Laboratory	**Geological and Metallurgical Laboratories (A Division of IRCLASS Systems and Solutions Pvt. Ltd.), 105x, 3rd Main, 3rd Cross, II Stage, Yeshwanthpur Industrial Suburb, Goraguntepalya, Bangalore, Karnataka**
Accreditation Standard	**ISO/IEC 17025: 2005**
Certificate Number	**TC-6835** ***(in lieu of T-3774 & T-3775)*** **Page 1 of 17**
Validity	**29.01.2018 to 28.01.2020** **Last Amended on 26.11.2018**

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**			
A.	**Chemical Analysis by Arc Emission Spectrometry**			
1.	**Carbon and Low Alloy Steels**	C	Arc emission spectrometry, IS 8811:1998 (RA 2012) ASTM E415-17	0.01 % to 2.0 %
		Si		0.02 % to 2.0 %
		Mn		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		0.02 % to 0.19 %
		Ti		0.005 % to 0.1 %
		Nb		0.005 % to 0.10 %
2.	**Stainless Steel**	C	Arc emission spectrometry , IS 9879:1998 (RA 2015) ASTM E 1086-14	0.01 % to 1.0 %
		Si		0.02 % to 1.5 %
		Mn		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 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
3.	**Tool Steel**	C	Arc emission spectrometry JIS G 1253-2002 (RA2013)	0.01 % to 2.5 %
		Si		0.02 % to 1.0 %
		Mn		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 2014) IS 11035:1984 (RA 2014) ASTM E 1251-17a	0.01 % to 15.0 %
		Cu		0.01 % to 11.0 %
		Fe		0.01**%** to1.50 **%**
		Mn		0.01 **%** to 0.80 **%**
		Mg		0.01 % to 12.0 %
		Zn		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 %
5.	**Copper Base Alloys**	Sn	Arc emission spectrometry, BS EN15079:2015	0.002 % to12.0 %
		Pb		0.002 % to 10.0 %
		Zn		0.001 % to 8.0 %
		Fe		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 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		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.	**Pure Copper**	Sn	Arc emission spectrometry, BS EN15079:2015	0.0003 % to 1.0 %
		Pb		0.0005 % to 2.0 %
		Zn		0.0005 % to 1.0 %
		Fe		0.0003 % to 1.0 %
		P		0.0001 % to 0.5 %
		Ni		0.0002 % to 0.1 %
		Al		0.0001 % to 3.0 %
		Co		0.0003 % to 0.5 %
		Sb		0.0005 % to 0.5 %
		Mn		0.0002 % to 0.5 %
		Be		0.01 % to 2.00 %
		Si		0.0002 % to 1.0 %
		As		0.0005 % to 0.2 %
		Bi		0.0005 % to 0.3 %
		Ag		0.0002 % to 0.5 %
		S		0.0001 % to 0.5 %
		Cr		0.0003 % to 1.0 %
7.	**Lead Alloys Antimonial Lead and Battery Grade Lead**	Sn	Arc emission spectrometry, DD ENV 12908:1998	0.005 % to 0.5 %
		Sb		0.01 % to 7.0 %
		Zn		0.001 % to 0.03 %
		Ni		0.001 % to 0.03 %
		Cd		0.001 % to 0.03 %
		Bi		0.001 % to 0.03 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		As		0.001 % to 0.03 %
8.	**Solders**	Sn	Arc emission spectrometry, STP CH 04, Issue No.1, Issue Date: 28-01-2015	25.0 % to 65.0 %
		Pb	IS 403 : 1964 (RA 2016)	30.0 % to 50.0 %
		Bi	Arc emission spectrometry, STP CH 04, 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	Arc emission spectrometry, STP CH 04, Issue No.1, Issue Date: 28-01-2015	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 %
B.	**Chemical Analysis by Instrumental & Wet Conventional Methods**			
1.	**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 2014), ASTM E 353 -14 IS 12308 (Part 6)–1991 (RA 2012)	0.05 % to 6.0 %
		Mn	IS 228 (Part 2) – 1987, (RA 2012) , IS 12308 (Part 10) 1991 (RA 2012), IS 228 (Part 12) 2001 (RA 2014)	0.05 % to 5.0 %
		P	IS 228 (Part 3) –1987 (RA 2012) IS 12308 (Part 5)– 1991 (RA 2012)	0.01 % to 0.5 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Cr	ASTM E350-12 ASTM E 351-13 ASTM E352-13 ASTM E353-14	0.05 % to 35.0 %
		Ni	IS 228 (Part 5) – 1987 (RA 2014) , ASTM E 351-13	0.1 % to 48 %
		Mo	IS 228 (Part 7)-1990 (RA 2012) , IS 228 (Part 10)-1989 (RA 2014) , IS 12308 (Part 9)-1993 (RA 2014) ; ASTM E352-13	0.05 % to 10.0 %
