

Laboratory **Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-5771**

Page 1 of 16

Validity **04.10.2018 to 03.10.2020**

Last Amended on **27.01.2019**

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.	METAL & ALLOYS			
A.	Ferrous			
1.	Low Alloy Steel Plain Carbon Steel	Carbon	ASTM E 1019-11 (Leco)	0.02% to 1.0%
		Sulphur	ASTM E 1019-11 (Leco)	0.005% to 0.35%
		Molybdenum	IS 228 (Part 7)RA 2018 (wet) JMLPL/WI/CHEM-15(AAS) Issued date:- 01/05/2016 Issued no.:-2	1.0% to 1.50% 0.15% to 1.0 %
		Silicon	ASTM E 350-12 (wet)	0.005% to 5.00%
		Phosphorus	ASTM E 350-12 (wet)	0.004% to 0.25%
		Manganese	ASTM E 350-12 (wet) JMLPL/WI/CHEM-15 (AAS) Issued date:- 01/05/2016 Issued no.:-2	0.10% to 1.50% 0.10% to 2.0%
		Chromium	ASTM E 350-12 (wet) JMLPL/WI/CHEM-15 (AAS) Issued date:- 01/05/2016 Issued no.:-2	0.05% to 3.99% 0.070% to 1.50%
		Nickel	IS 228 -90 RA 2014(Part 5) (wet) JMLPL/WI/CHEM -15(AAS) Issued date:- 01/05/2016 Issued no.:-2	0.2% to 5.0% 0.15% to 5.0%
		Nitrogen	ASTM E 1019-11 (Leco)	0.005% to 0.30%
		Oxygen	ASTM E 1019-11	0.005% to 0.20%
	Cobalt	JMLPL/WI/CHEM-15(AAS) Issued date:- 01/05/2016 Issued no.:-2	0.003% to 0.120%	

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

TC-5771

Page 2 of 16

Validity

04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Copper	JMLPL/WI/CHEM-15(AAS) Issued date:- 01/05/2016 Issued no.:-2	0.005% to 0.40%
		Vanadium	JMLPL/WI/CHEM-15(AAS) Issued date:- 01/05/2016 Issued no.:-2	0.003% to 0.50%
		Lead	JMLPL/WI/CHEM-15(AAS) Issued date:- 01/05/2016 Issued no.:-2	0.005% to 0.02%
2.	Stainless Steel	Carbon	ASTM E 1019-11 (Leco)	0.005 to 4.50%
		Sulphur	ASTM E 1019-11 (Leco)	0.003% to 0.35%
		Manganese	IS 228 (Part 2)-87 RA 2018 (Wet) JMLPL/WI/CHEM-16 (AAS) Issued date:- 01/05/2016 Issued no.:-2	0.2% to 1.5% 0.30% to 12.0%
		Molybdenum	IS 228 (Part 7)-90 RA 2018 Wet JMLPL/WI/CHEM-16 (AAS) Issued date:- 01/05/2016 Issued no.:-2	1.0% to 3.0% 0.2% to 2.80%
		Phosphorus	ASTM E 353 -14 (Wet)	0.05% to 0.35%
		Silicon	ASTM E 353 -14 (Wet)	0.03% to 4.0%
		Chromium	ASTM E 353 -14 (Wet)	0.20% to 35.0%
		Nickel	IS 228 (Part 5)-87 RA 2014 (Wet) JMLPL/WI/CHEM-16 (AAS) Issued date:- 01/05/2016 Issued no.:-2	0.6% to 48% 2.0% to 20.0%
		Nitrogen	ASTM E 1019-11 (Leco)	0.003% to 0.30%
		Oxygen	ASTM E 1019-11 (Leco)	0.02% to 0.03%

