

Laboratory TAG Corporation, 91, Thiruneermalai Road, Chromepet, Chennai, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 1 of 16

Validity 05.06.2018 to 04.06.2020

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.	TRANSMISSION LINE EQUIPMENT AND ACCESSORIES			
1.	Stranded Conductor (ACSR / AAAC/ AAC/ ACCC/ ACSS/AL59/ACS/ STACIR/ Copper/ OPGW/ GS Earth Wire)	DC Resistance	TAG/TM/DC/01 (2015) IS 398 (Part 1) IS 398 (Part 2) IS 398 (Part 4) IS 398 (Part 5) TAG/SOP/DC/001 Issue Date 05.03.2016 Issue No. 03 IS 12776 IEEE 1138 (PGCIL Specification Annexure A & B Section II (Volume II) Issue Dt-13-12-2016 Issue No.1Rev.0)	10 $\mu\Omega$ to 100 m Ω
		Dry Corona	IS 398 (Part 5) TAG/SOP/COR/001 Issue Date 12.01.2017 Issue No. 04 (PGCIL Specification Annexure A & B Section II (Volume II) Issue Dt-13-12-2016 Issue No.1Rev.0)	51 to 800 kV HVAC system
		RIV	IEC 60437 IS 8263 TAG/SOP/RIV/001 Issue Date 12.01.2017 Issue No. 04 (PGCIL Specification Annexure A & B Section II (Volume II) Issue Dt-13-12-	10 dB μ V to 120 dB μ V

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 2 of 16

Validity 05.06.2018 to 04.06.2020

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
			2016 Issue No.1 Rev.0)	
		Ampacity	TAG/TM/AMP/01 Issue Date 05.03.2016 Issue No. 03	40 A to 2000 A 28 °C to 400 °C
2.	Individual Strands of the Stranded Conductor (ACSR/AAAC/ AAC/ ACCC/ ACSS/AL59/ACS/ STACIR/Copper/ GS Earth Wire)	DC Resistance	IS 398 (Part 1) IS 398 (Part 2) IS 398 (Part 4) IS 398 (Part 5) IS 12776 IEC 61232 IEC 60889	10 μΩ to 100 mΩ
3.	Suspension clamps/ Tension Joints & clamps/ Spacer/ Damper (ACSR/ AAAC/ AAC/ AL59/ ACS/HTLS)	Magnetic Power losses	IEC 61284 IS 9708 IS 10162 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/MPL/001 Issue Date 25.01.2018 Issue No. 01	1 W to 20 W
4.	Tension Joints and Tension clamps / Partial tension Fittings (ACSR/ AAAC/ AAC/ AL59/HTLS)	Heat Cycle	IEC 61284 IS 2121 (Part 2) IS 2121 (Part 4) IS 2486 (Part 1) BS 3288 (Part 1) ANSI C119.4	150 A to 3500 A Ambient to 400 °C 10 μΩ to 100 mΩ
5.	Tension Joints/ Spacer Damper/ Flexible Spacer (ACSR/ AAAC/ AAC/AL59/ ACS/HTLS)	Electrical Resistance	IEC 61854 IS 2121 (Part 2) IS 2121 (Part 3) BS 3288 (part 1)	5 V to 300V AC 2 mA to 10 mA 10 kΩ to 80 kΩ