		V	STP CH 05, Issue No.1, Issue Date: 28-01-2015	0.05 % to 5.0 %
		W	IS 228-(Part 16) 1992 (RA2014)	0.1% to2.0%
		Cu	ASTM E 351-13, ASTM E352-13, ASTM E353-14	0.05 % to 5.0 %
		Co	ASTM E350-12; ASTM E351-13 ASTM E352-13; ASTM E353-14	0.05 % to 5.0%
		Pb	STP CH 08, Issue No.1, Issue Date: 28-01-2015	0.15 % to 0.35 %
		Ti	ASTM E350-12, ASTM E351-13, ASTM E353-14	0.01% to 0.35%
2.	**Pure Copper**	Cu	IS 440-1964 (RA 2006) ASTM E 53–200 (RA 2013)	99.75 % to 99.99 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
3.	**Copper alloys**	Cu	IS 4027-(Part 1)-1987 (RA 2012), IS 3685-1966 (RA 2012), IS 3187 – 1965(RA 2012)	50.0 % to 99.95 %
		Sn	IS 3685:1966 (RA2012) IS 4027- (Part 5)-1987 (RA 2012)	0.05 % to 20.0 %
		Pb	IS 4027-(Part 1)-1987 (RA 2012), IS 3685-1966 [RA 2012],	0.05 % to 20.0 %
		Zn	IS 4027-(Part 6)-1987 (RA 2012) IS 3685-1966 [RA 2012] IS 3187 – 1965 (RA 2012)	0.05 % to 50.0 %
		P	IS 4027-(Part 3)1987 (RA 2012), IS 3685 1966 (RA 2012)	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 2012), IS 4027-(Part 8)-1991 (RA 2012) IS 3187 – 1965 RA 2012	0.05 % to 5.0 %
		Ni	IS 4027-(Part 4) 1987 (RA2012), IS 3685-1966 (RA2012) IS 3187–1965 (RA 2006)	0.05 % to 50.0 %
		Mn	IS 4027-(Part 2)-1987 (RA2012) IS 3685 - 1966 (RA 2012) IS 3187 – 1965 (RA 2006)	0.05 % to 5.0 %
		Si	IS 3685 – 1966 (RA 2012), IS 4027–(Part 10)-2000	0.05 % to 5.0 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			(RA 2012)	
		Sb	IS 4027:1967(RA 2000)	0.05 % to 5.0 %
4.	**Nickel Alloys**	C	ASTM E1019-11	0.01 % to 1.0 %
		Si	ASTM E 354 -14	0.05 % to 5.0 %
		Mn	IS 1952 – 1963 (RA 2017) ASTM E354-14	0.05 % to 2.0 %
		S	ASTM E1019-11	0.005 % to 0.1 %
		P	ASTM E 353 –14, ASTM E 354 -14	0.01 % to 0.2 %
		Cr	ASTM E 354 –14	0.05 % to 33.0 %
		Mo	ASTM E 354-14 STP CH 13, Issue No.1, Issue Date: 28-01-2015	0.01 % to 1.5% 0.05 % to 10.0 %
		Co	ASTM E354-14, ASTM E75 - 76	0.1 % to 10.0 %
		Fe	IS 1952–1963 (RA 2017) ASTM E 75-76	0.05 % to 50.0 %
		Cu	ASTM E 354-14	0.05 % to 50.0 %
5.	**Aluminium Alloys**	Si	IS 504 (Part 1)-2002 (RA2012) ASTM E34 - 11	0.1 % to 30.0 %
		Fe	IS 504 (Part 2)-2002 (RA2012), ASTM E34 – 11	0.01 % to 2.0 %
		Cu	ASTM E34 – 11, IS 504 (Part 3)-2002(RA2012)	0.05 % to 10.0 %
		Zn	IS 504 (Part 4)-2002	0.05 % to 10.0 %
		Mn	IS 504: (Part 5) 2002 (RA2012), ASTM E34 - 11	0.05 % to 1.5 %
		Mg	IS 504: (Part 6) -02 (RA 2012) ASTM E 34-11	0.05 % to 12.0 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Ni	IS 504 (Part 7): 2002 (RA 2012) ASTM E 34-11	0.05 % to 4.0 %
		Pb	ASTM E 34-11, IS 504-(Part 1)- 2002 (RA 2012)	0.1 % to 1.0 %
		Cr	IS 504: (Part 8)-2002 (RA 2012)	0.05 % to 5.0 %
		Sn	IS 504: (Part 9) -2002 (RA 2012)	0.05 % to1.0 %
		Ti	IS 504:(Part 11) -2002 (RA 2012)	0.01% to1.0 %
6.	**Ferro Silicon**	C	ASTM E1019-11	0.01 % to 4.5 %
		Si	IS 1559-1961(RA 2012)	15.0 % to 85.0 %
		S	ASTM E1019-11	0.005 % to 0.10 %
		P	IS 1559-1961(RA 2012)	0.05 % to 0.15 %
		Al	IS 1559-1961(RA 2012)	0.1% to1.0 %
7.	**Ferro Manganese**	C	ASTM E1019-11.	0.01 % to 4.5 %
		Si	IS 1559-1961(RA 2012)	0.1% to20 %
		S	ASTM E1019-11.	0.005 % to 0.10 %
		P	IS 1559-1961(RA 2012)	0.01 % to 0.20 %
		Mn	IS 1559-1961(RA 2012)	30.0 % to 75.0 %
8.	**Ferro Chrome**	C	ASTM E1019-11.	0.01 % to 4.5 %
		Si	IS 1559 – 1961(RA 2012)	0.10 % to 20 %
		S	ASTM E1019-11.	0.005 % to 0.10 %
		P	IS 1559 – 1961(RA 2012)	0.01 % to 0.20 %
		Cr	IS 1559 – 1961(RA 2012)	30.0 % to 75.0 %
9.	**Silico Manganese**	C	ASTM E1019-11.	0.01 % to 4.5 %
		Si	IS 1559-1961(RA 2012)	10.0 % to 50.0 %
		S	ASTM E1019-11.	0.005 % to 0.10 %
		Mn	IS 1559-1961(RA 2012)	30.0 % to 65.0 %