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

TC-5771

Page 3 of 16

Validity

04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Copper	JMLPL/WI/CHEM-16 (AAS) Issued date:- 01/05/2016 Issued no.:-2	0.15% to 0.45%
		Vanadium	JMLPL/WI/CHEM-16 (AAS) Issued date:- 01/05/2016 Issued no.:-2	0.05% 0.30%
3.	Tool Steel	Carbon	ASTM E 1019-11 (Leco)	0.2% to 2.5%
		Sulphur	ASTM E 1019-11 (Leco)	0.02% to 0.35%
		Chromium	ASTM E 352 - 13 (wet)	0.25% to 14.0%
		Manganese	ASTM E 352 - 13 (wet)	0.2% to 15.0%
		Tungsten	ASTM E 352 - 13 (wet)	0.01% to 21.0%
		Cobalt	ASTM E 352 - 13(wet)	0.10% to 14.0%
		Vanadium	ASTM E 352 - 13(wet)	0.02% to 5.50%
		Silicon	ASTM E 352 - 13(wet)	0.10% to 2.5%
		Molybdenum	ASTM E 352 - 13(wet)	0.1% to 6.0%
4.	Cast Iron	Carbon	ASTM E 1019-11 (Leco)	0.001% to 4.5%
		Sulphur	ASTM E 1019-11 (Leco)	0.002% to 0.25%
		Phosphorus	IS 12308 (P 5)-91 RA 2018 (Wet)	0.01% to 0.5%
		Silicon	IS 12308(P- 6)-91RA 2018 Wet)	0.10% to 6.0%
		Manganese	IS 12308(P-10)-91 RA 2018 (Wet)	0.10% to 7.0%
		Nickel	IS 12308 (P-7)- 91 RA 2018 (Wet)	1.0% to 36%
		Chromium	IS 12308 (P-8)- 97RA 2018 (Wet)	0.10% to 28.0%
		Molybdenum	ASTM E 354-14	0.01% to 30.0%
5.	Ferrous Alloy (by OES Method)	Carbon	ASTM E 415:2017	0.02% to 1.1%
		Sulphur		0.001% to 0.55%
		Phosphorus		0.006% to 0.085%
		Silicon		0.02% to 1.54%

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

TC-5771

Page 4 of 16

Validity

04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Manganese		0.03% to 2.00%
		Chromium		0.007% to 8.14%
		Nickel		0.006% to 5.00%
		Molybdenum		0.007% to 1.3%
		Copper		0.006% to 0.5%
		Aluminum		0.006% to 0.093%
		Vanadium		0.003% to 0.3%
		Cobalt		0.006% to 0.20%
		Niobium		0.003% to 0.12%
		Titanium		0.001% to 0.20%
		Boron		0.0004% to 0.007%
		Arsenic		0.003% to 0.1%
		Tin		0.005% to 0.061%
6.	Stainless Steel	Carbon	ASTM E 1086:2014	0.005% to 0.25%
		Sulphur		0.003% to 0.065%
		Phosphorus		0.003% to 0.15%
		Silicon		0.01% to 0.9%
		Manganese		0.01% to 2.0%
		Molybdenum		0.01% to 3.00%
		Chromium	JMLPL/WI/CHEM-23	8.0% to 26.0%
		Nickel	Issued date:- 01/05/2016	5.0% to 34.0%
		Copper	Issued no.:-1	0.3% to 3.5%
		Niobium		0.1% to 1.2%
		Titanium		0.1% to 1.1%
		Boron		0.0004% to 0.003%
		Aluminium		0.003% to 0.1%
		Cobalt		0.02% to 0.25%
		Vanadium		0.05% to 0.25%

