

Cir. No. 35/DIV/ CAB/05/

24th April 2018

To Members of the Cable Division, Utilities, Railways & Listed purchasing organizations

Sub: Correction in PV formulae of LT XLPE Power Cable and addition of factors for HT XLPE Power Cables

We have recently published revised Price Variation Clause for LT&HT XLPE Power Cables and made it effective from 1st November 2017 vide Cir. No.111/DIV/CAB/05 dated 5th December 2017

While replying to a query of a buyer it is observed that the polymer factor for LT XLPE Power Cables (both aluminium and copper) was incorrectly represented by Table P2.

We have now corrected the anomaly by correcting the PV formulae of LT XLPE Aluminium and Copper Insulated Cables (Sl. No. D & E) by representing Polymer factor by Table L2.

We have also worked out factors for XLPE, Copper and Steel for 3 core HT XLPE Power Cables for 500 and 630 sq.mm.

We now enclose complete PV clause of Cable by including all the PV formulae of different types of power cable (Sl. No. A to I), polymer factor Table L2 and updated XL4, H2 and H5 Table of factors for your perusal & record.

We request to replace PV clause of Cable already circulated vide Cir. 111/DIV/CAB/05 dated 5th December 2017 with the enclosed PV clause in your records for future use.


Senior Director
Encl: as above

IEEMA (PVC)/CABLE(R-1)/2017**Effective from: 1st November 217****Material Price Variation Clause For PVC And XLPE Insulated Cables**

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:

P Price payable as adjusted in accordance with above appropriate formula (in Rs/Km)

Po Price quoted/confirmed (in Rs/Km)

ALUMINIUM

AIF Variation factor for aluminium

AI Price of Aluminium. This price is as applicable of first working day of the month, one month prior to the date of delivery.

Alo Price of aluminium. This price is as applicable on first working day of the month, one month prior to the date of tendering.

COPPER

CuF Variation factor for copper

Cu Price of CC copper rods. This price is as applicable on first working day of the month, one month prior to the date of delivery.

Cuo Price of CC copper rods. This price is as applicable on first working day of the month, one month prior to the date of tendering.

PVC COMPOUND

PVCC price of PVC compound. This price is as applicable on first working day of the month, one month prior to the date of delivery.

PVCCo Price of PVC compound. This price is as applicable on first working day of the month, one month prior to the date of tendering.

CCFAI Variation factor for PVC compound/Polymer for aluminum conductor cable.

CCFCu Variation factor for PVC compound/Polymer for copper conductor cable.

IEEMA (PVC)/CABLE(R-1)/2017
XLPE COMPOUND

Effective from: 1st November 217

Cc price of XLPE compound. This price is as applicable on first working day of the month, one month prior to the date of delivery.

Cco Price of XLPE compound. This price is as applicable on first working day of the month, one month prior to the date of tendering.

XLFAL Variation factor for XLPE compound for aluminum conductor cable.

XLFCU Variation factor for XLPE compound for Copper conductor cable.

STEEL

FeF Variation factor for steel

FeW Variation factor for round wire steel armouring

Fe Price of Steel Strips/steel wire. This price is as applicable on the first working day of the month, one month prior to the date of delivery.

Feo Price of steel strips/steel wire. This price is as applicable on first working day of the month, 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 1st 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 PVC Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer.
3. Price of XLPE Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer
4. Price of CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.
5. Price of galvanized steel strip / steel wire (in Rs/MT) is ex-works price as quoted by the manufacturer for Round steel Wire and Flat steel strip (the relevant price of steel strip or steel wire is to be selected depending upon the type of armouring of the cable).

IEEMA (PVC)/CABLE(R-1)/2017**Effective from: 1st November 217****Price variation formulae for 'Power Cables'****A. Aluminum conductor PVC insulated 1.1 kV power cables**

$$P = P_o + AIF (AL - ALo) + CCFAI (PVCc - PVCco) + FeF (Fe - Feo)$$

For unarmoured multicore cables (without steel armour); $FeF = 0$ Table References:

ALP	Aluminium conductor in single core unarmoured & multicore cables
P1	Aluminium conductor aluminium armour in single core armoured cables
P2	PVC compound
P3	Steel armour

B. Copper conductor PVC insulated 1.1 kV power cables

$$P = P_o + CuF (Cu - Cuo) + CCFCu (PVCc - PVCco) + FeF (Fe - Feo) + AIF (Al - ALo)$$

For steel armoured cables; $AIF = 0$ For aluminium armoured cables; $FeF = 0$ For unarmoured cables; $FeF, AIF = 0$ Tables References:

