

Laboratory **Quality Control Lab, Diffusion Engineers Limited, Plot No. T5 & 6, MIDC Industrial Area, Nagpur, Maharashtra**

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

Certificate Number **TC-7916**

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Validity **26.09.2018 to 25.09.2020**

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 AND ALLOYS			
1.	Plain Carbon & Low Alloy Steels	Carbon	IS 8811	0.02 % to 1.0 %
		Silicon	ASTM E415	0.10 % to 1.20 %
		Manganese		0.10 % to 6.00 %
		Phosphorus		0.005 % to 0.09 %
		Sulphur		0.005 % to 0.08 %
		Chromium		0.10 % to 2.50 %
		Molybdenum		0.05 % to 1.00 %
		Nickel		0.10 % to 3.50 %
		Aluminium		0.005 % to 0.20 %
		Cobalt		0.05 % to 0.15 %
		Copper		0.04 % to 0.50 %
		Vandium		0.01 % to 2.00 %
		Boron		0.0005 % to 1.00 %
		Tin		0.005 % to 0.020 %
		Tungsten	JIS-G1253	0.20 % to 0.60 %
2.	Stainless Steel	Carbon	IS 9879	0.01 % to 0.50 %
		Silicon	ASTM E1086	0.10 % to 0.90 %
		Manganese		0.10 % to 25.00 %
		Phosphorus		0.005 % to 0.08 %
		Sulphur		0.003 % to 0.06 %
		Chromium		5.00 % to 35.00 %
		Molybdenum		0.05 % to 4.00 %
		Nickel		2.00 % to 25.00 %
		Copper		0.05 % to 2.00 %
		Titanium	JIS-G1253	0.01 % to 1.00 %
		Boron		0.001 % to 1.00 %
		Cobalt		0.02 % to 0.50 %
		Vandium		0.02 % to 0.40 %
		Nitrogen		0.005 % to 0.08 %

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3.	Cast Iron	Carbon	ASTM E1999 IS 15338	0.50 % to 4.00 %
		Silicon		0.10 % to 2.00 %
		Manganese		0.10 % to 18.00 %
		Phosphorus		0.005 % to 0.08 %
		Sulphur		0.005 % to 0.06 %
		Chromium		0.10 % to 30.00 %
		Molybdenum		0.05 % to 5.50 %
		Copper		0.01 % to 1.00 %
		Vandium		0.01 % to 2.00 %
		Aluminium		0.01 % to 0.20 %
		Nickel		0.10 % to 2.00 %
		Tungsten	JIS-G1253	0.01 % to 17.00 %
4.	Nickel Alloys	Boron		0.003 % to 1.00 %
		Carbon	SOP / DE/ CHEM /1: 2012 (Based on ASTM E3047)	0.01 % to 0.20 %
		Silicon		0.01 % to 0.30 %
		Managnese		0.01 % to 1.00 %
		Phosphorus		0.003 % to 0.08 %
		Sulphur		0.003 % to 0.06 %
		Chromium		0.01 % to 24.00 %
		Molybdenum		0.01 % to 16.00 %
		Iron		0.01 % to 10.00 %
		Aluminium		0.01 % to 6.00 %
		Cobalt		0.01 % to 2.00 %
		Copper		0.01 % to 32.0 %
		Niobium		0.01 % to 2.5 %
		Titanium		0.01 % to 1.00 %
5.	Cobalt Alloys	Vandium		0.01 % to 0.25 %
		Tungsten		0.01 % to 3.00 %
		Boron		0.003 % to 0.15 %
		Carbon	SOP / DE/ CHEM /2:2012 (Based on ASTM E1473)	0. 10 % to 2.00 %
		Silicon		0. 10 % to 1.00 %
		Manganese		0.010 % to 2.00 %
		Sulphur		0.001 % to 0.05 %
		Chromium		10.00 % to 30.00 %

