

Laboratory **Calcutta Metal Testing Laboratory, Balitikuri, Brahmin Para, Padma Pukur, Howrah, West Bengal**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-6775 (in lieu of T-2044, T-2045 & T-3693)** Page 1 of 6

Validity **20.11.2017 to 19.11.2019** Last Amended on **07.02.2018**

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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CHEMICAL TESTING

I.	METALS & ALLOYS			
1.	Plain Carbon & Low Alloy Steel	Carbon	IS 228 (Part 1)	0.05 % to 2.5 %
		Manganese	IS 228 (Part 2)	0.1 % to 1.5 %
		Silicon	IS 228 (Part 8)	0.05 % to 5.0 %
		Sulphur	IS 228 (Part 9)	0.01 % to 0.25 %
		Phosphorus	IS 228 (Part 3)	0.01 % to 0.3 %
		Nickel	IS 228 (Part 5)	0.1 % to 25.0 %
		Chromium	IS 228 (Part 6)	0.10 % to 30.0 %
		Copper	IS 228 (Part 15)	0.05 % to 1.0 %
		Vanadium	CMTL/SOP/02/09	0.05 % to 4.0 %
		Molybdenum	IS 228 (Part 7)	0.05 % to 6.0 %
2.	Stainless Steel	Carbon	IS 228 (Part 1)	0.05 % to 2.5 %
		Manganese	IS 228 (Part 2)	0.1 % to 2.0 %
		Silicon	IS 228 (Part 8)	0.05 % to 5.0 %
		Sulphur	IS 228 (Part 9)	0.01 % to 0.25 %
		Phosphorus	IS 228 (Part 3)	0.01 % to 0.3 %
		Nickel	IS 228 (Part 5)	0.1 % to 25.0 %
		Chromium	IS 228 (Part 6)	0.10 % to 30.0 %
		Copper	IS 228 (Part 15)	0.05 % to 1.0 %
		Vanadium	CMTL/SOP/02/09	0.05 % to 4.0 %
		Molybdenum	IS 228 (Part 7)	0.05 % to 6.0 %
3.	Cast Iron	Carbon	IS 12308 (Part 11)	1.50 % to 4.5 %
		Manganese	IS 12308 (Part 10)	0.05 % to 2.0 %
		Silicon	IS 12308 (Part 6)	0.10 % to 3.5 %
		Sulphur	IS 12308 (Part 2)	0.01 % to 0.25 %
		Phosphorus	IS 12308 (Part 5)	0.01 % to 0.50 %
		Nickel	IS 12308 (Part 7)	0.10 % to 6.0 %
		Chromium	IS 12308 (Part 8)	0.05 % to 6.0 %
4.	Aluminium Base Alloys	Silicon	IS 504 (Part 1)	0.3 % to 20.0 %
		Chromium	IS 504 (Part 8)	Upto 1 %

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6775 (in lieu of T-2044, T-2045 & T-3693) **Page 2 of 6**

Validity 20.11.2017 to 19.11.2019 **Last Amended on** 07.02.2018

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		Copper	IS 504 (Part 3)	0.10 % to 10.0 %
		Zinc	IS 504 (Part 4)	0.10 % to 5.0 %
		Manganese	IS 504 (Part 5)	0.10 % to 1.50 %
		Magnesium	IS 504 (Part 6)	0.05 % to 12.0 %
		Nickel	IS 504 (Part 7)	0.10 % to 6.0 %
		Iron	IS 504 (Part 2)	0.10 % to 5.0 %
5.	Copper Base Alloys	Silicon	IS 3685	Upto 5 %
		Zinc	IS 3685 IS 3187 IS 4027 (Part 6)	0.10 % to 50.0 %
		Tin	IS 4027(Part 5) IS 3685	0.10 % to 10.0 %
		Manganese	IS 3187 IS 3685	0.05 % to 5.0 %
		Nickel	IS 3187 IS 3685	0.05 % to 6.0 %
		Iron	IS 4027(Part 8) IS 3685 IS 3187	0.05 % to 6.0 %
		Aluminium	CMTL/SOP/02/17	0.10 % to 15.0 %
		Phosphorus	IS 4027 (Part 3) IS 3685	0.02 % to 1.0 %
		Copper	IS 3187	0.10 % to 99.98 %
		Lead	IS 3187	0.05 % to 30.0 %
II.	METALLIC COATINGS & TREATMENT SOLUTIONS			
1.	Zinc Coated Iron & Steel	Mass of Zinc Coating	IS 6745	10 g/m ² to 2000 g/m ²
		Uniformity of Coating	IS 2633	1 DIPS to 6 DIPS
		Thickness of Coating	CMTL/SOP/02/34	1.0 µm to 200 µm
		Adhesion (Pivoted Hammer)	IS 2629	Qualitative

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Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-6775 (in lieu of T-2044, T-2045 & T-3693)** **Page 3 of 6**

