

501, Kakad Chambers 132, Dr. A. B. Road, Worli, Mumba i 400 018 India

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Cir. No. 22/DIV/CAB/05

07 June 2023

To Cable Division and Utilities/SEBS, listed of purchasing organisations

Sub: Correction in amendment to Price Variation Clause for MV and EHV Cables wef Apr 2023

IEEMA recently published amended Price Variation Clause for MV and EHV Cables wef Apr 2023 vide Cir. No. 07/DIV/CAB/05 and 06/DIV/CAB/05 dated 08 May 2023. After publishing IEEMA found some corrections to be done in the below factor tables:

For EHV Cables -Table: 3d (SMIF): Variation factor for Copper in Lead + Cu wire construction (CuFpb)

For MV Cables -Table: H4 (c) 3.3 KV (E) Unscreened arm And note added for Table: H5 (a) & Table: H5 (b) as "Fillers added in above factors"

The corrected factor tables are attached and request to all stakeholders to replace these tables with earlier published factor tables.

All other factor tables and guidelines remains unchanged as per Cir No. 07/DIV/CAB/05 and 06/DIV/CAB/05 dated 08 May 2023.

Monel

Director Encl.: corrected factor tables for amended PV clause for EHV Cables wef Apr 23.



132, Dr. A. B. Road, Worli, Mumba i 400 018 India

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	Table 3	d (SMIF)	: Variatio	n factor	for Copp	er in Lea	d +Cu wii	re constru	uction (C	CuFpb)			
Nominal Cross Sectional Area (in Sq. mm)			38/6	6 KV			64/110 kV						
SC Current in KA		31.5			40			31.5		40			
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3	
185	1.762	2.531	3.196	2.235	3.325	4.163	1.637	2.383	3.048	2.087	3.177	4.015	
240	1.719	2.509	3.174	2.213	3.304	4.141	1.565	2.359	3.024	2.063	3.153	3.991	
300	1.692	2.555	1.566	2.258	3.262	4.100	1.538	2.428	1.488	2.111	3.104	3.942	
400	1.646	2.525	3.211	2.215	3.347	4.068	1.484	2.360	3.044	2.059	3.183	3.907	
500	1.584	2.463	3.147	2.154	3.281	4.135	1.438	2.324	3.011	2.022	3.140	3.993	
630	1.551	2.432	3.111	2.122	3.239	4.118	1.390	2.281	2.956	1.962	3.087	3.949	
800	1.475	2.363	3.035	2.057	3.179	4.035	1.308	2.188	2.868	1.883	3.015	3.869	
1000	1.400	2.282	2.961	1.975	3.095	3.960	1.240	2.125	2.800	1.817	2.937	3.796	
1200	1.228	2.109	2.786	1.800	2.928	3.782	1.160	2.050	2.729	1.740	2.861	3.724	
1400	1.216	2.056	2.730	1.745	2.869	3.726	1.082	1.973	2.642	1.660	2.779	3.627	
1600	1.095	1.975	2.652	1.669	2.784	3.662	0.988	1.873	2.542	1.563	2.678	3.541	
1800	1.106	2.017	2.709	1.699	2.841	3.720	1.037	1.938	2.631	1.630	2.773	3.655	
2000	0.976	1.861	2.535	1.549	2.670	3.539	0.909	1.769	2.450	1.466	2.585	3.451	
2500	0.896	1.796	2.490	1.489	2.632	3.514	0.913	1.768	2.460	1.457	2.598	3.490	

Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)													
Nominal Cross Sectional Area (in Sq. mm)		76/132 kV											
SC Current in KA		31.5 40											
Duration in sec	1	2	3	1	2	3							
185	1.562	2.290	2.955	1.994	3.085	3.922							
240	1.488	2.265	2.930	1.969	3.059	3.897							
300	1.472	2.395	1.466	2.049	3.061	3.898							
400	1.414	2.292	2.977	1.983	3.110	3.970							
500	1.364	2.238	2.918	1.941	3.055	3.938							
630	1.299	2.187	2.860	1.875	2.996	3.866							
800	1.215	2.104	2.776	1.797	2.924	3.783							
1000	1.152	2.036	2.716	1.729	2.849	3.712							
1200	1.062	1.945	2.627	1.641	2.761	3.622							
1400	0.975	1.854	2.539	1.555	2.676	3.549							
1600	0.924	1.797	2.479	1.491	2.612	3.468							
1800	0.977	1.857	2.554	1.546	2.695	3.572							
2000	0.853	1.717	2.395	1.414	2.536	3.385							
2500	0.809	1.664	2.359	1.351	2.505	3.379							

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501, Kakad Chambers 132, Dr. A. B. Road, Worli, Mumba i 400 018 India P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

	Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)													
Nominal														
Cross														
Sectional						127/2	20 kV							
Area (in Sq.														
mm)														
SC Current														
in KA		31.5	1		40			50			63			
Duration in		-		_	-	-			_		_			
sec	1	2	3	1	2	3	1	2	3	1	2	3		
400	1.053	1.937	2.613	1.623	2.751	3.621	2.362	-	-	-	-	-		
500	0.973	1.849	2.536	1.543	2.662	3.512	2.305	3.666	-	3.157	-	-		
630	0.942	1.820	2.495	1.506	2.632	3.482	2.276	3.619	4.697	3.116	4.834	-		
800	0.909	1.775	2.460	1.465	2.596	3.458	2.249	3.597	4.640	3.077	4.803	6.134		
1000	0.828	1.702	2.377	1.387	2.506	3.373	2.139	3.480	4.562	2.988	4.701	6.053		
1200	0.717	1.577	2.251	1.266	2.382	3.258	2.033	3.419	4.477	2.888	4.620	5.944		
1400	0.686	1.536	2.211	1.232	2.357	3.203	2.033	3.356	4.449	2.856	4.563	5.909		
1600	0.680	1.457	2.117	1.140	2.267	3.124	1.921	3.276	4.340	2.769	4.493	5.836		
1800	0.724	0.724 1.540 2.205 1.270 2.347 3.227 1.889 3.226 4.235 2.692 4.409 5.719												
2000	0.529													
2500	0 373	1 3 3 7	2 020	1 036	2 140	2 977	1 722	3 067	4 1 2 7	2 5 5 9	4 258	5 581		

	Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)													
Nominal														
Cross														
Sectional						220/4	00 kV							
Area (in Sq.														
mm)														
SC Current														
in KA		31.5 40 50 63												
Duration in														
sec	1	2	3	1	2	3	1	2	3	1	2	3		
630	0.870	1.756	2.455	1.443	2.581	3.465	2.137	3.501	4.568	3.003	4.761	6.687		
800	0.862	1.734	2.425	1.414	2.566	3.448	2.120	3.500	4.532	2.993	4.720	6.483		
1000	0.833	1.701	2.396	1.385	2.516	3.422	2.081	3.445	4.492	2.958	4.704	6.398		
1200	0.750	1.611	2.312	1.299	2.447	3.326	2.015	3.389	4.427	2.882	4.613	6.316		
1400	0.711	1.566	2.252	1.270	2.399	3.274	2.007	3.334	4.362	2.809	4.576	6.268		
1600	0.697	1.472	2.165	1.178	2.302	3.176	1.880	3.259	4.318	2.757	4.499	6.186		
1800	0.642	0.642 1.457 2.123 1.183 2.265 3.139 1.867 3.250 4.304 2.750 4.488 6.141												
2000	0.488	1.360	2.048	1.089	2.158	3.042	1.800	3.141	4.167	2.633	4.364	6.058		
2500	0.283	1.245	1.927	0.948	2.019	2.877	1.701	2.989	4.037	2.536	4.208	5.920		

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India

P +91 22 2493 0532 132, Dr. A. B. Road, Worli, +91 22 2493 2705

mumbai@ieema.org

W www.ieema.org



IEEMA (PVC)/EHV CABLE/2019 (R-2)

Cir. No. 06/DIV/CAB/05

08 May 2023

Effective from: 01 Apr 2023

To Cable Division and Utilities/SEBS, listed of purchasing organisations

Sub: Amendment to Price Variation Clause for EHV Cables (66 KV to 400 KV)

IEEMA EHV Cable PV formula is applicable from Sep 2019. With the coming demand for EHV cables; EHV Cable manufacturers' requested IEEMA to publish following missing factors from formula document of EHV Cable effective from Sep 2019; since some of the users were procuring such cables and demanding these factors and also for the correction in the SMIF factor for Copper Wire Metallic Screen for MV and EHV cables.

IEEMA Cable Technical committee discussed the subject in depth and IEEMA collected the variation factors and finalised in consensus. The average factors are tabled in annexure which are effective from 01 Apr 2023 and accordingly modified the formulae, attached with circular.

New evolved variation factors and corrections in formulae are as below:

1. Variation factors for EHV Cable (lead + Copper Screen) 220 KV – 50 KA and 63 KA 400 KV - 50 KA and 63 KA

2. IEEMA variation factors and NEW formula for a special construction of 66kV EHV Cable; Aluminium Conductor with PolyAl Sheath & Copper Screen with Aluminium wire armor

3. The formula for copper screen factor given in IEEMA EHV Cable PV clause for all formulae wef Sep 19 is for copper wires only and copper tape binder if provided, its area would be additional.

The SMIF, weight factor for Copper Wire Metallic Screen has been modified as under:

SMIF = (A x D x LF)/1000, where D = Density (= 8.89 for Cu), LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape)

4. Considering the fluctuations in the prices; and as suggested by members IEEMA will be publishing a separate price for XLPE for EHV Cables (Above 66 KV) in IEEMA Cable price variation circular from 01 Apr 2023 onwards. This price will applicable for XLPE in all EHV Cable (Above 66 KV) formulae from 01 Apr 2023 onwards. And correction/change in existing "XLPE - HV Cable" being mentioned in IEEMA Price circulars with "XLPE - MV Cable" applicable for MV cables

5. For the better clarity and application of prices, it is also agreed upon to change/replace the existing PVC grades "CW 22" & "HR-11" being mentioned in IEEMA Price circulars with generic PVC names as under;

CW 22 to be changed to "PVC" & HR 11 to be changed to "HR PVC"

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501. Kakad Chambers 132, Dr. A. B. Road, Worli, Mumba i 400 018

India

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IEEMA (PVC)/EHV CABLE/2019 (R-2)

Effective from: 01 Apr 2023

As discussed and agreed in consensus, the understanding for above generic PVC grades is that "PVC" will be considered for PVC insulation and PVC sheath of General Purpose PVC insulated LV cables as per IS 1554 (I) suitable max conductor temperature of 70 °C, whereas "HRPVC" will be considered for Heat Resisting PVC insulation and Heat Resisting PVC sheath of HRPVC insulated LV Cables as per IS 1554 (I) and also for Heat Resisting PVC sheath of XLPE insulated LV cables as per IS 7098 (I) & Heat Resisting PVC sheath of XLPE insulated HT/EHV Cables as per IS 7098 (Part-2 and Part-3).

6. As suggested by stake holders and in consensus with IEEMA Cable Tech committee, prices of Steel for armouring for following thickness are published in IEEMA Cable PVC from 01 Jan 2023 and are effective/applicable from 01 Jan 2023.

Round wire 2.0 mm dia, Round wire 2.5 mm dia, Round wire 3.15 mm dia, Round wire 4.0 mm dia

We are enclosing amended price variation clause for EHV Cables (66 KV to 400 KV) along with applicable table of variation factors and additional table of variation factors which are effective from 01 Apr 2023. We recommend all stakeholders to incorporate these changes in all the contracts/tenders henceforth for settlement of price variation from 01 Apr 2023 onwards.

