NAME 8	ADDRESS OF MANUI	FACTURER WORKS		MANU	JFACTUI	RING	QUAL	ITY PLAN		Project :	Solar _J	ower p		rishnagai	Development Agency, 10 MWP nj, Block Bhajanghat, Nadia
APAR I	NDUSTRIES LIMITE	D (Unit:Uniflex Cables)											Ü		
862/1,8		. 82/2 P1, 88, 861/1, ad, Khatalwada , Dist: Valsad,						T		Customer :	M/s L	UMINO	JUPITI	ER SOLA	AR FOR WBREDA
T-1 N1-	: 0260 - 2406100		ITEM: Solar	Cable as per S	specn. EN 506	18:2014		QPNO: AIL/QP/Cu REV.NO.00	istomer/01	PO No. :	LUMI	NO/WB	REDA/2	2019-20/0	05 DATED: 02-08-2019
	: 0260 - 2406100 : 0260 - 2406100							DATE: 06/08/201	0						
	: uniflex.works@ap	ar.com						PAGE: 01 of 08							
												INSPE	CTION AG	ENCY	
SL	COMPONENT/	CHARACTERISTICS	CATE-GORY OF CHECK#	TYPE OF CHECK	QUANTU	M OF CHE	ск	REFERENCE	ACCEPTANCE NORMS	FORMAT OF REC	ORD	М	С	А	REMARKS
NO	OPERATION				М	С	Α	DOCUMENT							
1	2	3	4	5		6		7	8	9	D*		**10	•	11
A. RA	W MATERIAL														
1	Copper Rod	Tensile strength	Meas.	Phy.	Sampling plan			IS:191/ ASTM B49, IEC 60228,	Min. 210 N/mm²	Incoming		Р	V	V	
		Elongation	Meas.	Phy.	AIL/QA/SM			Supplier TC	Min. 30%	Inspection Report,		Р	V	V	
		Elect. Resistivity	Meas.	Elect.	PL/01 Table-2				Max. 17.241 Ohm mm²/Km	AIL/QA/RD/02- 13		Р	V	V	
		Diameter	Meas.	Phy.					Min. 7.8 mm			Р	V	V	
2	EB Cross- linked Polyolefin	Tensile Strength	Meas.	Phy.	One Sample Each Lot			EN spec. EN 50618:2014	EN spec. EN 50618:2014	Raw Material Test report		Р	V	V	
	NA I - I I	Elongation at break	Meas.	Phy.						AIL/QA/RD/02 104/105	-	Р	V	V	
	sheet)	Hot set test	Meas.	Phy.						104/105	-	Р	V	V	
		Colour	Visual	Visual								Р	V	V	JOUSTRIES!
3		Dimension	Meas.	Phy.	10% of			RM	Product data sheet	Incoming		Р	V	V	(3)
	Drum	Finishing	Visual	Visual	each lot			specification for wooden drum		inspection report for cable drum AIL/QA/RD/02		Р	V	V	UNIFIELD IS
		Nail protrusion	Visual	Visual						79		Р	V	V	06.08.19

Use the following term as appropriate in columns 10.

P: Perform, V: verification and H: Customer Hold Point to be witnessed and work shall not proceeded till it is witnessed and cleared in writing.

For Manufacturer For Main Supplier For QA /FQA

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^{**} M: Manufacturer / Sub-Supplier, C: Main Supplier, A: Customer their authorized representative.

NAME &	ADDRESS OF MANU	FACTURER WORKS		MANU	JFACTU	RING	QUAL	ITY PLAN		Project :		_			Development Agency, 10 MWP nj, Block Bhajanghat, Nadia
APAR II	NDUSTRIES LIMITE	ED(Unit:Uniflex Cables)										ct West 1	•	_	ij, biock bhajanghat, Natha
862/1,86	63/1 , Manekpur Ro	o. 82/2 P1, 88, 861/1, ad, Khatalwada , Dist: Valsad,								Customer :			Ü		AR FOR WBREDA
Gujarat-	-396120		ITEM: Solar	Cable as per S	Specn. EN 506	18:2014		QPNO: AIL/QP/Cus	stomer/01	PO No. :	LUMI	NO/WB	REDA/2	019-20/0	05 DATED: 02-08-2019
Tel No:	0260 - 2406100							REV.NO.00							
Fax No	: 0260 - 2406100							DATE: 06/08/2019							
E- Mail:	: uniflex.works@ap	par.com						PAGE: 02 of 08							
												INSPE	CTION AGI	ENCY	
SL	COMPONENT/	CHARACTERISTICS	CATE-GORY OF CHECK#	TYPE OF CHECK	QUANTU	M OF CHE	ск	REFERENCE	ACCEPTANCE NORMS	FORMAT OF REC	ORD	М	С	A	REMARKS
NO	OPERATION				М	С	Α	DOCUMENT							
1	2	3	4	5		6		7	8	9	D*		**10		11
B. INP	ROCESS INSPE	CTION													
1	Wire Drawing	Diameter of wire	Meas.	Phy.	One sample			IEC 60228, GTP	Spec. EN			Р	-	-	
1	Wire Drawing	Diameter of wire Surface finish	Meas. Visual	Phy. Visual	One sample Each setting & during process			IEC 60228, GTP	Spec. EN 50618:2014			P P	-	-	
	, and the second	Surface finish	Visual	Visual	Each setting & during process			,	50618:2014			'	-	-	
	, and the second			-	Each setting & during			IEC 60228, GTP		Inprocess Inspection report AIL/QA/RD/03- 17		P	-	- - -	
2	Annealing	Surface finish % of Elongation	Visual Meas.	Visual Phy.	Each setting & during process One sample Each setting & during			,	50618:2014 Spec. EN	Inspection report		P P		-	Janor Grand UNIFICE S. 19

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For Manufacturer	For Main Supplier	For QA /FQA

NAME	& ADDRESS OF MANUI	FACTURER WORKS		MANU	IFACTU	RING	QUAL	ITY PLAN		Project :					Development Agency, 10 MWP
APAR	INDUSTRIES LIMITE	D (Unit:Uniflex Cables)											Bengal- 7		ij, biock bhajanghat, Nadia
862/1,		. 82/2 P1, 88, 861/1, ad, Khatalwada , Dist: Valsad,								Customer :					R FOR WBREDA
Gujara	t-396120		ITEM: Solar (Cable as per S	pecn. EN 506	18:2014		QPNO: AIL/QP/Cus	stomer/01	PO No. :	LUMI	NO/WB	REDA/2	2019-20/0	05 DATED: 02-08-2019
Tel No	o: 0260 - 2406100							REV.NO.00							
Fax N	o: 0260 - 2406100							DATE: 06/08/2019	1						
E- Ma	il: uniflex.works@ap	ar.com						PAGE: 03 of 08							
												INSPE	CTION AG	ENCY	
SL	COMPONENT/	CHARACTERISTICS	CATE-GORY OF CHECK#	TYPE OF CHECK	QUANTU	M OF CHE	ск	REFERENCE	ACCEPTANCE NORMS	FORMAT OF REC	ORD	М	С	Α	REMARKS
NO	OPERATION				М	С	Α	DOCUMENT							
1	2	3	4	5		6		7	8	9	D*		**10		11
4	Bunching/ Stranding	No & Diameter of wires Lay Direction & lay length Diameter Over Conductor D.C resistance	Counting /Meas Meas. Meas Meas.	Phy. Phy. Phy. Elect.	One sample Each setting & during process			IEC 60228, GTP	Spec. EN 50618:2014			P P P	-		
5	Sheath	Material Radial Thickness Ovality Overall Diameter Surface Finish	Visual Meas. Meas. Meas. Visual	Visual Phy. Phy. Phy. Visual	One sample Each setting & during process			IEC 60228, GTP	Spec. EN 50618:2014	Inprocess Inspection report AIL/QA/RD/03- 17		P P P P	- - - -	- - - -	TSTR/E
6	Electron Beam Cross Linking (EBXL)	Spark Test Tensile strength & Elongation test Hot set & Permanent set test	Counting Meas. Meas.	Elect. Phy. Phy.	100% One sample Each setting & during Bobbin			EN spec. 50618:2014	Spec. EN 50618:2014 Table 4			P P P	-	-	Denor Grand UNITLE 15 06. 08. 19

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,	'	ů	
For Manufacturer	For Main Supplier	For QA /FQA	

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NAME &	ADDRESS OF MANU	FACTURER WORKS		MANU	JFACTU	RING	QUAL	ITY PLAN		Project :		_			Development Agency, 10 MWP
APAR I	NDUSTRIES LIMITE	D (Unit:Uniflex Cables)											Bengal- 7		ij, block bilajangilat, Natila
862/1,8	63/1, Manekpur Ro	. 82/2 P1, 88, 861/1, ad, Khatalwada , Dist: Valsad,								Customer :					R FOR WBREDA
Gujarat	-396120		ITEM: Solar	Cable as per S	Specn. EN 506	18:2014		QPNO: AIL/QP/Cus	tomer/01	PO No. :	LUMI	NO/WB	REDA/2	019-20/0	05 DATED : 02-08-2019
Tel No	0260 - 2406100							REV.NO.00							
Fax No	: 0260 - 2406100							DATE: 06/08/2019							
E- Mail	: uniflex.works@ap	ar.com						PAGE: 04 of 08							
SL	COMPONENT/	CHARACTERISTICS	CATE-GORY	TYPE OF CHECK	QUANTU	M OF CHE	ск	REFERENCE	ACCEPTANCE NORMS	FORMAT OF REC	OBD	INSPE	CTION AGE	ENCY	REMARKS
02	00	CHARACTERISTICS	OF CHECK#					NEI ENEIVOE		TORMAT OF REC	OKD	м	С	Α	KEMAKKO
NO	OPERATION				М	С	Α	DOCUMENT							
1	2	3	4	5		6		7	8	9	D*		**10		11
7		Printing Matter Distance between printing	Visu Meas.	Visual Phy.	One sample Each setting & during process			GTP	Spec. EN 50618:2014	Inprocess Inspection report AIL/QA/RD/03- 17		P P	-	-	
C. TES	T ON FINISHED C	ABLE													
1	Routine Test	Conductor resistance test	Meas.	Elect.	100%	2 drums	2 drums	EN spec. 50618:2014	Spec. EN 50618:2014	Ruotine Test Report		Р	W	W	
		High Voltage test	Meas.	Elect.						AIL/QA/RD/04- 03		Р	W	W	
2	Acceptance Test	Conductor resistance te	Meas.	Elect.				EN spec.	Spec. EN	Acceptance Test		Р	W	W	
		Test for thickness of insulation & sheath	Meas.	Phy.			1 / 6:	50618:2014	50618:2014	Report AIL/QA/RD/04 04	-	Р	W	W	
		Hot set test	Meas.	Phy.	One sample / Colour	е / опегеа	Lot / Size					Р	W	W	
		Tensile strength & elongation & break for insulation & sheath	Meas.	Phy.	/ Coloui							Р	W	W	
D* Re	cords identified v	vith tick (p) shall be essenti	•				•	mentation packag	e.		<u> </u>			1	NOT GO

Use the following term as appropriate in columns 10.

P: Perform, V: verification and H: Customer Hold Point to be witnessed and work shall not proceeded till it is witnessed and cleared in writing.

For Main Supplier For QA /FQA For Manufacturer

^{**} M: Manufacturer / Sub-Supplier, C: Main Supplier, A: Customer their authorized representative.

