

Laboratory **Bhartiya Enterprises, Material Testing Laboratory, Plot No. 254, Sector-24, Faridabad, Haryana**

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

Certificate Number **TC-5739 (in lieu of T-1258, T-1259)**

Page 1 of 6

Validity **21.05.2017 to 20.05.2019**

Last Amended on **29.05.2017**

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.	Low Alloy Steel	Carbon	ISO14707	0.010% to 1.08%			
		Silicon		0.050% to 2.00%			
		Manganese		0.200% to 2.00%			
		Phosphorous		0.009% to 0.075%			
		Sulphur		0.008% to 0.300%			
		Nickel		0.020% to 4.000%			
		Chromium		0.020% to 4.100%			
		Molybdenum		0.010% to 1.38%			
		Copper		0.010% to 1.00%			
		Vanadium		0.02% to 0.65%			
		Aluminium		0.005% to 1.200%			
		Lead		0.02% to 0.260%			
		Boron		0.0003% to 0.010%			
		2.		Low Alloy Steel	Carbon	IS 8811ASTM E 415	0.010% to 1.08%
Silicon	0.050% to 2.00%						
Manganese	0.200% to 2.00%						
Phosphorous	0.009% to 0.075%						
Sulphur	0.005% to 0.060%						
Nickel	0.020% to 4.000%						
Chromium	0.020% to 4.100%						
Molybdenum	0.010% to 1.38%						
Copper	0.010% to 0.50%						
Vanadium	0.02% to 0.65%						
Aluminium	0.005% to 0.093%						
Boron	0.0004% to 0.010%						
3.	Stainless Steel		Carbon		ISO 14707		0.020% to 0.25%
			Silicon				0.20% to 2.30%
		Manganese	0.23 % to 1.55%				
		Phosphorous	0.020% to 0.044%				

Prachi Kukreti
Convenor

N. Venkateswaran
Program Director

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Page 2 of 6

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		Sulphur		0.010% to 0.30%
		Nickel		2.00% to 40.00%
		Chromium		10.00% to 28.00%
		Molybdenum		0.07% to 5.00%
		Copper		0.14% to 2.30%
		Vanadium		0.020% to 0.200%
		Aluminium		0.020% to 0.100%
		Titanium		0.010% to 0.750%
		Cobalt		0.020% to 0.150%
		Neobium		0.070% to 0.700%
		Tungsten		0.005% to 0.030%
		Carbon	IS 9879 ASTM E 1086	0.020% to 0.25%
		Silicon		0.20% to 2.00%
		Manganese		0.23% to 1.55%
		Phosphorous		0.020% to 0.044%
		Sulphur		0.010% to 0.10%
		Nickel		2.00% to 15.00%
		Chromium		10.00% to 23.00%
		Molybdenum		0.07% to 3.00%
		Copper		0.14% to 0.50%
4.	Tool Steel	Carbon	ISO 14707	0.66% to 0.94%
		Silicon		0.20% to 0.31%
		Manganese		0.25% to 0.33%
		Phosphorous		0.018% to 0.030%
		Sulphur		0.010% to 0.025%
		Nickel		0.050% to 0.090%
		Chromium		3.73% to 4.55%
		Molybdenum		0.090% to 5.00%
		Copper		0.035% to 0.077%
		Vanadium		1.00% to 2.00%
		Aluminium		0.010% to 0.020%
		Cobalt		0.01% to 0.05%
		Tungsten		5.50% to 18.00%
5.	Cast Iron	Carbon	ISO 14707	2.50% to 3.8%
		Silicon		0.654% to 2.00%

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Page 3 of 6

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		Manganese		0.550% to 2.0%
		Phosphorous		0.09% to 0.45%
		Sulphur		0.055% to 0.180%
		Nickel		0.14% to 3.50%
		Chromium		0.88% to 2.200%
		Molybdenum		0.020% to 0.500%
		Copper		0.030% to 0.800%
		Vanadium		0.04% to 0.700%
		Aluminium		0.010% to 0.220%

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Page 4 of 6

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MECHANICAL TESTING

I.	MECHANICAL PROPERTIES OF METALS			
1.	Ferrous materials, alloys & products Aluminium materials, alloys & products Copper materials, alloys & products Metallic Materials	Tensile test -Tensile Strength -Yield Strength (By Offset method) - % Elongation - % Reduction in Area	IS 1608	100 N/mm ² to 2200 N/mm ² 75 N/mm ² to 1500 N/mm ² 1% to 70% 10% to 80%
		Vickers Hardness	IS 1501(Part 1)	100 HV5 to 700 HV5 100 HV10 to 500 HV10 200 HV30 to 800 HV30
		Micro Vickers hardness	IS 1501(Part 1)	100 HV0.3 to 800 HV0.3 100 HV0.5 to 800 HV0.5 100 HV1 to 800 HV1
		Brinell Hardness	IS 1500 (Part 1)	100 HBW10/3000 to 600HBW10/3000 100 HBW5/750 to 400HBW5/750 100 HBW2.5/187.5 to 400HBW2.5/187.5
		Rockwell Hardness "A" "B" "C"	IS 1586 (Part1)	20 HRA to 90 HRA 20 HRBW to 100 HRBW 20 HRC to 70 HRC
		Rockwell Superficial Hardness "HR15N", "HR30N", "HR 45N"	IS 1586 (Part1)	70 HR15N to 95 HR15N 40 HR 30N to 85 HR 30N 20 HR45N to 80 HR45N

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Page 5 of 6

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2.	Ferrous materials, alloys & products	Bend	IS 1599	Qualitative (Mandrel dia: 6,8,10,18,20,24,30,32,36,40,48,50,60,64,66,80,90 100,110,125,150 mm)
		Charpy Impact (V notch)	IS 1757(Part 1)	2J to 300J at 25° to (-) 50° C
		Charpy Impact (U notch)	IS 1499	2J to 300 J at 25° to (-) 50° C
		Izod Impact	IS 1598	2J to 168J 25± 5° C
II	METALLOGRAPHY TEST			
1.	Ferrous materials, alloys & products	Estimation of Average Grain Size -Microscopic Method -Comparison Method	IS 4748	1 to 10 100X
		Non-Metallic Inclusion Rating by "Method A"	IS 4163	(A,B,C&D: 1 to 3) 100X
		Case Depth by Microscopic method	IS 6416	0.01 mm to 1.0 mm 100X
		Case Depth by Micro Vickers Hardness method	IS 6416	0.01 mm to 10.0 mm (HV 0.3,05 & 1)
		Depth of Decarburization by Microscopic Method	IS 6396	0.01 mm to 1.0 mm 100X
		Depth of Decarburization by Micro Vickers Hardness method	IS 6396	0.01 mm to 10.0 mm (HV 0.3,05 & 1)
2.	Ferrous materials, alloys & products (Bloom Forging and casting)	Macro structural Analysis	IS 11371 IS 13015	Qualitative (5X to 10X)

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Page 6 of 6

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3.	Ferrous materials, alloys & products (Grey Iron, Malleable Iron, S.G. Iron & Steel)	Micro structural Analysis	ASM HAND BOOK VOL – 9 IS 7739 – Part -1 IS 7739 -Part-5	Qualitative (100X, 200X, 250X, 400X, 500X, 800X & 1000X)
4.	Ferrous materials, alloys & products (Coated &Plated Products)	Natural Salt Spray	IS 9844 ASTM B117	Qualitative

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