



Save Energy for Benefit of Self and Nation

Uttar Gujarat Vij Company Limited

CIN - U40102GJ2003SGC042906
(A subsidiary of Gujarat Urja Vikas Nigam Limited)

Price Variation Formulae

Tender item MVCC Conductor, Distribution Transformer (for all kVA rating as per Schedule-B) and HT & LT XLPE Cable is invited on Price Variation basis as per IEEMA price variation formula for Delivery F.O.R. Destination.

The price adjustment amount towards the price components of materials shall be as per the price variation formulas without any ceiling. However, UGVCL will closely observe the actual finance progress during the execution of order for total amount of executed work. In any case UGVCL will not allow / pay any amount higher than the total amount of work order. Successful bidders have to take prior approval in such cases before any procurement or execution of work.

The prices quoted by you in your tender for the supply of the above materials are accepted on Price Variation basis for delivery F.O.R Destination. The prices are inclusive of packing and forwarding charges.

The base date for PV calculation is one month before the date of scheduled date of opening of tender.

In case of any clarifications in the formula kindly refer the IEEMA price variation formula as per various circular issued by IEEMA. In case of any discrepancies the IEEMA circular shall prevail.

The Employer shall use the recent formula/ revisions published by IEEMA to calculate the Price adjustment on supply of plants and facilities.

If the price adjustment amount works out to be positive, the same is payable to the Contractor by the Employer and if it works out to be negative, the same is to be recovered by the Employer from the Contractor without any ceiling.

The Contractor shall promptly submit the price adjustment invoices for the supplies made and works executed at site, positively within three (3) months from the date of shipment/work done whether it is positive or negative.

Bids shall conform to the price adjustment provisions detailed above. Bids specifying prices for items on variable basis run the risk of rejection. A bid submitted on a fixed price basis will not be rejected but the price adjustment will be treated as zero.

In case of extension of the project beyond the scheduled date of completion, the price adjustment shall remain in effect till the time of scheduled completion, however for the period beyond the scheduled date of completion for which the Contractor is liable to pay penalty as per penalty clause to the employer, the price adjustment shall not be applicable.

No price increase shall be allowed beyond the original delivery dates unless specifically stated in the Time Extension letter, if any, issued by the Employer. The Employer will, however, be entitled to any decrease in the Contract price which may be caused due to lower price

Regd. & Corporate Office: Visnagar Road, MEHSANA - 384 001 (North Gujarat)

Telephone: (02762) 222080-81

Website: www.ugvcl.com

Fax: (02762) 223574

e-mail: aceproject@ugvcl.com



adjustment amount in case of delivery beyond the original delivery dates. In such event were the time extension is agreed by the Employer, a revised L2 schedule is to be released by the Employer for the extended period in which price variation would also be allowed.

For the supplies made during the contractual delivery period and matching with the scheduled date of delivery, price shall be payable in accordance with the Price Variation formula as per purchase order. (With positive/negative variation as the case may be).

For delayed deliveries but within contractual delivery period, price shall be payable at lower of the following:

- a. Worked out with indices applicable for schedule date of delivery / month
OR
- b. Worked out with indices applicable for actual date of delivery of material/ month

For delayed deliveries and also beyond the contractual delivery period, price shall be payable at lower of the following subject to the company decided to accept materials beyond the contractual delivery period.:

- a. Worked out with indices applicable for scheduled date of delivery / month
OR
- b. Worked out with indices applicable for actual date of delivery of material/ month
OR
- c. Worked out with indices applicable for last date of Contractual Delivery period.

The pre-ponement of delivery should not be entertained to avoid the inventory carrying cost unless it is extremely essential for the work under execution. However, the price as worked out with indices applicable for actual date of delivery of material/month shall be payable.

The date of delivery is the date on which the material is notified as being ready for inspection/dispatch subject to condition that material is received within 15 days for Gujarat based suppliers/21 days for out of Gujarat based suppliers from the date of dispatch instruction. Otherwise, actual date of receipt of material at store is to be considered.

The supplier will have to submit all supporting documents like IEEMA Circulars, PV Calculation sheet etc. duly attested along with invoice.

For delayed delivery beyond schedule delivery date, the penalty shall be applicable as per A/T (i.e. Purchase order) terms.

The date of delivery is the date on which the MVC Conductor 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.

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 2017

- 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

- All prices of raw materials are exclusive of GST amount.
- All prices excluding Aluminium & Copper are as on first working day of the month.
- The details of prices are as under:
 - 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.
 - Price of PVC Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer.
 - Price of XLPE Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer
 - Price of CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.
 - 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)/2017Effective 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

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

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 (XLFAI)

E. Copper conductor XLPE insulated 1.1 kV power cables

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

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

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**HEAD OFFICE - DELHI**

Rishyarnook Building, First Floor, 85 A, Panchsukian 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 CU_{sd}c 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	1.035	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	8.534	-	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 CUdc

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
TABLE P2

Effective from: 1st November 217

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 217

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	4.225	5.958	6.301
630	4.774	6.018	6.737	7.141

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	0.594	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
TABLE P6

Effective from: 1st November 217

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

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								

TABLE XL2
VARIATION FACTOR FOR XLPE COMPOUND (XLFCU)
XLPE 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	0.010	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 217

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 (CCF1A/ / 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	3.530	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

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

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



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

Cir. No.: 142/ PVC/DT_PT/05

November 22, 2021

To All Members of Distribution Transformers Division, SEBs and other listed purchasing bodies.

**Sub: Amendment in Revision in Price Variation Formulae for Power and Distribution Transformers
 Evolution of new PV formulae for Solar Invertor Duty Transformers**

Ref: Cir. No. 140/PVC/DT_PT/05 dated November 10, 2021

We write further to above mentioned circular published for revision in Price Variation Formulae for Power and Distribution Transformers and evolution of new PV formulae for Solar Invertor Duty Transformers.

In the PV formulae for Aluminium and Copper wound Distribution Transformers of rating above 2500 KVA and voltage class up to 33 KV – for both supplied against domestic and Deemed export/Export orders; there is an error in the month reference of CRGO price in the example given for date of delivery. (Page no. 8 & 11)

We are now attaching the corrected PV formulae after correcting the month references of CRGO price in the example given for date of delivery on page no. 8 & 11.

We request to replace the attached PV formulae in place of earlier sent vide circular referred above for using in future contracts.

It has been also noted that for date of delivery falling in November 2021 for Power Transformers Up to 400 KV and for date of delivery falling in November and December 2021 for Power Transformers Above 400 KV, prices of Steel plates 10 mm thick and Transformer Oil is required one month prior to the date of delivery.

The price and the source remains same for Steel Plate 10 mm thick and Transformer Oil for the revised PV clauses as for earlier PV clauses, the same are published in the monthly circular of October and November 2021. Hence, though, circulars for these two months are not applicable for earlier PV clauses effective from 1st April 2015, we recommend using these prices only for price variation calculation for the date of delivery falling in November 2021 for Power Transformers Up to 400 KV and for date of delivery falling in November and December 2021 for Power Transformers Above 400 KV

Director

Encl.:

1. Revised PV formulae for Aluminium and Copper wound Distribution Transformers of rating above 2500 KVA and voltage class up to 33 KV for transformers supplied against domestic orders
2. PV formulae for Aluminium and Copper wound Distribution Transformers and Copper wound dry type Distribution Transformers of rating up to and including 2500 KVA and voltage class up to 33 KV for transformers supplied against domestic orders as published vide cir no. 140/PVC/DT_PT/05 dated November 10, 2021





Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers,
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 3493 0532
 F +91 22 3493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA/PVC/DIST_CU_upto 2.5 MVA/2021

Effective from: 01 September 2021

**PRICE VARIATION CLAUSE FOR COPPER WOUND DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (For single & three phase of ratings up to and including 2,500 KVA and voltage class up to 33 KV)
 supplied against domestic contracts**

This price variation clause is applicable for 'Copper Wound Distribution Transformers', with rating up to and including 2,500 KVA and voltage class up to 33 KV supplied against domestic contracts. A separate price variation clause IEEMA/PVC/DIST_CU_upto 2.5 MVA/DE/2021 has been evolved for above types of Transformers supplied against export/deemed export contracts under special imprest licensing scheme.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(7 + 41 \frac{C}{C_0} + 23 \frac{ES}{ES_0} + 10 \frac{IS}{IS_0} + 5 \frac{IM}{IM_0} + 8 \frac{TO}{TO_0} + 6 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- C₀ = Price of CC copper rods (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- IS₀ = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- IM₀ = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- TO₀ = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers,
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA/PVC/DIST_CU_upto 2.5 MVA/2021

Effective from: 01 September 2021

W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Copper (C_0), Transformer Oil (TO_0), CRGO Steel Sheets (ES_0), HR Coil (IS_0) and Insulating material (IM_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/_/ **ONE** month prior to the date of tendering.

C = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IS = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Copper (C), Transformer Oil (TO), CRGO Steel Sheets (ES), HR Coil (IS) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/_/ **ONE** month prior to the date of delivery.



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The date of delivery is the date on which the transformer 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 are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
- (b) Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier
- (c) The details of prices are as under:
 1. Price of 8 mm CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.
 2. The price of CRGO Electrical Steel Lamination suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers
 3. Price of steel is the average retail price of HR Coil 3.15 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT.
 4. The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.
 5. The price of Transformer Oil (in Rs./K.Ltr) is the average price on ex-refinery basis as quoted by primary producers for supply in drums.
- (d) Some purchasers are purchasing oil immersed Transformers from manufacturers without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under:

$$P = \frac{P_o}{92} \left(7 + 41 \frac{C}{C_o} + 23 \frac{ES}{ES_o} + 10 \frac{IS}{IS_o} + 5 \frac{IM}{IM_o} + 6 \frac{W}{W_o} \right)$$

Where description of P, P_o, C, ES, IS, IM, W etc. remains same as mentioned earlier.

Director

Page 3 of 15





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 132, Dr A. B. Road, Worli,
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 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA/PVC/DIST_AL_upto 2.5 MVA/2021

Effective from: 01 September 2021

**PRICE VARIATION CLAUSE FOR ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (For single & three phase of ratings up to and including 2,500 KVA and voltage class up to 33 KV)
 supplied against domestic contracts**

This price variation clause is applicable for 'Aluminium Wound Distribution Transformers', with rating up to and including 2,500 KVA and voltage class up to 33 KV supplied against domestic contracts. A separate price variation clause IEEMA/PVC/DIST_AL_upto 2.5 MVA/DE/2021 has been evolved for above types of Transformers supplied against export/deemed export contracts under special imprest licensing scheme.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(8 + 22 \frac{AL}{AL_0} + 36 \frac{ES}{ES_0} + 12 \frac{IS}{IS_0} + 5 \frac{IM}{IM_0} + 10 \frac{TO}{TO_0} + 7 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- AL₀ = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- IS₀ = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- IM₀ = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- TO₀ = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.

Page 4 of 15



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 501, Kakad Chambers,
 132, Dr A. B. Road, Worli,
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 India
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 W www.ieema.org

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W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Aluminium (AL_0), Transformer Oil (TO_0), CRGO Steel Sheets (ES_0), HR Coil (IS_0) and Insulating material (IM_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/_/ **ONE** month prior to the date of tendering.

AL = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IS = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Aluminium (AL), Transformer Oil (TO), CRGO Steel Sheets (ES), HR Coil (IS) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/_/ **ONE** month prior to the date of delivery.



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 E mumbai@ieema.org
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IEEMA/PVC/DIST_AL_upto 2.5 MVA/2021

Effective from: 01 September 2021

The date of delivery is the date on which the transformer 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 are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
- (b) Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier
- (c) The details of prices are as under:
 1. Price of 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 using exchange rate and adding appropriate customs duty.
 2. The price of CRGO Electrical Steel Lamination suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers
 3. Price of steel is the average retail price of HR Coil 3.15 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT.
 4. The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.
 5. The price of Transformer Oil (in Rs./K.Ltr) is the average price on ex-refinery basis as quoted by primary producers for supply in drums.
 - d) Some purchasers are purchasing oil immersed Transformers from manufacturers without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under:

$$P = \frac{P_o}{90} \left(8 + 22 \frac{AL}{AL_o} + 36 \frac{ES}{ES_o} + 12 \frac{IS}{IS_o} + 5 \frac{IM}{IM_o} + 7 \frac{W}{W_o} \right)$$

Where description of P, P_o, AL, ES, IS, IM, W etc. remains same as mentioned earlier

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Page 6 of 15





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

IEEMA/PVC/DIST_CU_Above 2.5 MVA/2021

Effective from: 01 September 2021

**PRICE VARIATION CLAUSE FOR COPPER WOUND DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (of ratings above 2,500 KVA and voltage class up to 33 KV)
 supplied against domestic contracts**

This price variation clause is applicable for 'Copper Wound Distribution Transformers' for single & three phase of rating above 2,500 KVA and voltage class up to 33 KV; supplied against domestic contracts. A separate price variation clause IEEMA/PVC/DIST_CU_Above 2.5 MVA/DE/2021 has been evolved for above types of Transformers supplied against export/deemed export contracts under special imprest licensing scheme.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(8 + 40 \frac{C}{C_0} + 24 \frac{ES}{ES_0} + 8 \frac{IS}{IS_0} + 4 \frac{IM}{IM_0} + 8 \frac{TO}{TO_0} + 8 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- C₀ = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- IS₀ = Price of MS Plate of 6 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- IM₀ = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- TO₀ = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.



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 W www.ieema.org

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W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Copper (C_0), Transformer Oil (TO_0), CRGO Steel Sheets (ES_0), MS Plate (IS_0) and Insulating material (IM_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/_/ **ONE** month prior to the date of tendering.

C = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** months prior to the date of delivery.

IS = Price of MS Plate of 6 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Copper (C), Transformer Oil (TO), MS Plate (IS), CRGO Steel Sheets (ES) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The date of delivery is the date on which the transformer 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.



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Effective from: 01 September 2021

Notes:

- a) All prices are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
- b) Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier
- c) The details of prices are as under:
 1. Price of 8 mm CC copper rods (in Rs./MT) is ex-works price as quoted by the primary producer.
 2. The price of CRGO Electrical Steel Lamination suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers
 3. Price of steel is the average retail price of MS Plate 6 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT.
 4. The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.
 5. The price of Transformer Oil (in Rs./K.Ltr) is the average price on ex-refinery basis as quoted by primary producers for supply in drums.
- d) Some purchasers are purchasing oil immersed Transformers from manufacturers without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under:

$$P = \frac{P_o}{92} \left(8 + 40 \frac{C}{C_o} + 24 \frac{ES}{ES_o} + 8 \frac{IS}{IS_o} + 4 \frac{IM}{IM_o} + 8 \frac{W}{W_o} \right)$$

Where description of P, P_o, C, ES, IS, IM, W etc. remains same as mentioned earlier.

Director

Page 9 of 15



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

IEEMA/PVC/DIST_AL_Above 2.5 MVA/2021

Effective from: 01 September 2021

**PRICE VARIATION CLAUSE FOR ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (of ratings above 2,500 KVA and voltage class up to 33 KV)
 supplied against domestic contracts**

This price variation clause is applicable for 'Aluminium Wound Distribution Transformers' for single & three phase of rating above 2,500 KVA and voltage class up to 33 KV; supplied against domestic contracts. A separate price variation clause IEEMA/PVC/DIST_AL_Above 2.5 MVA/DE/2021 has been evolved for above types of Transformers supplied against export/deemed export contracts under special imprest licensing scheme.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(9 + 16 \frac{AL}{AL_0} + 35 \frac{ES}{ES_0} + 14 \frac{IS}{IS_0} + 6 \frac{IM}{IM_0} + 11 \frac{TO}{TO_0} + 9 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- AL₀ = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- IS₀ = Price of MS Plate of 6 mm thickness (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- IM₀ = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- TO₀ = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.



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W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Aluminium (AL_0), Transformer Oil (TO_0), MS Plate (IS_0) and Insulating material (IM_0) and CRGO Steel Sheets (ES_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/_/ **ONE** month prior to the date of tendering.

AL = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IS = Price of MS Plate of 6 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Aluminium (AL), Transformer Oil (TO), MS Sheet (IS), CRGO Steel Sheets (ES) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The date of delivery is the date on which the transformer 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.

