

BANGALORE SUB-URBAN RAIL PROJECT

KRIDE

TENDER DOCUMENTS

FOR

“Supply, Erection, Testing and Commissioning of Receiving Substation with incoming Cabling from Grid Substation including 25 kV-AC Traction cum 33kV Auxiliary Main Sub- Stations, 25kV Overhead Equipment (FOCS), Auxiliary Power Supply & Other Associated Works on Viaduct, At-Grade & Stations including Soladevanahalli Depot and SCADA System for complete Corridor 2 & Corridor 4 of BSRP and includes any modification in existing OHE /PSI if required along the alignment of C2 and C4.”

Annexure A

IEEMA Formula

$$P = P_o + CuF (Cu-Cu_0) + XLFCu (CC-Cco) + SMIFS (SMIF1-SMIF0) + AIF (Al-Alo) + CCFAI (PVCc-PVCco)$$

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

- 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

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

(ii) Price Variation Clause for XLPE Insulated EHV Cables (66kV to 500kV)

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:

Terms used in price variation formula:

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

CONDUCTOR METAL:

- MIF - Variation Factor for Conductor
- MIF2 - Price of Respective Conductor Material as below (from a to b) ; this price is as applicable on two months prior to the date of delivery.
- MIF1 - Price of Respective Conductor Material as below (from a to b) ; this price is as applicable on one month prior to the date of Tendering.

ALUMINIUM CONDUCTOR

- AIF - Variation Factor for Aluminium
- Al - Price of Aluminium. This price is as applicable on Two months prior to the date of delivery.
- Alo - Price of Aluminium. This price is as applicable on one month prior to the date of Tendering.

COPPER CONDUCTOR:

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

XLPE COMPOUND

- CC - Price of XLPE Compound. This price is as applicable on two months prior to the date of delivery
- Cco - Price of XLPE Compound. This price is as applicable on one month prior to the date of tendering
- XLFCu - Variation factor for XLPE compound for copper conductor cable

XLFAI - Variation factor for XLPE compound for Aluminium conductor cable

XL3 - Variation factor for XLPE Compound

POLYMER COMPOUND

POC - Price of Polymer Compound. This price is as applicable on two months prior to the date of delivery.

POCo - Price of Polymer Compound. This price is as applicable on one month prior to the date of Tendering.

CCFAI - Variation factor for PE compound for aluminum conductor cable

CCFCu - Variation factor for PE compound for copper conductor cable

XL5 - Variation factor for Polymer Compound

METALLIC SCREEN / SHEATH

SMIF - Variation Factor for Sheath / Screen Material

SMIF2 - Price of Respective Sheath / Screen Material as below (from a to d); this price is as applicable on two months prior to the date of delivery.

SMIF1 - Price of Respective Sheath / Screen Material as below (from a to d); this price is as applicable on One month prior to the date of Tendering.

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

CuFc - Variation Factor for Copper Screen

Cu - Price of CC copper rods. This price is as applicable on Two months prior to the date of delivery

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

COPPER (Screen): In Lead Sheath Construction:

CuFpb - Variation Factor for Copper Screen

Cu - Price of CC copper rods. This price is as applicable on Two months prior to the date of delivery

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

LEAD: In Lead Sheath Construction:

PbF - Variation Factor for Lead

- Pb - Price of Pig lead (99.97%). This price is as applicable on Two months prior to the date of delivery
- Pbo - Price of Pig lead (99.97%). This price is as applicable one month prior to the date of tendering

CORRUGATED ALUMINIUM SHEATH:

- AIFs - Variation Factor for Corrugated Aluminium Sheath
- Al - Price of Aluminium. This price is as applicable on Two months prior to the date of delivery
- Alo - Price of Aluminium This price is as applicable on one month prior to the date of tendering

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

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

Notes:

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

For aluminium / copper conductor XLPE insulated corrugated Aluminium Metallic Sheathed PE/PVC Sheathed Cables

IEEMA Formula

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

MIF	-	Aluminium Conductor AIF / Copper Conductor CuF
XL3	-	Aluminium Conductor XLFAI / Copper Conductor XLFCu
SMIF	-	Corrugated Aluminium in CAS Construction AIFs
XL5	-	Aluminium Conductor CCFAI / Copper Conductor CCFCu

Note:

For cases where short circuit current through screen /Sheath is required & is not available in the reference table. In that case Screen/ Sheath area as approved by the customer in data sheet / short circuit current calculation of screen / Sheath shall be used to derive SMIF as below:

If

A=Area of Metallic Screen / Sheath in Approved Data sheet / Calculation Sheet

D=Density =2.703 for Al

SMIF= (A*D) /1000

Attachment -10

3.2.1 (d) Price Variation Clause for Contact / Catenary Wires

The price payable shall be subject to adjustment, up or down, in accordance with the following formula:

IEEMA Formula

$$P1 = P_o + (L2 - L1)$$

- | | | |
|----|------|--|
| Po | - | Quoted ex-works price of contact/catenary wire. |
| L1 | - | Average LME cash settlement quotation for Copper Grade A, 60 days prior to the date of opening of the tender |
| L2 | - | L2 will be minimum of (i) & (ii) given below: - |
| | (i) | LME rates prevailing on 90 days prior to the date of offering for inspection of each lot. |
| | (ii) | Invoiced rate in invoice of actual imports. |

Notes:

1. For prevailing LME rates, certified copy of LME rate downloaded from official LME website will be accepted as documentary evidence.
2. LME rate in L1&L2 will be converted to Indian Rupees at SBI's Selling Bills rate of exchange on the 30 days prior to the date of opening of tender and date of delivery respectively.
3. In case index/price data are not available for particular date due to any reason then the index/price data shall be calculated by drawing a graph of 1st working day before and 1st working day after that particular date. As per graphic line price data arrived at on that particular date may be taken.

Attachment -11

3.2.1 (e) Price Variation Clause for Fabricated and Galvanized Steel Structure

(Item Nos. as specified in special conditions). The price adjustment of these items shall be paid as follows:

Price Variation clause for Fabricated and Galvanized Steel Structures for Railway Electrification works

The Price payable shall be subject to adjustment, up or down, in accordance with the following formula:

IEEMA Formula

$$P = P_o/100 (11 + 57 \text{ SBLR/SBLRo} + 09 \text{ Zn/Zno} + 23 \text{ W/Wo})$$

- | | | |
|----------------|---|---|
| P | - | Price payable as adjusted in accordance with the above formula. |
| P _o | - | Price quoted |
| SBLRo | - | Price of Steel Blooms-Retail (refer notes). |

This price is as applicable on the 1st working day of the month, one month prior to the deadline for submission of bids.

Zno = Prices of electrolytic high-grade zinc (refer notes)

This price is as applicable on the 1st working day of the month, one month prior to the deadline for submission of bids.

Wo = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of labour, Government of India (Base:2001=100) (Refer notes). This index number is as applicable on the first working day of the month, three months prior to the deadline for submission of bids.

(For example, if date of tendering falls in May 2014, the applicable prices of Steel Blooms- Retail (SBLRo) and electrolytic high-grade zinc (Zno) should be for the month of April 2014 and all India average consumer price index number (Wo) should be for the month of February 2014.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA (PVC)/TLT/2014 one month prior to the deadline for submission of bids.

SBLR= Price of Steel Blooms-Retail (refer notes).

This price is as applicable on the 1st working day of the month, two months prior to the date of delivery.

Zn= Prices of electrolytic high-grade zinc (refer notes)

This price is as applicable on the 1st working day of the month, two months 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, Government of India (Base:2001=100) (Refer notes).

This index number is as applicable on the first working day of the month, four month prior to the date of delivery.

(For example, if date of delivery falls in December 2014, the applicable prices of Steel Blooms-Retail (SBLR) and Zinc (Zn) should be for the month of October 2014 and all India average consumer price index number (W) should be for the month of August 2014.

The date of Delivery is the date on which transmission line towers are notified as being ready for inspection/dispatch (in the absence of such notification, the date of manufacturers 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 and any other taxes, duties, levies etc
- (b) All prices are as on first working day of the month.
- (c) The details of prices are as under:
 - 1. The prices of Steel Blooms are the average Retail price of Blooms of size 150mm*150mm of all cities in Rs/MT as published by Joint Plant Committee (JPC), Kolkata.
 - 2. The price of electrolytic high-grade zinc (in Rs/MT) is ex-works price as quoted by the primary producer.
 - 3. Cost weight age of re-rolling/conversion charges is included in labour weightage(W)



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Cir. No. 22/DIV/CAB/05

07 June 2023

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

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

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

For EHV Cables -

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

For MV Cables -

Table: H4 (c) 3.3 KV (E) Unscreened arm

And note added for Table: H5 (a) & Table: H5 (b) as "Fillers added in above factors"

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

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

Director

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



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

Nominal Cross Sectional Area (in Sq. mm)	38/66 kV						64/110 kV					
	31.5			40			31.5			40		
SC Current in KA												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
185	1.762	2.531	3.196	2.235	3.325	4.163	1.637	2.383	3.048	2.087	3.177	4.015
240	1.719	2.509	3.174	2.213	3.304	4.141	1.565	2.359	3.024	2.063	3.153	3.991
300	1.692	2.555	1.566	2.258	3.262	4.100	1.538	2.428	1.488	2.111	3.104	3.942
400	1.646	2.525	3.211	2.215	3.347	4.068	1.484	2.360	3.044	2.059	3.183	3.907
500	1.584	2.463	3.147	2.154	3.281	4.135	1.438	2.324	3.011	2.022	3.140	3.993
630	1.551	2.432	3.111	2.122	3.239	4.118	1.390	2.281	2.956	1.962	3.087	3.949
800	1.475	2.363	3.035	2.057	3.179	4.035	1.308	2.188	2.868	1.883	3.015	3.869
1000	1.400	2.282	2.961	1.975	3.095	3.960	1.240	2.125	2.800	1.817	2.937	3.796
1200	1.228	2.109	2.786	1.800	2.928	3.782	1.160	2.050	2.729	1.740	2.861	3.724
1400	1.216	2.056	2.730	1.745	2.869	3.726	1.082	1.973	2.642	1.660	2.779	3.627
1600	1.095	1.975	2.652	1.669	2.784	3.662	0.988	1.873	2.542	1.563	2.678	3.541
1800	1.106	2.017	2.709	1.699	2.841	3.720	1.037	1.938	2.631	1.630	2.773	3.655
2000	0.976	1.861	2.535	1.549	2.670	3.539	0.909	1.769	2.450	1.466	2.585	3.451
2500	0.896	1.796	2.490	1.489	2.632	3.514	0.913	1.768	2.460	1.457	2.598	3.490

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

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





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

Nominal Cross Sectional Area (in Sq. mm)	127/220 kV											
	31.5			40			50			63		
SC Current in KA												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
400	1.053	1.937	2.613	1.623	2.751	3.621	2.362	-	-	-	-	-
500	0.973	1.849	2.536	1.543	2.662	3.512	2.305	3.666	-	3.157	-	-
630	0.942	1.820	2.495	1.506	2.632	3.482	2.276	3.619	4.697	3.116	4.834	-
800	0.909	1.775	2.460	1.465	2.596	3.458	2.249	3.597	4.640	3.077	4.803	6.134
1000	0.828	1.702	2.377	1.387	2.506	3.373	2.139	3.480	4.562	2.988	4.701	6.053
1200	0.717	1.577	2.251	1.266	2.382	3.258	2.033	3.419	4.477	2.888	4.620	5.944
1400	0.686	1.536	2.211	1.232	2.357	3.203	2.033	3.356	4.449	2.856	4.563	5.909
1600	0.680	1.457	2.117	1.140	2.267	3.124	1.921	3.276	4.340	2.769	4.493	5.836
1800	0.724	1.540	2.205	1.270	2.347	3.227	1.889	3.226	4.235	2.692	4.409	5.719
2000	0.529	1.317	1.996	1.049	2.109	2.968	1.795	3.154	4.215	2.643	4.371	5.667
2500	0.373	1.337	2.020	1.036	2.140	2.977	1.722	3.067	4.127	2.559	4.258	5.581

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

Nominal Cross Sectional Area (in Sq. mm)	220/400 kV											
	31.5			40			50			63		
SC Current in KA												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
630	0.870	1.756	2.455	1.443	2.581	3.465	2.137	3.501	4.568	3.003	4.761	6.687
800	0.862	1.734	2.425	1.414	2.566	3.448	2.120	3.500	4.532	2.993	4.720	6.483
1000	0.833	1.701	2.396	1.385	2.516	3.422	2.081	3.445	4.492	2.958	4.704	6.398
1200	0.750	1.611	2.312	1.299	2.447	3.326	2.015	3.389	4.427	2.882	4.613	6.316
1400	0.711	1.566	2.252	1.270	2.399	3.274	2.007	3.334	4.362	2.809	4.576	6.268
1600	0.697	1.472	2.165	1.178	2.302	3.176	1.880	3.259	4.318	2.757	4.499	6.186
1800	0.642	1.457	2.123	1.183	2.265	3.139	1.867	3.250	4.304	2.750	4.488	6.141
2000	0.488	1.360	2.048	1.089	2.158	3.042	1.800	3.141	4.167	2.633	4.364	6.058
2500	0.283	1.245	1.927	0.948	2.019	2.877	1.701	2.989	4.037	2.536	4.208	5.920



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IEEMA (PVC)/EHV CABLE/2019 (R-2)**Effective from: 01 Apr 2023**

Cir. No. 06/DIV/CAB/05

08 May 2023

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

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

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

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

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

1. Variation factors for EHV Cable (lead + Copper Screen)
 220 KV – 50 KA and 63 KA
 400 KV – 50 KA and 63 KA
2. IEEMA variation factors and **NEW** formula for a special construction of 66kV EHV Cable; Aluminium Conductor with PolyAl Sheath & Copper Screen with Aluminium wire armor
3. The formula for copper screen factor given in IEEMA EHV Cable PV clause for all formulae wef Sep 19 is for copper wires only and copper tape binder if provided, its area would be additional.

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

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

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

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

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



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IEEMA (PVC)/EHV CABLE/2019 (R-2)**Effective from: 01 Apr 2023**

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

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

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

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

Director

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



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IEEMA (PVC)/EHV CABLE/2019 (R-2)**Effective from: 01 Apr 2023****Material Price Variation Clause for XLPE Insulated EHV Cables (66 kV to 400 KV)**

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

Terms used in price variation formulae:

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

1) Conductor Metal

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

a) ALUMINIUM (Conductor)

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

b) COPPER (Conductor)

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

2) XLPE Compound

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

3) Polymer Compound / PVC Compound

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



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IEEMA (PVC)/EHV CABLE/2019 (R-2)**Effective from: 01 Apr 2023****4) Metallic Screen / Sheath**

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

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

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

b) COPPER (Screen) : In Lead Sheath Construction

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

c) LEAD : In Lead Sheath Construction

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

d) Corrugated Aluminium Sheath

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

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 CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.
 - Price of Pig lead (in Rs/MT) is ex-works price as quoted by the primary producer.
 - Price of Polymer Compound (in Rs/MT) is the ex-work price, as quoted by the manufacturer/s
 - Price of XLPE Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer/s
 - Price of PVC Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer/s



IEEMA (PVC)/EHV CABLE/2019 (R-2)**Effective from: 01 Apr 2023****PV Formulae****a) For Aluminium /copper Conductor XLPE insulated copper wire screen + polyal PE/PVC sheathed cables**

$$P = P_o + MIF (MIF2 - MIF1) + XL3 (CC-Cco) + SMIF (SMIF2-SMIF1) + XL5 (POC - POC_o)$$

Table references:-

Table 1 (MIF) : Aluminium Conductor AIF / Copper Conductor CuF

Table 2 (XL3) : Aluminium Conductor XLFAI / Copper Conductor XLFCu

Table 3a (SMIF) : Copper Wire Screen in Copper Wire Screen + Polyal Construction (CUFc)

Table 4 (XL5) : Aluminium Conductor CCFAl / Copper Conductor CCFCu

Note:

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

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

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

$$SMIF = (A \times D \times LF)/1000$$

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

$$P = P_o + MIF (MIF2 - MIF1) + XL3 (CC-Cco) + SMIF_{Pbf} (SMIF2-SMIF1) + SMIF_{CuFpb} (SMIF2-SMIF1) + XL5 (POC - POC_o)$$

Table references :-

Table 1 (MIF) : Aluminium Conductor AIF / Copper Conductor CuF

Table 2 (XL3) : Aluminium Conductor XLFAI / Copper Conductor XLFCu

Table 3c (SMIF) : Lead in Lead Sheath Construction PbF

Table 3d (SMIF) : Copper wire screen in Lead Sheath Construction CuFpb

Table 4 (XL5) : Aluminium Conductor CCFAl / Copper Conductor CCFCu

Note:

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

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

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

$$SMIF = (A \times D \times LF)/1000$$



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IEEMA (PVC)/EHV CABLE/2019 (R-2)**Effective from: 01 Apr 2023****c) For Aluminium /Copper Conductor XLPE insulated Corrugated Aluminium metallic sheathed PE/PVC sheathed cables**

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

Table references:-

Table 1 (MIF) : Aluminium Conductor AIF / Copper Conductor CuF

Table 2 (XL3) : Aluminium Conductor XLFAI / Copper Conductor XLFCu

Table 3b (SMIF) : Corrugated Aluminium in CAS Construction AIFs

Table 4 (XL5) : Aluminium Conductor CCFAl / Copper Conductor CCFCu

Note:

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

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

D= Density= 2.703 for Al;

$$SMIF = (A \times D)/1000$$

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

$$P = P_o + MIF (MIF2 - MIF1) + XL3 (CC-Cco) + SMIF (SMIF2-SMIF1) + XL5 (POC - POCco) + ALA (Al - Alo)$$

Table references:-

Table 1 (MIF) : Aluminium Conductor AIF / Copper Conductor CuF

Table 2 (XL3) : Aluminium Conductor XLFAI / Copper Conductor XLFCu

Table 3a (SMIF) : Copper Wire Screen in Copper Wire Screen + Polyal Construction (CUFc)

Table 4 (XL5) : Aluminium Conductor CCFAl / Copper Conductor CCFCu

Table 5 (ALA) : Aluminium factor ALA

Note:

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

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

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

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TABLE 1 MIF

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

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

Table 2 : XL3 (For XLPE Compound Factor)

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

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

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

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

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



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

Table 3b (SMIF) : Variation factor for Aluminium in Corr Al construction (AIFs)						
Nominal Cross Sectional Area (in Sq. mm)	76/132 kV					
	31.5			40		
SC Current in KA						
Duration in sec	1	2	3	1	2	3
185	1.098	1.354	1.740	1.227	1.740	2.133
240	1.236	1.404	1.703	1.272	1.736	2.142
300	1.237	1.522	0.834	1.494	1.734	2.138
400	1.304	1.698	2.037	1.553	2.109	2.171
500	1.404	1.665	2.045	1.522	2.098	2.545
630	1.519	1.650	2.032	1.587	2.107	2.578
800	1.652	1.712	2.039	1.691	2.067	2.519
1000	1.813	1.813	2.029	1.792	2.088	2.566
1200	1.972	2.068	2.060	1.994	2.115	2.543
1400	2.193	2.193	2.193	2.216	2.238	2.555
1600	2.355	2.355	2.355	2.355	2.355	2.581
1800	2.519	2.519	2.519	2.519	2.519	2.556
2000	2.788	2.788	2.788	2.788	2.788	2.788
2500	3.077	3.077	3.077	3.077	3.077	3.077



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

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





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Table 3c (SMIF) : Variation factor for Lead in Lead +Cu wire construction (PbF)

Nominal Cross Sectional Area (in Sq. mm)	38/66 kV						64/110 kV					
	31.5			40			31.5			40		
SC Current in KA												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
185	3.101	3.101	3.101	3.101	3.101	3.101	4.279	4.279	4.279	4.279	4.279	4.279
240	3.544	3.268	3.268	3.268	3.268	3.268	4.770	4.463	4.463	4.463	4.463	4.463
300	3.784	3.600	3.600	3.790	3.600	3.600	5.045	4.850	4.850	5.045	4.850	4.850
400	4.120	4.120	4.120	4.120	4.120	3.838	5.423	5.423	5.423	5.423	5.423	5.112
500	4.592	4.592	4.592	4.592	4.592	4.592	5.749	5.749	5.749	5.749	5.749	5.749
630	4.881	4.881	4.881	4.881	4.881	4.881	6.184	6.184	6.184	6.184	6.184	6.184
800	5.494	5.494	5.494	5.494	5.494	5.494	6.853	6.853	6.853	6.853	6.853	6.853
1000	6.100	6.100	6.100	6.100	6.100	6.100	7.381	7.381	7.381	7.381	7.381	7.381
1200	7.516	7.516	7.516	7.516	7.516	7.516	8.069	8.069	8.069	8.069	8.069	8.069
1400	7.950	7.950	7.950	7.950	7.950	7.950	8.746	8.746	8.746	8.746	8.746	8.746
1600	8.584	8.584	8.584	8.584	8.584	8.584	9.602	9.602	9.602	9.602	9.602	9.602
1800	9.096	9.096	9.096	9.096	9.096	9.096	9.930	9.930	9.930	9.930	9.930	9.930
2000	9.550	9.550	9.550	9.550	9.550	9.550	10.443	10.443	10.443	10.443	10.443	10.443
2500	10.976	10.976	10.976	10.976	10.976	10.976	11.379	11.379	11.379	11.379	11.379	11.379

