Laboratory	**Materials Laboratory, Cummins India Limited, Dahanukar Colony, Kothrud, Pune, Maharashtra**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Certificate Number	**TC-7310** ***(in lieu of T-0092, T-0151)***	**Page 1 of 3**	
Validity	**24.05.2018 to 23.05.2020**	**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
		CHEMICAL TESTING		
I.	**METALS AND ALLOYS**			
		By OES		
1(a)	**Ferrous, Non Ferrous Metals: Plain carbon & low alloy steels**	Carbon	ASTM E 415 2017	0.025 % to 1.40 %
		Silicon		0.050 % to 2.00 %
		Manganese		0.040 % to 2.00 %
		Phosphorus		0.005 % to 0.085 %
		Sulfur		0.005 % to 0.35 %
		Chromium		0.050 % to 3.00 %
		Molybdenum		0.002% to 1.00 %
		Nickel		0.020 % to 4.45 %
		Aluminum		0.005 % to 0.20 %
		Copper		0.015 % to 0.75 %
1(b)	**Stainless steels**	Carbon	ASTM 1086 2014	0.015 % to 0.30 %
		Silicon		0.050 % to 4.10 %
		Manganese		0.20 % to 15.10 %
		Phosphorus		0.015% to 0.060 %
		Sulfur		0.003 % to 0.080 %
		Chromium		7.50 % to 25.50 %
		Molybdenum		0.10 % to 4.00 %
		Nickel		0.10 % to 20.50 %
		Titanium		0.05 % to 1.00 %
		Copper		0.040 % to 2.00 %
1 (c)	**Chilled Cast Iron**	Carbon	ASTM 1999 2011	2.00 % to 4.00 %
		Silicon		0.50 % to 2.75 %
		Manganese		0.20 % to 2.00 %
		Phosphorus		0.020 % to 0.39 %
		Sulfur		0.005% to 0.155 %
		Chromium		0.050 % to 2.50 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Molybdenum		0.040 % to 1.60 %
		Nickel		0.050% to 2.70 %
		Titanium		0.050 % to 0.150 %
		Tin		0.010 % to 0.24 %
		Aluminum		0.005 % to 0.15 %
		Magnesium		0.010 % to 0.10 %
		Copper		0.010 % to 1.55 %
1(d)	**Aluminum alloys**	Silicon	ASTM E 1251 2017	0.15 % to 14.50 %
		Manganese		0.050 % to 0.75 %
		Chromium		0.01 % to 0.32 %
		Nickel		0.15 % to 1.25 %
		Titanium		0.050 % to 0.20 %
		Tin		0.07 % to 6.50 %
		Copper		0.50 % to 4.75 %
		Magnesium		0.035 % to 1.0 %
		Iron		0.20 % to 1.0 %
		Zinc		0.030 % to 2.0 %
		Lead		0.10 % to 0.25 %

MECHANICAL TESTING

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Validity	**24.05.2018 to 23.05.2020**	**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
I.	**MECHANICAL PROPERTIES OF METALS**			
1	**Ferrous & Non Ferrous metals & alloys**	Tensile test: Ultimate Tensile Strength Yield Strength (0.2% Proof Stress) % Elongation %Reduction in area	ASTM E 8 M 2016a ASTM A 370 2017a	2 kN to 250 kN 1 kN to 300 kN 0.3 kN to 50 kN 2% to 80% 2% to 80%
		Rockwell Hardness	ASTM E 18 2017 E1 ASTM A 370 2017a	40 HRBW to 100 HRBW 20 HRC to 68 HRC 70 to 96 HR15N
		Brinell Hardness	ASTM E 10 2017 ASTM A 370 2017a	40 HBW to 125 HBW (HB10/500) 125 HBW to 600 HBW (HB10/3000) 125 HBW to 600 HBW (HB 5/750)
		Microhardness Vickers	ASTM E 384:2017	100 HV1 to 1000 HV1
II.	**METALLOGRAPHY TEST**			
1.	**Ferrous & Non Ferrous metals & alloys**	Grain size measurement (By Comparison method)	ASTM E 112: 2013	Qualitative (ASTM 1 to 10)

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Convenor

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