

Laboratory **Quality Assurance Laboratories, Ship Building Centre, Naval Base (P.O),
Dhruv Bldg. No. 15, Godavari Gate, Scindia Road, Visakhapatnam,
Andhra Pradesh**

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

Discipline **Mechanical Testing** **Issue Date** **18.09.2014**

Certificate Number **T-1444** **Valid Until** **17.09.2016**

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S.No.	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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I. MECHANICAL PROPERTIES OF MATERIALS

1.	Ferrous Material/ Non- Ferrous Material / Weldments	Tensile strength	ASTM E8/8M - 2013	50 N/mm ² to 1800 N/mm ²
		Yield strength	E 21 - 2009	
		0.2 % Proof Stress	ASME Sec.IX - 2013	50 N/mm ² to 1200 N/mm ²
		% Elongation		2 % to 95 %
		% Reduction of area		2 % to 95 % (Up to 500 kN) (20 °C to 650 °C)
		Bend Test	ASME Sec IX - 2013 E 190 - 2008	Qualitative (Mandrel dia: 1, 2, 4, 10, 12, 16, 20, 24, 25, 30, 40, 50, 60, 70, 80, 100, 120 & 150 mm)
2.	Ferrous Material/ Non- Ferrous Material	Bend test	ASTM E 290 - 2013	Qualitative (Mandrel dia: 1, 2, 4, 10, 12, 16, 20, 24, 25, 30, 40, 50, 60, 70, 80, 100, 120 & 150 mm)
		Compressive Strength	ASTM E 9 - 2009	1 kN to 500 kN 100 N/mm ² to 1500 N/mm ²
3.	Ferrous Material / Non- Ferrous Material/ Weldments	Rockwell Hardness	ASTM E 18 - 2014	30 HRA to 70 HRA 45 HRBW to 100 HRBW 20 HRC to 68 HRC

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	Ferrous Material / Non- Ferrous Material/ Weldments	Vickers Hardness	ASTM E 384 - 2011	25 HV to 60 HV, 1kgf 30 HV to 180 HV, 5kgf 95 HV to 1500 HV, 20kgf 130 HV to 1700 HV, 30kgf
		Brinell Hardness	ASTM E 10 - 2012	21 HBW to 90 HBW (2.5/15.625 kgf) 20 HBW to 140 HBW (2.5/31.25 kgf) 125 HBW to 170 HBW (2.5/62.5 kgf) 110 HBW to 700 HBW (2.5/187.5 kgf) 230 HBW to 800 HBW (5/750 kgf) 200 HBW to 800 HBW (10/3000 kgf)
		Charpy Impact test (“U”, “V” Notch)	ASTM E 23 - 2012	10 J to 300 J (20 °C to (-) 60 °C)
4.	Ferrous Material / Non- Ferrous Material Pipes	Flattening test	SA 450 - 2010 SA 530 - 2012 ASTM A370 - 2013	Qualitative (Outside Diameter: 10 mm to 200 mm)
		Flaring test	SA 450 - 2010 SA 530 - 2012 ASTM A370-2013	Qualitative (Inside Diameter: 6 mm to 60 mm)

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II. METALLOGRAPHY TEST

1.	Ferrous Material / Non- Ferrous Material/ Weldments	Macro examination	ASME Sec IX - 2013 ASTM E 340 – 2013	Qualitative (20 X Magnification)
		Micro examination	ASM Vol-9 (Metallography and Microstructures)	Qualitative (50 X to 1500 X Magnification)
		Micro hardness test	ASTM E 384 - 2011	100 HV to 1000 HV,0.3kgf 100 HV to 1000 HV,0.2kgf 100 HK to 1000 HK,0.3kgf
2.	Austentic Stainless Steels	Delta ferrite measurement	AWS A 4.2 - 1997	(0 to 80) %Fe
		Inter granular corrosion test	ASTM A 262 - 2013 Practice A	Qualitative (250 X to 500 X Magnification)
			ASTM A 262 - 2013 Practice E	Qualitative (Bend: 180° Mandrel Size : 1T to 4T)
		Inter granular corrosion test	GOST 6032 - 1990 (Method AM)	Qualitative (Bend: 90° Mandrel Size : 1T to 4T)

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	Austentic Stainless Steels	Stress corrosion cracking test	ASTM G 36 - 2013	Qualitative (Bend: 180° Mandrel Size: 1T to 4T)
3.	Ferrous Material/ Non- Ferrous Material	Determination of average grain size	ASTM E-112- 2013 (comparison method)	Qualitative (ASTM grain size from 1 to 8)

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