Validity **20.11.2017 to 19.11.2019** **Last Amended on 07.02.2018**

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MECHANICAL TESTING

I. MECHANICAL PROPERTIES OF METALS					
1.	Ferrous & Non-Ferrous Metals & Alloys (Tube/ Wire/ Bar/ Flat)	Tensile Strength	IS 1608 ASTM A 370	10 kN to 600 kN	
		Yield Stress			
		0.2% Proof Stress			
		0.5 % Proof Stress			
		% Elongation			5.0 % to 80 %
		% Reduction of Area			10 % to 90 %
		Breaking Load		10 kN to 600 kN	
2.	Ferrous & Non-Ferrous Tube	Flattening	IS 2328	Qualitative (Outside Diameter: 10 mm to 400 mm Thick: 1.5 mm to 20 mm)	
3.	Carbon and Alloy Steel Bolts (Size: M8 to M39 Coarse Thread)	Tensile Strength	IS 1367 (Part 3)	10 kN to 600 kN	
		Breaking Load			
		Proof Load			
4.	Carbon and Alloy Steel Nuts (Size: M8 to M39 Coarse Thread)	Proof Load	IS 1367 (Part 6)	Qualitative	
5.	Ferrous & Non-Ferrous Metals and Alloys	Bend	IS 1599 ASTM A370	Qualitative (Mandrel Diameter: 8, 10, 12, 16, 17, 20, 22, 24, 25, 32, 36, 40, 43, 45, 50, 56, 60, 80, 85, 100, 110, 125, 145, 175, 190) mm	
6.	Steel Tube (above 114.3 mm Outside Diameter)	Bend (Strip)	IS 3601	Qualitative (Mandrel Diameter: 16, 17, 20, 22, 24, 25, 32, 36, 40, 43, 45, 50, 56, 60, 80, 85,	

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Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-6775 (in lieu of T-2044, T-2045 & T-3693) Page 4 of 6**

Validity **20.11.2017 to 19.11.2019 Last Amended on 07.02.2018**

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				100, 110, 125, 145, 175, 190) mm
7.	High Strength Deformed Steel Bar	Re-Bend	IS 1786	Qualitative (Mandrel Diameter: 16, 17, 20, 22, 24, 25, 32, 36, 40, 43, 45, 50, 56, 60, 80, 85, 100, 110, 125, 145, 175, 190) mm
		Weight per Meter		upto 9.9 kg/m
		Tensile Strength		10 kN to 600 kN
8.	Ferrous & Non-Ferrous Metals	Brinell Hardness	IS1500 (Part 1) ASTM A 370	100 HBW to 400 HBW
		Rockwell Hardness	IS1586 (Part 1) ASTM A 370	20 HRC to 70 HRC 20 HRBW to 100 HRBW
9.	Ferrous Metallic Materials	Izod Impact	IS 1598	2 J to 168 J
		Charpy Impact (U & V Notch)	IS 1757 (Part 1) IS1499	2 J to 300 J (Temperature: (-40 °C) to 35 °C)
10.	Ferrous & Non-Ferrous Welded Plate / Pipes (Butt Weld & Filled Weld)	Tensile Strength	ASME Section IX IS 2825	10 kN to 600 kN
		Bend (Face/Root/ Side)	ASME Section IX IS 7307 (Part 1) IS7310 (Part 1) IS 7318 (Part 2)	Qualitative (Mandrel Diameter: 16, 17, 20, 22,24, 25, 32, 36, 40, 43, 45, 50, 56, 60, 80, 85, 100, 110, 125, 145, 175, 190) mm
		Fracture	ASME Section IX IS 7307 (Part 1) IS7310 (Part 1)	Qualitative (Thickness: 3 mm to 19 mm)
		Nick Break	IS 7310 (Part 1) IS2825	Qualitative
11.	Ferrous & Non-Ferrous Metals	Leeb Rebound Hardness	ASTM A956	170 HLD to 960 HLD

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Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-6775 (in lieu of T-2044, T-2045 & T-3693)** **Page 5 of 6**

Validity **20.11.2017 to 19.11.2019** **Last Amended on 07.02.2018**

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II.	METALLOGRAPHY TEST			
1.	Ferrous & Non-Ferrous Welded Plate / Pipes (Butt Weld & Filled Weld)	Macro Examination	ASME Section IX IS 7307 (Part 1) IS7310 (Part 1)	Qualitative
2.	Metals & Alloys	Macro Etch	IS 7739 (Part 4)	Qualitative

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Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-6775 (in lieu of T-2044, T-2045 & T-3693)** **Page 6 of 6**

Validity **20.11.2017 to 19.11.2019** **Last Amended on 07.02.2018**

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NON - DESTRUCTIVE TESTING

I. METALS & ALLOYS				
1.	Ferritic Steel Forging & Rolled	Ultrasonic	ASTM A 388/388M SA388/388M IS 8791	Qualitative (Φ20 mm to Φ 1000 mm Length: 2000 mm)
2.	Ferritic Steel Plates	Ultrasonic	SA 435/435M ASTM A 435/435M SA 578/578M ASTM A 578/578M IS 4225	Qualitative (Thick: 8 mm to 200 mm)
3.	Structural Welding	Ultrasonic	AWS D 1.1 (Clause 6, Part F)	Qualitative (8 mm to 150 mm)
4.	Welding in Ferritic Steel	Ultrasonic	ASME Section V, Article 4 ASME Section VIII, Appendix 12 UW- 53 ASME B31.3 Para 344.6.1	Qualitative (8 mm to 100 mm)
5.	Plate, Pipe, Forging, Casting	Ultrasonic Measurement by Pulse Echo Contact Method	SE 797 ASTM E 797	2 mm to 200 mm
6.	Ferro magnetic Materials	Magnetic Particle for Sub Surface Flaws	ASTM E 709 ASME Section V, Article 7	Qualitative (Flaws upto 2 mm depth from surface)
7.	Ferrous & Non Ferrous Metals	Liquid Penetrant	ASTM E 165 ASME Section V Article 6 IS 3658	Qualitative (Flaws open to surface)