Laboratory	**Controllerate of Quality Assurance (Metals), P.O. Ichapur-Nawabganj, Dist.: 24 Parganas (North), West Bengal**			
Accreditation Standard	**ISO/IEC 17025: 2005**			
Discipline	**Chemical Testing**		**Issue Date**	**19.10.2016**
Certificate Number	**T-0124**		**Valid Until**	**18.10.2018**
Last Amended on	**09.12.2016**		**Page**	**1 of 7**

S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
I.	**METALS AND ALLOYS**			
1.	**Cast Iron**	Total Carbon	ASTM E 1019 Method A: 2011	1.5 % to 4.5 %
		Sulphur	ASTM E 1019 Method A: 2011	0.005 % to 0.25 %
		Phosphorous	IS 12308 (Part 5): 1991 (RA 2012)	0.01 % to .50 %
		Silicon	IS 12308 (Part 6): 1991 (RA 2012)	0.10 % to 4.0 %
		Manganese	IS 12308 (Part 10): 1991 (RA 2012)	0.05 % to 7.0 %
2.	**Stainless Steel**	Carbon	ASTM E 1019 Method A: 2011	0.01 % to 1.5 %
		Sulphur	ASTM E 1019 Method A: 2011	0.005 % to 0.25 %
		Manganese	IS 228 (Part 2): 1987 (RA 2012)	0.1 % to 1.5 %
		Phosphorous	IS 228 (Part 3): 1987 (RA 2012)	0.01 % to 1.0 %
		Nickel	IS 228 (Part 5): 1987 (RA 2012)	0.1 % to 20.0 %
		Chromium	IS 228 (Part 6): 1987 (RA 2012)	0.1 % to 20.0 %
		Silicon	IS 228 (Part 8): 1989 (RA 2012)	0.05 % to 5.0 %
		Copper	IS 228 (Part 15): 1987 (RA 2004)	0.05 % to 5.0 %
		Vanadium	CQA(MET)/LAB/ CHEM/TP/001(V) Issue. 01, Issue Dated. 12.04.2005, Rev. 02, Revision Dated. 03.10.2016	0.05 % to 2.0 %

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	Stainless Steel	Cobalt	CQA(MET)/LAB/ CHEM/TP/001(Co) Issue. 01, Issue Dated. 12.04.2005, Rev. 02, Revision Dated. 03.10.2016	0.20 % to 8.0 %
		Tungsten	CQA(MET)/LAB/ CHEM/TP/001(W) Issue. 01, Issue Dated. 12.04.2005, Rev. 02, Revision Dated. 03.10.2016	0.50 % to 21.0 %
3.	**Brass**	Copper	IS 3685: 1966 (RA 2012)	50.0 % to 90.0 %
		Lead	IS 3685: 1966 (RA 2012)	0.1 % to 4.5 %
		Tin	IS 3685: 1966 (RA 2012)	0.1 % to 1.5 %
		Iron	IS 3685: 1966 (RA 2012)	0.01 % to 0.30 %
		Phosphorous	IS 3685: 1966 (RA 2012)	0.01 % to 0.1 %
		Nickel	IS 3685: 1966 (RA 2012)	0.1 % to 5.0 %
		Manganese	IS 3685: 1966 (RA 2012)	0.1 % to 2.0 %
4.	**Bronze**	Copper	IS 4027 (Part 1): 1987 (RA 2012)	70.0 % to 95.0 %
		Lead	IS 4027 (Part 1): 1987 (RA 2012)	0.1 % to 6 %
		Phosphorous	IS 4027 (Part 3): 1987 (RA 2012)	0.01 % to 0.50 %
		Tin	IS 4027 (Part 5): 1987 (RA 2012)	0.1 % to 13 %

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	Bronze	Zinc	IS 4027 (Part 6): 1987 (RA 2012)	0.1 % to 6.0 %
		Iron	IS 4027 (Part 8): 1991 (RA 2012)	0.01 % to 5.0 %
		Silicon	IS 4027 (Part 10): 2000 (RA 2012)	0.05 % to 1.0 %
5.	**Copper Nickel Alloy**	Copper	IS 3187: 1965 (RA 2012)	60.0 % to 90.0 %
		Nickel	IS 3187: 1965 (RA 2012)	5.0 % to 32.0 %
		Iron	IS 3187: 1965 (RA 2012)	0.1 % to 2.0 %
6.	**Aluminium & Aluminium Alloys**	Silicon	IS 504 (Part 1): 2002 (RA 2012) ASTM E 34: 1994 (Re-approved 2002)	0.3% to 20.0 %
		Copper	IS 504 (Part 3): 2002 (RA 2012)	0.1 % to 5.0 %
		Iron	ASTM E 34: 1994 (Re-approved 2002)	0.1 % to 0.7 %
		Manganese	IS 504 (Part 5): 2002 (RA 2012)	0.1 % to 1.5 %
		Zinc	ASTM E 34: 1994 (Re-approved 2002)	0.1 % to 12.0 %
7.	**Zinc Base Alloy**	Aluminium	BS EN 12441 - 1: 2004	3.0 % to 5.0 %
8.	**Lead & Lead Alloys**	Arsenic	IS 403: 1964 (RA 2016)	0.005 % to 1.0 %
		Antimony	IS 403: 1964 (RA 2016)	0.005 % to 10.5 %
		Tin	IS 403: 1964 (RA 2016)	0.1 % to 2.0 %
		Bismuth	IS 403: 1964 (RA 2016)	0.005 % to 0.6 %