CUP	Copper conductor
P2	PVC compound
P3	Steel armour
P4	Aluminium armour

C. Copper conductor PVC insulated 1.1 kV control cables

$$P = P_o + CuF (Cu - Cuo) + CCFCu (PVCc - PVCco) + FeF (Fe - Feo)$$

For unarmoured cables; $FeF = 0$ Tables References:

CUC	Copper conductor
P5	PVC compound
P6	Steel armour

D. Aluminum conductor XLPE insulated 1.1 kV power cables

$$P = P_o + AIF (AL - ALo) + XLFAL(CC-Cco) + CCFAI (PVCc - PVCco) + FeF (Fe - Feo)$$

For unarmoured multicore cables (without steel armour); $FeF = 0$ Table References:

ALP	Aluminium conductor in single core unarmoured & multicore cables
P1	Aluminium conductor aluminium armour in single core armoured cables
L2	Polymer (CCFAI)
P3	Steel armour
XL1	XLPE Compound (XLFAL)

E. Copper conductor XLPE insulated 1.1 kV power cables

$$P = P_o + CuF (Cu - Cuo) + XLFCU (CC-Cco) + CCFCu (PVCc - PVCco) + FeF (Fe - Feo) + AIF (Al - ALo)$$

proud partners in implementation

For steel armoured cables; $AIF = 0$ For aluminium armoured cables; $FeF = 0$ **HEAD OFFICE - DELHI**

Rishyamook Building, First Floor, 85 A, Panchkuian Road, New Delhi - 110001, INDIA.

P +91 11 2336 3013 / 14 • F +91 11 2336 3015 • E delhi@ieema.org • W www.ieema.org

IEEMA (PVC)/CABLE(R-1)/2017**Effective from: 1st November 217**

For unarmoured cables; FeF, AIF = 0

Tables References:

CUP	Copper conductor
L2	Polymer (CCFCu)
P3	Steel armour
P4	Aluminium armour
XL1	XLPE Compound (XLFCu)

F. Copper conductor XLPE insulated 1.1 kV control cables

$$P = P_o + CuF (Cu - Cu_o) + XLFCU (CC-Cco) + CCFCu (PVCc-PVCco) + FeF (Fe-Fe_o)$$

For unarmoured cables; FeF = 0

Tables References:

CUC	Copper conductor
P5	PVC compound
P6	Steel armour
XL2	XLPE Compound

G. For Aluminium conductor XLPE insulated 3.3 to 33 kV power cables

$$P = P_o + AIF (Al - Al_o) + XLFAL(CC-Cco) + CCFAI (PVCc - PVCco) + FeF (Fe - Fe_o)$$

For unarmoured multicore cables (without steel armour); FeF = 0

Table References:

ALP	Aluminium conductor in single core unarmoured & multicore cables
H1	Aluminium conductor + aluminium armour in single core armoured cables
H2	Polymer
H3/H5	Steel armour (Flat/Round)
XL3/XL4	XLPE Compound (Single core /Multicore)

H. Copper conductor XLPE Insulated 3.3 to 33 kV power cables

$$P = P_o + CuF (Cu - Cu_o) + XLFCU (CC-Cco) + CCFCu (PVCc - PVCco) + FeF (Fe - Fe_o) + AIF (Al - Al_o)$$

For steel armoured cables; AIF = 0 For aluminium armoured cables; FeF = 0

For unarmoured cables; FeF, AIF = 0

Table References:

CUP	Copper conductor
H2	Polymer
H3/H5	Steel armour (Flat/Round)
H4	Aluminium armour
XL3/XL4	XLPE Compound (Single core /Multicore)

I. Copper conductor XLPE insulated 1.0 and 1.5 kV Solar PV DC cables

$$P = P_o + CuF (Cu - Cu_o)$$

Table CUcdc Copper Conductor


Authorized Signatory

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE ALP

VARIATION FACTOR FOR ALUMINIUM (AIF)
POWER CABLES WITH ALUMINIUM CONDUCTOR
(EXCLUDING SINGLE CORE ARMoured CABLES)

