

Laboratory **GSD Lab, Shop No. 7, 8 & 9, Plot No. A/2/A, Capital City, Chakan Industrial Area, Phase-IV, Village Nigoje, Chakan, Pune, Maharashtra**

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

Certificate Number **TC-6621** Page 1 of 5

Validity **29.03.2019 to 21.09.2020** 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.	Low Carbon Alloy Steel & Mild Steel	Carbon	ASTM E 415-2017 IS 8811:1998 (RA 2018)	0.02 % to 1.50 %
		Silicon		0.02 % to 2.00 %
		Sulphur		0.005 % to 0.10 %
		Phosphorous		0.003 % to 0.050 %
		Chromium		0.02 % to 2.50 %
		Nickel		0.04 % to 4.50 %
		Manganese		0.15 % to 2.50 %
		Molybdenum		0.0008 % to 0.50 %
		Vanadium		0.0009 % to 0.20 %
		Cobalt		0.006 % to 0.20 %
		Aluminum		0.02 % to 0.20 %
		Copper		0.09 % to 0.65 %
		Niobium		0.001 % to 0.5 %
		Tin		0.001 % to 0.10 %
Boron	0.0003 % to 0.0006 %			
Titanium	0.0009 % to 0.015 %			
2.	Ferrous Metals and Alloys: Stainless Steel	Carbon	ASTM E 1086-2014 IS 9879:1998 (RA 2015)	0.010 % to 0.20 %
		Silicon		0.40 % to 1.70 %
		Sulphur		0.006 % to 0.030 %
		Phosphorous		0.010 % to 0.10 %
		Chromium		17.0 % to 28.0 %
		Nickel		8.5 % to 33.0 %
		Manganese		1.30 % to 2.00 %
		Molybdenum		0.09 % to 8.00 %
		Copper		0.010 % to 1.8 %
3.	Non-Ferrous Metals: Aluminum Alloys	Zinc	ASTM-E1251-2011 IS 11035-84 (2010)	0.6 % to 1.00 %
		Manganese		0.10 % to 1.50 %
		Iron		0.08 % to 1.25 %
		Silicon		0.09 % to 16.00 %

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		Copper	ASTM-E1251-2011	0.35 % to 6.00 %
		Magnesium		0.70 % to 2.00 %
		Titanium		0.005 % to 0.25 %
		Chromium		0.0007 % to 0.050 %
		Cobalt		0.0004 % to 0.10 %
		Vanadium		0.009 % to 0.020 %
		Bismuth		0.008 % to 0.025 %
		Lead		0.002 % to 0.25 %
		Nickel		0.004 % to 0.06 %
		Tin		0.006 % to 0.15 %
4.	Non-Ferrous Metals: Copper & Alloys	Zinc	BS EN 15079-2015	0.10 % to 45.0 %
		Lead		0.01 % to 12.00 %
		Tin		0.013 % to 12.50 %
		Iron		0.01 % to 0.20 %
		Nickel		0.010 % to 0.70 %
		Antimony		0.010 % to 0.20 %
		Phosphorus		0.007 % to 0.02 %
II.	CORROSION TESTS			
1.	Ferrous Metals	Salt Spray	ASTM B117-2016 ISO 9227-2017	Qualitative

