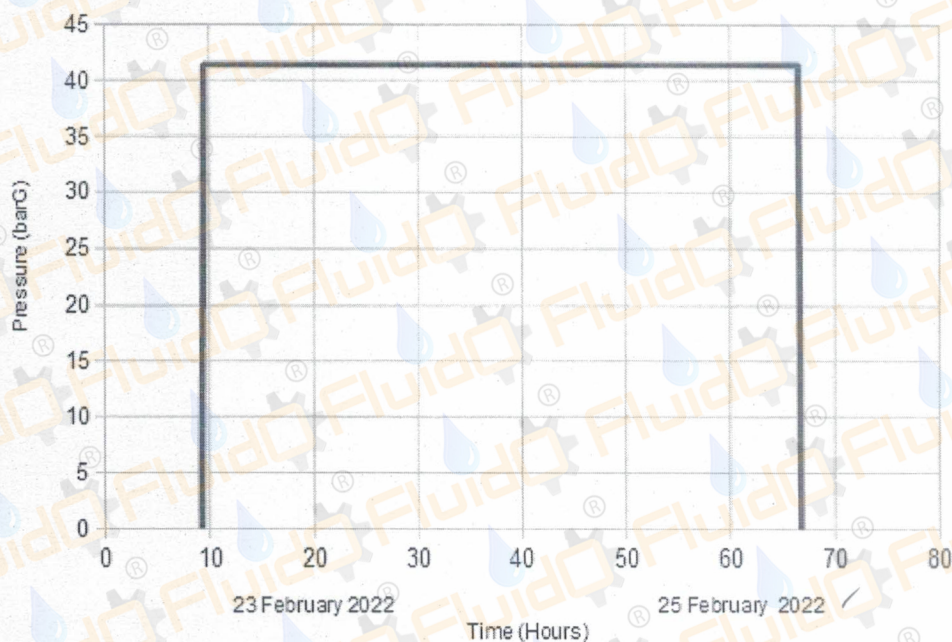
Annexure 7 Pressure Measurements

Report Date: PVT/SD/FET/R/202202/ 25

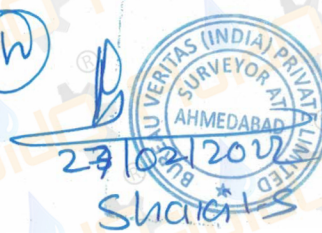
Report Date: 27 February 2022



4 Inch 300# Gate Valve ; Fluid-O-Mech Controls Inc.
API 624 Test : Pressure Profile ✓



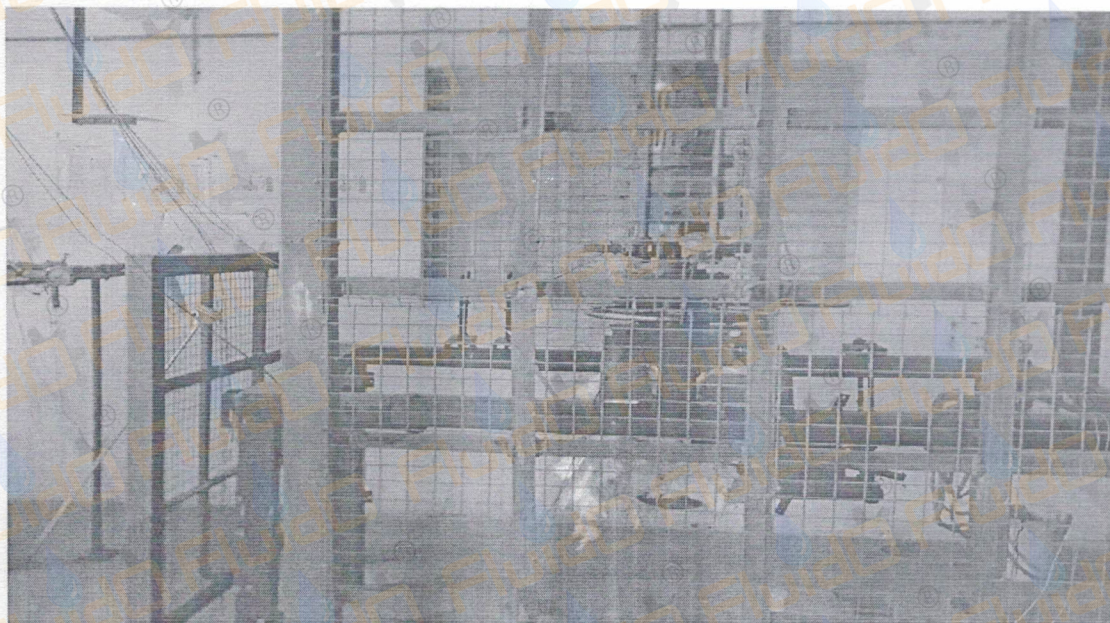
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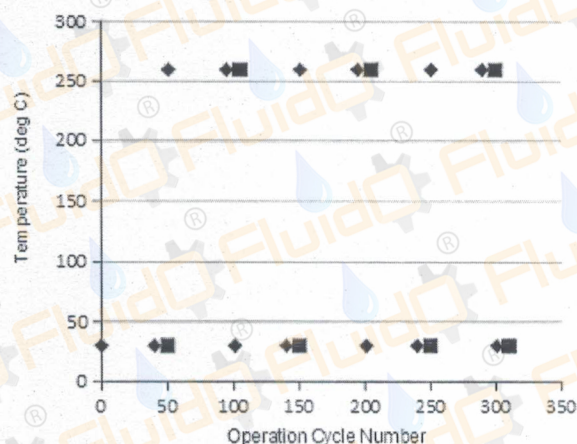
Annexure 8 Valve Operation Mechanism