Mond

Director Encl.: Amended PV clause for EHV Cables along with table of variation factors



Indian Electrical & Electronics Manufacturer's Association 501, Kakad Chambers

Mumba i 400 018

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IEEMA (PVC)/EHV CABLE/2019 (R-2)

Effective from: 01 Apr 2023

Material Price Variation Clause for XLPE Insulated EHV Cables (66 kV to 400 KV)

The Price quoted/confirmed is based on the input cost of raw materials/components as on the date of quotation, and the same is deemed to be related to the prices of raw materials as specified in the price variation clause given below. In case of any variation in these prices, the price payable shall be subject to adjustment up or down in accordance with the formulae provided in this document. Terms used in price variation formulae:

- Ρ Price payable as adjusted in accordance with above appropriate formula (in Rs/Km)
- Price quoted/confirmed (in Rs/Km) Ро

1) Conductor Metal

- MIF Variation factor for Conductor
- MIF2 Price of Respective Conductor Material as below (from a to b); this price is as applicable on **Two** months prior to the date of delivery.
- MIF1 Price of Respective Conductor Material as below (from a to b); this price is as applicable on **One** month prior to the date of tendering.

a) ALUMINIUM (Conductor)

- AIF Variation factor for Aluminium
- AI Price of Aluminium; this price is as applicable on **Two** months prior to the date of delivery.
- Alo Price of Aluminium; this price is as applicable on **One** month prior to the date of tendering.

b) COPPER (Conductor)

- CuF Variation factor for copper
- Cu Price of CC Copper rods. This price is as applicable on **Two** months prior to the date of delivery.
- Cuo Price of CC copper rods. This price is as applicable on **One** month prior to the date of tendering.

2) XLPE Compound

- Variation factor for XLPE Compound XL3
- XLFAI Variation factor for XLPE Compound for Aluminium Conductor Cable
- XLFCu Variation factor for XLPE Compound for Copper Conductor Cable
- CC Price of XLPE Compound. This price is as applicable on **Two** months prior to the date of delivery.
- Ссо Price of XLPE Compound. This price is as applicable on **One** month prior to the date of tendering.

3) Polymer Compound / PVC Compound

- Variation factor for Polymer Compound / PVC Compound XL5
- CCFAI Variation factor for Polymer Compound / PVC Compound for Aluminium Conductor Cable
- CCFCu Variation factor for Polymer Compound / PVC Compound for Copper Conductor Cable
- POC Price of Polymer Compound / PVC Compound. This price is as applicable on **Two** months prior to the date of delivery.
- Price of Polymer Compound / PVC Compound. This price is as applicable on **One** month prior to POCo the date of tendering.





501, Kakad Chambers 132, Dr. A. B. Road, Worli, Mumba i 400 018 India P +91 22 2493 0532
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IEEMA (PVC)/EHV CABLE/2019 (R-2)

4) Metallic Screen / Sheath

- SMIF Variation factor for Sheath/Screen material
- SMIF2 Price of Respective Sheath/Screen Material as below (from a to d); this price is as applicable on **Two** months prior to the date of delivery.
- SMIF1 Price of Respective Sheath/Screen Material as below (from a to d); this price is as applicable on **One** month prior to the date of tendering.

a) COPPER (Screen) : In Copper Wire Screen + PolyAl Construction

- CuFc Variation factor for copper screen
- Cu Price of CC copper rods. This price is as applicable on **Two** months prior to the date of delivery.
- Cuo Price of CC copper rods. This price is as applicable on **One** month prior to the date of tendering.

b) COPPER (Screen) : In Lead Sheath Construction

- CuFpb Variation factor for copper screen
- Cu Price of CC copper rods. This price is as applicable on **Two** months prior to the date of delivery.
- Cuo Price of CC copper rods. This price is as applicable on **One** month prior to the date of tendering.

c) LEAD : In Lead Sheath Construction

- PbF Variation factor for Lead
- Pb Price of Pig lead (99.97%). This price is as applicable on **Two** months prior to the date of delivery.
- Pbo Price of Pig lead (99.97%). This price is as applicable on **One** month days prior to the date of tendering.

d) Corrugated Aluminium Sheath

- AIFs Variation factor for corrugated Aluminium sheath
- Al Price of Aluminiujm. This price is as applicable on **Two** months prior to the date of delivery.
- Alo Price of Aluminium). This price is as applicable on **One** month prior to the date of tendering.

The above prices and indices are as published by IEEMA vide Circular reference IEEMA(PVC)/CABLE(R-1)/--/- - prevailing as on 1^{st} working day of the month i.e. one month prior to the date of tendering.

The date of delivery is the date on which the cable is notified as being ready for inspection/dispatch (in the absence of such notification, the date of manufacturer's dispatch note is to be considered as the date of delivery) or the contracted delivery date (including any agreed extension thereto), whichever is earlier.

Notes

- (a) All prices of raw materials are exclusive of GST amount.
- (b) All prices excluding Aluminium & Copper are as on first working day of the month.
- (c) The details of prices are as under:
- 1. Price of Aluminium is LME average Cash SELLER Settlement price of Primary Aluminium in US\$ per MT as published by London Metal Bulletin (LME) including Premium for Aluminium Ingot in US\$ per MT is converted in Indian Rs./MT
- 2. Price of CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.
- 3. Price of Pig lead (in Rs/MT) is ex-works price as quoted by the primary producer.
- 4. Price of Polymer Compound (in Rs/MT) is the ex-work price, as quoted by the manufacturer/s
- 5. Price of XLPE Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer/s
- 6. Price of PVC Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer/s



Effective from: 01 Apr 2023

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IEEMA (PVC)/EHV CABLE/2019 (R-2)

Effective from: 01 Apr 2023

PV Formulae

a) For Aluminium /copper Conductor XLPE insulated copper wire screen + polyal PE/PVC sheathed cables

P = Po + MIF (MIF2 - MIF1) + XL3 (CC-Cco) + SMIF (SMIF2-SMIF1) + XL5 (POC - POCo)