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 3 of 16

Validity 05.06.2018 to 04.06.2020

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
6.	Insulator set fittings / Suspension clamps/ Tension Joints and Tension clamps/ Partial tension Fittings/ Insulator Protective fittings/	Corona	IEC 61284 IS 731 IS 2121 (Part 1) IS 2121 (Part 2) IS 9708 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/COR/001 Issue Date 12.01.2017 Issue No. 04	51 to 800 kV HVAC system
	Spacer Damper/ Flexible Spacer/ Rigid Spacer/ Vibration Damper Armour Rod/ Aluminum Clad Steel (ACSR/ AAAC/ AAC/ AL59/ ACS/HTLS)	RIV	IEC 61284 IEC 60437 IS 8263 TAG/SOP/RIV/001 Issue Date 12.01.2017 Issue No. 04 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0)	10 db μ V to 120 db μ V
7.	Insulator set fittings(ACSR / AAAC/AAC/ AL59/ ACS/HTLS)	Voltage Distribution	TAG/SOP/VDT/001 Issue Date. 25.01.2018 Issue No. 01 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0)	51 kV to 800 kV HVAC system
8.	Armour Rod/ Aluminum Clad Steel	DC Resistance	IS 2121 (Part 1) IS 2121 (Part 2) IS 2121 (Part 3)	10 $\mu\Omega$ to 100 m Ω

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 4 of 16

Validity 05.06.2018 to 04.06.2020

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
	(ACSR / AAAC/ AAC/ AL59/ ACS/HTLS/OPGW/ ADSS/ GS & ACS Earthwire)		BS 3288 (Part 1) TAG/SOP/DC/001 Issue Date 05.03.2016 Issue No. 03	

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 5 of 16

Validity 05.06.2018 to 04.06.2020

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
<u>MECHANICAL TESTING</u>				
I.	MECHANICAL PROPERTIES OF MATERIALS			
1.	Stranded Conductor (ACSR / AAAC/ AAC/ ACCC/ ACSS/AL59/ ACS/ STACIR/ Copper/ OPGW/ GS Earth Wire)	Visual Examination	IS 398 (Part 5) IEC 61089 IEC 62219 IEC 61089 BS EN 50540 SS 4240814 ASTM B232/B232M-17 BS EN 50182	Qualitative
		Surface Condition	IS 398 (Part 2) IS 398 (Part 5) IS12776 TAG/SOP/UTS/002 Issue Date 05.03.2016 Issue No.03 (PGCIL Specification Annexure A & B Section II (Volume II) Issue Dt-13-12-2016 Issue No.1Rev.0)	0.01 mm to 200 mm 5 kN to 2000 kN
		Ultimate Tensile Strength Test/ Breaking Load Test	IS 398 (Part 2) IS 398 (Part 5) IS 12776 IEC 61089 IEC 62219 BS EN 50182 SS 4240814 SS 4240813 AS 3822 ASTM B232/B232M-17, ASTM B399/B399M-04, ASTM B856	5 kN to 2000 kN

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 6 of 16

Validity 05.06.2018 to 04.06.2020

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
			AS 1531 NF-34-120 NFC 34-125 TAG/SOP/UTS/002 Issue Date 05.03.2016 Issue No.03 (PGCIL Specification Annexure A & B Section II (Volume II) Issue Dt-13-12-2016 Issue No.1Rev.0) BS EN 50540 IEEE 1138	
		Stress Strain	IS 398 (Part 2) IEC 61089 IEC 62219 BS EN 50182 AS 3822 IEEE 1138 BS EN 50540	5 kN to 300 kN
		Long Term Creep	IEC 61395 IEEE 1138 SS 4240814 SS 4240813 BS EN 61395 TAG/SOP/CRP/001 Issue Date 05.03.2016 Issue No.03 (PGCIL Specification Annexure B Section II (Volume II) Issue Dt-13-12-2016 Issue No.1 Rev.0) SS 112318	5 kN to 300 kN
		Measurement of Lay Ratio	IS 398 (Part 1) IS 398 (Part 2) IS 398 (Part 3)	5 mm to 40 mm