APAR I Khata N 862/1,8 Gujarat	lo. 1932, Survey No	FACTURER WORKS ED (Unit: Uniflex Cables) 0. 82/2 P1, 88, 861/1, ad, Khatalwada , Dist: Valsad,	ITEM: Solar		JFACTU		QUAI	QPNO: AIL/QP/Cu	stomer/01	Project : Customer : PO No. :	Solar p Districe M/s L	power pret West 1	roject,Ki Bengal- 7 JUPITI	rishnagar 741507. ER SOLA	Development Agency, 10 MWP nj, Block Bhajanghat, Nadia AR FOR WBREDA 05 DATED : 02-08-2019
	: 0260 - 2406100							DATE: 06/08/2019	9						
E- Mai	: uniflex.works@ap	oar.com		1	1			PAGE: 05 of 08				INSPE	CTION AGI	FNCY	
SL	COMPONENT/	CHARACTERISTICS	CATE-GORY OF CHECK#	TYPE OF CHECK	QUANTU	IM OF CHE	ск	REFERENCE	ACCEPTANCE NORMS	FORMAT OF REC	ORD	м	c		REMARKS
NO	OPERATION				М	С	Α	DOCUMENT				M		A	
1	1 2 3		4	5		6	•	7	8	9	D*		**10	•	11
	Continued High voltage test Overall diameter Ovality Sheath Colour Sheath Marking Insulation resistance Flame Propagation test		Meas. Meas. Meas. Meas. Meas. Meas. Meas. Meas. Meas.	Elect. Phy. Phy. Phy. Phy. Elect. Phy.	One Sample / Colour	Offered L	ot / Size /	EN spec. 50618:2014	Spec. EN 50618:2014	Acceptance Test Report AIL/QA/RD/04- 04		P P P P	W W W W W	W W W W W	
3		est DC resistance test Voltage Test on complete cable Surface resistance of sheath	Meas. Mea s Mea s	Elect. Elect.	One Sample Once Per Type			EN spec 50618:2014	Spec EN 50618:2014	Type Test Report AIL/QA/RD/04- 02		P P P	V V	> > >	TETRIS

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For Manufacturer

For Main Supplier

For QA /FQA

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	ADDRESS OF MANU	FACTURER WORKS ED (Unit:Uniflex Cables)		MANU	JFACTU	RING	QUAL	ITY PLAN			Solar	power p		rishnagar	Development Agency, 10 MWF nj, Block Bhajanghat, Nadia
362/1,8	63/1, Manekpur Ro	o. 82/2 P1, 88, 861/1, ad, Khatalwada , Dist: Valsad,								Customer :			-		R FOR WBREDA
Tel No Fax No	:-396120 : 0260 - 2406100 o: 0260 - 2406100 l: uniflex.works@ap	par.com	ITEM: Solar	Cable as per S	Specn. EN 506	18:2014		QPNO: AIL/QP/Cu: REV.NO.00 DATE: 06/08/2019 PAGE: 06 of 08		PO No. :	LUMI	INO/WB	BREDA/2	2019-20/0	05 DATED: 02-08-2019
SL	COMPONENT/	CHARACTERISTICS	CATE-GORY OF CHECK#	TYPE OF CHECK	QUANTUM OF CHECK			REFERENCE	ACCEPTANCE NORMS	FORMAT OF REC	ORD	INSPE	CTION AG	ENCY	REMARKS
NO	OPERATION				М	С	Α	DOCUMENT							
1	2	3	4	5		6		7	8	9	D*		**10		11
	Type Test Electrical Test														
		Insulation resistance (VR) at room temp. & at	Mea s	Elect.	One Sample Once per			EN spec. 50618:2014	EN Spec 50618:2014			Р	V	V	
		90°C			Type										
		DC High Voltage Test	Mea	Elect.	Туре	Type One Sample Once per Once per Once per						Р	V	V	

Phy.

Phy.

Phy.

Mea

Mea

Mea

s

Use the following term as appropriate in columns 10.

Measurement of thickness

of insulation

& Sheath Overall Diameter

Ovality

P: Perform, V: verification and H: Customer Hold Point to be witnessed and work shall not proceeded till it is witnessed and cleared in writing.

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For Manufacturer For Main Supplier For QA /FQA

Туре

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NAME 8	ADDRESS OF MANUE	FACTURER WORKS		MANU	JFACTU	RING	QUAL	ITY PLAN		Project :		_			Development Agency, 10 MWP
APAR	INDUSTRIES LIMITE	D (Unit:Uniflex Cables)											roject,Kı Bengal- 7		j, Block Bhajanghat, Nadia
	No. 1932, Survey No.	. 82/2 P1, 88, 861/1, ad, Khatalwada , Dist: Valsad,								Customer :	M/s L	IIMINO	HPITE	ER SOLA	R FOR WBREDA
	t-396120	du, Krialaiwada , Dist. Valsau,	ITEM 0 1	0.11	- FN 500	10.0011		I		_					
T-1 N1-			ITEM: Solar	Cable as per S	specn. EN 506	18:2014		QPNO: AIL/QP/Cu: REV.NO.00	stomer/01	PO No. :	LUMI	NO/WB	REDA/2	2019-20/00	05 DATED : 02-08-2019
	: 0260 - 2406100 b: 0260 - 2406100		DATE: 06/08/2019												
	l: uniflex.works@ap	ar.com	PAGE: 07 of 08												
												INSPE	CTION AGI	ENCY	
SL	COMPONENT/	CHARACTERISTICS	CATE-GORY OF CHECK#	TYPE OF CHECK	QUANTU	M OF CHE	СК	REFERENCE	ACCEPTANCE NORMS	FORMAT OF REC	ORD				REMARKS
NO	OPERATION				М	С	Α	DOCUMENT				М	С	Α	
1	2	3	4	5		6		7	8	9	D*		**10		11
	71	Sheath Colour	Visual	Visual	One Sample			EN spec.	EN spec.	Type Test Report		Р	V	V	
	continued	Damp heat test	Mea	Phy.	Once per Type			50618:2014	50618:2014	AIL/QA/RD/04- 02		Р	V	V	
		Resistance to acid & alkaline solution	Mea	Phy.								Р	٧	٧	
		Compatibility Test	s Mea	Phy.								P	V	V	
		Ageing Test Insulation & sheath	Wica	1 119.									Ů	•	
		Cold impact test /Bend test	Mea s	Phy.								Р	٧	V	
		Ozone resistance	Mea	Phy.								Р	V	V	
		Weathering/UV resistance	Mea	Phy.								Р	V	V	
		test Dynamic penetration	s Mea	Phy.								P	V	V	
		test	s	rny.								-	V	v	
		Shrinkage test at complete cable	Mea s	Phy.								Р	٧	٧	

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For Manufacturer For Main Supplier For QA /FQA

APAR I Khata N 862/1,8 Gujarat Tel No Fax No	lo. 1932, Survey No	ED (Unit:Uniflex Cables) . 82/2 P1, 88, 861/1, ad, Khatalwada , Dist: Valsad,	ITEM: Solar		JFACTUI		QUAI	QPNO: AIL/QP/Ct REV.NO.00 DATE: 06/08/201 PAGE: 08 of 08	9	Project : Customer : PO No. :	Solar j Distric M/s L	power pi ct West l	roject,Kı Bengal- 7 JUPITE	rishnagar 741507. ER SOLA	Development Agency, 10 MWP nj, Block Bhajanghat, Nadia AR FOR WBREDA 05 DATED : 02-08-2019
SL NO	COMPONENT/	CHARACTERISTICS	CATE-GORY OF CHECK#	TYPE OF CHECK	QUANTU	M OF CHE	ECK A	REFERENCE	ACCEPTANCE NORMS	FORMAT OF REC	ORD	INSPE M	CTION AGE	A	REMARKS
1	2	3	4	5	IVI	6	_ ^	7	8	9	D*		**10		11
4	Type Test continued	Flame Propagation Test Test Under fire Conditions (Assesment of Halogens) Smoke Emission test of complete cable	Mea s Mea s Meas.	Phy. Chem Phy.	One Sample Once per Type			EN 60332-1- 2 EN spec. 50618:2014 EN spec 50618:2014	EN Spec 50618:2014 EN spec 50618:2014 EN spec 50618:2014	Type Test Report AIL/QA/RD/04- 02		P P	V	V V	
	Marking / End Sealing	Printing Matter Stenciling on Box/Drum End Sealing	Meas. Meas. Meas.	Visual Visual Visual	100%			GTP / EN spec 50618:2014	GTP / EN spec 50618:2014	Packing Check list		P P	-		GIRIF

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For Manufacturer

For Main Supplier

For QA /FQA

06. 08. IC

MANUFACTURER'S NAME & ADDRESS			MANUEACET	RING OUALITY PLAN	LEGENDS:				
APAR INDUSTRIES LTD		ITEM · I T D		ner sheathed,Round or strip armoured &					
			er sheathed cable	mer sneamen, kound or surp armoured &	WAF NO. AIL/WAF/LT-LUMINO-01				
(UNIT : UNIFLEX CABLES)		Name of co			REV. NO. 00				
Plot:158-163, GIDC,	PA (R)		NTRACTOR		DATE : 06.08.19				
Umbergaon, Gujarat	PAR			NO IUDITED COL AD COD WIDDEDA	DATE . 00.00.19				
email: rk.pawar@apar.com	(• (• • • • • • • • • • • • • • • • •	Name of Cu	istomer .: IVI/S LUIVIII	NO JUPITER SOLAR FOR WBREDA					
1 31									
	अपार	PO NO : LI	JMINO/WBREDA/2	019-20/005, DATED : 02-08-2019	IS: 1554 PART 1				
		Project L	ocation :West B	engal Renewable Energy					
				MWP Solar power					
	(III) (COR)	-		District West Bengal- 741507,					
	ul i Cub	DIOCK DIR	ijangnat, Natia b	istrict West Bengar-141501,	4				
Sr.No. COMPONENT AND OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF	TE	STING	Remarks
COM ONEM AND OF ERATION	CHARACTERISTICS	CLASS	THE OF CHECK	QUALITOR OF CHECK	ACCEL TANCE NORMO / REF. STANDARDS	RECORD		ENCY	Kelliaika
							M	C A	_
1 2	3	4	5	6	7	8	M	9 A	
	3	4	3	6	,	8	+	,	
		3.5 *		1000/	England Ct. 3 3	D /01	-		D. Df
1. ALUMINIUM ROD/COPPEER ROD	a) Make	Maj.	visual	100%	Factory Standard	Reg./Sheet	P		P = Perform
	b) Resistivity at 20°C	Maj.	Elec.	AQL 4 %S'3' (IS:2500-1)	IS 613-2000/ IS 5484-1997	Reg./Sheet	P		R = Review
	c) Diameter	Maj.	Phy.	DO	IS 613-2000/ IS 5484-1997	Reg./Sheet	P		V = Verify
	d) Tensile strength (for AL only)	Maj.	Phy.	DO	IS 613-2000/ IS 5484-1997	Reg./Sheet	P		W = Witness
	e) Elongation (for Cu only)	Maj.	Phy.	DO	IS 613-2000	Reg./Sheet	P		
	f) Chemical composition	Maj.	CHEM	SUPPLIER CERTIFICATE	SUPPLIER CERTIFICARE	S.C.	R		
	g) Surface finish	Maj.	visual	AQL 4 %S'3' OF IS 2500 Part 1	Factory Standard	Reg./Sheet	Р		
2. PVC COMPOUND FOR INSULATION	a) Make	Maj.	Visual	100%	Factory standard	Reg./sheet	P		
	b) Type/Grade	Мај.	Visual	100%	Factory Standard	Reg./Sheet	P		
	c) Volume & surface resistivity	Maj.	Ele	AQL 4 %S'3' OF IS 2500 Part 1	IS: 5831-1984	Reg./Sheet	P		
	a) Thermal stability	Maj.	Phy.	AQL 4 %S'3' (IS:2500-1)	IS : 5831-1984	Reg./Sheet	P		
	b) specific Gravity	Maj.	Phy.	S.C.	Factory Standard	S.C.	P		
	c) Tensile strength and Elongation	Maj.	Phy.	AOL 4 %S'3' OF IS 2500 Part 1	IS: 5831-1984	Reg./Sheet	P	-	
	c) Tensue strength and Elongation	ıvıdj.	I iiy.	AQL 4 /00 3 OF 15 2500 Fart 1	13 . 3031-1704	Acg./Silect	+++		
3 PVC COMPOUND FOR INNER SHEATH	a) Make	Maj.	Visual	100%	Factory standard	Reg./sheet	P		
5 TTC COMITOUND FOR INNER SHEATH	b) Type/Grade	Maj.	Visual	100%	Factory Standard Factory Standard	Reg./Sheet	P		
	C) Thermal Stability	Maj.	Phy.	AQL 4 %S'3' (IS:2500-1)	IS : 5831-1984	Reg./Sheet	P	-	
	D) Tensile strength and Elongation	Maj.	Phy.	AQL 4 %S'3' OF IS 2500 Part 1	IS : 5831-1984	Reg./Sheet	P	_	
	2) Tensue strength and Elongation	ıvıdj.	I iiy.	11QL 4 705 5 OF 15 2500 Fait 1	15 - 5051-1704	Acg./Sheet	1	-	
4 STEEL WIRE / STRIP ARMOUR	a) Make	Maj.	Visual	100%	Factory standard	Reg./sheet	P	-	
7 STEEL WIKE / STRIL ARMOUR	b) Dimensions	Maj.	Phy.	AQL 4 %S'3' (IS:2500-1)	IS:1554-1/IS: 10810: Pt-36	Reg./Sheet	P		
	c) Tensile strength & elongation test	Maj.	Phy.	AQL 4 %S'3' (IS:2500-1)	IS:1554-1/IS: 10810: Pt-37	Reg./Sheet	P	-	
	c) Tensite strength & clongation test	iviaj.	1,.	1221 4 /00 5 (1512500-1)	25:1554-1/15 : 10010: 1 €57	Acg./Sheet	•		
TISTRIFE	d) Torsion test for round wire	Maj.	Phy.	AQL 4 %S'3' (IS:2500-1)	IS:1554-1/IS: 10810: Pt-38	Reg./Sheet	P		
180000000000000000000000000000000000000	e) Winding test for formed wires	Maj.	Phy.	AQL 4 %S'3' (IS:2500-1)	IS:1554-1/IS: 10810: Pt-39	Reg./Sheet	P		
and Carlot	f) Uniformity of Zinc coating	Maj.	Phy.	AQL 4 %S'3' (IS:2500-1)	IS:1554-1/IS: 10810: Pt-40	Reg./Sheet	P		
Janor 7 Jell -	g) Mass of Zinc coating			AQL 4 %S'3' (IS:2500-1) AQL 4 %S'3' (IS:2500-1)	IS:1554-1/IS: 10810: Pt-40 IS:1554-1/IS: 10810: Pt-41	_	P		
UNIFLET	5	Maj.	Phy.			Reg./Sheet	-		
08.19	h) Resistivity test	Maj.	Phy.	AQL 4 %S'3' (IS:2500-1)	IS:1554-1/IS: 10810: Pt-42	Reg./Sheet	P		
06.	d) Chemical composition	Maj.	CHEM	SUPPLIER CERTIFICATE	SUPPLIER CERTIFICATE /	SC	R		
					IS:3975:1999		+		
		1	1	1			1 1	1	1

