Laboratory	MICROLAB, SP. 101, 2 Chennai, Tamil Nadu	2 nd Main Road, Ambattur Industrial Estate,			
Accreditation Standard	ISO/IEC 17025: 2005				
Discipline	Chemical Testing	Issu	e Date	21.12.2013	
Certificate Number	T-0774	Valio	d Until	20.12.2015	
Last Amended on	-	Page	e	1 of 10	
S.No. Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range Limits	e of Testing / s of Detection	

I. METALS & ALLOYS

1. FERROUS ALLOYS

a.	Low Alloy Steel	Aluminium Arsenic Boron Carbon Chromium Cobalt Copper Lead Manganese Molybdenum Nickel Niobium/Columbium Nickel Niobium/Columbium Nitrogen Phosphorus Silicon Sulphur Tin Titanium Tungsten Vanadium Zirconium	IS 8811-1998 / ASTM E415 - 2008 ML/VAL/Fe/2013-2014	0.001% to 0.100% 0.001% to 0.010% 0.001% to 0.010% 0.001% to 2.0% 0.001% to 5.00% 0.001% to 0.500% 0.001% to 0.500% 0.001% to 0.40% 0.001% to 2.00% 0.001% to 1.50% 0.001% to 5.00% 0.001% to 0.050% 0.001% to 0.100% 0.001% to 0.300% 0.001% to 0.300% 0.001% to 0.010% 0.001% to 1.10% 0.001% to 1.00% 0.001% to 0.050%

Laboratory	MICROLAB, SP. 101, 2 nd Main Road, Ambattur Industrial Estate, Chennai, Tamil Nadu				
Accreditation Standard	ISO/IEC 17025: 2005				
Discipline	Chemical Testing	Issue Date	21.12.2013		
Certificate Number	T-0774	Valid Until	20.12.2015		
Last Amended on	-	Page	2 of 10		

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
b.	Stainless Steel	Aluminium	ASTM E 1086-2008	0.001% to 0.150%
		Boron	IS 9879 - 1998 ML/VAL/Fe/013-014	0.001% to 0.010%
		Carbon		0.001% to 0.35%
		Chromium		0.001% to 23.00%
		Cobalt		0.001% to 0.40% 0.40% to 12.00%
		Copper		0.001% to 5.00%
		Manganese		0.001% to 2.00% 2.00% to 12.00%
		Molybdenum		0.001% to 3.00%
		Nickel		0.001% to 7.50%
		Niobium		0.001% to 0.70%
		Nitrogen		0.005% to 0.600%
		Phosphorus		0.001% to 0.080%
		Silicon		0.100% to 0.900% 0.900% to 4.00%
		Sulphur		0.001% to 0.35%
		Tantulam		0.001% to 0.06%
		Titanium		0.001% to 0.7%
		Tungsten		0.001% to 1.10% 1.00% to 20.00%
		Vanadium		0.001% to 2.50%
		Zirconium		0.001% to 0.050%

Laboratory	MICROLAB, SP. 101, 2 nd Main Road, Ambattur Industrial Estate, Chennai, Tamil Nadu				
Accreditation Standard	ISO/IEC 17025: 2005				
Discipline	Chemical Testing	Issue Date	21.12.2013		
Certificate Number	T-0774	Valid Until	20.12.2015		
Last Amended on	-	Page	3 of 10		

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
c.	Cast Iron/ SG Iron	Carbon	ASTM E 1999-99 (RA 2004)	1.90% to 3.80%
		Chromium		0.025% to 2.00%
		Copper		0.015% to 0.750%
		Magnesium		0.01% to 0.09%
		Manganese		0.030% to 1.80%
		Molybdenum		0.010% to 2.00%
		Nickel		0.020% to 2.00%
		Phosphorus		0.005% to 0.400%
		Silicon		0.150% to 2.50%
		Sulphur		0.010% to 0.080%
		Tin		0.004% to 0.140%
		Titanium		0.003% to 0.120%
		Vanadium		0.008% to 0.220%
2.	ALUMINIUM	Beryllium	ASTM E 1251 - 2007	0.001% to 0.100%
	ALLOYS	Bismuth		0.001% to 0.100%
		Chromium		0.010% to 0.20%
		Copper		0.020% to 5.50%
		Iron		0.100% to 1.50%
		Lead		0.005% to 0.600%
		Magnesium		0.010% to 5.00%
		Manganese		0.010% to 1.20%
		Nickel		0.010% to 2.00%
		Silicon		0.100% to 15.00%
		Tin		0.010% to 0.500%
		Titanium		0.010% to 0.300%
		Vanadium		0.001% to 0.025%
		Zinc		0.100% to 5.00%
		Zirconium		0.001% to 0.15%

