Laboratory	**Jyothi Spectro Analysis Pvt. Ltd., Plot No. A-30, APIE, Balanagar, Hyderabad, Telangana**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Discipline	**Chemical Testing**	**Issue Date**	**21.07.2015**
Certificate Number	**T-1253**	**Valid Until**	**20.07.2017**
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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.	**Low Alloy Steels**	C	ASTME415: 2008	0.030 % to 1.17 %
		Si		0.15 % to 2.27 %
		Mn		0.30 % to 1.75 %
		P		0.001 % to 0.050 %
		S		0.001 % to 0.050 %
		Cr		0.055 % to 2.00 %
		Mo		0.10 % to 0.75 %
		Ni		0.044 % to 3.50 %
		Al		0.010 % to 0.10 %
		As		0.005 % Max.
		B		0.001 % Max.
		Co		0.01 % to 0.259 %
		Cu		0.10 % to 0.30 %
		Nb		0.001 % to 0.29 %
		V		0.010 % Max.
		Sn		0.005 % to 0.40 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Low Alloy Steels	Ti	ASTME415: 2008	0.005 % to 0.020 %
		N		0.001 % to 0.026 %
2.	**Cast Iron**	C	ASTM E 1999: 99 Rev 2004	1.50 % to 3.50 %
		Si		1.05 % to 3.50 %
		S		0.01 % to 0.094 %
		P		0.05 % to 0.15 %
		Mn		0.010 % to 1.01 %
3.	**Manganese Steel**	C	ASTM E 2209: 2002	0.70 % to 2.00 %
		Mn		10.00 % to 14.50 %
		P		0.02 % to 0.060 %
		S		0.001 % to 0.010 %
		Cr		0.10 % to 0.75 %
		Mo		0.05 % to 0.25 %
		Al		0.003 % to 0.005 %
		Ni		0.50 % to 1.00 %
		Cu		0.10 % to 0.20 %
		Si		0.20 % to 0.50 %
		N		0.010 % to 0.018 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
4.	**High Speed Tools Steel**	C	JSAPL/SOP/02/O Issue Date: 02.08.2012	0.40 % to 1.50 %
		Si		0.10 % to 0.50 %
		S		0.015 % to 0.050 %
		P		0.015 % to 0.050 %
		Mn		0.10 % to 0.35 %
		Cr		2.50 % to 5.00 %
		Mo		0.10 % to 10.50 %
		Co		0.10 % to 0.50 % & 8.00 % to 10.00 %
		V		0.20 % to 2.50 %
		W		1.00 % to 2.50 % & 10.00 % to 15.00 %
		Al		0.002 % to 0.010 %
5.	**Stainless Steel**	C	ASTM E 1086 Rev 2008	0.010 % to 0.279 %
		Si		0.21 % to 0.80 %
		Mn		0.50 % to 2.00 %
		P		0.005 % to 0.050 %
		S		0.005 % to 0.050 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Stainless Steel	Cr	ASTM E 1086 Rev 2008	11.00 % to 30.00 %
		Ni		0.24 % to 25.00 %
		Cu		0.01 % to 1.95 %
		Mo		1.50 % to 3.50 %
		V		0.010 % to 0.045 %
		Co		0.010 % to 0.22 %
		N		0.045 % to 0.055 %
6.	**Titanium and its Alloys**	Mo	JSAPL/SOP/02/K Issue Date:0208.2012	0.90 % to 1.50 %
		Fe		0.010 % to 0.15 %
		V		0.50 % to 1.50 %
		Al		7.00 % to 8.50 %
7.	**Tin and its Alloys**	Sb	JSAPL/SOP/02/M Issue Date:02.08.2012	0.10 % to 6.25 %
		As		0.050 % to 0.100 %
		Bi		0.10 % to 0.40 %
		Cd		0.010 % to 0.050 %
		Cu		0.10 % to 0.20 %
		Fe		0.010 % to 0.050 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Tin and its Alloys	Pb	JSAPL/SOP/02/M Issue Date:02.08.2012	0.10 % to 0.35 %
		Zn		0.010 % to 0.15 %
		In		0.0005 % to 0.010 %
		S		0.0002 % to 0.010 %
		Ni		0.0001 % to 0.005 %
8.	**Cast Steels**	C	JSAPL/SOP/02/O Issue Date:02.08.2012	2.0 % to 3.5 %
		Mn		0.40 % to 1.2 %
		Si		1.0 % to 2.50 %
		S		0.020 % to 0.1 %
		P		0.01 % to 0.1 %
		Co		0.10 % to 1.00 %
		Ni		0.20 % to 6 %
		Mo		0.10 % to 0.6 %
		Al		0.010 % to 0.030 %
		Pb		0.001 % to 0.020 %
		V		0.010 % to 0.20 %
		W		0.1 % to 0.3 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Cast Steels	Nb	JSAPL/SOP/02/O Issue Date:02.08.2012	0.010 % to 0.050 %