Table 3c (SMIF) : Variation factor for Lead in Lead +Cu wire construction (PbF)

Nominal Cross Sectional Area (in Sq. mm)	76/132 kV					
	31.5			40		
SC Current in KA						
Duration in sec	1	2	3	1	2	3
185	5.001	5.001	5.001	5.001	5.001	5.001
240	5.440	5.193	5.193	5.193	5.193	5.193
300	5.525	5.194	5.194	5.525	5.194	5.194
400	6.042	6.042	6.042	6.042	6.042	5.706
500	6.470	6.470	6.470	6.470	6.470	6.470
630	6.933	6.933	6.933	6.933	6.933	6.933
800	7.638	7.638	7.638	7.638	7.638	7.638
1000	8.186	8.186	8.186	8.186	8.186	8.186
1200	8.910	8.910	8.910	8.910	8.910	8.910
1400	9.710	9.710	9.710	9.710	9.710	9.710
1600	10.225	10.225	10.225	10.225	10.225	10.225
1800	10.630	10.630	10.630	10.630	10.630	10.630
2000	10.895	10.895	10.895	10.895	10.895	10.895
2500	12.260	12.260	12.260	12.260	12.260	12.260



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

Effective from: 01 Apr 2023

Table 3c (SMIF) : Variation factor for Lead in Lead +Cu wire construction (PbF)

Nominal Cross Sectional Area (in Sq. mm)	127/220 kV											
	31.5			40			50			63		
SC Current in KA												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
400	9.088	9.088	9.088	9.088	9.088	9.078	9.329	9.432	9.432	9.432	9.432	9.432
500	9.862	9.862	9.862	9.862	9.862	9.862	10.034	10.034	10.117	10.034	10.117	10.117
630	10.130	10.130	10.130	10.130	10.130	10.130	10.294	10.294	10.294	10.294	10.294	10.286
800	10.454	10.454	10.454	10.454	10.454	10.454	10.648	10.648	10.648	10.648	10.648	10.648
1000	11.081	11.081	11.081	11.081	11.081	11.081	11.440	11.440	11.440	11.440	11.440	11.440
1200	12.074	12.074	12.074	12.074	12.074	12.074	12.334	12.334	12.334	12.334	12.334	12.334
1400	12.368	12.368	12.368	12.368	12.368	12.368	12.656	12.656	12.656	12.656	12.656	12.656
1600	13.154	13.154	13.154	13.154	13.154	13.154	13.451	13.451	13.451	13.451	13.451	13.451
1800	13.514	13.514	13.514	13.514	13.514	13.514	13.799	13.799	13.799	13.799	13.799	13.799
2000	14.337	14.337	14.337	14.337	14.337	14.337	14.662	14.662	14.662	14.662	14.662	14.662
2500	15.640	15.640	15.640	15.640	15.640	15.640	15.638	15.638	15.638	15.638	15.638	15.638

Table 3c (SMIF) : Variation factor for Lead in Lead +Cu wire construction (PbF)

Nominal Cross Sectional Area (in Sq. mm)	220/400 kV											
	31.5			40			50			63		
SC Current in KA												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
630	11.596	11.596	11.596	11.596	11.596	11.596	11.761	11.799	11.828	11.792	11.828	12.015
800	11.784	11.784	11.784	11.784	11.784	11.784	11.979	12.016	12.046	12.009	12.046	12.221
1000	12.016	12.016	12.016	12.016	12.016	12.016	12.349	12.386	12.415	12.379	12.415	12.461
1200	12.794	12.794	12.794	12.794	12.794	12.794	13.080	13.119	13.150	13.112	13.150	13.284
1400	13.196	13.196	13.196	13.196	13.196	13.196	13.702	13.702	13.702	13.702	13.702	13.702
1600	14.011	14.011	14.011	14.011	14.011	14.011	14.361	14.401	14.433	14.394	14.433	14.529
1800	14.372	14.010	14.010	14.010	14.010	14.010	14.909	14.909	14.909	14.909	14.909	14.909
2000	15.189	15.189	15.189	15.189	15.189	15.189	15.512	15.553	15.586	15.546	15.586	15.734
2500	16.551	16.551	16.551	16.551	16.715	16.551	16.858	16.901	16.935	16.893	17.099	17.143



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

Effective from: 01 Apr 2023

Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)												
Nominal Cross Sectional Area (in Sq. mm)	38/66 kV						64/110 kV					
	31.5			40			31.5			40		
SC Current in KA												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
185	1.762	2.555	3.566	2.258	3.347	4.163	1.637	2.428	3.048	2.111	3.183	4.015
240	1.719	2.531	3.211	2.235	3.325	4.141	1.565	2.383	3.044	2.087	3.177	3.993
300	1.692	2.525	3.196	2.215	3.304	4.135	1.538	2.360	3.024	2.063	3.153	3.991
400	1.646	2.509	3.174	2.213	3.281	4.118	1.484	2.359	3.011	2.059	3.140	3.949
500	1.584	2.463	3.147	2.154	3.262	4.100	1.438	2.324	2.956	2.022	3.104	3.942
630	1.551	2.432	3.111	2.122	3.239	4.068	1.390	2.281	2.868	1.962	3.087	3.907
800	1.475	2.363	3.035	2.057	3.179	4.035	1.308	2.188	2.800	1.883	3.015	3.869
1000	1.400	2.282	2.961	1.975	3.095	3.960	1.240	2.125	2.729	1.817	2.937	3.796
1200	1.228	2.109	2.786	1.800	2.928	3.782	1.160	2.050	2.642	1.740	2.861	3.724
1400	1.216	2.056	2.730	1.745	2.869	3.726	1.082	1.973	2.631	1.660	2.779	3.655
1600	1.106	2.017	2.709	1.699	2.841	3.720	1.037	1.938	2.542	1.630	2.773	3.627
1800	1.095	1.975	2.652	1.669	2.784	3.662	0.988	1.873	2.460	1.563	2.678	3.541
2000	0.976	1.861	2.535	1.549	2.670	3.539	0.913	1.769	2.450	1.466	2.598	3.490
2500	0.896	1.796	2.490	1.489	2.632	3.514	0.909	1.768	1.488	1.457	2.585	3.451

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

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

Effective from: 01 Apr 2023

Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)												
Nominal Cross Sectional Area (in Sq. mm)	127/220 kV											
	31.5			40			50			63		
SC Current in KA												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
400	1.053	1.937	2.613	1.623	2.751	3.621	2.362	-	-	-	-	-
500	0.973	1.849	2.536	1.543	2.662	3.512	2.305	3.666	-	3.157	-	-
630	0.942	1.820	2.495	1.506	2.632	3.482	2.276	3.619	4.697	3.116	4.834	-
800	0.909	1.775	2.460	1.465	2.596	3.458	2.249	3.597	4.640	3.077	4.803	6.134
1000	0.828	1.702	2.377	1.387	2.506	3.373	2.139	3.480	4.562	2.988	4.701	6.053
1200	0.724	1.577	2.251	1.270	2.382	3.258	2.033	3.419	4.477	2.888	4.620	5.944
1400	0.717	1.540	2.211	1.266	2.357	3.227	2.033	3.356	4.449	2.856	4.563	5.909
1600	0.686	1.536	2.205	1.232	2.347	3.203	1.921	3.276	4.340	2.769	4.493	5.836
1800	0.680	1.457	2.117	1.140	2.267	3.124	1.889	3.226	4.235	2.692	4.409	5.719
2000	0.529	1.337	2.020	1.049	2.140	2.977	1.795	3.154	4.215	2.643	4.371	5.667
2500	0.373	1.317	1.996	1.036	2.109	2.968	1.722	3.067	4.127	2.559	4.258	5.581

Table 3d (SMIF) : Variation factor for Copper in Lead +Cu wire construction (CuFpb)												
Nominal Cross Sectional Area (in Sq. mm)	220/400 kV											
	31.5			40			50			63		
SC Current in KA												
Duration in sec	1	2	3	1	2	3	1	2	3	1	2	3
630	0.870	1.756	2.455	1.443	2.581	3.465	2.137	3.501	4.568	3.003	4.761	6.687
800	0.862	1.734	2.425	1.414	2.566	3.448	2.120	3.500	4.532	2.993	4.720	6.483
1000	0.833	1.701	2.396	1.385	2.516	3.422	2.081	3.445	4.492	2.958	4.704	6.398
1200	0.750	1.611	2.312	1.299	2.447	3.326	2.015	3.389	4.427	2.882	4.613	6.316
1400	0.711	1.566	2.252	1.270	2.399	3.274	2.007	3.334	4.362	2.809	4.576	6.268
1600	0.697	1.472	2.165	1.183	2.302	3.176	1.880	3.259	4.318	2.757	4.499	6.186
1800	0.642	1.457	2.123	1.178	2.265	3.139	1.867	3.250	4.304	2.750	4.488	6.141
2000	0.488	1.360	2.048	1.089	2.158	3.042	1.800	3.141	4.167	2.633	4.364	6.058
2500	0.283	1.245	1.927	0.948	2.019	2.877	1.701	2.989	4.037	2.536	4.208	5.920

IEEMA (PVC)/EHV CABLE/2019 (R-2)**Effective from: 01 Apr 2023**

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



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Cir. No. 22/DIV/CAB/05

07 June 2023

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

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

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

For EHV Cables -

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

For MV Cables -

Table: H4 (c) 3.3 KV (E) Unscreened arm

And note added for Table: H5 (a) & Table: H5 (b) as "Fillers added in above factors"

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

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

Director

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



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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	3.3 KV (E) screened arm	6.6 KV (E)	11 KV (E) / 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)	33 KV (UE)
25	1.258	1.358	1.457	1.612	2.509	1.503	-	-
35	1.361	1.465	1.569	1.853	2.644	2.797	2.517	-
50	1.682	1.685	1.687	2.321	2.800	2.921	4.569	4.603
70	2.033	1.959	1.979	2.503	3.219	3.347	4.809	4.935
95	2.202	2.355	2.507	2.718	4.019	4.200	5.437	6.553
120	2.371	2.523	2.675	2.882	4.241	4.416	6.713	6.820
150	2.870	2.812	2.847	3.265	4.447	4.621	6.976	7.088
185	3.121	3.215	3.309	4.148	4.726	5.289	7.356	7.489
240	3.758	3.993	4.227	4.442	5.442	6.651	7.718	7.890
300	4.099	4.562	5.024	5.182	6.894	7.084	8.187	8.359
400	5.750	6.161	6.572	6.658	7.433	7.657	8.760	8.960
500	6.716	6.747	6.777	6.861	7.588	7.797	8.830	9.629
630	7.492	7.116	7.465	7.477	8.209	8.386	9.413	10.365

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	3.3 KV(E) screened 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	33 KV (UE) ARM
35	0.123	0.197	0.259	0.278	0.330	0.376	0.468	0.493
50	0.152	0.209	0.272	0.294	0.379	0.394	0.483	0.530
70	0.170	0.227	0.295	0.317	0.404	0.419	0.508	0.583
95	0.184	0.244	0.317	0.338	0.435	0.449	0.554	0.609
120	0.197	0.261	0.337	0.392	0.457	0.472	0.576	0.634
150	0.194	0.303	0.389	0.413	0.477	0.492	0.597	0.656
185	0.224	0.322	0.414	0.445	0.502	0.539	0.674	0.767
240	0.276	0.354	0.456	0.479	0.558	0.573	0.711	0.806
300	0.294	0.377	0.489	0.506	0.587	0.602	0.811	0.915
400	0.333	0.450	0.569	0.578	0.687	0.703	0.866	0.974
500	0.367	0.493	0.675	0.679	0.809	0.826	1.056	1.139
630	0.438	0.611	0.735	0.739	0.873	0.928	1.168	1.290
800	0.529	0.734	0.863	0.866	1.027	1.05	1.189	1.380
1000	0.648	0.880	1.031	1.035	1.138	1.158	1.402	1.619

Note: The above factors are for PVC and Zero Halogen low smoke (LSZH) and for PE factor, the above factor will be multiplied by 0.63
 Fillers added in above factors



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TABLE : H5 (a)

VARIATION FACTOR FOR Polymer (CCFAL/CCFCu)

SINGLE CORE UNARMoured 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	3.3 KV(E) screened 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	33 KV (UE) ARM
35	0.158	0.191	0.224	0.252	0.323	0.342	0.361	0.380
50	0.177	0.209	0.240	0.269	0.342	0.361	0.520	0.539
70	0.198	0.232	0.265	0.296	0.370	0.391	0.551	0.572
95	0.233	0.261	0.288	0.318	0.396	0.450	0.582	0.636
120	0.253	0.282	0.310	0.342	0.454	0.477	0.613	0.636
150	0.269	0.299	0.328	0.361	0.476	0.500	0.638	0.662
185	0.292	0.323	0.354	0.420	0.508	0.532	0.719	0.743
240	0.322	0.371	0.419	0.455	0.547	0.572	0.766	0.791
300	0.355	0.408	0.461	0.490	0.585	0.610	0.863	0.888
400	0.423	0.474	0.524	0.539	0.683	0.711	0.932	0.960
500	0.477	0.553	0.629	0.635	0.743	0.825	1.059	1.141
630	0.548	0.620	0.691	0.697	0.866	0.898	1.144	1.176
800	0.672	0.749	0.826	0.833	1.016	1.051	1.320	1.355
1000	0.789	0.877	0.964	0.964	1.099	1.200	1.488	1.589

Note: The above factors are for PVC and Zero Halogen low smoke (LSZH) and for PE factor the above factor will be multiplied by 0.63
Fillers added in above factors

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 (E) Unscreened ARM	3.3 KV (E) screened 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	33 KV (UE) ARM
35	0.374	0.634	0.990	1.142	1.604	1.782	-	-
50	0.445	0.702	1.119	1.260	1.834	2.046	2.864	3.070
70	0.547	0.863	1.290	1.396	2.011	2.284	3.219	3.380
95	0.594	0.990	1.440	1.647	2.269	2.428	3.367	3.721
120	0.732	1.214	1.692	1.877	2.498	2.715	3.646	4.020
150	0.812	1.355	1.906	2.061	2.767	2.931	3.927	4.216
185	0.960	1.589	2.086	2.406	3.028	3.180	4.166	4.529
240	1.130	1.832	2.484	2.744	3.398	3.580	4.589	4.917
300	1.219	2.201	2.912	3.161	3.840	4.016	5.029	5.325
400	1.313	2.561	3.530	3.664	4.353	4.666	5.736	5.911
500	1.652	3.138	3.925	3.971	4.621	4.878	5.913	6.625
630	1.949	3.774	4.487	4.982	5.225	5.477	6.696	7.445

Note: The above factors are for PVC and Zero Halogen low smoke (LSZH) and for PE factor the above factor will be multiplied by 0.63
Fillers added in above factors



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023**

Cir. No. 07/DIV/CAB/05

08 May 2023

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

Sub: Amendment to Price Variation Clause for MV Cables

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

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

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

1. Variation factors for Polymer (CCFAL/CCFCu), Table: H5 (a) are added for Single core unarmored XLPE insulated 3.3 to 33 KV Power cables with Al / Cu conductor
2. Variation factors for 33 KV (UE) and 3.3 KV (screened) are added
3. The formula for copper screen factor given in IEEMA MV Cable PV clause for all formulae wef Sep 19 is for copper wires only and copper tape binder if provided, its area would be additional.

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

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

4. Considering the fluctuations in the prices; and as suggested by members, IEEMA will be publishing a separate price for XLPE for EHV Cables (Above 66 KV) in IEEMA Cable price variation circular from 01 Apr 2023 onwards. This price will be applicable for XLPE in all EHV Cable (Above 66 KV) formulae from 01 Apr 2023 onwards. And correction/change in existing "XLPE - HV Cable" being mentioned in IEEMA Price circulars with "XLPE - MV Cable" applicable for MV cables.
5. For the better clarity and application of prices, it is also agreed upon to change/replace the existing PVC grades "CW 22" & "HR-11" being mentioned in IEEMA Price circulars with generic PVC names as under;

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



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023**

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

6. There is regular requirement of 3.3 kV DC cables for Metro Projects, with Galvanized Steel (GS) wire/strip armouring, in view of this, Variation Factors for GS wire/ Strip armouring for Single core 3.3 kV cables are collected and the table of average variation factor is evolved.
7. As suggested by stake holders and in consensus with IEEMA Cable Tech committee, prices of Steel for armouring for following thickness are published in IEEMA Cable PVC from 01 Jan 2023 and are effective/applicable from 01 Jan 2023.
 Round wire 2.0 mm dia, Round wire 2.5 mm dia, Round wire 3.15 mm dia, Round wire 4.0 mm dia

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

Director

Encl.: Amended PV clause for MV Cables along with table of variation Factors



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)

Effective from: 01 April 2023

Material 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 Aluminum. 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.

POLYMER COMPOUND (PVC/PE/Zero Halogen low smoke)

PVC Price of PVC Compound / PE / Zero Halogen low smoke. This price is as applicable on **one** month prior to the date of delivery.

PVCo Price of PVC Compound / PE / Zero Halogen low smoke. This price is as applicable on **one** month prior to the date of tendering.

(the relevant price of Polymer Compound is to be selected depending upon the type of compound used for the cable)

CCFAI Variation factor for PVC compound / PE / Zero Halogen low smoke for aluminum conductor cable.

CCFCu Variation factor for PVC compound / PE / Zero Halogen low smoke 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.



