

Laboratory **Unitech Laboratories Services, 16, Samrat Industrial Area, Gondal Road, Rajkot, Gujarat**

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

Certificate Number **TC-7322 (in lieu of T-2144, T-2095)**

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Validity **13.05.2018 to 12.05.2020**

Last Amended on **28.05.2018**

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 & ALLOYS			
1.	<b>Carbon &amp; Low Alloy Steel</b>	Carbon	ASTM E 415	0.035 % to 1.15 %
		Silicon		0.13 % to 1.300 %
		Manganese		0.30 % to 1.700 %
		Phosphorous		0.009 % to 0.070 %
		Sulphur		0.002 % to 0.050 %
		Chromium		0.200 % to 1.500 %
		Molybdenum		0.035 % to 0.650 %
		Nickel		0.030 % to 3.300 %
		Copper		0.050 % to 0.230 %
		Aluminium		0.010 % to 0.300 %
		Boron		0.0005 % to 0.001 %
		Niobium		0.005 % to 0.050 %
		Vanadium		0.005 % to 0.200 %
		Titanium		0.002 % to 0.015 %
2.	<b>Stainless Steel</b>	Carbon	ASTM E 1086	0.010 % to 0.240 %
		Silicon		0.350 % to 0.850 %
		Manganese		0.480 % to 1.500 %
		Phosphorous		0.009 % to 0.025 %
		Sulphur		0.001 % to 0.030 %
		Chromium		10.650 % to 28.500 %
		Molybdenum		0.150 % to 3.700 %
		Nickel		1.75 % to 36.000 %
		Copper		0.020 % to 3.500 %
		Aluminium		0.010 % to 0.110 %
		Cobalt		0.020 % to 0.100 %
Niobium	0.005 % to 0.400 %			
Vanadium	0.030 % to 0.230 %			

**Prince Garg  
Convenor**

**N. Venkateswaran  
Program Director**

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		Titanium		0.001 % to 0.440 %
		Nitrogen		0.010 % to 0.280 %
3.	Copper Base alloys	Silicon	BS EN 15079	0.010 % to 0.210 %
		Manganese		0.270 % to 0.520 %
		Phosphorus		0.010 % to 0.060 %
		Nickel		0.130 % to 3.800 %
		Aluminium		0.020 % to 12.30 %
		Bismuth		0.050 % to 0.100 %
		Tin		0.100 % to 9.000 %
		Antimony		0.020 % to 0.600 %
		Lead		0.090 % to 13.700 %
		Zinc		0.280 % to 32.800 %
		Iron		0.020 % to 4.400 %
		Arsenic		0.010 % to 0.160 %
		4.	Cast Iron	Cobalt
Carbon	ASTM E 1999			2.900 % to 3.880 %
Silicon				1.700 % to 2.500 %
Manganese				0.290 % to 0.580 %
Phosphorus				0.150 % to 0.200 %
5.	Ni Base Alloys	Sulphur		0.010 % to 0.080 %
		Carbon	ASTM E 3047	0.010 % to 0.190 %
		Silicon		0.030 % to 0.900 %
		Manganese		0.090 % to 1.400 %
		Phosphorus		0.010 % to 0.040 %
		Sulphur		0.001 % to 0.040 %
		Chromium		17.000 % to 24.000 %
		Molybdenum		2.400 % to 17.000 %
		Iron		1.600 % to 34.500 %
Copper		0.200 % to 35.000 %		
Aluminium		0.020 % to 0.350 %		
		Titanium		0.050 % to 0.900 %

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		Cobalt		0.030 % to 0.250 %
		Niobium		0.170 % to 3.900 %
		Vanadium		0.010 % to 0.550 %
		Tungsten		0.050 % to 5.800 %

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<b><u>MECHANICAL TESTING</u></b>				
<b>I.</b>	<b>MECHANICAL PROPERTIES OF METALS</b>			
1.	<b>Metallic Materials Ferrous &amp; Non-Ferrous Metals and its alloys</b>	Ultimate Tensile Strength 0.2% & 1 % Proof Stress Yield Stress Elongation Reduction in area	IS 1608 ISO 6892 IS 1786 ASTM A370 ASTM E8 EN 10002 EN 895 ASME Section IX BS EN ISO 15614-1 IS 7307-1	100 MPa to 1500 MPa 100 MPa to 1200 MPa 100 MPa to 1200 MPa 1 % to 85 % 1 % to 95 %
		Fasteners Breaking Load Proof load for Nut Proof load for Bolts & studs	IS 1367 (Part 3) ISO 898-1 IS 1367 (Part 6) IS 898-2 ASTM F 606	Qualitative (Bolt Size: M6, M8, M10, M12, M16, M20 & M24 Nut Size: M6, M8, M10, M12, M16, M20 & M24)
		Bend Test	IS 1599 ISO 7438 ASTM A370 ASTM E190 ASTM E290 IS 7307-1 ASME Section IX BS EN ISO 15614	Qualitative (Mandrel Diameter: 12, 25, 32, 44, 60, 90 mm)
		Re--Bend test of TMT Bar/ Reinforcement Bar	IS 1786	Qualitative (Mandrel Diameter: 12, 25, 32, 44, 60, 90 mm)
		Flattening Test on tube	ASTM A 370 ASTM B 111 IS 2328 ISO 8492	Qualitative (Outside Diameter: 6 mm to 250 mm)



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		Inclusion Rating	IS 4163 ISO 4967 (Method A & B) ASTM E 45 (Method A & D)	A, B, C, D A, B, C, D, DS
		Microstructure of Graphite in Cast Iron	IS 7754 ASTM A 247 ISO 945-1	Type: I to VII Size: 1 to 8 Distribution: A to E
		Volume Fraction (Micro)	ASTM E562 ASTM E1245 ASTM A800	Point Count Phase analysis Ferrite Content
		Carbide Structure (Class)	SEP 1520	Qualitative
		Micro Examination	ASTM E 3 ASTM E407 EN 1321 ASM (Volume 9) BS EN ISO 17639	Qualitative
		Macro Etch	ASTM E340 IS 13015 IS 11371 EN 1321 E381	Qualitative
2.	<b>Austenitic Stainless Steel</b>	IGC Practice A	ASTM A 262	Qualitative
		IGC Practice B	ASTM A 262	2 mpy to 500 mpy
		IGC Practice F	ASTM A 262	2 mpy to 500 mpy
		IGC Practice C	ASTM A 262	2 mpy to 500 mpy
		IGC Practice E	ASTM A 262	Qualitative
3.	<b>Stainless Steel &amp; Related Alloys</b>	Method A	ASTM G 48	0.01 g/m <sup>2</sup> to 200 g/m <sup>2</sup>
		Method B	ASTM G 48	0.01 g/m <sup>2</sup> to 200 g/m <sup>2</sup>
		Method E	ASTM G 48	0.01 g/m <sup>2</sup> to 200 g/m <sup>2</sup>
4.	<b>Duplex (Austenitic/Ferritic) Stainless Steel</b>	Practice-A	ASTM A 923	Qualitative
		Practice C	ASTM A 923	0.01 to 200 mdd

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5.	Ferritic, Austenitic, Ferritic-Austenitic/ Stainless Steel	Practice A	ISO 3651-2	Qualitative
		Practice B	ISO 3651-2	Qualitative
		Practice C	ISO 3651-2	Qualitative
6.	Wrought, Nickel Rich, Chromium Bearing Alloys Steel	Practice A	ASTM G28	2 mpy to 500 mpy