

Laboratory **ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra**

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

Certificate Number **TC-5743**

Page 1 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
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CHEMICAL TESTING

I.	METALS & ALLOYS			
1.	Low Alloy Steel, & Mild Steel	Carbon	ASTM E 1019	0.01 % to 1.50 %
		Silicon	IS 228 Part. 8 ASTM E350	0.01 % to 5.00 % 0.01 % to 3.50 %
		Manganese	IS 228 Part. 2, ASTM E350	0.10 % to 1.50 %
		Sulphur	ASTM E 1019	0.001 % to 0.35 %
		Phosphorus	IS 228 Part 3, ASTM E 350	0.02 % to 0.25 %
		Chromium	IS 228, Part 6, ASTM E 350 ASTM E 350 AAS	0.05 % to 3.00 % 0.05 % to 4.00 % 0.006 % to 1.00 %
		Nickel	IS 228 Part 5, ASTM E350 ASTM E350 AAS	0.1 % to 5.00 % 0.1 % to 5.00 % 0.005 % to 0.50 %
		Molybdenum	IS 228 Part 7 ASTM E350 AAS	0.1 % to 1.00 % 0.1 % to 1.00 %
		Vanadium	ASTM E350 AAS	0.006 % to 0.40 %
		Copper	ASTM E-350, AAS IS 228 Part 15	0.004 % to 0.50 % 0.05 % to 5.00 %
		Silicon	ASTM E-415 IS 8811	0.026 % to 2.00 %
2.	Cast Iron	Carbon	ASTM E 1019	1.25 % to 4.5 %
		Silicon	IS 12308 Part 6 ASTM E351	0.10 % to 6.00 % 0.10 % to 6.00 %
		Manganese	IS 12308 Part 10 ASTM E351	0.1 % to 7.0 % 0.1 % to 3.50 %
		Sulphur	ASTM E 1019	0.005 % to 0.25 %
		Phosphorus	IS 12308 Part 5 ASTM E351	0.01 % to 0.50 % 0.02 % to 0.90 %
		Chromium	IS 12308, Part 8	0.10 % to 2.80 %

**Nitan Garg
Convenor**

**Avijit Das
Program Manager**

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Certificate Number **TC-5743**

Page 2 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

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			ASTM E351	0.006 % to 1.20 %
		Nickel	IS 12308 Part 7 ASTM E351 ASTM E351 AAS	0.50 % to 1.90 % 0.10 % to 1.90 % 0.005 % to 0.10 %
		Molybdenum	ASTM E351	0.01 % to 1.00 %
		Copper	IS 12308 part 12 ASTM E351	0.01 % to 0.10 % 0.03 % to 0.10 %
3.	Austenitic Stainless Steel	Carbon	ASTM E 1019	0.010 % to 1.50 %
		Silicon	ASTM E 353	0.05 % to 4.00 %
		Manganese	ASTM E 353	0.10 % to 2.00 %
		Sulphur	ASTM E 1019	0.002 % to 0.050 %
		Phosphorus	ASTM E 353	0.020 % to 0.50 %
		Chromium	ASTM E 353	0.10 % to 20.00 %
		Nickel	ASTM E 353	0.10 % to 18.00 %
		Molybdenum	ASTM E 353	0.01 % to 4.00 %
		Copper	ASTM E 353	0.01 % to 2.00 %
4.	Aluminium Alloys	Silicon	IS 504 Part 1 ASTM E34 ASTM E3061	0.30 % to 11.00 %
		Copper	ASTM E3061 IS 504 Part 3	0.50 % to 5.5 %
		Magnesium	IS 504 Part 6	0.01 % to 11.00 %
		Iron	IS 504 Part 2	0.20 % to 0.80 %
		Manganese	IS 504 Part 5	0.10 % to 1.50 %
		Zinc	IS 504 Part 4	0.085 % to 3.00 %
		Chromium	IS 504 Part 8	0.01 % to 1.00 %
		Nickel	IS 504 Part 7	0.1 % to 4.00 %
		Lead	IS 504 Part 1	0.05 % to 0.3 %
5.	Nickel & Cobalt Alloys	Aluminium	ASTM E1473	0.005 % to 0.7 %
		Carbon	ASTM E1019	0.001 % to 1.10 %
		Copper	ASTM E1473	0.01 % to 35 %
		Iron	ASTM E1473	0.01 % to 50.0 %
		Manganese	ASTM E1473	0.01 % to 3.00 %
		Molybdenum	ASTM E1473	0.01 % to 30.0 %

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

Certificate Number **TC-5743**

Page 3 of 36

Validity **09.07.2019 to 23.10.2020**

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		Niobium	ASTM E1473	0.01 % to 6.0 %
		Nickel	ASTM E1473	0.10 % to 98.00 %
		Phosphorus	ASTM E1917	0.002 % to 0.08 %
		Sulphur	ASTM E1019	0.002 % to 0.10 %
		Silicon	ASTM E1473	0.01 % to 5 %
		Titanium	ASTM E1473	0.01 % to 5 %
		Tungsten	ASTM E1473	0.01 % to 18 %
		Vanadium	ASTM E1473	0.01 % to 2.00 %
6.	Copper & its Alloys	Copper	ASTM E478	10.00 % to 99.00 %
			IS 3685	
			IS 4027 Part.1 ASTM E53 IS 440	40.0 % to 85.00 % 90.0 % to 99.95 % 90.0 % to 99.99 %
		Lead	ASTM E478 IS 4027 Part.1 IS 3685	0.5 % to 10.00 %
	Zinc	ASTM E478 ASTM E53, IS 3685	1.00 % to 35.00 %	
7.	Low Alloy & Carbon Steel	Iron	IS 4027 Part 8	0.05 % to 6.00 %
			IS 440	0.05 % to 6.00 %
			IS 3685	0.05 % to 6.00 %
		Aluminium	IS 3685	0.1 % to 12.0 %
		Manganese	IS 3187	0.1 % to 6.00 %
		Nickel	ASTM E478 IS 3685 IS 440	4.00 % to 50.0 % 0.5 % to 10.00 % 0.10 % to 5.00 %
		Phosphorous	ASTM E478	0.045 % to 0.60 %
7.	Low Alloy & Carbon Steel	Carbon	ASTM E-415	0.008 % to 1.50 %
			IS 8811	
			ASTM E-415	0.021 % to 2.00 %
			IS 8811	
7.	Low Alloy & Carbon Steel	Phosphorus	ASTM E-415	0.002 % to 0.090 %
			IS 8811	
7.	Low Alloy & Carbon Steel	Sulphur	ASTM E-415	0.007 % to 0.40 %

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Certificate Number **TC-5743**