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
10.	**Ferro Molybdenum**	C	ASTM E1019-11.	0.01 % to 4.5 %
		Si	IS 1559-1961(RA 2012)	0.1 % to 20.0 %
		S	ASTM E1019-11.	0.005 % to 0.2 %
		Mo	IS 12614 (Part 1): 1988 (RA 2014)	30.0 % to 75.0 %
II.	**METALLIC COATING**			
1.	**Galvanised Articles**	Mass of Zinc coating	IS 6745:1972 (RA 2016) Cl. 5	5 g/m^2 to 800 g/m^2
2.	**Phosphated Articles**	Mass of Phosphate coating	IS 3618:1966 (RA 2007) Cl. 6.3	0.1 g/m^2 to15.0 g/m^2
3.	**Anodized Articles**	Anodic coating thickness, microns	IS 5523:1983 (RA 2015) Cl. 2.3	1 µm to 15 µm

Laboratory	**Geological and Metallurgical Laboratories (A Division of IRCLASS Systems and Solutions Pvt. Ltd.), 105x, 3rd Main, 3rd Cross, II Stage, Yeshwanthpur Industrial Suburb, Goraguntepalya, Bangalore, Karnataka**		
Accreditation Standard	**ISO/IEC 17025: 2005**		
Certificate Number	**TC-6835** ***(in lieu of T-3774 & T-3775)***	**Page 10 of 17**	
Validity	**29.01.2018 to 28.01.2020**	**Last Amended on 26.11.2018**	

