Laboratory	**Accurate Labs, 311, 312, Govinda Complex, G.I.D.C Char Rasta, Vapi, Dist: Valsad, Gujarat**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Certificate Number	**CC-2657** ***(In lieu of C-0425,C-0426, C-0427)***	**Page**	**1 of 18**
Validity	**25.04.2018 to 24.04.2020**	**Last Amended on**	**18.05.2018**

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		ELECTRO TECHNICAL CALIBRATION		
I.	**MEASURE**			
1.	DC Voltage[#]	1 mV to 100 mV 100 mV to 10 V 10V to 1000 V	0.92% to 0.011% 0.011% to 0.007% 0.007 % to 0.009%	Using 6 ½ DMM Fluke 8846 A By Direct Method
2.	AC Voltage [#]	**50 Hz** 3 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	 1.64 % to 0.12 % 0.12 % to 0.11 % 0.11 % to 0.10 % 0.10% 0.11%	Using 6 ½ DMM Fluke 8846 A By Direct Method
3.	DC Current [#]	200 µA to 1 mA 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A	0.066 % to 0.07 % 0 07 % to 0.08% 0.065% 0.065% to 0.10% 0.10% to 0.2 %	Using 6 ½ DMM Fluke 8846 A By Direct Method
4.	AC Current [#]	**50 Hz** 33 µA to 1 mA 1 mA to 3 A 3 A to 10 A	 0.68 % to 0.57 % 0.57 % to 0.26% 0.26 % to 0.28 %	Using 6 ½ DMM Fluke 8846 A By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
5.	DC Resistance[#]	10μΩ to 100 μΩ	2.19 % to 0.81 %	Using 6 ½ DMM Fluke 8846 A & Calibrator By Direct Method
		2 Ω to 10 Ω 10 Ω to 1 MΩ 1 MΩ to 10 MΩ 10 MΩ to 100 MΩ	0.61% to 0.13 % 0.13 % to 0.014 % 0.014 % to 0.079 % 0.079 % to 0.95 %	Using 6 ½ DMM Fluke 8846 A By Direct Method
6.	Time [#]	10 Sec to 30 min 30 min to 23 Hrs	0.5 Sec to 0.69 Sec 0.69 Sec to 3.54 sec	Using Digital Stop Watch By Comparison Method
7.	Temperature Simulation[$] RTD Mode J,K,T Type Thermocouple R,SType Thermocouple	 (-)200°C to 800°C (-)200°C to 1370°C 0°C to 1760°C	 0.04°C to 0.09 °C 0.20 °C to 0.50 °C 0.35 °C to 0.50 °C	Using Fluke 7526A Precesion process Calibrator By Direct Method
8.	Frequency [#]	10 Hz to 1kHz	0.57% to 0.12%	Using 6 ½ DMM Fluke 8846 A By Direct Method
9.	AC High Voltage[♣]	2 kV to 15 k V	3.6 % to 2.4 %	Using HV Probe with DMM By Direct Method
10.	DC High Voltage[♣]	2 kV to 30 kV	3.34 % to 2.73 %	Using HV Probe with DMM By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
11.	Temperature Simulation[♣] PT-100 Thermocouple (J,K,T,R,S Type)	 (-)200°C to 800°C (-)200°C to 1750°C	 0.16 °C to 0.46°C 0.38 °C to 1.17°C	Using Beamax calibrator By Direct Method
12.	Capacitance[$]	100µF to 1 nF	0.42 % to 6.67%	Using LCR Meter By Direct Method
13.	Inductance [$]	100µH to 1H	0.41 %	Using LCR Meter By Direct Method
II.	**SOURCE**			
1.	DC Voltage [$]	1 mV to 330 mV 330 mV to 30 V 30 V to 1000 V	1.28% to 0.041% 0.041% to 0.014% 0.014 % to 0.023 %	Using Fluke 5080A Calibrator By Direct Method
2.	DC Voltage[♣]	1 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 to 1000 V	1.36 % to 0.13 % 0.13% to 1.28 % 1.28% 1.28% 1.28%	Using Multifunction Calibrator with Fluke 8846 A 6 ½ DMM By Indirect Method
3.	AC Voltage[$]	**50 Hz** 10 mV to 33 mV 33 mV to 330 mV 330 mV to 1000 V	 1.193 % to 0.63% 0.63 % to 0.42 % 0.42% to 0.20%	Using Fluke 5080A Calibrator By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
4.	AC Voltage[♣]	3 mV to 100 mV 100 mV to 1 V 1 V to 10 V 10 V to 100 V 100 V to 1000 V	1.63 % to 0.4 % 0.4 % to 0.37 % 0.37% 0.37 % to 0.40 % 0.40 % to 1.27 %	Using Multifunction Calibrator with Fluke 8846 A 6 ½ DMM By Indirect Method
5.	DC Current[$]	3.3 mA to 330 mA 330 mA to 3 A 3 A to 20 A 20 A to 1000 A	0.097 % to 0.072 % 0.072 % to 0.24 % 0.24 % to 0.62 % 1.07%	Using Fluke 5080A Calibrator By Direct Method Using Fluke 5080A Calibrator and Current Coil By Direct Method