Report No.: PVT/SD/FET/R/202202/ 25

Report Date: 27 February 2022



API 624 Test : Methane Leakage Measurement Points



W

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27/02/2022
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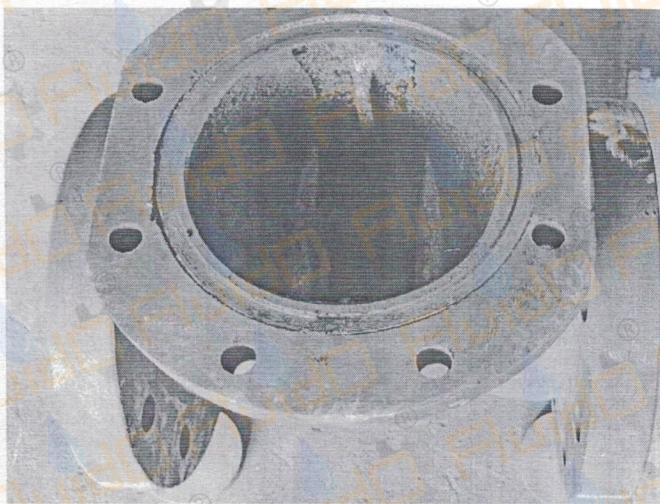
Website : www.plasmavac.com

Annexure 9 - Contd.

Post - Test Valve Opened Up Photographs

Report No.: PVT/SD/FET/R/202202/ 25

Report Date: 27 February 2022



Remarks:

The disassembled Valve parts were inspected and the condition was found satisfactory.

List of Calibration Reports of Instruments / Documents attached

Report No.: PVT/SD/FET/R/202202/ 25

Report Date: 27 February 2022

- 1 Methane Gas Cylinder 709
- 2 Gas Monitor Pump (Flow Rate), Report No. PVT/SD/FRM/R/2022/01
- 3 Standard Leak, SI No PVT/TD/CL/06, Report No. PVT/SD/FRM/R/2022/02
- 4 Helium Standard Leak, SI No. PVT/CD/SL/03
- 5 Helium Standard Leak, SI No. PVT/CD/SL/04
- 6 Torque Wrench, MACMASTER, PVT/SD/TW/01 & 02
- 7 Pressure Gauge, LA, PVT/SD/GP70D/14 ✓
- 8 Temperature Sensor, Thermal Sense Tech, PVT/SD/TST/26 & 27 ✓
- 9 ASNT NDT Level III certification of V N Ramani ✓
- 10 API 622 Qualified Packing Certificate

Page 13 of 13



Verified.
B
27/02/2022
Shantil S.



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Bhagwati
Enterprise

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Mob No.: + 91 9377279287, 932769285

Email:- sbesmp@yahoo.co.in

Date: 20/12/2021

To,
M/s. PLASMA & VACUUM TECHNOLOGIES
PLOT NO. 17, ROAD NO. 1-A,
G I D C ESTATE, KATHWADA,
AHMEDABAD-382430..

Sub: Confirmation regarding purity of **PURE METHANE Gas**

Cylinder No. : 299, 709

Challan No.: 085/21-22

Dear Sir,

It is hereby confirmed that supplied **PURE METHANE Gas** have the following purity and impurities.

Total Purity : 99.50%

Maximum level of impurities (PPM by Volume)

Impurities	PPM
OXYGEN	< 500.00
H2O	< 10.00
N2	<2000.00
H2	NIL
CO	NIL
CO2	NIL
THC	<3000.00
N-OXIDES	NIL

Please note that the given details are as per the certificate which we have received from the manufacturer of above mentioned Gas.

Thanking You

Yours Faithfully,

Authorized Signatory



(R)

23/12/2022
Shantil S.



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Email : pvt@plasmavac.com

Website : www.plasmavac.com

AN ISO 9001:2015 CERTIFIED COMPANY (ISOQAR Cert. No. 14224)

GAS FLOW RATE TEST REPORT

Report No.	PVT/SD/FRM/R/2022/01	Certificate Format No.	F/CR/05, Rev No.01
Date of Issue	20/01/2022	Validity of Report	20/01/2023
Page	1 of 1		

Name of Customer : Service Division, Plasma & Vacuum Technologies,
Plot No. 17, Road No. 1-A, G.I.D.C. Kathwada, Ahmedabad.

Sample Description : Methane Leak Detector Pump (Flow Rate)
Sr. No.: 202018113737 PlasVac Sr. No.: PVT/SD/FET/MLD/02
Model: TVA 2020 - B3S1B2; Make: Thermofisher

Traceability of Standard Used : Methane Standard Leak, Sr. No. 14-276, Leak Rate Value:
1.59E-06 Pa m³/s Calibrated by Vacuum Instruments Corporation, LLC,
New York.

Procedure No. : SP/05, Rev. No. 01

Observations :

Sr.No.	Test Temperature (°C) 'T _s '	Final Observed Pressure in Sample Chamber (Pa) 'P _s '	Final Observed Pressure in Pumping Chamber (Pa) 'P _p '	Steady Differential Pressure between the Chambers (Pa) 'ΔP = P _s -P _p '
1	23	8.04E+04	6.41E+04	1.63E+04
Conductance of Orifice (m ³ s ⁻¹) 'C'	Throughput (Gas Load from Sample + background) (Pa m ³ S ⁻¹) 'Q _G =C*ΔP'	Throughput (background) (Pa.m ³ s ⁻¹) 'Q ₀ '	Through from the Sample (Pa m ³ s ⁻¹) 'Q _S = Q _G -Q ₀ '	Remarks
1.00E-04	1.61E+00	1.01E-09	1.61E+00	Flow Rate is 0.966 lpm

1 Pa m³ / s = 10 std cc/s = 10 mbar l/s = Approx. 0.6 lpm

(Ronak Pethani)
Tested By



(Venkat Ramani)
Approved By



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Phone : +91 79-29705319, Fax : 079-29709216

Email : pvt@plasvac.com

Website : www.plasvac.com

AN ISO 9001:2015 CERTIFIED COMPANY (ISOQAR Cert. No. 14224)

GAS FLOW RATE TEST REPORT

Report No.	PVT/SD/FRM/R/2022/02	Certificate Format No.	F/CR/05, Rev No.01
Date of Issue	20/01/2022	Validity of Report	20/01/2023
Page	1 of 1		

Name of Customer : Service Division, Plasma & Vacuum Technologies,
Plot No.17, Road No. 1-A, G.I.D.C. Kathwada, Ahmedabad.

