

GEMSCAB INDUSTRIES LIMITED

STANDARD PLAN FOR HT XLPE CABLES AS PER IS:7098(PART-II)

SL. NO.	COMPONENT & OPERATION	CHARACTERISTICS	QUANTUM OF CHECK	REFERENCE & ACCEPTANCE NORM	CHECK/ TEST RECORDS	FORM OF RECORDS	AGENCY	REMARKS
-1	RAW MATERIAL INSPECTION							
1.1	ALUMINIUM ROD/COPPER ROD	(i) Diameter	100%	IS:5484 & IS:613	IS:5484 & IS:613	GIL-GIR-006	IQC	
		(ii) Conductivity or resistivity at 20 Deg.C	100%	IS:5484 & IS:613	IS:5484 & IS:613	GIL-GIR-006	IQC	
		(iii) Tensile Strength	100%	IS:5484 & IS:613	IS:5484 & IS:613	GIL-GIR-006	IQC	
		(iv) Surface finish	100%	IS:5484 & IS:613	IS:5484 & IS:613	GIL-GIR-006	IQC	
1.2	XLPE COMPOUND FOR	(i) Physical Properties		IS:7098(PT-II) & plant standard	IS:7098(PT-II) & plant standard	Supplier TC	IQC	
1.3	SEMI CONDUCTING	(i) Physical Properties		IS:7098(PT-II) & plant standard	IS:7098(PT-II) & plant standard	Supplier TC	IQC	
1.4	COPPER FOIL	(i) Resistivity	4%	IS:7098(PT-II) & plant standard	IS:7098(PT-II) & plant standard	GIL-GIR-008	IQC	
		(ii) Dimensions	4%	IS:7098(PT-II) & plant standard	IS:7098(PT-II) & plant standard	GIL-GIR-008	IQC	
1.5	PVC COMPOUND FOR SHEATHING	(i) Density	4% Composite per batch Lot	IS:7098(PT-II) & plant standard	IS:7098(PT-II) & plant standard	GIL-GIR-003	IQC	
		(ii) Tensile strength & Elongation Test	4% Composite per batch	IS:5831/84 & 7098(PT-II)	IS:5831/84 & 7098(PT-II)	GIL-GIR-003	IQC	
		(iii) Thermal Stability	4% Composite per batch	IS:5831/84 & 7098(PT-II)	IS:5831/84 & 7098(PT-II)	GIL-GIR-003	IQC	
	FOR FRLS COMPOUND	(i) Oxygen Index	4% Composite per batch	ASTMD 2863 Min.29 Max.250 Deg.C	ASTMD 2863	GIL-GIR-003	IQC	
		(ii) Smoke Density	4% Composite per batch	ASTMD 2843 Max.SDR 60% or Min. light transmission 40%	ASTMD 2843	GIL-GIR-003	IQC	
		(iii) Acid Gas Generation	4% Composite per batch	IEC 754(Pt-1) Max.20%	IEC 754(Pt-I)	GIL-GIR-003	IQC	

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1.6	ARMOURING	(i) Surface finish	4%	IS:3975/88	IS:3975/88	GIL-GIR-004	IQC	
		(ii) Dimensions	4%	IS:3975/88	IS:3975/88	GIL-GIR-004	IQC	
		(iii) Tensile Strength	4%	IS:3975/88	IS:3975/88	GIL-GIR-004	IQC	
		(iv) Elongation	4%	IS:3975/88	IS:3975/88	GIL-GIR-004	IQC	
		(v) Torsion/Winding	4%	IS:3975/88	IS:3975/88	GIL-GIR-004	IQC	
		(vi) Weight of Zinc coating	4%	IS:3975/88	IS:3975/88	GIL-GIR-004	IQC	
		(vii) Uniformity of Zinc coating	4%	IS:3975/88	IS:3975/88	GIL-GIR-004	IQC	
		(viii) Resistivity	4%	IS:3975/88	IS:3975/88	GIL-GIR-004	IQC	
1	(2) IN PROCESS INSPECTION WIRE DRAWING	(i) Diameter	Start & end	Plant standard	Plant standard	GIL-P11-001	PQC	
		(ii) Surface finish	visual	Plant standard	Visual	GIL-P11-001	PQC	
		(iii) Resistance/Resistivity	every setting	IS:8130/84	IS:8130/84	GIL-P11-001	PQC	
		(iv) Tensile Strength(Al.)	every setting	IS:8130/84	IS:8130/84	GIL-P11-001	PQC	
		(v) Elongation(Cu.)	every setting	IS:8130/84	IS:8130/84	GIL-P11-001	PQC	
		(vi) Wrapping Test (if applicable)	every setting	IS:8130/84	IS:8130/84	GIL-P11-001	PQC	
2	STRANDING	(i) Construction(No.of strands)	Each setting & during running of M/C. Min.two reading in each shift.	IS:8130/84	IS:8130 & Visual	GIL-P11-001	PQC	
		(ii) Dimensions	-do-	Plant standard	Measurement	GIL-P11-002	PQC	
		(iii) Surface Finish	-do-	Data sheet	Visual	GIL-P11-002	PQC	
3	(A) INSULATED CORE	(i) Thickness of Insulation	-do-	IS:7098(PT-II)	IS:7098(PT-II)	GIL-P11-009	PQC	
		(ii) Surface finish	-do-	Visual	Visual	GIL-P11-009	PQC	