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

TC-5771

Page 5 of 16

Validity

04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
B.	Non - Ferrous			
1.	Aluminium & Aluminium Alloys	Chromium	ASTM E 34 - 11 (AAS)	0.01% to 1.0%
		Copper	ASTM E 34 - 11 (AAS)	0.01% to 10.0%
		Iron	ASTM E 34 - 11 (AAS)	0.01% to 2.0%
		Magnesium	ASTM E 34 - 11 (AAS)	0.002% to 5.0%
		Manganese	ASTM E 34 - 11 (AAS)	0.005% to 2.0%
		Lead	ASTM E 34 - 11 (AAS)	0.02% to 1.0%
		Silicon	IS 504 (Part 1) -18 Cl.7.0	0.05% to 20.0%
		Zinc	JMLPL/WI/CHEM-15 (AAS) Issued date:- 01/05/2016 Issued no.:-2	0.07% to 10.0%
2.	Copper & its Alloy	Copper	IS 440 - 1964 RA 2018 ASTM E 53 - 2007RA 2013	40.0% to 99.99% 35.0% to 99.95%
		Lead	IS 4027 (Part 1)-87 RA 2018 ASTM E 478 Cl.90 (AAS)	0.15% to 20.0% 0.025% to 1.5%
		Zinc	IS 4027: 1987 RA 2018 ASTM E 478-2017 Cl. 79 (AAS)	0.5% to 40.0% 0.5% 0.2%
		Tin	IS 3685 (1966)RA 2018	0.02% to 5.0%
		Iron	IS 440 (1964)RA 2018	0.01% to 2.0%
		Phosphorus	IS 4027 (Part 3)-1987 RA 2018	0.007% to 0.25%
		Nickel	IS 4027 (Part 4)1987 RA 2018	0.10% to 40.0%
		Silicon	IS 3685 - 1966 RA 2018	0.005% to 0.10%
		Arsenic	ASTM E 478 - 2008 RA 2017	0.01% to 0.12%
		Oxygen	JMLPL/WI/CHEM-53 Issued date:- 01/7/2018 Issued no.:-1	0.0005% to 0.4%

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

TC-5771

Page 6 of 16

Validity

04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
3.	Nickel & its alloy	Carbon	ASTM E 1019-11 (Leco)	0.007% to 4.50%
		Sulphur	ASTM E 1019-11 (Leco)	0.005% to 0.35%
		Silicon	ASTM E 354 - 14	0.12% to 5.00%
		Chromium	ASTM E 354 - 14	0.005% to 20.0%
		Molybdenum	ASTM E 354 - 14	0.001% to 15.0%
4.	Zinc & its alloys	Aluminium	JMLPL/WI/CHEM-17 Issued date:- 01/05/2016 Issued no.:-1	0.005% to 5.0%
		Cadmium	ASTM E 536 - 16(AAS)	0.002% to 0.06%
		Copper	ASTM E 536 - 16(AAS)	0.002% to 1.3%
		Iron	ASTM E 536 - 16(AAS)	0.002% to 0.1%
		Lead	ASTM E 536 - 16(AAS)	0.002% to 1.6%
5.	Titanium & its alloy	Magnesium	ASTM E 536 - 16(AAS)	0.001% to 0.1%
		Iron	JMLPL/WI/CHEM-18 (AAS) Issued date:- 01/05/2016 Issued no.:-1	0.005% to 0.20%
6.	Ferro Silicon	Carbon	ASTM E 1019-11 (Leco)	0.25% to 4.5%
		Sulphur	ASTM E 1019-11 (Leco)	0.007% to 0.35%
		Phosphorus	IS 1559 (Part 4)-82RA 2018	0.05% to 0.15%
		Silicon	IS 1559 (Part 3)-82RA 2018	15.0% to 85.0%
7.	Ferro Chrome	Phosphorus	IS 13452-2003 (Part 7) RA 2009	0.01% to 0.06%
		Silicon	IS 13452-92 (Part 1 & 2) RA 2018	0.15% to 10.0%
		Chromium	IS 13452-2003(Part 5) RA 2018	50.0% to 70.0%
			IS 13452-97 (Part 6) RA 2018	60.0% to 70.0%
8.	Ferro Manganese	Phosphorus	IS 13452-2003 (Part 7) RA 2009	0.10% to 0.35%

