

Laboratory Senior Quality Assurance Establishment (Metals), Muradnagar, Distt. Ghaziabad, Uttar Pradesh

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6903 (in lieu of T-0059 & T-0054)

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Validity 08.02.2018 to 07.02.2020

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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 AND ALLOYS			
1.	Plain Carbon Steel & Low alloy Steel	Carbon	ASTM E-1019:11	0.01 % to 1.5 %
		Sulphur	ASTM E-1019:11	0.01 % to 0.35 %
		Manganese	IS 228 (Part 2): 1987 (RA 2012)	0.10 % to 1.0 %
		Vanadium	SQAEM/CHEM/SOP/01 (SQAEM/QP/04/WI/I Sec-I)	0.2 % to 0.5 %
		Chromium	IS 228 (Part 6): 1987 (RA 2014)	0.10 % to 5 %
		Phosphorus	IS 228 (Part 3): 1987 (RA 2012)	0.01 % to 0.2 %
		Nickel	IS 228 (Part 5): 1987 (RA 2014)	0.10 % to 4 %
		Molybdenum	IS 228 (Part 7): 1990 (RA 2012)	0.010 % to 0.5 %
		Silicon	IS 228 (Part 8): 1989 (RA 2014)	0.05 % to 1.5 %
		Copper	IS 228 (Part 15): 1992 (RA 2014)	0.1 % to 0.5 %
2.	Stainless Steel	Carbon	ASTM E-1019:11	0.01 % to 1.5 %
		Sulphur	ASTM E-1019:11	0.01 % to 0.35 %
		Manganese	IS 228 (Part-2) 1987 (RA 2012)	0.05 % to 2.0 %
		Vanadium	SQAEM/CHEM/SOP/01 (SQAEM/QP/04/WI/I Sec-I)	0.2 % to 0.5 %
		Chromium	IS 228 (Part 6): 1987 (RA 2014)	6.0 % to 25 %
		Phosphorus	IS 228 (Part 3): 1987 (RA 2012)	0.01 % to 0.2 %

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		Nickel	IS 228 (Part 5): 1987 (RA 2014)	4.0 % to 12 %
		Molybdenum	IS 228 (Part 7): 1990 (RA 2012)	0.1 % to 0.5 %
		Silicon	IS 228 (Part 8): 1989 (RA 2014)	0.05 % to 1.5 %
		Copper	IS 228 (Part 15): 1992 (RA 2014)	0.05 % to 0.5 %
3.	Cast Iron	Carbon	ASTM E-1019:11	1.5 % to 3.5 %
		Sulphur	ASTM E-1019:11	0.01 % to 0.35 %
		Manganese	IS 12308 (Part 10): 1991 (RA 2012)	0.10 % to 2.00 %
		Phosphorus	IS 12308 (Part 5): 1991 (RA 2012)	0.01 % to 0.3 %
		Nickel	IS 12308 (Part-7): 1991 (RA 2012)	0.5 % to 3.00 %
		Chromium	IS 12308 (Part 8): 1997 (RA 2012)	0.10 % to 4.0 %
		Silicon	IS 12308 (Part 6): 1991 (RA 2012)	0.10 % to 2.50 %
4.	Copper & its Alloys	Copper	IS 7212:1974 (RA 2015)	50.00 % to 99.9 %
		Iron	IS 440:1964 (RA 2012) (For Copper) IS 3685:1966 (RA 2012) (For Brass) IS 4027 (Part 8): 1991 (RA 2012) (For Bronze)	0.05 % to 1.0 %
		Nickel	IS 440:1964 (RA 2012) (For Copper) IS 3685:1966 (RA 2012) (For Brass) IS 4027 (Part 8): 1991 (RA 2012) (For Bronze)	0.20 % to 2.0 %

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		Lead	IS 440:1964 (RA 2012) (For Copper) IS 3685:1966 (RA 2012) (For Brass) IS 4027 (Part 1): 1987 RA 2012 (For Bronze)	0.20 % to 3.5 %
		Tin	IS 3685:1966 (RA 2012) (For Brass) IS 4027 (Part 5): 1987 (RA 2012) (For Bronze)	0.20 % to 5.0 %
		Manganese	IS 3685:1996 (RA 2012)	0.10 % to 2.0 %
		Phosphorus	IS 440:1964 (RA 2012) (For Copper) IS 4027 (Part 3): 1987 (RA 2012) (For Bronze)	0.01 % to 0.1 %
		Zinc	IS 4027(Part-6) 1987 (RA 2012) (For Bronze)	0.3 % to 2.0 %
5.	Aluminium & Its Alloys	Silicon	IS 504 (Part 1 to Part 12): 2002 (RA 2012)	0.3 % to 14.0 %
		Manganese	IS 504 (Part 5): 2002 (RA 2012)	0.10 % to 1.5 %
		Copper	IS 504 (Part 3): 2002 (RA 2012)	0.10 % to 6.0 %
		Zinc	IS 504 (Part 4) : 2002 (RA 2012)	0.10 % to 0.5 %
		Iron	IS 504 (Part 2): 2002 (RA 2012)	0.10 % to 1.0 %
		Magnesium	IS 504 (Part 6): 2002 (RA 2012)	0.10 % to 12 %
		Nickel	IS 504 (Part 7): 2002 (RA 2012)	0.10 % to 1.0 %
II.	<b>METALLIC COATING &amp; TREATMENT SOLUTION</b>			
1.	Mild Steel Tin Plates	Mass of Tin coating	IS 1327:1988 (RA 2016)	1.5 g/m <sup>2</sup> to 100 g/m <sup>2</sup>

