

Laboratory Industrial Metal Test Lab, A/56, 2nd Floor, Nand-Jyot Industrial Estate,  
K-A Road, Safed-Pool, Sakinaka, Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6771 (in lieu of T-2024 & T-2025)

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Validity 24.11.2017 to 23.11.2019

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			
A.	By Wet Method			
1.	Copper Based Metal & Alloys	Lead	IS 3685	0.10 % to 15.00 %
		Tin		0.05 % to 15.00 %
		Zinc		0.01 % to 45.00 %
		Iron		0.01 % to 6.00 %
		Nickel		0.10 % to 40.00 %
		Manganese	IS 3187	0.10 % to 6.00 %
		Antimony	IMTL/QS/C/04-2015	0.05 % to 1.00 %
		Phosphorus	IS 3685	0.05 % to 1.00 %
		Copper	IS 440/IS 3685	50 % to 99.5 %
		2.	Aluminium Based Metals & Alloys	Silicon
Iron	IS 504 (Part 2)			0.10 % to 2.00 %
Copper	IMTL/QS/C/06-2015			0.10 % to 5.00 %
Manganese	IS 504 (Part 5)			0.10 % to 11.00 %
Magnesium	IMTL/QS/C/07-2015			0.05 % to 0.50 %
Zinc	IMTL/QS/C/08-2015			0.05 % to 5.00 %
Nickel	IS 504 (Part 6)			0.04 % to 2.00 %
Chromium	IS 504 (Part 6)			0.10 % to 0.50 %
Titanium	IMTL/QS/C/09-2015			0.05 % to 0.50 %
3.	Plain Carbon & Low Alloy Steel			Carbon
		Sulphur	IS 228 (Part 9) ASTM E 350	0.01 % to 0.25 %
		Phosphorus	IS 228 (Part 3) ASTM E 350	0.01 % to 0.30 %
		Manganese	IS 228 (Part 2) ASTM E 350	0.10 % to 1.50 %
		Silicon	IS 228 (Part 6) ASTM E 350	0.05 % to 5.00 % 0.01 % to 1.50 %

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		Chromium	IS 228 (Part 6) ASTM E 350	0.10 % to 4.00 % 0.05 % to 4.00 %
		Nickel	IS 228 (Part 5) ASTM E 350	0.1 % to 5.00 %
		Molybdenum	IS 228 (Part 7) ASTM E 350	0.10 % to 3.00 % 1.00 % to 3.00 %
4.	Cast Iron	Copper	ASTM E 353	0.10 % to 5.00 %
		Carbon	IS 12308 (Part 11)	1.5 % to 4.5 %
		Sulphur	IS12308 (Part 2)	0.10 % to 0.25 %
		Phosphorus	IS 12308 (Part 5)	0.01 % to 0.50 %
		Manganese	IS12308 (Part 10)	0.10 % to 1.00 %
5.	Stainless Steel	Silicon	IS 12308 (Part 6)	0.10 % to 3.00 %
		Carbon	IS 228 (Part 1) IMTL/QS/C/01-2015	0.05 % to 1.50 % 0.015 % to 0.035 %
		Sulphur	IS 228 (Part 9)	0.01 % to 0.25 % 0.01 % to 0.30 %
		Phosphorus	IS 228 (Part 3) ASTM E 353	0.01% to 0.30 % 0.02 % to 0.05 %
		Manganese	IS 228 (Part 2) ASTM E 353	0.10 % to 10.00 %
		Silicon	ASTM E 353	0.05 % to 4.00 %
		Chromium	ASTM E 353	0.10 % to 25.00 %
		Nickel	IS 228 (Part 5)	0.10 % to 15.00 %
		Molybdenum	IS 228 (Part 7)	0.10 % to 3.00 %
B.	By Optical Emission Spectrometer Method			
6.	Copper based Metals & Alloys	Zinc	IMTL/QS/SP/02-2017	0.05 % to 35.00 %
		Lead		1.40 % to 11.00 %
		Tin		0.04 % to 11.80 %
		Phosphorus		0.005 % to 0.012 %
		Manganese		0.006 % to 0.025 %
		Iron		0.08 % to 0.30 %
		Nickel		0.08 % to 1.70 %