Page 4 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

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			IS 8811	
		Chromium	ASTM E-415 IS 8811	0.002 % to 3.60 %
		Nickel	ASTM E-415 IS 8811	0.002 % to 5.00 %
		Aluminium	ASTM E-415 IS 8811	0.0018 % to 0.33 %
		Copper	ASTM E-415 IS 8811	0.0014 % to 0.70 %
		Titanium	ASTM E-415 IS 8811	0.01 % to 0.25 %
		Molybdenum	ASTM E-415 IS 8811	0.021 % to 1.15 %
		Vanadium	ASTM E-415 IS 8811	0.001 % to 0.60 %
		Niobium	ASTM E-415 IS 8811	0.0057 % to 0.025 %
8.	Austenitic Stainless Steels	Carbon	ASTM E-1086	0.014 % to 0.30 %
		Silicon	ASTM E-1086	0.21 % to 1.70 %
		Manganese	ASTM E-1086	0.21 % to 2.0 %
		Phosphorus	ASTM E-1086	0.009 % to 0.043 %
		Sulphur	ASTM E-1086	0.003 % to 0.35 %
		Chromium	ASTM E-1086	4.00 % to 30.00 %
		Nickel	ASTM E-1086	0.25 % to 32.00 %
		Copper	ASTM E-1086	0.026 % to 4.00 %
		Molybdenum	ASTM E-1086	0.05 % to 3.50 %
		Nitrogen	ASTM E-1086	0.003 % to 0.52 %
		Titanium	ASTM E-1086	0.005 % to 0.50 %
9.	Austenitic & Ferritic Steel	Carbon	IS 9879	0.014 % to 1.60 %
		Silicon	IS 9879	0.21 % to 1.70 %
		Manganese	IS 9879	0.21 % to 10.00 %
		Phosphorus	IS 9879	0.009 % to 0.043 %
		Sulphur	IS 9879	0.003 % to 0.35 %
		Chromium	IS 9879	4.00 % to 30.00 %

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

Certificate Number **TC-5743**

Page 5 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

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		Nickel	IS 9879	0.25 % to 32.00 %
		Copper	IS 9879	0.026 % to 4.00 %
		Molybdenum	IS 9879	0.05 % to 3.50 %
		Nitrogen	IS 9879	0.003 % to 0.52 %
		Niobium	IS 9879	0.005 % to 1.30 %
10.	Tool Steel	Carbon	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.65 % to 1.80 %
		Silicon	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.14 % to 0.42 %
		Manganese	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.21 % to 0.45 %
		Phosphorus	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.021 % to 0.045 %
		Sulphur	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.005 % to 0.045 %
		Chromium	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	2.50 % to 12.00 %
		Molybdenum	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.25 % to 9.50 %
		Vanadium	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.50 % to 2.00 %
		Tungsten	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.05 % to 21.00 %
		Copper	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.044 % to 0.053 %

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Certificate Number **TC-5743**

Page 6 of 36

Validity **09.07.2019 to 23.10.2020**

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		Cobalt	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.015 % to 10.00 %
		Titanium	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.0025 % to 0.003 %
		Nickel	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.15 % to 0.18 %
		Aluminium	WI/CHE/03b Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.006 % to 0.007 %
11.	Copper Base	Tin	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.005 % to 12.37 %
		Phosphorus	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.005 % to 0.90 %
		Lead	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.003 % to 6.21 %
		Nickel	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.002 % to 30.00 %
		Zinc	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.003 % to 40.00 %
		Copper	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	60.0 % to 99.95 %
		Iron	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.003 % to 4.00 %
		Aluminium	WI/CHE/03d Issue No-3, Issue Date:27/01/2009,	0.001 % to 11.20 %

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Certificate Number **TC-5743**

Page 7 of 36

Validity **09.07.2019 to 23.10.2020**

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			Rev-1 dtd.25/02/2015	
		Antimony	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.010 % to 0.030 %
		Bismuth	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.009 % to 0.15 %
		Sulphur	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.007 % to 0.018 %
		Chromium	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.001 % to 0.90 %
		Zirconium	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.003 % to 0.005 %
		Manganese	WI/CHE/03d Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.044 % to 1.02 %
12.	Aluminium and Its Alloys	Magnesium	ASTM E 1251 IS 11035	0.0011 % to 3.04 %
		Zinc	ASTM E 1251 IS 11035	0.020 % to 3.50 %
		Tin	ASTM E 1251 IS 11035	0.0050 % to 0.22 %
		Chromium	ASTM E 1251 IS 11035	0.006 % to 0.50 %
		Titanium	ASTM E 1251 IS 11035	0.002 % to 0.22 %
13.	Titanium & Alloys	Aluminium	WI/CHE/03f, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.005 % to 7.00 %
		Copper	WI/CHE/03f, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.001 % to 0.02 %

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Certificate Number **TC-5743**

Page 8 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

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		Iron	WI/CHE/03f, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.15 % to 2.21 %
		Molybdenum	WI/CHE/03f, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.001 % to 1.23 %
		Silicon	WI/CHE/03f, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.001 % to 0.3 %
		Vanadium	WI/CHE/03f, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.005 % to 4.10 %
		Manganese	WI/CHE/03f, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.001 % to 0.04 %
		Tungsten	WI/CHE/03f, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.002 % to 0.38 %
		Carbon	WI/CHE/03f, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.010 % to 0.012 %
14.	Nickel base	Copper	WI/CHE/03c, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.22 % to 32.00 %
		Tungsten	WI/CHE/03c, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.050 % to 6.00 %
		Chromium	WI/CHE/03c, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.006 % to 22.00 %
		Phosphorous	WI/CHE/03c, Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.005 % to 0.050 %
15.	Copper alloys	Silicon	WI/CHE/03d Issue No-3, Issue Date:27/01/2009,	0.019 % to 0.25 %

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Certificate Number TC-5743

Page 9 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

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16.	Aluminium Alloys	Silicon	Rev-1 dtd.25/02/2015	
			ASTM E 1251	0.002 % to 15.00 %
		Copper	IS 11035	
			ASTM E 1251	0.001 % to 6.00 %
		Nickel	IS 11035	
			ASTM E 1251	0.0082 % to 4.16 %
		Iron	IS 11035	
			ASTM E 1251	0.001 % to 4.00 %
		Manganese	IS 11035	
			ASTM E 1251	0.001 % to 1.35 %
Lead	IS 11035			
	ASTM E 1251	0.0033 % to 0.32 %		
Aluminium	IS 11035			
	ASTM E 1251	50.00 % to 99.90		
17.	Nickel Alloys	Carbon	WI/CHE/03c Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.02 % to 0.30 %
			WI/CHE/03c Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.005 % to 0.050 %
		Sulphur	WI/CHE/03c Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.068 % to 1.25 %
			WI/CHE/03c Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.04 % to 15.00 %
		Manganese	WI/CHE/03c Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	1.00 % to 9.00 %
			WI/CHE/03c Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.007 % to 25.5 %
		Silicon	WI/CHE/03c Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.09 % to 3.50 %
WI/CHE/03c Issue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015				