		Cr		8.0 % to 27 %
9.	**Aluminium Alloy**	Cu	ASTM E 1251: 2011	0.20 % to 4.50 %
		Mg		0.10 % to 2.50 %
		Si		0.50 % to 2.00 % & 12.00 % to 16.00 %
		Mn		0.010 % to 1.00 %
		Ni		0.05 % to 3.00 %
		Zn		0.10 % to 0.50 %
		Pb		0.001 % to 0.10 %
		Sn		0.070 % to 0.25 %
		Zr		0.10 % to 0.30 %
		Cr		0.010 % to 0.50 %
		Co		0.050 % to 0.25 %
		V		0.001 % to 0.010 %
		P		0.001 % to 0.01 %
		Bi		0.010 % to 0.35 %
		Fe		0.20 % to 1.00 %
		Ti		0.01 % to 0.25 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
10.	**Cu Base Alloy**	Cu	JSAPL/SOP/02/I Issue Date:02.08.2012	52.00 % to 90.00 %
		Sn		0.001 % to 0.14 % & 5.22 % to 13.00 %
		Pb		0.001 % to 5.25 %
		Zn		0.001 % to 4.25 % & 30.00 % to 45.00 %
		Ni		0.001 % to 11.00 %
		Fe		0.001 % to 4.50 %
		Si		0.005 % to 1.00 %
		Mn		0.001 % to 1.20 %
		As		0.001 % to 0.10 %
		P		0.01 % to 0.75 %
		Bi		0.0005 % to 0.040 %
		Al		0.0005 % to 0.15 % & 7.00 % to 10 .00 %
		Sb		0.0005 % to 0.60 %
		Ag		0.005 % to 0.02 %
		Co		0.0001 % to 0.10 %
		S		0.001 % to 0.10 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
11.	**Lead and its Alloys**	Sn	JSAPL/SOP/02/N Issue Date:02.08.2012	0.001 % to 0.35 % & 45 % to 55 %
		Sb		0.0001 % to 0.60 %
		Bi		0.02 % to 0.50 %
		Cu		0.0005 % to 1.0 %
		As		0.0003 % to 0.050 %
		Ag		0.001 % to 5.00 %
		Zn		0.0001 % to 0.050 %
		Fe		0.0002 % to 0.050 %
		Cd		0.0001 % to 0.010 %
		Al		0.0001 % to 0.010 %
		In		0.0001 % to 0.080 %
		Ni		0.0001 % to 0.010 %
		Tl		0.0001 % to 0.010 %
12.	**Nickel and its Alloys**	C	JSAPL/SOP/02/J Issue Date:02.08.2012	0.015 % to 0.20 %
		S		0.0005 % to 0.01 %
		Si		0.010 % to 0.25 %
		Mn		0.025 % to 1.50 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Nickel and its Alloys	Cr	JSAPL/SOP/02/J Issue Date:02.08.2012	16.0 % to 20.0 %
		Mo		2.75 % to 3.25 %
		Ni		50 % to 75 %
		Co		0.001 % to 0.10 %
		Cu		0.01 % to 32.0 %
		Nb		4.75 % to 5.50 %
		Ti		0.90 % to 1.10 %
		Al		0.020 % to 0.75 %
		Fe		1.00 % to 2.00 % 16 % to 20 %
13.	**Zinc and its Alloys**	Al	JSAPL/SOP/02/L Issue Date:02.08.2012	3.0 % to 4.5 %
		Pb		0.001 % to 0.1 %
		Mg		0.010 % to 0.10 %
		Fe		0.001 % to 0.10 %
		Cu		0.010 % to 2.0 %
		Mn		0.001 % to 0.10 %
		Sb		0.002 % to 0.005 %
		Cd		0.001 % to 0.020 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Zinc and its Alloys	Sn	JSAPL/SOP/02/L Issue Date:02.08.2012	0.001 % to 0.020 %
		In		0.001 % to 0.005 %
		Ni		0.005 % to 0.010 %
		Ti		0.003 % to 0.005 %
14.	**Magnesium and its Alloys**	Al	ASTM B 954: 2007	5.00 % to 10.00 %
		Zn		0.50 % to 1.50 %
		Mn		0.5 % to 1.00 %
		Cu		0.010 % to 0.25 %
		Si		0.080 % to 0.25 %
		Fe		0.001 % to 0.050 %
		Ni		0.001 % to 0.050 %
		Sn		0.001 % to 1.00 %
		Pb		0.001 % to 0.035 %
		Be		0.0020 % to 0.010 %
		Ag		0.001 % to 0.050 %
		Cd		0.001 % to 0.035 %
		Ce		0.009 % to 0.035 %

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Magnesium and its Alloys	La	ASTM B 954: 2007	0.005 % to 0.025 %
		Ca		0.010 % to 0.050 %
		Zr		0.001 % to 0.010 %
15.	**Nickel Alloys**	Al	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
		Cr		
		Mo		
		Si		
		B		
		Cu		
		Ti		
		Fe		
		P		
		W		
		Co		
		Mn		
		S		
		Ni		
		Nb		

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