Page 11 of 15



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Notes:

- All prices are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
- Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier
- The details of prices are as under:
 - Price of 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 using exchange rate and adding appropriate customs duty.
 - The price of CRGO Electrical Steel Lamination suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers
 - Price of steel is the average retail price of MS Plate 6 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT.
 - The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.
 - The price of Transformer Oil (in Rs./K.Ltr) is the average price on ex-refinery basis as quoted by primary producers for supply in drums.
- Some purchasers are purchasing oil immersed Transformers from manufacturers without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under:

$$P = \frac{P_o}{89} \left(9 + 16 \frac{AL}{AL_o} + 35 \frac{ES}{ES_o} + 14 \frac{IS}{IS_o} + 6 \frac{IM}{IM_o} + 9 \frac{W}{W_o} \right)$$

Where description of P, P_o, AL, ES, IS, IM, W etc. remains same as mentioned earlier.

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 E mumbai@ieema.org
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IEEMA/PVC/DIST_DT_CU/2021

Effective from: 01 September 2021

**PRICE VARIATION CLAUSE FOR COPPER WOUND DRY TYPE DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (Of ratings up to and including 2,500 KVA and voltage class up to 33 KV)
 supplied against domestic contracts**

This price variation clause is applicable for 'Copper Wound Dry Type Distribution Transformers', with rating up to and including 2,500 KVA and voltage class up to 33 KV supplied against domestic contracts. A separate price variation clause IEEMA/PVC/DIST_DT_CU/DE/2021 has been evolved for above types of Transformers supplied against export/deemed export contracts under special imprest licensing scheme.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(7 + 35 \frac{C}{C_0} + 30 \frac{ES}{ES_0} + 7 \frac{IS}{IS_0} + 8 \frac{IM}{IM_0} + 7 \frac{ER}{ER_0} + 6 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- C₀ = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- IS₀ = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- IM₀ = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- ER₀ = Price of Epoxy resin (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.



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

IEEMA/PVC/DIST_DT_CU/2021

Effective from: 01 September 2021

W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Copper (C_0), Epoxy Resin (ER_0), CRGO Steel Sheets (ES_0), HR Coil (IS_0) and Insulating material (IM_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/_/ **ONE** month prior to the date of tendering.

C = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IS = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ER = Price of Epoxy resin (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Copper (C), Epoxy Resin (ER), CRGO Steel Sheets (ES), HR Coil (IS) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/_/ **ONE** month prior to the date of delivery.



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers,
 132, Dr. A. B. Road, Worli,
 Mumbai 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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The date of delivery is the date on which the transformer 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 and exclusive of any other central, state or local taxes etc..

a) Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier

b) The details of prices are as under:

1. Price of 8 mm CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.
2. The price of CRGO Electrical Steel Lamination suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers
3. Price of steel is the average retail price of HR Coil 3.15 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT
4. The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty.
5. The price of Epoxy resin is price quoted by resin manufacturer for their grade CT 5900 or its nearest equivalent.

Director

Page 15 of 15



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

Cir. No.: 142/ PVC/DT_PT/05

November 22, 2021

To All Members of Distribution Transformers Division, SEBs and other listed purchasing bodies.

**Sub: Amendment in Revision in Price Variation Formulae for Power and Distribution Transformers
 Evolution of new PV formulae for Solar Invertor Duty Transformers**

Ref: Cir. No. 140/PVC/DT_PT/05 dated November 10, 2021

We write further to above mentioned circular published for revision in Price Variation Formulae for Power and Distribution Transformers and evolution of new PV formulae for Solar Invertor Duty Transformers.

In the PV formulae for Aluminium and Copper wound Distribution Transformers of rating above 2500 KVA and voltage class up to 33 KV – for both supplied against domestic and Deemed export/Export orders; there is an error in the month reference of CRGO price in the example given for date of delivery. (Page no. 8 & 11)

We are now attaching the corrected PV formulae after correcting the month references of CRGO price in the example given for date of delivery on page no. 8 & 11.

We request to replace the attached PV formulae in place of earlier sent vide circular referred above for using in future contracts.

It has been also noted that for date of delivery falling in November 2021 for Power Transformers Up to 400 KV and for date of delivery falling in November and December 2021 for Power Transformers Above 400 KV, prices of Steel plates 10 mm thick and Transformer Oil is required one month prior to the date of delivery.

The price and the source remains same for Steel Plate 10 mm thick and Transformer Oil for the revised PV clauses as for earlier PV clauses, the same are published in the monthly circular of October and November 2021. Hence, though, circulars for these two months are not applicable for earlier PV clauses effective from 1st April 2015, we recommend using these prices only for price variation calculation for the date of delivery falling in November 2021 for Power Transformers Up to 400 KV and for date of delivery falling in November and December 2021 for Power Transformers Above 400 KV

Director

Encl.:

3. Revised PV formulae for Aluminium and Copper wound Distribution Transformers of rating above 2500 KVA and voltage class up to 33 KV for transformers supplied against Deemed export/Export orders
4. PV formulae for Aluminium and Copper wound Distribution Transformers and Copper wound dry type Distribution Transformers of rating up to and including 2500 KVA and voltage class up to 33 KV for transformers supplied against Deemed export/Export orders as published vide cir no. 140/PVC/DT_PT/05 dated November 10, 2021



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA/PVC/DIST_CU_upto 2.5 MVA/DE/2021

Effective from: 01 September 2021

**PRICE VARIATION CLAUSE FOR COPPER WOUND DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (For single & three phase of ratings up to and including 2,500 KVA and voltage class up to 33 KV)
 supplied against Export/ Deemed Export contracts**

This price variation clause is applicable for 'Copper Wound Distribution Transformers', with rating up to and including 2,500 KVA and voltage class up to 33 KV supplied against export/deemed export contracts with duty free inputs under special imprest licensing scheme. A separate price variation clause IEEMA/PVC/DIST_CU_upto 2.5 MVA/2021 has been evolved for above types of Transformers supplied against domestic contracts.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(7 + 41 \frac{C}{C_0} + 23 \frac{ES}{ES_0} + 10 \frac{IS}{IS_0} + 5 \frac{IM}{IM_0} + 8 \frac{TO}{TO_0} + 6 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- C₀ = Price of CC copper rods (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.
- ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.
- IS₀ = Price of HR Coil of 3.15 mm thickness (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.
- IM₀ = Price of Insulating Materials (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.
- TO₀ = Price of Transformer Oil (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 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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Effective from: 01 September 2021

W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Copper (C_0), Transformer Oil (TO_0), CRGO Steel Sheets (ES_0), HR Coil (IS_0) and Insulating material (IM_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/DE/_/_ **ONE** month prior to the date of tendering.

C = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IS = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Copper (C), Transformer Oil (TO), CRGO Steel Sheets (ES), HR Coil (IS) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/DE/_/_ **ONE** month prior to the date of delivery.



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA/PVC/DIST_CU_upto 2.5 MVA/DE/2021

Effective from: 01 September 2021

The date of delivery is the date on which the transformer 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 are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
- (b) Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier
- (c) The details of prices are as under:
 1. Price of 8 mm CC copper rods (in Rs./MT) is ex-works price as quoted by the primary producer.
 2. The price of CRGO Electrical Steel Lamination suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers
 3. Price of steel is the average retail price of HR Coil 3.15 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT.
 4. The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers.
 5. The price of Transformer Oil (in Rs./K.Ltr) is the average price on ex-refinery basis as quoted by primary producers for supply in drums.
- (d) Some purchasers are purchasing oil immersed Transformers from manufacturers without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under:

$$P = \frac{P_o}{92} \left(7 + 41 \frac{C}{C_o} + 23 \frac{ES}{ES_o} + 10 \frac{IS}{IS_o} + 5 \frac{IM}{IM_o} + 6 \frac{W}{W_o} \right)$$

Where description of P, P_o, C, ES, IS, IM, W etc. remains same as mentioned earlier.