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 7 of 16

Validity 05.06.2018 to 04.06.2020

Last Amended on -

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			IS 398 (Part 4) IS 398 (Part 5) IS 12776 IEC 61089 IEC 62219 BS EN 50182 BS 7884 BS 215 (Part-1) BS 215 (Part-2) BS EN 50540 SS 4240814, SS 4240813 ASTM B232/B232M-17, ASTM B856-13, AS 3607 NFC 34-120 IEEE 1138	
		Brittle Fracture	TAG/SOP/BF/001 Issue Date.22.09.2017 Issue No.1 (PGCIL Specification Annexure A Section II (Volume II) Issue Dt-13-12-2016 Issue No.1 Rev.0)	5 kN to 2000 kN
		Inertness	EN 50182 BS EN 50540	Qualitative
		Longitudinal Smoothness	TAG/TM/LST/01 Issue 5-5-2014 Rev.01 Date 14-5-2015	0.05 mm to 1 mm
		Mass weight of the conductor	BS EN 50182 BS EN 50540 IEC 61089 NFC 34-120 SS 4240814 ASTM B232/B232M	10 g to 15 kg

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 8 of 16

Validity 05.06.2018 to 04.06.2020

Last Amended on -

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			IS 12776 IEC 62219	
		Annular Gap Measurement Test	IEC 62420	0.001 mm to 25 mm
		Measurement of Diameter	BS EN 50540 IEC 62219 IEC 61089	0.001 mm to 50 mm
2.	Individual Strands of the Stranded Conductor. (ACSR /AAAC/ AAC/ ACCC/ACSS/ AL59/ACS/STACIR/ Copper/GS Earth Wire)	Measurement of Diameter	BS 2627 BS 7884 SS 4240813 ASTM B232/B232M-17, ASTM B856 ASTM A363 NFC 34-120 NFC 34-125 NFC 34-113 IS 398 (Part 1) IS 398 (Part 2) IS 398 (Part 3) IS 398 (Part 4) IS 398 (Part 5) IS 12776 IEC 61089 IEC 61232 IEC 60889 IEC 60888 BS EN 50182 BS EN 50189 IEC 60104 IEC 62004 BS 215 (Part-1) BS 215 (Part-2), BS EN 50540	0.001 mm to 25 mm
		Thickness of Aluminum Cladding	BS EN 50540 IEC 61232	Upto 1250 µm

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 9 of 16

Validity 05.06.2018 to 04.06.2020

Last Amended on -

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		Breaking Load / Tensile Strength	IS 398 (Part 1) IS 398 (Part 2) IS 398 (Part 3) IS 398 (Part 4) IS 398 (Part 5) IS 12776 IEC 61089 IEC 61232 IEC 60889 IEC 60888 IEC 62219 IEC 62004 IEC 60104 BS EN 50540 BS EN 50189 BS EN 50182 BS 2627 BS 4565 BS 7884 SS 4240813 SS 4240814 ASTM B232/B232M ASTM B856 ASTM A363 NFC 34-120 NFC 34-125 NFC 34-113	0.1 kN to 50 kN
		Elongation	IS 398 (Part 2) IS 398 (Part 3) IS 398 (Part 4) IS 398 (Part 5) SS 4240813 SS 4240814 IS 12776 IEC 61232	1 mm to 100 mm

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Laboratory TAG Corporation, 91, Thiruneermalai Road, Chromepet, Chennai, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 10 of 16

Validity 05.06.2018 to 04.06.2020

Last Amended on -

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			IEC 60888 IEC 62219 IEC 60104 IEC 62004 BS EN 50182 BS EN 50189 BS 4565 ASTM B363 NFC 34-113 EN 50540	
		Torsion	IS 398 (Part 1) IS 398 (Part 2) IS 398 (Part 3) IS 398 (Part 4) IS 398 (Part 5) IS 12776 IEC 60889 IEC 60888 IEC 62004 BS 2627 BS 4565 BS 7884 SS 4240813 BS EN 50189 ASTM A363 NFC 34-113 IEC 61232	1 Turns to 999 Turns
		Wrapping	IS 398 (Part 1) IS 398 (Part 2) IS 398 (Part 3) IS 398 (Part 4) IS 398 (Part 5) IS 12776 SS 4240814 IEC 60889	Qualitative