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		MECHANICAL TESTING		
I.	**MECHANICAL PROPERTIES OF METALS**			
1.	**Ferrous and Non-Ferrous Alloys (Wrought and Cast Products)**	Tensile test Tensile Strength Yield Stress 0.2% Proof Stress 0.2% Offset Yield Strength, % Elongation % Reduction in area	IS 1608-2005 (RA 2011), ASTM E8/E8M-16a, ASTM A370-17 Sec. 6-14 ISO 6892-1 :2016	0.10 to 40 kN/ 0.0025 kN 4 to196 kN/ 0.02 kN Upto 20 to 980 kN/ 0.05 kN % Elongation – 0.5 to 85.0% % Reduction in area – 2.0 to 85.0%
2.	**Reinforcement Steel (Upto 36 mm)**	Tensile test Tensile Strength 0.2% Proof Stress % Elongation Mass/unit length,kg/m	IS 1608-2005 (RA 2011), IS 1786 – 2008 (RA2013)	4 to196 kN/ 0.02 kN Upto 20 to 980 kN/ 0.05 kN % Elongation -0.5 to 30.0% 0.10 to 10 kg/m
3.	**Ferrous and Non-Ferrous Alloys and Hard Metals, Welded Joints**	Vickers Hardness test	ASTM E384 -17 ASTM E92-17 IS 1501-(Part1)- 2013, IS 12783-1989. (RA 2009) BS EN ISO 9015-1-2011	700 to 1100 (HV0.05, HV0.1) 30 to 1000 (HV0.2, HV0.3, HV0.5, HV1) 30 to 1000 (HV5, HV10, HV30)
4.	**Ferrous and Non-Ferrous Alloys**	Brinell Hardness test	IS 1500-(Part 1)-2013 ASTM A370-17 Sec.17 ASTM E10-17	100 to 500 HBW 2.5mm/187.5 kg 50 to 200 HBW 2.5mm/62.5kg 20 to 100 HBW 2.5 mm/31.25 kg

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Rockwell hardness (HRB/HRC)	IS 1586-(Part 1)-2012 ASTM A370-17 Sec.18 ASTM E18-17e1	30 to 100 HRB 20 to 65 HRC
5.	**Ferrous and non-ferrous alloys (for wrought & cast products) (on flats Upto 50 mm thick, rounds Upto 50 mm dia)**	Bend Test	IS 1599-2012 IS 1786-2008 (RA2013) ASTM A370-17 Sec.15	Mandrel diameter: 4to210mm
6.	**Reinforcement Steel (Upto 36mm)**	Rebend test	IS 1786-2008 (RA2013)	Mandrel diameter: 36 to 216 mm
7.	**Steel Tubes**	Flattening test	IS 2328-2005 (RA2011) ASTM A530/530M-12, Clause 21	OD 50 to 300 mm
		Crushing test	IS 3074-2013	OD 6 to 100mm
		Drift expansion test	IS 2335-2005 (RA2011)	OD 10 to 80mm
8.	**Impact Test**	Charpy RT to -196^{0}C	(Charpy U) IS 1499-1977 (RA 2015), (Charpy V) IS 1757-1988 (RA 2009), ASTM E 23 –16b, ASTM A370 -17, Sec.20-29	Charpy Impact value: 2 to 300 J / LC to 2J
		Lateral Expansion	ASTM E 23 –16b ASTM A 370-17	0.01to 5 mm
		Percent Shear Fracture	ASTM E 23 –16b ASTM A 370-17	10 to100 %
		Izod impact test	IS 1598-1977 (RA 2015)	Izod impact value : 2 to 160 J/ LC: 2J
9.	**Welded Products**	Tensile test	ASME BPVC.IX –2017, IS 3600 (Part 3)–2009, IS 3600 (Part 4)–1984 (RA 2010),	For tensile test : 0.10 to 40.0 kN/ 0.0025 kN 4 to196 kN/ 0.02 kN