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**MECHANICAL TESTING**

<b>I. MECHANICAL PROPERTIES OF METALS</b>					
1.	<b>Ferrous and Non-Ferrous (Rod, Sheet, Plate, Forgings &amp; Casting)</b>	<b>Tensile Tests</b>	IS 1608:2005 (RA 2017)	0 to 400 kN	
		Proof Stress			
		Yield Stress			
		Ultimate Tensile Strength			
		% Elongation			1 % to 80 %
		% Reduction of Area			1 % to 90 %
2.	<b>Ferrous and Non-Ferrous Wire</b>	<b>Tensile Tests</b>	IS 1608:2005 (RA 2017)	0 to 2.5 kN	
		Ultimate Tensile Strength			
		Breaking Load			
		Wrapping Test	IS 1755:1983 (RA 2011)	Wires up to 6 mm dia.	
		Torsion Test	IS 1717: 2012	Wire of 0.3 to 5 mm dia. or thickness	
3.	<b>Ferrous and Non-Ferrous (Rods &amp; Plates)</b>	Bend Test	IS 1599:2012 (RA 2015)	Qualitative (Mandrel size 12.5 mm, 19 mm, 20 mm, 25 mm, 30 mm, 40 mm and 50 mm)	
4.	<b>Ferrous and Non-Ferrous (Rod, Sheet, Plate, Wire, Forgings &amp; Casting)</b>	<b>Hardness Tests</b>	IS 1501(Part 1): 2013	100 to 900 (HV 10) 100 to 900 (HV 30)	
		Vickers			
		Brinell	IS 1500 (Part 1): 2013	100 to 400 (HBW/5mm/750Kg) 100 to 500 (HBW/10mm/3000Kg)	
		Rockwell Scale B Scale C	IS 1586 (Part 1): 2012	20 to 100 (HRB) 20 to 70 (HRC)	

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5.	Ferrous and Non-Ferrous Tube	Flattening Test	IS 2328:2005 (RA 2011)	---
		Drift Expansion Test	IS 2335:2005 (RA 2011)	10 mm/ 45° 15 mm/ 50° 25 mm/ 60°
6.	Ferrous and Non-Ferrous (Bar, Forgings and Castings)	Izod Impact Test	IS 1598:1977 (RA 2015) (at Ambient Temperature)	30 mkgf /0.2 mkgf (162.72 Joules/1.96J)
		Charpy Impact Test ('U' Notch)	IS 1499:1977 (RA 2015) (at ambient temperature)	30 mkgf Max/ 0.2 mkgf (294.3 Joules /1.96 J)
7.	Ferrous Sheet	Cupping Test	IS 10175:2012	Upto 2.00 mm thickness
II.	<b>METALLOGRAPHY TEST</b>			
1.	Metals & Alloys	Examination of Macrostructure	a) Ferrous Alloys IS 13015 :1991 (RA 2012) ASTM E 381-17/ASM-Vol.-8 b) Metals and Alloys ASM– Vol. 7 & 8 ASTM E 340-15	4 x to 25 x
		Examination of Micro-structure	ASM – Vol. 7 ASTM E 3-11-2017	450 x
		Estimation of average grain size of metals	IS 4748: 2009 ASTM E 112 – 13	Cu base – 75 x Other – 100 x
		Coating thickness	IS 3203:1982 (RA 2016) by microscopic method	1 µm to 500 µm
2.	Ferrous Materials	Inclusion rating in Steel	IS 4163:2004 (Third revision) (RA 2010) by Microscopic Method	100 x
		Decarburized depth of Steel	IS 6396:2000 (RA 2012) by Microscopic method	10 µm to 2000 µm
		Case Depth of Steel	IS 6416:1988 (RA 2012) by Microscopic Method	0.01 mm to 10.0 mm

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3.	Cast Iron	Evaluation of Graphite flake (distribution and size)	IS 7754:1975 (RA 2012)	100 x
4.	Copper Base Materials	M. N. Test	IS 2305:1988 (RA 2015)	10 x to 16 x