

Laboratory S.B. Steels Company, 366/6 & 366/1, G.T. Road Bally, Howrah, West Bengal

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5979 *(In lieu of T-0365 & T-0366)* **Page 1 of 9**

Validity 30.07.2017 to 29.07.2019 **Last Amended on --**

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) ASTM E350 BS:1121 (Part 16)	0.05 % to 14%
		Silicon	IS: 228 (Part 8) ASTM E350 IS:228 (Part 11)	0.01 % to 3.5 %
		Sulphur	IS:228 (Part 9)	0.01 % to 0.30 %
		Phosphorous	IS:228 (Part 3)	0.01 % to 0.30 %
		Chromium	IS:228 (Part 6) ASTM E350	0.05 % to 6.00%
		Nickel	IS:228 (Part 5)	0.1 % to 5.00 %
		Molybdenum	IS:228 (Part 7) ASTM E 350 BS 1121 (Part 48) IS: 228 (Part. 10)	0.01 % to 2.00 %
		Copper	IS:228 (Part 15) IS:228 (Part 21)	0.01 % to 2.00 %
		Vanadium	BS:1121 (Part 25/ 56)	0.01 % to 2.00 %
		Titanium	ASTM E 350	0.025 % to 0.3 %
		Tungsten	IS:228 (Part 16)	0.01 % to 1.00 %
		Nitrogen	IS : 228 (Part 19)	0.001 to 0.0500
2.	Stainless Steel	Carbon	IS:228 (Part 1)	0.01 % to 0.5 %
		Manganese	IS: 228 (Part 2) ASTM E 350 BS:1121 9Part I6/66) IS : 1559 (Part 7)	0.05 % to 14.00 %
		Silicon	IS: 228 (Part 8) ASTM E 350 IS:228 (Part 11)	0.01 % to 3.5 %

Ashutosh D. Tatwawadi
Convenor

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		Sulphur	IS:228 (Part 9)	0.01 % to 0.30 %
		Phosphorous	IS:228 (Part 3)	0.01 % to 0.30 %
		Chromium	IS:228 (Part 6) ASTM E 350	6.00 % to 35.00%
		Nickel	IS:228 (Part 5)	5.00 % to 30.00 %
		Molybdenum	IS:228 (Part 7) ASTM E350 BS:1121 (Part 48) IS: 228 (Part 10)	1.0 % to 4.00 %
		Copper	IS: 228 (Part 15) IS: 228 (Part 21)	0.01 % to 2.00 %
		Vanadium	BS:1121 (Part 25)	0.01 % to 2.00 %
		Titanium	ASTM E 350	0.01 % to 1.00 %
		Tungsten	IS:228 (Part 16)	0.1 % to 1.00 %
		Nitrogen	IS : 228 (Part 19)	0.002 to 0.250
3.	Cast Iron	Carbon	IS : 12308 (Part 11)	1.5 % to 4.5 %
		Manganese	IS : 12308 (Part 10)	0.1 % to 3.00 %
		Silicon	IS :12308 (Part 6)	0.10 % to 4.00 %
		Sulphur	IS:12308 (Part 2)	0.01 % to 0.35 %
		Phosphorous	IS:12308 (Part 5)	0.01 % to 0.50 %
		Chromium	IS:12308 (Part 8)	0.10 % to 5.00 %
		Nickel	IS:12308 (Part 7)	0.5 % to 5.00 %
		Molybdenum	IS:12308 (Part 9)	0.01 % to 1.00 %
4.	Copper and Copper Base Alloys	Copper	IS : 440 (CI. 4) IS : 3685 (CI-5) IS : 3187 (CI-4) IS : 7212 (CI-5) IS : 4027 (Part 1)	50.00 % to 99.99%
		Tin	IS:3685 (CI-6) IS:4027 (Part 5) IS:440 (CI-14)	0.1 % to 15.00%
		Iron	IS : 4027 (Part 8) IS:440 (CI-8) IS : 3685 (CI-10)	0.03 % to 6.00%