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		Aluminium		0.01 % to 0.22 %
		Arsenic		0.005 % to 0.023 %
		Antimony		0.008 % to 0.025 %
7.	Aluminium Based Metals & Alloys	Silicon	ASTM E 1251	1.25 % to 13.50 %
		Iron		0.27 % to 1.00 %
		Copper		0.22 % to 2.50 %
		Manganese		0.045 % to 0.82 %
		Magnesium		0.02 % to 1.50 %
		Chromium		0.05 % to 0.30 %
		Zinc		0.09 % to 3.00 %
8.		Carbon Steel & Low Alloy Steel	Carbon	ASTM E 415
	Silicon		IS 8811	0.05 % to 0.73 %
	Manganese			0.18 % to 1.85 %
	Phosphorus			0.01 % to 0.08 %
	Sulphur			0.01 % to 0.055 %
	Chromium			0.02 % to 3.3 %
	Molybdenum			0.08 % to 1.05 %
	Nickel			0.2 % to 1.8 %
	Aluminium			0.02 % to 0.053 %
	Copper			0.2 % to 0.45 %
9.	Stainless Steel	Vanadium		0.01% to 0.20 %
		Carbon	ASTM E 1086	0.01 % to 0.30 %
		Silicon	IS 9879	0.34 % to 0.63 %
		Manganese		0.54 % to 1.44 %
		Phosphorus		0.005 % to 0.022 %
		Sulphur		0.005 % to 0.03 %
		Chromium		10.75 % to 23.00 %
		Molybdenum		0.01 % to 3.00 %
	Nickel		2.00 % to 15.00 %	
II.	<b>METALLIC COATINGS &amp; TREATMENT SOLUTIONS</b>			
1.	Steel	Mass of Zinc Coating	IS 6745	1.0 g/m <sup>2</sup> to 1200 g/m <sup>2</sup>

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**MECHANICAL TESTING**

I.	<b>MECHANICAL PROPERTIES OF METALS</b>			
1.	<b>Metals &amp; Alloys</b>	Tensile Strength Yield Strength 0.2%, 1.0% Proof Stress % Elongation % Reduction Area	IS 1608 ASTM E 8/8M ISO 6892-1 ASTM B 557 ASTM A 370	10 kN to 400 kN 10 kN to 400 kN 10 kN to 400 kN 2 % to 80 % 2 % to 80 %
		Through Thickness Tensile Strength % Reduction Area	ASTM A 770 BS EN 10164	10 kN to 400 kN 20 % to 70 %
		V-Notch Charpy Impact	IS 1757 (Part 1) ISO148-1/ASTM E 23	10 J to 240 J
		Rockwell Hardness	IS 1586 (Part 1) ASTM E 18	20 HRBW to 100 HRBW 20 HRC to 70 HRC
		Brinell Hardness	IS 1500 (Part 1) ASTM E 10	15.9 HBW to 109 HBW 31.8 HBW to 218 HBW 113 HBW to 653 HBW
		Vickers Hardness	IS 1501 (Part 1) ASTM E 92	150 HV <sub>5</sub> to 850 HV <sub>5</sub> 150 HV <sub>10</sub> to 850 HV <sub>10</sub> 150 HV <sub>30</sub> to 850 HV <sub>30</sub>
		Bend	IS 1599 ASTM A370	Qualitative (Mandrel Diameter: 6, 10, 16, 20, 23, 25, 28, 32, 33, 36, 38, 40, 43, 48, 50, 55, 60, 63, 64, 65, 75 mm)
		Flattening	IS 2328/ASTM A370 API 5L- 45 <sup>th</sup> Edition	Outside Diameter: 5 mm to 500 mm
		Flaring /Drift Expansion	IS 2325 ASTM A370	Inside Diameter: 10 mm to 50 mm Mandrel Cone Angle: 60° & 90°