Nominal Cross Sectional Area (in Sq. mm.)	1 core	2 core	3 core	3.5 core	4 core
2.5	0.007	0.014	0.021	-	0.028
4	0.011	0.023	0.034	-	0.046
6	0.017	0.034	0.052	-	0.069
10	0.029	0.053	0.087	-	0.116
16	0.046	0.091	0.137	-	0.183
25/16	0.073	0.146	0.219	0.262	0.292
35/16	0.101	0.202	0.302	0.345	0.404
50/25	0.137	0.273	0.410	0.478	0.547
70/35	0.197	0.395	0.593	0.687	0.791
95/50	0.274	0.548	0.821	0.949	1.095
120/70	0.346	0.691	1.036	1.221	1.382
150/70	0.425	0.853	1.279	1.464	1.706
185/95	0.533	1.070	1.605	1.861	2.140
225/120	0.655	1.310	1.965	2.287	2.620
240/120	0.703	1.400	2.099	2.421	2.799
300/150	0.879	1.757	2.635	3.033	3.514
400/185	1.126	2.249	3.374	3.873	4.498
500	1.418	2.838	4.256	-	5.675
630	1.828	3.663	5.494	-	7.326
800	2.340	4.679	7.018	-	9.357
1000	2.951	5.890	8.934	-	11.779

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE CUP

VARIATION FACTOR FOR COPPER CONDUCTOR (CUF)
POWER CABLES WITH COPPER CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm.)	1 core	2 core	3 core	3.5 core	4 core
2.5	0.023	0.046	0.069	-	0.092
4	0.036	0.076	0.112	-	0.151
6	0.056	0.112	0.171	-	0.227
10	0.095	0.174	0.286	-	0.382
16	0.151	0.299	0.451	-	0.602
25/16	0.240	0.480	0.720	0.862	0.960
35/16	0.332	0.664	0.993	1.135	1.329
50/25	0.451	0.898	1.348	1.572	1.799
70/35	0.648	1.299	1.950	2.260	2.602
95/50	0.901	1.802	2.700	3.121	3.601
120/70	1.138	2.273	3.407	4.016	4.545
150/70	1.398	2.806	4.207	4.815	5.611
185/95	1.753	3.519	5.279	6.121	7.038
225/120	2.154	4.309	6.463	7.522	8.617
240/120	2.312	4.605	6.904	7.963	9.206
300/150	2.891	5.779	8.667	9.976	11.558
400/185	3.703	7.397	11.097	12.738	14.794
500	4.664	9.334	13.998	-	18.665
630	6.012	12.048	18.070	-	24.095
800	7.696	15.389	23.082	-	30.775
1000	9.706	19.372	29.055	-	38.741

TABLE CU_{sd}c

VARIATION FACTOR FOR COPPER CONDUCTOR (CUF)
1.0 & 1.5KV Solar PV DC Cables with Copper Conductor

Cable Size in sq.mm.	Copper content in MT/km
2.5	0.023
4	0.038
6	0.058
10	0.090

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE CUC

VARIATION FACTOR FOR COPPER CONDUCTOR (CUF)
CONTROL CABLES WITH COPPER CONDUCTOR

No of Cores	Core size 1.5 sq mm	Core size 2.5 sq mm
2	0.026	0.047
3	0.039	0.070
4	0.052	0.094
5	0.065	0.117
6	0.078	0.141
7	0.091	0.164
8	0.110	0.182
9	0.117	0.205
10	0.130	0.235
12	0.157	0.282
14	0.183	0.329
16	0.209	0.376
18	0.246	0.410
19	0.248	0.446
20	0.260	0.456
24	0.313	0.563
27	0.352	0.634
30	0.391	0.704
37	0.483	0.869
44	0.573	1.033
52	0.678	1.221
61	0.796	1.432

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE P1

VARIATION FACTOR FOR ALUMINIUM (AIF)
ALUMINIUM ARMoured SINGLE CORE PVC INSULATED 1.1 KV CABLES

Nominal cross sectional area (in Sq.mm)	Aluminium factor for Aluminium armoured cable with aluminium conductor
4	0.0685
6	0.0795
10	0.1017
16	0.1303
25	0.1693
35	0.2090
50	0.2597
70	0.3360
95	0.4567
120	0.5443
150	0.6427
185	0.7743
240	0.9737
300	1.2582
400	1.5502
500	1.8958
630	2.3650
800	2.9306
1000	3.7666