Sample Description : Standard Leak, Sr. No. PVT/TD/CL/06.
Sintered Porous Plug; Material: Brass, Make: PlasVac

Traceability of Standard Used : Methane Standard Leak, Sr. No. 14-276, Leak Rate Value:
1.59E-06 Pa m³/s Calibrated by Vacuum Instruments Corporation, LLC,
New York.

Procedure No. : SP/05, Rev. No. 01

Observations :

S.R.No.	Test Temperature (°C) 'T _s '	Final Observed Pressure in Sample Chamber (Pa) 'P _s '	Final Observed Pressure in Pumping Chamber (Pa) 'P _p '	Steady Differential Pressure between the Chambers (Pa) 'ΔP = P _s -P _p '
1	23	5.39E+00	4.19E+00	1.20E+00
Conductance of Orifice (m ³ s ⁻¹) 'C'	Throughput (Gas Load from Sample + background) (Pa m ³ s ⁻¹) 'Q _G =C*ΔP'	Throughput (background) (Pa.m ³ s ⁻¹) 'Q ₀ '	Through from the Sample (Pa m ³ s ⁻¹) 'Q _s = Q _G -Q ₀ '	Remarks
1.00E-04	1.20E-04	1.01E-09	1.20E-04	Leak Rate is 0.072 ml/min

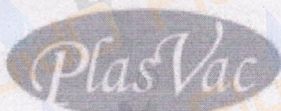
1 Pa m³ / s = 10 std cc/s = 10 mbar l/s = Approx 0.6 lpm

(Ronak Pethani)
Tested By



(Venkat Ramani)
Approved By

23/02/2022



Plasma And Vacuum Technologies

Plot No. 17, Road 1 - A, GIDC, Kathwada, Ahmedabad - 382430.

Phone : + 91 79-29705319, Fax : 079-29709216

Email : pvt@plasmavac.com, Website : www.plasmavac.com

Services : Calibration of Vacuum Gauges and Helium Standard Leaks



CERTIFICATE OF HELIUM STANDARD LEAK CALIBRATION

Certificate No.	PVT/CD/CR/LSHe/2021/24	Certificate Format No.	F/CAL/04/CR, Issue No.04
Date of Issue	07/10/2021	Recommended Date for Next Calibration	06/10/2022
Page	1 of 2		

Name of Customer : Plasma & Vacuum Technologies
Plot No. 17, Road No 1-A,
Kathwada GIDC, Kathwada, Ahmedabad- 382430.

Customer Reference No. : PVT/IFR/2021/03 Dated on 07/10/2021,
S.R.No.: PVT/CD/SR/LSHe/2021/24-25.
Date of Receipt: 07/10/2021.

Discipline And Group : Mechanical – Pressure Indicating Devices

Description And Identification Of Instrument : He Standard Leak
Id. No. / Sr. No.: PVT/CD/SL/03
Model No. HSL PLASVAC; Make: PLASVAC
Mentioned Value of Leak: $1.0E-06$ std cc/s, $\pm 10\%$ of Tolerance
He depletion rate: 0.5%/year; Temperature Co-efficient: $3\%/^{\circ}\text{C}$
(As per manufacturer certificate)

Environment Condition : Temp.: $23 \pm 1.5^{\circ}\text{C}$, Relative Humidity: 40-60 %Rh

Standard Used Associated Uncertainty : Helium standard Leak, a master reference standard which has leak rate value $1.84E-09$ mbar.l/s. The expanded measurement uncertainty is $\pm 3.75E-10$ mbar.l/s ($k=2$).

Traceability of Standard Used : Helium standard Leak, Sr. No. PVT/CD/SL/02, Leak rate value: $1.84E-09$ mbar.l/s calibrated by National Physical Laboratory, New Delhi. Certificate No.: 20100861/D1.06/C-163 valid up to 18/11/2021

Principle of Calibration & Calibration Procedure No. : Direct Comparison Method & Calibration Procedure No: CP/04

Date of Calibration : 07/10/2021

HPB
(Hardik Baldaniya)

Calibrated By – Laboratory Scientist



(Ronak Pethani)

Approved & Reviewed By – Laboratory In-charge

(R)

23/02/2022





Plasma And Vacuum Technologies

Plot No. 17, Road 1 - A, GIDC, Kathwada, Ahmedabad - 382430.

Phone : + 91 79-29705319, Fax : 079-29709216

Email : pvt@plasmavac.com, Website : www.plasmavac.com

Services : Calibration of Vacuum Gauges and Helium Standard Leaks



CC-2702

CERTIFICATE OF HELIUM STANDARD LEAK CALIBRATION

Certificate No.	PVT/CD/CR/LSHe/2021/24	Certificate Format No.	F/CAL/04/CR, Issue No.04
	ULR-CC270221000000040F		
Date of Issue	07/10/2021	Recommended Date for Next Calibration	06/10/2022
Page	2 of 2		

Result

Temperature (°C)	Leak Rate (mbar.l/s)	Expanded Measurement Uncertainty (mbar.l/s)
23.6	1.13E-06	±5.418E-08

- Remarks :
- The reported expanded uncertainty in measurement is stated as the standard uncertainty in measurement multiplied by the coverage factor $k=2.57$, which for a normal distribution corresponds to a coverage probability of approximately 95%.
 - The Expanded Uncertainty mentioned in the report to the Instrument / Unit Calibrated is not applicable if any correction or repair made to it.
 - Any adjustment or repair has not been performed by the laboratory for this Instrument / Unit calibrated.
 - This calibration certificate should not be reproduced in part/full without approval of laboratory.
 - These results are obtained at the time of calibration in the laboratory permanent facility at PlasVac.
 - Condition of instrument found satisfactory during receipt.
 - The standard methods DKD-R 6-1 and DKD-R 6-2 have been followed. No statement of conformity was applied in the Calibration Result.
 - The calibration certificate without review and approval is not valid.
 - This certificate and expanded uncertainty are related only to the Instrument / Unit Calibrated and mentioned in this report.
 - This Certificate issued for Scientific and Industrial purpose only.

