

Laboratory **ARCVAC Forgecast Limited, Durgapur Expressway, NH2, Panchghara, Hooghly, West Bengal**

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

Certificate Number **TC-5977 (in lieu of T-3430, T-3431)** **Page 1 of 4**

Validity **24.05.2017 to 23.05.2019** **Last Amended on 11.07.2017**

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.	Plain Carbon and Low alloy Steel	Carbon (C)	ASTM : E-415-2015	0.02% to 0.85%
		Manganese (Mn)		0.30 % to 1.70%
		Sulphur (S)		0.001 % to 0.045%
		Phosphorus (P)		0.005% to 0.045%
		Silicon (Si)		0.020% to 2.10%
		Chromium (Cr)		0.020% to 5.00%
		Nickel (Ni)		0.030% to 3.50%
		Molybdenum (Mo)		0.010% to 1.25%
		Vanadium (V)		0.003% to 0.35%
		Titanium (Ti)		0.001% to 0.10%
		Nitrogen (N)		0.010% to 0.055%
		Copper (Cu)		0.020% to 0.50%
		Arsenic (As)		0.003 % to 0.01%
		Cobalt (Co)		0.006% to 0.030%
		Aluminum (Al)		0.006 % to 0.06%
Niobium (Nb)	0.003 % to 0.12%			
Tin (Sn)	0.005 % to 0.020%			
2.	Stainless Steel	Carbon (C)	ASTM : E-1086-2015	0.04% to 0.30%
		Manganese (Mn)		0.30% to 1.50%
		Sulphur (S)		0.005% to 0.045%
		Phosphorus (P)		0.005% to 0.045%
		Silicon (Si)		0.30% to 1.00%
		Chromium (Cr)		5.00% to 19.00%
		Nickel (Ni)		2.00% to 10.00%
		Molybdenum (Mo)		0.050% to 1.00%
		Vanadium (V)		0.010% to 0.15%
		Titanium (Ti)		0.005% to 0.50%
		Nitrogen (N)		0.009% to 0.055%

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		Copper (Cu)	ASTM : E-1086-2015	0.010% to 0.25%
		Cobalt (Co)		0.010% to 0.10%
		Aluminum (Al)		0.005% to 0.030%

Sangeeta Negi
Convenor

N. Venkateswaran
Program Director

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MECHANICAL TESTING				
I. MECHANICAL PROPERTIES OF METALS				
1.	Ferrous Materials	Tensile Test : TS YS %El %RA	IS 1608- 2005 ISO 6892-2016 ASTM A370-2014	Load:15 kN to 600 kN 5% to 60% 5% to 80%
		Bend Test	IS 1599-2012 ASTM A 370-2014 ASTM E 190-2014 ASTM E 290-2014	Mandrel diameter: 6.35 mm to 56 mm Qualitative
		Brinell Hardness Test	IS 1500-2013 ISO 6506-1-2014 ASTM A 370-2014 ASTM E10-2014	130 HBW to 450 HBW
		Rockwell Hardness Test	IS 1586-2012 ASTM A 370-2014 ASTM E18-2014	20 HRC to 65 HRC
		Impact Charpy Test ('U' & 'V' notch)	IS 1757-1988 (V Notch) En 10045-1-1991(V&U Notch) ISO 148-1-2010 (V&U Notch) IS 1499-1977 (U Notch)	05 J to 300 J (at room temperature to -45°C)
II. METALLOGRAPHY TEST				
1.	Ferrous Materials	Microstructure Examination	ASTM E 3 – 2011 ASTM E 407-07 ASM Hand Book, Vol 9-2004	50 X to 1000 X Qualitative
		Macrostructure Examination	ASTM E 381 – 2001(2012) IS 13015-1991	Qualitative

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		Examination of Grain Size by Comparison Method	ASTM E 112 – 2013 IS 4748 - 2009	100 X Grain size No 1-10 Qualitative
		Inclusion Rating by Comparison Method	ASTM E 45 – 2013 ISO 4967 – 2013 IS 4163 – 2004 DIN 50602 – 1985-09	100 X (Type A, B, C, D : 0.5 – 3.0) Qualitative