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE P2

VARIATION FACTOR FOR PVC COMPOUND (CCFAI/CCFCu)
PVC INSULATED 1.1 KV POWER CABLES WITH COPPER/ALUMINIUM CONDUCTOR

Nominal cross Sectional Area (in Sq. mm)	1 core	2 core		3 core		3.5 core		4 core	
	Unarm	Unarm	arm	Unarm	arm	Unarm	arm	Unarm	arm
2.5	0.079	0.125	0.139	0.141	0.157	-	-	0.161	0.179
4	0.094	0.140	0.156	0.164	0.182	-	-	0.188	0.209
6	0.101	0.154	0.171	0.179	0.199	-	-	0.198	0.220
10	0.114	0.194	0.216	0.214	0.238	-	-	0.249	0.277
16	0.142	0.234	0.246	0.279	0.290	-	-	0.328	0.345
25	0.171	0.288	0.303	0.364	0.383	0.422	0.444	0.443	0.466
35	0.189	0.321	0.338	0.403	0.429	0.489	0.515	0.498	0.524
50	0.211	0.411	0.433	0.508	0.535	0.613	0.645	0.647	0.681
70	0.241	-	-	0.613	0.645	0.707	0.744	-	-
95	0.284	-	-	0.795	0.811	0.908	0.927	-	-
120	0.339	-	-	0.866	0.884	1.024	1.045	-	-
150	0.388	-	-	1.070	1.092	1.289	1.315	-	-
185	0.450	-	-	1.310	1.337	1.499	1.530	-	-
225	0.521	-	-	1.586	1.618	1.840	1.878	-	-
240	0.534	-	-	1.649	1.683	1.990	2.031	-	-
300	0.653	-	-	2.007	2.048	2.361	2.409	-	-
400	0.770	-	-	2.437	2.487	2.616	2.669	-	-
500	0.936	-	-	3.117	3.181	3.687	3.762	-	-
630	1.175	-	-	-	-	-	-	-	-
800	1.433	-	-	-	-	-	-	-	-
1000	1.642	-	-	-	-	-	-	-	-

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE P3

VARIATION FACTOR FOR STEEL (FeF)
PVC INSULATED 1.1 KV POWER CABLES WITH COPPER/ALUMINIUM CONDUCTOR

Nominal Cross sectional Area (in Sq. mm)	2 core	Shape	3 core	Shape	3 ½ core	Shape	4 core	Shape
4	0.305	W	0.335	W	-	-	0.363	W
6	0.348	W	0.363	W	-	-	0.407	W
10	0.392	W	0.407	W	-	-	0.293	F
16	0.235	F	0.293	F	-	-	0.323	F
25	0.293	F	0.352	F	0.382	F	0.382	F
35	0.323	F	0.382	F	0.411	F	0.440	F
50	0.382	F	0.440	F	0.469	F	0.499	F
70	0.411	F	0.499	F	-	F	0.587	F
95	0.499	F	0.587	F	0.616	F	0.645	F
120	0.528	F	0.616	F	0.675	F	0.731	F
150	0.587	F	0.675	F	0.731	F	0.790	F
185	0.645	F	0.761	F	0.820	F	0.879	F
240	0.731	F	0.879	F	0.937	F	0.996	F
300	0.820	F	0.966	F	1.055	F	1.113	F
400	0.937	F	1.083	F	1.172	F	1.231	F
500	1.055	F	1.231	F	1.348	F	1.406	F
630	1.172	F	-	-	-	-	-	-

IEEMA (PVC)/CABLE(R-1)/2017
TABLE P3 (Additional)

Effective from: 1st November 2017

VARIATION FACTOR FOR ROUND WIRE 'W' STEEL (FeF)
PVC INSULATED 1.1 KV POWER CABLES WITH COPPER/ALUMINIUM CONDUCTOR

Nominal Cross Sectional Area (in sq. mm)	2 Core	3 Core	3 .5 Core	4 Core
1.5	0.247	0.259		0.288
2.5	0.273	0.289		0.329
4	0.305	0.335		0.363
6	0.348	0.363		0.407
10	0.392	0.407		0.533
16	0.439	0.523	0.014	0.573
25	0.526	0.625	0.664	0.685
35	0.591	0.685	0.729	0.761
50	0.661	0.790	0.864	1.108
70	0.745	1.122	1.200	1.256
95	1.085	1.286	1.376	1.443
120	1.147	1.386	1.479	1.562
150	1.267	1.526	1.684	2.173
185	1.403	2.090	2.315	2.421
240	1.994	2.397	2.641	2.722
300	2.180	2.642	3.670	3.842
400	2.987	3.728	4.126	4.292
500	3.517	4.226	5.958	6.301
630	4.774	6.018	6.737	7.141

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE P4

VARIATION FACTOR FOR ALUMINIUM (AIF)
PVC INSULATED 1.1 KV POWER CABLES WITH COPPER CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm)	Aluminium Factor for Aluminium armoured cable with copper conductor
4	0.058
6	0.063
10	0.073
16	0.084
25	0.096
35	0.108
50	0.123
70	0.139
95	0.183
120	0.198
150	0.218
185	0.241
240	0.271
300	0.379
400	0.424
500	0.478
630	0.537
800	0.591
1000	0.816