(End of Calibration Certificate)

(R)



23/02/2022
Shailesh



HPB
(Hardik Baldaniya)

Calibrated By – Laboratory Scientist

(Ronak Pethani)

Approved & Reviewed By – Laboratory In-charge



Plasma And Vacuum Technologies

Plot No. 17, Road 1 - A, GIDC, Kathwada, Ahmedabad - 382430.

Phone : + 91 79-29705319, Fax : 079-29709216

Email : pvt@plasmavac.com, Website : www.plasmavac.com

Services : Calibration of Vacuum Gauges and Helium Standard Leaks



CC-2702

CERTIFICATE OF HELIUM STANDARD LEAK CALIBRATION

Certificate No.	PVT/CD/CR/LSHe/2021/25 ULR-CC270221000000041F	Certificate Format No.	F/CAL/04/CR, Issue No.04
Date of Issue	07/10/2021	Recommended Date for Next Calibration	06/10/2022
Page	1 of 2		

Name of Customer : **Plasma & Vacuum Technologies**
Plot No. 17, Road No 1-A,
Kathwada GIDC, Kathwada, Ahmedabad- 382430.

Customer Reference No. : PVT/IFR/2021/03 Dated on 07/10/2021,
S.R.No.: PVT/CD/SR/LSHe/2021/24-25, Date of Receipt: 07/10/2021.

Discipline And Group : **Mechanical – Pressure Indicating Devices**

Description And Identification of Instrument : **He Standard Leak**
Id. No./Sr. No.: PVT/CD/SL/04 or 100/104/00
Model No.: HSL 102; Make: HINDHIVAC
Mentioned Value of Leak: 2.6E-08 mbar.l/s \pm 10% of Tolerance
He depletion rate: 1%/year; Temperature Co-efficient: 3%/°C
(As per Manufacturer Certificate)

Environment Condition : Temp.: $23 \pm 1.5^\circ\text{C}$, Relative Humidity: 40-60 %Rh

Standard Used Associated Uncertainty : Helium standard Leak, a master reference standard which has leak rate value 1.84E-09 mbar.l/s. The expanded measurement uncertainty is $\pm 3.75\text{E-}10$ mbar.l/s ($k=2$).

Traceability of Standard Used : Helium standard Leak, Sr. No. PVT/CD/SL/02, Leak rate value: 1.84E-09 mbar.l/s calibrated by National Physical Laboratory, New Delhi. Certificate No.: 20100861/D1.06/C-163 valid up to 18/11/2021

Principle of Calibration & Calibration Procedure No. : Direct Comparison Method & Calibration Procedure No: CP/04

Date of Calibration : 07/10/2021



HPB
(Hardik Baldaniya)

Calibrated By – Laboratory Scientist

(R)



Shaili's
(Ronak Pethani)

Approved & Reviewed By – Laboratory In-charge



Plasma And Vacuum Technologies

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Phone : + 91 79-29705319, Fax : 079-29709216

Email : pvt@plasmavac.com, Website : www.plasmavac.com

Services : Calibration of Vacuum Gauges and Helium Standard Leaks



CC-2702

CERTIFICATE OF HELIUM STANDARD LEAK CALIBRATION

Certificate No.	PVT/CD/CR/LSHe/2021/25 ULR-CC270221000000041F	Certificate Format No.	F/CAL/04/CR, Issue No.04
Date of Issue	07/10/2021	Recommended Date for Next Calibration	06/10/2022
Page	2 of 2		

Result

Temperature (°C)	Leak Rate (mbar. l/s)	Expanded Measurement Uncertainty (mbar. l/s)
23.5	2.48E-08	$\pm 6.447E-10$

- Remarks :
- The reported expanded uncertainty in measurement is stated as the standard uncertainty in measurement multiplied by the coverage factor $k=2.57$, which for a normal distribution corresponds to a coverage probability of approximately 95%.
 - The Expanded Uncertainty mentioned in the report to the Instrument / Unit Calibrated is not applicable if any correction or repair made to it.
 - Any adjustment or repair has not been performed by the laboratory for this Instrument / Unit calibrated.
 - This calibration certificate should not be reproduced in part/full without approval of laboratory.
 - These results are obtained at the time of calibration in the laboratory permanent facility at PlasVac.
 - Condition of instrument found satisfactory during receipt.
 - The standard methods DKD-R 6-1 and DKD-R 6-2 have been followed. No statement of conformity was applied in the Calibration Result.
 - The calibration certificate without review and approval is not valid.
 - This certificate and expanded uncertainty are related only to the Instrument / Unit Calibrated and mentioned in this report.
 - This Certificate issued for Scientific and Industrial purpose only.

(End of Calibration Certificate)



HPB

(Hardik Baldaniya)

Calibrated By – Laboratory Scientist

(R)



23/02/2022

Shruti S.

SHD

(Rohak Pethani)

Approved & Reviewed By – Laboratory In-charge



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E-mail : ncqc@calibrationlaboratory.in, • calibrationlab.ncqc@gmail.com

Visit our Web Site : www.calibrationlaboratory.in



CC-2128

Precision Calibration with National / International Traceability for Temperature, Dimensional, Pressure, Vacuum, Time, Mass, Electrical, Noise, Airflow, Lux & all Special Purpose Instruments in all ranges.