Director

Page 3 of 15





Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA/PVC/DIST_AL_upto 2.5 MVA/DE/2021

Effective from: 01 September 2021

**PRICE VARIATION CLAUSE FOR ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (For single & three phase of ratings up to and including 2,500 KVA and voltage class up to 33 KV)
 supplied against Export/ Deemed Export contracts**

This price variation clause is applicable for 'Aluminium Wound Distribution Transformers', with rating up to and including 2,500 KVA and voltage class up to 33 KV supplied against export/deemed export contracts under special imprest licensing scheme. A separate price variation clause IEEMA/PVC/DIST_AL_upto 2.5 MVA/2021 has been evolved for above types of Transformers supplied against domestic contracts.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(8 + 22 \frac{AL}{AL_0} + 36 \frac{ES}{ES_0} + 12 \frac{IS}{IS_0} + 5 \frac{IM}{IM_0} + 10 \frac{TO}{TO_0} + 7 \frac{W}{W_0} \right)$$

Wherein,

P = Price payable as adjusted in accordance with the above formula.

P₀ = Price quoted/confirmed.

AL₀ = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.

ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.

IS₀ = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.

IM₀ = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.

TO₀ = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 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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W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Aluminium (AL_0), Transformer Oil (TO_0), CRGO Steel Sheets (ES_0), HR Coil (IS_0) and Insulating material (IM_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/DE/_/_ **ONE** month prior to the date of tendering.

AL = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IS = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Aluminium (AL), Transformer Oil (TO), CRGO Steel Sheets (ES), HR Coil (IS) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/DE/_/_ **ONE** month prior to the date of delivery.



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

IEEMA/PVC/DIST_AL_upto 2.5 MVA/DE/2021

Effective from: 01 September 2021

The date of delivery is the date on which the transformer 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 are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
- (b) Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier
- (c) The details of prices are as under:
 1. Price of 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 using exchange rate.
 2. The price of CRGO Electrical Steel Lamination suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers
 3. Price of steel is the average retail price of HR Coil 3.15 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT.
 4. The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers.
 5. The price of Transformer Oil (in Rs./K.Ltr) is the average price on ex-refinery basis as quoted by primary producers for supply in drums.
- d) Some purchasers are purchasing oil immersed Transformers from manufacturers without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under:

$$P = \frac{P_o}{90} \left(8 + 22 \frac{AL}{AL_o} + 36 \frac{ES}{ES_o} + 12 \frac{IS}{IS_o} + 5 \frac{IM}{IM_o} + 7 \frac{W}{W_o} \right)$$

Where description of P, P_o, AL, ES, IS, IM, W etc. remains same as mentioned earlier

Director

Page 6 of 15





Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA/PVC/DIST_CU_Above 2.5 MVA/DE/2021

Effective from: 01 September 2021

**PRICE VARIATION CLAUSE FOR COPPER WOUND DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (of ratings above 2,500 KVA and voltage class up to 33 KV)
 supplied against Export/ Deemed Export contracts**

This price variation clause is applicable for 'Copper Wound Distribution Transformers' for single & three phase of rating above 2,500 KVA and voltage class up to 33 KV; supplied against export/deemed export contracts under special imprest licensing scheme. A separate price variation clause IEEMA/PVC/DIST_CU_Above 2.5 MVA/2021 has been evolved for above types of Transformers supplied against domestic contracts.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(8 + 40 \frac{C}{C_0} + 24 \frac{ES}{ES_0} + 8 \frac{IS}{IS_0} + 4 \frac{IM}{IM_0} + 8 \frac{TO}{TO_0} + 8 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- C₀ = Price of CC copper rods (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.
- ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.
- IS₀ = Price of MS Plate of 6 mm thickness (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.
- IM₀ = Price of Insulating Materials (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.
- TO₀ = Price of Transformer Oil (refer notes)
This price is as applicable for the month, ONE month prior to the date of tendering.



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 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 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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W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, THREE months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Copper (C_0), Transformer Oil (TO_0), CRGO Steel Sheets (ES_0), MS Plate (IS_0) and Insulating material (IM_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/DE/_/_ ONE month prior to the date of tendering.

C = Price of CC copper rods (refer notes)
 This price is as applicable for the month, ONE month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, ONE months prior to the date of delivery.

IS = Price of MS Plate of 6 mm thickness (refer notes)
 This price is as applicable for the month, ONE month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, ONE month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, ONE month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, THREE months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Copper (C), Transformer Oil (TO), MS Plate (IS), CRGO Steel Sheets (ES) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The date of delivery is the date on which the transformer 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.



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 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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Effective from: 01 September 2021

Notes:

- a) All prices are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
- b) Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier
- c) The details of prices are as under:
 1. Price of 8 mm CC copper rods (in Rs./MT) is ex-works price as quoted by the primary producer.
 2. The price of CRGO Electrical Steel Lamination is suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers
 3. Price of steel is the average retail price of MS Plate 6 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT.
 4. The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers.
 5. The price of Transformer Oil (in Rs./K.Ltr) is the average price on ex-refinery basis as quoted by primary producers for supply in drums.
- d) Some purchasers are purchasing oil immersed Transformers from manufacturers without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under:

$$P = \frac{P_o}{92} \left(8 + 40 \frac{C}{C_o} + 24 \frac{ES}{ES_o} + 8 \frac{IS}{IS_o} + 4 \frac{IM}{IM_o} + 8 \frac{W}{W_o} \right)$$

Where description of P, P_o, C, ES, IS, IM, W etc. remains same as mentioned earlier.

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 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 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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**PRICE VARIATION CLAUSE FOR ALUMINIUM WOUND DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (of ratings above 2,500 KVA and voltage class up to 33 KV)
 supplied against Export/ Deemed Export contracts**

This price variation clause is applicable for 'Aluminium Wound Distribution Transformers' for single & three phase of rating above 2,500 KVA and voltage class up to 33 KV; supplied against export/deemed export contracts under special imprest licensing scheme. A separate price variation clause IEEMA/PVC/DIST_AL_Above 2.5 MVA/2021 has been evolved for above types of Transformers supplied against domestic contracts.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(9 + 16 \frac{AL}{AL_0} + 35 \frac{ES}{ES_0} + 14 \frac{IS}{IS_0} + 6 \frac{IM}{IM_0} + 11 \frac{TO}{TO_0} + 9 \frac{W}{W_0} \right)$$

Wherein,

P = Price payable as adjusted in accordance with the above formula.

P₀ = Price quoted/confirmed.

AL₀ = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.

ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.

IS₀ = Price of MS Plate of 6 mm thickness (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.

IM₀ = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.

TO₀ = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 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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Effective from: 01 September 2021

W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Aluminium (AL_0), Transformer Oil (TO_0), MS Plate (IS_0) and Insulating material (IM_0) and CRGO Steel Sheets (ES_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/_/ **ONE** month prior to the date of tendering.

AL = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IS = Price of MS Plate of 6 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Aluminium (AL), Transformer Oil (TO), MS Sheet (IS), CRGO Steel Sheets (ES) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The date of delivery is the date on which the transformer 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.



Indian Electrical & Electronics Manufacturer's Association
 501, Kalkad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 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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Notes:

- All prices are exclusive of GST amount and exclusive of any other central, state or local taxes etc.
- Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier
- The details of prices are as under:
 - Price of 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 using exchange rate.
 - The price of CRGO Electrical Steel Lamination suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers.
 - Price of steel is the average retail price of MS Plate 6 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT.
 - The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers.
 - The price of Transformer Oil (in Rs./K.Ltr) is the average price on ex-refinery basis as quoted by primary producers for supply in drums.
- Some purchasers are purchasing oil immersed Transformers from manufacturers without first filling of oil. Oil for first filling is procured and filled by the purchasers. For such supplies PVC formula, excluding Oil will apply as under:

$$P = \frac{P_o}{89} \left(9 + 16 \frac{AL}{AL_o} + 35 \frac{ES}{ES_o} + 14 \frac{IS}{IS_o} + 6 \frac{IM}{IM_o} + 9 \frac{W}{W_o} \right)$$

Where description of P, P_o, AL, ES, IS, IM, W etc. remains same as mentioned earlier.