Laboratory	MICROLAB, SP. 101, 2 nd Main Road, Ambattur Industrial Estate, Chennai, Tamil Nadu				
Accreditation Standard	ISO/IEC 17025: 2005				
Discipline	Chemical Testing	Issue Date	21.12.2013		
Certificate Number	T-0774	Valid Until	20.12.2015		
Last Amended on	-	Page	4 of 10		

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
3.	COPPER ALLOYS	Tin	ML/VAL/Cu/011-012	0.005% to 15.00%
		Lead		0.005% to 15.00%
		Zinc		0.005% to 5.00% 20.00% to 40.00%
		Iron		0.005% to 7.80%
		Nickel		0.005% to 10.00% 10.00% to 35.00%
		Manganese		0.005% to 3.00%
		Sulphur		0.001% to 0.050%
		Phosporus		0.001% to 0.200%
		Aluminium		0.005% to 15.00%
		Silicon		0.002% to 3.50%
		Antimony		0.002% to 0.500%
		Arsenic		0.005% to 0.100%
		Chromium		0.002% to 0.020%
		Cobalt		0.005% to 0.250%
		Bismuth		0.001% to 0.100%

Laboratory	MICROLAB, SP. 101, 2 nd Main Road, Ambattur Industrial Estate, Chennai, Tamil Nadu				
Accreditation Standard	ISO/IEC 17025: 2005				
Discipline	Chemical Testing	Issue Date	21.12.2013		
Certificate Number	T-0774	Valid Until	20.12.2015		
Last Amended on	-	Page	5 of 10		

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
4.	NICKEL ALLOYS	Carbon	ML/VAL/Ni/011-012	0.005% to 0.300%
		Silicon		0.010% to 2.00%
		Manganese		0.010% to 2.00%
		Sulphur		0.002% to 0.040%
		Phosporus		0.002% to 0.040%
		Iron		0.100% to 41.00%
		Molybdenum		0.020% to 25.00%
		Vanadium		0.002% to 0.600%
		Copper		0.001% to 4.00% 4.00% to 34.00%
		Niobium		0.002% to 1.00% 2.50% to 6.00%
		Cobalt		0.005% to 0.750% 0.750% to 10.00% 10.00% to 17.50%
		Tungsten		0.010% to 0.200% 1.50% to 5.00%
		Titanium		0.005% to 3.00%
		Aluminium		0.050% to 3.00%
		Chromium		0.005% to 2.00% 8.00% to 30.00%
		Tantalum		0.010% to 0.050%

Laboratory	MICROLAB, SP. 101, 2 nd Main Road, Ambattur Industrial Estate, Chennai, Tamil Nadu				
Accreditation Standard	ISO/IEC 17025: 2005				
Discipline	Chemical Testing	Issue Date	21.12.2013		
Certificate Number	T-0774	Valid Until	20.12.2015		
Last Amended on	-	Page	6 of 10		

Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
TITANIUM	Aluminium	ML/VAL/Ti/011-012	0.006% to 9.00%
ALLOYS	Iron		0.025% to 0.250%
	Molybdenum		0.005% to 2.00%
	Vanadium		0.005% to 3.00%
	Zirconium		1.00% to 4.50%
	Tin		0.005% to 2.50%
	Carbon		0.010% to 0.050%
COBALT ALLOYS	Aluminium	ML/VAL/Co/2013	0.025% to 0.25%
	Boron		0.001% to 0.005%
	Chromium		15.0% to 28.0%
	Carbon		0.100% to 0.300%
	Copper		0.02% to 0.06%
	Iron		2.00% to 3.00%
	Manganese		0.20% to 2.00%
	Molybdenum		0.50% to 2.00%
	Nickel		8.0% to 25.0%
	Silicon		0.10% to 0.60%
	Vanadium		0.005% to 0.050%
	Sulphur		0.0005% to 0.005%
	Phosphorus		0.005% to 0.020%
	Tungsten		10.0% to 16.0%
	Titanium		0.005% to 0.015%
	Niobium/ Columbium		0.02% to 0.05%
	Tantalum		0.02% to 0.05%
	Product / Material of Test TITANIUM ALLOYS COBALT ALLOYS	Product / Material of TestSpecific Test PerformedTITANIUM ALLOYSAluminium Iron Molybdenum Vanadium Zirconium Tin CarbonCOBALT ALLOYSAluminium Boron Chromium CarbonCOBALT ALLOYSAluminium Boron Chromium Carbon Chromium Carbon Copper Iron Manganese Molybdenum Nickel Silicon Vanadium Sulphur 	Product / Material of TestSpecific Test PerformedTest Method Specification against which tests are performedTITANIUM ALLOYSAluminium Iron Molybdenum Vanadium Zirconium Tin CarbonML/VAL/Ti/011-012COBALT ALLOYSAluminium Boron Chromium CarbonML/VAL/Co/2013COBALT ALLOYSAluminium Manganese Molybdenum Nickel Silicon Vanadium Nickel Silicon Sulphur Phosphorus Tungsten Titanium Nicbium/ Columbium TantalumML/VAL/Co/2013

Laboratory	MICROLAB, SP. 101, 2 nd Main Road, Ambattur Industrial Estate, Chennai, Tamil Nadu		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Chemical Testing	Issue Date	21.12.2013
Certificate Number	T-0774	Valid Until	20.12.2015
Last Amended on	-	Page	7 of 10

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
7.	CARBON STEEL, LOW ALLOY	Carbon	IS 228 (Part 1):1987 (2007)	0.01% to 2.5 %
	STEEL,		IS 12308 (Part 11) :1991	1.0% to 4.00 %
	STEEL, CAST Silicon IS 228 (Part 8) : 19 IRON, SG IRON IS 12308 (Part 6) Manganese ML/Val/ST-Fe-01/	IS 228 (Part 8) : 1989 (2004) / IS 12308 (Part 6)	0.05% to 5.00 %	
		Manganese	ML/Val/ST-Fe-01/13	0.005% to 3.0 %
		Phosphorus	ML/Val/ST-Fe-01/13	0.005% to 2.5%
		Sulphur	IS 12308 (Part 2) :1987(2002)	0.005% to 0.25 %
		Copper	ML/Val/ST-Fe-01/13	0.005% to 1.50%
		Chromium	IS 228 (Part 6): 1987 (2002) ML/Val/ST-Fe-01/13	1.0% to 25 % 0.005% to 6.00 %
		Nickel	IS 228 (Part 5): 1987(2002) ML/Val/ST-Fe-01/13	1.0% to 14 % 0.005% to 1.50 %
		Molybdenum	ML/Val/ST-Fe-01/13	0.01% to 2.50 %
		Aluminium	ML/Val/ST-Fe-01/13	0.001% to 1.50 %
		Lead	ML/Val/ST-Fe-01/13	0.001% to 0.50 %
		Tin	ML/Val/ST-Fe-01/13	0.002% to 0.5 %

Laboratory	MICROLAB, SP. 101, 2 nd Main Road, Ambattur Industrial Estate, Chennai, Tamil Nadu		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Chemical Testing	Issue Date	21.12.2013
Certificate Number	T-0774	Valid Until	20.12.2015
Last Amended on	-	Page	8 of 10

