Laboratory	**Quality Management Labs, BHEL, CFFP, Haridwar, Uttarakhand**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Certificate Number	**TC-6562** ***(in lieu of T-3641 & T-4219)***	**Page 1 of 2**	
Validity	**26.10.2017 to 25.10.2019**	**Last Amended on 15.11.2017**	

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection

CHEMICAL TESTING

I.	**METALS & ALLOYS**			
1.	**High Alloy / Stainless Steel**	Carbon	ISO 14707(E)	0.03% to 0.300%
		Sulphur	ISO 14707(E)	0.003% to 0.030%
		Phosphorus	ISO 14707(E)	0.01% to 0.040%
		Silicon	ISO 14707(E)	0.250% to 1.8%
		Manganese	ISO 14707(E)	0.25% to 1.800%
		Nickel	ISO 14707(E)	0.4% to 21.00%
		Chromium	ISO 14707(E)	5.000% to 26.000%
		Molybdenum	ISO 14707(E)	0.030% to 3.500%
		Vanadium	ISO 14707(E)	0.04% to 0.350%
		Copper	ISO 14707(E)	0.030% to 0.200%
		Tungsten	ISO 14707(E)	0.050% to 1.10%
		Titanium	ISO 14707(E)	0.005% to 0.350%
2.	**Low Alloy / Plain Carbon Steel**	Carbon	ISO 14707(E)	0.08% to 1.00%
		Sulphur	ISO 14707(E)	0.006% to 0.060%
		Phosphorus	ISO 14707(E)	0.009% to 0.070%
		Manganese	ISO 14707(E)	0.04% to 2.000%
		Nickel	ISO 14707(E)	0.06% to 5.000%
		Chromium	ISO 14707(E)	0.06% to 3.000%
		Molybdenum	ISO 14707(E)	0.030% to 1.000%
		Vanadium	ISO 14707(E)	0.010% to 0.400%
		Copper	ISO 14707(E)	0.050% to 1.000%
		Aluminum	ISO 14707(E)	0.010% to 0.30%
		Silicon	ISO 14707(E)	0.050% to 1.0%

Pankaj Goyal
Convenor

N. Venkateswaran
Program Director

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MECHANICAL TESTING

I.	**MECHANICAL PROPERTIES OF METALS**			
1.	**Ferrous Materials (Casting & Forgings)**	Tensile (0.2%PS, UTS, %Elongation, %RA	IS 1608 ASTM E8M	8 to 40 KN/ 0.2 KN 20 to 100 KN /0.5 KN 40 to 200 KN/ 1 KN 80 to 400 KN/ 2 KN % Elongation =5-80 % % RA = 5-90 %
		Charpy Impact testing (V-notch)	IS 1757	Impact Energy = 03 J to 300 J Test temp= [-50°C to +150°C]
		Charpy Impact testing (U-notch)	IS 1499	Impact energy = 03 J to 300 J (At Room Temp)
		Brinell Hardness	IS 1500-1	150 to 350 HBW 5/750
		Bend testing	IS 1599	Mandrel dia.= 20, 25,35,45,50, 55,60 mm, Bend angle= 90° & 180°
2.	**Ferrous Material**	Microstructural Analysis	IS 7739 ASM Metals handbook, Vol-7	Magnification : 50X to 500X
		Grain size (by Comparison Method)	ASTM E112 IS 4748	Qualitative at 100X Grain size no-1 to 8
		Macro Etch	ASTM E381-01	Magnification 10X Measurement by Comparison.
		Inclusion rating By Method A & D	ASTM E45 IS 4163	Thin & Thick Series of Type: A,B,C,D: 1 to 5

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