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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

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)/--/-- for 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/s
3. Price of XLPE Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer/s
4. Price of Polymer Compound (in Rs/MT) is the ex-work price, as quoted by the manufacturer/s
5. Price of Zero halogen low smoke (LSZH) (in Rs/MT) is the ex-work price, as quoted by the manufacturer/s
6. Price of CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer
7. 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)



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023****Price variation formulae****G. For Aluminium conductor XLPE insulated 3.3 to 33 kV Single Core Armoured power cables**

$P = P_o + AIF (AI - AIo) + XLFAL(CC - Cco) + SMIFS (SMIF1 - SMIF0) + CCFAI (PVCc - PVCco)$
 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 AI Cond.
H2(a)	XLPE Compound Factor ; XLFAI
H3(a)	Copper Tape Factor ; SMIFS
H5(a)	Polymer factor for Single 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; LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape)

$$SMIF = (A \times D \times LF) / 1000$$

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

$P = P_o + CuF (Cu - Cu0) + XLFCu(CC - Cco) + SMIFS (SMIF1 - SMIF0) + AIF(AI - AIo) + CCFAI (PVCc - PVCco)$

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; LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape)

$$SMIF = (A \times D \times LF) / 1000$$





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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023****I. For Aluminium conductor XLPE insulated 3.3 to 33 kV Three Core Armoured power cables**

$$P = P_o + AIF (Al - ALo) + XLFAL(CC-Cco) + SMIF (SMIF1-SMIF0) + FeF(FeF1-FeF0) + CCFAI (PVCc - PVCco)$$

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
H4(c)	Steel Wire Armour ; 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; LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape)

$$SMIF = (A \times D \times LF)/1000$$

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

$$P = P_o + CuF (Cu - Cuo) + XLFCu(CC-Cco) + SMIF(SMIF1-SMIF0) + FeF(FeF1-FeF0) + CCFCu (PVCc - PVCco)$$

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
H4(c)	Steel Wire Armour Factor; 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; LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape)

$$SMIF = (A \times D \times LF)/1000$$



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023****K. For Aluminium conductor XLPE insulated 3.3 kV Single Core Armoured power cables**

$$P = P_o + AIF (AI - AIo) + XLFAI(CC-Cco) + CCFAI (PVCc - PVCco) + FeF(FeF1-FeF0)$$

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
H4(d)	Steel Strip Armour Factor ; FeF / Steel Wire Armour Factor ; FeW for 3.3KV cables
H5(a)	Polymer factor for Single 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; LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape) **SMIF = (A x D x LF)/1000**

L. For Copper conductor XLPE insulated 3.3 kV Single Core Armoured power cables

$$P = P_o + CuF (Cu - Cu0) + XLFCu(CC-Cco) + AIF(AI-AIo) + CCFAI (PVCc - PVCco) + FeF(FeF1-FeF0)$$

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
H4(a)	Aluminium Armour factor ; AIF
H4(d)	Steel Strip Armour Factor ; FeF / Steel Wire Armour Factor ; FeW for 3.3KV cables
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; LF = Lay Factor (=1.07, for Copper Wire Metallic Screen and counter helix tape) **SMIF = (A x D x LF)/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

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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023****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	3 core
25	0.073	0.219
35	0.101	0.302
50	0.137	0.410
70	0.197	0.593
95	0.274	0.821
120	0.346	1.036
150	0.425	1.279
185	0.533	1.605
240	0.703	2.099
300	0.879	2.635
400	1.126	3.374
500	1.418	4.256
630	1.828	5.494
800	2.340	7.018
1000	2.951	8.834





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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023****TABLE CUP**

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

Nominal Cross Sectional Area (in Sq. mm.)	1 core	3 core
25	0.240	0.720
35	0.332	0.993
50	0.451	1.348
70	0.648	1.950
95	0.901	2.700
120	1.138	3.407
150	1.398	4.207
185	1.753	5.279
240	2.312	6.904
300	2.891	8.667
400	3.703	11.097
500	4.664	13.998
630	6.012	18.070
800	7.696	23.082
1000	9.706	29.055



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023****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	3.3 KV(E) screened Arm	6.6 KV (E)	11 KV (E)/ 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)	33 KV (UE)
35	0.251	0.268	0.284	0.301	0.344	0.358	0.473	0.528
50	0.312	0.324	0.336	0.352	0.397	0.408	0.672	0.695
70	0.385	0.397	0.409	0.423	0.469	0.501	0.723	0.775
95	0.476	0.488	0.500	0.518	0.637	0.656	0.856	0.883
120	0.561	0.574	0.586	0.601	0.726	0.744	0.949	0.985
150	0.653	0.666	0.678	0.696	0.823	0.842	1.050	1.094
185	0.773	0.785	0.797	0.893	0.949	0.965	1.183	1.247
240	0.997	1.030	1.063	1.083	1.139	1.154	1.387	1.463
300	1.209	1.240	1.271	1.283	1.333	1.307	1.753	1.877
400	1.438	1.497	1.556	1.565	1.620	1.636	2.046	2.217
500	1.873	1.887	1.901	1.910	2.110	2.128	2.484	2.613
630	2.337	2.349	2.361	2.369	2.580	2.595	2.978	3.147
800	3.007	3.039	3.071	3.080	3.145	3.163	3.588	3.789
1000	3.737	3.739	3.741	3.749	3.804	3.822	4.565	4.891



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023**

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	3.3 KV(E) screened Arm	6.6 KV (E)	6.6 KV (UE) / 11 KV (E)	11 KV (UE)	22 KV (E)	33 KV (E)	33 KV (UE)
25	0.110	0.117	0.131	0.170	0.279	-	-	-
35	0.122	0.129	0.137	0.175	0.284	0.317	0.522	0.575
50	0.135	0.144	0.151	0.191	0.307	0.341	0.563	0.620
70	0.155	0.165	0.172	0.215	0.342	0.379	0.615	0.678
95	0.174	0.185	0.193	0.241	0.377	0.417	0.670	0.732
120	0.192	0.205	0.212	0.262	0.407	0.449	0.713	0.785
150	0.209	0.223	0.229	0.283	0.437	0.481	0.757	0.832
185	0.228	0.244	0.250	0.308	0.471	0.518	0.809	0.888
240	0.255	0.271	0.279	0.343	0.519	0.569	0.883	0.961
300	0.280	0.296	0.322	0.372	0.560	0.613	0.943	1.030
400	0.326	0.345	0.392	0.420	0.625	0.683	1.041	1.133
500	0.388	0.407	0.461	0.469	0.694	0.757	1.142	1.236
630	0.467	0.490	0.520	0.529	0.777	0.845	1.265	1.356
800	0.567	0.595	0.593	0.602	0.874	0.949	1.407	1.494
1000	0.656	0.688	0.665	0.660	0.955	1.036	1.525	1.624

Note : XLPE factors include Semicons for Conductor & Insulation screen



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023**

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	3.3 KV screened 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	33 KV (UE) ARM
25	0.315	0.315	0.394	0.511	0.838	-	-	-
35	0.339	0.350	0.427	0.545	0.880	0.982	1.638	-
50	0.378	0.387	0.474	0.600	0.957	1.065	1.751	1.858
70	0.435	0.445	0.541	0.679	1.067	1.183	1.916	2.034
95	0.489	0.499	0.604	0.755	1.171	1.295	2.071	2.194
120	0.537	0.554	0.661	0.822	1.265	1.396	2.210	2.355
150	0.585	0.601	0.719	0.890	1.359	1.497	2.350	2.494
185	0.642	0.660	0.784	0.968	1.468	1.614	2.513	2.665
240	0.717	0.734	0.873	1.074	1.615	1.773	2.732	2.882
300	0.781	0.804	1.006	1.167	1.744	1.928	2.919	3.089
400	0.886	0.910	1.227	1.314	1.948	2.130	3.229	3.399
500	0.956	1.085	1.421	1.446	2.148	2.381	3.588	3.689
630	1.129	1.285	1.582	1.609	2.382	2.630	3.940	4.068

Note : XLPE factors include Semicons for Conductor & Insulation screen



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023****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.	3.3 KV Screened	6.6 KV (E)	6.6 KV (UE) / 11 KV (E)	11 KV (UE)	22 KV (E)	33 KV (E)	33 KV (UE)
	ARM	ARM	ARM	ARM	ARM	ARM	ARM
35	0.016	0.018	0.020	0.025	0.026	0.016	0.035
50	0.016	0.019	0.022	0.026	0.028	0.035	0.038
70	0.020	0.022	0.024	0.029	0.030	0.037	0.040
95	0.022	0.024	0.026	0.031	0.032	0.039	0.043
120	0.022	0.025	0.028	0.032	0.034	0.041	0.045
150	0.025	0.027	0.029	0.034	0.035	0.042	0.046
185	0.027	0.029	0.031	0.036	0.038	0.045	0.049
240	0.030	0.032	0.034	0.039	0.040	0.047	0.052
300	0.034	0.035	0.036	0.043	0.043	0.050	0.054
400	0.039	0.040	0.041	0.046	0.047	0.054	0.062
500	0.045	0.045	0.045	0.050	0.051	0.058	0.066
630	0.048	0.049	0.050	0.054	0.056	0.063	0.071
800	0.055	0.055	0.055	0.060	0.061	0.068	0.077
1000	0.056	0.060	0.058	0.065	0.066	0.073	0.082



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)

Effective from: 01 April 2023

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.	3.3 KV Screened	6.6 KV (E)	6.6 KV (UE) / 11 KV (E)	11 KV (UE)	22 KV (E)	33 KV (E)	33 KV (UE)
	ARM	ARM	ARM	ARM	ARM	ARM	
35	0.049	0.055	0.061	0.072	0.079	-	-
50	0.053	0.059	0.065	0.076	0.083	0.104	0.123
70	0.059	0.065	0.071	0.082	0.090	0.111	0.130
95	0.065	0.071	0.077	0.088	0.096	0.117	0.137
120	0.071	0.077	0.083	0.094	0.101	0.123	0.144
150	0.076	0.082	0.088	0.099	0.106	0.128	0.149
185	0.082	0.088	0.094	0.105	0.113	0.134	0.157
240	0.091	0.097	0.103	0.114	0.121	0.143	0.166
300	0.102	0.106	0.110	0.122	0.129	0.150	0.174
400	0.120	0.122	0.124	0.135	0.142	0.164	0.198
500	0.134	0.135	0.136	0.147	0.155	0.176	0.211
630	0.149	0.149	0.149	0.160	0.168	0.190	0.228



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)

Effective from: 01 April 2023

TABLE : H4 (a)
VARIATION FACTOR FOR ALUMINIUM (AIF)
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	3.3 KV(E) screened Arm	6.6 KV (E)	11 KV (E)/ 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)	33 KV (UE)
35	0.153	0.170	0.187	0.204	0.247	0.258	0.372	0.426
50	0.179	0.191	0.203	0.220	0.262	0.275	0.425	0.456
70	0.196	0.208	0.219	0.233	0.278	0.311	0.444	0.501
95	0.213	0.225	0.237	0.254	0.373	0.392	0.470	0.523
120	0.228	0.241	0.253	0.268	0.393	0.410	0.488	0.545
150	0.243	0.256	0.269	0.287	0.414	0.432	0.504	0.567
185	0.261	0.273	0.285	0.381	0.437	0.455	0.526	0.600
240	0.324	0.357	0.389	0.410	0.465	0.480	0.556	0.633
300	0.365	0.397	0.428	0.440	0.490	0.510	0.737	0.834
400	0.432	0.452	0.471	0.480	0.536	0.552	0.783	0.895
500	0.489	0.503	0.517	0.526	0.726	0.744	0.844	0.955
630	0.544	0.556	0.568	0.572	0.787	0.801	0.902	1.034
800	0.706	0.747	0.787	0.797	0.862	0.880	0.982	1.111
1000	0.824	0.845	0.865	0.867	0.923	0.940	1.324	1.504



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W www.ieema.org**IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)****Effective from: 01 April 2023****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	3.3 KV (E) screened arm	6.6 KV (E)	11 KV (E) / 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)	33 KV (UE)
25	0.551	0.553	0.604	0.656	0.814	-	-	-
35	0.645	0.645	0.645	0.731	0.879	0.937	-	-
50	0.675	0.684	0.703	0.761	0.937	0.966	1.181	1.301
70	0.761	0.764	0.761	0.849	0.996	1.055	1.289	1.393
95	0.820	0.828	0.849	0.907	1.083	1.113	1.348	1.454
120	0.879	0.924	0.907	0.966	1.142	1.172	1.406	1.531
150	0.966	0.988	0.966	1.055	1.201	1.259	1.494	1.592
185	1.025	1.051	1.055	1.113	1.259	1.318	1.553	1.668
240	1.142	1.147	1.142	1.231	1.377	1.406	1.641	1.760
300	1.231	1.258	1.259	1.318	1.465	1.524	1.758	1.852
400	1.348	1.402	1.406	1.435	1.582	1.641	1.876	1.990
500	1.454	1.500	1.573	1.642	1.714	1.758	2.095	2.100
630	1.632	1.680	1.745	1.943	1.889	1.918	2.150	2.280

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	3.3 KV (E) screened arm	6.6 KV (E)	11 KV (E) / 6.6 KV (UE)	11 KV (UE)	22 KV (E)	33 KV (E)	33 KV (UE)
25	1.258	1.358	1.457	1.612	2.509	1.503	-	-
35	1.361	1.465	1.569	1.853	2.644	2.797	2.517	-
50	1.682	1.685	1.687	2.321	2.800	2.921	4.569	4.603
70	1.938	1.959	1.979	2.503	3.219	3.347	4.809	4.935
95	2.202	2.355	2.507	2.718	4.019	4.200	5.437	6.553
120	2.371	2.523	2.675	2.882	4.241	4.416	6.713	6.820
150	2.776	2.812	2.847	3.265	4.447	4.621	6.976	7.088
185	3.121	3.215	3.309	4.148	4.726	5.289	7.356	7.489
240	3.758	3.993	4.227	4.442	5.442	6.651	7.718	7.890
300	4.099	4.562	5.024	5.182	6.894	7.084	8.187	8.359
400	5.750	6.161	6.572	6.658	7.433	7.657	8.760	8.960
500	6.716	6.747	6.777	6.861	7.588	7.797	8.830	9.629
630	6.767	7.116	7.465	7.477	8.209	8.386	9.413	10.365





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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023****TABLE : H4 (d)****VARIATION FACTOR FOR STEEL WIRE ARMOUR (FeW/FeF)****SINGLE CORE ARMoured XLPE INSULATED 3.3 KV POWER CABLES WITH Al / Cu CONDUCTOR**

Nominal Cross section area in sq. mm	Single Core 3.3 kV	
	FeF	FeW
25	0.276	0.385
35	0.303	0.409
50	0.314	0.442
70	0.331	0.528
95	0.341	0.584
120	0.369	0.629
150	0.395	0.676
185	0.423	0.731
240	0.464	0.92
300	0.504	0.982
400	0.573	1.215
500	0.613	1.359
630	0.696	1.518

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	3.3 KV(E) screened 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	33 KV (UE) ARM
35	0.123	0.197	0.259	0.278	0.330	0.376	0.468	0.493
50	0.152	0.209	0.272	0.294	0.379	0.394	0.483	0.530
70	0.170	0.227	0.295	0.317	0.404	0.419	0.508	0.583
95	0.184	0.244	0.317	0.338	0.435	0.449	0.554	0.609
120	0.197	0.261	0.337	0.392	0.457	0.472	0.576	0.634
150	0.194	0.303	0.389	0.413	0.477	0.492	0.597	0.656
185	0.224	0.322	0.414	0.445	0.502	0.539	0.674	0.767
240	0.276	0.354	0.456	0.479	0.558	0.573	0.711	0.806
300	0.294	0.377	0.489	0.506	0.587	0.602	0.811	0.915
400	0.333	0.450	0.569	0.578	0.687	0.703	0.866	0.974
500	0.367	0.493	0.675	0.679	0.809	0.826	1.056	1.139
630	0.438	0.611	0.735	0.739	0.873	0.928	1.168	1.290
800	0.529	0.734	0.863	0.866	1.027	1.05	1.189	1.380
1000	0.648	0.880	1.031	1.035	1.138	1.158	1.402	1.619

Note: The above factors are for PVC and Zero Halogen low smoke (LSZH) and for PE factor, the above factor will be multiplied by 0.63



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IEEMA (PVC)/MV SCREEN CABLE/2019 (R-1)**Effective from: 01 April 2023****TABLE : H5 (a)****VARIATION FACTOR FOR Polymer (CCFAL/CCFCu)****SINGLE CORE UNARMoured 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	3.3 KV(E) screened 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	33 KV (UE) ARM
35	0.158	0.191	0.224	0.252	0.323	0.342	0.361	0.380
50	0.177	0.209	0.240	0.269	0.342	0.361	0.520	0.539
70	0.198	0.232	0.265	0.296	0.370	0.391	0.551	0.572
95	0.233	0.261	0.288	0.318	0.396	0.450	0.582	0.636
120	0.253	0.282	0.310	0.342	0.454	0.477	0.613	0.636
150	0.269	0.299	0.328	0.361	0.476	0.500	0.638	0.662
185	0.292	0.323	0.354	0.420	0.508	0.532	0.719	0.743
240	0.322	0.371	0.419	0.455	0.547	0.572	0.766	0.791
300	0.355	0.408	0.461	0.490	0.585	0.610	0.863	0.888
400	0.423	0.474	0.524	0.539	0.683	0.711	0.932	0.960
500	0.477	0.553	0.629	0.635	0.743	0.825	1.059	1.141
630	0.548	0.620	0.691	0.697	0.866	0.898	1.144	1.176
800	0.672	0.749	0.826	0.833	1.016	1.051	1.320	1.355
1000	0.789	0.877	0.964	0.964	1.099	1.200	1.488	1.589

Note: The above factors are for PVC and Zero Halogen low smoke (LSZH) and for PE factor the above factor will be multiplied by 0.63

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 (E) Unscreened ARM	3.3 KV (E) screened 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	33 KV (UE) ARM
35	0.374	0.634	0.990	1.142	1.604	1.782	-	-
50	0.445	0.702	1.119	1.260	1.834	2.046	2.864	3.070
70	0.547	0.863	1.290	1.396	2.011	2.284	3.219	3.380
95	0.594	0.990	1.440	1.647	2.269	2.428	3.367	3.721
120	0.732	1.214	1.692	1.877	2.498	2.715	3.646	4.020
150	0.812	1.355	1.906	2.061	2.767	2.931	3.927	4.216
185	0.960	1.589	2.086	2.406	3.028	3.180	4.166	4.529
240	1.130	1.832	2.484	2.744	3.398	3.580	4.589	4.917
300	1.219	2.201	2.912	3.161	3.840	4.016	5.029	5.325
400	1.313	2.561	3.530	3.664	4.353	4.666	5.736	5.911
500	1.652	3.138	3.925	3.971	4.621	4.878	5.913	6.625
630	1.949	3.774	4.487	4.982	5.225	5.477	6.696	7.445

Note: The above factors are for PVC and Zero Halogen low smoke (LSZH) and for PE factor the above factor will be multiplied by 0.63



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Cir. No.: 140/ PVC/DT_PT/05

November 10, 2021

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

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

In light of changes in technology, manufacturing practises and substantial fluctuations in raw material prices over past 6-7 years, IEEMA has decided to revise PV Clauses for Power and Distribution Transformers and evolve new PV formulae for Solar Inverter Duty Transformers considering huge potential of Solar Inverter Duty Transformers in coming period as Renewable and clean energy resources (Solar and Wind) is going to play a major role in the Generation mix.

IEEMA had circulated draft PV clauses of Power and Distribution Transformer and new formula for Solar Inverter Duty Transformers vide Cir. No. 134/PVC/DT_PT/05 dated 30 September 2021. After incorporating changes suggested by the industry stakeholders on the Distribution Transformer PV formulae; we are making all these Price Variation formulae operational from 1st September 2021.

We have enclosed all PV clauses applicable for Power and Distribution Transformer and new formula for Solar Inverter Duty Transformers which are effective from 1st September 2021.

Although, these PV clauses are made effective from 1st September 2021, practically they can be incorporated in all the current new tenders/contracts starting from 1st October 2021.

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

Salient points of the revised Transformer PV formulae:

1. As per contemporary tendering processes, to cover Dist. Transformers of above 10 MVA and Up to 33 KV DTs, definition of Distribution Transformers has been proposed as Transformers Up to 33 KV and definition of Power Transformers has been proposed as Transformers above 33 KV
2. The PV formulae for Distribution Transformers have been made generic by removing reference of BEE or IS 1180 from all PV formulae since practically now almost all Transformers up to 2,500 KVA are manufactured as per IS 1180 and these PV formulae can also be used for non BIS /Non BEE purposes also; if required
3. It was decided to discontinue old PV formulae for Non BIS/Non BEE DTs effective from June 2015 and subsequently discontinuation of publishing applicable price of other CRGO Steel Lamination and price of Aluminium rod (Domestic) from the monthly PV circulars.
4. Copper price source has been proposed as Domestic Copper price of 8 mm since majority of manufacturers procure it locally and it also aligns to price published in other IEEMA PV circulars
5. Common price of CRGO Laminations to be used for all proposed PV formulae
6. Change in lead time period prior to date of delivery for some PV formulae as per contemporary manufacturing practises.

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7. Cost weightages for Distribution Transformer PVCs have been re-worked and revised post the suggestions received from industry stakeholders on the Draft PV formulae.

For pending contracts, for the date of delivery as given below, 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. Applicability of this two stage method is recommended as under:

For Power Transformer up to 400 KV – For Delivery on or after 1st December 2021

For Power Transformer Above 400 KV – For Delivery on or after 1st January 2022

For Distribution Transformer – For Delivery on or after 1st November 2021

1. Calculate price variation 'P' from applicable prices/indices as per your base date / date of tendering up to September 2021 i.e. considering all prices/indices published in PV circular of September 2021 at numerator place; using applicable IEEMA PV clauses of Transformers effective from April / June 2015
2. Treat the above calculated 'P' as 'P₀' and calculate final price variation considering all prices / indices published in PV circular of September 2021 applicable for revised PV clauses of Transformer effective from 1st September 2021 as base prices/indices (at the denominator place) up to the applicable prices/indices as per the date of delivery; applicable as per revised relevant PV clause of Transformer effective from 1st September 2021.

Please find enclosed a sample two stage calculation showing month references for selecting the price/indices as per above method.