Sr.No.	COMPONENT AND OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF RECORD		ESTING GENC		Remarks
								M	С	A	İ
1	2	3	4	5	6	7	8		9		
4	FR-LSH PVC COMPOUND FOR OUTERSHEATH	a) Thermal Stability	Maj.	Phy.	AQL 4 %S'3' (IS:2500-1)	IS: 5831-1984	Reg./Sheet	P	\neg		
		b) T.S. & Elongation	Maj.	Phy.	DO	IS: 5831-1984/IS:10810: Pt-7	Reg./Sheet	P			
		c) specific gravity	Maj.	chem	AQL 4 %S'3' (IS:2500-1)	IS: 5831-1984/factory standard	Reg./Sheet	P	\Box		
		d) Oxygen Index/Temperature index Test	Maj.	FRLS	AQL 4 %S'3' (IS:2500-1)	IS:1554-1/IS: 10810: Pt-58/ASTM D 2863	Reg./Sheet	P		1	
		e) Test for specific optical density of smoke	Maj.	FRLS	AQL 4 %S'3' (IS:2500-1)	ASTM D 2843	Reg./Sheet	P		1	
		f) Test for halogen acid gas evolution	Maj.	FRLS	AQL 4 %S'3' (IS:2500-1)	IS:1554-1/IS:10810: Pt-59/IEC-60754-1	Reg./Sheet	P			
3.	IN PROCESS										
1.	WIRE DRAWING	a) Diameter of Wire	Maj.	Phy.	10% OF A LOT	IS:8130-1984	Reg./Sheet	P			
		b) Surface Finish	Maj.	Vis.	100%	Smooth Surface		P	\Box	i '	
		c) Tensile Strength(FOR Al only)	Maj.	Phy.	10% OF A LOT	IS:8130-1984/IS:10810-2	Reg./Sheet	P		i	
		d) Elongation at break/Annealing (for CU only)	Maj.	Phy.	10% OF A LOT	IS:8130-1984/IS:10810-1	Reg./Sheet	P			
		e) Wrapping Test (forAl only)	Maj.	Phy.	10% OF A LOT	IS:8130-1984/IS:10810-3	Reg./Sheet	P		i '	
			·	·			Ŭ				
2.	STRANDING	a) Dia/ number of strand	Maj.	Count	At the time of M/C setting	IS:8130/84, T.P., F.S	Reg./Sheet	P			
		b) Lay Length	Maj.	Phy.	DO	Factory Standard	Reg./Sheet	P			
		c) Direction of lay	Maj.	Phy.	DO	Factory Standard	Reg./Sheet	P			
		d) Conductor Resistance at 20°C	Maj.	Elec.	DO	IS:7098-1/IS:8130-1984/IS:10810:Pt-5	Reg./Sheet	P		i	
		e) Surface Appearance	Min.	Vis.	100%	No. surface defects		P			
		f) Dia/ depth of conductor	Maj.	Phy.	once in each shift	Factory Standard	Reg./Sheet	P	П		
		g) Records of strand breakage/welding	Maj.	Phy.	once in each shift	Factory Standard	Reg./Sheet	P			
3	INSULATION (PVC)	a) Radial Thickness & concentricity	Maj.	Phy.	During m/c Setting after atabilisation	IS:1554(I)1988,/IS:10810:Pt-6	Reg./Sheet	P			
		b) Thermal stability Test	Maj.	Phy.	ONE SAMPLE EACH DRUM	IS:5831 - 1984	Reg./Sheet	P	\dashv		
		c) T.S. & Elongation	Maj.	Phy.	During M/c Setting after atabilisation	IS:1554(I)1988/IS : 10810-7	Reg./Sheet	P		1	
		d) Colour of insulation	Maj.	Vis.	100%	IS:1554(I)1988	Reg./Sheet	P	-		
		e) Spark test	Maj.	Elec.	100%	Factory Standard	Reg./Sheet	P	\rightarrow		
		f) Shrinkage test	Maj.	Phy.	One sample per Size	IS:7098(I)1988/IS:10810-12	Reg./Sheet	P	,	i '	
		b) Surface Finish	Min	Vis.	100%	Surface shall be smooth		P	\Box	Г	
									\Box	i '	
3	LAYING-UP	a) Direction of lay	Maj.	Vis.	During m/c Setting after atabilisation	IS:1554(I)1988	Reg./Sheet	P			
		b) Diameter ove laid-up core	Maj.	Phy.	During m/c Setting after atabilisation	Factory Standard	Reg./Sheet	P			TISTRIE
		c) Lay length	Maj.	Phy.	During m/c Setting after atabilisation	Factory Standard	Reg./Sheet	P	1		nor Gran
									0	1	UNIFLET
4	INNER-SHEATH	a) Radial Thickness	Maj.	Phy.	During m/c Setting after atabilisation	IS:1554(I)1988,/IS:10810:Pt-6	Reg./Sheet	P	_		06. 03. 10
		b) Diameter over inner sheath	Maj.	Phy.	During m/c Setting after atabilisation	Factory Standard	Reg./Sheet	P	ш,		06.
		c) Surface Finish	Min	Vis.	100%	Surface shall be smooth		P	ا		
								1		'	1

Sr.No.	COMPONENT AND OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF RECORD		STING GENCY		Remarks
								M	С	A	
1	2	3	4	5	6	7	8		9		
5	ARMOURING (GI wire / strips)	a) Dimension of wires/ strips	Maj.	Phy.	During m/c setting	IS:1554(I) ,T.P.S	Reg./Sheet	P	\Box		
		b) No. of Wires/Strips	Min	Count	DO	Factory standard	Reg./Sheet	P			
		c) Direction of Lay	Maj.	Vis.	DO	IS:1554(I):1988	Reg./Sheet	P			
		d) Coverage / Quality of armour	Maj.	Phy.	DO	IS:1554(I):1988	Reg./Sheet	P			
		e) Diameter over armouring	Maj.	Phy.	During m/c Setting after atabilisation	Factory standard	Reg./Sheet	P			
		f) Conductor resistance test corrected at 20°C	Maj.	Elect	100%	IS:1554(I)1988/IS:8130/1984/IS:10810-5	Reg./Sheet	P			
		g) Insulation resistance(Volume resistivity)test	Maj.	Elect	100%	IS:1554(I)1988/IS:10810-43	Reg./Sheet	P			
		h) High voltage test	Maj.	Elect	100%	IS:1554(I)1988/IS:10810-45	Reg./Sheet	P			
6	PVC SHEATHING (FR-LSH)	a) Radial Thickness	Maj.	Phy.	During m/c setting & once in each shift	IS:1554(PT-2)1985, IS:10810-6	Reg./Sheet	P			
		b) Overall Diameter	Maj.	Phy.	DO	T.P.S.	Reg./Sheet	P			
		c) Surface Appearance	Maj.	Vis.	100%	Surface shall be smooth		P			
		d) Embossing	Maj.	Vis.	During m/c setting	IS:1554(PT-1)1988, T.P.S.	Reg./Sheet	P			
		e) Clour of sheath	Maj.	Vis.	During m/c setting	IS:1554(PT-1)1988, T.P.S.	Reg./Sheet	P			
		f) T.S. & Elongation	Maj.	Phy.	During M/c Setting after atabilisation	IS:1554(I)1988/IS: 10810-7	Reg./Sheet	P			
		g) Shrinkage test	Maj.	Phy.	During m/c setting	IS:1554(I)1988/IS:10810-12	Reg./Sheet	P			
		h) Thermal stability	Maj.	Phy.	During m/c setting	IS: 5831-1984	Reg./Sheet	P			
		i) Oxygen index & temperature index test	Maj.	FRLS	During m/c setting	IS:1554(I)1988/IS:109810-58	Reg./Sheet	P			
		j) Halogen acid gas generation test	Maj.	FRLS	During m/c setting	IS:1554(I)1988/IS:10810-59	Reg./Sheet	P			
		k) Smoke density test on cube sample	Maj.	FRLS	Cube cut from Outer Sheath of one sample	ASTM D 2843	Reg./Sheet	P			
	FINAL CABLE TESTING					IS:1554(I) ,T.P.S			4		
	ROUTINE TEST	a) Conductor Resistance Test at 20°C	Maj.	Elec.	100%	IS:1554(1),1.F.S IS: 8130-1984/IS:10810-5	Reg./Sheet	P	+	v	
1.	ROUTINE TEST	b) High Voltage Test at room temperature	Maj.	Elec.	100%	IS:1554(I)1988/IS:10810-45	Reg./Sheet	P		v	
2.	TYPE TEST	The manufacturer shall conduct internal type t				15:1554(1)1966/15:10610-45	Reg./Sileet	Г	+	•	
4.	A) Test on Conductor	a) Conductor Resistance at 20°C	Mai.	Elec.	One sample per Size	IS : 8130-1984/IS:10810-5	TTC	P	-+	v	
	A) 10st on Conductor	b) T.S. & wrapping (before stranding) for Aluminium conductor only	Maj.	Mech.	One sample per Size	IS: 8130-1984/IS:10810-2&3	TTC	P		v	
		c) Annealing (before stranding) for Copper only	Maj.	Maj.	One sample per Size	IS : 8130-1984/IS:10810-1	TTC	P	+	v	
	Test on PVC Insulation	a) Insulation Resistance Test	Maj.	Elec.	One sample per Size	IS:1554 Pt-1/1988/IS:10810-43	TTC	P		v	
	2000 OM 2 1 O HISURIUOH	b) Test for thickness of Insulation	Maj.	Phy.	One sample per Size	IS:1554 Pt-1/1988/IS:10810-6	TTC	P		v	
		c) T.S. & Elong before & after ageing	Maj.	Mech.	One sample per Size	IS:1554 Pt-1/1988/IS:10810-7	TTC	P		v	
	DUSTRIES	d) Loss of mass in Air Oven	Maj.	Mech.	One sample per Size	IS:1554 Pt-1/1988/IS:10810-10	TTC	P		v	
	(3)	e) Variation in T.S & E.B	Maj.	Mech.	One sample per Size	IS:1554 Pt-1/1988/IS:10810-10	TTC	P		v	
	Manor mill	f) Hot Deformation	Maj.	Phy.	One sample per Size	IS:1554 Pt-1/1988/IS:10810-11	TTC	P		v	
	Laure E S	g) Heat Shock Test	Maj.	Phy.	One sample per Size	IS:1554 Pt-1/1988/IS:10810-14	TTC	P		v	
	06. 08. 19	h) Shrinkage Test	Maj.	Ther	One sample per Size	IS:1554 Pt-1/1988/IS:10810-12	TTC	P		v	
-	06.02	i) Thermal Stability Test	Maj.	Ther	One sample per Size	IS: 5831-1984	TTC	P		v	
	T4 (Wi / 64-i-)	, ,	-		• • •					v	
	Test on armour (Wire / Strip)	a) Dimension of wires/ strips	Maj. Maj.	Phy. Mech.	One sample per Size	IS: 3975: 19999/IS:19810-36 IS: 3975: 19999/IS:19810-37	TTC TTC	P		v	
-		b) Tensile strength & elongation c) All acceptance test as per IS :3975:1999	Maj. Maj.	Mech. Phy/Elec &	One sample per Size One sample per Size	IS: 3975: 19999/IS:19810-37 IS: 3975: 19999/IS:10810	TTC	P		v	
		c) An acceptance test as per 15 :59/5:1999	waj.	Chem	One sample per Size	13:39/5:19999/13:10810	110	r		*	