6.	DC Current[♣]	1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A	1.27% 1.27% to 1.28 % 1.28 % 1.28 % to 0.23 %	Using Multifunction Calibrator with Fluke 8846 A 6 ½ DMM By Indirect Method
7.	AC Current[$]	**50 Hz** 3.3 mA to 330 mA 330 mA to 3 A 3 A to 20 A 20 A to 1000 A	 0.31 % to 0.22 % 0.22 % to 0.27 % 0.27 % to 0.89 % 0.89 % to 0.99 %	Using Fluke 5080A Calibrator By Direct Method Using Fluke 5080A Calibrator and Current Coil By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
8.	AC Current[♣]	**50 Hz** 1 mA to 10 mA 10 mA to 100 mA 100 mA to 1 A 1 A to 10 A	 0.65 % 0.65 % to 0.39 % 0.39% 0.39 % to 0.45 %	Using Multifunction Calibrator with Fluke 8846 A 6 ½ DMM By Indirect Method
9.	DC Resistance (4 Wire Method)[$]	10μΩ 100μΩ 1 mΩ 10 mΩ 100 mΩ.	0.51μΩ 1.5μΩ, 0.066 mΩ, 0.067 mΩ 0.075 mΩ	Using Micro ohm(Ω) meter calibrator By Direct Method
	DC Resistance (2 Wire Method)[$]	1 mΩ to 1 Ω 1 Ω to 9 kΩ	5.9% to 0.21% 0.21%	Using High precision Deacade resistance Box By Direct Method
		10 kΩ to 100kΩ	0.06 % to 2.38%	Using Decade Box ByDirect Method
		100 kΩ to 1000 MΩ	2.38 % to 2.42 %	Using Vaiseshika Deacade Box By Direct Method
10.	Resistance [♣]	2 Ω to 4000 Ω	0.34 % to 1.8 %	Using Beamax Calibrator Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
11	Temperature Indicator / Controller $ PT-100 Thermocouple J,K,T Type R,S Type	 (-)200°C to 630°C (-)200°C to 1370°C 0°C to 1750°C	 0.08 °C 0.18 °C to 0.50°C 1.17 °C to 0.93 °C	Using Fluke 7526A Calibrator Direct Method
12	Temperature Indicator / Controller ♣ Pt-100 Thermocouple (J, K, R, S, T Type)	 (-)200°C to 800°C (-)200°C to 1750°C	 0.21 °C to 0.49°C 0.36 °C to 1.2 °C	Using Beamax Calibrator Direct Method
13.	Ac Power #	At 50 Hz PF -0.5 to 0.5 120 W to 1.2 kW (240 V, 1A to 5 A)	1.14%	Using Load Manager By Comparison Method
14.	Frequency #	40 Hz to 1000 Hz	0.93% to 0.26%	Using Multifunction Calibrator Fluke 725 By Direct Method
15.	Capacitance$	1nF to 1µF 1µF to 100 µF	3.5%	Using Decade Capacitance Box By Direct Method
16.	Inductance $	100µH to 1H	2.89 % to 2.8 %	Using Decade Inductance Box By Direct Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	MECHANICAL CALIBRATION			
I.	**DIMENSION (BASIC MEASURING INSTRUMENT, GAUGE ETC.)**			
1.	Calipers [$] (Vernier / Digital / Dial) L.C : 0.01 mm [Φ]	0 to 600 mm	15.4 µm	Using Caliper Checker & Slip Gauge
2.	Height Gauge [$] (Vernier / Digital / Dial) L.C : 0.01 mm [Φ]	0 to 600 mm	17 µm	Using Caliper Checker & Slip Gauge
3.	External Micrometer [$] L.C : 0.001 mm [Φ]	0 to 150 mm	2.3 µm	Using Micrometer Check Set , Gauge Block Set
	L.C : 0.01 mm	150 mm to 600 mm	8.8 µm	Using Micrometer Check Set , Long Gauge Block Set
4.	Plunger Dial [$] L.C : 0.001 mm [Φ]	0 to 10 mm	1 µm	Using Single Axis Measuring Machine
	L.C : 0.01 mm	0 to 50 mm	6 µm	
5.	Lever Dial [$] L.C: 0.001 mm [Φ]	0 to 0.14 mm	1.3 µm	Using Single Axis Measuring Machine
	L.C : 0.01 mm	0 to 1.6 mm	6 µm	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
6.	Bore Gauge [$] (For Transmission Error) L.C : 0.001 mm[Φ]	Up to 1 mm	1.3 µm	Using Single Axis Measuring Machine
7.	Plain Plug Gauge[$]	Up to 225 mm	1.9 µm	Using Single Axis Measuring Machine
8.	Plain Ring Gauge[$]	3mm to 200 mm	2.1 µm	Using Single Axis Measuring M/c , Machine , Master Ring Gauge
9.	Thread Plug Gauge[$]	3 mm to 225 mm	2.1 µm	Using Single Axis Measuring, Machine, Thread Measuring Wire
10.	Thread Ring Gauge[$] (Effective Diameter)	3mm to 100 mm	1.9 µm	Using Single Axis Measuring Machine , Master Ring Gauge
11.	Snap Gauge[$]	Up to 150 mm	1.4 µm	Using Single Axis Measuring Machine
12.	Dial Snap Gauge[$]	Up to 150 mm	6 µm	Using Gauge Block
13.	Dial Thickness Gauge[$] L.C : 0.01 mm [Φ] L.C : 0.001 mm	Up to 20 mm 0 to 1 mm	5.8 µm 1 µm	Using Gauge Block Set