Director





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Sample calculation showing month references for two stage method

For Power Transformer up to 400 KV --- Two stage method if delivery period falls on or after 1st December 2021

For e.g. date of tendering - January 2021			Date of delivery - December 2021		
STEP I			STEP II		
	Jan-21	Sep-21		Sep-21	Dec-21
Prices/ Indices	Month applicable for Date of Tendering as per old PV formula	Month applicable for Date of Delivery (FIXED)	Prices/ Indices	Month applicable for Date of Tendering (FIXED)	Month applicable for Date of Delivery as per new PV formula
Fix			Fix		
CU	Dec-20	Sep-21	CU	Sep-21	Oct-21
ES	Dec-20	Sep-21	ES	Sep-21	Oct-21
IS	Dec-20	Sep-21	IS	Sep-21	Oct-21
IM	Dec-20	Sep-21	IM	Sep-21	Oct-21
TO	Dec-20	Sep-21	TO	Sep-21	Nov-21
W	Oct-20	Jul-21	W	Jul-21	Sep-21

For Power Transformer Above 400 KV --- Two stage method if delivery period falls on or after 1st January 2022

For e.g. date of tendering - January 2021			Date of delivery - January 2022		
STEP I			STEP II		
	Jan-21	Sep-21		Sep-21	Jan-22
Prices/ Indices	Month applicable for Date of Tendering as per old PV formula	Month applicable for Date of Delivery (FIXED)	Prices/ Indices	Month applicable for Date of Tendering (FIXED)	Month applicable for Date of Delivery as per new PV formula
CU	Dec-20	Sep-21	CU	Sep-21	Oct-21
ES	Dec-20	Sep-21	ES	Sep-21	Oct-21
IS	Dec-20	Sep-21	IS	Sep-21	Oct-21
IM	Dec-20	Sep-21	IM	Sep-21	Oct-21
TO	Dec-20	Sep-21	TO	Sep-21	Nov-21
W	Oct-20	Jul-21	W	Jul-21	Oct-21

In step I calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/PWR_DIST_TRF of applicable month as per old PV formulae wef Apr 2015

In step II calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/PWR_DIST_TRF (R-1) for applicable month as per new PV formulae wef Sep 2021

proud partners in implementation



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For Distribution Transformer --- Two stage method if delivery period falls on or after 1st November 2021

For e.g. date of tendering - January 2021			Date of delivery - November 2021		
STEP I			STEP II		
	Jan-21	Sep-21		Sep-21	Nov-21
Prices/ Indices	Month applicable for Date of Tendering as per old PV formula	Month applicable for Date of Delivery (FIXED)	Prices/ Indices	Month applicable for Date of Tendering (FIXED)	Month applicable for Date of Delivery as per new PV formula
Fixed			Fixed		
AL/Cu	Dec-20	Sep-21	AL/Cu	Sep-21	Oct-21
ES	Dec-20	Sep-21	ES	Sep-21	Oct-21
IS	Dec-20	Sep-21	IS	Sep-21	Oct-21
IM	Dec-20	Sep-21	IM	Sep-21	Oct-21
TO	Dec-20	Sep-21	TO	Sep-21	Oct-21
W	Oct-20	Jul-21	W	Jul-21	Aug-21

In step I calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/PWR_DIST_TRF of applicable month as per old PV formulae wef Apr 2015

In step II calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/PWR_DIST_TRF (R-1) for applicable month as per new PV formulae wef Sep 2021





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IEEMA/PVC/PWR TRF_Up to 400 KV/2021

Effective from: 1st September 2021

**PRICE VARIATION CLAUSE FOR POWER TRANSFORMERS AND REACTORS
COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
of voltage above 33 kV and up to 400 kV
of supplied against domestic contracts**

This price variation clause is applicable for Transformers and Reactors of voltage above 33 kV and up to 400 KV supplied against domestic contracts. A separate price variation clause IEEMA/PVC/PWR TRF_Up to 400 KV/DE/2021 has been evolved for above types of Transformers and Reactors supplied against export/deemed export 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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(6 + 32 \frac{C}{C_0} + 27 \frac{ES}{ES_0} + 12 \frac{IS}{IS_0} + 4 \frac{IM}{IM_0} + 9 \frac{TO}{TO_0} + 10 \frac{W}{W_0} \right)$$

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 note)
This price is as applicable for the month, ONE months prior to the date of tendering.
- IS₀ = Average price of steel Plates 10 mm thick (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 months 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.
- W₀ = 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.

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IEEMA/PVC/PWR TRF_Up to 400 KV/2021**Effective from: 1st September 2021**

For example, if date of tendering falls in December 2021, applicable prices of Copper Rods (C₀), Steel Plates 10 mm thick (IS₀), CRGO Electrical Steel Laminations (ES₀) and Insulating material (IM₀) and Transformer Oil (TO₀) should be as on 1st November 2021 and all India average consumer price index no. (W₀) should be for the month of 1st 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, TWO months prior to the date of delivery.
- ES = Price of CRGO Electrical Steel Lamination (refer note)
This price is as applicable for the month, TWO months prior to the date of delivery.
- IS = Average price of Steel Plates 10 mm thick (refer notes)
This price is as applicable for the month, TWO months prior to the date of delivery.
- IM = Price of Insulating Materials (refer notes)
This price is as applicable for the month, TWO months 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 Rods (C), Insulating material (IM), CRGO Electrical Steel Lamination (ES), Plates 10 mm thick (IS) should be as on 1st October 2022 and Transformer Oil (TO) should be 1st November 2022 and all India average consumer price index no. (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.



IEEMA/PVC/PWR TRF_upto 400 KV/2021

Effective from: 1st September 2021

Note: All prices are exclusive of GST and exclusive of any other central, state or local taxes etc.

a) The details of prices are as under:

1. Price of 8 mm CC copper rod (in Rs./MT) is ex-works price as quoted by the primary producer.
2. The price of CRGO is the price of CRGO Electrical Steel Lamination in Rs./MT suitable for Transformers of voltage above 33 kV and up to 400 kV
3. Price of Steel is the average retail price of steel plates 10 mm thick as published by Joint Plant Committee (JPC) in Rs./MT
4. The price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 10 mm thick, 3200 mm x 4100 mm is the average 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.

b) 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:

$$P = \frac{P_o}{91} \left(6 + 32 \frac{C}{C_o} + 27 \frac{ES}{ES_o} + 12 \frac{IS}{IS_o} + 4 \frac{IM}{IM_o} + 10 \frac{W}{W_o} \right)$$

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



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Cir. No. 08/ PVC/BTR CHR/05**27 February 2023**

To Members of Battery Storage and Charging Infrastructure Division,
member manufactures of Battery chargers and
SEBs and other listed purchasing bodies

Sub: Revision in Battery Charger PV formulae

1. Revision in Battery Charger Equipment PV Clause, 'Conventional Battery Charger'
2. New PV clause for 'Modular Battery Charger' and 'Electric Vehicle Charger'

In view of current practices and technology used for manufacturing and volatility in prices, battery charger manufacturers' felt the need to revise the current applicable PV formula of IEEMA which is effective from Jan 2002. Members then discussed the subject at length and mentioned that battery charger equipment comprises of Semiconductors and Switchgear product (switches, fuses, contactors, MCBs, MCCBs etc.) whose costing to be covered while revising the formula. Considering the demand, members also felt the need to have price variation formula for 'Modular Battery Charger' and 'Electric vehicle charger'.

IEEMA has collected costing data, lead and lag time for manufacturing etc. from major manufacturers of battery chargers and in consensus arrived at the draft Price Variation Clauses for Conventional Battery charger, Modular Battery charger and for Electric vehicle charger vide cir no. **01/ PVC/BTR CHR/05 dated 04th January 2023.**

Since there are no adverse comments received; we are making these operational from 1st January 2023.

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

For pending contracts, for the date of delivery on or after 1st February 2023, 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 as per your base date / date of tendering up to January 2023 i.e. considering all prices/indices published in PV circular of January 2023; using applicable IEEMA PV clause of Battery Charger which is effective from June 2002.
2. Treat the above calculated 'P' as 'P₀' and calculate final price variation considering all prices / indices published in PV circular of January 2023 applicable for revised PV clause of Battery Charger effective from 1st January 2023 as base prices/indices up to the applicable prices/indices as per the date of delivery; applicable as per revised relevant PV clause of Battery Charger effective from 1st January 2023.

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IEEMA/PVC/BTR-CHRG/2023

Effective from: 1st January 2023**PRICE VARIATION CLAUSE FOR BATTERY CHARGER EQUIPMENT**

The price quoted/confirmed is based on the cost of raw materials/components, the wholesale price index numbers and labour cost as on the date of quotation and the same is deemed to be related to prices of raw materials, index numbers for wholesale prices 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 and Index numbers, the price payable shall be subject to adjustment up or down in accordance with the following formulae:

(A) Conventional Battery Charger

$$P = \frac{P_0}{100} \left(12 + 28 \frac{C}{C_0} + 25 \frac{ES}{ES_0} + 8 \frac{AL}{AL_0} + 8 \frac{ER}{ER_0} + 7 \frac{EP}{EP_0} + 12 \frac{W}{W_0} \right)$$

(B) Modular Battery Charger

$$P = \frac{P_0}{100} \left(11 + 15 \frac{C}{C_0} + 17 \frac{ES}{ES_0} + 4 \frac{AL}{AL_0} + 32 \frac{ER}{ER_0} + 8 \frac{EP}{EP_0} + 13 \frac{W}{W_0} \right)$$

(C) Electric Vehicle Charger

$$P = \frac{P_0}{100} \left(11 + 14 \frac{C}{C_0} + 12 \frac{ES}{ES_0} + 2 \frac{AL}{AL_0} + 35 \frac{ER}{ER_0} + 12 \frac{EP}{EP_0} + 14 \frac{W}{W_0} \right)$$

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 note)This price is as applicable for the month, **ONE** month prior to the date of tendering.AL₀ = LME CSP Average of Aluminium (refer notes)This price is as applicable for the month, **ONE** month prior to the date of tendering.ER₀ = IEEMA's Banker's selling rate of exchange between foreign currency prevailing on the Banker's first working day, **ONE** month prior to the date of tendering (refer notes)EP₀ = Wholesale Price Index Number (WPI) of Electronic PCB/ Micro Circuits (refer notes)This price is as applicable for the month, **THREE** months prior to the date of tendering.

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IEEMA/PVC/BTR-CHRG/2023**Effective from: 1st January 2023**

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 the date of tendering falls in June 2023, the applicable price of Copper (C_0), Aluminium (AL_0), CRGO Electrical Steel Lamination (ES_0) and Exchange Rate (ER_0) should be for the month of May 2023, and wholesale price index numbers for 'Electronic PCB/ Micro Circuits' (EP_0) and all India average consumer price index number (W_0) should be for the month of March 2023.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)/BTR/(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 note)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.
- AL** = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.
- ER** = IEEMA's Banker's selling rate of exchange between foreign currency prevailing on the Banker's first working day, **TWO** month prior to the date of delivery (refer note)
- EP** = Wholesale Price Index Number (WPI) of Electronic PCB/ Micro Circuits
 This price is as applicable for the month, **THREE** months prior to the delivery (refer note)
- 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 tendering.

For example, if the date of delivery falls in August 2023, the applicable price of Copper (C), Aluminium (AL) and CRGO Electrical Steel Lamination (ES) should be for the month of Jul 2023 and Exchange Rate (ER) should be for the month of Jun 2023, and wholesale price index numbers for 'Electronic PCB/ Micro Circuits' (EP) and all India average consumer price index number (W) should be for the month of May 2023.





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IEEMA/PVC/BTR-CHRG/2023**Effective from: 1st January 2023**

For example, if the date of delivery falls in August 2023, the applicable price of Copper (C), Aluminium (AL) and CRGO Electrical Steel Lamination (ES) should be for the month of Jul 2023 and Exchange Rate (ER) should be for the month of Jun 2023, and wholesale price index numbers for 'Electronic PCB/ Micro Circuits' (EP) and all India average consumer price index number (W) should be for the month of May 2023.

The "date of delivery" is the date on which the Battery Charger equipment is notified as being ready for inspection/despatch. (In the absence of such notification the date of manufacturer's despatch 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. Price of 8 mm CC copper rod (in Rs/MT) is ex-works price as quoted by the primary producer.
 3. The price of CRGO Electrical Steel Lamination is the average price as quoted by processing centres of overseas mills and lamination suppliers
 4. The wholesale price index number for 'Electronic PCB/ Micro Circuits' is as published by the Office of Economic Advisor, Ministry of Industry, Govt. of India, New Delhi with base 2011-12=100.
 5. The exchange rates that would be published by IEEMA would be for the following currencies only.

1) US Dollars	2) pound Sterling	3) Japanese Yen	4) Euro
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Authorised Signatory

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Cir. No.04/DIV/BUSDUCTS/05

02/01/2001

To: All Members of Switchgear Division. (Busducts mailing list)
Members on the CHRG PVC mailing list for Busducts.
SEBS & Listed Purchasing Organization.

Sub: Updated price variation clause for Busducts effective from 1st January 2001.

You are aware that the work of updating IEEMA Price Variation Clauses was undertaken during last 18 months. We had circulated drafts of updated clauses highlighting the modifications being carried out requesting users to send their comments.

This exercise was proposed to bring the uniformity in IEEMA's price variation clauses and to amend the workings of the existing clauses giving correct references to the basic prices and indices considered for calculations.

We are now pleased to enclose a copy of this updated price variation clause effective from **1st January 2001** for your reference and perusal.

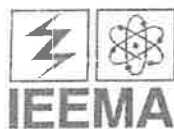
From **1st January 2001 onwards**, we request you to kindly incorporate these clauses in all your future tenders/contracts.

We will issue the indices applicable to this clause in our standard format every month giving reference to this updated clause. To enable users to claim variation on this basis of earlier clause, we will be circulating the indices applicable to the said earlier clause up to December 2001 only.

We request members to kindly make note of this.

Sr. Executive Officer

Nripptc:pooja\pvclause final



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IEEMA/PVC/BUSDUCT/2001

Effective from : 1st January, 2001

PRICE VARIATION CLAUSE FOR BUSDUCTS

The price quoted/confirmed is based on the 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, index number for busducts 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 Index numbers, the price payable shall be subject to adjustment up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(15 + 65 \frac{IN - BUSDUCT}{IN_0 - BUSDUCT} + 20 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.

IN₀-BUSDUCT= Index number for busduct is based on relative prices and weightages (as given in the brackets) busbar grade aluminium (50), wholesale price index number for iron and steel (5), epoxy resin (5) and copperwire bars (5) calculated considering their prices as on 1st June 2000 (as base =100) (refer notes).

This index number is as applicable on the first working day of the month, three months prior to the date of tendering.

W₀ = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 1982 = 100).

This index number is as applicable for the month, three months prior to the date of tendering.

For example, if the date of tendering falls in May 2001, the applicable index number for busducts (IN₀-BUSDUCT) and all India average consumer price index number (W₀) both should be for the month of February 2001, Which would appear in the circular issued for the month of April 2001.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA(PVC)BUSDUCT/_/_ prevailing as on first working day of the month..... i.e., one month prior to the date of tendering.

IN-BUSDUCT = Index number for busduct is based on relative prices and weightages (as given in the brackets) busbar grade aluminium (50), wholesale price index number for iron and steel (5), epoxy resin (5) and copperwire bars (5) calculated considering their prices as on 1st June 2000 (as base =100) (refer notes).

This index number is as applicable on the first working day of the month, three months prior to the date of delivery.

IEEMA/PVC/BUSDUCT/2001

Effective from : 1st January, 2001

W = All India average consumer price index number for industrial workers, general index as published by the Labour Bureau, Govt. of India (Base 1982 = 100).

This index number is as applicable for the month, three months prior to the date of delivery.

For example, if the date of delivery in terms of clause given below falls in December 2001 the applicable index number for busducts (IN-BUSDUCT) and the applicable all India average consumer price index number (W) should be for the month of September 2001, which would appear in the circular issued for the month of November 2001.

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

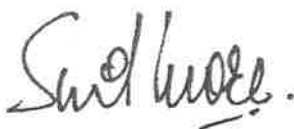
Notes: (a) All prices of raw materials considered for arriving at the index number for busduct are exclusive of modvatable excise/CV duty amount and exclusive of any other central, state or local taxes, octroi etc.

(b) All prices are as on first working day of the month.

(c) The details of prices considered for index number for busduct are as under:

1. The price of busbar grade aluminium (in Rs/MT) is the average of ex-works price as quoted by the two primary producers for the busbar size 152.4 x 6.35 mm flat approximately, of grade equivalent to E91E as per IS 5082-1981 (or the latest).
2. The wholesale price index number for iron and steel is as published by the office of the economic adviser, Ministry of industry, Govt. of India, New Delhi, with base (1993-94 = 100). This wholesale price index is being published weekly on provisional basis. However, the same gets finalised after 8 weeks and is normally available after two months. Therefore we are considering in our calculations this final index only as published by the economic adviser.
3. The price of Epoxy Resin (Rs/KG) is ex-works price as quoted by a resin manufacturer for their epoxy resin CT5900 or its nearest equivalent.
4. Price for electrolytic copper wire bars (in Rs/MT) is the ex-godown / ex-works price as quoted by the primary producer.

For Indian Electrical & Electronics Manufacturers' Association



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Cir. No.: 12/DIV/Insulator/05

15 July 2022

To All members of Insulator Division

To all State Electricity Boards, Utilities and Other purchasing organizations

Sub: Correction in revised price variation clauses for Composite Insulator for Railway and Transmission

Recently IEEMA had circulated revised price variation clauses for Composite Insulator for Railway and Composite Insulator for Transmission effective from Apr 2022 vide circular no. 06/DIV/Insulator/05 dated 15 June 2022. IEEMA had also published relevant prices for Apr 22.

After circulation we noted IEEMA received suggestions from few stakeholders on the raw material and lag period for Steel and Silicon Rubber. We had reviewed the suggestions and incorporated the same

We are now attaching the updated PV formulae after correcting the price and month references for Steel and Silicon Rubber. We have also corrected the relevant price variation circular of Composite Insulator for Apr 22.

Earlier published revised price variation clauses for Composite Insulator for Railway and Composite Insulator for Transmission effective from Apr 2022 vide circular no. 06/DIV/Insulator/05 dated 15 June 2022 and relevant published prices stands obsolete.

We request to replace the attached PV formulae and relevant PVC of Apr 22 in place of earlier sent formula vide circular referred above for using in future contracts.

For pending contracts, for the date of delivery on and after 1st June 2022 as given below, 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. Applicability of this two stage method is recommended as under:

1. Calculate price variation 'P' from applicable prices/indices as per your base date / date of tendering up to Apr 22 i.e. considering all prices/indices published in PV circular of Apr 22 at numerator place; using applicable IEEMA PV clauses of Composite Insulators effective from January 2013
2. Treat the above calculated 'P' as 'Po' and calculate final price variation considering all prices / indices published in PV circular of Apr 22 applicable for revised PV clauses of Composite Insulator effective from 1st April 2022 as base prices/indices (at the denominator place) up to the applicable prices/indices as per the date of delivery; applicable as per revised relevant PV clause of Composite Insulator effective from 1st April 2022.

Please find enclosed a sample two stage calculation showing month references for selecting the price/indices as per above method.