r.No.	COMPONENT AND OPERATION	CHARACTERISTICS	CLASS	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF RECORD		TING	Remarks
							1	M	C A	
1	2	3	4	5	6	7	8		9	
	Tests on Sheath (FR-LSH)	a) Thickness of sheath	Maj.	Phy.	One sample per Size	IS:1554 Pt-1/IS-10810-6	TTC	P	v	
		b) T.S. & Elong before & after ageing	Maj.	Phy.	One sample per Size	IS:5831-1984/IS:10810-7	TTC	P	v	
		c) Variation in T.S & E.B	Maj.	Phy.	One sample per Size	IS:5831-1984/IS:10810-11	TTC	P	v	
		d) Shrinkage	Maj.	Phy.	One sample per Size	IS:5831-1984/IS:10810-12	TTC	P	v	
		e) Hot Deformation	Maj.	Phy.	One sample per Size	IS:5831-1984/IS:10810-15	TTC	P	v	
		f) Loss of mass in Air Oven	Maj.	Phy.	One sample per Size	IS:5831-1984/IS:10810-10	TTC	P	v	
		g) Heat Shock Test	Maj.	Phy.	One sample per Size	IS:5831-1984/IS:10810-14	TTC	P	v	
		h) Thermal Stability Test	Maj.	Phy.	One sample per Size	IS:5831-1984	TTC	P	v	
		i) Flammability Test	Maj.	FRLS	One sample per Size	IS: 1554-1/IS 10810Pt-53	TTC	P	v	
		j) Flammability Test on Single cable	Maj.	FRLS	One sample per Size	IS: 1554-1/IS 10810Pt-61	TTC	P	v	
		k) Flammability test on bunched cable	Maj.	FRLS	One sample per Size	IS: 1554-1/IS 10810Pt-62	TTC	P	v	
		l) Oxygen index	Maj.	FRLS	One sample per Size	IS: 1554-1/IS 10810Pt-58	Reg./Sheet	P	v	
		m) Halogen acid gas generation test	Maj.	FRLS	One sample per Size	IS: 1554-1/IS 10810Pt-59	Reg./Sheet	P	v	
		n) Test for specific optical density of smoke	Maj.	FRLS	Cube cut from Outer Sheath of one sample	ASTM D 2843	Reg./Sheet	P	v	
		o) Smoke density	Maj.	FRLS	One sample per Size	IS: 1554-1/IS:10810Pt-63	Reg./Sheet	P	v	
		p) Temperature index test	Maj.	FRLS	One sample per Size	ASTM D 2863	Reg./Sheet	P	v	
		q) High Voltage Test	Maj.	Elec.	One sample per Size	IS:1554 Pt-1/1988/IS:10810-45	TTC	P	v	
	Additional Special Tests	i UV RADIATION TEST	Maj.	ENVIR.	do	Factory Standard	TTC	P	v	
		ii Anti-Termite & Rodent repulsion Test on outer sheath	Maj.	Chem	do	Factory Standard	TTC	P	v	
3	ACCEPTANCE TEST							\vdash	+	
3.	A) Electrical	a) Conductor Resistance test 20°C	Mai.	Elec.	IS:1554 Pt-1/1988	IS: 8130-1984/10810-5	INSPECTION	P	W	
	11) Decemen	b) High Voltage Test	Maj.	Elec.	IS:1554 Pt-1/1988	IS:1554 Pt-1/1988/10810-45	DO	P	w	
T		c) Insulation Resistance Test	Maj.	Elec.	IS:1554 Pt-1/1988	IS:1554 Pt-1/1988/10810-43	DO			
	B) Non-Electrical	d) Thickness of Insulation and Outer Sheath	Maj.	Phy.	IS:1554 Pt-1/1988	IS:1554 Pt-1/1988/10810-6	DO	P	w	
		e) Tensile Strength & Elongation at break	Maj.	Phy.	IS:1554 Pt-1/1988	IS:1554 Pt-1/1988/10810-7	DO	P	W	
		for insulation & Sheath					1			
		f) Dimensions	Maj.	Phy.	IS:1554 Pt-1/1988	IS:1554 Pt-1/1988	DO	P	W	
	C) FRLS Test	a) Oxygen index	Maj.	FRLS	One sample per Size	IS: 1554-1/IS 10810Pt-58	INSPECTION	P	W	
		b) Halogen acid gas generation test	Maj.	FRLS	One sample per Size	IS: 1554-1/IS 10810Pt-59	INSPECTION	P	W	
		c) Test for specific optical density of smoke	Maj.	FRLS	Cube cut from Outer Sheath of one	ASTM D 2843	INSPECTION	P	W	1
		d) Smoke density	Maj.	FRLS	One sample per Size	IS: 1554-1/IS:10810Pt-63	INSPECTION	P	W	1
		e) Temperature index test	Maj.	FRLS	One sample per Size	ASTM D 2863	INSPECTION	P	W	
								\vdash	_	
5	PACKING & MARKING	a) Cable end sealing	Maj.	Vis.	100 %	F.S. & IS: 1554 (I)1988		P	+-	
		b) Stencilling/Marking	Min.	Vis.	100 %	F.S. & IS: 1554 (I)1988		P	+-	
		,			/-	(-/ 30		 -	-	+

Note

1) Tests at Raw Material stage, in-process stage and during final inspection shall be carried out as applicable to the construction of cables. Abbreviations used in the above quality plan are as under.

Legends / Abbreviations used in the above quality plan are as under.

M= MANUFACTURER / SUB-SUPPLIER

C: CLIENT / OWNER A: Third party / Client

F.S.- Factory Standard

Min - Minor Elec- Electrical Chem -- Chemical S.C. -- Supplier Certificate
Maj. -Major Vis - Visual Reg -- Register T.P. -- Technical Particular

TEC .. Type test certificate

Phy. -- Physical ENV -- Environmental Mech -- Mechnical

FRLS -- Fire retardent low smoke

MANUFACTURER'S NAME & ADDRESS		MANUFACT	TURING QUA	LITY PLAN	LEGENDS:			
APAR INDUSTRIES LTD				ner sheathed,Round or strip armoured &	QAP NO.: AIL/QAP/HT LUMINO/02		REV NO :	DATE : 6-8 -19
(UNIT : UNIFLEX CABLES)	<u> </u>	FR-LSH outer sh	neathed cable	•			KEV NO:	DATE: 0-8 -19
Plot:158-163, GIDC,	PAA BO	Name of custor	ner .:M/s LUMIN	O JUPITER SOLAR FOR WBREDA				•
Umbergaon, Gujarat	(. ())				M= MANUFACTURER C= CLIENT	A= THIRD P	ARTY	
email: rk.pawar@apar.com		PO NO : LUMII	NO/WBREDA/20	119-20/005, DATED : 02-08-2019				
eman. rk.pawar@apar.com	अपार				P= PERFORM V = VERIFY	W= WITNESS		
		Project Loca	tion :West Ber	ngal Renewable Energy				
	A constant	Development	Agency, 10 M	WP Solar power				
	(Un ic or)	Block Bhaian	nahat Nadia Di	strict West Bengal- 741507,				
	un bedie	Brook Bridger	gnat, mada 21	outet troot zongar 141001;	-			
Sr.No. COMPONENT AND OPERATION	CHARACTERISTICS	CLASS	TYPE OF	QUANTUM OF CHECK	ACCEPTANCE NORMS /	FORMAT	AGENCYT	
			CHECK		REF. STANDARDS	OF RECORD	M C A	Remarks
A. RAW MATERIALS 1. ALUMINIUM ROD/COPPEER ROD	a) Make	Moi	Visual	100%	Footows Standard	Dog/Chort	P	
1. ALUMINIUM KOD/COPPEER ROD	a) Make b) Resistivity at 20°C	Maj. Maj.	Visuai Elec.	100% AQL 4 %S'3' OF IS 2500 Part 1	Factory Standard IS 613-2000/ IS 5484-1997	Reg./Sheet Reg./Sheet	P	1
	c) Diameter	Maj.	Phy.	DO	IS 613-2000/ IS 5484-1997 IS 613-2000/ IS 5484-1997	Reg./Sheet	P	1
	d) Tensile strength	Maj.	Phy.	DO	IS 613-2000/ IS 5464-1997	Reg./Sheet	P	1
	e) Elongation (for Cu only)	Maj.	Phy.	DO	IS 613-2000	Reg./Sheet	P	1
	f) Chemical composition	Maj.	CHEM	SUPPLIER CERTIFICATE	SUPPLIER CERTIFICARE	Reg./Sheet	P	
	g) Surface finish	Maj.	visual	AQL 4 %S'3' OF IS 2500 Part 1	Factory Standard	Reg./Sheet	P	
	g) garrace image		715441	1142 1 705 0 01 15 2000 1411 1	Tuestry standard	Reg./Blicet	•	
2. XLPE COMPOUND	a) Make	Maj.	Visual	100%	Factory standard	Reg./sheet	P	
	b) Type/Grade	Maj.	Visual	100%	Factory Standard	Reg./Sheet	P	
	c) Volume & surface resistivity	Maj.	Ele	SUPPLIER CERTIFICATE	SUPPLIER CERTIFICARE	Reg./Sheet	P	
	d) Hot Set	Maj.	Phy.	SUPPLIER CERTIFICATE	SUPPLIER CERTIFICARE	Reg./Sheet	P	
	e) specific Gravity	Maj.	Phy.	S.C.	Factory Standard	S.C.	P	
	f) Tensile strength and Elongation	Maj.	Phy.	AQL 4 %S'3' OF IS 2500 Part 1	Factory Standard	Reg./Sheet	P	
							1	
3. SEMI-CONDUCTING COMPOUND	a) Volume Resisitivity	Maj.	Elec.	S.C.	Factory Standard	S.C.	P	
4. COPPER TAPE	a) Thickness	Maj.	Phy.	DO	Factory Standard	Reg./Sheet	P	
4. COTTER TATE	b) Resistivity at 20°C	Maj.	Elec.	DO	Factory Standard	Reg./Sheet	P	
	S, Messering at 20 C	ıvıaj.	Licc.	D 0	ractory Standard	Reg./Bliect	*	
5. PVC COMPOUND FOR INNER SHEATH	a) Make	Maj.	Visual	100%	Factory standard	Reg./sheet	P	1
	b) Type/Grade	Maj.	Visual	100%	Factory Standard	Reg./Sheet	P	1
	c) Thermal Stability	Maj.	Phy.	AOL 4 %S'3' (IS:2500-1)	IS: 5831-1984	Reg./Sheet	P	1
	d) Tensile strength and Elongation	Maj.	Phy.	AQL 4 %S'3' OF IS 2500 Part 1	Factory Standard	Reg./Sheet	P	
	••							1
6. ARMOUR WIRE/STRIPS	a) Dimensions	Maj.	Phy.	AQL 4 %S'3' OF IS 2500 Part 1	IS 3975 / 10810-36	Reg./Sheet	P	1
	b) Resistivity at 20°C	Maj.	Elec.	DO	IS 3975 / 10810-42	Reg./Sheet	P	1
San	c) T.S. & Elongation	Maj.	Phy.	DO	IS 3975 / 10810-37	Reg./Sheet	P	1
Qua STE	d) Mass and Uniformity	Maj.	Chem.	DO	IS 3975 / 10810-40 & 41	Reg./Sheet	P	
UNIFLET 03.19	of Zinc coating	,	p.	70	TG 2055 / 10010 20 0 20	D 200		1
06.00	e) Torsion Test/winding Test	Maj.	Phy.	DO	IS 3975 / 10810-38 & 39	Reg./Sheet	P	
7. PVC COMPOUND (FRLSH)	a) Thermal Stability	Maj.	Phy.	AQL 4 %S'3' OF IS 2500 Part 1	IS: 5831-1984	Reg./Sheet	P	
1. 5 COM COM (TRESH)	b) T.S. & Elongation	Maj.	Phy.	DO	IS: 5831-1984 / 10810-7	Reg./Sheet	P	1
I	c) Specific Gravity	Maj.	Phy.	DO	Factory Standard	Reg./Sheet	P	1
	d) Loss of mass in Air Oven (O/SH)	Maj.	Phy.	DO	IS:5831-1984 / 10810-10	Reg./Sheet	P	
	.,				1			
CDECIAL TEST ON EDIT COMPOUND	a) Oxygen Index Test	Maj.	ENVIR.	AQL 4 %S'3' OF IS 2500 Part 1	ASTM 2863/10810-58	Reg./Sheet	P	1
SPECIAL TEST ON FRLS COMPOUND	b) Temperature Index test	Maj.	ENVIR.	DO	ASTM 2863/10810-58	Reg./Sheet	P	1
I	C) Acid gas generationtest	Maj.	ENVIR.	DO	IEC: 754-1/10810-59	Reg./Sheet	P	1
	d) Smoke density rating	Maj.	ENVIR.	DO	ASTM D 2843	Reg./Sheet	P	1
•	• •		•	•	•	. ~		•