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			ISO 15614-1-2017(E), AWS D1.1/D1.1M-2010 (1)	Upto 20 to 980 kN/ 0.05 kN
		Impact test	ASTM A370-17,Sec20-29, IS 3600 (Part 2)–1985 (RA 2008), IS 1757-(Part 1): 2014, AWS D1.1/D1.1M-2010 (1)	Charpy Impact value : 2 to 300 J / LC to 2J
		Bend tests	ASME BPVC. IX –2017, ISO 15614-1-2017(E), IS 3600 (Part.5)-1983 (RA2010), IS 3600 (Part.6) -1983 (RA 2008), IS 3600 (Part.7)–1985 (RA 2008), AWS D1.1/D1.1M-2010 (1) BS EN ISO 9606-2013	Mandrel diameter: 6 to 210 mm
		Fillet break test	ASME BPVC. IX –2017- QW-182, IS 3600 (Part 8)–1985 (RA 2008) BS EN ISO 9606-2013	4 to196 kN/ 0.02 kN Upto 20 to980 kN/ 0.05 kN
10.	**Helical Compression Springs**	Static load test in compression	IS 7906 (Part 2) – 1975 (RA 2009) Cl.7.1	0.10 to 40.0 kN/ 0.0025 kN 4 to100 kN/ 0.02 kN
11.	**Steel Tubes and Plates**	Dimensional Inspection	IS 1239- (Part 1)–2004 (RA 2010)	Thickness – 1.5 to 6 mm OD – 8 to170 mm, Mass per unit length : 0.3 to 25 kg/m
12.	**Welded Wire Mesh**	Dimensional Inspection	IS1566-1982 (RA2009)	Wire dia 2 to10mm Mesh size : 45 to 300mm Mass/m^2 – 0.2 to10 kg/m^2

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
13.	**Nuts , M4 to M39**	Proof load test in Compression	ISO 898-2: 2012 (E) Clause 9	2 kN to 900 kN
II.	**METALLOGRAPHY TEST**			
1.	**Ferrous Forgings, Rolled Products And Castings, Copper and Aluminium Alloys And Welded Joints**	Macrostructural analysis by visual and low magnification examination Photo-macrography	ASTM E340-15 ASTM E 381-17 IS 7739 – 1975, IS 13015- 1991 (RA 2012), IS 11371 – 1985 (RA 2007), IS 12573 – 2010 (RA2016), IS 3600 (Part 9) –1985 (RA 2008) , ASME BPVC.IX-2017, ISO 15614-1-2017(E) DIN EN1321:1996(E) BS EN ISO 9606-2013	3.75x, 5x, 10x, 15x, 20x, 25x, 30x, 35x, 40x, 45x, and 50x Magnification
2.	**Ferrous, Non Ferrous**	Microstructural analysis Photo micrographs	IS 7739- 1975/76 & IS 7754 – 1975(RA 2012), IS 11959 – 1987 (RA 2009), IS 3600 (Part 9)–1985 (RA 2008), ASTM E3-11(RA2017) ASM Handbook Vol.9-2004 ASTM E407-07(2015)e1	25x, 50x, 100x, 200x 500x and 1000x magnification
3.	**Ferrous and Non-Ferrous Alloys**	Grain size / austenitic grain size by comparative method	IS 4748-2009 (Cl. 7.1.2) ASTM E112-13, Cl.10	100x
4.	**Case Hardened Steels**	Case depth by hardness and microscopic methods	IS 6416-1988 Cl. 5 & Cl. 8 (RA 2012)	100x, 0.1mm to 4mm/0.1mm , (microscopic) 0.05 mm to 4mm/0.05 (hardness method)