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W www.ieema.org**Sample calculation showing month references for two stage method****For Composite Insulators for TRANSMISSION --- Two stage method if delivery period falls on or after 1st June 2022**

For e.g. date of tendering - January 2022			Date of delivery - December 2022		
STEP I			STEP II		
	Jan-22	Apr-22		Apr-22	Dec-22
Prices/ Indices	Month applicable for Date of Tendering as per old PV formula	Month applicable for Date of Delivery (FIXED)	Prices/ Indices	Month applicable for Date of Tendering (FIXED)	Month applicable for Date of Delivery as per new PV formula
Fix			Fix		
Zn	Dec-21	Apr-22	Zn	Apr-22	Nov-22
Al	Dec-21	Apr-22	Al	Apr-22	Nov-22
I	Oct-21	Feb-22	I	Mar-22	Oct-22
R	Oct-21	Feb-22	R	Mar-22	Nov-22
F	Oct-21	Feb-22	F	Feb-22	Oct-22
FP	Oct-21	Feb-22	HSD	Feb-22	Oct-22
FE	Dec-21	Apr-22	FE	Apr-22	Nov-22
W	Oct-21	Feb-22	W	Feb-22	Oct-22

For Composite Insulators for RAILWAY --- Two stage method if delivery period falls on or after 1st June 2022

For e.g. date of tendering - January 2022			Date of delivery - December 2022		
STEP I			STEP II		
	Jan-22	Apr-22		Apr-22	Dec-22
Prices/ Indices	Month applicable for Date of Tendering as per old PV formula	Month applicable for Date of Delivery (FIXED)	Prices/ Indices	Month applicable for Date of Tendering (FIXED)	Month applicable for Date of Delivery as per new PV formula
Fix			Fix		
Zn	Dec-21	Apr-22	Zn	Apr-22	Nov-22
Al	Dec-21	Apr-22		--	--
I	Oct-21	Feb-22	I	Feb-22	Oct-22
R	Oct-21	Feb-22	R	Mar-22	Nov-22
F	Oct-21	Feb-22	F	Feb-22	Oct-22
FP	Oct-21	Feb-22	HSD	Feb-22	Oct-22
FE	Dec-21	Apr-22		--	--
W	Oct-21	Feb-22	W	Feb-22	Oct-22

In step I calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/Comp Insu of applicable month as per old PV formulae wef Jan 2013

In step II calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/Comp Insu (R-1) for applicable month as per new PV formulae wef Apr 2022

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IEEMA/PVC/Comp Insu/Transmission/2022

Effective from 1st April 2022

PRICE VARIATION CLAUSE FOR COMPOSITE INSULATORS FOR TRANSMISSION

The price quoted/confirmed is based on the cost of raw material and labour cost as on the date of quotation and the same is deemed to be related to the prices of raw material 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 index numbers, the price payable shall be subject to adjustment up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(10 + 3 \frac{Zn}{Zn_0} + 9 \frac{Al}{Al_0} + 9 \frac{I}{I_0} + 45 \frac{R}{R_0} + 8 \frac{F}{F_0} + 3 \frac{HSD}{HSD_0} + 3 \frac{FE}{FE_0} + 10 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
 P₀ = Price quoted/confirmed.
- Zn₀ = Price of electrolytic high grade zinc (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- Al₀ = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- I₀ = Price of Rounds 25 mm (refer notes)
 This index number is as applicable for the month, **TWO** months prior to the date of tendering.
- R₀ = Price of Silicone Rubber (refer notes)
 This price is as applicable for the month, **TWO** months prior to the date of tendering.
- F₀ = Wholesale Price Index number for Fibre Glass & Glass sheet (Base: 2011-12 = 100)
 This index number is as applicable for the month, **TWO** months prior to the date of tendering.
- HSD₀ = Wholesale price index number for HSD (Base: 2011-12=100) (refer notes)
 This index number is as applicable for the month, **TWO** months prior to the date of tendering.
- FE₀ = IEEMA's Banker's selling rate of exchange between foreign currencies prevailing as on first working day (refer notes)
 This exchange rate is as applicable **ONE** month prior to the date of tendering

IEEMA/PVC/Comp Insu/Transmission/2022 page 1 of 3

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Effective from 1st April 2022

W₀ = 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 **TWO** months prior to the date of tendering.

For example, if date of tendering falls in June 2022, the applicable Prices of Zinc (Zn₀), Aluminium (Al₀) and rate of exchange (FE₀) to be considered for the month of May 2022 whereas prices of Steel (I₀), Silicone Rubber (R₀), and wholesale price index numbers for Fibre Glass & Glass Sheet (F₀), HSD (HSD₀) and all India average consumer price index number (W₀) to be considered for the month of April 2022.

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

- Zn** = Price of electrolytic high grade zinc (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.
- Al** = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.
- I** = Price of Rounds 25 mm (refer notes)
 This index number is as applicable for the month, **TWO** months prior to the date of delivery.
- R** = Price of Silicone Rubber (refer notes)
 This price is as applicable for the month, **TWO** month prior to the date of delivery.
- F** = Wholesale Price Index number for Fibre Glass & Glass sheet (Base: 2011-12 = 100) (refer notes)
 This index number is as applicable for the month, **TWO** months prior to the date of delivery.
- HSD** = Wholesale price index number for HSD (Base: 2011-12=100) (refer notes)
 This index number is as applicable for the month, **TWO** months prior to the date of delivery.
- FE** = IEEMA's Banker's selling rate of exchange between foreign currencies prevailing as on first working day (refer notes)
 This exchange rate is as applicable **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) (refer notes)
 This index number is as applicable for the month **TWO** months prior to the date of delivery.





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Effective from 1st April 2022

For example, if date of delivery falls in December 2022, the applicable Prices of Zinc (Zn), Aluminium (Al) and Rate of exchange (FE) to be considered for the month of November 2022 whereas prices of Steel (I), Silicone Rubber (R) and wholesale price index numbers for Fibre Glass & Glass Sheet (F), HSD (HSD) and all India average consumer price index number (W) to be considered for the month of October 2022.

The "date of delivery" is the date on which the Composite Insulator for transmission is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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 and exclusive of any other central, state or local taxes.

(b) The details of the prices considered 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 Electrolytic high grade zinc (in Rs/MT) is ex-works price quoted by a primary producer
3. Price of steel is the average retail price of Rounds 25 mm as published by Joint Plant Committee (JPC) in Rs./MT
4. Price of Silicone Rubber in Rs./Kg is the average price as quoted by supplier for their standard grade
5. The wholesale price index numbers for 'Fiber Glass & Glass sheet' and 'HSD' are as published by the Office of Economic Advisor, Ministry of Industry, Govt. of India, New Delhi with base 2011-12 = 100.
6. The exchange rates in Indian Rs. would be for the following currencies only.

1) US Dollars	2) pound Sterling	3) Japanese Yen	4) Euro
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IEEMA/PVC/Comp Insu/Transmission/2022 page 3 of 3

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IEEMA/PVC/Comp Insu/Railway/2022

Effective from 1st April 2022**PRICE VARIATION CLAUSE FOR COMPOSITE INSULATORS FOR RAILWAY**

The price quoted/confirmed is based on the cost of raw material and labour cost as on the date of quotation and the same is deemed to be related to the prices of raw material 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 index numbers, the price payable shall be subject to adjustment up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(10 + 3 \frac{Zn}{Zn_0} + 25 \frac{I}{I_0} + 40 \frac{R}{R_0} + 8 \frac{F}{F_0} + 4 \frac{HSD}{HSD_0} + 10 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
P₀ = Price quoted/confirmed.
Zn₀ = Price of electrolytic high grade zinc (refer notes)
This price is as applicable for the month, **ONE** month prior to the date of tendering.
I₀ = Wholesale Price Index number for Casting (Base : 2011-12 = 100) (refer notes)
This index number is as applicable for the month, **TWO** months prior to the date of tendering.
R₀ = Price of Silicone Rubber (refer notes)
This price is as applicable for the month, **TWO** month prior to the date of tendering.
F₀ = Wholesale Price Index number for Fibre Glass & Glass sheet (Base: 2011-12 = 100) (refer notes)
This index number is as applicable for the month, **TWO** months prior to the date of tendering.
HSD₀ = Wholesale price index number for HSD (Base: 2011-12=100) (refer notes)
This index number is as applicable for the month, **TWO** months prior to the date of tendering.
W₀ = 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 **TWO** months prior to the date of tendering.

For example, if date of tendering falls in June 2022, the applicable Prices of Zinc (Zn₀) to be considered for the month of May 2022 whereas price of Silicone Rubber (R₀), wholesale price index numbers for Casting (I₀), Fibre Glass & Glass Sheet (F₀), HSD (HSD₀) and all India average consumer price index number (W₀) to be considered for the month of April 2022.

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

IEEMA/PVC/Comp Insu/Railway/2022 page 1 of 3

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- Zn** = Price of electrolytic high grade zinc (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.
- I** = Wholesale Price Index number for Casting (Base : 2011-12 = 100) (refer notes)
 This index number is as applicable for the month, **TWO** months prior to the date of delivery.
- R** = Price of Silicone Rubber (refer notes)
 This price is as applicable for the month, **TWO** months prior to the date of delivery.
- F** = Wholesale Price Index number for Fibre Glass & Glass sheet (Base: 2011-12 = 100) (refer notes)
 This index number is as applicable for the month, **TWO** months prior to the date of delivery.
- HSD** = Wholesale price index number for HSD (Base: 2011-12=100) (refer notes)
 This index number is as applicable for the month, **TWO** months 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 **TWO** months prior to the date of delivery.

For example, if date of delivery falls in December 2022, the applicable Prices of Zinc (Zn) to be considered for the month of November 2022 whereas price of Silicone Rubber (R) and wholesale price index numbers for Casting (I), Fibre Glass & Glass Sheet (F), HSD (HSD) and all India average consumer price index number (W) to be considered for the month of October 2022.

The "date of delivery" is the date on which the Composite Insulator for railway is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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 and exclusive of any other central, state or local taxes.
- b) The details of the prices considered are as under:
 1. The price of Electrolytic high grade zinc (in Rs/MT) is ex-works price quoted by a primary producer.
 2. Price of Silicone Rubber in Rs./Kg is the average price as quoted by supplier for their standard grade
 3. The wholesale price index numbers for 'Casting', 'Fiber Glass & Glass sheet' and 'HSD' are as published by the Office of Economic Advisor, Ministry of Industry, Govt. of India, New Delhi with base 2011-12 = 100.

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Cir. No.:073/PVC/CLAR/02

12th May 2015

To Members of Conductor and Project T&D division, Subscribers of PV Circulars
All SEBs, Utilities and other listed Purchasing Organizations

Sub: PV formula for 'Earth Wire'

In the recent IEEMA Project T&D division, members decided to adopt Price Variation formula of Power Grid Corporation of India (PGCIL) for 'Earth Wire' with fixed cost weightages of 70 and 10 for Steel and Labour portion respectively.

Steel portion is represented by High Tensile galvanized steel wires which is already being published in IEEMA PV circular for Aluminium Conductors.

Hence, 'Earth Wire' PV formula is being made operational vide monthly PV circular applicable for Aluminium Conductor after adding All India Average Consumer Price Index Number in the circular.

We recommend incorporating this new PV clause in all future tenders starting from 1st May 2015.



Deputy Director General

Encl.: IEEMA PV clause of 'Earth Wire'



your link to innovation

IEEMA(PVC)/EARTHWIRE/2015

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The price quoted/confirmed for Earthwire 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 formula.

$$P = \frac{P_0}{100} \left(20 + 70 \frac{FE}{FE_0} + 10 \frac{W}{W_0} \right)$$

Wherein,

P = Ex-works price payable as adjusted in accordance with the price variation clause

P₀ = Ex-works price quoted/confirmed

FE₀ = Price of High Tensile Galvanized Steel Wire in Rs./MT of appropriate size
This price is applicable prevailing as on 1st working day of the month one month prior to the date of tender opening.

W₀ = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 100)
This index number is as applicable on the first working day of the month, three months prior to the date of tender opening.

For example, if tender is opened during June 2015, then the applicable raw material price of Steel Wire (FE₀) and All India average consumer price index number (W₀) would be for the month of May 2015 and March 2015 respectively.

The above prices and indices are as published by IEEMA vide monthly PV circular for Aluminium Conductor; currently circulated vide reference number IEEMA (PVC)/AL_CONDUCTOR_LME/2014/_/_ one month prior to the date of tendering.

FE = Price of High Tensile Galvanized Steel Wire in Rs./MT of appropriate size
This price is applicable prevailing as on first working day of the month Two months 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: 2001 = 100)
This index number is as applicable on the first working day of the month, four months prior to the date of delivery.

IEEMA(PVC)/EARTHWIRE/2015/Page 1 of 2





your link to **IEEMA(PVC)/EARTHWIRE/2015**

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Effective from: 1st April 2015

For example, if date of delivery falls during December 2015, then the applicable raw material price of Steel Wire (FE) and All India average consumer price index number (W) would be for the month of October 2015 and August 2015 respectively.

The date of delivery is the date on which the 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 domestic prices of raw materials applicable to excise duty units are exclusive of modvatable excise/CV duty amount and exclusive of any other central, state or local taxes, octroi etc.
2. The price of High tensile Galvanized Steel Wire (in Rs./MT) for different sizes in mm is the price as quoted by a primary producer.


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IEEMA(PVC)/EARTHWIRE/2015/Page 2 of 2



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Cir. No. 09/PVC/MV-HV SWGR/05

18th July 2022

To Members of MV-HV Switchgear Division
To all State Electricity Boards, Utilities and Other purchasing organizations

Sub: Final Price Variation Formulae for MV Gas insulated Switchgear (MV GIS)

Gas Insulated Switchgear (GIS). GIS is high value product with a mix of various domestic and imported raw materials/components and having manufacturing time of around 12-15 months. MV-HV Switchgear division of IEEMA has decided to evolve new PV Clause for **MV Gas insulated Switchgear**.

IEEMA has collected costing data from major manufacturers of MV GIS and arrived at the draft Price Variation Clauses – separate up to 12 KV and 12-36 KV which was circulated vide cir no 01/PVC/MV-HV SWGR dated 3rd Jan 2022 to all stake holders for their review/comments.

Only Exchange rate has been considered to represent the imported portion of the GIS in terms of value; which is to be declared and mutually agreed between supplier and purchaser along with basket of currencies with appropriate cost weightages; aggregating to not more than 8 as given in above PV formula.

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

We have enclosed PV clauses applicable for MV Gas insulated Switchgear (MV GIS) which are effective from 1st June 2022.

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

Director



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IEEMA(PVC)/ MV GIS-up to 12 KV

Effective from: 1st June 2022

**PRICE VARIATION CLAUSE FOR MEDIUM VOLTAGE GAS INSULATED SWITCHGEAR (MV GIS)
 UPTO AND INCLUDING 12 KV**

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(22 + 14 \frac{IS}{IS_0} + 12 \frac{S}{S_0} + 24 \frac{Cu}{Cu_0} + 4 \frac{Al}{Al_0} + 4 \frac{ER}{ER_0} + 8 \frac{EC}{EC_0} + 12 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- IS₀ = Price of HR Coil 3.15 mm (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- S₀ = Wholesale price index number for 'Stainless steel coils, strips and sheets' (Base: 2011-12=100) (refer notes)
 This price is as applicable for the month, THREE months prior to the date of tendering.
- Cu₀ = Price of CC copper rods (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- Al₀ = LME CSP Average of Aluminium (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.
- EC₀ = IEEMA's Banker's selling rate of exchange for select foreign currencies prevailing as on first working day (refer notes)
 This exchange rate is as applicable ONE month prior to the date of tendering.
- W₀ = 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.





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IEEMA(PVC)/ MV GIS-up to 12 KV**Effective from: 1st June 2022**

For example, if date of tendering falls in June 2022, applicable prices of HR Coil (IS₀), Copper (Cu₀), Aluminium (Al₀), Epoxy Resin (ER₀) and Exchange rate (EC₀) should be as on May 2022 and Wholesale price index number for 'Stainless steel coils, strips and sheets' (S₀) and all India average consumer price index no. (W₀) should be for the month of March 2022.

The above prices and indices are as published by IEEMA vide circular reference number
IEEMA(PVC)GIS/___/___ ONE month prior to the date of tendering.

- IS = Price of HR Coil 3.15 mm (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.
- S = Wholesale price index number for 'Stainless steel coils, strips and sheets' (Base: 2011-12=100)
 (refer notes)
 This price is as applicable for the month, **THREE** months prior to the date of delivery.
- Cu = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **TWO** months prior to the date of delivery.
- Al = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, **TWO** months 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 delivery.
- EC = IEEMA's Banker's selling rate of exchange between foreign currencies prevailing as on first
 working day (refer notes)
 This exchange rate is as applicable **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 HR Coil (IS), Epoxy Resin (ER) and Exchange rate (EC) should be as on November 2022 and Copper (Cu), Aluminium (Al) should be as on October 2022, and Wholesale price index number for 'Stainless steel coils, strips and sheets' (S) and all India average consumer price index no. (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)GIS/___/___ ONE month prior to the date of delivery.





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IEEMA(PVC)/ MV GIS-up to 12 KV

Effective from: 1st June 2022

The date of delivery is the date on which the MV GIS is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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/CV duty amount and exclusive of any other central, state or local taxes etc.
- b) The details of prices are as under:
 1. The Price of 8 mm CC copper rod (in Rs./MT) is ex-works price as quoted by the primary producer.
 2. Price of Steel is the average retail price of steel HR Coil 3.15 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT
 3. 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.
 4. The wholesale price index number for 'Stainless steel coils, strips and sheets' is as published by the Office of Economic Advisor, Ministry of commerce & Industry, Govt. of India, New Delhi with base 2011-12 = 100
 5. The price of Epoxy resin is price quoted by resin manufacturer for their grade CT 5900 or its nearest equivalent.
 6. The exchange rates in Indian Rs. would be for the following currencies only.

1) US Dollars	2) pound Sterling	3) Japanese Yen	4) Euro
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Exchange rate is to represent the imported portion of the GIS in terms of value; which is to be declared and mutually agreed between supplier and purchaser along with basket of currencies with appropriate cost weightages; aggregating to not more than 8 as given in above PV formula

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IEEMA(PVC)/ MV GIS- Above 12 KV up to 36 KV

Effective from: 1st June 2022

**PRICE VARIATION CLAUSE FOR MEDIUM VOLTAGE GAS INSULATED SWITCHGEAR (MV GIS)
 ABOVE 12 KV UPTO & INCLUDING 36 KV**

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(16 + 16 \frac{IS}{IS_0} + 8 \frac{S}{S_0} + 18 \frac{Cu}{Cu_0} + 5 \frac{Al}{Al_0} + 6 \frac{ER}{ER_0} + 16 \frac{EC}{EC_0} + 15 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- IS₀ = Price of HR Coil 3.15 mm (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- S₀ = Wholesale price index number for 'Stainless steel coils, strips and sheets' (Base: 2011-12=100) (refer notes)
 This price is as applicable for the month, **THREE** months prior to the date of tendering.
- Cu₀ = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- Al₀ = LME CSP Average of Aluminium (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.
- EC₀ = IEEMA's Banker's selling rate of exchange between foreign currencies prevailing as on first working day (refer notes)
 This exchange rate is as applicable **ONE** month prior to the date of tendering
- W₀ = 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.





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IEEMA(PVC)/ MV GIS- Above 12 KV up to 36 KV**Effective from: 1st June 2022**

For example, if date of tendering falls in June 2022, applicable prices of HR Coil (IS_0), Copper (Cu_0), Aluminium (Al_0), Epoxy Resin (ER_0) and Exchange rate (EC_0) should be as on May 2022 and Wholesale price index number for 'Stainless steel coils, strips and sheets' (S_0) and all India average consumer price index no. (W_0) should be for the month of March 2022.

The above prices and indices are as published by IEEMA vide circular reference number
IEEMA(PVC)GIS/___/___ ONE month prior to the date of tendering.

- IS** = Price of HR Coil 3.15 mm (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of delivery.
- S** = Wholesale price index number for 'Stainless steel coils, strips and sheets' (Base: 2011-12=100)
 (refer notes)
 This price is as applicable for the month, **THREE** months prior to the date of delivery.
- Cu** = Price of CC copper rods (refer notes)
 This price is as applicable for the month, **TWO** months prior to the date of delivery.
- Al** = LME CSP Average of Aluminium (refer notes)
 This price is as applicable for the month, **TWO** months 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 delivery.
- EC** = IEEMA's Banker's selling rate of exchange between foreign currencies prevailing as on first working day (refer notes)
 This exchange rate is as applicable **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 HR Coil (IS), Epoxy Resin (ER) and Exchange rate (EC) should be as on November 2022 and Copper (Cu), Aluminium (Al) should be as on October 2022, and Wholesale price index number for 'Stainless steel coils, strips and sheets' (S) and all India average consumer price index no. (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)GIS/___/___ ONE month prior to the date of delivery.





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IEEMA(PVC)/ MV GIS- Above 12 KV up to 36 KV

Effective from: 1st June 2022

The date of delivery is the date on which the MV GIS is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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/CV duty amount and exclusive of any other central, state or local taxes etc.
- b) The details of prices are as under:
 1. The Price of 8 mm CC copper rod (in Rs/MT) is ex-works price as quoted by the primary producer.
 2. Price of Steel is the average retail price of steel HR Coil 3.15 mm thickness as published by Joint Plant Committee (JPC) in Rs./MT
 3. 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.
 4. The wholesale price index number for 'Stainless steel coils, strips and sheets' is as published by the Office of Economic Advisor, Ministry of commerce & Industry, Govt. of India, New Delhi with base 2011-12 = 100
 5. The price of Epoxy resin is price quoted by resin manufacturer for their grade CT 5900 or its nearest equivalent.
 6. The exchange rates in Indian Rs. would be for the following currencies only.
 - 1) US Dollars
 - 2) pound Sterling
 - 3) Japanese Yen
 - 4) Euro

Exchange rate is to represent the imported portion of the GIS in terms of value; which is to be declared and mutually agreed between supplier and purchaser along with basket of currencies with appropriate cost weightages; aggregating to not more than 8 as given in above PV formula

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Cir. No.: 055A/DIV/Instrument Transformer/05

March 15, 2021

To All members of Instrument Transformer Division

To all State Electricity Boards, Utilities and Other purchasing organizations

Sub: Revision in Price variation clauses for Instrument Transformer

IEEMA had recently circulated final PV clause for Instrument Transformer vide cir. No. 055/DIV/Instrument Transformer/05 dated February 27, 2021.