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

TC-5771

Page 7 of 16

Validity

04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Manganese	IS 1559:1961RA 2018 JMLPL/WI/CHEM-16 (AAS) Issued date:- 01/05/2016 Issued no.:-2	10.0% to 70.0% 10.0% to 30.0%
9.	Silico Manganese	Silicon	IS 1559 (Part 1):88 RA 2018	50.0% to 90.0%
		Phosphorus	IS 1559 (Part 4):1982 RA 2018	0.01% to 0.10%
		Manganese	IS 1559 :1961 RA 2018 JMLPL/WI/CHEM-16 (AAS) Issued date:- 01/05/2016 Issued no.:-2	10.0% to 70.0% 10.0% to 20.0%
10.	Ferro Molybdenum	Silicon	IS 12614-1988(Part 3) RA 2009	5.0% to 10.0%
		Phosphorus	IS 1559:1961 (RA 18) IS 12614-1988(Part 5) RA 2009	0.01% to 10.0%
		Silicon	IS 1559:1961 (RA 18) IS 12614-1988(Part 3) RA 2009	0.10% to 1.0%
		Molybdenum	IS 12614-1988 (Page 1) RA 2009 ASTM E 1019:2011	5.0% to 70.0%
11.	Ferro Titanium	Silicon	IS 13840-1993 (Part 2) RA 2009	0.1% 3.0%
		Titanium	IS 13840-1993(Part 3) RA 2009	20.0% to 75.0%
12.	Ferro Vanadium	Phosphorus	IS 1599 (Part 4): 82 RA 2018	0.007% to 0.5%
		Silicon	IS 1559 (Part 1): 82 RA 2018	0.01% to 5.0%
		Vanadium	IS 1599:1961 RA 2018	0.55% to 45.0%
13.	Lead & its alloy	Antimony	IS 403:1964 RA 2016	0.002% to 15.0%
		Lead	ASTM E 37-11	60.0% to 90.0%
		Zinc	ASTM E 35 -2005 RA 2011	0.002% to 0.005%

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

TC-5771

Page 8 of 16

Validity

04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
14.	Tin & Lead alloy	Bismuth	ASTM E 35 :2005 RA 2011 (AAS)	0.003% to 0.02%
		Arsenic	ASTM E 37 (2011)	0.002% to 0.02%
15.	Silver & Brazing alloy	Silver	IS 4667 (Part 4):2001 RA 2018	1.0% to 100.0%
		Copper	IS 4667 (Part 4):2001 RA 2018	10.0% to 40.0%
		Zinc	IS 4667 (Part 4):2001 RA 1820	0.7% to 20.0%
		Cadmium	IS 4667 (Part 4):2001 RA 2018	0.15% to 20.0%
		Phosphorus	IS 4667 (Part 4):2001 RA 2018	0.1% to 20.0%
16.	Copper alloy (by OES)	Bismuth	BS EN 15079:2007	0.001% to 0.1%
		Tin		0.001% to 40.0%
		Zinc		0.0002% to 7.0%
		Lead		0.0003% to 5.0%
		Iron		0.0012% to 4.5%
		Nickel		0.0002% to 10.0%
		Aluminium		0.001% to 12.0%
		Phosphorus		0.002% to 0.5%
		Silicon		0.0005% to 0.20%
		Manganese		0.0003% to 2.0%
17.	Aluminium alloy (by OES)	Chromium	ASTM E 1251:2011	0.06% to 0.5%
		Copper		0.05% to 2.5%
		Iron		0.07% to 1.0%
		Magnesium		0.02% to 4.0%
		Manganese		0.01% to 1.0%
		Nickel		0.03% to 2.0%
		Lead		0.02% to 0.5%
		Silicon		0.02% to 13.0%
		Tin		0.03% to 0.5%

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number

TC-5771

Page 9 of 16

Validity

04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Titanium		0.02% to 0.2%
		Zinc		0.07% to 0.5%
18.	Nickel alloys (by OES)	Carbon	JMLPL/WI/Chem-22	0.01% to 0.20%
		Silicon	Issued date:- 01/05/2016	0.03% to 2.0%
		Sulphur	Issued no.:-2	0.002% to 0.02%
		Phosphorus		0.002% to 0.20%
		Manganese		0.03% to 2.0%
		Chromium		0.01% to 23.0%
		Molybdenum		0.03% to 16.0%
		Copper		0.002% to 35.0%
		Tungsten		0.003% to 4.0%
		Titanium		0.002% to 1.25%
		Cobalt		0.03% to 0.43%
		Aluminium		0.02% to 2.0%
		Niobium		0.002% to 5.5%
		Iron		0.07% to 20.0%
		Vanadium		0.01% to 1.0%
		Boron		0.002% to 0.03%