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
5.	**Steel Products**	Inclusion rating, Method 'A'	IS 4163-2004(RA2010) ASTM E45-13	100x
		Depth of decarburized layer by Microscopic Method & Hardness Method	IS 6396-2000 (Cl. 6 and 7) (RA 2012)	100x,0.01mm to 4mm / 0.01mm (microscopic) 0.05 mm to 4 mm/ 0.05 mm (hardness method)
6.	**Metallic/Non-Metallic Coatings On Iron Base, Copper Base, Aluminium Base**	Coating thickness by microscopic method	IS 3203-1982 (Cl. 3) (RA 2014), IS 101(Part 3/ Sec.2)- 1989 (RA 2009) IS 5523-1983 Cl.2.2 (RA2016)	1000microns / 1 micron
7.	**Austenitic Stainless Steels**	Inter granular corrosion test	Practice A of ASTM A 262-15	250x & 500x
			Practice B & C of ASTM A 262-15	0.001 mm to 0.4 mm/ month
			Practice E of ASTM A 262-15	1t & 4t/ 180º Bend
8.	**Thin Surface Hardened Steels**	Total case depth / compound (white) layer thickness	IS 13691:1993 Cl. 2.1 (RA 2007)	0.002 to 0.3 mm / 1 micron
III.	**BUILDING MATERIALS**			
1.	**Cement**	Consistency	IS 4031 Part 4 – 1988 (RA 2014) A 2	20% to 50%
		Initial setting time	IS 4031 Part 5 1988 (RA 2014) A2	5 min to 400 min
		Final setting time	IS 4031 Part 5 1988 (RA 2014) A2	35 min to 800 min
		Compressive strength	IS 4031 Part 6 1988 (RA 2014) A4	1N/mm^2 to 100 N/mm^2

Laboratory	**Geological and Metallurgical Laboratories (A Division of IRCLASS Systems and Solutions Pvt. Ltd.), 105x, 3rd Main, 3rd Cross, II Stage, Yeshwanthpur Industrial Suburb, Goraguntepalya, Bangalore, Karnataka**	
Accreditation Standard	**ISO/IEC 17025: 2005**	
Certificate Number	**TC-6835** ***(in lieu of T-3774 & T-3775)***	**Page 15 of 17**
Validity	**29.01.2018 to 28.01.2020**	**Last Amended on 26.11.2018**

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Soundness (Le-Chateliers method)	IS 4031 Part 3 1988 (RA 2014) A2	0.5 mm to 10 mm
		Fineness by dry sieving	IS 4031 (Part 1) 1996 (RA 2016)	0.1% to 100 %
		Density	IS 4031 (Part 11) 1988 (RA RA 2014)	2.7 gm/cc to 3.5gm/cc
2.	**Aggregate Coarse**	Sieve Analysis	IS 2386-1963 (Part 1) (RA 2016) A 4	4.75 mm to 40 mm
		Specific gravity	IS2386-1963 (Part 3) (RA 2016)	2 to 4
		Bulk Density (Loose & Rodded)	IS 2386-1963 (Part 3) (RA 2016)	500kg/m^3 to 3000 kg/m^3
		Flakiness Index	IS 2386-1963 (Part 1) (RA 2016) A 4	1% to 70 %
		Elongation Index	IS 2386-1963 (Part 1) (RA 2016) A 4	1% to 70 %
		Water Absorption	IS 2386-1963 (Part 3) (RA 2016)	0.01 % to 5%
3.	**Aggregate Coarse (Contd)**	Agg. Impact value	IS 2386-1963 (Part 4) A-3(RA 2016)	1% to 50%
		Abrasion Resistance (Los Angele's abrasion value)	IS 2386-1963 (Part 4) A-3(RA 2016)	1% to 50%
		Agg. Crushing value	IS 2386-1963 (Part 4) A-3(RA 2016)	1% to 50%
		Determination of 10% fines value	IS 2386-1963 (Part 4) A-3(RA 2016)	50 kN to 200 kN
4.	**Aggregate Fine**	Sieve analysis	IS 2386-1963 (Part 1) (RA 2016) A 4	150 micron to 4.75 mm
		Specific gravity	IS 2386-1963 (Part 3) (RA 2016)	2 to 4
		Bulk density (Loose & Rodded)	IS 2386-1963 (Part 3) (RA 2016)	500 kg/m^3 to 3000 kg/m^3