Table references:-

Table 1 (MIF) : Aluminium Conductor AIF / Copper Conductor CuF Table 2 (XL3) : Aluminium Conductor XLFAI / Copper Conductor XLFCu Table 3a (SMIF) : Copper Wire Screen in Copper Wire Screen + Polyal Construction (CUFc) Table 4 (XL5) : Aluminium Conductor CCFAI / Copper Conductor CCFCu

Note:

For cases where Short Circuit Current through Screen/Sheath is required & is not available in the Reference Tables, in that case Screen/Sheath area as approved by the customer in Datasheet / Short Circuit Current calculation of Screen/Sheath shall be used to derive SMIF as below:

If A= Area of Metallic Screen in Approved Datasheet / Calculation Sheet

D= Density= 8.89 for Cu. & 2.703 for Al; LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape) SMIF = (A x D x LF)/1000

b) For Aluminium /Copper Conductor XLPE insulated copper wire screen +Lead metallic sheathed PE/PVC sheathed cables

P = Po + MIF (MIF2 – MIF1) + XL3 (CC-Cco) + SMIF_{Pbf} (SMIF2-SMIF1) + SMIF_{CuFpb} (SMIF2-SMIF1) + XL5 (POC - POCco)
Table references :Table 1 (MIF) : Aluminium Conductor AIF / Copper Conductor CuF
Table 2 (XL3) : Aluminium Conductor XLFAI / Copper Conductor XLFCu
Table 3c (SMIF) : Lead in Lead Sheath Construction PbF
Table 3d (SMIF) : Copper wire screen in Lead Sheath Construction CuFpb
Table 4 (XL5) : Aluminium Conductor CCFAI / Copper Conductor CCFCu

Note:

For cases where Short Circuit Current through Screen/Sheath is required & is not available in the Reference Tables, in that case Screen/Sheath area as approved by the customer in Datasheet / Short Circuit Current calculation of Screen/Sheath shall be used to derive SMIF as below:

If A= Area of Metallic Screen in Approved Datasheet / Calculation Sheet D= Density= 8.89 for Cu. & 2.703 for Al; LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape) SMIF = (A x D x LF)/1000

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501. Kakad Chambers 132, Dr. A. B. Road, Worli, Mumba i 400 018

India

P +91 22 2493 0532 +91 22 2493 2705 E mumbai@ieema.org

W www.ieema.org

IEEMA (PVC)/EHV CABLE/2019 (R-2)

Effective from: 01 Apr 2023

c) For Aluminium /Copper Conductor XLPE insulated Corrugated Aluminium metallic sheathed PE/PVC sheathed cables

P = Po + MIF (MIF2 – MIF1) + XL3 (CC-Cco) + SMIF (SMIF2-SMIF1) + XL5 (POC - POCco)

Table references:-Table 1 (MIF) : Aluminium Conductor AlF / Copper Conductor CuF Table 2 (XL3) : Aluminium Conductor XLFAI / Copper Conductor XLFCu Table 3b (SMIF) : Corrugated Aluminium in CAS Construction AIFs Table 4 (XL5) : Aluminium Conductor CCFAl / Copper Conductor CCFCu

Note:

For cases where Short Circuit Current through Screen/Sheath is required & is not available in the Reference Tables, in that case Screen/Sheath area as approved by the customer in Datasheet / Short Circuit Current calculation of Screen/Sheath shall be used to derive SMIF as below:

If A= Area of Metallic Screen in Approved Datasheet / Calculation Sheet

D= Density= 2.703 for Al; $SMIF = (A \times D)/1000$

d) For Aluminium /copper Conductor XLPE insulated copper wire screen + polyal PE/PVC sheathed cables with Aluminium Armouring (66 KV Cable)

P = Po + MIF (MIF2 - MIF1) + XL3 (CC-Cco) + SMIF (SMIF2-SMIF1) + XL5 (POC - POCo) + ALA (AI - Alo)

Table references:-

Table 1 (MIF) : Aluminium Conductor AIF / Copper Conductor CuF Table 2 (XL3) : Aluminium Conductor XLFAl / Copper Conductor XLFCu Table 3a (SMIF) : Copper Wire Screen in Copper Wire Screen + Polyal Construction (CUFc) Table 4 (XL5) : Aluminium Conductor CCFAl / Copper Conductor CCFCu Table 5 (ALA) : Aluminium factor ALA

Note:

For cases where Short Circuit Current through Screen/Sheath is required & is not available in the Reference Tables, in that case Screen/Sheath area as approved by the customer in Datasheet / Short Circuit Current calculation of Screen/Sheath shall be used to derive SMIF as below:

If A= Area of Metallic Screen in Approved Datasheet / Calculation Sheet D= Density= 8.89 for Cu. & 2.703 for Al; LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape) SMIF = (A x D x LF)/1000

Authorised Signatory

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Indian Electrical & Electronics Manufacturer's Association 501, Kakad Chambers P +91 22 2493 0532

132, Dr. A. B. Road, Worli,

Mumba i 400 018

India

P +91 22 2493 0532
 F +91 22 2493 2705

E mumbai@ieema.org W www.ieema.org

IEEMA (PVC)/EHV CABLE/2019 (R-2)

Effective from: 01 Apr 2023

TABLE 1 MIF

VARIATION FACTOR FOR ALUMINIUM & COPPER CONDUCTOR (AIF & CuF) EHV CABLES WITH ALUMINIUM & COPPER CONDUCTOR

Nominal Cross Sectional Area (in	ALUMINIUM FA	CTORS (AIF)	COPPER FA	CTORS (CuF)
Sq. mm.)	1 core	3 core	1 core	3 core
95	0.274	0.821	0.901	2.700
120	0.346	1.036	1.138	3.407
150	0.425	1.279	1.398	4.207
185	0.533	1.605	1.753	5.279
225	0.655	1.965	2.154	6.463
240	0.703	2.099	2.312	6.904
300	0.879	2.635	2.891	8.667
400	1.126	-	3.703	-
500	1.418	-	4.664	-
630	1.828	-	6.012	-
800	2.340	-	7.696	-
1000	2.951	-	9.706	-
1200	3.562	-	11.619	-
1400	4.154	-	13.578	-
1600	4.741	-	15.509	-
1800	5.352	-	17.346	-
2000	5.922	-	19.430	-
2500	7.176	-	24.287	-