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MECHANICAL TESTING

I.	MECHANICAL PROPERTIES OF METALS			
1.	Ferrous and Non-Ferrous Metals and Alloys	Rockwell & Rockwell Superficial Hardness	IS 1586(Part I):2012, ASTM A 370-2017	(30 to 88) HRA (50 to 100) HRBW (20 to 70) HRC (0.1HRC) (70 to 94) HR 15N (42 to 86) HR 30N
		Vickers Hardness	IS 1501 (Part 1) :2013, ISO 6507-1-2005, ASTM A 370-2017	(630 to 700) HV5 (HV5) (150 to 600) HV10 (HV10) (150 to 750) HV30 (HV30)
		Micro Hardness	IS 1501(Part 1):2013, ISO 6507-1-2005, ASTM A370-2017	(100 to 750) HV0.2 (200 to 750) HV 0.5 (100 to 850) HV 1
		Brinell Hardness	IS 1500(Part I) : 2013, ISO 6506-1:1991, ASTM A370-2017	(120 to 350) HBW (5mm/750 Kgf) (120 to 375) HBW (10mm/3000 Kgf)
2.	Ferrous Materials	Hardenability of steel by end quench or Jominy test	IS 3848-1981(RA 2009), SAE J 406-2009	20 HRC to 70 HRC
3.	Ferrous and Non Ferrous Metals and alloys	Tensile test: Ultimate Tensile Stress, Proof stress, Yield stress, % Elongation, % Reduction in Area	IS 1608:2005 , ISO 6892-2009, ASTM A370-2017, ASTM E8/8M-2016a	8 kN to 400 kN 8 kN to 400 kN 8 kN to 400 kN 8 kN to 400 kN 5 % to 80 % 5 % to 80 %
4.	Steel Pipe, Tube	Flaring Test Flattening Test	ASTM A370-2017	Qualitative (ID-20 to 100 mm ID-20 to 150 mm)
5.	Ferrous and Non-Ferrous Metals and Alloys	Bend Test	IS 1599-2012 (RA 2015), ASTM A 370-2017	Mandrel Diameter: 25, 30 mm

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6.	Ferrous Materials	Weld Hardness in metallic materials	ISO 9015-2 :2016	100 HV1 to 700 HV1
II. METALLOGRAPHY TEST				
1.	Ferrous and Non-ferrous metals and Alloys	Estimation of Grain Size by Microscopic Method (By Comparison Method)	IS 4748-2009, ISO 643-2012, ASTM E112-2013 (By Circular Intercept Method)	Magnification-100X Grain Size-Upto 10
		Inclusion Rating	IS 4163-2004 (RA 2010), ASTM E45-2013, ISO 4967-1998	Magnification-100X
2.	Ferrous and Non-Ferrous Metals and Alloys	Micro structural Analysis	ASM Handbook Volume 9 Edition : 2004	Magnification-100X, 200X, 500X, 1000X
3.	Cast Irons (White, Gray, Malleable, Ductile)	Graphite Type, Distribution, Size, Nodularity and Nodule count	ISO 945-2008-11-15, IS 7754-1975 (RA 2018)	Magnification-100X
4.	Metals, Steel Bars, Billets, Blooms, Forgings	Grain flow	IS 11371-1985 (RA 2018), IS 13015-1991 (RA 2018)	Qualitative
5.	Ferrous and Alloys	Effective case depth (By micro hardness traverse method)	IS 6416 : 2008(RA 2018), IS 1501-2003	0.05 mm to 4.50 mm
		Total case depth (By microscopic method)		0.1 to 2.0 mm 50X ,100X, 200X, 500 X
6.	Ferrous Materials	Measuring Decarburized Depth of Steel (By micro hardness traverse method) Decarburized Depth (By microscopic method)	IS 6396 : 2000 (RA 2018)	0.1 mm to 4.5 mm 0.1 to 2.0 mm 50X ,100X,200X, 500 X

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7.	Ferrous Materials: Weld Joints Welding-Fusion Welded Joints	Dimensional Measurement of Weld Joint	ISO 5817-2014, ISO 17639-2003 , IS 7310-1-1974(RA 2006), IS 7318-1-1974	1 mm to 20 mm
8.	Ferrous and Non-Ferrous Metals and Alloys	Coating Thickness (By Microscopic Method)	IS 3203-1982 (RA 2016)	0.005 mm to 2.0 mm 50X ,100X,200X, 500 X
9.	Ferrous alloys Metallurgical Testing of Gears	Non Martensitic Transformation material Inter granular Oxidation Retained Austenite	AGMA923-B05 May 2005	Magnification- 500X, 1000X