

**Laboratory** Mangalam Testing Bureau, P-83, Beneras Road, Belgachia, Howrah, West Bengal

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

**Certificate Number** TC-5132 (in lieu of T-3000, T-3001)

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**Validity** 22.09.2016 to 21.09.2018

Last Amended on 29.12.2016

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.	<b>Plain Carbon &amp; Low Alloy Steels</b>	Carbon	IS: 228 (Part 1)-1987 RA 2008	0.05% to 2.5%
		Manganese	IS: 228 (Part 2)-1987 RA 2008	0.1% to 1.5%
		Silicon	IS: 228 (Part 8)-1989 RA 2009	0.05% to 2.0%
		Sulphur	IS: 228 (Part 9)-1989 RA 2009	0.01% to 0.25%
		Phosphorus	IS: 228 (Part 3)-1987 RA 2008	0.01% to 0.15%
		Chromium	IS: 228 (Part 6)-1987 RA 2009	0.10% to 3.0%
2.	<b>Pig Iron, Cast Iron &amp; S.G. Iron</b>	Carbon	IS: 12308 (Part 11)-1991 RA 2006	1.5% to 4.5%
		Manganese	IS: 12308 (Part 10)-1991 RA 2006	0.05% to 2.0%
		Silicon	IS: 12308 (Part 6)-1991 RA 2006	0.10% to 4.0%
		Sulphur	IS: 12308 (Part 2)-1987 RA 2007	0.01% to 0.25%
		Phosphorus	IS: 12038 (Part 5)-1991 RA 2006	0.01% to 0.50%
		Chromium	IS: 12308 (Part 8)-1997 RA 2007	0.10% to 1.0%
3.	<b>Copper &amp; Copper-Base Alloys</b>	Lead	IS: 440-1964 RA 2006 IS: 3685-1966 RA 2006 IS: 4027 (Part 1)-1987 RA 2006	0.01% to 20.0%
		Zinc	IS: 3685-1966 RA 2006 IS: 4027 (Part 6)-1987 RA 2006	0.10% to 45.0%

**Ravi Johri**  
Convenor

**N. Venkateswaran**  
Program Director

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		Tin	IS: 4027 (Part 5)-1987 RA 2006 IS: 3685-1966 RA 2006	0.10% to 11.0%
		Manganese	IS: 3187-1965 RA 2006	0.05% to 2.5%
		Iron	IS: 440:-1964 RA 2006 IS: 4027 (Part 8)-1991 RA 2006 IS: 3685-1966 RA 2006	0.10% to 5.50%
		Silicon	IS: 3685-1966 RA 2006 IS: 4027 (Part 10)-2000 RA 2006	0.10% to 1.50%
		Phosphorus	IS: 440-1964 RA 2006 IS: 4027 (Part 3)-1987 RA 2006	0.01% to 1.00%
		Aluminium	IS: 3685/66/RA-2006	0.10% to 12.00%
4.	<b>Stainless Steels/High Alloy Steels</b>	C	IS: 228 (Part 1) – 1987 RA 2008	0.05% to 2.5%
		Si	IS: 228 (Part 8) – 1989 RA 2009	0.05% to 4.0%
		P	IS: 228 (Part 3) – 1987 RA 2008	0.01% to 0.10%
		Cr	IS: 228 (Part 6) – 1987 RA 2009	0.10% to 30.00%
		Mo	IS: 228 (Part 7) – 1990 RA 2012	1.00% to 3.0%
5.	<b>Aluminium and its alloys</b>	Si	IS 504 (Part 1): 2002 Clause 7	0.30% to 15%
		Cu	IS 504 (Part 1): 2002 Clause 7	0.10% to 40%
		Fe	IS 504 (Part 1): 2002 Clause 6	0.01% to 1.00%

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II.	<b>METALLIC COATING &amp; TREATMENT SOLUTIONS</b>			
1.	<b>Copper &amp; its Alloys</b>	Mercurous Nitrate test for surface crack determination	IS: 2305 – 1988 RA 2009	L: 150 mm to 300 mm Dia: 5 mm to 75 mm
2.	<b>Zinc-Coated Iron &amp; Steel Articles</b>	Determination of mass of Zinc coating & thickness	IS: 6745-1972, Cl. 3.2 RA 2006 IS: 1573 – 1986 RA 2006	10 g/m <sup>2</sup> to 1800 g/m <sup>2</sup> 8 microns to 12 microns
3.	<b>Zinc-Coated Iron &amp; Steel Articles</b>	Dip Test	IS: 2633 – 1986, Cl. 2 RA 2006	Qualitative
		Adhesion Test	IS: 2629-1985, Cl. 6.4 RA 2006	Qualitative