Table 2 : XL3 (For XLPE Compound Factor)												
Nominal Cross	XLPE Facto	XLPE Factor for Armoured/ Unarmoured Cable with AL /CU Conductor (XLFAI/XLFCu)										
Sectional Area (in Sq. mm.)	38/66 KV	64/110 kV	76/132 kV	127/220 kV	220/400 kV							
185	1.072	1.814	2.332	-	-							
240	1.259	2.057	2.562	-	-							
300	1.345	2.175	2.570	-	-							
400	1.467	2.345	2.761	5.283	-							
500	1.597	2.463	2.966	5.596	-							
630	1.743	2.663	3.193	5.751	7.170							
800	1.963	2.940	3.504	5.970	7.247							
1000	2.135	3.172	3.769	6.349	7.351							
1200	2.370	3.487	4.127	6.805	7.549							
1400	2.514	3.684	4.357	6.907	7.898							
1600	2.657	3.967	4.567	7.196	8.219							
1800	2.815	4.177	4.798	7.471	8.523							
2000	2.939	4.347	4.989	7.737	8.816							
2500	3.262	4.784	5.473	8.357	9.534							

Note : XLPE factors include Semicons for Conductor & Insulation screen (based on IS 7098 (Part-3)) Proposed For 3 core cables for 66 kV and sizes up to 300 sq.mm XLPE factors will be multiplied by 3



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		Table 4 : XL5 (For I	Polymer Compound	d Factor)									
Nominal Cross Sectional Area	Polymer Fact	Polymer Factor for Armoured/ Unarmoured Cable with AL /CU Conductor (CCFAI/CCFCu)											
(in Sq. mm.)	38/66 KV	64/110 kV	76/132 kV	127/220 kV	220/400 kV								
185	0.447	0.624	0.710	-	-								
240	0.540	0.707	0.805	-	-								
300	0.585	0.747	0.832	-	-								
400	0.646	0.857	0.917	1.789	-								
500	0.710	0.881	1.140	1.848	-								
630	0.792	1.115	1.223	1.887	2.326								
800	0.867	1.177	1.287	1.932	2.365								
1000	1.092	1.266	1.366	2.008	2.405								
1200	1.185	1.365	1.442	2.103	2.561								
1400	1.267	1.417	1.499	2.212	2.644								
1600	1.312	1.488	1.545	2.278	2.708								
1800	1.380	1.534	1.597	2.343	2.768								
2000	1.422	1.576	1.640	2.396	2.839								
2500	1.527	1.680	1.741	2.531	3.063								

Note : For PVC Factor the above factor will be multiplied by 1.58

Table 3a (SMIF) Variation factor for Copper screen in CU wire + polyal construction (CuFc)											
Short Circuit capacity of Metallic screen	(CuFc)	Short Circuit capacity of Metallic screen	(CuFc)								
31.5 kA for 1 sec	2.104	50 kA for 1 sec	3.232								
31.5 kA for 2 sec	2.963	50 kA for 2 sec	4.585								
31.5 kA for 3 sec	3.614	50 kA for 3 sec	5.571								
40 kA for 1 sec	2.660	63 kA for 1 sec	4.071								
40 kA for 2 sec	3.752	63 kA for 2 sec	5.758								
40 kA for 3 sec	4.579	63 kA for 3 sec	7.233								



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 F mumbai@ieema.or

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Table 3b (SMIF) : Variation factor for Aluminium in Corr Al construction (AIFs)													
Nominal Cross Sectional Area (in Sq. mm)	38/66 KV							64/110 kV					
SC Current in KA	31.5 40						31.5			40			
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3	
185	1.100	1.381	1.628	1.259	1.729	2.138	1.079	1.385	1.677	1.213	1.795	2.094	
240	1.110	1.398	1.708	1.220	1.708	2.078	1.186	1.472	1.745	1.322	1.745	2.116	
300	1.167	1.508	1.887	1.482	1.774	2.157	1.183	1.461	0.908	1.483	1.816	2.137	
400	1.190	1.656	2.027	1.529	2.195	2.173	1.207	1.676	2.050	1.547	2.134	2.300	
500	1.206	1.696	2.085	1.526	2.139	2.621	1.255	1.689	2.045	1.530	2.122	2.585	
630	1.219	1.712	2.083	1.492	2.120	2.580	1.369	1.685	2.007	1.538	2.138	2.536	
800	1.279	1.760	2.141	1.490	2.138	2.601	1.503	1.651	2.001	1.561	2.080	2.539	
1000	1.426	1.777	2.127	1.533	2.125	2.599	1.647	1.669	2.054	1.647	2.098	2.539	
1200	1.531	1.792	2.185	1.535	2.117	2.582	1.819	1.819	2.020	1.819	2.073	2.557	
1400	1.730	1.781	2.186	1.730	2.168	2.544	2.055	2.055	2.080	2.055	2.104	2.546	
1600	1.890	1.890	2.189	1.890	2.193	2.536	2.261	2.261	2.261	2.261	2.261	2.576	
1800	2.068	1.974	2.198	2.068	2.186	2.495	2.389	2.389	2.389	2.389	2.389	2.522	
2000	2.234	2.159	2.258	2.234	2.280	2.669	2.623	2.623	2.623	2.623	2.623	2.679	
2500	2.611	2.611	2.611	2.611	2.611	2.744	2.971	2.971	2.971	2.971	2.971	2.971	