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	(B) COPPER TAPE SHEILDING	(iii) Colour of cores/core identification	-do-	IS:7098(PT-II)	IS:7098(PT-2)	GIL-P11-009	PQC	
		(iv) Hot Set Test	-do-	IS:7098(PT-II)	IS:7098(PT-II)	GIL-P11-009	PQC	
		Number & dimension of tape	-do-	IS:7098(PT-II)&Plant Std	IS:7098(PT-II)&Plant Std	GIL-P11-010	PQC	
4	LAYING UP	(i) Lay length	Each setting & during running of M/C. Min.two reading in each shift.	IS:7098(PT-II)&Plant Std	IS:7098(PT-II)&Plant Std	GIL-P11-005	PQC	
	(ii) Laying sequence & direction	IS:7098(PT-II)&Plant Std		IS:7098(PT-II)&Plant Std	GIL-P11-005	PQC		
	(iii) Diameter(laid up)	IS:7098(PT-II)&Plant Std		IS:7098(PT-II)&Plant Std	GIL-P11-005	PQC		
5	INNER SHEATH	(i) Thickness of Inner sheath	-do-	IS:7098(PT-2)	IS:7098(PT-2)	GIL-P11-006	PQC	
		(ii) Dia over Inner sheath	-do-	Plant Standard	Measurement	GIL-P11-006	PQC	
		(iii) Surface finish	-do-	Plant Standard	Visual	GIL-P11-006	PQC	
6	ARMOURING	(i) No.of wires/strips	-do-	Plant Standard	Counting	GIL-P11-007	PQC	
		(ii) Lay Direction & Sequence	-do-	IS:7098(PT-2)	IS:7098(PT-2)	GIL-P11-007	PQC	
		(iii) Dimensions of wire/strip	-do-	IS:7098(PT-2)&3975/88	IS:7098(PT-2)&3975/88	GIL-P11-007	PQC	
		(iv) Gap between two wires/ strips	-do-	Plant Standard	Plant Standard	GIL-P11-007	PQC	
		(v) Surface finish	-do-	Plant Standard	Visual	GIL-P11-007	PQC	
		(vi) Dia over Armour	-do-	Plant Standard	Measurement	GIL-P11-007	PQC	
7	OUTER SHEATHING	(i) Thickness of sheath	-do-	IS:7098(PT-2)	IS:7098(PT-2)	GIL-P11-008	PQC	
		(ii) Surface Finish	-do-	Plant Standard	Visual	GIL-P11-008	PQC	
		(iii) Embossing Details	-do-	IS:7098(PT-2)	Visual	GIL-P11-008	PQC	
		(iv) Overall dia	-do-	Plant Standard &data sheet	Plant Standard &data sheet	GIL-P11-008	PQC	
		(v) Progressive Sequential Marking	-do-	Plant Standard &data sheet	Visual	GIL-P11-008	PQC	

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-3	FINAL TESTING							
1	ROUTINE TEST	(i) Conductor Resistance	100%	IS:7098(PT-2)	IS:7098(PT-2)	GIL-FIR-006	FQC	To be reviewed by client / Const.
		(ii) H.V.Test	100%	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC	
		(iii) Partial Discharge Test	100%	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC	
2	TYPE TEST	(A) Test on Conductor						To be reviewed by client / Const.
		(i) Conductor resistance test	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	GIL-FIR-002	FQC	
		(ii) Annealing Test(Cu.)	1 sample / size	IS:8130/84	IS:8130/84	-do-	FQC	
		(iii) Tensile Strength(Al.)	1 sample / size	IS:8130/84	IS:8130/84	-do-	FQC	
		(iv) Wrapping Test(Al.)	1 sample / size	IS:8130/84	IS:8130/84	-do-	FQC	
		(B) TEST FOR THICKNESS OF INSULATION & SHEATH						
		(i) Thickness of insulation	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	GIL-FIR-002	FQC	
		(ii) Thickness of inner sheath	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)		FQC	
		(iii) Thickness of outer sheath	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC	
		(C) PHYSICAL TEST ON INSULATION :						
		(i) Hot set Test	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	GIL-FIR-002	FQC	
		(ii) Tensile strength & Elongation before ageing	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)		FQC	
		(iii) Tensile strength & Elongation after ageing	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC	
		(iv) Shrinkage Test	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC	
		(v) Water Absorption Test (Gravimetric)	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC	

