

Laboratory Mahindra Research Valley (MRV) Testing Laboratories, Mahindra & Mahindra Ltd., Plot No. 41/1 Anjur P.O., Chengalpattu, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Discipline Chemical Testing **Issue Date** 29.06.2015

Certificate Number T-3492 **Valid Until** 28.06.2017

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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
I.	LUBRICANTS			
1.	Lubricants	Elemental Analysis	ASTM D 5185-13	
		Non-Aqueous		
		Calcium		1 mg/kg to 4000 mg/kg
		Magnesium		1 mg/kg to 3000 mg/kg
		Phosphorus		1 mg/kg to 2000 mg/kg
		Zinc		1 mg/kg to 2000 mg/kg
		Iron		1 mg/kg to 2000 mg/kg
		Chromium		1 mg/kg to 200 mg/kg
		Lead		1 mg/kg to 200 mg/kg
		Copper		1 mg/kg to 500 mg/kg
		Nickel		1 mg/kg to 200 mg/kg
		Tin		1 mg/kg to 200 mg/kg
		Aluminium		1 mg/kg to 500 mg/kg
		Silicon		1 mg/kg to 400 mg/kg
		Manganese		1 mg/kg to 200 mg/kg
		Molybdenum		1 mg/kg to 1000 mg/kg
		Boron		1 mg/kg to 1000 mg/kg

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	Lubricants	Soot	ASTM D 7844 – 12 & MRV/FL/SOP/5.4/002 Rev. 0 / 01.10.2014	0.01 % to 7.0 %
		Kinematic Viscosity	ASTM D 7042 – 14 / ASTM D 445 – 11-a	2.0 cSt to 200 cSt
		Total Base Number (TBN)	ASTM D 4739 – 11	1 mg KOH to 15 mg KOH
		Total Acid Number (TAN)	ASTM D 974 – 12	0.1 mg KOH to 5.0 mg KOH
		Moisture Content	ASTM D 1744 – 13	0.01 % to 3 %
		Flash point, COC	ASTM D 92 – 12B	80 °C to 400 °C
		Pour Point	ASTM D 97 – 12	(-) 33 °C to 25 °C
		Density	ASTM D 1298 – 12B / D 4052 - 11	0.750 kg/l to 1.120 kg/l
II. PETROLEUM				
1.	Fuel	Abel Flash Point	IS 1448 (Part 20): 98	25 °C to 70 °C
		Pour Point	ASTM D 97 – 12	(-) 21 °C to 25 °C
		Sulphur Content	ASTM D 4294 – 10	10 mg/kg to 500 mg/kg
		Diesel Distillation Characteristics	ASTM D 86– 12	Upto 400 °C
		Density	ASTM D 1298 – 12B / D 4052 - 11	0.750 kg/l to 1.120 kg/l

Malancha Das
Convenor

N. Venkateswaran
Program Manager

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	Fuel	Cold Filter Plugging Point (CFPP)	ASTM D 6371-10	Upto (-) 20 °C
		Moisture Content	ASTM D 1744 – 13	0.01 % to 0.5 %
2.	Coolant	pH	ASTM D 1287-11	4.01 to 11.72
		Reserve Alkalinity	ASTM D 1121 - 11	Minimum 1ml
		Foaming	IS 5759-2006	1 ml to 100 ml
		Density	ASTM D 1298-12b	1.0 kg/l to 1.2 kg/l
3.	Brake Fluid	Equilibrium Reflux Boiling Point (ERBP)	IS 8654: 2001	Upto 280 °C
		pH	IS 8654: 2001	4.01 to 11.72
		Moisture content	IS 8654: 2001	0.01 % to 5 %
III. RUBBER & SYNTHETIC RUBBER				
1.	Rubber Products	Identification of Rubber Ethylene Propylene Diene Monomer Rubber	ASTM D 3677-10: 2011 E1	Qualitative (4000 cm ⁻¹ to 450 cm ⁻¹)
		Butyl Rubber		
		Natural Rubber		
		Silicone Rubber		

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	Rubber Products	Neoprene Rubber	ASTM D 3677-10: 2011 E1	Qualitative (4000 cm ⁻¹ to 450 cm ⁻¹)
		Fluorocarbon Rubber		
		Nitrile Butadiene Rubber– Polyvinylchloride Blend		
		Nitrile Butadiene Rubber		
		Poly Acrylic Rubber		
		Ash % by Thermogravimetry	ASTM E 1131–08: 2014	0.1 % to 98 %
		Melting point of Polymer	ASTM D 3418-12	Ambient to 550 °C
IV.	PLASTICS AND RESINS			
1.	Plastics & polymers	Polypropylene	ASTM E 1252-98: 2013 E1	Qualitative (4000 cm ⁻¹ to 450 cm ⁻¹)
		High Density Polyethylene		
		Low Density Polyethylene		
		Linear Low Density Polyethylene		
		Polyoxymethylene		
		Acrylonitrile Styrene Acrylate		
		Acrylonitrile Butadiene Styrene		

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	Plastics & polymers	Polycarbonate	ASTM E 1252-98: 2013 E1	Qualitative (4000 cm ⁻¹ to 450 cm ⁻¹)
		Polymethylmethacrylate		
		Polycarbonate + Acrylonitrile Styrene Acrylate Blend		
		Polycarbonate + Acrylonitrile Butadiene Styrene Blend		
		Polyamide 6		
		Polyamide 6, 6		
		Polyvinyl Chloride		
		Polyurethane Foam		
		Polytetrafluoroethylene		
		Ash % by Thermogravity	ASTM E 1131-08: 2014	0.1 % to 98 %
		Melting point of Polymer	ASTM D 3418-12	Ambient to 550 °C

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V. METALS & ALLOYS				
1.	Low Alloy Steel	Chemical Analysis	ASTM E 415-14	
		C		0.03 % to 1.1 %
		Si		0.07 % to 1.15 %
		Mn		0.10 % to 2.0 %
		P		0.02 % to 0.085 %
		S		0.01 % to 0.20 %
		Cr		0.02 % to 2.25 %
		Mo		0.03 % to 0.60 %
		Ni		0.02 % to 5.0 %
		Al		0.02 % to 0.075 %
		Cu		0.04 % to 0.5 %
		V		0.004 % to 0.3 %
		N		0.004 % to 0.015 %
		Co		0.008 % to 0.18 %
2.	Stainless Steel	Chemical Analysis	ASTM E1086-14	
		C		0.05 % to 0.25 %
		Si		0.01 % to 0.90 %
		Mn		0.01 % to 2.0 %
		P		0.003 % to 0.15 %
		S		0.003 % to 0.065 %
		Cr		9.51 % to 30.46 %
		Mo		0.01 % to 3.0 %
		Ni		4.52 % to 24.06 %
		Cu		0.01 % to 2.33 %
3.	Aluminum & Aluminum Alloys	Chemical Analysis	ASTM E1251-11	
		Cu		0.01 % to 6.67 %
		Mg		0.03 % to 5.4 %
		Si		0.07 % to 33.12 %
		Fe		0.11 % to 1.30 %

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	Aluminum & Aluminum Alloys	Mn	ASTM E1251-11	0.02 % to 2.0 %
		Ni		0.005 % to 3.0 %
		Zn		0.01 % to 2.71 %
		Ti		0.007 % to 0.37 %
		Cr		0.003 % to 0.38 %
		Co		0.0004 % to 0.25 %
		V		0.004 % to 0.03 %
	Bi	0.004 % to 0.6 %		

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