Calibration Certificate

Name of Customer → Plasma & Vacuum Technologies Plot No.17, 1/A Road, GIDC Kathwada, Ahmedabad-382 430, Gujarat.	Certificate No. NCQC-M/161221/03 Date of Issue 17-12-2021 Date of Calibration 16-12-2021 Suggested Due Date 15-12-2022
---	---

Date Of Receipt / Ref. No. → 16-12-2021

F/CR/M/052, Issue No.01
Page 1 of 1

ULR – CC212821000005773F

Discipline → Mechanical Calibration,
Force, Torque

Details of Observation of Unit Under Calibration

Identification No. : PVT/SD/TW/01
Serial No. : 24B – 41
Name of Instrument : Torque Wrench

Range	70 – 340 Nm	Visual Inspection	OK
Least Count	10 Nm	Make	Mac Master
Type	Type II	Model	TW 250 R
Accuracy	± 4 % of rdg.	Class	A

Force Set on Torque Wrench in Nm	Reading Observed By Torque Wrench calibration system in Nm	Absolute Error In Nm	Expanded Uncertainty (±)
110	107.9	2.1	2.42 % rdg.
230	226.7	3.3	2.42 % rdg.
320	324.3	4.3	2.42 % rdg.

Remarks:

- Averages of minimum five readings are reported.
- Suggested due date is given based on customer requirements.
- Calibration points are given based on customer requirements.
- These results are obtained at the time of calibration.
- Any hand written corrections (except @ marked) or photocopies of the report invalidates this certificate.
- The uncertainties are for a confidence probability of not less than 95% with coverage factor k = 2.
- Environment condition during calibration: 23 ± 2°C, 40 to 60% Rh.
- Reference standard no.: IS/ISO 6789.
- Location of performance of calibration → At Lab.
- Condition of instrument found satisfactory during receipt.
- Reference calibration method no.: NCQC/CM/M/052.
- Our masters are directly calibrated through NABL accredited calibration laboratory having direct Traceability with national / international standard.

Details of master Instrument Used for Calibration

Nomenclature	Make / Model	Id. No. / Sr. No.	Calibration Due Date
Torque Wrench calibration system	Sushma / TS-103F & TDU-RB-103	TS13-0089,0091,0092,0093, / DU13-0032 (NCQC-M/022)	30-03-2023
NCQC System Certificate No.	Certificate no. & traceability of master with National Standards		
152, 152/2, 152/3, 152/4	Our master torque wrench calibration system is calibrated and traceable to National Standard through NABL accredited laboratory Sushma Industries calibration centre, Certificate no. SCPL/CC/2876,2877,2878, 2879 /03/2020-2021, Date - 31-03-2021.		

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23/02/2022
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Traceable To National / International Standards.	
Calibrated By Jaydeep Khatri	Reviewed & Approved By Jigar Panchal

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E-mail: ncqc@calibrationlaboratory.in, • calibrationlab.ncqc@gmail.com

Visit our Web Site : www.calibrationlaboratory.in



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Calibration Certificate

Name of Customer → Plasma & Vacuum Technologies Plot No.17, 1/A Road, GIDC Kathwada, Ahmedabad-382 430, Gujarat.		Certificate No. Date of Issue Date of Calibration Suggested Due Date	NCQC-M/161221/01 17-12-2021 16-12-2021 15-12-2022
Date Of Receipt / Ref. No. → 16-12-2021		F/CR/M/052, Issue No.01 Page 1 of 1	
ULR – CC212821000005771F		Discipline → Mechanical Calibration, Force, Torque	
Details of Observation of Unit Under Calibration		Identification No. : PVT/SD/TW/02 Serial No. : 24R – 12 Name of Instrument : Torque Wrench	
Range Least Count Type Accuracy	10 – 68 Nm 2 Nm Type II ± 4 % of rdg.	Visual Inspection Make Model Class	OK Mac Master TW 50 R A
Force Set on Torque Wrench in Nm	Reading Observed By Torque Wrench calibration system in Nm	Absolute Error In Nm	Expanded Uncertainty (±)
24	22.94	1.06	2.58 % rdg.
44	42.25	1.75	2.58 % rdg.
68	66.21	1.79	2.58 % rdg.

Remarks:

- Averages of minimum five readings are reported.
- Suggested due date is given based on customer requirements.
- Calibration points are given based on customer requirements.
- These results are obtained at the time of calibration.
- Any hand written corrections (except @ marked) or photocopies of the report invalidates this certificate.
- The uncertainties are for a confidence probability of not less than 95% with coverage factor k = 2.
- Environment condition during calibration: 23 ± 2°C, 40 to 60% Rh.
- Reference standard no.: IS/ISO 6789.
- Location of performance of calibration → At Lab.
- Condition of instrument found satisfactory during receipt.
- Reference calibration method no.: NCQC/CM/M/052.
- Our masters are directly calibrated through NABL accredited calibration laboratory having direct Traceability with national / international standard.

Details of master Instrument Used for Calibration

Nomenclature	Make / Model	Id. No. / Sr. No.	Calibration Due Date
Torque Wrench calibration system	Sushma / TS-103F & TDU-RB-103	TS13-0089,0091,0092,0093, / DU13-0032 (NCQC-M/022)	30-03-2023
NCQC System Certificate No.	Certificate no. & traceability of master with National Standards		
152, 152/2, 152/3, 152/4	Our master torque wrench calibration system is calibrated and traceable to National Standard through NABL accredited laboratory Sushma Industries calibration centre, Certificate no. SCPL/CC/2876/2877, 2878, 2879 /03/2020-2021, Date - 31-03-2021.		

(R)

23/02/2022
Shari's

Traceable To National / International Standards.