After circulation one of the member informed the anomaly in the cost weightages of PV formula IEEMA(PVC)/INST.TR_Polymer_Insulator_Above72.5KV effective from 01 Jan 21.

In above mentioned formula, cost weightage for W was mentioned as 12 instead of 13, due to oversight; all other weightages are correct.

Request all members to use the enclosed PV formula and replace the PV formula IEEMA(PVC)/INST.TR_Polymer_Insulator_Above72.5KV effective from 01 Jan 21 published vide cir no 055/DIV/Instrument Transformer/05 dated February 27, 2021.

All other formulae and guidelines are applicable as stated in the cir. No. 055/DIV/Instrument Transformer/05 dated February 27, 2021.

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IEEMA(PVC)/INST.TR_Polymer Insulator_Above 72.5 KV

Effective from: 1st January 2021

**PRICE VARIATION CLAUSE FOR INSTRUMENT TRANSFORMERS
 USING POLYMER INSULATOR FOR Above 72.5 KV**

(Current and Potential Transformers designed for operation on system voltage
 Above 72.5 KV using Polymer Insulator)

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(18 + 8 \frac{AL}{AL_0} + 10 \frac{C}{C_0} + 9 \frac{ES}{ES_0} + 13 \frac{FE}{FE_0} + 17 \frac{IN}{IN_0} + 7 \frac{IM}{IM_0} + 5 \frac{TO}{TO_0} + 13 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.

AL₀ = Price of LME CSP Average of Aluminium (refer notes)

This price is as applicable on the 1st working day of the month, ONE month prior to the date of tendering.

C₀ = Average LME settlement price of Copper wire bars (refer notes)

This price is as applicable for the month, TWO month prior to the date of tendering.

ES₀ = Price of CRGO Electrical Steel Lamination (refer note)

This price is as applicable on the 1st working day of the month, ONE months prior to the date of tendering.

FE₀ = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, THREE month prior to the date of tendering.

IN₀ = Whole sale price index of Insulator (refer notes)

This index number is as applicable for the month, THREE month prior to the date of tendering

IM₀ = Price of Insulating Materials (refer notes)

This price is as applicable on the 1st working day of the month, ONE months prior to the date of tendering.

TO₀ = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of the month, ONE month prior to the date of tendering.





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IEEMA(PVC)/INST.TR_Polymer Insulator_Above 72.5 KV

Effective from: 1st January 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 on the first working day of the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in April 2021, applicable prices of Aluminium (AL_0), CRGO (ES_0), Insulating material (IM_0), Transformer Oil (TO_0) should be as on March 2021 and Copper (C_0) as on February 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W_0) should be for the month of January 2021.

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

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

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of delivery.

C = Average LME settlement price of Copper wire bars (refer notes)

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

ES = Price of CRGO Electrical Steel Lamination (refer note)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of delivery.

FE = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

IN = Whole sale price index of Insulator (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of 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 on the first working day of 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 2021, applicable prices of Aluminium (AL), CRGO (ES), Insulating material (IM), Transformer Oil (TO) should be as on November 2021 and Copper (C) as on October 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W) should be for the month of September 2021.





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IEEMA(PVC)/INST.TR_Polymer Insulator_Above 72.5 KV**Effective from: 1st January 2021**

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

The date of delivery is the date on which the Instrument Transformer is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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/CV duty amount and exclusive of any other central, state or local taxes etc. Instrument Transformers manufacturers import major raw materials like Copper, CRGO etc. The landed cost of these imported raw materials includes applicable custom duty but exclusive of modvatable CVD

(b) 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 LME price of Copper Wire Bars (in Rs./MT) is the LME average settlement price of Copper Wire Bars converted into Indian Rupees with applicable average exchange rate of SBI of the month. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty
- 3) The price of CRGO Electrical Steel Lamination suitable for Instrument Transformers of rating up to 72.5 KV is the average price as quoted by processing centres of mills and lamination suppliers
- 4) The price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm thick, 3200 mm x 4100 mm C&F price in free currency per Kg 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.
- 6) The wholesale price index numbers for 'Manufacture of Basic Metals' and 'Insulators' are as published by the Office of Economic Advisor, Ministry of commerce & Industry, Govt. of India, New Delhi with base 2011-12 = 100

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Cir. No.: 055/DIV/Instrument Transformer/05

February 27, 2021

**To All members of Instrument Transformer Division
 To all State Electricity Boards, Utilities and Other purchasing organizations**

Sub: Revision in Price variation clauses for Instrument Transformer

IEEMA Instrument Transformer division has decided to revise earlier applicable Price Variation clause for Instrument Transformer which was effective from June 2005. The PV clauses are revised considering change in cost composition, changes in raw materials which are currently in vogue and considering changes in technology as well as manufacturing practices.

IEEMA had circulated a Draft PV clause for Instrument Transformer vide cir. No. 026/DIV/Instrument Transformer/05 dated January 27, 2021. Since there are no adverse comments received; we are making it operational from 1st January 2021.

We have enclosed revised PV clauses applicable for Instrument Transformers – Up to 72.5 KV and above 72.5 KV using Porcelain and Polymer Insulator and for Capacitive Voltage Transformer which are effective from 1st January 2021.

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

For pending contracts, for the date of delivery on or after from 1st March 2021, 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 as per your base date / date of tendering up to January 2021 i.e. considering all prices/indices published in PV circular of January 2021 at numerator place; using IEEMA PV clause of Instrument Transformer effective from 1st June 2005.
2. Treat the above calculated 'P' as 'P₀' and calculate final price variation considering all prices / indices published in PV circular of January 2021 applicable for revised PV clause of Instrument Transformer effective from 1st January 2021 as base prices/indices (at the denominator place) up to the applicable prices/indices as per the date of delivery; applicable as per revised relevant PV clause of Instrument Transformer effective from 1st January 2021.

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IEEMA(PVC)/INST.TR_Polymer Insulator_upto 72.5 KV

Effective from: 1st January 2021

**PRICE VARIATION CLAUSE FOR INSTRUMENT TRANSFORMERS
 USING POLYMER INSULATOR FOR UP TO 72.5 KV**

(Current and Potential Transformers designed for operation on system voltage
 up to 72.5 KV using Polymer Insulator)

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(18 + 3 \frac{AL}{AL_0} + 20 \frac{C}{C_0} + 8 \frac{ES}{ES_0} + 10 \frac{FE}{FE_0} + 14 \frac{IN}{IN_0} + 8 \frac{ER}{ER_0} + 4 \frac{TO}{TO_0} + 15 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.

AL₀ = Price of LME CSP Average of Aluminium (refer notes)

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of tendering.

C₀ = Average LME settlement price of Copper wire bars (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 note)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of tendering.

FE₀ = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100)
 (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of tendering.

IN₀ = Whole sale price index of Insulator (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of tendering

ER₀ = Price of epoxy resin (refer notes).

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of tendering.

TO₀ = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of tendering.



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IEEMA(PVC)/INST.TR_Polymer Insulator_upto 72.5 KV

Effective from: 1st January 2021

W₀ = 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 on the first working day of the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in April 2021, applicable prices of Aluminium (AL₀), Copper (C₀) CRGO (ES₀), Epoxy Resin (ER₀), Transformer Oil (TO₀) should be as on March 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W₀) should be for the month of January 2021.

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

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

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of delivery.

C = Average LME settlement price of Copper wire bars (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 note)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of delivery.

FE = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

IN = Whole sale price index of Insulator (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

ER = Price of epoxy resin (refer notes).

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of 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 on the first working day of the month, **THREE** months prior to the date of delivery.





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IEEMA(PVC)/INST.TR_Polymer Insulator_upto 72.5 KV**Effective from: 1st January 2021**

For example, if date of delivery in terms of clause given below falls in December 2021, applicable prices of Aluminium (AL), Copper (C), CRGO (ES), Epoxy Resin (ER), Transformer Oil (TO) should be as on November 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W) should be for the month of September 2021.

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

The date of delivery is the date on which the Instrument Transformer is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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/CV duty amount and exclusive of any other central, state or local taxes etc. Instrument Transforms manufacturers import major raw materials like Copper, CRGO etc. The landed cost of these imported raw materials includes applicable custom duty but exclusive of modvatable CVD

b) 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 LME price of Copper Wire Bars (in Rs./MT) is the LME average settlement price of Copper Wire Bars converted into Indian Rupees with applicable average exchange rate of SBI of the month. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty

3) The price of CRGO Electrical Steel Lamination suitable for Instrument Transformers of rating up to 72.5 KV is the average price as quoted by processing centres of mills and lamination suppliers

4) The price of epoxy resin (in Rs./Kg) is as quoted by a resin manufacturer for their grade CT 5900 or its nearest equivalent applicable

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.

6) The wholesale price index numbers for 'Manufacture of Basic Metals' and 'Insulators' are as published by the Office of Economic Advisor, Ministry of commerce & Industry, Govt. of India, New Delhi with base 2011-12 = 100

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IEEMA(PVC)/INST.TR_Porcelain Insulator_upto 72.5 KV

Effective from: 1st January 2021

**PRICE VARIATION CLAUSE FOR INSTRUMENT TRANSFORMERS
 USING PORCELAIN INSULATOR FOR UP TO 72.5 KV**

(Current and Potential Transformers designed for operation on system voltage
 up to 72.5 KV using Porcelain Insulator)

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(20 + 3 \frac{AL}{AL_0} + 21 \frac{C}{C_0} + 8 \frac{ES}{ES_0} + 13 \frac{FE}{FE_0} + 10 \frac{IN}{IN_0} + 4 \frac{ER}{ER_0} + 5 \frac{TO}{TO_0} + 16 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.

AL₀ = Price of LME CSP Average of Aluminium (refer notes)

This price is as applicable on the 1st working day of the month, ONE month prior to the date of tendering.

C₀ = Average LME settlement price of Copper wire bars (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 note)

This price is as applicable on the 1st working day of the month, ONE months prior to the date of tendering.

FE₀ = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100)(refer notes)

This index number is as applicable for the month, THREE month prior to the date of tendering.

IN₀ = Whole sale price index of Insulator (refer notes)

This index number is as applicable for the month, THREE month prior to the date of tendering

ER₀ = Price of epoxy resin (refer notes).

This price is as applicable on the 1st working day of the month, ONE month prior to the date of tendering.

TO₀ = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of the month, ONE month prior to the date of tendering.





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IEEMA(PVC)/INST.TR_Porcelain Insulator_upto 72.5 KV

Effective from: 1st January 2021

W₀ = 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 on the first working day of the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in April 2021, applicable prices of Aluminium (AL₀), Copper (C₀), CRGO (ES₀), Epoxy Resin material (ER₀), Transformer Oil (TO₀) should be as on March 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W₀) should be for the month of January 2021.

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

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

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of delivery.

C = Average LME settlement price of Copper wire bars (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 note)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of delivery.

FE = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

IN = Whole sale price index of Insulator (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

ER = Price of epoxy resin (refer notes).

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of 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 on the first working day of the month, **THREE** months prior to the date of delivery.



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IEEMA(PVC)/INST.TR_Porcelain Insulator_upto 72.5 KV

Effective from: 1st January 2021

For example, if date of delivery in terms of clause given below falls in December 2021, applicable prices of Aluminium (AL), Copper (C), CRGO (ES), Epoxy Resin (ER), Transformer Oil (TO) should be as on November 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W) should be for the month of September 2021.

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

The date of delivery is the date on which the Instrument Transformer is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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/CV duty amount and exclusive of any other central, state or local taxes etc. Instrument Transforms manufacturers import major raw materials like Copper, CRGO etc. The landed cost of these imported raw materials includes applicable custom duty but exclusive of modvatable CVD

b) 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 LME price of Copper Wire Bars (in Rs./MT) is the LME average settlement price of Copper Wire Bars converted into Indian Rupees with applicable average exchange rate of SBI of the month. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty

3) The price of CRGO Electrical Steel Lamination suitable for Instrument Transformers of rating up to 72.5 KV is the average price as quoted by processing centres of mills and lamination suppliers

4) The price of epoxy resin (in Rs/Kg) is as quoted by a resin manufacturer for their grade CT 5900 or its nearest equivalent applicable

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.

6) The wholesale price index numbers for 'Manufacture of Basic Metals' and 'Insulators' are as published by the Office of Economic Advisor, Ministry of commerce & Industry, Govt. of India, New Delhi with base 2011-12 = 100

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IEEMA(PVC)/INST.TR_Porcelain Insulator_Above 72.5 KV

Effective from: 1st January 2021

**PRICE VARIATION CLAUSE FOR INSTRUMENT TRANSFORMERS
 USING PORCELAIN INSULATOR FOR ABOVE 72.5 KV**

(Current and Potential Transformers designed for operation on system voltage
 Above 72.5 KV using Porcelain Insulator)

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(20 + 7 \frac{AL}{AL_0} + 12 \frac{C}{C_0} + 10 \frac{ES}{ES_0} + 12 \frac{FE}{FE_0} + 14 \frac{IN}{IN_0} + 6 \frac{IM}{IM_0} + 5 \frac{TO}{TO_0} + 14 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.AL₀ = Price of LME CSP Average of Aluminium (refer notes)This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of tendering.C₀ = Average LME settlement price of Copper wire bars (refer notes)This price is as applicable for the month, **TWO** month prior to the date of tendering.ES₀ = Price of CRGO Electrical Steel Lamination (refer note)This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of tendering.FE₀ = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100)(refer notes)This index number is as applicable for the month, **THREE** month prior to the date of tendering.IN₀ = Whole sale price index of Insulator (refer notes)This index number is as applicable for the month, **THREE** month prior to the date of tenderingIM₀ = Price of Insulating Materials (refer notes)This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of tendering.TO₀ = Price of Transformer Oil (refer notes)This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of tendering.



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IEEMA(PVC)/INST.TR_Porcelain Insulator_Above 72.5 KV**Effective from: 1st January 2021**

W₀ = 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 on the first working day of the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in April 2021, applicable prices of Aluminium (AL₀), CRGO (ES₀), Insulating material (IM₀), Transformer Oil (TO₀) should be as on March 2021 and Copper (C₀) as on February 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W₀) should be for the month of January 2021.

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

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

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of delivery.

C = Average LME settlement price of Copper wire bars (refer notes)

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

ES = Price of CRGO Electrical Steel Lamination (refer note)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of delivery.

FE = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

IN = Whole sale price index of Insulator (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of 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 on the first working day of 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 2021, applicable prices of Aluminium (AL), CRGO (ES), Insulating material (IM), Transformer Oil (TO) should be as on November 2021 and Copper (C) as on October 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W) should be for the month of September 2021.





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IEEMA(PVC)/INST.TR_Porcelain Insulator_Above 72.5 KV**Effective from: 1st January 2021**

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

The date of delivery is the date on which the Instrument Transformer is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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/CV duty amount and exclusive of any other central, state or local taxes etc. Instrument Transforms manufacturers import major raw materials like Copper, CRGO etc. The landed cost of these imported raw materials includes applicable custom duty but exclusive of modvatable CVD
- (b) 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 LME price of Copper Wire Bars (in Rs./MT) is the LME average settlement price of Copper Wire Bars converted into Indian Rupees with applicable average exchange rate of SBI of the month. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty
 - 3) The price of CRGO Electrical Steel Lamination suitable for Instrument Transformers of rating up to 72.5 KV is the average price as quoted by processing centres of mills and lamination suppliers
 - 4) The price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 mm thick, 3200 mm x 4100 mm C&F price in free currency per Kg 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.
 - 6) The wholesale price index numbers for 'Manufacture of Basic Metals' and 'Insulators' are as published by the Office of Economic Advisor, Ministry of commerce & Industry, Govt. of India, New Delhi with base 2011-12 = 100

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IEEMA(PVC)/INST.TR_CVT

Effective from: 1st January 2021

**PRICE VARIATION CLAUSE FOR INSTRUMENT TRANSFORMERS
 For Capacitive Voltage Transformer**

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(18 + 11 \frac{AL}{AL_0} + 6 \frac{C}{C_0} + 6 \frac{ES}{ES_0} + 9 \frac{FE}{FE_0} + 20 \frac{IN}{IN_0} + 13 \frac{IM}{IM_0} + 6 \frac{TO}{TO_0} + 11 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.

AL₀ = Price of LME CSP Average of Aluminium (refer notes)

This price is as applicable on the 1st working day of the month, ONE month prior to the date of tendering.

C₀ = Average LME settlement price of Copper wire bars (refer notes)

This price is as applicable for the month, TWO month prior to the date of tendering.

ES₀ = Price of CRGO Electrical Steel Lamination (refer note)

This price is as applicable on the 1st working day of the month, ONE months prior to the date of tendering.

FE₀ = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100)(refer notes)

This index number is as applicable for the month, THREE month prior to the date of tendering.

IN₀ = Whole sale price index of Insulator (refer notes)

This index number is as applicable for the month, THREE month prior to the date of tendering

IM₀ = Price of Insulating Materials (refer notes)

This price is as applicable on the 1st working day of the month, ONE months prior to the date of tendering.

TO₀ = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of the month, ONE month prior to the date of tendering.





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IEEMA(PVC)/INST.TR_CVT**Effective from: 1st January 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 on the first working day of the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in April 2021, applicable prices of Aluminium (AL_0), CRGO (ES_0), Insulating material (IM_0), Transformer Oil (TO_0) should be as on March 2021 and Copper (C_0) as on February 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W_0) should be for the month of January 2021.

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

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

This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of delivery.

C = Average LME settlement price of Copper wire bars (refer notes)

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

ES = Price of CRGO Electrical Steel Lamination (refer note)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of delivery.

FE = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

IN = Whole sale price index of Insulator (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** month prior to the date of delivery.

IM = Price of Insulating Materials (refer notes)

This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of delivery.

TO = Price of Transformer Oil (refer notes)

This price is as applicable on the 1st working day of 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 on the first working day of 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 2021, applicable prices of Aluminium (AL), CRGO (ES), Insulating material (IM), Transformer Oil (TO) should be as on November 2021 and Copper (C) as on October 2021 and Wholesale price index number for 'Manufacture of Basic Metals', Whole sale price index of 'Insulator' and all India average consumer price index no. (W) should be for the month of September 2021.





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IEEMA(PVC)/INST.TR_CVT**Effective from: 1st January 2021**

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

The date of delivery is the date on which the Instrument Transformer is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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/CV duty amount and exclusive of any other central, state or local taxes etc. Instrument Transformers manufacturers import major raw materials like Copper, CRGO etc. The landed cost of these imported raw materials includes applicable custom duty but exclusive of modvatable CVD
- (b) 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 LME price of Copper Wire Bars (in Rs./MT) is the LME average settlement price of Copper Wire Bars converted into Indian Rupees with applicable average exchange rate of SBI of the month. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty
 - 3) The price of CRGO Electrical Steel Lamination suitable for Instrument Transformers of rating up to 72.5 KV is the average price as quoted by processing centres of mills and lamination suppliers
 - 4) The price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 3 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.
 - 6) The wholesale price index numbers for 'Manufacture of Basic Metals' and 'Insulators' are as published by the Office of Economic Advisor, Ministry of commerce & Industry, Govt. of India, New Delhi with base 2011-12 = 100

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IEEMA(PVC)/INST.TR_Dry Type upto 72.5 KV

Effective from: 1st January 2021**PRICE VARIATION CLAUSE FOR DRY TYPE INSTRUMENT TRANSFORMERS UP TO 72.5 KV**

(Dry Type Current and Potential Transformers designed for operation on system voltage up to 72.5 KV)

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(14 + 26 \frac{C}{C_0} + 22 \frac{ES}{ES_0} + 4 \frac{FE}{FE_0} + 21 \frac{ER}{ER_0} + 13 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.

C₀ = Average LME settlement price of Copper wire bars (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 note)
 This price is as applicable on the 1st working day of the month, **ONE** months prior to the date of tendering.

FE₀ = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100) (refer notes)
 This index number is as applicable for the month, **THREE** month prior to the date of tendering.

ER₀ = Price of epoxy resin (refer notes).
 This price is as applicable on the 1st working day of the month, **ONE** month prior to the date of tendering.