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			IS : 3187	
		Manganese	IS:3187 (CI-7) IS:3685 (CI-7) IS : 4027 (Part 2)	0.01 % to 3.00%
		Nickel	IS:3187 (CI-5) IS:3685 (CI-9) IS:440 (CI-10) IS : 4027 (Part 4)	0.01 % to 6.00%
		Silicon	IS : 3685 (CI-11) IS : 4027/ (Part 10)	0.01 % to 2.00%
		Phosphorous	IS : 3685(CI-8) IS : 440 (CI-15) IS : 4027 (Part 3) Cl. 3	0.01 % to 1.00 %
		Lead	IS: 4404 (CI-9) IS: 3685 (CI-5) IS : 4027 (Part 1) Cl. 4	0.01 % to 30.00%
		Zinc	IS : 3685 (CI-13) IS : 4027 (Part 6) IS : 3187	0.01 % to 50.00%
5.	Aluminium & Aluminium Alloys	Silicon	BS:1728 (Part 11) IS:504 (Part 1) Sec.6,7	0.01 % to 16.00 %
		Copper	IS:504 (Part 3) Sec.5,6	0.01 % to 5.00 %
		Manganese	BS: 1728 (Part 9) IS:504 (Part 5) Sec.5 BS:1728 (Part 10)	0.01 % to 1.5 %
		Nickel	IS:504 (Part 7) Sec.5	0.01 % to 4.0 %
		Zinc	IS:504 (Part 4) Sec.5,6	0.01 % to 5.00 %
		Magnesium	IS:504 (Part 6) Sec.5	0.01 % to 12.00 %
		Iron	IS:504 (Part 2) Sec.5,6 BS:1728 (Part 8)	0.1 % to 6.00 %
		Chromium	IS:504 (Part 8) Sec.5	0.01 % to 2.00 %
		Lead	IS:504 (Part 1) Sec.8	0.02 % to 5.0 %
		Titanium	IS:504 (Part 11)	0.01 % to 1.0 %
		Tin	IS:504 (Part 9) Sec.5	0.1 % to 2.00 %

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6.	White Metal	Lead	IS:1409 Sec. 7	0.10 % to 80.00 %
		Tin	IS: 1409 Sec. 4	4.5 % to 93.00 %
		Antimony	IS: 1409 Sec. 6	7.00 % to 16.00 %
		Copper	IS: 1409 Sec. 7	0.10 % to 6.0 %
7.	Plain Carbon Steel & Low Alloy Steel	Carbon	IS : 8811	0.005% to 1.5%
		Manganese	ASTM E 415 (by Emission Spectrometer)	0.01% to 2.0 %
		Silicon		0.02 % to 2.0 %
		Sulphur		0.005 % to 0.1 %
		Phosphorous		0.005 % to 0.1 %
		Chromium		0.01 % to 5.0 %
		Nickel		0.01 % to 5.0 %
		Molybdenum		0.008 % to 1.50 %
		Aluminium		0.01 % to 0.15 %
		Copper		0.008 % to 0.5 %
		Titanium		0.008 % to 0.25 %
		Vanadium		0.005 % to 1.0 %
		Nitrogen	IS: 228 (Part 23)	0.002 % to 0.5 %
		Boron	IS : 8811	0.0005 % to 0.01 %
		Niobium	ASTM E 415 (by Emission Spectrometer)	0.0100 % to 0.12%
8.	Stainless Steel	Carbon	IS : 9879	0.005% to 0.5%
		Manganese	ASTM E 1086	0.01% to 2.0 %
		Silicon		0.01 % to 2.0 %
		Sulphur		0.005 % to 0.1 %
		Phosphorous		0.005 % to 0.15 %
		Chromium		10.0 % to 23.0 %
		Nickel		5.0 % to 15.0 %
		Molybdenum		0.01 % to 3.0 %
		Copper		0.008 % to 1.0 %
		Nitrogen	IS: 228 (Part 23)	0.002 % to 0.5 %
9.	Copper & Copper Base Alloys	Aluminium	SBS/SOP/04-02	0.01 % to 12.00%
		Zinc	(by Emission Spectrometer)	0.01 % to 45.00 %
		Iron		0.01 % to 7.00 %