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9.	**Solder**	Tin	IS 998 (Part 1): 1983 (RA 2014)	40.0 % to 60.0 %
		Antimony	IS 998 (Part 1): 1983 (RA 2012)	0.05 % to 6.0 %
		Arsenic	IS 998 (Part 2): 1983 (RA 2014)	0.005 % to 0.05 %
		Copper	IS 998 (Part 2): 1983 (RA 2014)	0.01 % to 0.2 %
		Iron	IS 998 (Part 2): 1983 (RA 2014)	0.01 % to 0.2 %
		Bismuth	IS 998 (Part 3): 1983 (RA 2014)	0.005 % to 0.05 %
		Rosin Content	IS 1921: 2005 (RA 2016)	2.0 % to 4.0 %
		Halogen Content	IS 1921: 2005 (RA 2016)	0.1 % to 0.5 %
10.	**Cartridge Brass**	Mercurous Nitrate Test	IS 2305: 1988 (RA 2015)	Qualitative
11.	**Iron & Its Alloys**	Carbon	CQA(MET) / LAB / SPEC/ TP/01 01 Issue. 02, Issue Dated. 01.12.2007	0.08 % to 4.0 %
		Silicon		0.07 % to 5.5 %
		Manganese		0.10 % to 20.0 %
		Chromium		0.02 % to 12.0 %
		Molybdenum		0.03 % to 10.0 %
		Nickel		0.02 % to 36.0 %
		Aluminium		0.02 % to 2.20 %
		Cobalt		0.002 % to 18.0 %
		Copper		0.02 % to 4.60 %

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	Iron & Its Alloys	Niobium	CQA(MET) / LAB / SPEC/ TP/01 01 Issue. 02, Issue Dated. 01.12.2007	0.04 % to 1.00 %
		Titanium		0.004 % to 3.00 %
		Vanadium		0.04 % to 4.00 %
		Tungsten		0.004 % to 21.0 %
		Tin		0.004 % to 0.22 %
		Boron		0.001 % to 0.12 %
12.	**Copper & Its Alloys**	Zinc	CQA(MET) / LAB / SPEC/ TP/01 01 Issue. 02, Issue Dated. 01.12.2007	0.001 % to 5.0 %
		Lead		0.002 % to 12.0 %
		Tin		0.001 % to 15.0 %
		Manganese		0.001 % to 12.0 %
		Iron		0.001 % to 6.10 %
		Nickel		0.004 % to 34.00 %
		Silicon		0.001 % to 5.00 %
		Magnesium		0.001 % to 0.20 %
		Chromium		0.001 % to 2.40 %
		Tellurium		0.001 % to 1.00 %
		Antimony		0.001 % to 1.60 %
		Bismuth		0.001 % to 0.08 %

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	Copper & Its Alloys	Cobalt	CQA(MET) / LAB / SPEC/ TP/01 01 Issue. 02, Issue Dated. 01.12.2007	0.0025 % to 2.40 %
		Aluminium		0.001 % to 12.0 %
		Beryllium		0.001 % to 3.10 %
		Cadmium		0.001 % to 1.25 %
13.	**Aluminium & Its Alloy**	Silicon	CQA(MET) / LAB / SPEC/ TP/01 01 Issue. 02, Issue Dated. 01.12.2007	0.001 % to 23.0 %
		Iron		0.001 % to 2.10 %
		Manganese		0.001 % to 13.50 %
		Magnesium		0.001 % to 12.00 %
		Zinc		0.001 % to 5.00 %
		Nickel		0.001 % to 3.00 %
		Chromium		0.001 % to 0.35 %
		Lead		0.001 % to 1.00 %
		Tin		0.001 % to 0.80 %
		Titanium		0.001 % to 0.50 %
		Bismuth		0.01 % to 0.60 %
		Cadmium		0.001 % to 0.35 %
		Lithium		0.001 % to 0.05 %
		Vanadium		0.001 % to 0.11 %

S. No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Aluminium & Its Alloy	Zirconium	CQA(MET) / LAB / SPEC/ TP/01 01 Issue. 02, Issue Dated. 01.12.2007	0.001 % to 0.25 %
		Copper		0.001 % to 5.0 %
14.	**Zinc & Its Alloy**	Aluminium	CQA(MET) / LAB / SPEC/ TP/01 Issue. 02 , Issue Dated. 01.12.2007	0.01 % to 11.00 %
		Lead		0.001 % to 0.07 %
		Tin		0.001 % to 0.02 %
		Cadmium		0.001 % to 0.025 %
		Nickel		0.001 % to 0.035 %
		Copper		0.001 % to 3.30 %
		Magnesium		0.001 % to 0.22 %
		Iron		0.001 % to 0.12 %
II.	**METALLIC COATINGS & TREATMENT SOLUTIONS**			
1.	**Surface Treated Components**	Salt Droplet Test	JSS 0465-01: 94 (Clause. 17.5.2 & 17.5.3)	Qualitative (Visual)
		Mass Of Tin Coating	IS 1327: 1988 (RA 2011) (Clause. 3)	10 g/m^2 to 1500 g/m^2
		Mass Of Phosphate Coating	JSS 0465-01: 94 (Clause 17.3)	1.6 g/m^2 to 100 g/m^2

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