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory **Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-5771**

Page **10 of 16**

Validity **04.10.2018 to 03.10.2020**

Last Amended on **27.01.2019**

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 & Non Ferrous Metals & Alloys, Products and welded coupons	Tensile Test: Ultimate Tensile Strength, Yield Strength, 0.2% Proof Stress	ASTM A-370-17a, ASTM E8/E8M-16a, IS 1608:2005, AWS B4.0-2016.	10 kN to 400 kN 15 kN to 600 kN 30 kN to 1000 kN
		% Elongation	API-1104:2013,	5% to 75%.
		Reduction area	ASME SEC.IX:2017, AWS D1.1/D1.1M :2015, ISO-15614-1-2017, IBR 1950- 2017, IS 3600 (Part-4)- 1984- RA 2006, IS 7307: 1974-RA 2008	5% to 85 %
		Rockwell Hardness Test (B & C)	ASTM A-370-17a, ASTM E-18-17, IS 1586-1- 2012.	20 HRBW to 100 HRBW 22 HRCto 60 HRC
		Brinell Hardness Test	ASTM A-370-17a, ASTM E-10-17, IS 1500-1- 2013, AWS B 4.0- 2016.	60 HBW to 600 HBW 2.5/187.5, HBW 10/3000
		Vickers Hardness Test	ASTM E92-17, IS 1501-01- 2013, IS 12783-89- 2013, ISO 9015-01-2001, AWS B 4.0-2016	50 to 1000 HV5, HV10, HV30.
		Micro Hardness	ASTM E:384-16, ISO 9015-01-2001, IS 12783-89-2013	50 to 1000 HV0.01, 0.025, 0.05, 0.1, 0.2, 0.3, 0.5, 1.

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5771

Page 11 of 16

Validity 04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Charpy V-Notch Impact test	ASTM A 370-17a, ISO 148-1-2016, ASTM E-23-16b	5 J to 240 J, Temp: (-) 70°C to 35 °C and (-) 196 °C.
		Izod V-Notch Impact	IS 1598-1977- 2015, IBR 1950- 2017,	2 J to 164 J
		Charpy U-Notch Impact	ISO 148-1-2016, IBR 1950-2017	5 J to 240 J
		Bend test	ASTM A-370-2017a, ASTM E190-14, ASTM E-290- 14, ASME Sec-IX-2017, IBR 1950-2017, API-1104-2013, AWS B4.0/4.0M-2016, AWS 1.1/D1.1M:2013- RA-06, IS 7310-1: 1974, IS 3600 Part-6:1983- RA 2003, ISO 5177-1984, IS 3600-7:1985-RA 2003, IS 1599- 2012, API-5L- 2012, IS 814: 2004, ASTM B820- 18, IS 7307- 1974, IS 814: 2004, ASME-II-2017.	Qualitative (Mandrel diameter: 6, 10,12,16, 22, 24, 27, 28, 30, 32, 33, 34, 35, 36, 38, 40, 42, 44, 45, 50, 62, 55, 60, 64, 65,75, 84, 90, 100, 110, 130, 165, 168, 170, 270, 300 in mm).
2.	Tube & Pipe	Flattening Test	ASTM A 1016/1016M-2017, ASTM A 999/999M-2017, API 5L-2012, ASTM A 370:2017a, IS-2328- 2005, ASTM A530/530M-2017, A450/450M-17, B968/B 968M-16, IBR 1950.	Qualitative (Diameter: 10 mm to 800 mm)