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
14.	Feeler Gauge[$]	Up to 3 mm	2.3 µm	Using Digital Micrometer
15.	Measuring Pin / Thread Measuring Wire[$]	0.17 to 20 mm	2.3 µm	Using Single Axis Measuring Machine
16.	Thickness Foils[$]	Up to 2 mm	2.3 µm	Using Digital Micrometer
17.	Measuring Scale[$]	Up to 1000 mm	290 µm	Using Tape & Scale Calibrator
18.	Measuring Tape[$]	Up to 50 mtr	290 √ L L is in mtr	Using Tape & Scale Calibrator
19.	Bevel Protractor[$] (L.C : 1 Min) [Φ]	0 – 90˚- 0 - 90˚	1 Min	Using Angle Gauge Block By Comparison method
20.	Degree Protractor[$] (L.C : 1 Degree) [Φ]	0 - 90˚ - 0	35 Min	Using Angle Gauge Block By Comparison Method
21.	Combination Set[$] (L.C : 1 Degree) [Φ]	0 - 90˚-0	35 Min	Using Angle Gauge Block By Comparison method
22.	Coating Thickness Gauge[$]	Up to 2 mm	6.2 µm	Using Thickness Foils By Comparison Method
23.	Radius Gauge[$]	Up to R 40 mm	11.8 µm	Using Vision Inspection System By Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
24.	Thread Pitch Gauge[$] (Pitch & Angle)	0.4 to 6 mm 60 ˚ & 55 ˚	6.8 µm 4.1 Min arc	Using Vision Inspection System by Comparison method
25.	Test Sieves[$]	0.032 to 50 mm 50 mm to 125 mm	6.4 µm 28 µm	Using Vision Inspection System Digital Caliper by Comparison Method
26.	Pie Tape[$]	1 Mtr to 50 mtr	290 √ L L is in Mtr	Using Tape & Scale Calibrator By Comparison Method
27.	Micrometer Setting Standard[$]	25 mm to 300 mm 300 mm to 575 mm	2.8 µm 5.7 µm	Using Single Axis Measuring M/c , Machine Comparator Stand , Digital Dial , Long Gauge Block By Comparison Method
28.	Tachometer [$] (Contact)	10 to 5000 Rpm	5.2% to 0.15 % rdg	Using Digital Tachometer By Comparison method
29.	Tachometer [$] (Non Contact)	10 to 13000 Rpm	0.21% to 0.36 % rdg	Using Digital Tachometer By Comparison method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
II.	**DIMENSION (PRECISION INSTRUMENTS)**			
1.	Profile Projector / Optical Microscope / Tool Makers Microscope / Vision Measuring M/C ♣ (L.C : 0.0001 mm) Φ	Linear 0 - 200 mm	6.3 µm	Glass Scale, Glass Scale / Digital Caliper, Angle Gauge By Comparison Method (JIS B 7184)
		Magnification 10 X to 100 X	0.6%	
		Angular 0 - 360º	4.7 Min	
III.	**PRESSURE INDICATING DEVICES**			
1.	(Pneumatic Pressure Gauge) Digital & Dial Pressure Gauge, Pressure Transmitter, Pressure Switch #	0 to 10 Mbar 0 to 50 Mbar 0 to 30 Bar	0.02 mbar 0.63 mbar 0.01 bar	Using Multifunction Calibrator, Using Digital Pressure Gauge & Pressure Comparator, Using Digital Pressure Gauge & Pressure Comparator By Comparison Method using DKD R-6-1
2.	(Hydraulic Pressure Gauge) Digital & Dial Pressure Gauge, Pressure Transmitter, Pressure Switch $	0 to 200 Bar 0 to 60 Bar 60 Bar to 1000 Bar	0.1 bar 0.06 % rdg 0.06 % rdg	Using Digital Pressure Gauge & Pressure Comparator, Using Dead Weight Tester By Comparison Method as per DKD R-6-1