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### MECHANICAL TESTING

<b>I. MECHANICAL PROPERTIES OF METALS</b>				
1.	<b>Ferrous &amp; Non-Ferrous Materials &amp; Alloys of Tube/Wire/Bar/Angle/Welding Plate/Pipe</b>	Tensile Test (Y.S., T.S., 0.2% P.S. % Elog. & %RA,) Breaking Load	IS 1608: 2005 ISO 6892: 1998 ASTM A370: 2009 Clause. 5-13	12 kN to 5900 kN load Least Count: 10 N 1% to 80%
		Permanent Set Test of Spring Washer Twist Test of Washer	IS 3063: 1994 (RA 2010) Cl. 11.2 & 11.3,11.4	10 kN to 590 kN Twist 90°
		Bend Test	IS 1599: 1985 (RA 2006) ASTM A 370: 2009, Cl. 14	Qualitative (Mandrel Range: 6mm to 200mm)
		Brinell Hardness Test	IS 1500: 2005/ ISO 6506-1: 1999 ASTM A 370: 2014, Cl. 16	100 HBW 650 HBW. Load 10/3000 kgf. & 10/1000 kgf.
		Rockwell Hardness Test	IS 1586 (Part 1): 2013 ASTM A 370: 2009, Cl. 17	1 HRB to 100 HRB 1 HRC to 70 HRC
2.	<b>Ferrous &amp; Non-Ferrous Tubes</b>	Flattening Test	IS 2328: 2005 (RA 2010) ISO 8492: 1998, IS 1239 (Part 1): 2004 (RA 2010) ASTM A370:2014,Cl. A2.5.1.1	10 mm to 100 mm dia & 10 mm thick
3.	<b>Steel Fasteners &amp; Rivet</b>	Tensile & Proof Load Test	IS 1367 (Part 3): 2002/ ISO 898-1: 2009 IS 1367 (Part 6):1994 (RA 2010) ISO 898-2: 1992, IRS T23: 1967	10 kN to 590 kN
4.	<b>Deformed Steel Bars</b>	Re-Bend Test, AR Value	IS 1786: 2008(RA 2013)	Qualitative (10 kN to 590 kN Dia 4mm to 40mm)

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5.	<b>Ferrous &amp; Non-Ferrous Welded Test Coupons</b>	Tensile Test Bend Test Macro Examination Fracture Test	ASME (Sec IX): 2015 ASME (Sec II) (Part C): 2010 IS 2825: 1969 (RA 2007) IS 7307 (Part 1):1974 (RA 2008) IS 7310 (Part 1):1974 (RA 2006) IS 7318 (Part 1):1974 (RA 2008) IS 7318 (Part 2):1974 (RA 2008) API 1104: 2013	10 kN to 590 kN
6.	<b>Ferrous &amp; Non-Ferrous Materials &amp; Alloys of Tube/ Wire/ Bar/ Angle/ Channel, Welding Plate/ Pipe</b>	Mass per Meter, Camber Test & Dimension Test	IS 1786:2008 (RA 2013) IS 808:1989 (RA 2009) IS 1730 (RA 2009) IS 1732:1989 (RA 2009) IS 1852:1985 (RA 2013)	1 g to 30 kg 0.1 mm to 6000 mm Qualitative
7.	<b>Spring</b>	Static Load Test	Relevant Drawings (Customer Specification, IS 7906 (Part 2):1975 (RA 2009)	Qualitative (10 kN to 590 kN)
8.	<b>Ferrous &amp; Non-Ferrous Materials &amp; Alloys</b>	Drift Expansion Test for Tube & Socket	IS 2335: 2005 (RA 2010)	Qualitative
9.	<b>Ferrous &amp; Non-Ferrous Materials &amp; Alloys of Tube/Wire/Bar/Angle/Welding Plate/Pipe Etc</b>	Impact Test Charpy Impact Test (V-Notch)	IS 1757: 1988 (RA 2009) ASTM A 370: 2014 BS 131 (Part 2) ASTM E23: 2009	2 J to 300 J (-40°C to Room Temp.
		Izod Impact Test (V-Notch Single, Double, Triple)	IS 1598: 1977 (RA 2009) ASTM A 370: 2014 BS 131 (Part 1) ASTM E23: 2009	2 J to 150 J

Ravi Johri  
Convenor

N. Venkateswaran  
Program Director