Table 3b (SMIF) : Variation factor for Aluminium in Corr Al construction (AIFs)													
Nominal Cross Sectional													
Area			76/13	32 kV									
(in Sq. mm)													
SC Current in KA		31.5 40											
Duration in sec	1	2	3	1	2	3							
185	1.098	1.354	1.740	1.227	1.740	2.133							
240	1.236	1.404	1.703	1.272	1.736	2.142							
300	1.237	1.522	0.834	1.494	1.734	2.138							
400	1.304	1.698	2.037	1.553	2.109	2.171							
500	1.404	1.665	2.045	1.522	2.098	2.545							
630	1.519	1.650	2.032	1.587	2.107	2.578							
800	1.652	1.712	2.039	1.691	2.067	2.519							
1000	1.813	1.813	2.029	1.792	2.088	2.566							
1200	1.972	2.068	2.060	1.994	2.115	2.543							
1400	2.193	2.193	2.193	2.216	2.238	2.555							
1600	2.355	2.355	2.355	2.355	2.355	2.581							
1800	2.519	2.519	2.519	2.519	2.519	2.556							
2000	2.788	2.788	2.788	2.788	2.788	2.788							
2500	3.077	3.077	3.077	3.077	3.077	3.077							



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E mumbai@ieema.org W www.ieema.org

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	Table 3b (SMIF) : Variation factor for Aluminium in Corr Al construction (AIFs)												
Nominal Cross													
Sectional Area		127/220 kV											
(in Sq. mm)													
SC Current in KA		31.5			40			50			63		
Duration in sec	1 2 3			1	2	3	1	2	3	1	2	3	
400	2.096	2.049	2.149	2.096	2.198	2.502	2.164	-	-	-	-	-	
500	2.206	2.124	2.206	2.206	2.219	2.551	2.175	2.513	-	2.476	-	-	
630	2.268	2.185	2.268	2.268	2.282	2.537	2.221	2.675	3.328	2.481	3.450	-	
800	2.357	2.270	2.326	2.357	2.371	2.574	2.231	2.745	3.382	2.554	3.461	4.356	
1000	2.619	2.497	2.546	2.619	2.634	2.679	2.445	2.827	3.368	2.658	3.478	4.291	
1200	2.845	2.826	2.779	2.845	2.869	2.923	2.490	2.884	3.379	2.754	3.485	4.239	
1400	2.983	2.929	2.872	2.983	2.999	3.018	2.533	2.897	3.390	2.754	3.520	4.243	
1600	3.156	3.101	3.008	3.156	3.183	3.156	2.662	3.101	3.393	2.951	3.526	4.284	
1800	3.241	3.263	3.241	3.241	3.263	3.191	2.710	3.149	3.438	2.999	3.526	4.274	
2000	3.517	3.545	3.517	3.517	3.545	3.517	2.795	3.182	3.482	3.028	3.572	4.179	
2500	3.796	3.836	3.796	3.796	3.836	3.796	3.242	3.385	3.708	3.242	3.781	4.192	

Table 3b (SMIF) : Variation factor for Aluminium in Corr Al construction (AIFs)													
Nominal Cross Sectional Area (in Sq. mm)		220/400 kV											
SC Current in KA	31.5 40 50 63												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3	
630	2.823	2.844	2.823	2.823	2.879	2.845	-	-	-	-	-	-	
800	2.955	2.991	2.955	2.955	2.991	2.955	-	-	-	-	-	-	
1000	3.031	3.053	3.031	3.031	3.053	3.031	2.896	2.915	3.131	2.896	3.167	-	
1200	3.217	3.240	3.217	3.217	3.240	3.217	3.054	3.073	3.182	3.054	3.210	4.041	
1400	3.486	3.511	3.486	3.486	3.511	3.486	3.122	3.132	3.221	3.122	3.263	4.118	
1600	3.589	3.614	3.589	3.589	3.614	3.589	3.334	3.344	3.334	3.334	3.334	4.057	
1800	3.693	3.719	3.693	3.693	3.719	3.693	3.729	3.729	3.729	3.729	3.729	4.088	
2000	3.998	4.041	3.998	3.998	4.041	3.998	3.734	3.745	3.745	3.734	3.734	4.110	
2500	4.229	4.273	4.229	4.229	4.273	4.229	3.903	3.903	3.903	3.903	3.903	4.204	



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		Tabl	e 3c (SMIF	Lead +Cu	wire cons	truction (F	PbF)					
Nominal Cross Sectional Area (in Sg. mm)			38/6	6 KV		64/110 kV						
SC												
Current												
IN KA		31.5			40			31.5			40	
in sec	1	2	3	1	2	3	1	2	3	1	2	3
185	3.101	3.101	3.101	3.101	3.101	3.101	4.279	4.279	4.279	4.279	4.279	4.279
240	3.544	3.268	3.268	3.268	3.268	3.268	4.770	4.463	4.463	4.463	4.463	4.463
300	3.784	3.600	3.600	3.790	3.600	3.600	5.045	4.850	4.850	5.045	4.850	4.850
400	4.120	4.120	4.120	4.120	4.120	3.838	5.423	5.423	5.423	5.423	5.423	5.112
500	4.592	4.592	4.592	4.592	4.592	4.592	5.749	5.749	5.749	5.749	5.749	5.749
630	4.881	4.881	4.881	4.881	4.881	4.881	6.184	6.184	6.184	6.184	6.184	6.184
800	5.494	5.494	5.494	5.494	5.494	5.494	6.853	6.853	6.853	6.853	6.853	6.853
1000	6.100	6.100	6.100	6.100	6.100	6.100	7.381	7.381	7.381	7.381	7.381	7.381
1200	7.516	7.516	7.516	7.516	7.516	7.516	8.069	8.069	8.069	8.069	8.069	8.069
1400	7.950	7.950	7.950	7.950	7.950	7.950	8.746	8.746	8.746	8.746	8.746	8.746
1600	8.584	8.584	8.584	8.584	8.584	8.584	9.602	9.602	9.602	9.602	9.602	9.602
1800	9.096	9.096	9.096	9.096	9.096	9.096	9.930	9.930	9.930	9.930	9.930	9.930
2000	9.550	9.550	9.550	9.550	9.550	9.550	10.443	10.443	10.443	10.443	10.443	10.443
2500	10.976	10.976	10.976	10.976	10.976	10.976	11.379	11.379	11.379	11.379	11.379	11.379