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		(D) PHYSICAL TEST ON SHEATH						
		(i) Tensile strength & Elongation before ageing	1 sample / size	IS:5831/84	IS:5831/84	GIL-FIR-002	FQC	To be reviewed by client / Constt.
		(ii) Tensile strength & Elongation after ageing	1 sample / size	IS:5831/84	IS:5831/84	-do-	FQC	
		(iii) Shrinkage Test	1 sample / size	IS:5831/84	IS:5831/84	-do-	FQC	
		(iv) Hot Deformation Test	1 sample / size	IS:5831/84	IS:5831/84	-do-	FQC	
		(v) Loss of Mass Test	1 sample / size	IS:5831/84	IS:5831/84	-do-	FQC	
		(vi) Heat Shock Test	1 sample / size	IS:5831/84	IS:5831/84	-do-	FQC	
		(vii) Thermal stability Test	1 sample / size	IS:5831/84	IS:5831/84	-do-	FQC	
		(E) TEST ON ARMOUR WIRES/STRIPS						
		(i) Dimensions	1 sample / size Strips of the sample drum	IS:3975/88	IS:3975/88	GIL-FIR-002	FQC	
		(ii) Tensile strength & Elongation Test	1 sample / size	IS:3975/88	IS:3975/88	-do-	FQC	
		(iii) Torsion/Winding Test	1 sample / size	IS:3975/88	IS:3975/88	-do-	FQC	
		(iv) Weight of zinc coating test	1 sample / size	IS:3975/88	IS:3975/88	-do-	FQC	
		(v) Dip Test	1 sample / size	IS:3975/88	IS:3975/88	-do-	FQC	
		(vi) Resistivity Test	1 sample / size	IS:3975/88	IS:3975/88	-do-	FQC	

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4	ACCEPTANCE TEST	(F) <u>ELECTRICAL TEST</u>								
		(i) Volume resistivity test for insulation	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	GIL-FIR-002	FQC	To be reviewed by client / Conslt		
		(ii) High voltage test	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC			
		(iii) Partial Discharge test	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC			
		(iv) Bending Test	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC			
		(v) Dielectric power factor test	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC			
		(vi) Heating Cycle Test	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC			
		(vii) Impulse withstand test	1 sample / size	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC			
		(G) TEST FOR FRLS PROPERTIES								
		(i) Oxygen Index Test	1 sample / size	ASTMD 2863 Min.29%	ASTMD 2863	GIL-FIR-005	FQC	To be witnessed by client /constl.		
		(ii) Temp.Index Test	-do-	Min.250 Deg.C	ASTMD 2863	-do-	FQC			
		(iii) Acid Gas Generation Test	-do-	IEC 754(PT-I)Max.20%	IEC 754(PT-I)	-do-	FQC			
		(iv) Smoke Density Test	-do-	ASTMD 2843	ASTMD 2843	-do-	FQC			
		(v) Flammability Test	-do-	Max.SDR 60% IEC 332(PT-I),IEEE 383	IEEE 383, IEC 332(PT-I)	-do-	FQC			
		<u>(NO.OF SAMPLE DRUMS AS PER IS:7098(PT-II)SAMPLING PLAN FOR ACCEPTANCE TEST)</u>								
					As per 7098 (Pt-II)	IS:7098(PT-II)	IS:7098(PT-II)	GIL-TEMP-008	FQC	To be witnessed by client /constl.
				do...	IS:8130:84	IS:8130:84	-do-	FQC	
				do...	IS:8130:84	IS:8130:84	-do-	FQC	
		do...	IS:8130:84	IS:8130:84	-do-	FQC			

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		(v) Thickness of insulationdo...	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC	To be witnessed by client /const.
		(vi) Thickness of inner sheath	....do...	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC
		(vii) Thickness of outer sheath	....do...	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC
		(viii) Hot set test	....do...	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC
		(ix) Tensile strength & Elongation(before ageing)	....do...	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC
		(x) Volume resistivity test for insulation	....do...	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC
		(xi) High voltage test	....do...	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC
		(xii) Partial discharge Test	....do...	IS:7098(PT-2)	IS:7098(PT-2)	-do-	FQC
		(xiii) TEST FOR FRLS PROPERTIES (ONE SAMPLE FROM ANY SIZE/LOT)						
		(a) Oxygen Index Test	On any one size /Lot	ASTMD 2863 Min 29%	ASTMD 2863	-do-	FQC	
		(b) Temp.Index Test	"	Min.250 Deg.C	ASTMD 2863	-do-	FQC	
		(c) Acid gas generation test		IEC 754(PT-I)Max.20%	IEC 754(PT-I)	-do-	FQC	
		(d) Smoke density test	"	ASTMD 2843	ASTMD 2843	-do-	FQC	
		(e) Flammability Test	"	Max.SDR 60% IEC 332(PT-I) IEEE 383,	IEC 332(PT-I),IEEE 383	-do-	FQC	