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
3.	Vacuum Dial / Digital Gauges,#	(-) 0.9 to 0 Bar	0.003 bar	Using Digital Vacuum Gauge & Comparator By Comparison Method as per DKD R-6-2
4.	Barometer$	940 to 1030 Mbar	1.7 mbar	Using Digital Pressure Gauge & Pressure Comparator By Comparison Method
5.	(Hydraulic Pressure Gauge) Digital & Dial Pressure Gauge, Pressure Transmitter, Pressure Switch ♣	0 to 300 Bar	0.19 bar	Using Digital Pressure Gauge & Pressure Comparator By Comparison Method as per DKD R-6-1
IV.	**ACCOUSTICS**			
1.	Sound Level Meter$	94 & 114 Db	0.8 dB	Using Sound level Calibrator By Direct Method
2.	Amplitude/ Vibration Meter$ Velocity Displacement Acceleration	 2 mm/s to 20 mm/s 10 µm to 145 µm 2.7 m/s^2 to 45 m/s^2	 3.85% 5.3 µm 4.7 %	 Using Vibration meter By Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
V.	**WEIGHTS**			
1	Mass-Weights[$]	1 mg 2 mg 5 mg 10 mg 20 mg 50 mg 100 mg 200 mg 500 mg	0.003 mg 0.003 mg 0.003 mg 0.003 mg 0.003 mg 0.002 mg 0.002 mg 0.002 mg 0.002 mg	Using E1 class weights and balance of readability 0.001mg as per OIML R-111
		1 G 2 G 5 G	0.004 mg 0.004 mg 0.006 mg	
		10 G 20 G 50 G 100 G 200 G	0.02 mg 0.02 mg 0.03 mg 0.03 mg 0.05 mg	Using E1 class weights and balance of readability 0.01mg as per OIML R-111
		500 G 1 kg	1 mg 3 mg	Using F1 class weights and balance of readability 1mg as per OIML R-111
		2 kg 5 kg	10 mg 30 mg	Using F1 class weights and balance of readability 10 mg as per OIML R-111
		10 kg 20 kg	100 mg 300 mg	Using F1 class weights and balance of readability 100 mg as per OIML R-111

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		50 kg	2 g	Using M1 class weights and balance of readability 1 g as per OIML R-111
VI.	**VOLUME**			
1.	Micro-Pipette[$] (L.C : 0.01 mg) [Φ]	1µl to 10 ml @ 27°C 10µl to 100 ml @ 27°C 100µl to 1000 ml @ 27°C	0.10 µl 0.11 µl 0.60 µl	Using Digital Micro balance with readability 0.001 mg Gravimetric method based on ISO 8655
2.	Glassware[$] Like Pipettes, Burettes, Measuring Cylinder, Volumetric Flask Etc	1ml to 10ml @27°C >10ml to 200ml @27°C >200ml to 1000ml @ 27°C 1000ml to 5ltr @27°C >5 Ltr to 20ltr @27°C	6.1 µl 6.6 µl 0.4ml 0.4 ml 6 ml	Using Weighing balance of 200g capacity and 0.01mg readability and distilled water By Gravimetric method based on IS/ISO 4787
VII.	**WEIGHING SCALE AND BALANCE**			
1.	Mass-Electronic Weighing Balances With Readability[♣] L.C. : 0.001 mg [Φ]	Maximum capacity up to 5g	0.06 mg	Using E1 class weights By Calibration of electronic weighing balance of Class I and coarser As per OIML R-76-1
	L.C. : 0.01 mg [Φ]	Maximum capacity up to 100g	0.43 mg	