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Certificate Number TC-5743

Page 10 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

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		Cobalt	WI/CHE/03cIssue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.005 % to 2.80 %
		Niobium	WI/CHE/03cIssue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.003 % to 4.2 %
		Titanium	WI/CHE/03cIssue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.003 % to 0.60 %
		Tungsten	WI/CHE/03cIssue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.01 % to 6.50 %
		Nickel	WI/CHE/03cIssue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.005 % to 90.00 %
		Tantalum	WI/CHE/03cIssue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.0034 % to 0.005 %
		Phosphorous	WI/CHE/03cIssue No-3, Issue Date:27/01/2009, Rev-1 dtd.25/02/2015	0.0065 % to 0.048 %
II.	METALLIC COATING AND TREATMENT SOLUTIONS			
1.	Coated Metallic Material	Mass of Zinc coating	IS 6745	10 gm/m ² to 1000gm/m ²
		Uniformity of Zinc Coating	IS 2633	Qualitative
		Mass of Tin coating	IS 1327	10 gm/m ² to 1000 gm/m ²
		Thickness of Tin Coating	IS 1359	2 µm to 50.00µm
		Total Bromine	IEC 62321-3-1	10 ppm to 2000 ppm

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Certificate Number **TC-5743**

Page 11 of 36

Validity **09.07.2019 to 23.10.2020**

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III.	HAZARDOUS & RESTRICTED CHEMICALS			
1.	Restriction of Hazardous Substances (ROHS)	Cadmium	IEC 62321-3-1	10 ppm to 500 ppm
		Mercury	IEC 62321-3-1	10 ppm to 2000 ppm
		Total Chromium	IEC 62321-3-1	10 ppm to 2000 ppm
		Lead	IEC 62321-3-1	10 ppm to 2000 ppm
		Total Bromine	IEC 62321-3-1	10 ppm to 2000 ppm
2.	Bulk Materials including Loose fill insulations, acoustic and thermal sprays, pipe and boiler wraps, plasters, paints, flooring products, roofing materials, gaskets, cementitious products etc.	Identification/Detection of Asbestos	NIOSH Method 9002, Issue 2, NMAM, Fourth Edn. 15/08/1994 HSG 248, 2006 (PLM Method)	Detected/Not Detected (Min Detection Limit <0.15 m/m)

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Certificate Number **TC-5743**

Page 12 of 36

Validity **09.07.2019 to 23.10.2020**

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CHEMICAL TESTING

AT SITE				
I.	METALS & ALLOYS			
1.	Austenitic and Stainless Steel	Carbon	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Silicon	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Manganese	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Phosphorus	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Sulphur	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Chromium	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Nickel	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Cobalt	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Aluminium	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Copper	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Titanium	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Vanadium	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Molybdenum	WI/PMI/02 PMI Master smart (Spark)	Qualitative
		Niobium	WI/PMI/02 PMI Master smart (Spark)	Qualitative

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Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 13 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
2.	Low alloy steels	Carbon	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Silicon	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Manganese	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Phosphorus	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Sulphur	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Chromium	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Molybdenum	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Nickel	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Aluminium	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Copper	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Vanadium	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
		Tungsten	WI/PMI/02, Issue No.:3 Date:27/01/09	Qualitative

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 14 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			PMI Master smart (Spark)	
		Titanium	WI/PMI/02, Issue No.:3 Date:27/01/09 PMI Master smart (Spark)	Qualitative
3.	Metals By XRF Ferrous For Material Verification and Sorting	Chromium	ASTM E 1476 XRF	Qualitative
		Manganese	ASTM E 1476 XRF	Qualitative
		Nickel	ASTM E 1476 XRF	Qualitative
		Molybdenum	ASTM E 1476 XRF	Qualitative
		Vanadium	ASTM E 1476 XRF	Qualitative
		Niobium	ASTM E 1476 XRF	Qualitative
		Columbiun	ASTM E 1476 XRF	Qualitative
		Titanium	ASTM E 1476 XRF	Qualitative
4.	Copper Alloys	Tin	ASTM E 1476 XRF	Qualitative
		Manganese	ASTM E 1476 XRF	Qualitative
		Nickel	ASTM E 1476 XRF	Qualitative
		Iron	ASTM E 1476 XRF	Qualitative
		Zinc	ASTM E 1476 XRF	Qualitative
		Lead	ASTM E 1476 XRF	Qualitative
5.	Nickel Alloys	Chromium	ASTM E 1476 XRF	Qualitative
		Iron	ASTM E 1476	Qualitative

Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 15 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			XRF	
		Cobalt	ASTM E 1476 XRF	Qualitative
		Tungsten	ASTM E 1476 XRF	Qualitative
		Molybdenum	ASTM E 1476 XRF	Qualitative
		Titanium	ASTM E 1476 XRF	Qualitative
		Copper	ASTM E 1476 XRF	Qualitative
6.	Titanium Alloys	Iron	ASTM E 1476 XRF	Qualitative
		Molybdenum	ASTM E 1476 XRF	Qualitative
7.	Cobalt Alloys	Chromium	ASTM E 1476 XRF	Qualitative
		Iron	ASTM E 1476 XRF	Qualitative
		Cobalt	ASTM E 1476 XRF	Qualitative
		Tungsten	ASTM E 1476 XRF	Qualitative
		Molybdenum	ASTM E 1476 XRF	Qualitative

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Laboratory **ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area, MIDC Mahape, Navi Mumbai, Maharashtra**

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

Certificate Number **TC-5743**

Page 16 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
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ELECTRICAL TESTING

I.	SAFETY TEST FACILITY			
1.	Electrical equipment for Explosive Gas Atmospheres	Resistance to Impact	IEC 60079-0 Clause No 26.4.2, A 3.3, Annex C IS/IEC 60079-0 Clause No 26.4.2, A3.3	Height:2m max, Mass:1kg
			CSA C22.2 No.30:M1986 Clause No 6.2	Height:1m max, Mass:2kg
			CSA C22.2 No.25 Clause No. 7.5	Height:0.275m, Mass:1kg
			CSA C22.2 No.213 Clause 16.4	2.7 Joules
			FM 3600 Clause 4.1.2	Height:2m max, Mass:1kg
			FM 3615 Clause No 4.6	Height:2m max, Mass:1kg
			FM 3616 Clause No 5.2	Height:2m max, Mass:1kg
			UL 1203 Clause No 25.2	Height:15.24 cm, Mass:1.81 kg
		Drop	IEC 60079-0 Clause No 26.4.3 IS/IEC 60079-0 Clause 26.4.3	1 m height on concrete surface
			UL 1203 Clause 32	3 feet height on concrete surface
			FM 3600 Clause 4.1.1	3 feet height on concrete surface
			FM 3611 Clause No 15	3 feet height on concrete surface
			FM 3616 Clause No 5.3	3 feet height on concrete surface

