Laboratory	**Geological & Metallurgical Laboratories, 105x, 3rd Main, 3rd Cross, II Stage, Yeshwanthpur Industrial Suburb, Goreguntepalya, Bangalore, Karnataka**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Discipline	**Chemical Testing**	**Issue Date**	**05.02.2015**
Certificate Number	**T-0247**	**Valid Until**	**04.02.2017**
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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. METALS AND ALLOYS				
1.	**Carbon and Low Alloy Steels**	C	Arc emission spectrometry	0.01% to 2.0 %
		Si	IS 8811: 1998	0.02 % to 2.0 %
		Mn	ASTM E415: 14	0.02 % to 2.0 %
		S		0.005 % to 0.15 %
		P		0.01 % to 0.15 %
		Cr		0.02 % to 5.0 %
		Ni		0.02 % to 5.0 %
		Mo		0.02 % to 1.5 %
		Al		0.01 % to 0.5 %
		V		0.02 % to 0.5 %
		Cu		0.02 % to 0.5 %
		B		0.001 % to 0.005 %
		Pb		0.020 % to 0.19 %
		Ti		0.02 % to 0.1 %
		Nb		0.005 % to 0.10 %
2.	**Stainless Steel**	C	Arc emission spectrometry	0.01 % to 1.0 %
		Si	IS 9879: 1998	0.02 % to 1.5 %
		Mn	ASTM E 1086: 14	0.02 % to 2.0 %
		S		0.005 % to 0.1 %
		P		0.01 % to 0.1 %
		Cr		10.0 % to 25.0 %
		Ni		0.02 % to 25.0 %
		Mo		0.02 % to 5.0 %
		Cu		0.02 % to 4.50 %
		Nb		0.02 % to 1.0 %
		Ti		0.005 % to 0.5 %

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3.	**Tool Steel**	C	Arc emission spectrometry	0.01 % to 2.5 %
		Si	STP CH 01,	0.02 % to 1.0 %
		Mn	Issue No.1, Issue Date: 28-01-2015	0.02 % to 1.0 %
		S		0.005 % to 0.1 %
		P		0.01 % to 0.1 %
		Cr		0.02 % to 15.0 %
		Ni		0.02 % to 1.0 %
		Mo		0.02 % to 6.0 %
		V		0.02 % to 2.5 %
		Co		0.02 % to 10.0 %
		W		0.02 % to 20.0 %
		Cu		0.02 % to 0.5 %
4.	**Aluminium base**	Si	Arc emission spectrometry IS 7658: 1975 (RA 2005)	0.01 % to 15.0 %
		Cu	IS 11035: 1984(RA 2000) ASTM E 1251: 11	0.01 % to 11.0 %
		Fe	Arc emission spectrometry	0.010 % to 1.50 %
		Mn	IS 7658: 1975 (RA 2005)	0.01 % to 0.80 %
		Mg	IS 11035: 1984(RA 2000)	0.01 % to 12.0 %
		Zn	ASTM E 1251: 11	0.02 % to 7.0 %
		Ti		0.01 % to 0.30 %
		Ni		0.01 % to 2.50 %
		Pb		0.01 % to 0.50 %
		Sn		0.01 % to 0.30 %
		Cr		0.01 % to 0.30 %
		V		0.01 % to 0.04 %

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5.	**Copper base Alloys**	Sn	Arc emission spectrometry	0.002 % to12.0 %
		Pb	Equipment manual	0.003 % to 10.0 %
		Zn	STP CH 02	0.001 % to 8.0 %
		Fe	Issue No.1, Issue Date: 28-01-2015	0.003 % to 5.0 %
		P		0.001 % to 0.8 %
		Ni		0.002 %to 6.0 %
		Al		0.001 % to 12.0 %
		Co		0.002 % to 0.5 %
		Sb		0.002 % to 0.5 %
		Mn		0.002 % to 0.5 %
		Be		0.002 % to 2.5 %
		Si		0.001 % to 0.2 %
		As		0.001 % to 0.18 %
		Bi		0.0005 % to 0.13 %
		Ag		0.0010 % to 0.15 %
		S		0.001 % to 0.15 %
		Cr		0.001 % to 0.20 %
6.	**Lead alloys Antimonial Lead and battery grade lead**	Sn	Arc Emission Spectrometry	0.005 % to 0.5 %
		Sb	STP CH 03	0.01 % to 7.0 %
		Zn	Issue No.1, Issue Date: 28-01-2015	0.001% to 0.03 %
		Ni		0.001 % to 0.03 %
		Cd		0.001 % to 0.03 %
		Bi		0.001 % to 0.03 %
		As		0.001 % to 0.03 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
7.	**Solders**	Sn	Arc emission spectrometry,	25.0 % to 65.0 %
