

Laboratory Crystal Metallurgical Services & Solutions, Block No. 3A, Phase-V,
IDA Cherlapally, E.C Nagar Junction Main Road, Dist. Rangareddi,
Telangana

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-6850 (in lieu of T-4203, T-4204, T-4205) **Page 1 of 5**

Validity 20.10.2016 to 19.10.2018 **Last Amended on** 18.12.2017

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.	Carbon & Low Alloy Steels	Carbon	IS 8811-1998	0.015 % to 1.30 %
		Manganese	ASTM E 415-2015	0.10 % to 2.0 %
		Phosphorus		0.005 % to 0.050 %
		Sulphur		0.005 % to 0.075 %
		Silicon		0.03 % to 2.00 %
		Copper		0.02 % to 0.25 %
		Nickel		0.05 % to 4.00 %
		Chromium		0.05 % to 4.00 %
		Molybdenum		0.05 % to 1.00 %
		Vanadium		0.03 % to 0.50 %
		Aluminum		0.005 % to 1.20 %
	Cobalt		0.10 % to 0.50 %	
2.	Stainless Steels	Carbon	ASTM E 1086-2014	0.015 % to 0.15 %
		Manganese	IS 9879-1998	0.10 % to 2.00 %
		Phosphorus		0.005 % to 0.050 %
		Sulphur		0.005 % to 0.050 %
		Silicon		0.10 % to 1.00 %
		Copper		0.05 % to 2.00 %
		Nickel		0.20 % to 25.00 %
		Molybdenum		0.05 % to 3.75 %
		Chromium		5.00 % to 25.00 %
		Niobium		0.10 % to 1.00 %
	Cobalt		0.05 % to 0.30 %	
3.	Aluminum Alloys	Magnesium	ASTM E1251 -2011	0.1 0 % to 2.50 %
		Silicon		0.05 % to 15.00 %
		Copper		0.10 % to 6.00 %
		Nickel		0.1 0 % to 0.25 %

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		Chromium		0.05 % to 0.30 %
		Titanium		0.005 % to 0.25 %
		Tin		0.10 % to 0.20 %
		Lead		0.05 % to 0.20 %
		Manganese		0.04 % to 0.75 %
		Zinc		0.1 % to 0.5 %
		Iron		0.10 % to 0.80 %

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MECHANICAL TESTING

I. MECHANICAL PROPERTIES OF METALS				
1.	Ferrous & Non-Ferrous Alloys	Rockwell hardness Test	IS 1586 (Part 1): 2012 (RA 2017) ASTM A 370/2017 ASTM E 18/2017	20 HRC to 80 HRC 50 HRBW to 90 HRBW
		Brinell Hardness Test	IS 1500 (Part 1): 2013 ASTM E 10-2017 ASTM A370-2017	150 HBW to 600 HBW (2.5 mm/187.5 kgf)
2.	Ferrous Alloys	Charpy- 'V' notch	IS 1757 (Part 1): 2014	2 Joules to 240 Joules Temp: -50 °C to 25 °C
		Izod Room temperature	IS 1598:1977 (RA 2015)	2 J to 170 J Temp: 25 ± 2°C
3.	Metals and Alloys	Tensile strength Yield stress % Elongation %RA 0.2% Proof Stress	IS 1608:2005 (RA 2011) ASTM A 370:2017 ASTM B 557:2015 ASTM E 8:2016 BS EN ISO 6892-1-2016	10 kN to 350 kN Dia. 5- 60 mm Upto 30 mm 5 % to 85 % 5 % to 80 %
		Bend test	IS 1599: 2012 (RA 2017) ASTM E 290: 2014	10 kN to 350 kN Thickness: 5 mm to 25 mm
4.	Weldments	Tensile Strength Bend Test Transverse Bend Test Side Bend Test	ASME Sec IX-2017	10 kN to 350 kN Mandrel Diameter: 32 mm

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II.	METALLOGRAPHY TEST			
1.	Ferrous (Steel, Stainless Steel) & Non ferrous Materials: Al, Ni Alloys	Estimation of Avg. Grain Size (By comparison method)	ASTM E 112-2013 (Plate I,II,III,IV) IS 4748:2009 (RA 2017)	ASTM G.S.No: 1 to 10 Magnification: Upto 100X
2.	Ferrous Materials (Steel)	Determination of Non-metallic Inclusion Rating Method 'A'	ASTM E 45-2013 IS 4163:2004 (RA 2017)	Qualitative Thin: 0.5 to 3 Heavy: 0.5 to 3 Magnification: Upto 100X
3.	Ferrous (Steel, Stainless Steel) & Non Ferrous Materials: Al, Ni Cu, Ti Alloys	Microstructure Examination	ASM Metal Hand Book-vol-9-Metallography & Microstructure ASTM E 407-2007 (RA 2015)	Qualitative Magnification: 100X, 200X, 500X, 1000X & 2000X
		Macrostructure Examination	ASTM E340-2015 ASTM-E-381-2017	Qualitative Magnification: 12.5 X to 50 X

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NON - DESTRUCTIVE TESTING

AT LAB & SITE				
I.	METALS & ALLOYS			
1.	Welds, Forgings & Castings (Ferrous & Non-Ferrous)	Liquid Penetrant Examination (Visible ,Fluorescent & solvent removable)	ASME Sec-V/Article24, 6, 2015 IS 3658:1999 (RA 2014) IS 11732:1995 (RA 2012) EN-1371-1 & 2 1998 (RA 2005) EN-571-1 (RA 1997)	Defects Open to Surface
2.	(Ferrous & Non-Ferrous) Pipes, Welds, Forgings & Castings	Ultrasonic Examination (Contact type)	ASME Sec-V Article 4, 5 & 23, 2015 IS 7666-1988 (RA 2014) IS 4225-2004:1995 (RA 2014) IS 4260:2014 (RA 2015) IS 7343:1986 (RA 2014) IS 9565:1995 (RA 2012) BS EN 12680-1, 2, 3 (RA 2003) ISO 23279 (RA 2010) BS EN ISO 17640 (RA 2010)	8 mm to 1000 mm 6 mm to 100 mm 8 mm to 1000 mm 8 mm to 1000 mm
3.	Welds, Forgings & Castings (Ferrous)	Magnetic Particle Examination (Wet ,Dry- Visible ,Fluorescent), (Prod &Yoke)	ASME Sec-V Article 7, 25, 2015 IS 3703-2004 (RA 2014) IS 10724-1990 (RA 2012) IS 7743-2006 (RA 2011) IS 5334 (RA 2014) BS EN1369 (RA 2012)	Surface & Subsurface defects (Upto 3 mm depth)