Director



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA/PVC/DIST_DT_CU/DE/2021

Effective from: 01 September 2021

**PRICE VARIATION CLAUSE FOR COPPER WOUND DRY TYPE DISTRIBUTION TRANSFORMERS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 (Of ratings up to 2,500 KVA and voltage class up to 33 KV)
 supplied against Export/ Deemed Export contracts**

This price variation clause is applicable for 'Copper Wound Dry Type Distribution Transformers', with rating up to 2,500 KVA and voltage class up to 33 KV supplied against export/deemed export contracts under special imprest licensing scheme. A separate price variation clause IEEMA/PVC/DIST_DT_CU/2021 has been evolved for above types of Transformers supplied against domestic contracts.

The price quoted/confirmed is based on the input cost of raw materials/components and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials and all India average consumer price index number for industrial workers as specified in the price variation clause given below. In case of any variation in these prices/indices, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(7 + 35 \frac{C}{C_0} + 30 \frac{ES}{ES_0} + 7 \frac{IS}{IS_0} + 8 \frac{IM}{IM_0} + 7 \frac{ER}{ER_0} + 6 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- C₀ = Price of CC copper rods (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- ES₀ = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- IS₀ = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- IM₀ = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- ER₀ = Price of Epoxy resin (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 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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W_0 = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in December 2021, applicable prices of Copper (C_0), Epoxy Resin (ER_0), CRGO Steel Sheets (ES_0), HR Coil (IS_0) and Insulating material (IM_0) should be as on 1st November 2021 and all India average consumer price index no. (W_0) should be for the month of September 2021.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/DE/_/_ **ONE** month prior to the date of tendering.

C = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ES = Price of CRGO Electrical Steel Lamination (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IS = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

ER = Price of Epoxy resin (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.

W = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2016 = 100)
 This index number is as applicable for the month, **THREE** months prior to the date of delivery.

For example, if date of delivery in terms of clause given below falls in December 2022, applicable prices of Copper (C), Epoxy Resin (ER), CRGO Steel Sheets (ES), HR Coil (IS) and Insulating material (IM) should be as on 1st November 2022 and all India average consumer price index number (W) should be for the month of September 2022.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/PWR_DIST_TRF (R-1)/DE/_/_ **ONE** month prior to the date of delivery.



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 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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The date of delivery is the date on which the transformer 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 and exclusive of any other central, state or local taxes etc..

a) Date of Tendering is the due date of tender submission or date of tender opening whichever is earlier

b) The details of prices are as under:

1. Price of 8 mm CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.
2. The price of CRGO Electrical Steel Lamination suitable for Transformers of voltage up to 33 KV is the average price as quoted by processing centres of mills and lamination suppliers
3. Price of steel is the average retail price of HR Coil 3.15 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT
4. The average price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm and 10 mm thick, 3200 mm x 4100 mm C&F price in free currency per MT converted into Indian Rupees with applicable exchange rates prevailing as on 1st working day of the month as quoted by primary suppliers.
5. The price of Epoxy resin is price quoted by resin manufacturer for their grade CT 5900 or its nearest equivalent.

Director

Page 15 of 15



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

Cir. No.04/PVC/Conductor/05

31 January 2023

To Members of Conductor Division

To all State Electricity Boards, Utilities and Other purchasing organizations

Sub: MV covered conductors PV formulae

IEEMA received request from industry and utilities for price variation formula for MV Covered conductors. After discussion with stakeholders considering the demand for MVCC and price volatility, IEEMA Conductor technical committee decided to evolve the PV formula.

IEEMA collected weight factors in MT/KM of required raw materials and insulations for various types and sizes of MV Covered Conductors and averaged the same and prepared the draft formulae for MV Covered Conductor in consultation with technical committee members of IEEMA Conductor division. We had circulated draft formulae vide cir no. **43/PVC/Conductor/05 dated 21st Dec 2022**.

Since there are no adverse comments received; we are making these operational from 1st December 2022.

Although, these PV clauses are made effective from 1st December 2022, practically it can be incorporated in all the current new tenders/contracts starting from 1st January 2023.

We request and recommend all the users & stakeholders including Utilities, PSUs etc. to incorporate these new PV formulae in all the new tenders/contracts henceforth.

Director



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA(PVC)/MVCC/2022

Effective from: 1st December 2022

MATERIAL PRICE VARIATION CLAUSE FOR MEDIUM VOLTAGE COVERED CONDUCTOR

The price quoted/confirmed for Medium Voltage Covered Conductor is based on the input cost of raw materials as on the date of quotation. It is deemed to be related to the prices of raw materials, as specified in the price variation clauses given below. In case of any variation in these prices, the prices payable shall be subject to adjustment up or down in accordance with the following formulae.

1. AAAC/AL-7/AL-59 Conductors

$$P = Po + WA (AL - ALo) + WSc (SC - SCo) + WI (IN - INo) + WO (IN - INo)$$

2. ACSR Conductors

$$P = Po + WA (AL - ALo) + WF (FE - FEo) + WSc (SC - SCo) + WI (IN - INo) + WO (IN - INo)$$

3. AL59 ACS Conductors

$$P = Po + WAL (AL - ALo) + WA (AL - ALo) + WF (FE - FEo) + WSc (SC - SCo) + WI (IN - INo) + WO (IN - INo)$$

Wherein,

P = Ex-works price payable in Rs. per km as adjusted in accordance with the price variation clause

Po = Ex-works price quoted/confirmed in Rs. per km.

WA = Variation factor of Aluminium in MV Covered Conductor as per the type of MVC conductor
 (Refer the enclosed annexure giving this factor for various types of MVC conductors)

WAL = Variation factor of AL-59 in MV Covered Conductor as per the type of MVC conductor
 (Refer the enclosed annexure giving this factor for various types of MVC conductors)

ALo = Price of LME CSP Average of Aluminium (refer notes)

This price is as applicable for the month, ONE month prior to the date of tender opening.

AL = Price of LME CSP Average of Aluminium (refer notes)

This price is as applicable for the month, ONE month prior to the date of delivery.

WF = Variation factor of Steel Content in ACSR and AL-59 ACS MVC Conductor as per the type of MVC conductor
 (Refer the enclosed annexure giving this factor for various types of MVC conductors)

FEo = Price of High Tensile Galvanized Steel Wire in Rs./MT of appropriate size (refer notes)

This price is as applicable for the month, ONE month prior to the date of tender opening.

FE = Price of High Tensile Galvanized Steel Wire in Rs./MT of appropriate size (refer notes)

This price is as applicable for the month, ONE month prior to the date of delivery.

WSc = Variation factor of Semiconducting conductor screening as per the type of MVC Conductor
 (Refer the enclosed annexure giving this factor for various types of MVC conductors)

IEEMA(PVC)/MVCC/2022/Page 1 of 7





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

IEEMA(PVC)/MVCC/2022**Effective from: 1st December 2022**

WI = Variation factor of inner insulation as per the type of MVC conductor
 (Refer the enclosed annexure giving this factor for various types of MVC conductors)

WO = Variation factor of outer insulation as per the type of MVC conductor
 (Refer the enclosed annexure giving this factor for various types of MVC conductors)

Note: For factor of HDPE, multiply XLPE factor by 1.2

SCo = Price of Semiconducting conductor screening in Rs./MT (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tender opening.

SC = Price of Semiconducting conductor screening in Rs./MT (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

INo = Price of XLPE Compound/ Polymeric Compound (HDPE) as used for inner/outer insulation in Rs./MT (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tender opening.

IN = Price of XLPE Compound/ Polymeric Compound (HDPE) as used for inner/outer insulation in Rs./MT (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.