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		Silicon		0.01 % to 1.5 %
		Manganese		0.01 % to 2.00 %
		Nickel		0.02 % to 3.50 %
		Lead		0.01 % to 25.00 %
		Tin		0.01 % to 12.00 %
		Phosphorous		0.0002 % to 1.00 %
10.	Zinc & Zinc Base Alloys	Aluminium	SBS/SOP/04-02	0.0002 % to 1.0 %
		Copper		0.0002 % to 1.0 %
		Lead		0.0002 % to 1.0 %
		Tin		0.0002 % to 1.0 %
		Cadmium		0.0002 % to 1.0 %
11.	Aluminium & Aluminium Alloys	Iron	ASTM E 1251	0.0002 % to 1.0 %
		Silicon	IS:11035	0.07 % to 16.00 %
		Iron		0.02 % to 1.00 %
		Copper		0.01 % to 5.5 %
		Magnesium		0.03 % to 5.5 %
		Zinc		0.01 % to 8.00 %
		Nickel		0.01 % to 5.7 %
		Lead		0.03 % to 0.5 %
		Titanium		0.01 % to 0.6 %
		Vanadium		0.005 % to 0.2 %
		Chromium		0.01 % to 0.6 %
		Manganese		0.01 % to 3.00 %
II.	METALLIC COATINGS & TREATMENT SOLUTIONS			
1.	Zinc Coated Steel	Mass Test	IS : 6745 BS : 729	50 to 1500 g/m ²
		Dip Test	IS : 2633 BS : 729	Qualitative
		Adhesion Test	IS : 2629 Cl. No. 6.4.1 & 6.4.2 BS 729	Qualitative

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MECHANICAL TESTING

I.	MECHANICAL PROPERTIES OF METALS			
1.	Ferrous materials (Stainless Steel, Carbon Steel & Low alloy steel-Casting)	Tensile Strength	IS:1608	0.1kN to 590 kN
		Yield Stress	ISO:6892	0.1kN to 990 kN
		(Point Drop Method)	ASTM A 370	0.1 kN to 50 kN
		0.2%/0.1%/0.5%/1% Proof Stress	ISO : 898-1	
		% Elongation	BS EN 10002-1	0.1kN to 590 kN
		% Reduction in Area		1% to 80.00%
		Breaking Load		1% to 80.00%
				0.1 kN to 50 kN
				0.1kN to 590 kN
		Slip load Test	IS:2486 (Part 1)	Qualitative
		Dimension	IS: 2486 (Part 2)	Qualitative
		Bend of Insulator fittings & Locking Device/ G.I. Stay Set, LT Pin, MS Hardware Fittings	IS: 2486 (Part 3) IS:2486 (Part 4) IS: 7935 IS:5561	Qualitative
		Lay Ratio and Lay Length	BS: 16	Qualitative
		Visual Examination	IS: 1367 (Part 5) IS: 6594 IS: 1835 IS: 2141 IS:2121 (Part 1 to 4)	Qualitative
		Permanent Set & Load Test of Spring Washer	IS: 3063 Cl. 11.2 & 11.3	0.1 kN to 590 kN