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5771

Page 12 of 16

Validity 04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
3.	Tube & Pipe	Drift Expansion/ Flaring Test	ASTM B 153-11, ASTM A 370-17a, ASTM A 450/450M-2017, ASTM A1016/1016M-2017, IBR1950- 2017,	Qualitative (Cone angle: 45° & 60°; Diameter: 10 mm to 150mm)
4.	Tube & Pipe	Reverse Flattening Test	ASTM A 450/450M-17, ASTM A1016/1016M-17a, A 370-17a.	Qualitative (Diameter: 10 mm to 100 mm)
5.	Tube	Flanging Test	ASTM A 450/450M-17a A 1016/1016M-17a IS 2330: 2011.	Qualitative (Diameter: 10 mm to 50 mm)
6.	Welded Test coupon	Fracture Test	IS 2825- 1969, ASME SEC.IX-2017, AWS B4.0/B4.0M-2016, BS EN 1320:1997, IS 7310-(Part 1) 1974- RA 2006	Qualitative (Upto 1000 kN)
7.	Welded Test coupon	Nick Break Test	API-1104-2012, AWS B4.0/B4.0M-2016, IBR 1950, IS 2825: 1969, IS 3600-8-RA 2003: 1985.	Qualitative (Upto 1000 kN)
8.	Steel Plates	Through Thickness Tension Test- % RA	ASTM A 770/770M-03 (2017)	10% to 90 %
9.	HSD bar / TMT bar	Bend	IS 1599-2012, IS 1786- 2008	Qualitative (Mandrel diameter: 10, 12, 16, 24 30, 32, 40, 50, 60, 64, 75, 84, 100, 168 in mm)

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5771

Page 13 of 16

Validity 04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Re-bend Test	IS 1786-2008	Qualitative (Mandrel diameter: 16, 24, 28, 30, 32, 35, 36, 40, 42, 50, 84, 168 in mm)
		Mass per unit Length	IS 1786- 2008	1 kg/m to 20 kg/m.
10.	Fabrications- Tube to Tube sheet	Pull out	ASME SEC.IX-:2017, IBR 1950- 2017	Load: 10 kN to 1000 kN
11.	Tube to Plate welding	Minimum Leak path	ASME Section IX-17-QW-193.	Magnification 10 X to 20X
12.	Coil Springs	Compression Test-Axial load	IS 7906-5:2004	Load: 10 kN to 1000 kN
13.	Steel rod	Double Shear	IS 5242-79-RA 2006	Load: 10 kN to 1000 kN
14.	Steel Ball	Crushing Strength	ASTM A370-17a	Load: 10 kN to 1000 kN
15.	SS (Nickel-Chromium) Cladding on CS/LAS Plates.	Shear	ASTM A263-17, ASTM A264- 17, ASTM A265-17.	Load: 10 kN to 1000 kN
16.	Nut	Proof Load	ASTM A194/194M-2017a ASTM A962/962M-2017 ASTM A 370-2017a IS 1367-6-1994 RA-04 ISO 898-2-2012	Qualitative (Coarse Thread: M6, M8, M10, M12, M14, M16, M18, M20, M22, M24, M27, M30, M33, M36, M39)
17.	Stud & Bolt	Proof Load	IS 1367-3: 2017 ISO 3506-4: 2009	Qualitative (Coarse Thread: M6, M8, M10, M12, M14, M16, M18, M20, M22, M24, M27, M30, M33, M36, M39)
II.	METALLOGRAPHY TEST			

