



# ACCREDITATION DOCUMENT

F-06/02  
Issue Date: 26/05/08  
Rev. No: 05  
LAB 008

## Testing Laboratory

Accreditation Scope of Metrological Centre, F6 Rebuild Factory, PAC Kamra, Pakistan

Permanent laboratory premises

Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum Detection Limit	Uncertainty of Measurement (Where applicable) MU ( $\pm$ ) K=2	Standard specification/ Techniques/Equ ipment used
Chemical Analysis	Fe from Al alloys	0.20 % - 1.00 %	0.10 %	0.01 %	TP-019 By Spectrometric technique Spectrophotomet er 751, Digital balance TE214S.
	Si from Al alloys	0.20 % - 8.00 %	0.10 %	0.02 %	TP-019 By Spectrometric technique Spectrophotomet er 751, Digital
	Mn from Al alloys	0.20 % - 2.00 %	0.10 %	0.03 %	TP-021 By Spectrometric technique Spectrophotomet er 751G, Digital
	Cu from Al alloys	0.20 % - 5.00 %	0.10 %	0.31 %	TP-022 By Spectrometric technique Spectrophotomet er 751, Digital balance TE214
	Cu from Cu alloy	60.00 % - 99.90 %	55.00 %	0.36 %	TP-023 By Electrolytic technique double cell electrolytic analyzer 44B

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Materials/ Products tested	Types of test/ Properties measured	Range of measurement	Minimum Detection Limit	Uncertainty of Measurement (Where applicable) MU (±) K=2	Standard specification/ Techniques/Equ ipment used
	Pb from Cu alloy	0.80 % - 4.50 %	0.70 %	0.06 %	TP-024 By Electrolytic technique Double cell electrolytic analyzer 44B

### Calibration Laboratory.

Field of measurement:			
Measured quantity	Range	Best Measurement Capability expressed as an uncertainty ( ± )	Brief description of measurement and equipment used
<b>LENGTH</b>			
Calibration of simple/dial/digital/ modified Vernier caliper	<u>0 mm - 300 mm</u> 0 mm – 125 mm 0 mm – 200 mm 0 mm – 300 mm	0.50 µm 0.53 µm 0.52 µm	CP-062 Gauge blocks G-3, External micrometer, Surface plate
Calibration of depth/dial depth Vernier	<u>0 mm – 300 mm</u> 0 mm – 200 mm 0 mm – 300 mm	0.45 µm 0.70 µm	CP-063 Gauge blocks G-3, Surface plate
Calibration of simple/digital height Vernier	<u>0 mm -300 mm</u> 0 mm – 200 mm 0 mm – 300 mm	0.52 µm 0.70 µm	CP-064 Gauge blocks G-3, Surface plate.
Calibration of Common/Normal/di gital/dial/ external Micrometer	<u>0 mm – 100 mm</u> 0 mm – 25 mm 25 mm – 50 mm 50 mm – 75 mm 75 mm – 100 mm	0.096 µm 0.140 µm 0.180 µm 0.230 µm	CP-065 Gauge blocks G-3, Optical flat, Length measuring machine JD-21 / Horizontal Optimeter JD- 2, Surface Plate.
Calibration of Plane Plug Gauge	<u>1 mm – 80 mm</u> 1 mm – 30 mm 30 mm – 80 mm	0.78 µm 1.30 µm	CP-070 Digital UTM JX

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Measured quantity	Range	Best Measurement Capability expressed as an uncertainty ( ± )	Brief description of measurement and equipment used
Calibration of Thread Plug Gauge	0.40 mm pitch - 3.00 mm pitch	1.20 μm pitch	CP-071 Universal metro scope JD-5, Thread measuring needles G-0.
Calibration of Plane Ring Gauge	<u>3.999 mm - 159.999 mm</u> 4.00 mm – 5.00 mm 50.00 mm – 160.00 mm	0.39 μm 0.80 μm	CP-072 UTM JX11/Horizontal optimeter JD2, Gauge blocks G-3
Calibration of Filler gauge	<u>0.02 mm-14.0 mm</u> 0.02 mm - 1.00 mm 1.00 mm - 14.00 mm	0.72 μm 0.72 μm	CP-073 Vertical optimeter JD-1, Gauge block G-3.
Calibration of Dial Test Indicator/Lever dial test Indicator	0 mm – 3 mm 0 mm – 5 mm 0 mm – 10 mm	0.69 μm 0.83 μm 0.85 μm	CP-075 DTI Calibrator C-25
Calibration of Knife edge ruler	10 μm 175 mm	0.04 μm	CP-084 Knife edge comparator, Gauge block G-3
<b>ELECTRIC</b>			
Digital D.C voltage	0.000 mV – 100.000 mV 1.000 V - 10.000 V 10.000 V - 100.000 V 100.000 V – 1000.000 V	0.001 mV 0.001 V 0.001 V 0.001 V	CP-108 By Direct method With 5700A multicalibrator
Digital A.C Voltage	0.000 V – 1.000 V 10.000 V – 100.000 V 100.000 V – 1000.000 V	0.002 V 0.002 V 0.002 V	CP-108 By Direct method With 5700A multicalibrator
Digital D.C Current	0.000 A – 2.000 A	0.018 mA	CP-108 By Direct method With 5700A
Digital A.C current	0.0000 A – 2.0000 A	0.0175 mA	CP-108 By Direct method With 5700A