Laboratory	**Geological and Metallurgical Laboratories (A Division of IRCLASS Systems and Solutions Pvt. Ltd.), 105x, 3rd Main, 3rd Cross, II Stage, Yeshwanthpur Industrial Suburb, Goraguntepalya, Bangalore, Karnataka**
Accreditation Standard	**ISO/IEC 17025: 2005**
Certificate Number	**TC-6835** ***(in lieu of T-3774 & T-3775)*** **Page 16 of 17**
Validity	**29.01.2018 to 28.01.2020** **Last Amended on 26.11.2018**

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Bulking	IS 2386-1963 (Part 3) (RA 2016)	1% to 50%
		Particle finer than 75 microns	IS 2386 (Part 2): 1963 (RA 2016) A 1	0.1% to 10%
		Water Absorption	IS 2386-1963 (Part 3) (RA 2016)	0.1 % to 5 %
		Moisture Content	IS 2386 (Part 3): 1963 (RA 2016)	0.1 % to 5%
5.	**Ceramic Tiles**	Water absorption	IS 15622-2006	0.5% to 20%
6.	**Building Bricks**	Water absorption	IS 3495 (Part 2) : 1992 (RA 2016)	1% to 20%
		Compressive strength	IS 3495 (Part 1) : 1992 (RA 2016)	1 N/mm^2 to 50 N/mm^2
		Efflorescence	IS 3495 (Part 3) : 1992 (RA 2016)	Qualitative
7.	**Cement Grout**	Compressive Strength	ASTM C1107-17	1 N/mm^2 to 100 N/mm^2
8.	**Concrete Cubes, Core, Beams and Cylinders**	Compressive strength	1S:516-1959 (RA 2013) A 2	15 N/mm^2 to 60 N/mm^2
9.	**Concrete Blocks Hollow/Solid**	Water absorption	IS 2185 (Part 1) -2005 (RA 2015)	1% to 10%
		Compressive Strength	IS 2185 (Part 1): 2005 (RA 2015)	1 N/mm^2 to 60 N/mm^2
		Block Density	IS 2185 (Part 1): 2005 (RA 2015)	1000 kg/m^3 to 2500 kg/m^3
10.	**Natural Building Stone**	Compressive strength	IS 1121 (Part 1) – 2013 (RA 2017)	10N/mm^2 to 200N/mm^2
		Water absorption	IS 1124 – 1974 (RA 2017)	0.2% to 20%
		Apparent specific gravity	IS 1124 – 1974 (RA2017)	1 to 6
		Transverse strength	IS 1121 (Part 2): 2013 (RA 2017)	1 N/mm^2 to100N/mm^2

Battal Singh
Convenor

N. Venkateswaran
Program Director

Laboratory	**Geological and Metallurgical Laboratories (A Division of IRCLASS Systems and Solutions Pvt. Ltd.), 105x, 3rd Main, 3rd Cross, II Stage, Yeshwanthpur Industrial Suburb, Goraguntepalya, Bangalore, Karnataka**	
Accreditation Standard	**ISO/IEC 17025: 2005**	
Certificate Number	**TC-6835** ***(in lieu of T-3774 & T-3775)***	**Page 17 of 17**
Validity	**29.01.2018 to 28.01.2020**	**Last Amended on 26.11.2018**

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
11.	**Paver Block**	Water Absorption	IS 15658: 2006 (RA 2017) A3	1% to 20%
		Compressive Strength	IS 15658: 2006 (RA 2017) A3	10N/mm^2 to 100N/mm^2
IV.	**METALLIC COATINGS AND OTHERS**			
1.	**Metals and its Alloys, Coated/ Plated materials, Anodized Products, Painted and Powder coated Articles, Galvanized items, Electrical & Electronic items & other organic or inorganic coating**	Neutral Salt Spray Test	ASTM B117-16 ISO 9227 – 2017 (E) IS 9844 – 1981 (RA 2016) IS 9000: (Part 11)-1983 (RA2016), Procedure 1	Qualitative
2.	**Copper / Nickel/Chromium Coatings on Ferrous base, Non Ferrous base and Plastics, Anodic coatings on aluminium**	Copper-Accelerated Acetic acid Salt Spray Test(CASS Test)	ASTM B368-09 (Re approved 2014) ISO 9227 – 2017 (E)	Qualitative

Battal Singh
Convenor

N. Venkateswaran
Program Director