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Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 17 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			CSA C22.2 No. 213 Clause 16	0.9 meter onto smooth concrete floor
		Ingress Protection (IP) For degree of protection (for Non-Rotating)	IEC 60079-0 Clause 26.4.5 & A 3.4 IS/IEC 60079-0 Clause 26.4.5 & Clause A 3.4	IP 1X to 6X & IP X1 to X9K (For IP 5X and 6X 1m*1m*1.5m Max. Weight 300Kgs of the DUT)
			IEC 60529	IP 1X to 6X & IP X1 to X9K (For IP 5X and 6X 1m*1m*1.5m Max. Weight 300Kgs of the DUT)
			IS/IEC 60529	IP 1X to 6X & IP X1 to X9K (For IP 5X and 6X 1m*1m*1.5m Max. Weight 300Kgs of the DUT)
		Circulating Dust Method	FM 3611 Clause 14.3	IP 1X to 6X for 1m x 1m x 1m Max. Weight 300 Kgs Max. of the DUT
			CSA C22.2 No. 213 Clause 15.3	IP 1X to 6X for 1m x 1m x 1m Max. Weight 300 Kgs Max. of the DUT
		Dust Exclusion	CSA C22.2 No.25 Clause No. 7.3 FM 3616 Clause No. 5.7	IP6X test (1m x 1m x 1.5m Max. Weight 300Kgs Max. of the DUT)
		Dust-Tightness	CSA 22.2 No.25 Clause No 7.2	IP6X test (1m x 1m x 1.5m Max. Weight 300Kgs Max. of the DUT)
		Ingress Protection (IP) For degree of protection For Rotating Machines	IEC 60079-0 Clause 26.4.5 & IEC 60034-5+AMD1	IP 1X to 6X & IP X1 to X9K (For IP 5X and 6X 1m*1m*1.5m Max. Weight 300Kgs Max. of the DUT)
		Thermal Temperature Measurement	IEC 60079-0 Clause 26.5.1 IS/IEC 60079-0 Clause 26.5.1	Ambient to 250°C

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 18 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			CSA C22.2 No.30 Clause 6.7	Ambient to 250°C
			CSA C22.2 No.25 Clause 7.4	Ambient to 250°C
			CSA C22.2 No.213 Clause 10	Ambient to 250°C
			UL 1203 , Clause 20	Ambient to 250°C
			FM 3616 , Clause 5.8	Ambient to 250°C
		Surface temperature requirements	FM 3611 , Clause 10	Ambient to 250°C
		Impact/Hammer	IEC 62262 BS EN 50102	IK 00 to IK 10 Max. Weight 10 Kgs Max Height 500mm
		Thermal Shock	IEC 60079-0 Clause 26.5.2 IS/IEC 60079-0 Clause 26.5.2	Sample at Service temperature and water at (10±5)°C
			UL 1203 Clause 25.1	Water temperature at 10°C Service temperature at 40° ambient
			FM 3600 , Clause 4.1.3	Water temperature at 10°C and Maximum Service temperature
			FM 3616 Clause No 5.2	Water temperature at 10°C and Maximum Service temperature
		Small Component Ignition	IEC 60079-0 Clause 26.5.3	2 x 2 x 2m height Max. Wt. 300 Kgs of the DUT
			IS/IEC 60079-0 Clause 26.5.3	2 x 2 x 2m height Max. Wt. 300 Kgs of the DUT
			CSA C22.2 No. 213 Clause No.:6.3	2 x 2 x 2m height Max. Wt. 300 Kgs of the DUT

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MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 19 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Torque Test for Bushings	IEC 60079-0 Clause 26.6	0.3 Nm to 225 Nm
			IS/IEC 60079-0 Clause 26.6	0.3 Nm to 225 Nm
		Secureness test on supply connection hubs	UL 1203 Clause 26	0.3 Nm to 225 Nm
			FM 3615 Clause No 4.2	0.3 Nm to 225 Nm
			FM 3616 Clause No 5.4	0.3 Nm to 225 Nm
		Thermal Endurance to Heat	IEC 60079-0 Clause 26.8	Temperature ambient to 150°C and Humidity 95 % RH at 50°C to 95°C And 50 %RH to 95 %RH at 25°C for 1m x 1m x 1m (Humidity Chamber)
			IS/IEC 60079-0 Clause 26.8	
			IS 9000 Part 3	
			ASTM D2247	
			IS 9000 Part 4	
			FM 3611 Clause 14.1.4	
			FM 3616 Clause No 5.5.1	
		Aging	FM 3611 , Clause 13.5.1 and Clause 14.1.3	Ambient to 250°C (Hot air oven)
		Thermal Endurance to Cold	IEC 60079-0 Clause 26.9	Temperature:ambient to (-) 70°C for 1m x 1m x 1m (Cold Chamber)
			IS/IEC 60079-0 Clause 26.9	
			IS 9000 Part 2	
			FM 3616	Temperature:ambient to

Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 20 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			Clause No 5.5.2	(-) 70°C for 1m x 1m x 1m (Cold Chamber)
		Resistance to Chemical Agents for group I Equipment	IEC 60079-0 Clause 26.11 IS/IEC 60079-0 Clause 26.11	Temperature: Ambient to 250°C for 0.45m x 0.45m x 0.45m
		Tests on Sealing Compound	UL 1203 , Clause 34	Qualitative
		Salt Spray Test	ASTM B-117	Qualitative
		Rust Resistance test	UL 1203 , Clause 24 and 47	Qualitative
		Earth Continuity Test	IEC 60079-0 Clause 26.12	3-40 Ampere DC
			IS/IEC 60079-0 Clause 26.12	3-40 Ampere DC
		Surface Resistance Test	IEC 60079-0 Clause 26.13	Resistance: 1MΩ to 100GΩ and Voltage: 250VDC, 500VDC & 1000VDC
			IS/IEC 60079-0 Clause 26.13	Resistance: 1MΩ to 100GΩ and Voltage: 250VDC, 500VDC & 1000VDC
		Test for accumulation of static electricity	UL 1203 , Clause 33.4 Method A	Resistance: 1MΩ to 100GΩ and Voltage: 250VDC, 500VDC & 1000VDC
		Measurement of Capacitance	IEC 60079-0 Clause 26.14 IS/IEC 60079-0 Clause 26.15	200pF to 200mF
		Alternative Qualification of Elastomeric Sealing O rings	IEC 60079-0 Clause 26.16	Temperature ambient to 150°C and Humidity 95 % RH at 50°C