Calibrated By

Jaydeep Khatri

Reviewed & Approved By

Jigar Ranchal

NCQC DEFINES CALIBRATION AS "PRECISION AND RELIABILITY OF INSTRUMENTS FOR YOUR BETTER TOMORROW"

CALIBRATION CERTIFICATE

Service Request No. :- 2022/01/056		Certificate No. :- HTC/2022/01/0341		
ULR No. :- CC247822000000341F		Certificate Date of Issue :- 13-Jan-2022		
Date of Calibration 08-Jan-2022	Recom.Due Date :- 07-Jan-2023	Discipline Mechanical - Pressure	NABL Certificate Due on 05-Dec-2022	Page 1 of 2
1. Customer :- Plasma & Vacuum Technologies Plot No. 17, Road No. 1A Kathwada GIDC, Ahmedabad-382430				
Received Date :- 08-01-2022		Work Instruction No.: HTC/WI/014		Environment Condition
Location of Calibration :- On Site		Reference Standard : NABL 129 & DKD-R 6-1		Temp.°C 20.4
Condition of Item :- Good				RH % 53.3
2. Description of Item				
Name :-	Pressure Gauge	Range :-	0 to 70 kg/cm ²	
ID No. :-	PVT/SD/GP70D/14	L.C. :-	1 kg/cm ²	
Sr. No. :-	---	Accuracy :-	---	
Make :-	LA	Working Range :-	Full	
Model / Type :-	--- / Analogue	Location :-	---	
3. Detail of Master equipment used for calibration				
Name	Make/I.D.No.	Certificate No.	Certified By	Cal. Validity
Digital Pressure Gauge (On Site)	HTC-EQP-248	VIS/21-22/T-893	VIS & CC-2695	08-Oct-2022
All Calibration done in SI units and are traceable to National / International standards as per required ISO/IEC/17025				
4. Tracibility : 1 Digital Pressure Gauge Calibrate through NABL Lab Vijay Instruments & CC-2695., Vide Certificate No.:VIS/21-22/T-893. Calibrated on 08-Oct-2021.Traceable to National Standard.				
<p>The reported uncertainty is the expanded uncertainty in measurement obtained by multiplying the standard uncertainty by the coverage factor $K=2$, which corresponds to a coverage probability of approximately 95% for normal distribution.</p> <p>Note :</p> <p>1) UUC stands for Unit Under Calibration.</p> <p>2) This certificate refers only to the particular item submitted for calibration</p> <p>3) This certificate shall not be reproduced, except in full unless written permission for the publication of an approved abstract has been obtained from the Technical Manager of "Hi - Tech Calibration, Vapi".</p> <p>4) The calibration results relate only to the item calibrated reported in the certificate are valid at the time of and under the stated conditions of measurement.</p>				
<p>Akshay J Patel Calibration Engineer</p> <p><i>AJP</i> Calibrated By</p>		<p><i>(R)</i></p> <p>23/02/2022 Shantil</p> <p><i>(R)</i></p> <p>Dharmesh R. Purohit Quality Manager</p> <p><i>(R)</i></p> <p>Authorised Signatory</p>		





For Quality Command



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Nr. Daman Ganga River, Valvada (VAPI), Tal. Umbergaon Dist. Valsad - 396105.
Email : hitechvapi@yahoo.com / hitechvapi307@gmail.com
Web : www.hi-techcalibration.in Cell : 9426832487 / 9427634137

Certificate No. :-	HTC/2022/01/0341	Date of Calibration :-	08-Jan-2022	Page 2 of 2
I.D. No. :-	PVT/SD/GP70D/14	Recom. Due Date :-	07-Jan-2023	
ULR No. :-	CC247822000000341F	Discipline :-	Mechanical - Pressure	

5. Calibration Method

As per NABL 129 Pressure indicated device is compare to higher accuracy master pressure gauge as per DKD R-6-1 Standard.

6. Calibration Results :

Zero Set Point Error = 0.00000 kg/cm²

Set Value on UUC Pind kg/cm ²	Cycle 1		Cycle 2		Cycle 3		Std. Average Reading Miw kg/cm ²	+/- Error ΔP Pind-Miw kg/cm ²	Repeatability b'real kg/cm ²	Hysteresis h'real kg/cm ²	Exp.UNC +/- bar
	Up M1 kg/cm ²	Down M2 kg/cm ²	Up M3 kg/cm ²	Down M4 kg/cm ²	Up M5 kg/cm ²	Down M6 kg/cm ²					
0	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.000	0.0000	0.0000	0.5661
14	14.015	14.012	14.017	14.014	14.019	14.016	14.016	-0.016	0.0040	0.0030	0.5662
28	28.021	28.018	28.023	28.020	28.025	28.022	28.022	-0.022	0.0040	0.0030	0.5662
42	42.026	42.024	42.028	42.027	42.031	42.029	42.028	-0.028	0.0050	0.0020	0.5662
56	56.033	56.030	56.035	56.031	56.037	56.032	56.033	-0.033	0.0040	0.0050	0.5662
70	70.039	70.036	70.041	70.038	70.043	70.040	70.040	-0.040	0.0040	0.0030	0.5662