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		Molybdenum		0.10 % to 1.00 %
		Iron		0.20 % to 4.00 %
		Aluminium		0.10 % to 0.50 %
		Nickel		0.10 % to 12.00 %
		Copper		0.10 % to 0.50 %
		Niobium		0.10 % to 0.50 %
		Tungsten		0.10 % to 15.0 %
6.	Ferrous Alloys (Plain Carbon, Low Alloy, Cast Iron, Stainless Steel & Ferro Alloys)	Carbon	ASTM E1019	0.001 % to 4.50 %
		Sulphur		0.001 % to 0.10 %
		Manganese	IS 228 (Part 2) IS 12308 (Part 10)	0.10 % to 7.0 %
		Phosphorus	IS 228 (Part 3) IS 12308 (Part 8)	0.10 % to 1.00 %
		Chromium	IS 228 (Part 6) IS 12308 (Part 8)	0.10 % to 30.0 %
		Molybdenum	IS 228 (Part 7)	1.0 % to 6.00 %
		Silicon	IS 228 (Part 8) IS 12308 (Part 6)	0.05 % to 5.00 %
7.	Aluminium Alloys	Silicon	IS 504 (Part 1, Clause 7)	0.30 % to 20.00 %
8.	Copper Alloys	Copper	SOP / DE/ CHEM /3: 2012 (Based on ASTM E478)	0.10 % to 50.0 %
		Phosphorus	IS 440/IS 3685	0.010 % to 0.50 %
		Tin	IS 4667 (Part 2)	0.10 % to 10.0 %
		Silicon	IS 3685	0.01 % to 5.00 %
9.	Ferro-Chromo	Silicon	IS 13452 (Part 1 & 2)	0.10 % to 3.00 %
		Chromium	IS 13452 (Part 5 & 6)	50.0 % to 75.00 %
		Phosphorus	IS 13452 (Part 7)	0.012 % to 0.06 %
11.	Ferro-Manganese	Silicon	IS 13938 (Part 1)	0.10 % to 3.00 %
		Phosphorus	IS 13938 (Part 3)	0.010 % to 1.00 %
		Manganese	IS 13938 (Part 2)	50.0 % to 80.80 %
12.	Ferro-Vanadium	Vanadium	ASTM E365	40.00 % to 52.10 %
		Silicon		0.10 % to 3.00 %
13.	Ferro-Molybdenum	Molybdenum	IS 12614 (Part 1)	50.00 % to 59.60 %
		Silicon	IS 12614 (Part 3)	0.10 % to 4.00 %

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14.	Ferro-Boron	Boron	IS 3295 (Part 2)	10.00 % to 20.00 %
		Silicon	IS 3295 (Part 1)	0.10 % to 3.00 %
15.	Ferro-Tungsten	Tungsten	IS 1559	50.0 % to 79.90 %
		Silicon	IS 1559	0.10 % to 3.00 %
16.	Weld Metal	Diffusible Hydrogen Content	IS 11802	0.5 ml/100g to 15 ml/100g

Prince Garg
Convenor

Birendra Prasad Murmu
Program Manager

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MECHANICAL TESTING

I.	MECHANICAL PROPERTIES OF METALS			
1.	Ferrous Material, Products & Weld Metals	Ultimate Tensile Strength Yield Strength 0.2 % Proof Stress Elongation Reduction in area	IS 1608 AWS B 4.0	100 N/mm ² to 1700 N/mm ² 100 N/mm ² to 1500 N/mm ² 100 N/mm ² to 1500 N/mm ² 2 % to 70 % 2 % to 80 %
		Bend Test	IS 1599 AWS B 4.0	Qualitative (Mandrel Size: Φ20, Φ30, Φ45 & Φ60)
2.	Ferrous Material & Products	Charpy V Notch Impact	IS 1757	2 J to 280 J (Temperature: (–) 30 °C to 27 °C)
		Rockwell Hardness	IS 1586 (Part 1)	20 HRA to 88 HRA 20 HRB to 100 HRB 20 HRC to 70 HRC
		Micro Indentation Hardness	ASTM E384	50 HV ₁ to 1500 HV ₁
II.	METALLOGRAPHY TEST			
1.	Ferrous Material & Products	Microstructural Examination	IS 7739 ASM Handbook Volume 9	Qualitative (Magnification: 100X, 200X, 500X & 1000X)
2.	Austenitic and Duplex Ferritic-Austenitic Cr-Ni Stainless Steel Weld Metals	Ferritic Content	ISO 8249	0.5 % to 80 %

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3.	Ferrous Material, Products & Weld Metals	Macroetching Test	ASTM E340	Qualitative (Magnification: 10X)
4.	Covered Manual Metal Arc Welding Electrode	Determination of Metal Recovery	IS 13043	1 % to 80 %
5.	Ferrous Materials & Products (Low, Medium & High- Abrasive-Resistant Materials)	Measuring Abrasion using the Dry Sand/ Rubber Wheel	ASTM G65	1.20 mm ³ to 580 mm ³
6.	Ferrous Material & Products	Erosion Tests by Solid Particle Impingement using Gas Jets (35 °C to 550 °C)	ASTM G76	1 X 10 ⁻³ mm ³ /g to 150 X 10 ⁻³ mm ³ /g