

Laboratory	L&T Heavy Engineering Calibration and Testing Laboratory, Larsen & Toubro Limited, Technology Block, Hazira Manufacturing Complex, Post: Bhatha, Dist: Surat, Gujarat		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Mechanical Testing	Issue Date	30.07.2016
Certificate Number	T-2296	Valid Until	29.07.2018
Last Amended on	06.09.2016	Page	1 of 2

S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
I.	MECHANICAL PROPERTIES OF METALS			
1.	Metals & Alloys	Brinell Hardness (HBW)	ASTM E10: 2015	100 HBW to 600 HBW
		Vickers Hardness (HV10)	ASTM E384: 2011	100 HV10 to 700 HV10
		Rockwell Hardness (HRC)	ASTM E18: 2015	20 HRC to 70 HRC
		Rockwell Hardness (HRBW)		60 HRBW to 100 HRBW
		Micro Vickers Hardness	ASTM E384: 2011	150 HV1 to 700 HV1
		Tensile Test (RT) Tensile Strength	ASME SA 370: 2015 ASTM E8: 2015	20 kN to 1000 kN
		Yield Strength (at 0.2% offset)		
		% Elongation		1 % to 50 %
		% Reduction in area		1 % to 90 %
		Tensile testing elevated temp. (Upto 800°C) / Tensile Strength	ASTM E21: 2009	5 kN to 300 kN
		Yield Strength (at 0.2 % offset)		
		% Elongation		1 % to 50 %
		% Reduction in area		1 % to 90 %
		Impact Testing: Charpy 'V' Notch test – Absorbed energy in Joules	ASME SA 370: 2015 ASTM E 23: 2012c	2 J to 325 J (-)196 °C to 90 °C
		Lateral Expansion		0.1 mm to 3 mm
		% Shear Fracture		Qualitative

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	Metals & Alloys	Bend test	ASME Section IX: 2015 ASTM E190-14 ASTM E290-14	Qualitative (Mandrel diameter: 4 mm to 120 mm)
2.	Ferrous Alloys	Drop weight test NDT Temperature	ASTM E 208: 2006	Qualitative
II. METALLOGRAPHY TESTING				
1.	Metals & Alloys	Macro structure Examination	ASME Section IX: 2015 (ASTM E 340: 2015)	Qualitative
		Grain size measurement	ASTM E112: 2013 (by Comparison method)	Qualitative (ASTM Grain size number 1 to 8)
		Inclusion rating	ASTM E 45: 2013 (Method A, Comparison Method)	Qualitative (Rating 1 to Rating 5) Inclusion type: A, B, C, & D
		Microstructure Examination	ASM Hand Book' (9 th Edition) (Vol. 9 Metallography and Microstructures) ASTM E 3: 2011	Upto 1000 x magnification
2.	Austenitic Stainless Steel	IGC test Practice "E"	ASTM A262-15	Qualitative

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