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
	L.C : 0.1 mg $^{\Phi}$	Maximum capacity up to 200g	0.50 mg	Using E1 & E2 class weights By Calibration of electronic weighing balance of Class I and coarser As per OIML R-76-1
	L.C : 1 mg $^{\Phi}$ L.C : 10 mg $^{\Phi}$ L.C : 100 mg $^{\Phi}$	Maximum capacity up to 1000g Maximum capacity up to 10 kg Maximum capacity up to 25 kg	7 mg 40 mg 250 mg	Using E2 & F1 class weights by Calibration of electronic weighing balance of Class II and coarser As per OIML R-76-1
	L.C : 1 g $^{\Phi}$ L.C : 10g $^{\Phi}$	Maximum capacity up to 100 kg	3 g 24 g	Using F1 and M1 class weights Calibration of electronic weighing balance of Class III and coarser As per OIML R-76-1

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		THERMAL CALIBRATION		
1.	RTD/ Thermocouple With/ Without Controller / Indicator / Analogue Temp.Gauge $	(-)80 °C to 50 °C 50 °C to 250 °C 250 °C to 600 °C	0.26°C 0.42°C 0.48 °C	Using DAQS with SPRT Sensor By Comparison Method
2.	Thermocouple With /Without Controller / Indicator / Dry Bath $	600 to 1200 °C	2.88 °C	Using DAQS with "S" Type thermocouple Sensor By Comparison Method
3	RTD/ Thermocouple With/ Without Controller / Indicator / Dry Bath,Liquid Bath Analogue Temp.Gauge♣	(-)80 °C to 50 °C 50 °C to 250 °C 250 °C to 600 °C	0.28 °C 0.72 °C 0.72 °C	Using 6.5 digit Multimeter with RTD Sensor By Comparison Method
4	Thermocouple With /Without Controller / Indicator / Dry Bath ♣	600 °C to 1200°C	3.47 °C	Using Beamax calibrator with "S" Type thermocouple Sensor By Comparison Method
5.	Glass Thermometer $	(-)30 to 200 °C	1.24 °C	Using Temperature indicator with Sensor By Comparison Method

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
6.	Liquid Bath, Dry Block[#]	(-)30 to 400 °C	1.48 °C	Using DAQS with SSPRT Sensor By Comparison Method
7.	Thermo Hygrometer [#]	10°C to 50 °C @ 46 %RH 20 to 30 % RH @40 °C 30 to 90 %RH @25 °C	0.40 °C 2.7% RH 1.87 %RH	Using Hygropalm ,Humidity Generator By Comparison Method
8.	Data Logger (Temperature)[$]	-30°C to 50 °C	0.62 °C	Using PT100 with Indicator& Low Temp By Comparison Method.
9.	IR Thermometer [$]	50 °C to 300 °C	0.68 °C	Using Temp indicator with Pt-100 Sensor & Black Body Source By Comparison Method
10.	Deep Freezer, Environmental Chamber [♣] (Single Point)	(-)30 to 10 °C	1.17 °C	Using Indicator with Sensor By Comparison Method
11.	Oven ,Furnace, Deep Freezer Environmental Chamber [♣] (Multi Point)	(-)20 °C to 100 °C	5.50 °C	Using indicator with sensor By Comparison Method

Laboratory	**Accurate Labs, 311, 312, Govinda Complex, G.I.D.C Char Rasta, Vapi, Dist: Valsad, Gujarat**		
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Validity	**25.04.2018 to 24.04.2020**	**Last Amended on**	**18.05.2018**

Sl.	Quantity Measured / Instrument	Range/Frequency	*Calibration Measurement Capability (±)	Remarks
		FLUID FLOW CALIBRATION		
1.	Velocity (Air) $	0.6 m/s to 20 m/s	7.5 %	Using Hot wire anemometer By Comparison using hot wire anemometer & Wind Tunnel

*** Measurement Capability is expressed as an uncertainty (±) at a confidence probability of 95%**
$ Only in Permanent Laboratory
*** Only for Site Calibration**
 # The laboratory is also capable for site calibration however, the uncertainty at site depends on the prevailing actual environmental conditions and master equipment used.
Φ Laboratory can also calibrate instruments/devices of coarser resolution / least count within the accredited range using same reference standard/ master equipment under the scope of accreditation.

Dheeraj Chawla
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