		Pb	STP CH 04	30.0 % to 50.0 %
		Bi	Issue No.1, Issue Date: 28-01-2015	0.001 % to 0.3 %
		Sb		0.001 % to 0.6 %
		Cu		0.001 % to 0.3 %
		As		0.001 % to 0.05 %
		Ag		0.001 % to 0.05 %
		Fe		0.001 % to 0.05 %
		Zn		0.001 % to 0.03 %
		Cd		0.001 % to 0.01 %
		Ni		0.001 % to 0.02 %
8.	**Carbon steels, alloy steels, stainless steels, tool steels cast iron**	C	ASTM E 1019: 11	0.01 % to 4.5 %
		S	ASTM E 1019: 11	0.005 %to 0.35 %
		Si	IS:228 (Part 8): 1989 (RA 2004) E - 353: 93 (RA 2006) IS 12308 (Part 6): 1991 (RA 2006)	0.05 %to 6.0 %
		Mn	IS 228 (Part 2): 1987 (RA 2002) IS 12308 (Part 10): 1991 (RA 2006) IS 228 (Part 12): 2001 (RA 2004)	0.05 % to 5.0 %
		P	IS 228 (Part 3): 1987 (RA 2002) IS 12308 (Part 5): 1991 (RA 2006)	0.01 %to 0.5 %
		Cr	ASTM E350: 12 E 352: 93 (RA 2006) E 353: 93 (RA 2006) E 351: 93 (RA 2006)	0.05 % to 35.0 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Carbon steels, alloy steels, stainless steels, tool steels cast iron	Ni	IS 228 (Part 5): 1987 (RA 2002) ASTM E 351: 93 (RA 2006)	0.1 % to 48 %
		Mo	IS 228 (Part 7): 1990 (RA 2001) IS 228 (Part 10): 1989 (RA 2004) IS 12308 (Part 9): 1993 (RA 2006) ASTM E 352: 93 (RA 2006)	0.05 % to 10.0 %
		V	STP CH 05 Issue No.1, Issue Date: 28-01-2015	0.05 % to 5.0 %
		W	STP CH 06 Issue No.1, Issue Date: 28-01-2015	0.05 % to 10.0 %
		Cu	ASTM E351: 93 (RA 2006) E352: 93 (RA 2006) E-353: 93(RA 2006)	0.05 % to 5.0 %
		Co	STP CH 07, Issue No.1, Issue Date: 28-01-2015	0.05 % to 10.0 %
		Pb	STP CH 08, Issue No.1, Issue Date: 28-01-2015	0.15 % to 0.35 %
		N	ASTM E 1019 – 11	0.0005 % to 0.20 %
		O	ASTM E 1019 – 11	0.0005 % to 0.01 %
		H	STP CH 09, Issue No.1,Issue Date: 28-01-2015	0.00005 % to 0.001 %
		Ti	STP CH 10, Issue No.1, Issue Date: 28-01-2015	0.05 % to 0.6 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
9.	**Copper alloys**	Cu	IS 4027 (Part 1): 1987 (RA 2006) IS 4027: 1967 (RA 2000) IS 3685: 1966 (RA 2006) ASTM E75: 76	50.0 % to 99.95 %
		Sn	STP CH 11 Issue No.1, Issue Date: 28-01-2015	0.05 % to 20.0 %
		Pb	IS: 4027 (Part 1): 1987 (RA 2006) IS:3685: 1966 (RA 2006) IS:4027: 1967 (RA 2000)	0.05 %to 20.0 %
		Zn	IS 4027 (Part 6): 1987 (RA 2006) IS 3685: 1966 (RA 2006) IS 4027: 1967 (RA 2000) ASTM E75: 76	0.05 % to 50.0 %
		P	IS 4027 (Part 3): 1987 (RA 2006), IS 3685: 1966 (RA 2006) IS:4027: 1967 (RA 2000)	0.01 % to 1.0 %
		Al	STP CH 12 Issue No.1, Issue Date: 28-01-2015	0.05 %to 15.0 %
		Fe	IS 3685: 1966 (RA 2006), IS 4027(Part 8): 1991 (RA 2006), IS 4027: 1967 (RA 2000)	0.05 % to 5.0 %
		Ni	IS 4027 (Part 4): 1987 (RA 2006) IS 3685: 1966 (RA 2006) IS 4027: 1967 (RA 2000) ASTM E75: 76	0.05 % to 50.0 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Copper alloys	Mn	IS 4027 (Part 2): 1987 (RA 2006) IS 3685: 1966 (RA 2006) IS 4027: 1967 (RA 2000)	0.05 % to 5.0 %
		Si	IS 3685: 1966 (RA 2006) IS 4027: 1967 (RA 2000)	0.05 % to 5.0 %
		Sb	IS 4027: 1967 (RA 2000)	0.05 % to 5.0 %
		O	ASTM E 2575: 08	0.0005 % to 0.04 %
10.	**Nickel alloys**	C	ASTM E1019: 11	0.01 % to 1.0 %
		Si	ASTM E 354: 93 (RA 2006)	0.05 % to 5.0 %