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 21 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
				to 95°C And 50 %RH to 95 %RH at 25°C for 1m x 1m x 1m (Humidity Chamber) Temperature ambient to 180°C and Humidity 40 % to 95 % RH at 30°C to 95°C for 0.6 m x 0.6m x 0.6m (Climatic Cyclic Chamber) Ambient to 250°C for 0.45m x 0.45m x 0.45m (Hot air Oven) Temperature: ambient to-70°C for 1m x 1m x 1m (Cold Chamber)
		Test for Cables and Cable Glands-Tests for Clamping of Non-armoured and braided cables	IEC 60079-0 A 3.1 IEC 60079-0 Clause A 3.1.4 IEC 60079-0 Clause A 3.1.5	96 N to 270 kN 0.3Nm to 225Nm
			IS/IEC 60079-0 , IS/IEC 60079-0 clause A 3.1.4 IS/IEC 60079-0 Clause A 3.1.5	96 N to 270 kN 0.3Nm to 225Nm
		Test for Cables and Cable Glands-Tests for Clamping of armoured cables	IEC 60079-0 A 3.2 IEC 60079-0 Clause A 3.2.1.2 IEC 60079-0 Clause A 3.2.1.3	96 N to 270kN 0.3Nm to 225Nm
			IS/IEC 60079-0 A 3.2 IS/IEC 60079-0 Clause A 3.2.1.1	96 N to 270kN 0.3Nm to 225Nm

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Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area, MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 22 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			IS/IEC 60079-0 A 3.2.1.2	
		Test for Cables and Cable Glands-Type test for Resistance to Impact	IEC 60079-0 Clause A 3.3 IS/IEC 60079-0 Clause A 3.3	Height:2m max, Mass:1Kg
		Test for Cables and Cable Glands-Test for degrees of protection (IP) of Cable Glands	IEC 60079-0 , Clause A 3.4 IS/IEC 60079-0 Clause A 3.4	IP 1X to 6X & IP X1 to X9K (For IP 5X and 6X 1m*1m*1.5m Max. Weight 300Kgs of DUT)
2.	Electrical Apparatus, equipment and enclosures for Explosive Gas mixtures- Equipment protection by flameproof enclosures "d'	Determination of Explosion Pressure	IEC 60079-1:2014, Clause 15.2.2, Clause 19.3, Clause D.3.6 IS/IEC 60079-1 , Clause 15.1.2, Clause 19.3.1.2, Clause 19.3.1.3, Clause D.3.6	Upto 50 bar
CSA C22.2 No.30 Clause 6.3			Upto 50 bar	
UL 1203 , Clause 21			Upto 50 bar	
FM 3615 , Clause 4.3			Upto 50 bar	
		Over Pressure	IEC 60079-1 Clause 15.2.3 and Clause 19.3 IS/IEC 60079-1, Clause 15.1.3, Clause 19.3.1.2	350 bar (Hydraulic)
			CSA C22.2 No.30:M Clause No. 6.6.2 and Clause No. 6.6.3	350 bar (Hydraulic)
		Hydrostatic Pressure	UL 1203 , Clause 22	350 bar (Hydraulic)
			FM 3615 , Clause 4.5	350 bar (Hydraulic)
		Test for non-transmission of an Internal Ignition	IEC 60079-1 Clause 15.3, Clause 19.3 and 19.4	2 x 2 x 2m Ht. Max. 300 Kgs max. of sample size and weights

Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 23 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			IS/IEC 60079-1, Clause 15.2, Clause 19.3.1.4	
		Explosion Flame Propagation test	CSA C22.2 No.30:M Clause 6.5	2 x 2 x 2m Ht. Max. 300 Kgs max. of sample size and weights
			FM 3615 Clause 4.4	2 x 2 x 2m Ht. Max. 300 Kgs max. of sample size and weights
		Test of Erosion by flame	IEC 60079-1 Clause 19.4	2 x 2 x 2m Ht. Max. 300 Kgs max. of sample size and weights
		Test for Cable Glands-Sealing Test	IEC 60079-1:2014-C3.1 IS/IEC 60079-1 -C3.1	2000 kPa-3000 kPa
		Test for Cable Glands-Test of Mechanical Strength	IEC 60079-1:2014-C3.2 IS/IEC 60079-1 , C3.2	0.3Nm to 225Nm
		Type tests for Ex blanking elements-Torque test	IEC 60079-1:2014-C3.3.1 IS/IEC 60079-1 , C3.3.1	0.3Nm to 225Nm
		Type tests for Ex Blanking Elements-Over Pressure Test	IEC 60079-1:2014-C3.3.2 IS/IEC 60079-1 , C3.3.2	2000kPa to 3000 kPa
		Type tests for Ex thread adapters-Torque test	IEC 60079-1:2014, C.3.4.1 IS/IEC 60079-1 , C3.4.1	0.3Nm to 225Nm
		Type tests for Ex thread adapters-Impact Test	IEC 60079-1:2014, C.3.4.2 IS/IEC 60079-1 , C3.4.2	Height:2m max, Mass:1Kg
		Type tests for Ex thread adapters-Over Pressure Test	IEC 60079-1:2014, C.3.4.3 IS/IEC 60079-1 , C3.4.3	2000kPa to 3000 kPa
3.	Electrical Apparatus for Explosive Gas	Tests on the Compound	IEC 60079-18 Clause 8.1 IS/IEC 60079-18	

Laboratory **ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area, MIDC Mahape, Navi Mumbai, Maharashtra**

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

Certificate Number **TC-5743**

Page 24 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Mixtures- Equipment Protection by Encapsulation "m"	Water Absorption Test	Clause 8.1.1	220gms max. +/-0.1mg
		Dielectric Strength Test	Clause 8.1.2	500V to 5 kV Max
		Tests on the Apparatus	IEC 60079-18 Clause 8.2 and IS/IEC 60079-18	
		Maximum Temperature	Clause 8.2.2	Ambient to 250°C
		Thermal Endurance to Heat	Clause 8.2.3.1	Temperature ambient to 150°C and Humidity 95 % RH at 50°C to 95°C And 50 %RH to 95 %RH at 25°C for 1m x 1m x 1m (Humidity Chamber) Temperature ambient to 180°C and Humidity 40 % to 95 % RH at 30°C to 95°C** for 0.6 m x 0.6m x 0.6m (Climatic Cyclic Chamber) Ambient to 250°C for 0.45m x 0.45m x 0.45m (Hot air Oven)
		Thermal Endurance to Cold	Clause 8.2.3.2	Temperature: ambient to -70°C for 1m x 1m x 1m
		Dielectric Strength Test	Clause 8.2.4	500V to 5 kV
		Cable Pull Test	Clause 8.2.5	1N to 2000 N
		Pressure Test for Group I and Group II electrical equipment	Clause 8.2.6	2000 kPa to 3000 kPa
		Sealing Test for Built in Protective devices	Clause 8.2.8	Qualitative
4.	Explosive Atmospheres-	Type tests for dust exclusion by	IEC 60079-31 Clause 6.1.1	

Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 25 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	Equipment dust ignition protection by enclosure "t"	enclosures	IS/IEC 60079-31	
		Thermal Endurance to heat, Thermal Endurance to Cold & Impact Test	IEC 60079-31 Clause 6.1.1.1 IS/IEC 60079-31 Clause 6.1.1	Temperature ambient to 150°C and Humidity 95 % RH at 50°C to 95°C And 50 %RH to 95 %RH at 25°C for 1m x 1m x 1m (Humidity Chamber) Temperature ambient to 180°C and Humidity 40 % to 95 % RH at 30°C to 95°C for 0.6 m x 0.6m x 0.6m (Climatic Cyclic Chamber) Ambient to 250°C for 0.45m x 0.45m x 0.45m (Hot air Oven)
		Impact test for supplementary enclosure	IEC 60079-31 Clause 6.1.1.2	Height:2meter max, Mass:1Kg
		Pressure test	IEC 60079-31 Clause 6.1.1.3 IS/IEC 60079-31 Clause 6.1.3	2kPa to 4 kPa
			FM 3616 Clause 5.6	2kPa-4 kPa
		IP test	IEC 60079-31 Clause 6.1.1.4 IS/IEC 60079-31 Clause 6.1.1	IP 5X to 6X 1m x 1m x 1.5m Max. Weight 300Kgs of DUT
		Dust-Penetration test	UL 1203 Clause 43	IP 5X to 6X 1m x 1m x 1.5m Max. Weight 300Kgs of DUT
		Thermal test	IEC 60079-31 Clause 6.1.2	Ambient to 250°C

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Laboratory **ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area, MIDC Mahape, Navi Mumbai, Maharashtra**

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

Certificate Number **TC-5743**

Page 26 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
5.	Explosive Atmospheres-Equipment protection by increased safety "e"	Type verification and type tests	IS/IEC 60079-31 Clause 6.1.2 FM 3616 Clause 5.8	Ambient to 250°C
		Dielectric Strength test	IEC 60079-7 Clause 6 IEC 60079-7 Clause No. 6.1	500V to 5kV AC rms
		Resistance to Impact	IEC 60079-7 Clause No. 6.3.2	Height:2m max, Mass:1Kg
		Drop test	IEC 60079-7 Clause No. 6.3.2	1 m height on concrete surface
II.	CABLES AND ACCESSORIES			
1.	Cable Glands for Electrical Installation Mechanical cable glands- Part 1: Armour Glands- Requirements and test methods	Mechanical Tests Mechanical Properties Mechanical Performance	IEC 62444 /BS EN 62444 BS EN 50262 BS 6121-1	
	Metallic Cable Glands	Cable Retention Test Cable Retention for cable glands without and with protective bonding to earth Cable Retention	IEC 62444 /BS EN 62444 Clause 9.2 BS EN 50262 Clause 9.1 and 9.2 BS 6121-1 Clause 4.2.1.1	5N to 70 N
2.	Metallic Cable Glands	Cable Anchorage test for non-armoured cable Cable Anchorage test for armoured cable Cable Anchorage	IEC 62444 / BS EN 62444 Clause 9.3 IEC 62444/ BS EN 62444 Clause 9.4 BS EN 50262 Clause 9.3	30N to 5600 N

Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 27 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Resistance to Impact	IEC 62444 / BS EN 62444 Clause 9.5 BS EN 50262 Clause 9.4 BS 6121-1 Clause 4.2.1.2	0.2J to 20J and 1m Height
		Seal Performance Test	IEC 62444 /BS EN 62444 Clause 9.6	0.3 Nm to 225 Nm
		Excess Tightening & Seal Performance Test Resistance to Excess torque	BS EN 50262 Clause 9.5 BS 6121-1 Clause 4.2.1.3	0.3 Nm to 225 Nm
		Electrical Tests	IEC 62444 /BS EN 62444 BS EN 50262 BS 6121	0.3 Nm to 225 Nm
		Equipotential Bonding to electrical equipment	IEC 62444 BS EN 62444 Clause 10.1 BS EN 50262 Clause 10.1 BS 6121-1 Clause 4.2.2.1	500 $\mu\Omega$ to 1 Ω
		Equipotential Bonding to metallic layers of Cable. Electrical connections to metallic layers of cable	IEC 62444 /BS EN 62444 Clause 10.2 BS EN 50262 Clause 10.2/BS 6121-1 Clause 4.2.2.2	500 $\mu\Omega$ to 1 Ω
		Degrees of protection in accordance with IEC 60529 IP code in accordance with EN 60529 Ingress Protection	IEC 62444 /BS EN 62444 Clause 12.1 BS EN 50262 Clause 12.1 BS 6121-1 Clause 4.2.3.1	IP 1X to 6X & IP X1 to X8
		Resistance to corrosion	IEC 62444 /BS EN 62444 Clause 12.2	

Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 28 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
3.	Cables	Resistance/Resistivity Test	IS 10810 Part 5	0.01 milli ohms to 1.0 kilo ohms
	Winding Wires	Resistance/Resistivity Test	IS 13778 Part 5: Clause No. 3	0.01 milli ohms to 1.0 kilo ohms
	Fuse Wires	Resistance/Resistivity Test	IEC 60851-5	0.01 milli ohms to 1.0 kilo ohms
			IS 13730 Part 27 Clause No. 5	0.01 milli ohms to 1.0 kilo ohms
			IS 9926 Clause No. 7.3	0.01 milli ohms to 1.0 kilo ohms
Crosslinked polyethylene insulated PVC sheathed cables	Resistance/Resistivity Test	IS 7098 Part 1 Clause No. 13.5	0.01 milli ohms to 1.0 kilo ohms	
4	Stranded Conductors	Cross Sectional Area	ASTM B 263	Qualitative
III.	ELECTRICAL MATERIALS			
1.	Electrical Conductors	Resistance/Resistivity Test	ASTM B 193 IEC 62561-2 Clause 5.3.8 BS EN 50164-2 Clause 5.2.5 IS 398 Part 2 Clause 4.1 IS 3635:1966 Clause 4.1 IS 613:2000 Clause no. 11 IS 1897 Clause No. 9.1 IS 191 Clause No.9.2	0.01 milli ohms to 1.0 kilo ohms
			Electrical Conductivity test	ASTM E 1004
				IS 613:2000