The above prices and indices are as published by IEEMA vide circular reference IEEMA(PVC)/MVCC/--/--

The date of delivery is the date on which the MVC Conductor 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:

1. All prices of raw materials are exclusive of GST amount.
2. Price of Daily LME Cash SELLER Settlement price of Primary Aluminium in US\$ per MT is as published by London Metal Bulletin (LME). Premium for Aluminium Ingot in US\$ per MT is added in this Daily LME price and converted in Indian Rs./MT using exchange rate and adding appropriate customs duty
3. The price of High tensile Galvanized Steel Wire (in Rs./MT) for different sizes in mm is the price as quoted by manufacturer/s
4. Price of Polymer Compound (in Rs./MT) is the ex-work price of Polyethylene PE ST-7, 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 Semiconducting conductor screening (in Rs./MT) is the ex-works price, as quoted by the manufacturer/s

Authorised Signatory

IEEMA(PVC)/MVCC/2022/Page 2 of 7



IEEMA(PVC)/MVCC/2022

Effective from: 1st December 2022

AAAC/AL-7/AL-59					
Conductor Sizes	Conductor Const. No. of Strands/Dia. of Strands	Conductor	11 kV (Combined Insulation Thickness - 2.3 mm (Nom))		
Variation factor		WA	WSc	WI	WO
Raw material		AAAC/AL-7/AL-59	Semiconducting	Inner (XLPE)	Outer (XLPE)
Sq.mm.	Nos./mm				
50	7/3.08	0.1463	0.0439	0.0477	0.0546
55	7/3.15	0.1528	0.0449	0.0486	0.0555
70	7/3.57	0.1966	0.0520	0.0537	0.0605
80	7/3.81	0.2225	0.0568	0.0576	0.0666
99	7/4.25	0.2785	0.0632	0.0621	0.0688
100	7/4.26	0.2796	0.0634	0.0622	0.0688
120	19/2.84	0.3381	0.0778	0.0677	0.0743
125	19/2.89	0.3486	0.0793	0.0702	0.0789
148	19/3.15	0.4142	0.0867	0.0756	0.0843
157	19/3.26	0.4438	0.0900	0.0779	0.0865
173	19/3.40	0.4825	0.0958	0.0808	0.0894
200	19/3.66	0.5592	0.1041	0.0862	0.0947
232	19/3.94	0.6480	0.1141	0.0921	0.1004
241	19/4.02	0.6748	0.1169	0.0938	0.1020

Note: For factor of HDPE, multiply XLPE factor by 1.2

IEEMA(PVC)/MVCC/2022/Page 3 of 7

IEEMA(PVC)/MVCC/2022

Effective from: 1st December 2022

AAAC/AL-7/AL-59					
Conductor Sizes	Conductor Const. No. of Strands/Dia. of Strands	Conductor	22 kV (Combined Insulation Thickness - 2.42 mm (Nom))		
Variation factor		WA	WSc	WI	WO
Raw material		AAAC/AL-7/AL-59	Semiconducting	Inner (XLPE)	Outer (XLPE)
Sq.mm.	Nos./mm				
50	7/3.08	0.1463	0.0455	0.0524	0.0563
55	7/3.15	0.1528	0.0492	0.0547	0.0597
70	7/3.57	0.1966	0.0561	0.0604	0.0648
80	7/3.81	0.2225	0.0594	0.0637	0.0678
99	7/4.25	0.2785	0.0663	0.0697	0.0732
100	7/4.26	0.2796	0.0664	0.0698	0.0733
120	19/2.84	0.3381	0.0811	0.0763	0.0791
125	19/2.89	0.3486	0.0825	0.0774	0.0801
148	19/3.15	0.4142	0.0902	0.0833	0.0854
157	19/3.26	0.4438	0.0936	0.0858	0.0877
173	19/3.40	0.4825	0.0995	0.0890	0.0905
200	19/3.66	0.5592	0.1081	0.0950	0.0958
232	19/3.94	0.6480	0.1183	0.1013	0.1015
241	19/4.02	0.6748	0.1212	0.1031	0.1032

Note: For factor of HDPE, multiply XLPE factor by 1.2

IEEMA(PVC)/MVCC/2022/Page 4 of 7

IEEMA(PVC)/MVCC/2022

Effective from: 1st December 2022

AAAC/AL-7/AL-59					
Conductor Sizes	Conductor Const. No. of Strands/Dia. of Strands	Conductor	33 kV (Combined Insulation Thickness - 3.63 mm (Nom))		
Variation factor		WA	WSc	WI	WO
Raw material		AAAC/AL-7/AL-59	Semiconducting	Inner (XLPE)	Outer (XLPE)
Sq.mm.	Nos./mm				
50	7/3.08	0.1463	0.0525	0.1052	0.0742
55	7/3.15	0.1528	0.0534	0.1068	0.0751
70	7/3.57	0.1966	0.0585	0.1143	0.0782
80	7/3.81	0.2225	0.0644	0.1228	0.0838
99	7/4.25	0.2785	0.0707	0.1304	0.0874
100	7/4.26	0.2796	0.0719	0.1337	0.0898
120	19/2.84	0.3381	0.0861	0.1412	0.0936
125	19/2.89	0.3486	0.0886	0.1471	0.0971
148	19/3.15	0.4142	0.0968	0.1576	0.1028
157	19/3.26	0.4438	0.1005	0.1620	0.1052
173	19/3.40	0.4825	0.1066	0.1677	0.1083
200	19/3.66	0.5592	0.1157	0.1781	0.1140
232	19/3.94	0.6480	0.1265	0.1894	0.1202
241	19/4.02	0.6748	0.1296	0.1926	0.1219

Note: For factor of HDPE, multiply XLPE factor by 1.2

IEEMA(PVC)/MVCC/2022/Page 5 of 7



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA(PVC)/MVCC/2022

Effective from: 1st December 2022

ACSR						
Conductor Sizes	Conductor Const. No. of Strands/Dia. of Strands	Conductor		11 kV (Combined Insulation Thickness - 2.3 mm (Nom))		
Variation factor		WA	WF	WSc	WI	WO
Raw material		Aluminium	HTGS	Semiconducting	Inner (XLPE)	Outer (XLPE)
Sq.mm.	Nos./mm					
50	6/3.35 + 1/3.35	0.1477	0.0701	0.0459	0.0518	0.0610
80	6/4.09 + 1/4.09	0.2036	0.0962	0.0569	0.0611	0.0770
100	6/4.72 + 7/1.57	0.2807	0.1098	0.0710	0.0689	0.0878
150	30/2.59 + 7/2.59	0.4439	0.2954	0.0949	0.0855	0.0940
200	30/3.00 + 7/3.00	0.5953	0.3965	0.1168	0.0975	0.1057

ACSR						
Conductor Sizes	Conductor Const. No. of Strands/Dia. of Strands	Conductor		22 kV (Combined Insulation Thickness - 2.42 mm (Nom))		
Variation factor		WA	WF	WSc	WI	WO
Raw material		Aluminium	HTGS	Semiconducting	Inner (XLPE)	Outer (XLPE)
Sq.mm.	Nos./mm					
50	6/3.35 + 1/3.35	0.1477	0.0701	0.0482	0.0574	0.0622
80	6/4.09 + 1/4.09	0.2036	0.0962	0.0589	0.0675	0.0712
100	6/4.72 + 7/1.57	0.2807	0.1098	0.0733	0.0761	0.0904
150	30/2.59 + 7/2.59	0.4439	0.2954	0.0988	0.0942	0.0951
200	30/3.00 + 7/3.00	0.5953	0.3965	0.1213	0.1072	0.1068

ACSR						
Conductor Sizes	Conductor Const. No. of Strands/Dia. of Strands	Conductor		33 kV (Combined Insulation Thickness - 3.63 mm (Nom))		
Variation factor		WA	WF	WSc	WI	WO
Raw material		Aluminium	HTGS	Semiconducting	Inner (XLPE)	Outer (XLPE)
Sq.mm.	Nos./mm					
50	6/3.35 + 1/3.35	0.1477	0.0701	0.0527	0.1117	0.0778
80	6/4.09 + 1/4.09	0.2036	0.0962	0.0642	0.1296	0.0875
100	6/4.72 + 7/1.57	0.2807	0.1098	0.0793	0.1585	0.0958
150	30/2.59 + 7/2.59	0.4439	0.2954	0.1064	0.1768	0.1133
200	30/3.00 + 7/3.00	0.5953	0.3965	0.1300	0.1999	0.1259

Note: For factor of HDPE, multiply XLPE factor by 1.2

IEEMA(PVC)/MVCC/2022/Page 6 of 7



Indian Electrical & Electronics Manufacturer's Association
 501, Kakad Chambers
 132, Dr. A. B. Road, Worli,
 Mumbai 400 018
 India
 P +91 22 2493 0532
 F +91 22 2493 2705
 E mumbai@ieema.org
 W www.ieema.org