TABLE P5

VARIATION FACTOR FOR PVC COMPOUND (CCFCu)
PVC INSULAYTED CONTROL CABLES WITH COPPER CONDUCTOR

No of cores	Core size 1.5 sq mm		Core size 2.5 sq mm	
	Unarm	Arm	Unarm	Arm
2	0.118	0.121	0.125	0.139
3	0.121	0.131	0.141	0.157
4	0.137	0.152	0.161	0.179
5	0.157	0.174	0.187	0.206
6	0.179	0.199	0.234	0.260
7	0.179	0.199	0.234	0.260
8	0.193	0.215	0.292	0.325
9	0.216	0.241	0.300	0.335
10	0.236	0.262	0.303	0.337
12	0.249	0.277	0.334	0.371
14	0.311	0.327	0.389	0.409
16	0.344	0.362	0.435	0.458
18	0.352	0.371	0.474	0.500
19	0.375	0.395	0.476	0.501
20	0.391	0.412	0.519	0.546
24	0.457	0.481	0.584	0.615
27	0.491	0.517	0.631	0.664
30	0.529	0.557	0.706	0.743
37	0.615	0.647	0.835	0.879
44	0.739	0.778	1.019	1.026
52	0.845	0.889	1.100	1.158
61	0.952	1.002	1.246	1.312

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE P6

VARIATION FACTOR FOR STEEL (FeF)
PVC INSULATED CONTROL CABLES WITH COPPER CONDUCTOR

No of cores	Core size 1.5 sq mm	Shape of armour	Core size 2.5 sq mm	Shape of armour
2	0.243	W	0.277	W
3	0.257	W	0.289	W
4	0.277	W	0.314	W
5	0.303	W	0.342	W
6	0.329	W	0.379	W
7	0.329	W	0.379	W
8	0.341	W	0.456	W
9	0.383	W	0.275	F
10	0.408	W	0.325	F
12	0.289	F	0.342	F
14	0.306	F	0.360	F
16	0.317	F	0.372	F
18	0.332	F	0.350	F
19	0.343	F	0.397	F
20	0.368	F	0.400	F
24	0.398	F	0.475	F
27	0.414	F	0.478	F
30	0.425	F	0.503	F
37	0.461	F	0.548	F
44	0.507	F	0.601	F
52	0.556	F	0.641	F
61	0.585	F	0.685	F

IEEMA (PVC)/CABLE(R-1)/2017
TABLE P6 (Additional)

Effective from: 1st November 217

VARIATION FACTOR FOR ROUND WIRE 'W' STEEL (FeF)
PVC INSULATED CONTROL CABLES WITH COPPER CONDUCTOR

No. of Cores	Core size 1.5 sq mm	Core size 2.5 sq mm
2	0.243	0.273
3	0.257	0.289
4	0.277	0.314
5	0.303	0.342
6	0.329	0.379
7	0.329	0.379
8	0.341	0.456
9	0.383	0.508
10	0.408	0.535
12	0.510	0.572
14	0.546	0.625
16	0.581	0.660
19	0.608	0.696
24	0.714	0.819
25	0.679	0.798
27	0.732	0.837
28	0.696	0.815
30	0.758	0.881
33	0.747	0.883
37	0.820	1.217
44	0.926	1.355
48	1.122	1.308
50	1.122	1.308
52	1.149	1.361
56	1.202	1.388
61	1.299	1.520