Sr.No.	COMPONENT AND OPERATION	CHARACTERISTICS	CLASS	TYPE OF	QUANTUM OF CHECK	ACCEPTANCE NORMS /	FORMAT	A	GENCY	T	
				CHECK		REF. STANDARDS	OF RECORD	M		A	Remarks
В.	IN PROCESS										
1.	WIRE DRAWING	a) Diameter of Wire	Maj.	Phy.	10% OF A LOT	IS:8130	Reg./Sheet	P			
		b) Surface Finish	Maj.	Vis.	100%	Smooth Surface		P			
		c) Tensile Strength	Maj.	Phy.	10% OF A LOT	IS:8130/10810 - 2	Reg./Sheet	P			For Aluminium
		(for aluminum only)		,-				_			conductor only
		d) Annealing test	Maj.	Phy.	10% OF A LOT	IS:8130/10810 - 1	Reg./Sheet	P			For copper
		u) Amicaning test	maj.	ıny.	10/0 01 /1 201	15.0130/10010 - 1	reg./blice	1			conductor only
		e) Wrapping Test	Maj.	Phy.	10% OF A LOT	IS:8130/10810 - 3	Reg./Sheet	P			For Aluminium
		c) Wrapping Test	maj.	I IIy.	1070 01 11 201	15.0130/10010 - 3	reg./blice	-			conductor only
											conductor only
2.	STRANDING	a) Dia/ number of strand	Maj.	Count	At the time of m/c setting	IS:8130, T.P., Factory Standard	Reg./Sheet	P			
	STRING	b) Lay Length /Direction of lay	Maj.	Phy.	DO	Factory Standard	Reg./Sheet	P			
		c) Conductor Resistance at 20°C	Maj.	Elec.	DO	IS:8130/10810 - 5	Reg./Sheet	P			
		d) Surface Appearance	Maj.	Vis.	100%	No. surface defects	reg./sneet	P			
		e) Dia/ depth of conductor	Maj.	Phy.	once in each shift	Factory Standard	Reg./Sheet	P			
		_ ·			once in each shift	2		P			
		f) Records of strand breakage/welding	Maj.	Phy.	once in each sunt	Factory Standard	Reg./Sheet	r			
_	INCHI ATION (VI DE)	a) Radial Thickness	M:	D1		IC.7009/II)2011 T.B.C	Dec /51	P			
. 3	INSULATION (XLPE)	a) Kaulai i nickness	Maj.	Phy.	Duning m/o Cotting often state!	IS:7098(II)2011,T.P.S	Reg./Sheet	r			
		1) 17 (0)	34.	701	During m/c Setting after atabilisation	TC #000/DT 4)2011/TC 10010 20	D (C)	_			
		b) Hot Set	Maj.	Phy.	ONE SAMPLE EACH DRUM	IS:7098(PT-2)2011/IS:10810-30	Reg./Sheet	P			
		c) T.S. & Elongation	Maj.	Phy.	During m/c Setting after atabilisation	IS:7098(PT-2)2011/IS:10810-7	Reg./Sheet	P			
								_			
		d) Colour of insulation	Maj.	Vis.	100%	IS:7098(PT-2)2011	Reg./Sheet	P			
		e) Spark test	Maj.	Elec.	100%	IS:7098(PT-2)2011	Reg./Sheet	P			
		f) Shrinkage test	Maj.	Phy.	One sample per Size	IS:7098(PT-2)2011/IS:10810-12	Reg./Sheet	P			
		g) Surface Finish	Min	Vis.	100%	Surface shall be smooth		P			
4	SEMICONDUCTING COMPOUND	a) Radial Thickness	Maj.	Phy.	ONE SAMPLE EACH DRUM	Factory Standard ,T.P.S	Reg./Sheet	P			
		b) Surface Finish over semi	Maj.	Vis.	During m/c setting after	surface should be smooth	Reg./Sheet	P			
		conducting Insulation screen.			stabilisation						
		c) Resistivity	Maj.	Elec.	ONE SAMPLE EACH DRUM	IS:7098(II)2011	Reg./Sheet	P			
5	COPPER TAPING	a) Thickness	Maj.	Phy.	During m/c setting	Factory Standard ,T.P.S	Reg./Sheet	P			
		b) Overlap	Maj.	Phy.	DO	Factory Standard ,T.P.S	Reg./Sheet	P			
		c) No. of Tapes	Maj.	Vis.	DO	Factory Standard ,T.P.S	Reg./Sheet	P			
		d) Identification of cores	Maj.	Vis.	100%	IS:7098(II)2011 ,T.P.S	Reg./Sheet	P			
			_				_				
6	LAYING - UP OF CORES	a) Core sequence	Maj.	Vis.	During m/c setting	Factory Standard ,T.P.S		P			
		b) Direction of lay	Maj.	Vis.	DO	Factory Standard ,T.P.S		P			
		c) Laid-up diameter	Maj.	Phy.	DO	Factory Standard ,T.P.S	Reg./Sheet	P			
		,				5 ,					
7	PVC INNER SHEATHING(ST 2)	a) Radial Thickness	Maj.	Phy.	During m/c setting	IS:7098(II)2011 .T.P.S	Reg./Sheet	P			
I '		b) Surface Finish	Min	Vis.	100%	Surface shall be smooth		P			
I		c) Diameter over Inner sheath	Min	Vis.	100%	Factory standard, T.P.S		P			
I		-,		1 202	10070	- 2007 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5		1 -			
8	ARMOURING(Wire/Strips)	a) Dimension of wires/ strips	Maj.	Phy.	During m/c setting	IS:7098(II)2011 ,T.P.S	Reg./Sheet	P			
ľ		b) No. of wire/Strips	Min	Count	DO	Factory standard	Reg./Sheet	P			
I	SUSTRIES.	c) Direction of Lay	Maj.	Vis.	DO	IS:7098(PT-2)2011	Reg./Sheet	P			
I		d) Lay Length	Min	Vis.	DO	Factory standard	Reg./Sheet	P			
	Dano Toll	e) Coverage/Quality of armour	Maj.	Phy.	DO	Factory standard Factory standard	Reg./Sheet	P			
I	Davor Grand	f) Diameter over Armourig	Min	Phy.	DO	Factory standard	Reg./Sheet	P			
I	06.	1) Diameter over Armourig	IVIIII	rny.		ractory standard	Aeg./Sneet	r			
•	I	I		1	ı l		l	1	ı	I	I

Sr.No.	COMPONENT AND OPERATION	CHARACTERISTICS	CLASS	TYPE OF	QUANTUM OF CHECK	ACCEPTANCE NORMS /	FORMAT	Α.	GENCY	т	
51.140.	COMPONENT AND OF ERATION	CHARACTERISTICS	CLASS	CHECK	QUALITOR OF CHECK	REF. STANDARDS	OF RECORD	M		A	Remarks
11.	PVC OUTER SHEATHING	a) Radial Thickness	Maj.	Phy.	During m/c setting & once in each	IS:7098(PT-2)2011, T.P.S.	Reg./Sheet	P		А	Kemai Ks
		,			shift	, , , , , ,					
	(FRLS)	b) Overall Diameter	Maj.	Phy.	DO	T.P.S.	Reg./Sheet	P			
		c) Surface Appearance	Maj.	Vis.	100%	Surface shall be smooth		P			
		d) Embossing	Maj.	Vis.	During m/c setting	IS:7098(PT-2)2011, T.P.S.		P			
		e) Clour of sheath	Maj.	Vis.	During m/c setting	IS:7098(PT-2)2011, T.P.S.	Reg./Sheet	P			
		f) T.S. & Elongation	Maj.	Phy.	During M/c Setting after atabilisation	IS:7098(PT-2)2011/IS: 10810-7	Reg./Sheet	P			
		c) Christman toot	M-:	DI	During m/c setting	TC-7009/DT 3/3011/TC - 10910 13	Reg./Sheet	P			
		g) Shrinkage test h) Thermal stability	Maj. Maj.	Phy. Phy.	During m/c setting	IS:7098(PT-2)2011/IS: 10810-12 IS: 5831-1984	Reg./Sheet	P			
		,						P			
		i) Oxygen index & temperature index test	Maj.	FRLS	During m/c setting	IS:7098(PT-2)2011/IS:109810-58	Reg./Sheet				
		j) Halogen acid gas generation test	Maj.	FRLS	During m/c setting	IS:7098(PT-2)2011/IS:109810-59	Reg./Sheet	P			
		k) Smoke density test on cube sample	Maj.	FRLS	Cube cut from Outer Sheath of one sample	ASTM D 2843	Reg./Sheet	P			
c.	FINAL CABLE TESTING										
	ROUTINE TEST	a) Conductor Resistance Test at 20°C	Maj.	Elec.	100%	IS: 8130	Reg./Sheet	P		v	
		b) Partial discharge Test	Maj.	Elec.	100%	IS:7098(PT-2)2011/10810-46	Reg./Sheet	P		v	
		c) High Voltage Test	Maj.	Elec.	100%	IS:7098(PT-2)2011/10810-45	Reg./Sheet	P		V	
2.	TYPE TEST										
	A) Electrical	a) Conductor Resistance Test at 20°C	Maj.	Elec.	One sample per Size	IS: 8130	TTC	P		V	For Aluminium
		b) Tensile & wrapping (before stranding)	Maj.	Mech.	One sample per Size	IS: 8130	TTC	P		v	conductor only
		c) Annealing Test(before stranding)	Maj.	Maj.	One sample per Size	IS: 8130	TTC	P		v	For Copper conductor only
		d) Partial discharge Test		Elec.	• •	IS:7098(PT-2)2011	TTC	P		v	conductor only
			Maj.		One sample per Size		TTC	P		V	
		e) Bending Test followed by Partial discharge Test	Maj.	Phy. & Ele.	One sample per Size	IS:7098(PT-2)2011	110	P		v	
		f) Dielectric Power factor Test									
		1) As a function of Voltage	Maj.	Elec.	One sample per Size	IS:7098(PT-2)2011	TTC	P		V	
		2) As a function of Temperature Max.	Maj.	Elec.	One sample per Size	IS:7098(PT-2)2011	TTC	P		V	
		g) Insulation Resistance Test									
		1) Volume Resistivity at Ambient	Maj.	Elec.	One sample per Size	IS:7098(PT-2)2011	TTC	P		V	
		2) Volume Resistivity at 90°C	Maj.	Elec.	One sample per Size	IS:7098(PT-2)2011	TTC	P		V	
		h) Heating Cycle Test	Maj.	Elec.	One sample per Size	IS:7098(PT-2)2011	TTC	P		v	
		k) Impulse withstand Test	Maj.	Elec.	One sample per Size	IS:7098(PT-2)2011	TTC	P		v	
		l) High Voltage Test (RMS)	Maj.	Elec.	One sample per Size	IS:7098(PT-2)2011	TTC	P		V	
	B) Non-Electrical	a) Test for thickness of Insulation Eccentricity and sheath	Maj.	Phy.	One sample per Size	IS:7098(PT-2)2011	TTC	P		V	
		b) Test for armour wire	Maj.	Phy.	One sample per Size	IS: 3975	TTC	P		v	
		Tensile strength	Maj.	Mech.	One sample per Size	IS: 3975	TTC	P		v	
		Mass& uniformity of Zinc coating	Maj.	Chem	One sample per Size	IS: 3975	TTC	P		V	
	JOUSTRIES	c) Physical Test for Insulation									
	(3)	i) Tensile Strength & Elongation at									
	Manor The	break before & after Ageing	Maj.	Phy.	One sample per Size	IS:7098(PT-2)2011	TTC	P		V	
	(3)	ii) Variation in T.S & E.B	Maj.	Phy.	One sample per Size	IS:7098(PT-2)2011	TTC	P		v	
	UNIFLE	iii) Hot Set Test	Maj.	Phy.	One sample per Size	IS:7098(PT-2)2011	TTC	P		v	
	06.08.17	iv) Shrinkage Test	Maj.	Phy.	One sample per Size	IS:7098(PT-2)2011	TTC	P		v	
	V	v) Water absorption (Gravimetric)	-	1							
		Test	Maj.	Phy.	One sample per Size	IS:7098(PT-2)2011	TTC	P		V	