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Measured quantity	Range	Best Measurement Capability expressed as an uncertainty ( ± )	Brief description of measurement and equipment used
Digital Resistance	0.000 MΩ -100.000 Ω 1.000 MΩ -100.000 KΩ 1.000 MΩ - 100.000 MΩ	0.001 Ω 0.310 Ω 0.710 KΩ	CP-108 By Direct method With 5700A multicalibrator
Resistance	<u>0.01 Ω - 10<sup>6</sup> Ω</u>  0.010 Ω - 10.000 Ω 10.000 Ω -100.000 Ω 100.000 Ω -1000.000 Ω 1000.000 Ω -10000.000 Ω	5.800 mΩ 0.006 Ω 0.008 Ω 0.050 Ω	CP-118 By Direct method With 8505A / 8840 A DMM
<b>ELECTRONICS</b>			
Capacitance	<u>100 pF -5000pF</u>  100 pF -1000 pF 2000 pF 3000 pF 4000 pF	0.20 pF 2.20 pF 2.70 pF 3.60 pF 0.22 pF	CP-124 By direct method with Standard capacitance FJ-16601 (China)
Inductance	1 μH-100 μH 1 mH-100 mH	0.2580 μH 0.0292 mH	CP-124 By direct method with Standard inductance FJ-16701 (China)
Power	<u>-0.06 μW - 0.1W</u>  -0.06 μW - 0.10 μW -0.001mW - 0.10 mW 3 μW - 300 μW	0.174 μW 0.013 mW 0.115 μW 0.114 mW	CP-119 By direct method with Range calibrator hP 11683A (USA)
<b>PRESSURE</b>			
Pressure (Pneumatic) BQY-1 Barometer.	920 mb - 1020 mb	0.05 mb	CP-125 Using direct comparison method Dead weight tester.
Oxygen Pressure	0 kgf/cm <sup>2</sup> - 250 kgf/cm <sup>2</sup>	0.061 kgf/cm <sup>2</sup>	CP-105 Using direct comparison method
Pressure (Hydraulic)	0.4 kgf/cm <sup>2</sup> -5 kgf/cm <sup>2</sup>	0.01 kgf/cm <sup>2</sup>	CP-039 Dead weight testers Yu-6

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Measured quantity	Range	Best Measurement Capability expressed as an uncertainty ( $\pm$ )	Brief description of measurement and equipment used
	0 kgf/cm <sup>2</sup> -50 kgf/cm <sup>2</sup>	0.028 kgf/cm <sup>2</sup>	CP-039 Dead weight testers Yu-60
	0 kgf/cm <sup>2</sup> -150 kgf/cm <sup>2</sup>	0.58 kgf/cm <sup>2</sup>	CP-039 Dead weight testers Yu-600 CHINA
<b>Temperature</b>			
Temperature indicator (EMF based) Temperature indicator and controller (milli volt	0 °C -1600 °C	0.35 °C	CP-035 By comparison method using std milli volt source UJ33a.
Thermocouple	0 °C -1080 °C	1.1 °C	CP-033 Comparison method using std thermocouple, DC potentiometer and tubular furnace.
Temperature indicator (Ohmic based) indicator and controller (Ohmic meter) digital and analogue	0 °C - 650 °C	0.1 °C	CP-036 Comparison method using Std ohmic source (decade resistor) ZX-54.
<b>Mass</b>			
Weights	<u>1 mg-200 g</u> 1 mg - 500 mg 1 g - 50 g 100 g - 200 g	0.2 mg 0.2 mg 0.2 mg	CP-117 Indirect Comparison Method by using TG328A Balance and Troemner Ultra class/ Grade II/
Balance	<u>1mg-200g</u> 1 mg - 900 mg 1 g - 200 g	0.2 mg 0.2 mg	CP-115 Direct Comparison Method by using Troemner
Table Balance	<u>0.1 g - 1000 g</u> 0.1 g -100g 200 g- 1000 g	0.06 g 0.02 g	CP-116 Direct Comparison Method by using Grade II/

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<b>Measured quantity</b>	<b>Range</b>	<b>Best Measurement Capability expressed as an uncertainty ( ± )</b>	<b>Brief description of measurement and equipment used</b>
Swing Balance	10 mg-200 g	0.003 g	CP-012 Direct Comparison Method by using Grade II/ Grade III Std Weights
<b>Volume</b>			
Glass Volume meters	0.1 ml – 1000 ml	0.02 ml	Q/3A21CP149-91 1. Volume Comparison Method by using Std Volume meter Calibrator. 2. Weighing Method by using TG328A Balance.

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