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE L2

VARIATION FACTOR FOR POLYMER (CCFAI / CCFCu)
XLPE INSULATED 1.1 KV POWER CABLES WITH COPPER / ALUMINIUM CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm)	1 core	2 core		3 core		3.5 core		4 core	
	Unarm	Unarm	Arm	Unarm	Arm	Unarm	Arm	Unarm	Arm
2.5	0.055	0.163	0.175	0.166	0.177	-	-	0.177	0.188
4	0.075	0.201	0.204	0.205	0.213	-	-	0.218	0.213
6	0.085	0.213	0.234	0.205	0.230	-	-	0.242	0.232
10	0.082	0.252	0.280	0.217	0.251	-	-	0.285	0.298
16	0.089	0.278	0.341	0.289	0.246	-	-	0.300	0.279
25	0.101	0.307	0.278	0.276	0.247	0.295	0.264	0.331	0.290
35	0.109	0.330	0.319	0.305	0.270	0.328	0.292	0.368	0.319
50	0.124	0.482	0.685	0.348	0.311	0.372	0.335	0.422	0.394
70	0.146	0.354	0.335	0.469	0.397	0.489	0.420	0.528	0.464
95	0.163	0.436	0.389	0.504	0.441	0.544	0.471	0.591	0.523
120	0.176	0.475	0.421	0.556	0.498	0.599	0.538	0.722	0.656
150	0.217	0.510	0.490	0.690	0.611	0.717	0.633	0.840	0.762
185	0.236	0.631	0.608	0.836	0.738	0.854	0.756	1.007	0.899
240	0.273	0.750	0.726	1.002	0.842	1.079	0.952	1.238	1.119
300	0.303	0.919	0.887	1.161	1.012	1.170	1.031	1.457	1.414
400	0.372	1.093	1.040	1.376	1.283	1.545	1.379	1.778	1.626
500	0.413	1.342	-	1.568	1.400	1.806	1.456	-	-
630	0.469	1.546	-	-	-	-	-	-	-
800	0.569	-	-	-	-	-	-	-	-
1000	0.667	-	-	-	-	-	-	-	-

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE XL1
VARIATION FACTOR FOR XLPE COMPOUND (XLFAL/XLFCU)
XLPE INSULATED 1.1 KV POWER CABLES WITH COPPER/ALUMINIUM CONDUCTOR

Nominal cross Sectional Area (in Sq. mm)	1 core		2 core		3 core		3.5 core		4 core	
	Unarm	Arm	Unarm	Arm	Unarm	arm	Unarm	Arm	Unarm	arm
2.5	0.007	0.010	0.014	0.014	0.021	0.021			0.028	0.028
4	0.009	0.012	0.018	0.018	0.027	0.027			0.036	0.036
6	0.010	0.015	0.022	0.022	0.033	0.033			0.043	0.043
10	0.013	0.018	0.025	0.025	0.039	0.039			0.053	0.053
16	0.016	0.023	0.034	0.034	0.049	0.049			0.065	0.065
25	0.021	0.030	0.048	0.048	0.070	0.070	0.084	0.084	0.093	0.093
35	0.025	0.035	0.059	0.059	0.084	0.084	0.099	0.099	0.112	0.112
50	0.033	0.044	0.075	0.075	0.108	0.108	0.130	0.130	0.144	0.144
70	0.042	0.054	0.095	0.095	0.137	0.137	0.160	0.160	0.179	0.179
95	0.048	0.062	0.110	0.110	0.160	0.160	0.190	0.190	0.211	0.211
120	0.060	0.076	0.138	0.138	0.200	0.200	0.239	0.239	0.266	0.266
150	0.078	0.095	0.180	0.180	0.259	0.259	0.296	0.296	0.344	0.344
185	0.097	0.116	0.224	0.224	0.324	0.324	0.369	0.369	0.430	0.430
240	0.116	0.137	0.266	0.266	0.388	0.388	0.446	0.446	0.518	0.518
300	0.138	0.164	0.325	0.325	0.467	0.467	0.540	0.540	0.620	0.620
400	0.175	0.214	0.357	0.357	0.536	0.536	0.619	0.619	0.714	0.714
500	0.217	0.260	0.440	0.440	0.660	0.660	0.769	0.769	0.880	0.880
630	0.265	0.318	0.542	0.542	0.814	0.814	0.941	0.941	1.085	1.085
800	0.323	0.389								
1000	0.375	0.444								

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 2017

TABLE XL2
VARIATION FACTOR FOR XLPE COMPOUND (XLFCU)
XLPE INSULATED CONTROL CABLES WITH COPPER CONDUCTOR

No of cores	Core size 1.5 sq mm		Core size 2.5 sq mm	
	Unarm	Arm	Unarm	Arm
2	0.010	0.010	0.012	0.012
3	0.016	0.016	0.018	0.018
4	0.021	0.021	0.025	0.025
5	0.026	0.026	0.031	0.031
6	0.031	0.031	0.037	0.037
7	0.036	0.036	0.043	0.043
8	0.036	0.036	0.043	0.043
9	0.042	0.042	0.049	0.049
10	0.052	0.052	0.061	0.061
12	0.062	0.062	0.074	0.074
14	0.073	0.073	0.086	0.086
16	0.083	0.083	0.098	0.098
18	0.094	0.094	0.110	0.110
19	0.099	0.099	0.116	0.116
20	0.104	0.104	0.123	0.123
24	0.125	0.125	0.147	0.147
27	0.140	0.140	0.165	0.165
30	0.156	0.156	0.184	0.184
37	0.192	0.192	0.227	0.227
44	0.229	0.229	0.270	0.270
52	0.270	0.270	0.319	0.319
61	0.317	0.317	0.374	0.374