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		Twist Test of Washer	IS: 3063 Cl. 11.4	90°
		Flattening Test of Pipe	IS: 2328 IS: 1239 (Part 1) ASTM A 370	Up to 600 mm
		Cupping Test	IS: 10175 (Part 1)	0.3 mm to 2.00 mm Depth up to 20 mm
		Drift Expansion Test for Tube, Socket	IS: 2335 IS:1239 (Part 2)	Up to 150 mm
		Tensile Test	IS: 1367 (Part 3)	0.1kN to 990 kN
		Proof Load Test of Bolts	ISO:8981	Qualitative
		Wedge Load	IS: 1367 (Part 6)	Qualitative
		Head Soundness	ISO: 898-2	Qualitative
		Dump	ASTM A193M	Qualitative
		Hot Compression	ASTM A194M IRS - T 23 IS: 10102 IS:1148, ASTM A 370	Qualitative
		Izod Impact (V - Notch)	IS: 1598 BS: 131 Pt.1	2 Joules to 168 Joules
		Charpy Impact U & V-notch [Ambient to (-)180°C]	ASTM A370 IS: 1757 BS: 131 (Part 2) IS: 1499	2 Joules to 300 Joules
		Transverse Tensile Test	IS: 1599	0.1kN to 990 kN
		Bend (Root & Face)	IS: 3600, ASTM A 370	Qualitative
		Side Bend	ASME Sec. IX	Qualitative
		Nick Break	IS: 7310 (Part 1)	Qualitative
		All Weld Tensile	IS:7318 (Part 2)	Qualitative
		Fillet Weld Fracture	IS: 2825 IS: 817 IS: 2329 IS : 7307 (Part 1)	Qualitative
		Reverse Bend	IS: 1716	Qualitative
		Wrapping Test of Wire	IS: 1755 ASTM A 370	Qualitative

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		Rebend	IS: 1786	Qualitative
		Brinell Hardness	IS: 1500 (Part 1) ASTM A 370	95.5 to 650 HBW
		Rockwell Hardness	IS: 1586 (Part 1) ASTM A 370	20 - 100 HRBW 20 - 70 HRC
		Vickers Hardness	ISO 6507-1 IS: 1501 (Part 1) ISO 6507-1 ASTM E92	5.0 to 300 HV/5 5.0 to 400 HV /10 14.0 to 1000 HV/30
		Shear Test of Rivet	IS: 5242 IS : 1929	Qualitative
		Torsion Test of Wire	IS: 1717 ISO 7800	Qualitative
		Mass Per Metre Camber Dimension	IS: 1786 IS: 808 IS : 1730 IS : 1732 IS: 1852	1g to 30 kg Qualitative 0.1 mm to 6000 mm
2.	Spring	Compression Load	IS: 7906 (Part 2)	Qualitative
II.	BUILDING MATERIALS			
1.	Bricks & CC Cube	Compressive Strength	IS: 3495 (Part 1 to 4) IS: 5454	0.1 kN to 590 kN
III.	METALLOGRAPHY TEST			
1.	Ferrous & Non Ferrous Metals & Alloys	Macro Structural Examination	IS: 11371 ASTM E381, ASTM E340 ASM Volume 7 & 9 IS: 13015, IS: 12573 ASM Volume 7 & 9 IS: 13015 , IS: 12573	Qualitative (10X)

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		Micro Structural Examination (Optical Microscope & Image Analyser)	ASM Metal Handbook Volume 7 & 9 IS: 7754 ASTM E 91-5 IS: 7739 (Part 1 to 5) ASTM E 562-11 & E1245-03 (for steel) ASTM A 247-16a (for SGCI)	50X to 400X
		Non-metallic Inclusion (Optical Microscope & Image Analyser)	IS:4163 ASTM E 45/11a	0.5 to 5.0
		Grain size (Optical Microscope & Image Analyser)	ASTM E 112 ASTM E 91, ASM Metal Handbook Vol. 7 & 9 IS: 4748 ISO 643 ASTM E 1382 ASTM E 112	100 X ASTM Grain Size No. : 3.0 - 9.0
		Depth of Decarburization in Steel (Optical Microscope & Image Analyser)	IS: 6396 ASTM E 1077	100 X 0.01 mm to 0.28 mm
		Coating thickness (Ag, Sn, Zn, Cd, Cu, Ni & Cr) (Optical Microscope & Image Analyser)	IS: 3203 IS: 1359 ASTM B 487-85	100 X 0.01 mm to 0.10 mm
		Case Depth of Steel (Optical Microscope & Image Analyser)	IS: 6416 Cl. No.8 ASTM/ISO/2639	10X & 100X; 0.02 to 2.00 mm
		Sulphur Print	IS: 12037	Qualitative
		Mercurous Nitrate Test	JSS-9535-2; IS: 2305	Qualitative
2.	Austenitic Stainless Steel	Susceptibility to Inter- granular Corrosion	ASTM A 262, Pr - A/B/C / E	200X & 400X