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2.	Welded Coupons	Tensile Strength	ASME Section II-C BS EN ISO 5178 IS 1608	10 kN to 400 kN	
		Yield Strength			
		0.2%, 1% Proof Strength			
		% Elongation			5 % to 80 %
		% Reduction Area			5 % to 80 %
		Transverse Weld	API 1104- 21 <sup>st</sup> Edition IS 2825 ISO 4136 ASME Section IX	10 kN to 400 kN	
		Tensile Strength			
		Yield Strength			5 % to 80 %
		% Elongation			
		Nick Break	API 1104-21 <sup>st</sup> Edition IS 2825	10 kN to 400 kN	
		Bend	IS 7310 (Part 1) IS 2825 ASTM E190 ASME Section VII (Division 1) ASME Section IX API 1104-21 <sup>st</sup> Edition AWS D1.1/D1.1M API 5L- 45 <sup>th</sup> Edition BS EN ISO 5173	Qualitative	
		Fracture	ASME Section IX	Qualitative	
3.	High Strength Deformed Steel Bars & Wires	Mass per unit length	IS 1786	0.08 kg/m to 11 kg/m	
4.	Steel Sheets & Strips	Erichsen Cupping	IS 10175 (Part 1)	Qualitative (Thickness : 0.20 mm to 2.0 mm)	
5.	Steel Plates, Sheets & Strips	Ultrasonic Thickness	ASTM E797/E797M	0.5 mm to 50 mm	
II.	<b>BUILDING MATERIALS</b>				
1.	Concrete Cube	Compression Strength	IS 516	20 kN to 2000 kN	

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III.	<b>METALLOGRAPHY TEST</b>			
1.	<b>Steel and Cast Iron</b>	Microstructure Analysis	ASM Handbook Volume 9 IS 7739 (Part 1) ASTM E 3/ASTM E 407	Qualitative (Magnification: 100, 200, 400, 500, 800X )
2.	<b>Steel</b>	Macro Etch	IS 11371/ASTM E 340 BS EN ISO 17639	Qualitative
		Case Depth Measurement Microscopic Method	IS 6416	0.02 mm to 1.0 mm (Magnification: 100, 200, 400, 500X)
		Average Grain Size	IS 4748 ASTM E 112	ASTM 1 to ASTM 10 (Untwined Grain)
3.	<b>Cast Iron</b>	Microstructure of graphite	IS 7754 ASTM A247	Qualitative (Magnification:100, 200, 400, 500X)
4.	<b>Austenitic Stainless Steel</b>	Oxalic Acid Etch for IGC	ASTM A 262 (IGC Practice A )	Qualitative (Magnification: 200X, 500X)
		Ferric Sulphate Corrosion for IGC	ASTM A 262 (IGC Practice B)	2 mpy to 1000 mpy
		Boiling Nitric for IGC Susceptibility	ASTM A 262 (IGC Practice C )	2 mpy to 1000 mpy
		Copper -Copper Sulphate + Sulphuric Acid For IGC Susceptibility	ASTM A 262 (IGC Practice E)	Qualitative
5.	<b>Wrought, Nickel-Rich, Chromium-Bearing Alloys</b>	Ferric Sulphate - Sulphuric Acid for IGC Susceptibility	ASTM G 28 (Method A)	Qualitative
6.	<b>Duplex (Austenitic – Ferritic) Stainless Steel</b>	Detecting Detrimental Intermetallic Phases by NaOH etching	ASTM A 92 (Method A)	Qualitative
		Detecting Detrimental Intermetallic phases by Ferric Chloride	ASTM A 923 (Method C)	Qualitative

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7.	Phosphate Coating on Iron and Steel	Presence of Coating	JSS 0465-01 (Clause 17.2a & 17.2b)	Qualitative