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 2017

TABLE XL3

VARIATION FACTOR FOR XLPE(XLFAL/XLFCU)

SINGLE CORE ARMoured /UNARMoured XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
CU / AL CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm.)	XLPE Factor for Armoured/ Unarmoured Cable with AL /CU Conductor					
	3.3 KV	6.6 KV (E)	11 KV (E)/ 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)
25	0.110	0.131	0.170	0.279		
35	0.122	0.137	0.175	0.284	0.317	0.522
50	0.135	0.151	0.191	0.307	0.341	0.563
70	0.155	0.172	0.215	0.342	0.379	0.615
95	0.174	0.193	0.241	0.377	0.417	0.670
120	0.192	0.212	0.262	0.407	0.449	0.713
150	0.209	0.229	0.283	0.437	0.481	0.757
185	0.228	0.250	0.308	0.471	0.518	0.809
240	0.255	0.279	0.343	0.519	0.569	0.883
300	0.280	0.322	0.372	0.560	0.613	0.943
400	0.326	0.392	0.420	0.625	0.683	1.041
500	0.388	0.461	0.469	0.694	0.757	1.142
630	0.467	0.520	0.529	0.777	0.845	1.265
800	0.567	0.593	0.602	0.874	0.949	1.407
1000	0.656	0.665	0.660	0.955	1.036	1.525

Note : XLPE factors include Semicons for Conductor & Insulation screen

TABLE – XL4

VARIATION FACTOR FOR XLPE (CCF1AL / CCF1Cu)

3 CORE XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH COPPER / ALUMINIUM CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm)	3.3 KV ARM	6.6 KV (E) ARM	6.6 KV (UE) / 11 KV (E) ARM	11 KV (UE) ARM	22 KV (E) ARM	33 KV (E) ARM
25	0.315	0.394	0.511	0.838		
35	0.339	0.427	0.545	0.880	0.982	1.638
50	0.378	0.474	0.600	0.957	1.065	1.751
70	0.435	0.541	0.679	1.067	1.183	1.916
95	0.489	0.604	0.755	1.171	1.295	2.071
120	0.537	0.661	0.822	1.265	1.396	2.210
150	0.585	0.719	0.890	1.359	1.497	2.350
185	0.642	0.784	0.968	1.468	1.614	2.513
240	0.717	0.873	1.074	1.615	1.773	2.732
300	0.781	1.006	1.167	1.744	1.928	2.919
400	0.886	1.227	1.314	1.948	2.130	3.229
500	0.956	1.421	1.445	2.148	2.381	3.538
630	1.129	1.582	1.609	2.382	2.630	3.940

Note : XLPE factors include Semicons for Conductor & Insulation screen

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE H1
VARIATION FACTOR FOR ALUMINIUM (AIF)
ALUMINIUM ARMoured SINGLE CORE XLPE INSULATED 3.3 TO 33 KV CABLES

Nominal Cross Sectional Area (in Sq. mm.)	Aluminium Factor for Aluminium Armoured Cable with Aluminium Conductor					
	3.3 KV	6.6 KV (E)	11 KV (E)/ 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)
35	0.251	0.284	0.301	0.344	0.358	0.473
50	0.312	0.336	0.352	0.397	0.408	0.672
70	0.385	0.409	0.423	0.469	0.501	0.723
95	0.476	0.500	0.518	0.637	0.656	0.856
120	0.561	0.586	0.601	0.726	0.744	0.949
150	0.653	0.678	0.696	0.823	0.842	1.050
185	0.773	0.797	0.893	0.949	0.965	1.183
240	0.997	1.063	1.083	1.139	1.154	1.387
300	1.209	1.271	1.283	1.333	1.307	1.753
400	1.438	1.556	1.565	1.620	1.636	2.046
500	1.873	1.901	1.910	2.110	2.128	2.484
630	2.337	2.361	2.369	2.580	2.595	2.978
800	3.007	3.071	3.080	3.145	3.163	3.588
1000	3.737	3.741	3.749	3.804	3.822	4.565