W₀ = 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 on the first working day of the month, **THREE** months prior to the date of tendering.

For example, if date of tendering falls in April 2021, applicable prices of Copper (C₀), CRGO (ES₀), Epoxy Resin (ER₀) as on March 2021 and Wholesale price index number for 'Manufacture of Basic Metals' and all India average consumer price index no. (W₀) should be for the month of January 2021.

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





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IEEMA(PVC)/INST.TR_Dry Type upto 72.5 KV**Effective from: 1st January 2021**

C = Average LME settlement price of Copper wire bars (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 note)

This price is as applicable on the 1st working day of the month, ONE months prior to the date of delivery.

FE = Wholesale price index number for 'Manufacture of Basic Metals' (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, THREE month prior to the date of delivery.

ER = Price of epoxy resin (refer notes).

This price is as applicable on the 1st working day of 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 on the first working day of 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 2021, applicable prices of Copper (C), CRGO (ES), Epoxy Resin (ER) should be as on November 2021 and Wholesale price index number for 'Manufacture of Basic Metals' and all India average consumer price index no. (W) should be for the month of September 2021.

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

The date of delivery is the date on which the Instrument Transformer is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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/CV duty amount and exclusive of any other central, state or local taxes etc. Instrument Transformers manufacturers import major raw materials like Copper, CRGO etc. The landed cost of these imported raw materials includes applicable custom duty but exclusive of modvatable CVD





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IEEMA(PVC)/INST.TR_Dry Type upto 72.5 KV
Effective from: 1st January 2021

(b) The details of prices are as under:

1. The LME price of Copper Wire Bars (in Rs./MT) is the LME average settlement price of Copper Wire Bars converted into Indian Rupees with applicable average exchange rate of SBI of the month. This price is the landed cost, inclusive of applicable customs duty only but exclusive of countervailing duty
2. The price of CRGO Electrical Steel Lamination suitable for Instrument Transformers of rating up to 72.5 KV is the average price as quoted by processing centres of mills and lamination suppliers
3. The price of epoxy resin (in Rs/Kg) is as quoted by a resin manufacturer for their grade CT 5900 or its nearest equivalent applicable
4. The wholesale price index numbers for 'Manufacture of Basic Metals' and 'Insulators' are as published by the Office of Economic Advisor, Ministry of commerce & Industry, Govt. of India, New Delhi with base 2011-12 = 100

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Cir. No.95/DIV/Insu/05

Date: 27 October 2017

To all members of IEEMA Insulator division
SEBs, Utilities and other listed purchasing organizations

Sub: Revision in IEEMA PV clause for Insulators

IEEMA had publishing index number for Insulator based on wholesale price indices for Fuel & Power, Basic Metals, Alloys & Metal Products, Light & Lubricants and Wood & wood products with base January 2003 published by Economic Advisor (MoCI).

From May 2017 Wholesale Price Index Numbers (WPI) published by them has been revised to new base 2011-12=100. Issuance of index numbers as per new base has been started with effect from April 2017 (final indices published for February 2017)

IEEMA Insulator division has therefore decided to revise the PV formula for Insulator incorporating the above change in Whole sale index as the WPIs of old base are not be comparable with the WPIs as per new base nor there is any linking factor.

IEEMA had circulated a Draft PV clause for Porcelain Insulator vide cir. No. 85/DIV/Insu/05 dated 20 September 2017. Since there are no adverse comments received; we are making it operational from 1st March 2017.

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

For pending contracts, for the date of delivery on or after 1st May 2017, 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 as per your base date / date of tendering up to March 2017 i.e. considering all prices/indices published in PV circular of March 2017 at numerator place; using IEEMA PV clause effective from 1st April 2003.
2. Treat the above calculated 'P' as 'P₀' and calculate final price variation considering all prices / indices published in March 2017 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 Insulator effective from 1st March 2017.

A two-step sample calculation is given as annexure.

Senior Director

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Annexure to cir no 95/DIV/Insu/05 dated 27 October 2017

Porcelain Insulator						
Step I			Apr-16	Date of Delivery	Sep-17	Step II
Insulator IEEMA PV clause effective from 1st April 2003						
Weightages	Raw Material	Applicable month as per Date of Tendering	Applicable month as per Date of Delivery	Weightages	Raw Material	Applicable month as per Date of Tendering
15 Fix			(FIXED)	12 Fix		(FIXED)
5 Zn		Mar-16	Mar-17	5 Zn		Mar-17
53 IN-INSLR		Mar-16	Mar-17	22 FP		Jan-17
27 W		Jan-16	Jan-17	27 MP		Jan-17
				10 BC		Mar-17
				7 WP		Jan-17
				17 W		Jan-17
						Prices/indices
15 Fix				12 Fix		
5 Zn		143,900.00	217700	5 Zn		217700
53 IN-INSLR		218.4	241.14	22 FP		93.1
27 W		269	274	27 MP		104.9
				10 BC		4575
				7 WP		130.1
				17 W		274
Price quoted	P ₀ = 100	Step I	P = 108.58	P ₀ = 108.58	Step II final value of P =	99.31
				(value at the end of step I)		
FINAL % VARIATION = (-) 0.69%						

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IEEMA/PVC/INSLR/2017

Effective from 1st March 2017

PRICE VARIATION CLAUSE FOR PORCELAIN INSULATORS

The price quoted/confirmed is based on the cost of raw material and labour cost as on the date of quotation and the same is deemed to be related to the prices of raw material 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 index numbers, the price payable shall be subject to adjustment up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(12 + 5 \frac{Z_n}{Z_{n0}} + 22 \frac{FP}{FP_0} + 27 \frac{MP}{MP_0} + 10 \frac{BC}{BC_0} + 7 \frac{WP}{WP_0} + 17 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.

Z_{n0} = Price of electrolytic high grade zinc (refer notes).

This price is as applicable on the first working day of the month, **ONE** month prior to the date of tendering.

FP₀ = Wholesale price index number for 'Fuel & Power' (Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** months prior to the date of tendering.

MP₀ = Wholesale price index number for 'Manufacture of structural metal products'

(Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** months prior to the date of tendering.

BC₀ = Price of Ball Clay (refer notes)

This price is as applicable on the first working day of the month, **ONE** month prior to the date of tendering.

WP₀ = Wholesale price index number for 'Manufacture Of Wood And Of Products Of Wood And Cork'

(Base: 2011-12=100) (refer notes)

This index number is as applicable for the month, **THREE** months prior to the date of tendering.

W₀ = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base: 2001 = 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 June 2017, the applicable Prices of electrolytic high grade zinc (Z_{n0}) and Ball Clay (BC₀) to be considered for the month of May 2017 whereas wholesale price index numbers for Fuel & Power (FP₀), Manufacture of structural metal products (MP₀), Manufacture Of Wood And Of Products Of Wood And Cork (WP₀) and all India average consumer price index number (W₀) to be considered for the month of March 2017.

The above indices are as published by IEEMA vide IEEMA circular reference IEEMA(PVC)/INSLR (R-1)/_/ prevailing as on first working day of the month _____ i.e., one month prior to the date of tendering.

IEEMA/PVC/INSLR/2017 page 1 of 2

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IEEMA/PVC/INSLR/2017

Effective from 1st March 2017

- Zn** = Price of electrolytic high grade zinc (refer notes).
This price is as applicable on the first working day of the month, **TWO** month prior to the date of delivery.
- FP** = Wholesale price index number for Fuel & Power (Base: 2011-12=100) (refer notes)
This index number is as applicable for the month, **FOUR** months prior to the date of delivery.
- MP** = Wholesale price index number for 'Manufacture of structural metal products' (Base: 2011-12=100) (refer notes)
This index number is as applicable for the month, **FOUR** months prior to the date of delivery.
- BC** = Price of Ball Clay (refer notes).
This price is as applicable on the first working day of the month, **TWO** month prior to the date of delivery.
- WP** = Wholesale price index number for 'Manufacture Of Wood And Of Products Of Wood And Cork'
(Base: 2011-12=100) (refer notes)
This index number is as applicable for the month, **FOUR** months 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: 2001 = 100).
This index number is as applicable for the month **FOUR** months prior to the date of delivery.

For example, if the date of delivery in terms of clause given below falls in December 2017, the applicable Prices of electrolytic high grade zinc (Zn) and Ball Clay (BC) to be considered for the month of October 2017 whereas wholesale price index numbers for Fuel & Power (FP), Manufacture of structural metal products (MP), Manufacture Of Wood And Of Products Of Wood And Cork (WP) and all India average consumer price index number (W) to be considered for the month of August 2017.

The "date of delivery" is the date on which the Insulator is notified as being ready for inspection/despatch (in the absence of such notification, the date of manufacturer's despatch 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 modvatable excise duty and exclusive of any other central, state or local taxes, octroi etc.
- All prices are as on 1st working day of the month.
- The details of the prices considered are as under:
 - The price of ball clay (in Rs/Kg) is the average price of 'N-1' type or equivalent ball clay as quoted by the suppliers.
 - The price of Electrolytic high grade zinc (in Rs/MT) is ex-works price quoted by a primary producer.
 - The wholesale price index numbers for 'Fuel & Power, 'Manufacture of structural metal products', 'Manufacture Of Wood And Of Products Of Wood And Cork' are as published by the Office of Economic Advisor, Ministry of commerce & Industry, Govt. of India, New Delhi with base 2011-12 = 100.


Authorized Signatory
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IEEMA/PVC/INSLR/2017 page 2 of 2

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Cir. No.06/DIV/BTR/CHRG/05

02/01/2001

To: All Members of Switchgear Division. (Battery Charger mailing list)
Members on the CHRG PVC mailing list for Battery Charger.
SEBS & Listed Purchasing Organization.

Sub: Updated price variation clauses for Lead Acid Batteries and for Battery Charger Equipment effective from 1st January 2001.

You are aware that the work of updating IEEMA Price Variation Clauses was under taken during last 18 months. We had circulated drafts of updated clauses highlighting the modifications being carried out requesting users to send their comments.

This exercise was proposed to bring the uniformity in IEEMA's price variation clauses and to amend the workings of the existing clauses giving correct references to the basic prices and indices considered for calculations.

We are now pleased to enclosed a copy of this updated price variation clause effective from 1st January 2001 for your reference and perusal.

From 1st January 2001 onwards, we request you to kindly incorporate these clauses in all your future tenders/contracts.

We will issue the indices applicable to this clause in our standard format every month giving reference to this updated clause. To enable users to claim variation on this basis of earlier clause, we will be circulating the indices applicable to the said earlier clause up to December 2001 only.

We request members to kindly make note of this.

Sr. Executive Officer

N:\p\p\c:\pooja\ pvcclause final



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IEEMA/PVC/BTR/2001

Effective from : 1st January, 2001

PRICE VARIATION CLAUSE FOR LEAD ACID BATTERIES

The price quoted/confirmed is based on the input cost of raw material and labour cost as on the date of quotation and the same is deemed to be related to the price of lead ingot 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 this price/index number, the price payable shall be subject to adjustment up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(40 + 30 \frac{LD}{LD_0} + 30 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.

LD₀ = Price of lead ingot (refer notes).

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

W₀ = All India average consumer price index number for industrial workers, as published by the Labour Bureau, Ministry of Labour, Govt. of India (Base 1982 = 100).

This index number is as applicable for the month, four months prior to the date of tendering.

For example, if the date of tendering falls in May 2001 the applicable price of lead ingot (LD₀) should be that prevailing as on 1st April 2001 and the applicable all India average consumer price index number (W₀) should be for the month of January 2001.

The above prices/indices are as published by IEEMA vide IEEMA circular reference number IEEMA(PVC)/BTR/_/_ prevailing as on first working day of the month i.e., one month prior to the date of tendering.

LD = Price of lead ingot (refer notes).

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

W = All India average consumer price index number for industrial workers (base 1982 = 100) as published by Labour Bureau, Ministry of Labour, Govt. of India.

This index number is as applicable for the month, four months prior to the date of delivery.

For example, if the date of delivery in terms of clause given below falls in December 2001, the applicable price of lead ingot (LD) should be that as published by IEEMA as prevailing on 1st November 2001 and the applicable all India average consumer price index number (W) should be for the month of August 2001.

IEEMA/PVC/BTR/2001

Effective from : 1st January, 2001

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

Note:(a) The price of lead ingot (in Rs/MT) is the ex-works price of 99.97% pure lead as quoted by a primary producer and is exclusive of modvatable excise duty and of any other central, state or local taxes, octroi etc.

For Indian Electrical & Electronics Manufacturers' Association

Sudhakar

Authorised Signatory



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Cir. No. 10/PVC/T & D Project/05**25 May 2022**

To Members of T & D Project Division, SEBs and other listed purchasing bodies.

Sub: New PV formulae for Steel Tubular Pole and Polygonal Pole

Currently Steel poles are increasingly used in distribution network especially in hilly area due to sturdiness and ease of transportation. And in the wake of upcoming scheme of Revamped Distribution network strengthening scheme (RDSS); members of IEEMA T & D project division decided to evolve PV formula for Steel Tubular Poles and Polygonal Poles.

IEEMA has collected costing data, lead time for manufacturing etc. from major manufacturers of poles and in consultation with division arrived at the draft Price Variation Clauses for Steel Tubular Poles and Polygonal Poles and circulated to all stakeholders vide circular no. **14/PVC/T & D Project/05 dated 9 Mar 22** for their comments.

After incorporating changes suggested by the industry stakeholders on the **Steel Tubular Pole and Polygonal Pole** PV formulae; we are making the Price Variation formulae operational from 1st April 2022.

We have enclosed PV clauses applicable for **Steel Tubular Pole and Polygonal Pole** which are effective from 1st April 2022.

Although, the PV clause is made effective from 1st April 2022, practically it can be incorporated in all the current new tenders/contracts starting from 1st May 2022.

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

Director



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IEEMA/PVC/Poles/2022

Effective from: 1st Apr 2022

PRICE VARIATION CLAUSE FOR POLES

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

(A) Steel Tubular Poles

$$P = \frac{P_0}{100} \left(7 + 70 \frac{IS}{IS_0} + 13 \frac{Zn}{Zn_0} + 10 \frac{W}{W_0} \right)$$

(B) Polygonal Poles

$$P = \frac{P_0}{100} \left(9 + 64 \frac{IS}{IS_0} + 13 \frac{Zn}{Zn_0} + 14 \frac{W}{W_0} \right)$$

Wherein,

- P = Price payable as adjusted in accordance with the above formula.
- P₀ = Price quoted/confirmed.
- 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.
- Zn₀ = Price of Electrolytic high grade zinc (refer notes)
 This price is as applicable on the 1st working day of the month, ONE month prior to the date of tendering.
- W₀ = 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) (Refer notes)
 This index number is as applicable for the month, THREE months prior to the date of tendering.

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IEEMA/PVC/Poles/2022**Effective from: 1st Apr 2022**

For example, if date of tendering falls in May 2022, the applicable prices of HR Coil (IS_0) should be for the month March 2022, Zinc (Zn_0) should be for the month April 2022 and all India average consumer price index number (W_0) should be for the month of February 2022.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA (PVC)/TLT-2014 (R-1)/_/ _ **ONE** month prior to the date of tendering.

- IS = Price of HR Coil of 3.15 mm thickness (refer notes)
 This price is as applicable for the month, **FOUR** month prior to the date of delivery.
- Zn = Price of Electrolytic high grade zinc (refer notes)
 This price is as applicable on the 1st working day of 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) (Refer notes)
 This index number is as applicable on the first working day of the month, **THREE** months prior to the date of delivery.

For example, if date of delivery falls in December 2022, the applicable prices of HR Coil (IS) should be for August 2022 and Zinc (Zn) should be for the month 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 Poles are 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 and any other central, state or local taxes etc.

(b) The details of prices are as under:

1. 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.
2. The price of Electrolytic high grade zinc (in Rs/MT) is ex-works price as quoted by a primary producer.


Director

IEEMA/PVC/Poles/2022/Page 2 of 3



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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



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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.

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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

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

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

$$P = P_o + CuF (Cu - Cu_0) + XLFCu(CC-Cco) + SMIFS (SMIF1-SMIF_0) + AIF(Al-Alo) + CCFAI (PVCc - PVCco)$$

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

$$P = P_o + AIF (Al - Alo) + XLFAL(CC-Cco) + SMIF (SMIF1-SMIF_0) + FeF(FeF1-FeF_0) + CCFAI (PVCc - PVCco)$$

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



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Cir. No.: 140/ PVC/DT_PT/05

November 10, 2021

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

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

In light of changes in technology, manufacturing practises and substantial fluctuations in raw material prices over past 6-7 years, IEEMA has decided to revise PV Clauses for Power and Distribution Transformers and evolve new PV formulae for Solar Inverter Duty Transformers considering huge potential of Solar Inverter Duty Transformers in coming period as Renewable and clean energy resources (Solar and Wind) is going to play a major role in the Generation mix.

IEEMA had circulated draft PV clauses of Power and Distribution Transformer and new formula for Solar Inverter Duty Transformers vide Cir. No. 134/PVC/DT_PT/05 dated 30 September 2021. After incorporating changes suggested by the industry stakeholders on the Distribution Transformer PV formulae; we are making all these Price Variation formulae operational from 1st September 2021.

We have enclosed all PV clauses applicable for Power and Distribution Transformer and new formula for Solar Inverter Duty Transformers which are effective from 1st September 2021.

Although, these PV clauses are made effective from 1st September 2021, practically they can be incorporated in all the current new tenders/contracts starting from 1st October 2021.

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

Salient points of the revised Transformer PV formulae:

1. As per contemporary tendering processes, to cover Dist. Transformers of above 10 MVA and Up to 33 KV DTs, definition of Distribution Transformers has been proposed as Transformers Up to 33 KV and definition of Power Transformers has been proposed as Transformers above 33 KV
2. The PV formulae for Distribution Transformers have been made generic by removing reference of BEE or IS 1180 from all PV formulae since practically now almost all Transformers up to 2,500 KVA are manufactured as per IS 1180 and these PV formulae can also be used for non BIS /Non BEE purposes also; if required
3. It was decided to discontinue old PV formulae for Non BIS/Non BEE DTs effective from June 2015 and subsequently discontinuation of publishing applicable price of other CRGO Steel Lamination and price of Aluminium rod (Domestic) from the monthly PV circulars.
4. Copper price source has been proposed as Domestic Copper price of 8 mm since majority of manufacturers procure it locally and it also aligns to price published in other IEEMA PV circulars
5. Common price of CRGO Laminations to be used for all proposed PV formulae
6. Change in lead time period prior to date of delivery for some PV formulae as per contemporary manufacturing practises.



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7. Cost weightages for Distribution Transformer PVCs have been re-worked and revised post the suggestions received from industry stakeholders on the Draft PV formulae.

For pending contracts, for the date of delivery as given below, 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. Applicability of this two stage method is recommended as under:

For Power Transformer up to 400 KV – For Delivery on or after 1st December 2021

For Power Transformer Above 400 KV – For Delivery on or after 1st January 2022

For Distribution Transformer – For Delivery on or after 1st November 2021

1. Calculate price variation 'P' from applicable prices/indices as per your base date / date of tendering up to September 2021 i.e. considering all prices/indices published in PV circular of September 2021 at numerator place; using applicable IEEMA PV clauses of Transformers effective from April / June 2015
2. Treat the above calculated 'P' as 'P₀' and calculate final price variation considering all prices / indices published in PV circular of September 2021 applicable for revised PV clauses of Transformer effective from 1st September 2021 as base prices/indices (at the denominator place) up to the applicable prices/indices as per the date of delivery; applicable as per revised relevant PV clause of Transformer effective from 1st September 2021.

Please find enclosed a sample two stage calculation showing month references for selecting the price/indices as per above method.