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Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 29 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			Clause no. 11.1.1 IS 1897 Clause No. 9.1.1	10 to 102 % IACS
IV. ENVIRONMENTAL TEST FACILITY				
1.	Road Vehicles- Degrees of Protection (IP Code)- Protection of Electrical Equipment Against Foreign Objects, Water and Access	Ingress Protection Test	ISO 20653	IP 1X to 6KX (Vertical Chamber) & IP X1 to X9K
2.	Enclosures for Electrical Equipment	For Non-rotating	IEC 60529	IP 1X to 6X & IP X1 to X9K
3.	Switchgear and Control Gears	Ingress Protection test	IS/IEC 60947-1 Annex C	IP 1X to 6X & IP X1 to X8
4.	Rotating Electrical Machines	Ingress Protection test	IEC 60034 Part 5	IP 1X to 6X & IP X1 to X8
5.	Environmental Testing	Salt Spray Test	ASTM B-117	Qualitative
			UL 1203, Clause 23 and 47	Qualitative
			ISO 9227 (NSS Test)	Qualitative
		Test Ka:Salt Mist test	IEC 60068-2-11 IS 9000 Part 11	Qualitative
Test Kb:Salt mist test	IEC 60068-2-52	Qualitative		
Corrosion test	JSS 55555 Test Number 9	Qualitative		
6.	Environmental Conditioning on Electrical	Dry heat test	IS 9000 Part 3 IEC 60068-2-2	Ambient to 180°C for 0.6m x 0.6m x 0.6m Ambient to 250°C for

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Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 30 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

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	equipment and components	Cold test	IS 9000 Part 2 IEC 60068-2-1	0.45m x 0.45m x 0.45m Ambient to -70°C for 1m x 1m x 1m
		Damp heat (Steady state) test Damp heat (Cyclic) test	IS 9000 Part 4 and IEC 60068-2-78 IEC 60068-2-30 IS 9000 Part 5	Humidity 30 % to 95 % RH at 25°C to 40°C
		Composite Temperature/Humidity cyclic test	IS 9000 Part 6 IEC 60068-2-38	Temperature ambient to 150°C and Humidity 40 % RH to 95 % RH at 25°C to 50°C for 1m x 1m x 1m (Humidity Chamber) Temperature ambient to 180°C and Humidity 40 % to 95 % RH at 30°C to 95°C for 0.6 m x 0.6m x 0.6m (Climatic Cyclic Chamber)

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Laboratory **ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area, MIDC Mahape, Navi Mumbai, Maharashtra**

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

Certificate Number **TC-5743**

Page 31 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
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MECHANICAL TESTING

I. MECHANICAL PROPERTIES OF METALS				
1.	Ferrous and Non Ferrous products	Tensile test Yield Stress Ultimate Tensile Test Elongation Reduction in area Proof Stress	IS 1608 ASTM A 370 ASTM E8/8M ISO 6892-1	10kN to 400 kN/ 0.1kN 2 % to 70 % 2 % to 80 % 5 % to 70 %
2.	Welded Coupon Plate & Weldments	Transverse Tensile Nick Break	BS EN ISO 4136 IBR 2005, IS 2825	10kN to 400 kN 10kN to 400 kN
		Impact on Weld	BS EN ISO 9016	2J to 300J Room temp to-196 deg. C
		Transverse Tensile on Weld Reduction area	BS EN ISO 4136	10kN to 400 kN/0.1kN 2 % to 70 %
		Transverse Bend on Weld	BS EN ISO 5173 +A1	Qualitative (10, 12, 18, 20, 22, 24,30,32, 34, 40, 44, 48, 50, 52, 54, 60, 70, 75, 80, 100, 150, 155, 160, 220, 260 mm mandrel dia)
		Hardness Test on Weld	BS EN ISO 9015-1	HV 5 to HV 30 700HV Max.
3.	Pipes & Tubes	Bend	IS 2329	10mm-61mm OD
		Crushing Strength	IS 3601 ASTM A 370	10mm-61mm OD 10kN-400kN
		Izod Impact	IS 1598	2 J-164 J
		Drift Expansion	IS 2335 ASTM A 1016/A1016M ASTM A 370	10mm to 61mm OD/Qualitative
		Flattening	IS 2328 ASTM A999/A999M ASTM A530/A530M	10mm to 660mmOD max/Qualitative

Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 32 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
			ASTM A 1016/A1016M ASTM A 370 ASTM B111/B111M ASTM A 450	
		Flanging	IS-2330 / A 370	10mm to 100 mm OD/Qualitative
		Crushing Strength	IS 3601 ASTM A 370	10kN to 1000kN/ Qualitative
4.	All metallic materials	Charpy Impact V-Notch	IS 1499 IS 1757-1 BS EN ISO 148-1 ASTM A 370	2J-300J Room temp to -196 deg. C
5.	Metallic materials	Vickers Hardness Method Including Micro hardness	IS 1501 Part-1 ASTM A 370 ISO 6507-1 ASTM E384 ASTM E 92	HV 5-HV 30 700HV Max. HV 0.1, HV0.2, HV 0.3 HV 0.5 HV 0.1-HV 1 100HV to 800 HV
6.	Hooks	Proof Load	IS 15560	0.5Ton-5 Tons
7.	Metallic Materials	Brinell Hardness	IS 1500-Part 1 ISO 6506-1 ASTM A 370 a ASTM E10	2.5mm/187.5kgf 10mm/3000kgf 400 HBW max.
		Rockwell Hardness	IS 1586 (Part 1-2) IS 1586 Part 3 ASTM A 370 ISO-6508-1 ASTM E18	A,B,C,T & N 20-88 HRA 20-100HRB 20-100HRBW 20-70HRC 67-93HR15T 70-94 HR15N 43-82 HR30T
8.	Cladded Plates & Rods	Shear	ASTM A 263 ASTM A 264 ASTM A 265	10kN-400 kN