TABLE H2
VARIATION FACTOR FOR POLYMER (CCFAI / CCFCu)
3 CORE XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH COPPER / ALUMINIUM CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm)	3.3 KV ARM	6.6 KV (E) ARM	6.6 KV (UE) / 11 KV (E) ARM	11 KV (UE) ARM	22 KV (E) ARM	33 KV (E) ARM
35	0.374	0.990	1.142	1.604	1.782	-
50	0.445	1.119	1.260	1.834	2.046	2.864
70	0.547	1.290	1.396	2.011	2.284	3.219
95	0.594	1.440	1.647	2.269	2.428	3.367
120	0.732	1.692	1.877	2.498	2.715	3.646
150	0.812	1.906	2.061	2.767	2.931	3.927
185	0.960	2.086	2.406	3.028	3.180	4.166
240	1.130	2.484	2.744	3.398	3.580	4.589
300	1.219	2.912	3.161	3.840	4.016	5.029
400	1.313	3.530	3.664	4.353	4.666	5.736
500	1.652	3.925	3.971	4.621	4.878	5.913
630	1.949	4.487	4.982	5.225	5.477	6.696

Fillers added in PVC consumption

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE H3
VARIATION FACTOR FOR STEEL (FeF)
XLPE INSULATED 3.3 TO 33 KV POWER CABLES WITH COPPER / ALUMINIUM CONDUCTOR

Nominal Cross Sectional Area Sq. mm.	3.3 KV	6.6 KV (E)	11 KV (E) / 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)
25	0.551	0.604	0.656	0.814		
35	0.645	0.645	0.731	0.879	0.937	-
50	0.675	0.703	0.761	0.937	0.966	1.181
70	0.761	0.761	0.849	0.996	1.055	1.289
95	0.820	0.849	0.907	1.083	1.113	1.348
120	0.879	0.907	0.966	1.142	1.172	1.406
150	0.966	0.966	1.055	1.201	1.259	1.494
185	1.025	1.055	1.113	1.259	1.318	1.553
240	1.142	1.142	1.231	1.377	1.406	1.641
300	1.231	1.259	1.318	1.465	1.524	1.758
400	1.348	1.406	1.435	1.582	1.641	1.876

IEEMA (PVC)/CABLE(R-1)/2017

Effective from: 1st November 217

TABLE H4
VARIATION FACTOR FOR ALUMINIUM (AIF)

XLPE INSULATED SINGLE CORE 3.3 TO 33 KV POWER CABLES WITH COPPER CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm.)	Aluminium Factor for Aluminium Armoured Cable with Copper Conductor					
	3.3 KV	6.6 KV (E)	11 KV (E)/ 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)
35	0.153	0.187	0.204	0.247	0.258	0.372
50	0.179	0.203	0.220	0.262	0.275	0.425
70	0.196	0.219	0.233	0.278	0.311	0.444
95	0.213	0.237	0.254	0.373	0.392	0.470
120	0.228	0.253	0.268	0.393	0.410	0.488
150	0.243	0.269	0.287	0.414	0.432	0.504
185	0.261	0.285	0.381	0.437	0.455	0.526
240	0.324	0.389	0.410	0.465	0.480	0.556
300	0.365	0.428	0.440	0.490	0.510	0.737
400	0.432	0.471	0.480	0.536	0.552	0.783
500	0.489	0.517	0.526	0.726	0.744	0.844
630	0.544	0.568	0.572	0.787	0.801	0.902
800	0.706	0.787	0.797	0.862	0.880	0.982
1000	0.824	0.865	0.867	0.923	0.940	1.324

TABLE - H5
VARIATION FACTOR FOR STEEL (FeW)

XLPE INSULATED 3.3KV TO 33 KV POWER CABLES WITH COPPER / ALUMINIUM CONDUCTOR

Nominal Cross Sectional Area in Sq. mm	3.3/3.3 KV	3.3/6.6 KV	11 KV (E) / 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)
25	1.258	1.457	1.612	2.509	1.503	--
35	1.361	1.569	1.853	2.644	2.797	2.517
50	1.682	1.687	2.321	2.800	2.921	4.569
70	2.033	1.979	2.503	3.219	3.347	4.809
95	2.202	2.507	2.718	4.019	4.200	5.437
120	2.371	2.675	2.882	4.241	4.416	6.713
150	2.870	2.847	3.265	4.447	4.621	6.976
185	3.121	3.309	4.148	4.726	5.289	7.356
240	3.758	4.227	4.442	5.442	6.651	7.718
300	4.099	5.024	5.182	6.894	7.084	8.187
400	5.750	6.572	6.658	7.433	7.657	8.760
500	6.716	6.777	6.861	7.588	7.797	8.830
630	7.492	7.465	7.477	8.209	8.386	9.413