Akshay J Patel

Calibration Engineer

Calibrated By

Priya P. Patel

Verification Engineer

Checked By

Dharmesh R. Purohit

Quality Manager

Authorised Signatory

HF-31A/00

CALIBRATION CERTIFICATE

Service Request No. :- 2021/07/285		Certificate No. :- HTC/2021/07/11358		
ULR No. :- CC247821000011358F		Certificate Date of Issue :- 26-Jul-2021		
Date of Calibration 22-Jul-2021	Recom.Due Date : 21-Jul-2022	Discipline Thermal - Temperature	NABL Certificate Due on 05-Dec-2021	
Page 1 of 3				
1. Customer :- Plasma & Vacuum Technologies Plot No. 17, Road No. 1A Kathwada GIDC, Ahmedabad-382430				
Received Date :- 21-07-2021	Work Instruction No.: HTC/WI/10	Environment Condition		
Location of Calibration :- At Lab	Reference Standard : NABL 129 & Euromat cg-8	Temp. °C 24.3	RH % 57.0	
Condition of Item :- Good				
2. Description of Item				
Name :- Thermocouple	Range :- 0 to 1200 °C			
ID No. :- PVT/SD/TST/26	L.C. :- ---			
Sr. No. :- ---	Accuracy :- ---			
Make :- TST	Working Range :- Full			
Model / Type :- --- / K - Type	Location :- PVT/SD/DLD/03			
3. Detail of Master equipment used for calibration				
Name	Make/I.D No.	Certificate No.	Certified By	Cal. Validity
R-type Thermocouple	HTC-EQP-018	NI/2008/029/001	Nishitronic CC-2294	17-Aug-2022
Pt-100 Sensor (4-Wire)	HTC-EQP-090	HTC/2020/08/13373	HTC, & CC-2478	13-Aug-2021
Pt-100 Sensor (4-Wire)	HTC-EQP-091	NI/2008/029/002	Nishitronic CC-2294	17-Aug-2022
6 1/2 Digital Precision Multimeter	HTC-EQP-017	HTC/2021/04/6227	HTC & CC-2478	28-Apr-2022
<p>The reported uncertainty is the expanded uncertainty in measurement obtained by multiplying the standard uncertainty by the coverage factor $k=2$, which corresponds to a coverage probability of approximately 95% for normal distribution.</p> <p>Note :</p> <p>1) UUC stands for Unit Under Calibration</p> <p>2) This certificate refers only to the particular item submitted for calibration</p> <p>3) This certificate shall not be reproduced, except in full unless written permission for the publication of an approved abstract has been obtained from the Technical Manager of "Hi - Tech Calibration,Vapi".</p> <p>4) The calibration results relate only to the item calibrated reported in the certificate are valid at the time of and under the stated conditions of measurement.</p>				
Ankit C Patel Calibration Engineer  Calibrated By		 <div style="text-align: right;">  Dharmesh R. Purohit Quality Manager  Authorised Signatory </div>		

HF-31/4

Name	Make/I.D No.	Certificate No.	Certified By	Page 2 of 3
------	--------------	-----------------	--------------	-------------

All Calibration done in SI units and are traceable to National / International standards as per required ISO/IEC/17025

4. Tracibility :
- 1 R-Type Thermocouple Calibrate through NABL Lab Nishitronic CC-2294, Vide Certificate No. NI/2008/029/001. Calibrated on 18-Aug-2020 Traceable to National Standard.
 - 2 Pt-100 Sensor (4-Wire) Calibrate through NABL Lab HTC & CC-2478, Vide Certificate No.: HTC/2020/05/13373. Calibrated on 14-Aug-2020, Traceable to National Standard
 - 3 Pt-100 Sensor (4-Wire) Calibrate through NABL Lab Nishitronic CC-2294, Vide Certificate No. NI/2008/029/002 Calibrated on 18-Aug-2020, Traceable to National standard
 - 4 6 1/2 Digital Precision Multimeter Calibrated through NABL Lab HTC & CC-2478, Vide Certificate No. HTC/2021/04/6227. Calibrated on 26-April-2022, Traceable to National Standard.

The reported uncertainty is the expanded uncertainty in measurement obtained by multiplying the standard uncertainty by the coverage factor $k=2$, which corresponds to a coverage probability of approximately 95% for normal distribution.

Note :

- 1) UUC stands for Unit Under Calibration
- 2) This certificate refers only to the particular item submitted for calibration
- 3) This certificate shall not be reproduced, except in full unless written permission for the publication of an approved abstract has been obtained from the Technical Manager of "Hi - Tech Calibration, Vapi".
- 4) The calibration results relate only to the item calibrated reported in the certificate are valid at the time of and under the stated conditions of measurement.

Ankit C Patel
Calibration Engineer

Calibrated By
Ankit C Patel

23/10/2022
Sharat S.

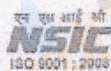
Dharmesh R. Purohit
Quality Manager

Authorised Signatory

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Certy No. CC-2478

HI-TECH CALIBRATION

Head Off.: ROYAL INDUSTRIAL HUB, Gala No. 60, N.H.No. 8,
Nr. Daman Ganga River, Valvada (VAPI), Tal. Umbergaon Dist. Valsad - 396105.
Email : hitechvapi@yahoo.com / hitechvapi307@gmail.com
Web : www.hi-techcalibration.com Cell : 9426832487 / 9662980366

Certificate No. :-	HTC/2021/07/11358	Date of Calibration :-	22-Jul-2021	Page
I.D. No. :-	PVT/SD/TST/26	Recom. Due Date :-	21-Jul-2022	3 of 3
ULR No. :-	CC247821000011358F	Discipline :-	Thermal - Temperature	

5. Calibration Method

Actual temperature reading indicated by UUC is compared with specified stable temperature for a given temperature measured using standard - pt-100 Sensor or Thermocouple & DMM or calibrator.

6. Calibration Results :

A) INSTRUMENTAL ERROR FOR TEMPERATURE

Sr. No.	Cal. Point in °C	UUC Reading in °C	Standard Reading in °C	Error in °C	+/- Expanded Uncertainty in °C
1	20.2	20.2	20.288	-0.088	0.820
2	260.2	260.2	260.374	-0.174	0.650
3	750.3	750.3	750.522	-0.222	2.770
4	1000.5	1000.5	1000.787	-0.287	2.530

(R)

23/07/2022
Shaikh S.