		Mn	IS 1952: 1963 (RA 2005) ASTM E354: 93 (RA 2006)	0.05 % to 2.0 %
		S	ASTM E1019: 11	0.005 % to 0.1 %
		P	IS 228 (Part 3): 1987 (RA 2002) ASTM E 353: 1993(RA 2006) ASTM E 354: 93(RA 2006)	0.01 % to 0.2 %
		Cr	ASTM E 354: 93(RA 2006)	0.05 % to 33.0 %
		Mo	STP CH 13 Issue No.1, Issue Date: 28-01-2015	0.05 % to 10.0 %
		Co	ASTM E 75: 76	0.1 % to 10.0 %
		Ni	ASTM E 354: 93 (RA 2006)	25 % to 99.8 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Nickel alloys	Fe	IS 1952 : 1963 (RA 2005) ASTM E 75: 76	0.05 % to 50.0 %
		Cu	ASTM E 354: 93(RA 2006)	0.05 % to 50.0 %
11.	**Aluminium alloys**	Si	IS 504 (Part 1): 2002 ASTM E34: 11	0.1 % to 30.0 %
		Fe	IS 504 (Part 2): 2002 ASTM E34: 11	0.01 % to 2.0 %
		Cu	ASTM E34: 11 IS 504 (Part 3): 2002	0.05 % to 10.0 %
		Zn	IS 504 (Part 4): 2002	0.05 % to 10.0 %
		Mn	IS 504 (Part 5):2002 ASTM E34: 11	0.05 % to 1.5 %
		Mg	IS 504 (Part 6): 02 ASTM E 34: 11	0.05% to 12.0 %
		Ni	IS 504 (Part 7): 02 ASTM E 34: 11	0.05 % to 4.0 %
		Pb	ASTM E 34: 11 IS: 504 (Part 1): 2002	0.1 % to 1.0 %
		Cr	IS 504 (Part 8**)**: 2002	0.05 % to 5.0 %
		Sn	IS 504 (Part 9): 2002	0.05 % to 1.0 %
		Ti	IS 504 (Part 11): 2002	0.01 % to 1.0 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
12.	**Ferro Silicon**	C	STP CH 14 Issue No.1, Issue Date: 28-01-2015	0.01 % to 7.0 %
		Si	IS 1559: 1961	15.0 % to 85.0 %
		S	STP CH 14 Issue No.1, Issue Date: 28-01-2015	0.005 % to 0.10 %
		P	IS 1559: 1961	0.05 % to 0.15 %
		Al	IS 1559: 1961	0.1 % to 1.0 %
		Fe	STP CH 15 Issue No.1, Issue Date: 28-01-2015	10.0 % to 50.0 %
13.	**Ferro Manganese**	C	STP CH 16 Issue No.1, Issue Date: 28-01-2015	0.01 % to 7.0 %
		Si	IS 1559: 1961	0.1 % to 20 %
		S	STP CH 16 Issue No.1, Issue Date: 28-01-2015	0.005 % to 0.10 %
		P	IS 1559: 1961	0.01 % to 0.20 %
		Mn	IS 1559: 1961	30.0 % to 75.0 %
14.	**Ferro Chrome**	C	STP CH 17 Issue No.1, Issue Date: 28-01-2015	0.01 % to 7.0 %
		Si	IS 1559 : 1961	0.10 % to 20 %
		S	STP CH 17 Issue No.1, Issue Date: 28-01-2015	0.005 % to 0.10 %
		P	IS 1559: 1961	0.01 % to 0.20%
		Cr	IS 1559: 1961	30.0 % to 75.0 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
15.	**Silico Manganese**	C	STP CH 18, Issue No.1, Issue Date: 28-01-2015	0.01 % to 7 %
		Si	IS 1559: 1961	10.0 % to 50.0 %
		S	STP CH 18, Issue No.1, Issue Date: 28-01-2015	0.005 % to 0.1 %
		Mn	IS 1559: 1961	30.0 % to 65.0 %
16.	**Ferro molybdenum**	C	STP CH 19, Issue No.1, Issue Date: 28-01-2015	0.01 % to 7 %
		Si	IS 1559: 1961	0.1 % to 20.0 %
		S	STP CH 19, Issue No.1, Issue Date: 28-01-2015	0.005 % to 0.2 %
		Mo	STP CH 20, Issue No.1, Issue Date: 28-01-2015	30.0 % to 75.0 %
III.	**METALLIC COATINGS**			
1.	**Phosphated articles**	Mass of Phosphate coating, g/m^2	IS 3618: 1966 (RA 2007) (Clause 6.3)	0.1 % to 15.0 %
2.	**Anodized articles**	Anodic coating thickness, microns	IS 5523: 1983 (RA 2010) (Clause 2.3)	1 % to 15 %
3.	**Galvanised articles**	Mass of Zinc coating, g/m^2	IS 6745: 1972 (RA 2010) (Clause 5)	60 % to 800 %

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