No. COMPONENT AND OPERATION	CHARACTERISTICS	CLASS	TYPE OF	QUANTUM OF CHECK	ACCEPTANCE NORMS /	FORMAT		GENCY	Т	
			CHECK		REF. STANDARDS	OF RECORD	M	С	A	Remarks
	d) Physical Test for Outer Sheath									
	i) Tensile Strength & Elongation at									
	break before & after Ageing	Maj.	Phy.	One sample per Size	IS:5831-1984	TTC	P		V	
	ii) Variation in T.S & E.B	Maj.	Phy.	One sample per Size	IS:5831-1984	TTC	P		V	
	iii) Shrinkage Test(O/SH)	Maj.	Phy.	One sample per Size	IS:5831-1984	TTC	P		V	
	iv) Hot Deformation Test(O/SH)	Maj.	Phy.	One sample per Size	IS:5831-1984	TTC	P		V	
	v) Loss of mass in Air Oven (O/SH)	Maj.	Phy.	One sample per Size	IS:5831-1984	TTC	P		V	
	vi) Heat Shock Test(O/SH)	Maj.	Phy.	One sample per Size	IS:5831-1984	TTC	P		V	
	vii) Thermal Stability Test(O/SH)	Maj.	Phy.	One sample per Size	IS:5831-1984	TTC	P		V	
	viii) Flammability Test	Maj.	Phy.	One sample per Size /lot	IEC 60332(P-1)	TEC	P		V	
C) FRLS TEST FOR OUTER SHEATH	a) Oxygen Index Test	Maj.	ENVIR.	One sample per Size /lot	ASTM 2863	TTC	P		V	
	b) Temperature Index Test	Maj.	ENVIR.	One sample per Size /lot	ASTM 2863	TTC	P		V	
	C) Acid gas generationtest	Maj.	ENVIR.	One sample per Size /lot	IEC: 754-1	TTC	P		V	
	d) Smoke density rating	Maj.	ENVIR.	One sample per Size /lot	ASTM D 2843	TTC	P		V	
3. ACCEPTANCE TEST										
A) Electrical	a) Conductor Resistance test 20°C	Maj.	Elec.	AS PER IS:7098(II)2011	IS: 8130	INSPECTION	P		w	
,	b) Partial discharge Test	Maj.	Elec.	AS PER IS:7098(II)2011	IS:7098(PT-2)2011	DO	P		w	
	c) High Voltage Test	Maj.	Elec.	AS PER IS:7098(II)2011	IS:7098(PT-2)2011	DO	P		w	
	d) Insulation Resistance Test	Maj.								
	1) Volume Resistivity at Ambient	Maj.	Elec.	AS PER IS:7098(II)2011	IS:7098(PT-2)2011	DO	P		w	
	2) Volume Resistivity at 90°C	Maj.	Elec.	AS PER IS:7098(II)2011	IS:7098(PT-2)2011	DO	P		w	
	Thickness of Insulation and Outer				-501 07 0(2 2 2)2022		_			
B) Non-Electrical	a) Sheath	Maj.	Phy.	AS PER IS:7098(II)2011	IS:7098(PT-2)2011	DO	P		w	
_,	b) Hot Set Test for Insulation	Maj.	Phy.	AS PER IS:7098(II)2011	IS:7098(PT-2)2011	DO	P		w	
	Tensile Strength & Elongation at		,				_			
	c) break for insulation & Sheath	Maj.	Phy.	AS PER IS:7098(II)2011	IS:7098(PT-2)2011	DO	P		w	
	d) Flammability Test	Maj.	Phy.	AS PER IS:7098(II)2011	IEC 60332(P-1)	DO	P		w	
	u) Tallinability Test	maj.	I IIy.	110 1 211 1517 05 0(11) 2011	IEC 00332(1-1)	20	1		''	
C) Special Test on FRLS Outer Sheath	a) Oxygen Index Test	Maj.	ENVIR.	1 SAMPLE PER LOT	ASTM 2863	DO	P		w	
C) Special Test on TRES Outer Sheath	b) Temperature Index Test	Maj.	ENVIR.	1 SAMPLE PER LOT	ASTM 2863	DO	P		w	
	C) Acid gas generationtest	Maj.	ENVIR.	1 SAMPLE PER LOT	IEC: 754-1	DO	P		w	
	d) Smoke density rating	Maj.	ENVIR.	1 SAMPLE PER LOT	ASTM D 2843	DO	P		w	
	u) billoke density rating	171aj.	EAVIK.	1 MAIN LE I EK LOI	Factory Standard & IS: 7098	50	ı .		''	
4 PACKING & MARKING	a) Cable end sealing	Maj.	Vis.	100 %	(II)2011		P			
THEMETO WHARMETO	a) Cable thu scaning	тај.	V 15.	100 /0	Factory Standard & IS: 7098		*			
	b) Stencilling/Marking	Min.	Vis.	100 %	(II)2011		P			
	b) Stellelling/Marking	will.	v is.	100 76	(11)2011		r			

Note:

1) Tests at Raw Material stage, in-process stage and during final inspection shall be carried out as applicable to the construction of cables. Abbreviations used in the above quality plan are as under.



TTC .-- Type test certificate

Min - Minor Elec- Electrical Maj. -Major Vis - Visual Chem -- Chemical Reg -- Register S.C. -- Supplier Certificate T.P. -- Technical Particular Phy. -- Physical ENV -- Environmental

Mech -- Mechnical

MANUFACTURER'S NAME &

ADDRESS M/s APAR INDUSTRIES





(UNIT: Uniflex Cables)

Plot No.158 -163 ,GIDC ,Umbergaon -396171

Phone: 0260-2562412, 2563412

MANUFACTURING QUALITY PLAN 1100V: LT- XLPE - POWER CABLE

CLIENT/CONTRACTOR NAME: M/s LUMINO JUPITER SOLAR FOR WBREDA

ITEM: 1100V Grade Cu/AL. Conductor XLPE Insulated, AL Armoured, M = MANUFACTURER/SUB-CONTRACTOR FRLS PVC Sheathed Power Cables as per IS:7098 Part-2/1988, 1.9/33.3

QAP NO.: LT-11-2015/001 Date-06.08.2019

PO NO: LUMINO/WBREDA/2019-20/005, DATED: 02-08-2019

Project Location : West Bangal Renewable Energy Development Agency, 10 MWP Solar power project, Krishnaganj, Block Bhajanghat, Nadia District West Bangal- 741507,

LEGENDS:

A- Third Party/Client; P- Perform

V -Verification, R: Review; W = Witness

C - Contractor

Third Party/Client shall be identified in Column "A" as a "W"

Sr. No.	COMPONENT A	AND OPERATION		CHARACTERISTICS	CATEGOR	TYPE OF	QUANTUM OF CHECK	ACCEPTANCE NORMS /	FORMAT OF		STIN	
					Y OF	CHECK		REF. STANDARDS	RECORD	M	С	Α
1	2		3		4	5	6 & 7	8	9		10	11
A.	RAW MATERI	IALS										
1	COPPEER RO	DD/AL ROD	a)	Resistivity at 20°C	Maj.	Elec.	AQL 4 %S'3' OF	IS:12444	Reg./Sheet	Р		on drawn wire
							IS 2500 Part 1	/ IS:8130			1	
			b)	Diameter	Maj.	Phy.	DO	DO	Reg./Sheet	Р		
			c)	Annealing test for Cu.	Maj.	Phy.	DO	DO	Reg./Sheet	Р	Ш	for cu rod
			d)	Tensile test for aluminium	Maj.	Phy.	DO	DO	Reg./Sheet	Р		for cu rod
											Ш	
2	XLPE COMPO	DUND	a)	Hot Set	Maj.	Phy.	S.C.	IS-7098 Part-I/1988	S.C.	Р	Ш	
			b)	specific Gravity	Maj.	Phy.	S.C.	Factory Standard	S.C.	Р	Ш	
			c)	T.S. & Elong.	Maj.	Phy.	S.C.	Factory Standard	S.C.	Р	Ш	
											Ш	
3	Galvanized St	teel Wire/Strips	a)	Dimensions	Maj.	Phy.	AQL 4 %S'3' OF	IS:3975	Reg./Sheet	Р	1	
	(Wherever ap	plicable)					IS 2500 Part 1				ш	
	VOU!	STRIES	b)	Resistivity at 20°C	Maj.	Elec.	DO	IS:3975	Reg./Sheet	Р	Ш	
	1/3/	(E)	c)	Tensile Strength	Maj.	Phy.	DO	IS:3975	Reg./Sheet	P	Ш	
	Ban	× 579	d)	Elongation	Maj.	Phy.	DO	IS:3975	Reg./Sheet	Р	Ш	
	Ches.	AVIELE CO	f)	Torsion / Winding Test	Maj.	Phy.	DO	IS:3975	Reg./Sheet	P	ш	
		06.08.19	g	Mass & Uniformity of Zinc	Maj.	Chem	DO	IS:3975	Reg./Sheet	Р	i i	
		00.		Coating			1			1	i l	