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5771

Page 14 of 16

Validity 04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
1.	Austenitic Stainless Steel	Susceptibility to Inter-granular Corrosion	ASTM A 262-15, IS 10461P-1: 1994, ISO 3651-1: 1998	Qualitative (250 X to 500 X)
		-Practice-A		2.5 mpy to 1430 mpy
		-Practice-B		2.5 mpy to 1430 mpy
		-Practice-C		Qualitative (5X to 20X & 100X to 250X for Micro Exam)
		-Practice E	2.5 mpy to 1430 mpy	
		-Practice-F	Qualitative (5X to 20X & 100X to 250X for Micro Exam)	
2.	Duplex Stainless Steel	Method-A	ASTM A923-14	2.5 mpy to 1430 mpy
		Method-C		0.319 mdd to 160 mdd
3.	Ferritic Stainless Steel	Practice-W	ASTM A763-15	Qualitative (250X to 500X)
		Practice- X		2.5 mpy to 1430 mpy
		Practice-Y		2.5 mpy to 1430 mpy
		Practice-Z		Qualitative (5X to 20X & 100X to 250X for Micro Exam)
4.	Wrought Ni-Cr Alloy	Susceptibility to Inter-granular Corrosion.	ASTM G28 (02-2015)	2.5 mpy to 1430 mpy
5.	Steel	Chloride Stress Corrosion in MgCl ₂	ASTM G36-94 (2013)	Qualitative
6.	Stainless Steel and Ni-Cr alloys	Pitting & Crevice Corrosion	ASTM G48-15 Method-A Method-B	Qualitative
7.	Ferrous & Non Ferrous Metals	Micro Structural Analysis	ASM Handbook Vol. 9-2004, ASTM A247-2017, ASTM E 407-07,	Qualitative (100X to 1000X)

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory

Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5771

Page 15 of 16

Validity 04.10.2018 to 03.10.2020

Last Amended on 27.01.2019

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			ASTM E-1351-2001 (Replica method), ASTM E3-2011, IS 11959-1987-RA 2002, IS 7754:1975-RA 2003,	
8.	Steel	Case depth Measurement by Microscopic Method	IS 6416-1988-RA 2003	0.01 mm to 1.0 mm
		Non Metallic Inclusion Rating	ASTM E 45-13 IS 4163-2004 RA 2010	Qualitative Type A, B, C & D 0.01 mm to 1.0 mm
		Depth of decarburization (Microscopic Method)	IS 6396-2000 RA 2012, ASTM E 1077-2014	100 X
9.	Non ferrous Alloys-Copper Based	Mercurous Nitrate Test	IS 2305-1988 RA 2009, ASTM B 154-16	Qualitative (Visual Examination)
10.	Zinc coated material	Mass of Zinc Coating	IS:6745-1972-RA 1994	10 g/m ² to 600 g/m ²
11.	Metallic coated material	Coating Thickness Measurement by Microscopic Method	IS 3203: 1982-RA 2006	0.01 mm to 1 mm
12.	Ferrous & Non Ferrous Metals & Alloys, products And welded coupons.	Macro Etching	ASTM E 381-01, ASME SEC IX:2017, AWS D1,1/D1.1M :2015, BS EN ISO 17639-2013, IBR 1950-2017, S 3600 (Part-9)-1985-RA 2003, ASTM E-340-2015, IS 11371-1985-RA 2003, IS 13015:91-RA 2003	Qualitative (Upto 10 X)

Neeraj Verma
Convenor

Birendra Prasad Murmu
Program Manager

Laboratory **Jewel Metallochem Laboratory Pvt. Ltd., A-12, Ghatkopar Industrial Estate, Off: Lbs Marg, Ghatkopar (W), Mumbai, Maharashtra**

Accreditation Standard **ISO/IEC 17025: 2005**

Certificate Number **TC-5771**

Page 16 of 16

Validity **04.10.2018 to 03.10.2020**

Last Amended on **27.01.2019**

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
13.	Stainless Steel	Ferrite Content by Ferrite Meter	ASTM A 800/A 800M-2014	2 % to 90 %
14.	Ferrous & Non Ferrous Metals & Alloy (except copper)	Average grain Size by Comparison Method	ASTM E 112-13	Qualitative (ASTM grain size no.1 to 10, Magnification: 100X)
15.	Non Ferrous Alloys- Copper	Average Grain size measurement Comparison Method	ASTM E 112-13	Qualitative (ASTM grain size diameter: 0.005 mm to 0.2 mm, Magnification: 75 X)
16.	Stainless Steels	Determining the Second Phase Constituent Content of Metals by Automatic Image Analysis	ASTM E 1245 RA 2016	2% to 80%