Laboratory ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area, MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 33 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
9.	Steel Plate	Through Thickness Test	ASTM A770/A770MBS EN 10164	25.00mm-200mm Thk
10.	Nuts	Proof Load test	IS 1367 Part 6 ASTM A 370 ISO 898-2	10kN-400kN M4-M39 coarse thread
11.	Coated Samples, Metallic Coatings	Hammer Test	IS 2629	Qualitative
		Bend Test	ASTM B 571	Qualitative
		Burnishing Test	ASTM B 571	Qualitative
		Chisel Knife Test	ASTM B 571	Qualitative
		File Test	ASTM B 571	Qualitative
		Grind Saw Test	ASTM B 571	Qualitative
		Heat-Quench Test	ASTM B 571	Qualitative
		Impact Test	ASTM B 571	Qualitative
		Peel Test	ASTM B 571	Qualitative
		Scribe Grid Test	ASTM B 571	Qualitative
12.	Ferrous Metals, Bars, Billets, Blooms, Forgings & Casting of Carbon & Low Alloy Steel Castings	Macro structure analysis	ASTM E-381 IS11371 IS12037 IS13015 ASTM A 604	Magnification 5X-20 X
13.	Weldment	Macro & Micro structure analysis	ASME Section IX ASTM E 340 BS EN ISO 17639	Magnification 5X-20X for Macro 100X-1000X for Micro
14.	Ferrous and Non Ferrous Materials & products Welded Coupon Plate	Tensile test	IS 1608	50 to 1800 MPa
		Yield Stress	ASTM A 370	50 to 2000 MPa
		Proof Stress	ASTM E8/8M	50 to 2000 MPa
		Ultimate Tensile Stress	ISO 6892-1	50 to 2000 MPa
		Elongation		2 to 70 %
		Reduction in area		5 to 70 %
		Transverse Tensile	BS EN ISO 4136	100 to 1800 MPa
		Nick Break	IBR 2005/IS 2825	Qualitative
15.	Ferrous Materials	Charpy Impact	ASTM E 23-16b/A 370	2J to 300 J

Laboratory **ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area, MIDC Mahape, Navi Mumbai, Maharashtra**

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

Certificate Number **TC-5743**

Page 34 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
	& Products	V Notch		(25° C to-196 ° C)
16.	Ferrous and Non Ferrous Materials & products, High strength Deformed Steel bars and Wires	Bend	IS 1599 ASTM A 370 ASTM E 290 (Guided by Roller)	Qualitative (10, 12, 18, 20, 22, 24,30,32, 34, 40, 44, 48, 50, 52, 54, 60, 70, 75, 80, 100, 150, 155, 160, 220, 260 mm Mandrel dia)
		Re-bend	IS-1786 IS 1599	Qualitative (6, 8, 10, 12, 14, 16, 18, 20, 22, 25, 28, 32, 36, 38 mm bar dia)
17.	Steel Hooks	Proof Load/ Safe working Load	IS 15560	20 to 100 kN/Qualitative
18.	Steel Fastener-Nuts	Proof Load	IS 1367 Part 6 ASTM A 370 ISO 898-2	10kN to 1000kN M4 to M36 Coarse thread/Qualitative
II.	METALLOGRAPHY TEST			
1.	Ferrous & Non Ferrous Metals & Alloys (Copper, Aluminium, Titanium, Nickel, Zinc Base)	Microstructure Analysis	ASM Handbook Volume 9	Magnification 100x-1000x
2.	Cast Irons (White/Grey Iron Malleable Iron, Ductile Iron Including Nodular SG	Microstructure analysis	ASM Handbook Volume 9 ASTM A247 IS 7754 ASTM E562	Magnification 100x-500x Max.
3.	Ferrous, Non Ferrous Metals & Alloys	Estimation of grain size by Microscopic method	ASTM E 112 BS EN-ISO-643 ASTM E 930 IS 4748	Magnification 100x ASTM G.S. Upto 10
4.	Steels	Inclusion rating method A & D	ASTM E 45 IS 4163	Magnification 100x

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MIDC Mahape, Navi Mumbai, Maharashtra

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5743

Page 35 of 36

Validity 09.07.2019 to 23.10.2020

Last Amended on --

Sl.	Product / Material of Test	Specific Test Performed	Test Method Specification against which tests are performed	Range of Testing / Limits of Detection
		Method K	DIN EN 10247	
		Effective Case depth by Micro hardness Traverse Method	IS 6416	0.01mm-10mm (traverse method) 0.01mm to 3mm (microscopic method)
		Microscopic Method		
		Depth of Decarburized Layer	ASTM E 1077 IS 6396	0mm-3mm
		Carbide morphology	Stahl-Eisen-SEP1520	Magnification 100X-1000X
5.	Multiphase Metals/ Alloys	Determination of Volume Fraction of Phases	ASTM E 562 ASTM E1245	2 % to 70 %
		Ferrite content By Ferritoscope	ASTM A 800/800M	0.1 FN to 110 FN 0.1 % to 80 %
6.	Austenitic Stainless Steels	Resistance to Inter granular corrosion Test	ASTM A 262 Method A, B, C E F	Practices A & E (Qualitative) Practices B C F (0.1mg to 5gm)
7.	Duplex (Austenite-Ferrite) Stainless steels	Detecting presence of detrimental intermetallic phases	ASTM A 923 Method A, B, C	Magnification 100X-1000X Method A Method B Method C
8.	Stainless Steels & related alloys	Pitting & Crevice Corrosion test	ASTM G 48 Method A, B, C, D, E, F	Magnification 5X-20X
		Chloride Stress Corrosion Cracking	ASTM G 36	Qualitative
		Hydrogen Induced Cracking	NACE TM 0284	Qualitative
		Sulphide Stress Corrosion Cracking	NACE TM 017	Qualitative
9.	Wrought Nickel, rich Chromium Bearing alloys	Detecting Susceptibility to Inter Granular Corrosion	ASTM G-28 Method A, B	0.1mg to 5gm

Laboratory **ELCA Laboratories, Gen-62, Trans Thane Creek (TTC) Industrial Area,
MIDC Mahape, Navi Mumbai, Maharashtra**

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

Certificate Number **TC-5743**

Page 36 of 36

Validity **09.07.2019 to 23.10.2020**

Last Amended on --

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10.	Brazed Products	Peel Test Fracture Test	ASME Sec IX QB 170 QW 182	Qualitative
11.	Painted Panel	Adhesion by tape Test by Method A & Method B	ASTM D 3359	Qualitative
		Pull of Adhesion	ASTM D 4541	1.3 MPa-69 MPa
		Pencil Hardness	ASTM D3363	Qualitative
12.	Ferrous Material & Products (Steel bars billets, blooms, forgings of Carbon & low alloy steel Castings)	Macro structure analysis	ASTM E-381 IS11371 IS13015	10X, 20 X & 40X/Qualitative
13.	Ferrous & Non-Ferrous Materials & Products	Macro structure analysis	ASTM E 340 ASME Section IX IS 3600 Part .9	10X, 20 X & 40X/Qualitative
		Coating thickness by Microscopic Method	IS 3203 ASTM B 487	100X to 1000X
14.	Magnetic Material	Coating thickness by Magnetic Method	ASTM B 499	For Ferrous: Upto 1250 micron
III.	BUILDING MATERIALS			
1.	Concrete Cubes	Compression test	IS 516	10kN-2000 kN