Sr. No.	COMPONENT AND OPERATION		CHARACTERISTICS	CATEGOR Y OF	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF RECORD		STIN	
1	2	3	1	4 4	5 5	6 & 7	REF. STANDARDS	9	М	C 10	A 11
	Aluminiuml Wire/Strips (Wherever applicable) for Armouring of Single	a)	Dimensions	Maj.	Phy.	AQL 4 %S'3' OF IS 2500 Part 1	IS:3975	Reg./Sheet	Р		
	Core	b)	Resistivity at 20°C	Maj.	Elec.	DO	IS:8130	Reg./Sheet	Р		
		c)	Tensile Strength	Maj.	Phy.	DO	IS:8130	Reg./Sheet	Р		
		e)	Wrapping only for Al. armour	Maj.	Phy.	DO	IS:8130	Reg./Sheet	Р		
5	PVC COMPOUND ST-2 FOR INNER AND OUTER SHEATH	a)	Thermal Stability	Maj.	Phy.	One sample per batch of 10MT	IS : 5831-1984	Reg./Sheet	Р		
		b)	T.S. & Elongation (Before & after ageing)	Maj.	Phy.	DO	IS : 5831-1984	Reg./Sheet	Р		
		c)	Specific Gravity	Maj.	Phy.	DO	Factory Standard	Reg./Sheet	Р		
		d)	Loss of mass	Maj.	Phy.	DO	IS : 5831-1984	Reg./Sheet	Р		
	Special Test on FRLS PVC ST-2 Outer Sheathing Compound	a)	Oxygen Index Test	Maj.	ENVIR.	AQL 4 %S'3' OF IS 2500 Part 1	ASTM 2863	Reg./Sheet	Р		Applicable on
	wherever applicable	b)	Temperature Index	Maj.	ENVIR.	DO	ASTM 2863	Reg./Sheet	Р		FRLS
		c)	Smoke density	Maj.	ENVIR.	DO	ASTM 2843	Reg./Sheet	Р		Compound
		d)	Acid Gas Generation (HCL) Test	Maj.	Chemical	DO	IEC:60754-1	Reg./Sheet	Р		Only
В.	IN PROCESS										
1.	WIRE DRAWING (CU)	a)	Diameter of Wire	Maj.	Phy.	5% OF A LOT	IS:8130-1984	Reg./Sheet	Р		
		b)	Surface Finish	Maj.	Vis.	100%	Smooth Surface	-	Р		
		c)	Annealing (Cu)	Maj.	Phy.	5% OF A LOT	IS:8130-1984	Reg./Sheet	Р		
		d)	Resistivity at 20°C	Maj.	Elec.	5% OF A LOT	IS:8130-1984	Reg./Sheet	Р		On Drawn Wire
2.	STRANDING	a)	Dia/ number of strand	Maj.	Count	At the time of m/c setting	IS:8130/84, TP., Factory Standard	Reg./Sheet	Р		
		b)	Lay Length	Maj.	Phy.	DO	Factory Standard	Reg./Sheet	Р		
	SEGUSTALES !	c)	Conductor Resistance at 20°C	Maj.	Elec.	DO	IS:8130-1984	Reg./Sheet	Р		
	_ KE (~ G XE) _	d)	Surface Appearance	Maj.	Vis.	100%	No. surface defects		Р		
	(Jano. 1)5/1	e)	Dia/ depth of conductor	Maj.	Phy.	once in each shift	Factory Standard /T.P.	Reg./Sheet	Р		
	06.08.19										
3	INSULATION (XLPE)	a)	Radial Thickness	Maj.	Phy.	During m/c Setting after stabilisation	IS:7098(I)1988,TP	Reg./Sheet	Р		
		b)	Hot Set	Maj.	Phy.	ONE SAMPLE EACH DRUM	IS:7098(I)1988,T.P	Reg./Sheet	Р		
		c)	T.S. & Elongation	Maj.	Phy.	DO	IS:7098(I)1988,T.P	Reg./Sheet	Р		

Sr. No.	COMPONENT AND OPERATION		CHARACTERISTICS	CATEGOR	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF RECORD		STIN	_	REMARKS
				Y OF					М	С	Α	
1	2	3		4	5	6 & 7	8	9		10		11
4	Laying up of Cores	a)	Core Sequence	Maj.	Vis	At the time of m/c setting	IS:7098(I)1988	Reg./Sheet	Р			
		b)	Laid up diameter	Maj.	Meas	DO	Factory Std.	Reg./Sheet	Р			
		c)	Laylength	Maj.	Meas	DO	Factory Std.	Reg./Sheet	Р			
		d)	Direction	Maj.	Vis	DO	IS:7098(I)1988	Reg./Sheet	Р			
5	PVC INNER SHEATHING ST-2 (wherever applicable)	a)	Radial Thickness	Maj.	Phy.	During m/c Setting after stabilisation	IS:7098(I)1988,T.P	Reg./Sheet	Р			
		b)	Surface Finish	Min	Vis.	100%	Surface shall be smooth		Р			
		c)	Dia over Inner sheath	Min	Phy.	During m/c setting (once in shift)	as per TPS	Reg./Sheet	Р			
6	ARMOURING	a)	Dimension of wires/ strips	Maj.	Phy.	During m/c setting	IS:7098(I)1988,T.P	Reg./Sheet	Р			
	(wherever applicable)	b)	No. of wire/Strips	Min	Count	DO	Factory standard	Reg./Sheet	Р			
		c)	Direction of Lay	Maj.	Vis.	DO	IS:7098(I)1988	Reg./Sheet	Р			
		d)	Lay Length	Min	Vis.	DO	Factory standard	Reg./Sheet	Р			
7	PVC OUTER SHEATHING	a)	Radial Thickness	Maj.	Phy.	During m/c setting &	10 T000 (1) 4000 T D	Reg./Sheet	Р			
			0 II D: /		- Bi	once in each shift	IS:7098(I)1988,T.P	D (0)	_			
		p)	Overall Diameter	Maj.	Phy.		T.P.S.	Reg./Sheet	P			
		c)	Surface Appearance	Maj.	Vis.	100%	Surface shall be smooth		Р			
		d	Colour of sheath	Maj.	Vis.	100%	T.P.S.		Р			
		e)	Embossing	Maj.	Vis.	100%	IS:7098(I)1988,T.P		Р			
C.	FINAL CABLE TESTING											
1.	ROUTINE TEST	a)	Conductor Resistance Test at 20°C	Maj.	Elec.	100% Drums	IS : 8130-1984	Reg./Sheet	Р		R	
		b)	High Voltage Test at room temp.	Maj.	Elec.	100% Drums	IS:7098(I)1988,T.P	Reg./Sheet	Р		R	
2.	TYPE TEST	+ ,					submitted for reviewed at			_	_	
	A) Electrical Tests	a)	Conductor d.c Resistance Test at 20°C	Maj.	Elec.	One Sample of Each size once in PO	IS : 8130-1984	Type Test Report	P		R	
	The Charles	e)	Insulation Resistance Test									
	UNIFLET S		1) Volume Resistivity at Ambient	Maj.	Elec.	DO	IS:7098(I)1988,T.P	Type Test Report	Р		R	
	06.03.19		2) Volume Resistivity at 90°C	Maj.	Elec.	DO	IS:7098(I)1988,T.P	Type Test Report	Р		R	
		j)	High Voltage Test	Maj.	Elec.	DO	IS:7098(I)1988,T.P	Type Test Report	Р		R	

Sr. No.	COMPONENT AND OPERATION		CHARACTERISTICS	CATEGOR Y OF	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF RECORD		C	
1	2	3		4	5	6 & 7	8	9		10	11
	B) Non-Electrical	a)	Test for thickness of Insulation & sheath	Maj.	Phy.	DO	IS:7098(I)1988,T.P	Type Test Report	Р	ı	₹
		b)	Test for armour wire	Maj.	Phy.	DO	IS: 3975	Type Test Report			₹
			1.Dimensions	Maj.	Phy.	DO	IS:3975	Type Test Report	Р		2
			2.Resistivity at 20°C	Maj.	Elec.	DO	IS:3975 for galvanized Steel wire/strip, and IS:8130 for AL. wire/strips	Type Test Report			₹
			3.Tensile Strength	Maj.	Phy.	DO	IS:3975 for galvanized Steel wire/strip, and IS:8130 for AL. wire/strips	Type Test Report			₹
			4.Elongation for galvanized Steel wire/strip	Maj.	Phy.	DO	IS:3975	Type Test Report	Р	I	3
			5.Torsion / Winding Test for galvanized Steel wire/strip	Maj.	Phy.	DO	IS: 3975	Type Test Report	Р		
			6.Mass & Uniformity of Zinc Coating for galvanized Steel wire/strip	Maj.	Chem	DO	IS : 3975	Type Test Report	Р	_	₹
		- \	Physical Test for Insulation	1						-	
		c)	i) Tensile Strength & Elongation	Maj.	Phy.	DO	IS:7098(I)1988,T.P	Type Test Report	Р	ı	2
			at break before & after				, ,				
			Ageing in air oven								
			ii) Variation in T.S & E.B	Maj.	Phy.	DO	IS:7098(I)1988,T.P	Type Test Report	Р	Ī	₹
			iii) Hot Set Test								
			1) Elongation & Permanent set	Maj.	Phy.	DO	IS:7098(I)1988,T.P	Type Test Report			₹
			iv) Shrinkage Test	Maj.	Phy.	DO	IS:7098(I)1988,T.P	Type Test Report			₹
			v) Water absorption (Gravimetric) Test	Maj.	Phy.	DO	IS:7098(I)1988,T.P	Type Test Report	Р		₹
		d)	Physical Test for Outer Sheath								
	SOUSTRIES IN	i	Tensile Strength & Elongation at break before & after	Maj.	Phy.	DO	IS:5831-1984	Type Test Report	Р	-	2
	15 Contain	1	Ageing in air oven								
	15/	ii	Variation in T.S & E.B	Mai.	Phy.	DO	IS:5831-1984	Type Test Report	Р	T la	₹ .
	06.08.19	iii	Loss of mass test	Maj.	Phy.	DO	IS:5831-1984	Type Test Report			₹
	06.08	iv	Thermal Stability	Maj.	Phy.	DO	IS:5831-1984	Type Test Report			3
		٧	Shrinkage Test	Maj.	Phy.	DO	IS:5831-1984	Type Test Report			₹
		vi	Heat Shock test	Maj.	Phy.	DO	IS:5831-1984	Type Test Report	Р		₹

Sr. No.	COMPONENT AND OPERATION		CHARACTERISTICS	CATEGOR	TYPE OF	QUANTUM OF CHECK	ACCEPTANCE NORMS /	FORMAT OF		STIN	
				Y OF	CHECK		REF. STANDARDS	RECORD	М	С	
1	2	3		4	5	6 & 7	8	9		10	11
		vii	Hot Deformation test	Maj.	Phy.	DO	IS:5831-1984	Type Test Report			R
		viii	Flammability Test	Maj.	ENVIR.	DO	IEC 60332-1	Type Test Report	Р		R
C)	Special Test on FRLS PVC ST-2 Outer Sheath wherever applicable	a)	Oxygen Index Test	Maj.	ENVIR.	DO	ASTM 2863	Reg./Sheet	Р		R
		b)	Temperature Index	Maj.	ENVIR.	DO	ASTM 2863	Reg./Sheet	Р		Applicable on FRLS Outer
		c)	Smoke density	Maj.	ENVIR.	DO	ASTM 2843	Reg./Sheet	Р		R Sheath Only
		d)	Acid Gas Generation (HCL) Test	Maj.	Chemical	DO	IEC:60754-1	Reg./Sheet	Р		R
D)	Anti termite & Anit rodent		. Anti Termite and Rodent test		Chemical	DO	Plant Standard	Plant Standard	Р	R	
3.	ACCEPTANCE TEST		Tioot					Otaridara			
<u> </u>	A) Electrical tests	a)	Conductor Resistance test 20°C	Maj.	Elec.	As per Sampling Plan of IS:7098-1/1988	IS: 8130-1984	INSPECTION	Р		w
		c)	High Voltage Test	Maj.	Elec.	DO	IS:7098(I)1988,T.P	DO	Р		w
		d)	Insulation Resistance Test	Maj.	Elec.	DO	IS:7098(I)1988,T.P	DO	Р		W
			1) Volume Resistivity at Ambient	Maj.	Elec.	DO	IS:7098(I)1988,T.P	DO	Р		W
			2) Volume Resistivity at 90°C	Maj.	Elec.	DO	IS:7098(I)1988,T.P	DO	Р		w
	B) Non-Electrical	a)	Dimensional check, Thickness of Insulation and Outer Sheath, overall dia of cable.	i Maj.	Elec.	DO	IS:7098(I)1988,T.P	DO	P		W
		b)	Tensile Strength & Elongation at break for insulation & Outer Sheath	Maj.	Phy.	DO	IS:7098(I)1988,T.P	DO	P		w
		c)	Hot Set Test for Insulation for XLPE insulation only	Maj.	Phy.	DO	IS:7098(I)1988,T.P	DO	Р		w
C)	Special Test on FRLS PVC ST-2 Outer Sheath wherever applicable	a)	Oxygen Index Test	Maj.	ENVIR.	One Sample per Lot	ASTM 2863	INSPECTION	Р		w
		b)	Temperature Index	Maj.	ENVIR.	DO	ASTM 2863	INSPECTION	Р		W Applicable on FRLS Outer
		c)	Smoke density	Maj.	ENVIR.	DO	ASTM 2843	INSPECTION	Р		W Sheath Only
		d)	Acid Gas Generation (HCL) Test	Maj.	Chemical	DO	IEC:60754-1	INSPECTION	Р		W
		e)	Smoke density	Maj.	ENVIR.	DO	ASTM 2843	INSPECTION	Р		R
4	PACKING & MARKING	a)	Cable end sealing	Maj.	Vis.	100 %	Factory Standard/ IS:7098(I)1988		Р		
		b)	Stencilling/Marking	Min.	Vis.	100 %	Factory Standard/ IS:7098(I)1988		Р		

Note: 1) Tests at Raw Material stage, in-process stage and during final inspection shall be carried out as applicable to the construction of cables. Legends / Abbreviations used in the above quality plan are as under.