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Titanium	ML/Val/ST-Fe-01/13	0.002% to 0.6 %
		Tungsten	ML/Val/ST-Fe-01/13	0.005% to 0.2 %
		Vanadium	ML/Val/ST-Fe-01/13	0.005% to 0.70 %
		Magnesium	ML/Val/ST-Fe-01/13	0.005% to 0.100%
		Lead	IEC-62321-Ed.1-2006 (By ICP-OES)	0.1 μg/g to 1000 μg/g
		Cadmium	IEC-62321-Ed.1-2006 (By ICP-OES)	0.1 μg/g to 1000 μg/g
		Mercury	IEC-62321-Ed.1-2006 (By ICP-OES)	0.1 μg/g to 1000 μg/g
8.	COATING	Chromium (Cr6+)	By UV Spectrometer	Qualitative
9.	SITE TESTING PMI CHEMICAL	For Segregation of mix up Alloys (Fe, Cu, Ni, Ti, Co, Zn, W, Cr base alloys)	ASTM E 1916-97	Qualitative

Lab	Laboratory MICROLAB, SP. 101, 2 nd Main Road, Ambattur Industrial Estate, Chennai, Tamil Nadu			state,		
Acc	reditation Standard	ISO/IEC 17025: 2005				
Disc	ipline	Chemical Testing		Issue	Date	21.12.2013
Cert	ificate Number	T-0774		Valid	Until	20.12.2015
Last	Amended on	-		Page		9 of 10
S.No.	Product / Material of Test	Specific Test Performed	Test Method Specificat against which tests are performed	ion	Range Limits	of Testing / of Detection
II. W	ATER					
1.	WATER FOR DRINKING PURPOSE IS:10500-19991	Total Dissolved solids - TDS	IS 3025 (Part 16) :1984 (RA 2006)		10 mg/	/l to 1000 mg/l
		рН	IS 3025 (Part 11) :1983 (RA 2002)		01.0 to	14.0
		Total Hardness as CaCO ₃	IS 3025 (Part 21) : 2009		5 mg/l	to 1000 mg/l
		Methyl orange alkalinity as CaCO ₃	IS 3025 (Part 23) :1986 (RA 2003)		0.5 mg/	/l to 500 mg/l
		Chlorides as Cl	IS 3025 (Part 32) :1988 (RA 2003)		0.5 mg/	/l to 500 mg/l
		Sulphate as SO ₄	IS 3025 (Part 24) :1986 (RA 2003)		10 mg/	l to 100 mg/l
		Calcium as Ca	IS 3025 (Part 40) :1991 (RA 2003)		5 mg/l	to 500 mg/l
		Magnesium as Mg	IS 3025 (Part 46) :1994 (RA 2003)		5 mg/l	to 500 mg/l
		Iron as Fe	IS 3025 (Part 2) : 2004 by ICP OES		0.1 mg/	/l to 10 mg/l

Laboratory	MICROLAB, SP. 101, 2 nd Main Road, Ambattur Industrial Estate, Chennai, Tamil Nadu		
Accreditation Standard	ISO/IEC 17025: 2005		
Discipline	Chemical Testing	Issue Date	21.12.2013
Certificate Number	T-0774	Valid Until	20.12.2015
Last Amended on	-	Page	10 of 10

S.No.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Copper as Cu	IS 3025 (Part 2) : 2004 by ICP OES	0.1 mg/l to 10 mg/l
		Zinc as Zn	IS 3025 (Part 2) : 2004 by ICP OES	0.1 mg/l to 10 mg/l
		Lead as Pb	IS 3025 (Part 2) : 2004 by ICP OES	0.1 mg/l to 10 mg/l
		Cadmium as Cd	IS 3025 (Part 2) : 2004 by ICP OES	0.1 mg/l to 10 mg/l
		Manganese as Mn	IS 3025 (Part 2) : 2004 by ICP OES	0.1 mg/l to 10 mg/l
2.	WATER FOR CONSTRUCTION PURPOSE	Total Suspended Solids-TSS	IS 3025 (Part 15):1984 (RA 2003)	10 mg/l to 1000 mg/l
		pH	IS 3025 (Part 11):1983 (RA 2002)	01.0 to 14.0
	(RA 2005)	Methyl orange alkalinity as CaCO ₃	IS 3025 (Part 23):1986 (RA 2003)	0.5 mg/l to 500 mg/l
		Chlorides as Cl	IS 3025 (Part 32):1988 (RA 2003)	0.5 mg/l to 500 mg/l
		Sulphate as SO ₄	IS 3025 (Part 24):1986 (RA 2003)	10 mg/l to 100 mg/l