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 11 of 16

Validity 05.06.2018 to 04.06.2020

Last Amended on -

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			IEC 60888 IEC 62004 BS 2627 BS 4565 BS 7884 SS 4240813 BS EN 50189 ASTM A363 NFC 34-113	
		Mass of Zinc Coating	IS 6745 BS 443 BS EN 50189	0.01 g to 600 g
		Uniformity of Zinc Coating	IS 2633 BS 443 BS EN 50189	Qualitative
		Thermal Resistance Property Test	IEC 62004	100 °C to 600 °C
		Adhesion	IS 4826 BS 443 BS EN 50189 ASTM A363 NFC 34-113	Qualitative
3.	Insulator set fittings and Earthwire fittings/ Suspension clamps/ Tension Joints and Tension clamps/ Partial tension Fittings/ Insulator Protective fittings/ Spacer Damper/ Flexible Spacer/	Visual Examination	IEC 61284 IEC 61854 IEC 61897 IS 2486(Part 1) IS 2121 (Part 1) IS 2121 (Part 2) IS 2121 (Part 3) IS 2121 (Part 4) IS 10162 IS 9708 BS 3288 (part 1)	Qualitative

Laboratory TAG Corporation, 91, Thiruneermalai Road, Chromepet, Chennai, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 12 of 16

Validity 05.06.2018 to 04.06.2020

Last Amended on -

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	Rigid Spacer/ 4R-Vibration Damper Suitable for (ACSR / AAAC/AAC/ AL59/ACS/HTLS/ OPGW/ADSS/GS Earthwire/ACS Earthwire)	Dimensional Verification	IEC 61284 IEC 61854 IEC 61897 IS 2486(Part 1) IS 2486(Part 2) IS 2121 (Part 1) IS 2121 (Part 2) IS 2121 (Part 3) IS 2121 (Part 4) IS 9708 IS 10162 BS 3288 (Part 1)	0.001 mm to 25 mm 0.01 mm to 200 mm 1 mm to 30000 mm
		Coating Thickness	BS EN ISO 1461	1 µm to 1250 µm
		Uniformity in Thickness	IS 2633 BS EN ISO 1461	Qualitative
		Mass of Coating	IS 6745 BS EN ISO 1461	0.01g to 600 g
		Adhesion of the coating	BS EN ISO 1461 IS 2629	Qualitative
		Proof load test	IEC 61284 IEC 61854 IEC 61897 IS 3703 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/UTS/001 Issue Date 05.03.2016 Issue No. 03	5 kN to 2000 kN
		Rockwell Hardness And Shore-A Hardness	IEC 61284 IEC 61854	30 HRBW to 100 HRBW 20 HRC to 70 HRC

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Laboratory TAG Corporation, 91, Thiruneermalai Road, Chromepet, Chennai, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 13 of 16

Validity 05.06.2018 to 04.06.2020

Last Amended on -

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			IEC 61897 IS 2121 (Part 3) ASTM E18 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/RH/001 Issue Date 01.11.2017 Issue No. 01	Upto 100 Shore A
		Damage and failure load test/Mechanical Strength Tests	IEC 61284 IS 2121 (Part 4) IS 2486(Part 1) BS 3288 (Part 1) (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/UTS/002 Issue Date 05.03.2016 Issue No. 03	5 kN to 2000 kN
		String Vibration	(PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/SVT/001 Issue Date 25.01.2018 Issue No. 01	10 Hz to 35 Hz 10 Million Cycles 5 kN to 2000 kN
4.	Suspension Clamps/ Spacer Damper/ Flexible Spacer/ Rigid	Slip tests/ Assembly Torque Test	IEC 61284 IEC 61854 IEC 61897 IS 2121 (Part 3)	0.01 mm to 200 mm 0.1 kN to 50 kN

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Laboratory TAG Corporation, 91, Thiruneermalai Road, Chromepet, Chennai, Tamil Nadu

Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 14 of 16

Validity 05.06.2018 to 04.06.2020

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
	Spacer/ Vibration Damper (ACSR / AAAC/AAC/ACAR/ AL59/ ACS/ HTLS/ OPGW/ ADSS/ GS Earthwire/ ACS Earthwire)		IS 2486 (Part 1) IS 9708 IS 10162 BS 3288 (Part 1) (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/SLP/001 Issue Date 25.01.2018 Issue No. 01	
		Clamp Bolt Torque test	IEC 61284 IEC 61854 IEC 61897 IS 9708 IS 10162 BS 3288 (part 1) (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/TOR/001 Issue Date 25.01.2018 Issue No. 01	0.2 kgm to 24 kgm
5.	Tension joints and Tension Clamps/ Partial Tension Fittings/ Repair Sleeve (ACSR / AAAC/ AAC/ AL59/ACS/ HTLS/OPGW/ ADSS/GS	Tensile Test/ Failing Load	IEC 61284 IS 2121 (Part 2) IS 2121 (Part 4) IS 2486 (Part 1) (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0)	0.01 mm to 200 mm 5 kN to 2000 kN

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 15 of 16

Validity 05.06.2018 to 04.06.2020

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
	Earthwire/ACS Earthwire)		TAG/SOP/UTS/002 Issue Date 05.03.2016 Issue No. 03	
6.	Spacer Damper/ Flexible Spacer/ Rigid Spacer (ACSR /AAAC/AAC/ AL59/ACS/HTLS)	Compression and Tension	IEC 61854 IS 10162 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/SDTR/001 Issue Date 03.11.2017 Issue No. 01	0.1 kN to 50 kN
		Flexibility tests/ Movement	IEC 61854 IS 10162 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/MOV/001 Issue Date 25.01.2018 Issue No. 01	0.1 mm to 100 mm 1° to 30 °
		Fatigue tests/Vibration	IEC 61854 IS 10162 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/FAT/001 Issue Date 25.01.2018 Issue No. 0	1 Hz to 3 Hz 5 Hz to 100 Hz Upto 100 Million Cycle

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Accreditation Standard ISO/IEC 17025: 2005

Certificate Number TC-5357

Page 16 of 16

Validity 05.06.2018 to 04.06.2020

Last Amended on -

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7.	Vibration Damper (ACSR / AAAC/AAC/ AL59/ACS/HTLS/ OPGW/ADSS/GS Earthwire/ACS Earthwire)	Attachment of Weights to messenger cable/Mass Pull off test	IEC 61897 IS 9708	0.1 kN to 50 kN
		Attachment of clamp to messenger cable test	IEC 61897	0.1 kN to 50 kN
		Damper Performance tests	IEC 61897 IS 9708 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017, Issue No.1 Rev.0)TAG/SOP/ST/001, Issue Date 01.11.2017, Issue No.01	5 Hz to 150 Hz 0.1 kgf to 226 kgf
		Damper Fatigue test	IEC 61897 IS 9708 (PGCIL Specification Section VI (Volume II) – Annexure A, B & C Issue Dt-11-12-2017 Issue No.1 Rev.0) TAG/SOP/ST/001 Issue Date 01.11.2017 Issue No. 01	Upto 100Million Cycle 5 Hz to 150 Hz
8.	Armour Rods/Aluminum Clad Steel ACSR / AAAC/AAC/ AL59/ACS/HTLS/ OPGW/ADSS/GS Earthwire/ACS Earthwire)	Visual Examination Verification of Dimensions	IS 2121 (Part 1)	Qualitative 0.001 mm to 25 mm 0.01 mm to 200 mm 1 mm to 30000 mm
		Tensile Strength test	IS 2121 (Part 1) IEC 61232	0.1 kN to 50 kN
		Slip Strength test	IS 2121 (Part 1)	0.1 kN to 50 kN
		Bend Test		Qualitative
		Resilient Test	IS 2121 (Part 1) IS 10162	Qualitative

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