16.	**Titanium Alloy**	Fe Pd Al V Cr Sn Ti Mo	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
17.	**Copper Alloy**	Cu Fe Pb As Sn Zn	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
18.	**Aluminum Alloy**	Cu Fe Mg	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Aluminum Alloy	Mn Si Zn Ni Pb Cr Ti V Al	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
19.	**Stainless Steel, Low Alloy Steels, Carbon Alloy Steel, Tool Steel**	Mn Si Ni Cr Mo Al Nb Cu	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Stainless Steel, Low Alloy Steels, Carbon Alloy Steel, Tool Steel	Ti Zn V Al Fe	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
20.	**Magnesium and its Alloys**	Si Mn Al Cu Zn Ni Mg Fe	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
21.	**Zinc and its Alloys**	Mn Mg Si Al	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Zinc and its Alloys	Zn Fe	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
22.	**Lead and its Alloys**	Pb Sb Cu Fe Ni Zn	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
23.	**Tin and its Alloys**	Sb Cu Fe Sn Zn Fe	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
24.	**Cobalt and its Alloys**	Cr Co Fe Ni	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
25.	**Tungsten and its Alloys**	Co W Fe Ni Al	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
26.	**Vanadium and its Alloys**	Fe Ni V Al Cr Ti Mn	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
27.	**Platinum and its Alloys**	Pt Fe Ag Pb As Au	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
28.	**Silver and its Alloys**	Fe	Innov to X Delta Standard Analyzer & ASTM E 1476- 94: 2010 ASTM E 1916 -11	Qualitative
29.	**Fe/Ni/Ti/ferro Alloys/Cu Base**	C	LECO Equipment Manual & ASTM E1019: 2003	0.010 % to 5.00 %
		S		0.001 % to 0.5 %
II.	**METALLIC COATINGS AND TREATMENT SOLUTIONS**			
1.	**Coatings on Metals and Alloys**	Uniformity of zinc coating	IS 2633: 86 (RA 2007)	Upto 6 Dips
		Mass of zinc coating	IS 6745: 1972 (RA 2007) ASTM A 90: 2001 AS 2331	1 g/m^2 to 3000 g/m^2 (10 Microns to 1250 Microns)
		Adhesion Test	IS 2629: 1985 ASTM B 571: 2003 ASTM D 3359-08	Qualitative
		Anodic Coatings & Other Non conductive Coatings on Non Magnetic Base	By Digital Coating Thickness Meter. ASTM B244: 1997 IS 6012: 1982	0 to 1250 Micron
		Non Magnetic Coatings on Magnetic Base	ASTM B499: 2002	0 to 1250 µm
		Electro Deposited Nickle Coating on Magnetic & Non Magnetic Base	ASTM B 530: 2002	0 to 1250 µm

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Coatings on Metals and Alloys	Electroplated Coatings	IS 3203: 1982	0 to 1250 µm 1g/m^2 to 500g/m^2
		Dry Film Thickness on Magnetic & Non Magnetic Base	ASTM D 7091 IS 101 (Part 3/Sec II)	1 µm to 1500 µm
		Anodic Coating Of Aluminium & its alloys	IS 5523: 2006 IS 6012: 1982	1 µm to 100 µm 1 µm to 1500 µm
		Electroplated Coating of Cadmium	IS 1572: 1986	1µm to 100 µm
		Phosphate Coatings	IS 3618: 1966	0.05 g/m^2 to 100 g/m^2
		Silver Coating	IS 1771: 1986 (RA 2006) ASTM B 700: 2002 IS 3203: 1982 (Eddy Current Method) ASTM B 487	0 to 500 microns
		Coating Thickness by stripping method	ASTM B 767:2001, ASTM B 137: 2000, IS 3203: 1982 IS 1572: 1986 IS 5523: 2006	0 to 500 microns

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