	Table 3c (SMIF) : Variation factor	for Lead in Lead +	Cu wire construct	ion (PbF)						
Nominal Cross Sectional Area (in Sq. mm)	76/132 kV										
SC Current in KA		31.5			40						
Duration in sec	1	2	3	1	2	3					
185	5.001	5.001	5.001	5.001	5.001	5.001					
240	5.440	5.193	5.193	5.193	5.193	5.193					
300	5.525	5.194	5.194	5.525	5.194	5.194					
400	6.042	6.042	6.042	6.042	6.042	5.706					
500	6.470	6.470	6.470	6.470	6.470	6.470					
630	6.933	6.933	6.933	6.933	6.933	6.933					
800	7.638	7.638	7.638	7.638	7.638	7.638					
1000	8.186	8.186	8.186	8.186	8.186	8.186					
1200	8.910	8.910	8.910	8.910	8.910	8.910					
1400	9.710	9.710	9.710	9.710	9.710	9.710					
1600	10.225	10.225	10.225	10.225	10.225	10.225					
1800	10.630	10.630	10.630	10.630	10.630	10.630					
2000	10.895	10.895	10.895	10.895	10.895	10.895					
2500	12.260	12.260	12.260	12.260	12.260	12.260					



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	Table 3c (SMIF) : Variation factor for Lead in Lead +Cu wire construction (PbF)											
Nominal												
Cross												
Sectional						127/2	20 kV					
Area (in Sq.												
SC Current												
in KA		31.5			40			50			63	
Duration in		_	_		_				_	_	_	_
sec	1	2	3	1	2	3	1	2	3	1	2	3
400	9.088	9.088	9.088	9.088	9.088	9.078	9.329	9.432	9.432	9.432	9.432	9.432
500	9.862	9.862	9.862	9.862	9.862	9.862	10.034	10.034	10.117	10.034	10.117	10.117
630	10.130	10.130	10.130	10.130	10.130	10.130	10.294	10.294	10.294	10.294	10.294	10.286
800	10.454	10.454	10.454	10.454	10.454	10.454	10.648	10.648	10.648	10.648	10.648	10.648
1000	11.081	11.081	11.081	11.081	11.081	11.081	11.440	11.440	11.440	11.440	11.440	11.440
1200	12.074	12.074	12.074	12.074	12.074	12.074	12.334	12.334	12.334	12.334	12.334	12.334
1400	12.368	12.368	12.368	12.368	12.368	12.368	12.656	12.656	12.656	12.656	12.656	12.656
1600	13.154	13.154	13.154	13.154	13.154	13.154	13.451	13.451	13.451	13.451	13.451	13.451
1800	13.514	13.514	13.514	13.514	13.514	13.514	13.799	13.799	13.799	13.799	13.799	13.799
2000	14.337	14.337 14.337 14.337 14.337 14.337 14.337 14.662 14.662 14.662 14.662 14.662 14.662									14.662	
2500	15.640	15.640 15.640 15.640 15.640 15.640 15.640 15.638 15.638 15.638 15.638 15.638 15.638 15.638										

	Table 3c (SMIF) : Variation factor for Lead in Lead +Cu wire construction (PbF)											
Nominal												
Cross												
Sectional						220/4	00 kV					
Area (in												
Sq. mm)				1						1		
SC Current												
in KA		31.5	1		40			50			63	
Duration												
in sec	1	2	3	1	2	3	1	2	3	1	2	3
630	11.596	11.596	11.596	11.596	11.596	11.596	11.761	11.799	11.828	11.792	11.828	12.015
800	11.784	11.784	11.784	11.784	11.784	11.784	11.979	12.016	12.046	12.009	12.046	12.221
1000	12.016	12.016	12.016	12.016	12.016	12.016	12.349	12.386	12.415	12.379	12.415	12.461
1200	12.794	12.794	12.794	12.794	12.794	12.794	13.080	13.119	13.150	13.112	13.150	13.284
1400	13.196	13.196	13.196	13.196	13.196	13.196	13.702	13.702	13.702	13.702	13.702	13.702
1600	14.011	14.011	14.011	14.011	14.011	14.011	14.361	14.401	14.433	14.394	14.433	14.529
1800	14.372	14.010	14.010	14.010	14.010	14.010	14.909	14.909	14.909	14.909	14.909	14.909
2000	15.189	15.189 15.189 15.189 15.189 15.189 15.512 15.553 15.586 15.546 15.586 15.734										
2500	16.551	16.551	16.551	16.551	16.715	16.551	16.858	16.901	16.935	16.893	17.099	17.143





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 F wumbai@iooma.org

E mumbai@ieema.org W www.ieema.org



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Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)												
Nominal Cross Sectional Area (in Sq. mm)		64/110 kV										
SC Current in KA		31.5			40			31.5		40		
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
185	1.762	2.555	3.566	2.258	3.347	4.163	1.637	2.428	3.048	2.111	3.183	4.015
240	1.719	2.531	3.211	2.235	3.325	4.141	1.565	2.383	3.044	2.087	3.177	3.993
300	1.692	2.525	3.196	2.215	3.304	4.135	1.538	2.360	3.024	2.063	3.153	3.991
400	1.646	2.509	3.174	2.213	3.281	4.118	1.484	2.359	3.011	2.059	3.140	3.949
500	1.584	2.463	3.147	2.154	3.262	4.100	1.438	2.324	2.956	2.022	3.104	3.942
630	1.551	2.432	3.111	2.122	3.239	4.068	1.390	2.281	2.868	1.962	3.087	3.907
800	1.475	2.363	3.035	2.057	3.179	4.035	1.308	2.188	2.800	1.883	3.015	3.869
1000	1.400	2.282	2.961	1.975	3.095	3.960	1.240	2.125	2.729	1.817	2.937	3.796
1200	1.228	2.109	2.786	1.800	2.928	3.782	1.160	2.050	2.642	1.740	2.861	3.724
1400	1.216	2.056	2.730	1.745	2.869	3.726	1.082	1.973	2.631	1.660	2.779	3.655
1600	1.106	2.017	2.709	1.699	2.841	3.720	1.037	1.938	2.542	1.630	2.773	3.627
1800	1.095	1.975	2.652	1.669	2.784	3.662	0.988	1.873	2.460	1.563	2.678	3.541
2000	0.976	1.861	2.535	1.549	2.670	3.539	0.913	1.769	2.450	1.466	2.598	3.490
2500	0.896	1.796	2.490	1.489	2.632	3.514	0.909	1.768	1.488	1.457	2.585	3.451

Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)											
Nominal Cross Sectional Area (in Sq. mm)		76/132 kV									
SC Current in KA		31.5			40						
Duration in sec	1	2	3	1	2	3					
185	1.562	2.395	2.977	2.049	3.110	3.970					
240	1.488	2.292	2.955	1.994	3.085	3.938					
300	1.472	2.290	2.930	1.983	3.061	3.922					
400	1.414	2.265	2.918	1.969	3.059	3.898					
500	1.364	2.238	2.860	1.941	3.055	3.897					
630	1.299	2.187	2.776	1.875	2.996	3.866					
800	1.215	2.104	2.716	1.797	2.924	3.783					
1000	1.152	2.036	2.627	1.729	2.849	3.712					
1200	1.062	1.945	2.554	1.641	2.761	3.622					
1400	0.977	1.857	2.539	1.555	2.695	3.572					
1600	0.975	1.854	2.479	1.546	2.676	3.549					
1800	0.924	1.797	2.395	1.491	2.612	3.468					
2000	0.853	1.717	2.359	1.414	2.536	3.385					
2500	0.809	1.664	1.466	1.351	2.505	3.379					

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 501, Kakad Chambers
 P
 +9

 132, Dr. A. B. Road, Worli,
 F
 +9

 Mumba i 400 018
 E
 m

India

P +91 22 2493 0532
 F +91 22 2493 2705
 F mumbai@iooma.org

E mumbai@ieema.org W www.ieema.org



IEEMA (PVC)/EHV CABLE/2019 (R-2)

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Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)													
Nominal													
Cross													
Sectional						127/2	20 kV						
Area (in Sq.													
mm)													
SC Current													
Duration in		51.5			40			50			05		
sec	1	2	3	1	2	3	1	2	3	1	2	3	
400	1.053	1.937	2.613	1.623	2.751	3.621	2.362	-	-	-	-	-	
500	0.973	1.849	2.536	1.543	2.662	3.512	2.305	3.666	-	3.157	-	-	
630	0.942	1.820	2.495	1.506	2.632	3.482	2.276	3.619	4.697	3.116	4.834	-	
800	0.909	1.775	2.460	1.465	2.596	3.458	2.249	3.597	4.640	3.077	4.803	6.134	
1000	0.828	1.702	2.377	1.387	2.506	3.373	2.139	3.480	4.562	2.988	4.701	6.053	
1200	0.724	1.577	2.251	1.270	2.382	3.258	2.033	3.419	4.477	2.888	4.620	5.944	
1400	0.717	1.540	2.211	1.266	2.357	3.227	2.033	3.356	4.449	2.856	4.563	5.909	
1600	0.686	1.536	2.205	1.232	2.347	3.203	1.921	3.276	4.340	2.769	4.493	5.836	
1800	0.680	1.457	2.117	1.140	2.267	3.124	1.889	3.226	4.235	2.692	4.409	5.719	
2000	0.529	.529 1.337 2.020 1.049 2.140 2.977 1.795 3.154 4.215 2.643 4.371 5.667											
2500	0.373	1.317	1.996	1.036	2.109	2.968	1.722	3.067	4.127	2.559	4.258	5.581	

Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)												
Nominal												
Cross												
Sectional						220/4	00 kV					
Area (in Sq.												
mm)												
SC Current												
in KA		31.5 40 50 63										
Duration in												
sec	1	2	3	1	2	3	1	2	3	1	2	3
630	0.870	1.756	2.455	1.443	2.581	3.465	2.137	3.501	4.568	3.003	4.761	6.687
800	0.862	1.734	2.425	1.414	2.566	3.448	2.120	3.500	4.532	2.993	4.720	6.483
1000	0.833	1.701	2.396	1.385	2.516	3.422	2.081	3.445	4.492	2.958	4.704	6.398
1200	0.750	1.611	2.312	1.299	2.447	3.326	2.015	3.389	4.427	2.882	4.613	6.316
1400	0.711	1.566	2.252	1.270	2.399	3.274	2.007	3.334	4.362	2.809	4.576	6.268
1600	0.697	1.472	2.165	1.183	2.302	3.176	1.880	3.259	4.318	2.757	4.499	6.186
1800	0.642	1.457	2.123	1.178	2.265	3.139	1.867	3.250	4.304	2.750	4.488	6.141
2000	0.488	0.488 1.360 2.048 1.089 2.158 3.042 1.800 3.141 4.167 2.633 4.364 6.058										
2500	0.283	1.245	1.927	0.948	2.019	2.877	1.701	2.989	4.037	2.536	4.208	5.920



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132, Dr. A. B. Road, Worli, Mumba i 400 018 India

P +91 22 2493 0532
F +91 22 2493 2705

E mumbai@ieema.org W www.ieema.org



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Table 5									
Variation factor for Armour for 66KV Poly Al cor	struction cables								
Variation factor for Aluminium in Aluminium Armoured construction (ALA)									
Nominal Cross Sectional Area (in Sq. mm)	66KV								
185	0.812								
240	0.835								
300	0.868								
400	0.991								
500	1.228								
630	1.281								
800	1.379								
1000	1.513								
1200	2.064								
1400	2.167								
1600	2.256								
1800	2.361								
2000	2.403								
2500	2.630								



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