IEEMA(PVC)/MVCC/2022

Effective from: 1st December 2022

AL59 ACS							
Conductor Sizes	Conductor Const. No. of Strands/Dia. of Strands	Conductor			11 kV (Combined Insulation Thickness - 2.3 mm (Nom))		
Variation factor		WAL	WF	WA	WSc	WI	WO
Raw material		AL-59	STEEL	Aluminium	Semiconducting	Inner (XLPE)	Outer (XLPE)
Sq.mm.	Nos./mm						
52.88	6/3.35 + 1/3.35	0.1477	0.0499	0.0069	0.0459	0.0518	0.0610
78.82	6/4.09 + 1/4.09	0.2204	0.0729	0.0093	0.0562	0.0611	0.0700
104.98	6/4.72 + 1/4.72	0.2933	0.1024	0.0114	0.0682	0.0689	0.0777
158	30/2.59 + 7/2.59	0.4439	0.2186	0.0267	0.0949	0.0855	0.0940
212	30/3.00 + 7/3.00	0.5953	0.2875	0.0358	0.1168	0.0975	0.1057
AL59 ACS							
Conductor Sizes	Conductor Const. No. of Strands/Dia. of Strands	Conductor			22 kV (Combined Insulation Thickness - 2.42 mm (Nom))		
Variation factor		WAL	WF	WA	WSc	WI	WO
Raw material		AL-59	STEEL	Aluminium	Semiconducting	Inner (XLPE)	Outer (XLPE)
Sq.mm.	Nos./mm						
52.88	6/3.35 + 1/3.35	0.1477	0.0499	0.0069	0.0482	0.0574	0.0622
78.82	6/4.09 + 1/4.09	0.2204	0.0729	0.0093	0.0589	0.0675	0.0712
104.98	6/4.72 + 1/4.72	0.2933	0.1024	0.0114	0.0714	0.0761	0.0789
158	30/2.59 + 7/2.59	0.4439	0.2186	0.0267	0.0988	0.0942	0.0951
212	30/3.00 + 7/3.00	0.5953	0.2875	0.0358	0.1213	0.1072	0.1068
AL59 ACS							
Conductor Sizes	Conductor Const. No. of Strands/Dia. of Strands	Conductor			33 kV (Combined Insulation Thickness - 3.63 mm (Nom))		
Variation factor		WAL	WF	WA	WSc	WI	WO
Raw material		AL-59	STEEL	Aluminium	Semiconducting	Inner (XLPE)	Outer (XLPE)
Sq.mm.	Nos./mm						
52.88	6/3.35 + 1/3.35	0.1477	0.0499	0.0069	0.0527	0.1117	0.0778
78.82	6/4.09 + 1/4.09	0.2204	0.0729	0.0093	0.0642	0.1296	0.0875
104.98	6/4.72 + 1/4.72	0.2933	0.1024	0.0114	0.0774	0.1447	0.0958
158	30/2.59 + 7/2.59	0.4439	0.2186	0.0267	0.1064	0.1768	0.1133
212	30/3.00 + 7/3.00	0.5953	0.2875	0.0358	0.1300	0.1999	0.1259

Note: For factor of HDPE, multiply XLPE factor by 1.2

IEEMA(PVC)/MVCC/2022/Page 7 of 7



Ref. No. 91/DIV/CAB/05

9th October 2019

All Members of Cable Division & All SEBs, Utilities & Listed Purchasing organisations

Sub: i) Revision in Price Variation Formulae for Medium Voltage Power Cables
ii) New Price Variation Formula for 6 Quad Railway signalling Cables as per RDSO specs

IEEMA was working on inclusion of Metallic screen factors of copper tape applicable for the MV Power Cables and on specific request from Railways, IEEMA was also working on evolution of factors and formula for 6 Quad Railway Signalling Cables as per RDSO specifications.

IEEMA has been discussing internally on evolution of standards weight factors of metals and polymers applicable for EHV Cables for various standard rating and for specific short circuit test requirements.

After compilation of all inputs of factors from major manufacturers, the revised Price Variation Formulae for EHV Cables, MV Power Cables including metallic screen factor (Cu tape) have been prepared. Similarly a new PV formula for 6 Quad Railway signalling cables as per RDSO specification has also been prepared. The same in the draft form were circulated vide cir. No. 73/DIV/CAB/05 dated 23rd August 2019 for your reviews.

Since there are no adverse comments received; we are making these formulae operational from 1st September 2019. We request and recommend all the users & stakeholders including Utilities, PSUs etc. to incorporate these PV formulae in all the new tenders/contracts.

For pending contracts of EHV Cables and MV Power Cables, the date of delivery on or after 1st September 2019, to arrive at the final price variation, we recommend using the following two stage method, which is a standard institutionalized methodology adopted by IEEMA for change over in all IEEMA PV clauses.

1. Calculate price variation 'P' from applicable prices/indices from your base date / date of tendering up to September 2019 i.e. considering all prices/indices published in PV circular of September 2019 at numerator place; using IEEMA PV clause effective from 1st November 2017.
2. Treat the above calculated 'P' as 'P₀' and calculate final price variation considering all prices / indices published in September 2019 as base prices/indices (at the denominator place) up to the applicable prices/indices as per your date of delivery; using revised PV clause of MV Power Cable effective from 1st September 2019.



Director

Encl: Revised PV Formulae for EHV Cables, Medium Voltage Power Cables
New PV Formula for 6 Quad Railway signaling Cables as per RDSO specs

IEEMA (PVC)/MV SCREEN CABLE/2019**Effective from: 1st September 2019****Price Variation Clause for 3.3-33 KV XLPE Insulated Armoured Single & Three core Screen 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 Ex-Works Price quoted/confirmed (in Rs/Km)

ALUMINIUM

AIF Variation factor for Aluminium

- Al Price of Aluminium. This price is as applicable one month prior to the date of delivery.
 Alo Price of Aluminium. This price is as applicable 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 one month prior to the date of delivery.
 Cuo Price of CC copper rods. This price is as applicable 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.

XLPE COMPOUND

- 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.

IEEMA (PVC)/MV SCREEN CABLE/2019

Effective from: 1st September 2019

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.

COPPER TAPE

SMIFS	Variation Factor for Copper Tape
SMIF1	Price of CC copper rods. This price is as applicable one month prior to the date of delivery.
SMIF0	Price of CC copper rods. This price is as applicable 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, date of manufacturer's dispatch note is to be considered as the date of delivery) or contracted delivery date (including any agreed extension thereto) whichever is earlier.

Notes: All prices of raw materials are exclusive of GST amount. 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).

Price variation formulae

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

$$P = P_o + AIF (A_l - A_o) + XLFAI(CC-Cco) + SMIFS (SMIF1-SMIF0) + CCFAI (PVCc - PVCco)$$

For Single Core unarmoured cables Aluminium factor (AIF) shall be referred from Table ALP

Table References:

ALP	Aluminium conductor Factor in single core (for unarmoured cable) ; AIF
H1	Aluminium Armour Factor for Armour with Al Cond.
H2(a)	XLPE Compound Factor ; XLFAI
H3(a)	Copper Tape Factor ; SMIFS
H5(a)	Polymer factor for Single core cable ; CCFAI

IEEMA (PVC)/MV SCREEN CABLE/2019

Effective from: 1st September 2019

Note: For cases where specific Earth Fault Current through Screen is required, Screen area as approved by the customer in Datasheet/Earth Fault Current calculation of Screen 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 **SMIFS=(A*D)/1000**

H. For Copper conductor XLPE insulated 3.3 to 33 kV Single Core Armoured power cables

$$P = P_0 + CuF (Cu - Cu_0) + XLFCu(CC - C_{co}) + SMIFS (SMIF1 - SMIF_0) + AIF(Al - Al_0) + CCFAI (PVC_c - PVC_{co})$$

For Single Core unarmoured cables Aluminium factor (AIF) shall be 0

Table References:

CuP	Copper conductor Factor in single core ; CuF
H2(a)	XLPE Compound Factor ; XLFCu
H3(a)	Copper Tape Factor ; SMIFS
H4(a)	Aluminium Armour factor ; AIF
H5(a)	Polymer factor for Single core cable ; CCFCu