M= MANUFACTURER/SUB-CONTRACTOR,

Third Party/Client shall be identified in Column "A" as a "W"

Min - Minor Elec- Electrical Chem -- Chemical Maj. -Major Vis - Visual Reg -- Register ENV -- Environmental Phy. -- Physical

S.C. -- Supplier Certificate TP. -- Technical Particular Mech -- Mechnical



MANUEL CEUDEDIC NAME O	MANUEL CEUDING QUALTEN DI AN	LEGENDS
MANUFACTURER'S NAME & M/s APAR INDUSTRIES LTD.	MANUFACTURING QUALITY PLAN	LEGENDS
120 III II DOGINIES EID		
(UNIT: Uniflex Cables)	ITEM: 1100 VOLTS COPPER CONDUCTOR, FR-LSH PVC FLEXIBLE	M = MANUFACTURER/SUB-CONTRACTOR
Plot No.158 -163 ,GIDC ,Umbergaon -396171	SINGLE CORE UNSHEATHED CABLE AS PER IS:694/2010	A- Third Party/Client; P- Perform
Phone: 0260-2562412, 2563412	Name of customer: M/s LUMINO JUPITER SOLAR FOR WBREDA	V -Verification , R: Review; W = Witness
e-mail: rk.pawar@apar.com;	QAP NO.: QAP-HW-XLPE- dt 06.08.19	C - Contractor
	PO NO: LUMINO/WBREDA/2019-20/005, DATED: 02-08-2019	Third Party/Client shall be identified in Column "A" as a
		"W"
	Project Location :West Bengal Renewable Energy	-
	Development Agency, 10 MWP Solar power project, Krishnagani,	
	Block Bhajanghat, Nadia District West Bengal- 741507,	
1		

Sr. No.	COMPONENT AND OPERATION		CHARACTERISTICS	CATEGOR Y OF	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF RECORD	M C A		REMARKS
1	2	3		4	5	6 & 7	8	9		10	11
Α.	RAW MATERIALS										
1.	. COPPEER ROD	a)	Resistivity at 20°C	Maj.	Elec.	AQL 4 %S'3' OF IS 2500 Part 1	IS:12444 / IS:8130	Reg./Sheet	Р		
		b)	Diameter	Maj.	Phy.	DO	DO	Reg./Sheet	Р		
		c)	Tensile strength	Maj.	Phy.	DO	DO	Reg./Sheet	Р		
		d)	Annealing test	Maj.	Phy.	DO	DO	Reg./Sheet	Р		
2	PVC INSULATION TYPE-D (FR-LSH)	a)	T.S. and Elong.before & after Ageing	Maj.	Phy.	One sample per batch of 10MT	IS-5831 (1984)	Reg./Sheet	Р		
		b)	Thermal Stability	Maj.	Visual	DO	IS-5831 (1984)	Reg./Sheet	Р		
		c)	Specific Gravity	Maj.	Phy.	DO	Factory Standard	Reg./Sheet	Р		
		d)		Maj.	Phy.	DO	IS-5831 (1984)	Reg./Sheet	Р		
		_ e)		Maj.	ENVIR.	One Sample per Batch	ASTM 2863	Reg./Sheet	Р		
		f)		Maj.	ENVIR.	DO	ASTM 2863	Reg./Sheet	Р		
		g)		Maj.	ENVIR.	DO	ASTM 2843	Reg./Sheet	Р		
		_ h)	Acid Gas Generation	Maj.	Chem	DO	IEC-754-1/94	Reg./Sheet	Р		
В.	IN PROCESS										
1.	WIRE DRAWING COPPER WIRE	- ' /	Diameter of Wire	Maj.	Phy.	5% OF A LOT	IS:8130-1984	Reg./Sheet	Р		on Drawn
		b)	Surface Finish	Maj.	Vis.	100%	Smooth Surface		Р		Wire
		d)	Annealing	Maj.	Phy.	5% OF A LOT	IS:8130-1984	Reg./Sheet	Р		
		f)	Resistivity at 20°C	Maj.	Elec.	5% OF A LOT	IS:8130-1984	Reg./Sheet	P		



Sr. No.	COMPONENT AND OPERATION	CHARACTERISTICS	CATEGOR Y OF	TYPE OF CHECK 5	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF RECORD	M C A		REMARKS 11					
1	2	3				8	9								
2.	Conductor Bunching /stranding (if applicable)	a) Dia/ number of strand	Maj.	Count	At the time of m/c setting	IS:8130/84, T.P., Factory Standard	Reg./Sheet	Р							
		b) Conductor Resistance at 20°C	Maj.	Elec.	DO	IS:8130-1984	Reg./Sheet	Р							
		c) Surface Appearance	Maj.	Vis.	100%	No. surface defects		Р							
		d) Dia of conductor	Maj.	Phy.	During m/c Setting & once in Shift	Factory Standard /T.P.	Reg./Sheet	Р							
3	PVC INSULATION TYPE D	a) Radial Thickness	Maj.	Phy.	During m/c Setting & once in Shift	IS:694/1990,T.P.	Reg./Sheet	Р							
		b) Surface Appearance	Maj.	Vis.	100%	No. surface defects		Р							
		c) Core Identification / Colour	Maj.	Phy.	DO	IS:694/1990,T.P.	Reg./Sheet	Р							
		d) T.S. & Elongation of core	Maj.	Phy.	At the time of m/c setting	IS:5831	Reg./Sheet	Р							
		e) Spark test	Maj.	Elect	100%	IS:694/1990		Р							
C.	FINAL CABLE TESTING														
1.	ROUTINE TEST	a) Conductor Resistance Test at 20°C	Maj.	Elec.	100% Drums	IS: 8130-1984	Reg./Sheet	Р	R						
		b) High Voltage Test at room temp.	Maj.	Elec.	100% Drums	IS:694/1990,T.P.	Reg./Sheet	Р	R						
2.	TYPE TEST	The Manufact	urer will co	nduct Internal	Type Tests and the reorts v	will be reviewed at the tim	le of inspection								
	A) Electrical Tests	a) Conductor Resistance Test at 20°C	Мај.	Elec.	One sample of Each size & Type once in PO	IS: 8130-1984	Type Test CER.	Р	R						
		b Insulation Resistance Test													
		Volume Resistivity at Ambient	Maj.	Elec.	DO	IS:5831,T.P.	Type Test CER.	Р	R						
		Volume Resistivity at max. rated temp.	Maj.	Elec.	DO	IS:5831,T.P.	Type Test CER.	Р	R						
		c High Voltage Test (RMS)	Maj.	Elec.	DO	IS:694/1990,T.P.	Type Test CER.	Р	R						
		d AC High Voltage Water Immersion Test	Maj.	Elec.	DO	IS:694/1990,T.P.	Type Test CER.	Р	R						
		e DC High Voltage Water Immersion Test	Maj.	Elec.	DO	IS:694/1990,T.P.	Type Test CER.	Р	R						
	B) Non-Electrical	a) Test for thickness of Insulation	Maj.	Phy.	DO	IS:694/1990,T.P.	Type Test CER.	Р	R						
		b) Physical Test for Insulation													
		i Tensile Strength & Elongation	Maj.	Phy.	DO	IS:5831-1984	Type Test CER.	Р	R						
		Before & After Ageingin Air Oven							R						
		ii Variation in T.S & E.B after Ageing	Maj.	Phy.	DO	IS:5831-1984	Type Test CER.	Р	R						
		iii Loss of mass test	Maj.	Phy.	DO	IS:5831-1984	Type Test CER.	P	R						
		iv Thermal Stability	Maj.	Phy.	DO	IS:5831-1984	Type Test CER.	P	R						
		v Shrinkage Test	Maj.	Phy.	DO	IS:5831-1984	Type Test CER.	Р	R						
		vi Heat Shock test	Maj.	Phy.	DO	IS:5831-1984	Type Test CER.	Р	R						
		vii Hot Deformation test	Maj.	Phy.	DO	IS:5831-1984	Type Test CER.	Р	R						
		viii Cold Bend/ Cold Impact	Maj.	Phy.	DO	IS:5831-1984	Type Test CER.	Р	R						



Sr. No.	COMPONENT AND OPERATION	CHARACTERISTICS	CATEGOR Y OF	TYPE OF CHECK	QUANTUM OF CHECK	ACCEPTANCE NORMS / REF. STANDARDS	FORMAT OF RECORD	TEST	TING C A	REMARKS
1	2	3	4	5	6 & 7	8	9	1	_	11
	C) FLAME RETARDANCE TEST	ix Flame retardance Test on single cable	Мај.	ENVIR.	DO	IS: 10810 Part-53	Type Test CER.	Р	R	
	D) FRLS TESTING	a) Oxygen Index Test	Maj.	ENVIR.	One sample per lot	Min : 29 , IS: 10810 Part- 58/ASTM 2863	Type Test CER.	Р	R	
		b) Temperature Index Test	Maj.	ENVIR.	One sample per lot	Min: 250, IS: 10810 Part- 58/ASTM 2863	Type Test CER.	Р	R	
		c) Smoke Density Test	Maj.	ENVIR.	One sample per lot	Max: 60 %, ASTM 2843	Type Test CER.	Р	R	
		d) Acid Gas Generation	Maj.	CHEM.	One sample per lot	max 20 % , IEC-754(1/94)	Type Test CER.	Р	R	
3.	ACCEPTANCE TEST									
	A) Electrical tests	a) Conductor Resistance test 20°C	Maj.	Elec.	As per Sampling Plan of IS:694/1990	IS : 8130-1984	Acceptance Test Report	Р	W	
		b) High Voltage Test	Maj.	Elec.	DO	IS:694/1990,T.P.	DO	Р	W	
		c) Insulation Resistance Test	Maj.	Elec.	DO	IS:5831-1984	DO	Р	W	
		i Volume Resistivity at Ambient	Maj.	Elec.	DO	IS:5831-1984	DO	Р	W	
		ii Volume Resistivity at max. rated temp.	Maj.	Elec.	DO	IS:5831-1984	DO	Р	W	
	B) Non-Electrical	a) Dimensional check, Thickness of Insulation and overall dia of cable.	Maj.	Elec.	DO	IS:694/1990,T.P.	DO	Р	W	
		b) T.S.& Elong for insulation (without Ageing)	Maj.	Phy.	DO	IS:5831-1984	DO	Р	W	
	C) FLAME RETARDANCE TEST	Flame retardance Test on single cable	Мај.	ENVIR.	on one sample /each size and Type of cable	IS: 10810 Part-53	DO	Р	W	
	D) FRLS TESTING	a) Oxygen Index Test	Maj.	ENVIR.	One sample per lot	Min : 29 , IS: 10810 Part- 58/ASTM 2863	DO	P	W	
		b) Temperature Index Test	Maj.	ENVIR.	One sample per lot	Min : 250 , IS: 10810 Part- 58/ASTM 2863	DO	Р	W	
		c) Smoke Density Test	Maj.	ENVIR.	One sample per lot	Max: 60 % ,ASTM 2843	DO	Р	W	
		d) Acid Gas Generation	Maj.	CHEM.	One sample per lot	max 20 % , IEC-754(1/94)	DO	Р	W	
4	PACKING & MARKING	a) Cable end sealing	Maj.	Vis.	100 %	Factory Standard/IS:694/1990		Р	-	
		b) Stencilling/Marking	Min.	Vis.	100 %	Factory Standard/IS:694/1990		Р	-	

Legends / Abbreviations used in the above quality plan are as under.

M= MANUFACTURER/SUB-CONTRACTOR, A-Third Party/Client

Third Party/Client shall be identified in Column "A" as a "W"

Min - Minor Elec- Electrical

Chem -- Chemical

Maj. -Major Vis - Visual Reg -- Register Mech -- Mechnical

ENV -- Environmental

S.C. -- Supplier Certificate

R =Review

Phy. -- Physical T.P. -- Technical Particular W = Witness P= Perform C -Contractor