Ankit C Patel

Calibration Engineer

AC Patel

Calibrated By

Kavita M. Panwala

Verification Engineer

KMP

Checked By



Dhamesh R. Purohit

Quality Manager

DP

Authorised Signatory

HF-31C/00

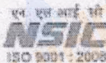
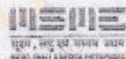
CALIBRATION CERTIFICATE

Service Request No. :- 2021/07/285		Certificate No. :- HTC/2021/07/11359	
ULR No. :- CC247821000011359F		Certificate Date of Issue :- 28-Jul-2021	
Date of Calibration 22-Jul-2021	Recom.Due Date 21-Jul-2022	Discipline Thermal - Temperature	NABL Certificate Due on 05-Dec-2021
Page 1 of 3			
1. Customer :- Plasma & Vacuum Technologies Plot No. 17, Road No. 1A Kathwada GIDC, Ahmedabad-382430			
Received Date :- 21-07-2021	Work Instruction No. :- HTC/WI/10	Environment Condition	
Location of Calibration :- At Lab	Reference Standard :- NABL 129 & Euromat cg-8	Temp. °C 24.5	RH % 56.0
Condition of Item :- Good			
2. Description of Item			
Name :- Thermocouple	Range :- 0 to 1200 °C		
ID No. :- PVT/SD/TST/27	L.C. :- ---		
Sr. No. :- ---	Accuracy :- ---		
Make :- TST	Working Range :- Full		
Model / Type :- --- / K - Type	Location :- PVT/SD/DLD/03		
3. Detail of Master equipment used for calibration			
Name	Make/I.D No.	Certificate No.	Certified By
R-type Thermocouple	HTC-EQP-018	NI/2008/029/001	Nishitronic CC-2294
Pt-100 Sensor (4-Wire)	HTC-EQP-090	HTC/2020/08/13373	HTC, & CC-2478
Pt-100 Sensor (4-Wire)	HTC-EQP-091	NI/2008/029/002	Nishitronic CC-2294
6 1/2 Digital Precision Multimeter	HTC-EQP-017	HTC/2021/04/6227	HTC & CC-2478
			Cal. Validity
			17-Aug-2022
			13-Aug-2021
			17-Aug-2022
			28-Apr-2022
<p>The reported uncertainty is the expanded uncertainty in measurement obtained by multiplying the standard uncertainty by the coverage factor $k=2$, which corresponds to a coverage probability of approximately 95% for normal distribution.</p> <p>Note :</p> <p>1) UUC stands for Unit Under Calibration.</p> <p>2) This certificate refers only to the particular item submitted for calibration</p> <p>3) This certificate shall not be reproduced, except in full unless written permission for the publication of an approved abstract has been obtained from the Technical Manager of "Hi - Tech Calibration, Vapi"</p> <p>4) The calibration results relate only to the item calibrated reported in the certificate are valid at the time of and under the stated conditions of measurement.</p>			
<p>Ankit C Patel Calibration Engineer</p> <p>Acted Calibrated By</p>		<p>23/02/2022</p> <p>Shakti S.</p> <p>Dharmesh R. Purohit Quality Manager</p> <p>Authorised Signatory</p>	





For Quality Command



Certy No. CC-2478

HI-TECH CALIBRATION

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Name	Make/I.D No.	Certificate No.	Certified By	Page 2 of 3
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All Calibration done in SI units and are traceable to National / International standards as per required ISO/IEC/17025

4. Tracibility :

- 1 R-Type Thermocouple Calibrate through NABL Lab Nishitronic CC-2294, Vide Certificate No NI/2008/029/001. Calibrated on 18-Aug-2020 Traceable to National Standard.
- 2 Pt-100 Sensor (4-Wire) Calibrate through NABL Lab HTC & CC-2478, Vide Certificate No.: HTC/2020/04/13373. Calibrated on 14-Aug-2020, Traceable to National Standard.
- 3 Pt-100 Sensor (4-Wire) Calibrate through NABL Lab Nishitronic CC-2294, Vide Certificate No. NI/2008/029/002 Calibrated on 18-Aug-2020, Traceable to National standard.
- 4 0 1/2 Digital Precision Multimeter Calibrated through NABL Lab HTC & CC-2476, Vide, Certificate No. HTC/2021/04/5227. Calibrated on 28-April-2022. Traceable to National Standard.

The reported uncertainty is the expanded uncertainty in measurement obtained by multiplying the standard uncertainty by the coverage factor $k=2$, which corresponds to a coverage probability of approximately 95% for normal distribution.

Note :

- 1) UUC stands for Unit Under Calibration.
- 2) This certificate refers only to the particular item submitted for calibration
- 3) This certificate shall not be reproduced, except in full unless written permission for the publication of an approved abstract has been obtained from the Technical Manager of "Hi - Tech Calibration, Vapi"
- 4) The calibration results relate only to the item calibrated reported in the certificate are valid at the time of and under the stated conditions of measurement.

Ankit C Patel
Calibration Engineer

Calibrated By



Dharmesh R. Purohit
Quality Manager

Authorised Signatory

(P)

23/02/2022
Shalini S.

HF-31/4

Certificate No. :-	HTC/2021/07/11359	Date of Calibration :-	22-Jul-2021	Page
I.D. No. :-	PVT/SD/TST/27	Recom. Due Date :-	21-Jul-2022	3 of 3
ULR No. :-	CC247821000011359F	Discipline :-	Thermal - Temperature	

5. Calibration Method

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6. Calibration Results :

A) INSTRUMENTAL ERROR FOR TEMPERATURE

Sr. No.	Cal. Point in °C	UUC Reading in °C	Standard Reading in °C	Error in °C	+/- Expanded Uncertainty in °C
1	20.2	20.2	20.267	-0.067	0.820
2	260.5	260.5	260.653	-0.153	0.650
3	750.6	750.6	750.823	-0.223	2.770
4	1000.7	1000.7	1000.986	-0.286	2.530

Ankit C Patel

Calibration Engineer

Ac Patel

Calibrated By

Kavita M. Panwala

Verification Engineer

KMP

Checked By



Dharmesh R. Purohit

Quality Manager

Dharmesh R. Purohit

Authorised Signatory



HF-31C/00