Laboratory	**Materials Engineering Laboratory, Tata Motors Limited, Pimpri, Pune, Maharashtra**
Accreditation Standard	**ISO/IEC 17025: 2005**
Certificate Number	**TC-6738** ***(in lieu of T-1280, T-1281 & T-1282)*** **Page 1 of 4**
Validity	**30.01.2018 to 29.01.2020** **Last Amended on --**

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 AND ALLOYS**			
1.	**Low Alloy Steel**	Carbon	ASTM E415: 2017	0.05% to 1.50%
		Manganese		0.15% to 1.60%
		Phosphorus		0.005% to 0.05%
		Sulphur		0.005% to 0.05%
		Silicon		0.05% to 2.0%
		Nickel		0.05% to 2.0%
		Chromium		0.05% to 2.0%
		Molybdenum		0.01% to 0.50%
		Aluminium		0.005% to 0.075%
2.	**Stainless Steel**	Carbon	ASTM E1086: 2014	0.01% to 0.20%
		Silicon		0.1% to 1.0%
		Manganese		0.1% to 2.0%
		Phosphorus		0.005% to 0.05%
		Sulphur		0.005% to 0.05%
		Chromium		5.0% to 25.0%
		Nickel		0.5% to 25.0%
		Molybdenum		0.1% to 3.0%
3.	**Cast iron**	Carbon	ASTM E1999: 2011	2.50% to 4.0%
		Silicon		1.0% to 2.50%
		Manganese		0.03% to 1.0%
		Phosphorus		0.005% to 0.25%
		Sulphur		0.005% to 0.25%
		Magnesium		0.01% to 0.075%
		Copper		0.05% to 0.25%
4.	**Copper Base Alloy**	Zinc	DIN EN 15079: 2015	0.05% to 45.0%
		Tin		0.05% to 10.0%
		Lead		0.1% to 2.50%
		Iron		0.05% to 0.50%
		Nickel		0.05% to 0.75%

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Aluminium		0.05% to 0.25%
		Silicon		0.05% to 0.25%
		Manganese		0.05% to 0.50%
5.	**Aluminium Base Alloy**	Copper	ASTM-E1251: 2011	0.05% to 5.0%
		Magnesium		0.05% to 0.75%
		Silicon		0.05% to 15.0%
		Iron		0.05% to 1.20%
		Manganese		0.05% to 0.50%
		Nickel		0.05% to 0.50%
		Zinc		0.05% to 1.0%

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Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		MECHANICAL TESTING		
I.	**METALLOGRAPHY**			
1.	**Cast Iron , Carbon Steel, Alloy Steel, Copper & Aluminium Alloys**	Microstructure (Optical Microscopy)	ASM Hand Book Volume:9: 2004	Qualitative (Magnification 50X to 1000X)
2.	**Ferrous and non-ferrous materials**	Macro-Fractography (Stereo Macroscopy)	ASM Hand Book Volume:12: 1987 (RA 1992)	Qualitative (Magnification 6.5X to 50X)
3.	**Case Hardened Steel**	Case Depth (Hardness Traverse)	IS 6416: 1988 (RA 2012)	0.2 mm to 12 mm
II.	**MECHANICAL PROPERTIES OF METALS**			
1	**Ferrous and non-ferrous materials**	Brinell Hardness	IS 1500: 2005 (RA 2010) IS 1500 Part 1: 2013	100 to 450 HBW (2.5 mm/187.5 kgf)
		Rockwell Hardness	IS 1586: 2000 (RA 2010) IS 1586 Part 1: 2012	20 HRA to 85 HRA 20 HRC to 70 HRC
		Vickers Hardness	IS 1501 Part 1: 2013 (RA 2017)	200 HV1 to 800 HV 1 200 HV 5 to 800 HV5

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N. Venkateswaran
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Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		NON-DESTRUCTIVE TESTING		
I.	**METAL & ALLOYS**			
1.	**Ferrous and Non-Ferrous weldments and castings**	X-ray Radiography (upto 250 kV)	ASME Boiler and Pressure Vessel Code Section-V, Articles 2: 2015 Edition. ASTM E390: 2015 ASTM E802: 2015 ASTM E689: 2015 ASTM E446: 2015 ASTM E155: 2015 ASTM E505: 2015	Qualitative (5mm to 40mm steel thickness or equivalent thickness of non-ferrous materials)

K. Siri Babu
Convenor

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