Note: For cases where specific Earth Fault Current through Screen is required, Screen area as approved by the customer in Datasheet/Earth Fault Current calculation of Screen 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

SMIFS=(A*D)/1000

I. For Aluminium conductor XLPE insulated 3.3 to 33 kV Three Core Armoured power cables

$$P = P_0 + AIF (Al - Al_0) + XLFAI(CC - C_{co}) + SMIF (SMIF1 - SMIF_0) + FeF(FeF1 - FeF_0) + CCFAI (PVC_c - PVC_{co})$$

For unarmoured Three Core cables , Steel Armour factor (FeF for Strip & FeW for Wire) shall be 0

Table References:

ALP	Aluminium conductor Factor in three core ; AIF
H2(b)	XLPE Compound Factor ; XLFAI
H3(b)	Copper Tape Factor ; SMIF
H4(b)	Steel Strip Armour Factor ; FeF. For Steel Wire Armour Refer Table H4(c); FeW
H5(b)	Polymer factor for Three Core cable ; CCFAI

Note: For cases where specific Earth Fault Current through Screen is required, Screen area as approved by the customer in Datasheet/Earth Fault Current calculation of Screen 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

SMIF=(A*D)/1000

IEEMA (PVC)/MV SCREEN CABLE/2019

Effective from: 1st September 2019

J. For Copper conductor XLPE insulated 3.3 to 33 kV Three Core Armoured power cables

$$P = P_0 + CuF (Cu - Cu_0) + XLFCu(CC - Cc_0) + SMIF(SMIF1 - SMIF0) + FeF(FeF1 - FeF0) + CCFCu (PVCc - PVCc_0)$$

For Three Core unarmoured cables , Steel Armour factor (FeF for Strip & FeW for Wire) shall be 0

Table References:

CuP	Copper conductor Factor in three core ; CuF
H2(b)	XLPE Compound Factor ; XLFCu
H3(b)	Copper Tape Factor ; SMIF
H4(b)	Steel Strip Armour Factor ; FeF. For Steel Wire Armour Refer Table H4(c); FeW
H5(b)	Polymer factor for Three Core cable ; CCFCu

Note: For cases where specific Earth Fault Current through Screen is required, Screen area as approved by the customer in Datasheet/Earth Fault Current calculation of Screen 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

$$SMIF = (A * D) / 1000$$

The PV factor for metallic screen will be computed based on approved screen area in case of cables having a specific short circuit capacity



Authorized Signatory

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	8.834	-	11.779

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 : 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(E) unscreened Arm	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 (a)
VARIATION FACTOR FOR XLPE(XLFAI/XLFCu)
SINGLE CORE ARMoured /UNARMoured XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
Al / Cu CONDUCTOR

Nominal Cross- Sectional Area (in Sq. mm.)	XLPE Factor for Armoured/ Unarmoured Cable with AL /CU Conductor					
	3.3 KV(E) unscreened Arm	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 – H2 (b)
VARIATION FACTOR FOR XLPE (XLFAI/XLFCu)
THREE CORE ARMoured /UNARMoured XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
Al / Cu CONDUCTOR

Nominal Cross- Sectional Area (in Sq. mm)	3.3 KV unscreened 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	1.446	2.148	2.381	3.588
630	1.129	1.582	1.609	2.382	2.630	3.940

Note : XLPE factors include Semicons for Conductor & Insulation screen

TABLE – H3 (a)
VARIATION FACTOR FOR COPPER TAPE (SMIFS)
SINGLE CORE ARMoured /UNARMoured XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
Al / Cu CONDUCTOR

Nominal Cross- Sectional Area in sq.mm.	6.6 KV (E)	6.6 KV (UE) / 11 KV (E)	11 KV (UE)	22 KV (E)	33 KV (E)
	ARM	ARM	ARM	ARM	ARM
35	0.0181	0.0201	0.0249	0.0263	0.0163
50	0.0194	0.0215	0.0263	0.0277	0.0348
70	0.0217	0.0237	0.0285	0.0299	0.0370
95	0.0237	0.0257	0.0305	0.0319	0.0387
120	0.0254	0.0275	0.0323	0.0337	0.0408
150	0.0273	0.0291	0.0339	0.0353	0.0424
185	0.0292	0.0313	0.0361	0.0375	0.0446
240	0.0322	0.0340	0.0388	0.0401	0.0472
300	0.0351	0.0364	0.0426	0.0426	0.0497
400	0.0403	0.0411	0.0457	0.0471	0.0543
500	0.0446	0.0450	0.0499	0.0513	0.0582
630	0.0494	0.0496	0.0544	0.0558	0.0630
800	0.0545	0.0547	0.0595	0.0609	0.0681
1000	0.0598	0.0584	0.0645	0.0659	0.0731

TABLE – H3 (b)
VARIATION FACTOR FOR COPPER TAPE (SMIF)
THREE CORE ARMoured /UNARMoured XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
Al / Cu CONDUCTOR

Nominal Cross- Sectional Area in sq.mm.	6.6 KV (E)	6.6 KV (UE) / 11 KV (E)	11 KV (UE)	22 KV (E)	33 KV (E)
	ARM	ARM	ARM	ARM	ARM
35	0.0549	0.0607	0.0717	0.0790	0.0000
50	0.0590	0.0649	0.0755	0.0831	0.1044
70	0.0654	0.0712	0.0822	0.0895	0.1110
95	0.0714	0.0773	0.0882	0.0955	0.1171
120	0.0771	0.0829	0.0939	0.1012	0.1225
150	0.0818	0.0878	0.0989	0.1062	0.1278
185	0.0884	0.0943	0.1052	0.1125	0.1341
240	0.0968	0.1026	0.1136	0.1209	0.1425
300	0.1062	0.1102	0.1216	0.1289	0.1497
400	0.1216	0.1238	0.1348	0.1422	0.1638
500	0.1353	0.1356	0.1467	0.1545	0.1762
630	0.1485	0.1491	0.1602	0.1680	0.1897

TABLE : H4 (a)
VARIATION FACTOR FOR ALUMINIUM (AlF)
SINGLE CORE ARMoured XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
Cu CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm.)	Aluminium Factor for Aluminium Armoured Cable with Copper Conductor					
	3.3 KV(E) unscreened Arm	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 : H4 (b)
VARIATION FACTOR FOR STEEL STRIP ARMOUR (FeF)
THREE CORE ARMoured XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
Al / Cu CONDUCTOR

Nominal Cross Sectional Area Sq. mm.	3.3 KV (E) unscreened arm	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

TABLE : H4 (c)
VARIATION FACTOR FOR STEEL WIRE ARMOUR (FeW)
THREE CORE ARMoured XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
Al / Cu CONDUCTOR

Nominal Cross Sectional Area in Sq. mm	3.3 KV (E) Unscreened arm	6.6 KV (E)	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

TABLE : H5 (a)
VARIATION FACTOR FOR Polymer (CCFAL/CCFCu)
SINGLE CORE ARMOURED XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
 Al / Cu CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm)	3.3 KV(E) Unscreened 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	0.123	0.259	0.278	0.330	0.376	0.468
50	0.152	0.272	0.294	0.379	0.394	0.483
70	0.170	0.295	0.317	0.404	0.419	0.508
95	0.184	0.317	0.338	0.435	0.449	0.554
120	0.197	0.337	0.392	0.457	0.472	0.576
150	0.194	0.389	0.413	0.477	0.492	0.597
185	0.224	0.414	0.445	0.502	0.539	0.674
240	0.276	0.456	0.479	0.558	0.573	0.711
300	0.294	0.489	0.506	0.587	0.602	0.811
400	0.333	0.569	0.578	0.687	0.703	0.866
500	0.367	0.675	0.679	0.809	0.826	1.056
630	0.438	0.735	0.739	0.873	0.928	1.168
800	0.529	0.863	0.866	1.027	1.05	1.189
1000	0.648	1.031	1.035	1.138	1.158	1.402

TABLE : H5 (b)
VARIATION FACTOR FOR POLYMER (CCFAI / CCFCu)
THREE CORE ARMOURED XLPE INSULATED 3.3 to 33 KV POWER CABLES WITH
 Al / Cu CONDUCTOR

Nominal Cross Sectional Area (in Sq. mm)	3.3 KV ARM Unscreen 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