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Sample calculation showing month references for two stage method

For Power Transformer up to 400 KV --- Two stage method if delivery period falls on or after 1st December 2021

For e.g. date of tendering - January 2021			Date of delivery - December 2021		
STEP I			STEP II		
	Jan-21	Sep-21		Sep-21	Dec-21
Prices/ Indices	Month applicable for Date of Tendering as per old PV formula	Month applicable for Date of Delivery (FIXED)	Prices/ Indices	Month applicable for Date of Tendering (FIXED)	Month applicable for Date of Delivery as per new PV formula
Fix			Fix		
CU	Dec-20	Sep-21	CU	Sep-21	Oct-21
ES	Dec-20	Sep-21	ES	Sep-21	Oct-21
IS	Dec-20	Sep-21	IS	Sep-21	Oct-21
IM	Dec-20	Sep-21	IM	Sep-21	Oct-21
TO	Dec-20	Sep-21	TO	Sep-21	Nov-21
W	Oct-20	Jul-21	W	Jul-21	Sep-21

For Power Transformer Above 400 KV --- Two stage method if delivery period falls on or after 1st January 2022

For e.g. date of tendering - January 2021			Date of delivery - January 2022		
STEP I			STEP II		
	Jan-21	Sep-21		Sep-21	Jan-22
Prices/ Indices	Month applicable for Date of Tendering as per old PV formula	Month applicable for Date of Delivery (FIXED)	Prices/ Indices	Month applicable for Date of Tendering (FIXED)	Month applicable for Date of Delivery as per new PV formula
CU	Dec-20	Sep-21	CU	Sep-21	Oct-21
ES	Dec-20	Sep-21	ES	Sep-21	Oct-21
IS	Dec-20	Sep-21	IS	Sep-21	Oct-21
IM	Dec-20	Sep-21	IM	Sep-21	Oct-21
TO	Dec-20	Sep-21	TO	Sep-21	Nov-21
W	Oct-20	Jul-21	W	Jul-21	Oct-21

In step I calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/PWR_DIST_TRF of applicable month as per old PV formulae wef Apr 2015

In step II calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/PWR_DIST_TRF (R-1) for applicable month as per new PV formulae wef Sep 2021

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For Distribution Transformer --- Two stage method if delivery period falls on or after 1st November 2021

For e.g. date of tendering - January 2021			Date of delivery - November 2021		
STEP I			STEP II		
	Jan-21	Sep-21		Sep-21	Nov-21
Prices/ Indices	Month applicable for Date of Tendering as per old PV formula	Month applicable for Date of Delivery (FIXED)	Prices/ Indices	Month applicable for Date of Tendering (FIXED)	Month applicable for Date of Delivery as per new PV formula
Fixed			Fixed		
AL/Cu	Dec-20	Sep-21	AL/Cu	Sep-21	Oct-21
ES	Dec-20	Sep-21	ES	Sep-21	Oct-21
IS	Dec-20	Sep-21	IS	Sep-21	Oct-21
IM	Dec-20	Sep-21	IM	Sep-21	Oct-21
TO	Dec-20	Sep-21	TO	Sep-21	Oct-21
W	Oct-20	Jul-21	W	Jul-21	Aug-21

In step I calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/PWR_DIST_TRF of applicable month as per old PV formulae wef Apr 2015

In step II calculation,

prices/indices to be taken from circular ref IEEMA(PVC)/PWR_DIST_TRF (R-1) for applicable month as per new PV formulae wef Sep 2021



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IEEMA/PVC/PWR TRF_Up to 400 KV/2021

Effective from: 1st September 2021

**PRICE VARIATION CLAUSE FOR POWER TRANSFORMERS AND REACTORS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 of voltage above 33 kV and up to 400 kV
 of supplied against domestic contracts**

This price variation clause is applicable for Transformers and Reactors of voltage above 33 kV and up to 400 KV supplied against domestic contracts. A separate price variation clause IEEMA/PVC/PWR TRF_Up to 400 KV/DE/2021 has been evolved for above types of Transformers and Reactors supplied against export/deemed export 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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(6 + 32 \frac{C}{C_0} + 27 \frac{ES}{ES_0} + 12 \frac{IS}{IS_0} + 4 \frac{IM}{IM_0} + 9 \frac{TO}{TO_0} + 10 \frac{W}{W_0} \right)$$

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 note)
This price is as applicable for the month, **ONE** months prior to the date of tendering.
- IS₀ = Average price of steel Plates 10 mm thick (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** months 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.
- W₀ = 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.

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IEEMA/PVC/PWR TRF_Up to 400 KV/2021

Effective from: 1st September 2021

For example, if date of tendering falls in December 2021, applicable prices of Copper Rods (C₀), Steel Plates 10 mm thick (IS₀), CRGO Electrical Steel Laminations (ES₀) and Insulating material (IM₀) and Transformer Oil (TO₀) should be as on 1st November 2021 and all India average consumer price index no. (W₀) should be for the month of 1st 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, **TWO** months prior to the date of delivery.
- ES = Price of CRGO Electrical Steel Lamination (refer note)
This price is as applicable for the month, **TWO** months prior to the date of delivery.
- IS = Average price of Steel Plates 10 mm thick (refer notes)
This price is as applicable for the month, **TWO** months prior to the date of delivery.
- IM = Price of Insulating Materials (refer notes)
This price is as applicable for the month, **TWO** months 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 Rods (C), Insulating material (IM), CRGO Electrical Steel Lamination (ES), Plates 10 mm thick (IS) should be as on 1st October 2022 and Transformer Oil (TO) should be 1st November 2022 and all India average consumer price index no. (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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IEEMA/PVC/PWR TRF_upto 400 KV/2021**Effective from: 1st September 2021**

Note: All prices are exclusive of GST and exclusive of any other central, state or local taxes etc.

a) The details of prices are as under:

1. Price of 8 mm CC copper rod (in Rs./MT) is ex-works price as quoted by the primary producer.
2. The price of CRGO is the price of CRGO Electrical Steel Lamination in Rs./MT suitable for Transformers of voltage above 33 kV and up to 400 kV
3. Price of Steel is the average retail price of steel plates 10 mm thick as published by Joint Plant Committee (JPC) in Rs./MT
4. The price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 10 mm thick, 3200 mm x 4100 mm is the average 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.

b) 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:

$$P = \frac{P_0}{91} \left(6 + 32 \frac{C}{C_0} + 27 \frac{ES}{ES_0} + 12 \frac{IS}{IS_0} + 4 \frac{IM}{IM_0} + 10 \frac{W}{W_0} \right)$$

Where description of P, P₀, C, ES, IS, IM, W etc. remains same as mentioned earlier.

Director

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IEEMA/PVC/PWR TRF_Above 400 KV/2021

Effective from: 1st September 2021

**PRICE VARIATION CLAUSE FOR POWER TRANSFORMERS AND REACTORS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 of voltage Above 400 kV
 of supplied against domestic contracts**

This price variation clause is applicable for Transformers and Reactor of voltage above 400 kV, supplied against domestic contracts. A separate price variation IEEMA/PVC/PWR TRF_Above 400 KV/DE/2021 has been evolved for above types of Transformers and Reactors 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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(9 + 27 \frac{C}{C_0} + 24 \frac{ES}{ES_0} + 10 \frac{IS}{IS_0} + 8 \frac{IM}{IM_0} + 9 \frac{TO}{TO_0} + 13 \frac{W}{W_0} \right)$$

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 note)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.
- IS₀ = Average price of steel Plates 10 mm thick (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.
- W₀ = 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.

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IEEMA/PVC/PWR TRF_Above 400 KV/2021

Effective from: 1st September 2021

For example, if date of tendering falls in December 2021, applicable prices of Copper rods (C_0), Transformer Oil (TO_0), Steel Plates 10 mm thick (IS_0), CRGO Electrical Steel Laminations (ES_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 1st 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, THREE months prior to the date of delivery.
- ES = Price of CRGO Electrical Steel Lamination (refer note)
This price is as applicable for the month, THREE months prior to the date of delivery.
- IS = Average price of Steel Plates 10 mm thick (refer notes)
This price is as applicable for the month, THREE month prior to the date of delivery.
- IM = Price of Insulating Materials (refer notes)
This price is as applicable for the month, THREE months prior to the date of delivery.
- TO = Price of Transformer Oil (refer notes)
This price is as applicable for the month, TWO 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 Rods (C), Insulating material (IM), CRGO Electrical Steel Lamination (ES), Steel Plates 10 mm thick (IS) should be as on 1st September 2022 and Transformer Oil (TO), should be 1st October 2022 and all India average consumer price index no. (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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IEEMA/PVC/PWR TRF_Above 400 KV/2021**Effective from: 1st September 2021**

Note: All prices are exclusive of GST and exclusive of any other central, state or local taxes etc.

c) The details of prices are as under:

1. Price of 8 mm CC copper rod (in Rs./MT) is ex-works price as quoted by the primary producer.
2. The price of CRGO is the price of CRGO Electrical Steel Lamination in Rs./MT suitable for Transformers of voltage above 400 kV
3. Price of Steel is the average retail price of steel plates 10 mm thick as published by Joint Plant Committee (JPC) in Rs./MT
4. The price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 10 mm thick, 3200 mm x 4100 mm is the average 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.

- a) 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:

$$P = \frac{P_o}{91} \left(9 + 27 \frac{C}{C_o} + 24 \frac{ES}{ES_o} + 10 \frac{IS}{IS_o} + 8 \frac{IM}{IM_o} + 13 \frac{W}{W_o} \right)$$

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

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IEEMA/PVC/PWR TRF_Up to 400 KV/DE/2021

Effective from: 1st September 2021

**PRICE VARIATION CLAUSE FOR POWER TRANSFORMERS AND REACTORS
 COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
 of voltage above 33 kV and up to 400 kV
 of supplied against Export/ Deemed Export contracts**

This price variation clause is applicable for Transformers and Reactors of voltage above 33 kV and up to 400 kV, supplied against export/deemed export contracts with duty free inputs under special imprest licensing scheme. A separate price variation clause IEEMA/PVC/PWR TRF_Up to 400 KV/2021 has been evolved for above types of Transformers and Reactors 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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(6 + 32 \frac{C}{C_0} + 27 \frac{ES}{ES_0} + 12 \frac{IS}{IS_0} + 4 \frac{IM}{IM_0} + 9 \frac{TO}{TO_0} + 10 \frac{W}{W_0} \right)$$

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 note)This price is as applicable for the month, **ONE** months prior to the date of tendering.IS₀ = Average price of steel Plates 10 mm thick (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** months 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.W₀ = 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.

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IEEMA/PVC/PWR TRF_Up to 400 KV/DE/2021

Effective from: 1st September 2021

For example, if date of tendering falls in December 2021, applicable prices of Copper Rods (C₀), Steel Plates 10 mm thick (IS₀), CRGO Electrical Steel Laminations (ES₀) and Insulating material (IM₀) and Transformer Oil (TO₀) should be as on 1st November 2021 and all India average consumer price index no. (W₀) should be for the month of 1st 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, **TWO** months prior to the date of delivery.
- ES = Price of CRGO Electrical Steel Lamination (refer note)
 This price is as applicable for the month, **TWO** months prior to the date of delivery.
- IS = Average price of Steel Plates 10 mm thick (refer notes)
 This price is as applicable for the month, **TWO** months prior to the date of delivery.
- IM = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **TWO** months 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 Rods (C), Insulating material (IM), CRGO Electrical Steel Lamination (ES), Plates 10 mm thick (IS) should be as on 1st October 2022 and Transformer Oil (TO) should be 1st November 2022 and all India average consumer price index no. (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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IEEMA/PVC/PWR TRF_upto 400 KV/DE/2021**Effective from: 1st September 2021**

Note: All prices are exclusive of GST and exclusive of any other central, state or local taxes etc.

a) The details of prices are as under:

1. Price of 8 mm CC copper rod (in Rs./MT) is ex-works price as quoted by the primary producer.
2. The price of CRGO is the price of CRGO Electrical Steel Lamination in Rs./MT suitable for Transformers of voltage above 33 kV and up to 400 kV
3. Price of Steel is the average retail price of steel plates 10 mm thick as published by Joint Plant Committee (JPC) in Rs./MT
4. The price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 10 mm thick, 3200 mm x 4100 mm is the average 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.

b) 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:

$$P = \frac{P_o}{91} \left(6 + 32 \frac{C}{C_o} + 27 \frac{ES}{ES_o} + 12 \frac{IS}{IS_o} + 4 \frac{IM}{IM_o} + 10 \frac{W}{W_o} \right)$$

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

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IEEMA/PVC/PWR TRF_Above 400 KV/DE/2021

Effective from: 1st September 2021

**PRICE VARIATION CLAUSE FOR POWER TRANSFORMERS AND REACTORS
COMPLETE WITH ALL ACCESSORIES AND COMPONENTS
of voltage Above 400 kV of
supplied against Export/Deemed Export contracts**

This price variation clause is applicable for Transformers and Reactors of voltage above 400 kV, supplied against export/deemed export contracts with duty free inputs under special imprest licensing scheme. A separate price variation clause IEEMA/PVC/PWR TRF_Above 400 KV/2021 has been evolved for above types of Transformers and Reactors 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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

$$P = \frac{P_0}{100} \left(9 + 27 \frac{C}{C_0} + 24 \frac{ES}{ES_0} + 10 \frac{IS}{IS_0} + 8 \frac{IM}{IM_0} + 9 \frac{TO}{TO_0} + 13 \frac{W}{W_0} \right)$$

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 note)
This price is as applicable for the month, **ONE** month prior to the date of tendering.
- IS₀** = Average price of steel Plates 10 mm thick (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.
- W₀** = 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.



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IEEMA/PVC/PWR TRF_Above 400 KV/DE/2021**Effective from: 1st September 2021**

For example, if date of tendering falls in December 2021, applicable prices of Copper rods (C_0), Transformer Oil (TO_0), Steel Plates 10 mm thick (IS_0), CRGO Electrical Steel Laminations (ES_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 1st 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, **THREE** months prior to the date of delivery.
- ES** = Price of CRGO Electrical Steel Lamination (refer note)
 This price is as applicable for the month, **THREE** months prior to the date of delivery.
- IS** = Average price of Steel Plates 10 mm thick (refer notes)
 This price is as applicable for the month, **THREE** month prior to the date of delivery.
- IM** = Price of Insulating Materials (refer notes)
 This price is as applicable for the month, **THREE** months prior to the date of delivery.
- TO** = Price of Transformer Oil (refer notes)
 This price is as applicable for the month, **TWO** 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 Rods (C), Insulating material (IM), CRGO Electrical Steel Lamination (ES), Steel Plates 10 mm thick (IS) should be as on 1st September 2022 and Transformer Oil (TO), should be 1st October 2022 and all India average consumer price index no. (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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IEEMA/PVC/PWR TRF_Above 400 KV/DE/2021**Effective from: 1st September 2021**

Note: All prices are exclusive of GST and exclusive of any other central, state or local taxes etc.

a) The details of prices are as under:

1. Price of 8 mm CC copper rod (in Rs./MT) is ex-works price as quoted by the primary producer.
 2. The price of CRGO is the price of CRGO Electrical Steel Lamination in Rs./MT suitable for Transformers of voltage above 400 kV
 3. Price of Steel is the average retail price of steel plates 10 mm thick as published by Joint Plant Committee (JPC) in Rs./MT
 4. The price of Insulating materials (in Rs./Kg) of pre-compressed pressboards of size 10 mm thick, 3200 mm x 4100 mm is the average 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.
- b) 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:

$$P = \frac{P_o}{91} \left(9 + 27 \frac{C}{C_o} + 24 \frac{ES}{ES_o} + 10 \frac{IS}{IS_o} + 8 \frac{IM}{IM_o} + 13 \frac{W}{W_o} \right)$$

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

Director

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Cir. No. 35/PVC/T & D Project/05

23rd Nov 2022

To Members of T & D Project Division, SEBs and other listed purchasing bodies.

Sub: Revision in Transmission Line Tower PV formulae

Recently IEEMA T & D project division on deep discussion, considering the current manufacturing practices and volatility in raw material prices members felt the need for revision in current applicable PV formulae for Transmission Line Towers.

IEEMA has collected costing data, lead time for manufacturing etc. from major manufacturers of transmission line tower and in consultation with division arrived at the draft Price Variation Clauses which were circulated to all stake holders for their review and comments. Since there are no adverse comments received; we are making it operational from 1st November 2022.

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

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

For pending contracts, for the date of delivery on or after from 1st February 2023, 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 as per your base date / date of tendering up to November 2022 i.e. considering all prices/indices published in PV circular of November 2022 at numerator place; using applicable IEEMA PV clause of Transmission Line Towers which is effective from April 2014.
2. Treat the above calculated 'P' as 'P₀' and calculate final price variation considering all prices / indices published in PV circular of November 2022 applicable for revised PV clause of Transmission Line Towers effective from 1st November 2022 as base prices/indices (at the denominator place) up to the applicable prices/indices as per the date of delivery; applicable as per revised relevant PV clause of Transmission Line Tower effective from 1st November 2022.

Director

proud partners in implementation



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IEEMA/PVC/TLT/2022

Effective from: 1st November 2022

PRICE VARIATION CLAUSE FOR TRANSMISSION LINE TOWERS

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 and index numbers, the price payable shall be subject to adjustment, up or down in accordance with the following formula:

(A) Transmission Line Tower with both Heavy and Light angles

$$P = \frac{P_0}{100} \left(09 + 35 \frac{SBLR}{SBLR_0} + 27 \frac{SBIR}{SBIR_0} + 13 \frac{Zn}{Zn_0} + 16 \frac{W}{W_0} \right)$$

(B) Transmission Line Tower with only Heavy angles

$$P = \frac{P_0}{100} \left(09 + 63 \frac{SBLR}{SBLR_0} + 12 \frac{Zn}{Zn_0} + 16 \frac{W}{W_0} \right)$$

(C) Transmission Line Tower with only Light angles

$$P = \frac{P_0}{100} \left(09 + 60 \frac{SBIR}{SBIR_0} + 14 \frac{Zn}{Zn_0} + 17 \frac{W}{W_0} \right)$$

Wherein,

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

P₀ = Price quoted/confirmed.

SBLR₀ = Price of Steel Blooms- Retail (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.

SBIR₀ = Price of Steel Billets- Retail (refer notes)
 This price is as applicable for the month, **ONE** month prior to the date of tendering.

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IEEMA/PVC/TLT/2022**Effective from: 1st November 2022**

- Zn₀** = Price of Electrolytic high grade zinc (refer notes)
 This price is as applicable for the month, ONE month prior to the date of tendering.
- W₀** = 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) (Refer notes)
 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 November 2023, the applicable prices of Steel Bloom-Retail (SBLR₀), Steel Billets-Retail (SBIR₀) and Zinc (Zn₀) should be for the month October 2023 and all India average consumer price index number (W₀) should be for the month of August 2023.

The above prices and indices are as published by IEEMA vide circular reference number IEEMA (PVC)/TLT-2022/_/_ ONE month prior to the date of tendering.

- SBLR** = Price of Steel Bloom-Retail (refer notes)
 This price is as applicable for the month, TWO months prior to the date of delivery.
- SBIR** = Price of Steel Billets-Retail (refer notes)
 This price is as applicable for the month, TWO months prior to the date of delivery.
- Zn** = Price of Electrolytic high grade zinc (refer notes)
 This price is as applicable for the month, TWO months 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) (refer notes)
 This index number is as applicable for the month, FOUR months prior to the date of delivery.

For example, if date of delivery falls in December 2023, the applicable prices of Steel Bloom-Retail (SBLR), Steel Billets-Retail (SBIR) and Zinc (Zn) should be for the month October 2023 and all India average consumer price index number (W) should be for the month of August 2023.

The date of delivery is the date on which Transmission line towers are 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: 1st November 2022

- Notes: (a) All prices of raw materials are exclusive of GST and any other central, state or local axes etc.
- (b) The details of prices are as under:
1. The prices of Steel Bloom-Retail are the average Retail price of Blooms of size 150 x 150 mm of all cities in Rs/MT; as published by Joint Plant Committee (JPC), Kolkata. **Heavy angles of size above 110mm x 110mm are deemed to be related to this price.**
 2. The prices of Steel Billet-Retail are the average Retail price of Billets of size 100 mm of all cities in Rs/MT; as published by Joint Plant Committee (JPC), Kolkata. **Light angles of size below & including 110mm x 110mm are deemed to be related to this price.**
 3. The price of Electrolytic high grade zinc (in Rs/MT) is ex-works price as quoted by a primary producer.

Director

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Price variation on Erection, Testing and Commissioning:

Price variation on erection, testing and commissioning, as applicable, will be reimbursable/recoverable on each monthly bill submitted by the contractor as per the following formula: -

The percentage variation on the net amount of erection bill

$$= [(I - I_0)/I_0] \times 85$$

Where,

I_0 = Consumer Price Index Number for Industrial Workers - All India - Published in R.B.I. Bulletin for the base period.

I = Consumer Price Index Number for Industrial Workers - All India - Published in R.B.I. Bulletin for the average price index of the 3 months of the quarter under consideration. In case, due to unavoidable reasons, measurements of work executed during the quarterly period are delayed beyond the next quarterly period, the benefit of the price variation in erection due to such delay shall not be allowed to the contractor.

The Base Month for 'Price Variation Clause' shall be taken as month 28 days prior to opening of tender including extensions, if any, unless otherwise stated elsewhere.