Price Variation Formulae for cables –Annexure-I

1. Prices shall be variable as per price variation formulae given below (basis-IEEMA). The price variation shall be limited to + 10% of total ex-works price actually supplied (cable size wise) and –ve price variation shall be unlimited. Rates for working out price variation shall be as per rates published by IEEMA for the factors given below:-

Sl no.	FORMULAE	Table Ref	Remarks
1.	P= Po+AIF(AL-Alo) + CCFAI(CC-CCo) + FeF(Fe-Feo)	As per Annexure-II	Steel strip armouring
2.	P= Po+AIF(AL-Alo) + CCFAI(CC-CCo) + FeW(Fe-Feo)		Round wire steel armouring
3.	P= Po+CuF(Cu-Cuo) + CCFCu(CC-CCo) + FeF(Fe-Feo)+ALF(Al-Alo)		Steel strip armouring
4.	P= Po+CuF(Cu-Cuo) + CCFCu(CC-CCo) + FeW(Fe-Feo)+ALF(Al-Alo)		Round wire steel armouring

Note:

i) Formula at sl. no. 1 & 3 are as per circular no. IEEMA (PVC)/CABLE/2007 dtd 01/01/2007

ii) Formula at sl. no. 2 & 4 are as per circular no. IEEMA (PVC)/CABLE/2007 dtd 01/01/2007 & table P3 (revised) of circular no. 50/PVC/CLAR/02 dtd 07/03/2012.

iii) For formulae at sl. no. 1 & 2: for unarmoured cable FeF & FeW = 0

iv) For formulae at sl. no. 3 & 4: FeF=0; if Al armouring is there, ALF =0; if steel armouring is there. For unarmoured cable ALF & FeF=0.

2. **Base date for prices :**

Initial Price (As per IEEMA) for-Alo, Cuo, CCo & Feo:
Base Date shall be- 1st working day of the previous month to the date of issue of tender enquiry.

Final Price (as per IEEMA) for- Al, Cu, Cc & Fe:
The first working day of month, one month prior to the date on which cable is notified as being ready for inspection i.e TPIA inspection call raise date on web portal.

3. Variation factor value for ALF, CuF, CCFAL, CCFCu, FeF & FeW, as applicable shall be as per Technical Specification.

4. PVC shall be payable within contractual delivery period (including any extension thereto).

Aluminium conductor cables

S. No.	Cable Type	AlF		CCFAl	FeF	FeW	IEEMA Formula
		Single core unarmoured & Multi core	Single Core armoured				
1	HT XLPE Power cable	ALP	H1	H2	H3	H5	Sl. No. 1 or 2 of Annexure-I
2	LT XLPE Power Cable	ALP	L1	L2	L3	L3 (Additional)	Sl. No. 1 or 2 of Annexure-I
3	LT PVC Power Cable	ALP	P1	P2	P3	P3 (Revised_07 March 2012)	Sl. No. 1 or 2 of Annexure-I
4	LT HRPVC Power Cable	ALP	P1	P2	P3	P3 (Revised_07 March 2012)	Sl. No. 1 or 2 of Annexure-I

Copper conductor cables

S. No.	Cable Type	CuF	AlF	CCFCu	FeF	FeW	IEEMA Formula
			Single Core armoured				
1	HT XLPE Power cable	CUP	H4	H2	H3	H5	Sl. No. 3 or 4 of Annexure-I
2	LT XLPE Power Cable	CUP	L4	L2	L3	L3 (Additional)	Sl. No. 3 or 4 of Annexure-I
3	LT PVC Power Cable	CUP	P4	P2	P3	P3 (Revised_07 March 2012)	Sl. No. 3 or 4 of Annexure-I
4	LT HRPVC Power Cable	CUP	P4	P2	P3	P3 (Revised_07 March 2012)	Sl. No. 3 or 4 of Annexure-I
5	LT XLPE Control Cable	CUC	--	L5	L6	L6 (Additional)	Sl. No. 3 or 4 of Annexure-I
6	LT PVC Control Cable	CUC	--	P5	P6	P6 (Revised_07 March 2012)	Sl. No. 3 or 4 of Annexure-I
7	LT HRPVC Control Cable	CUC	--	P5	P6	P6 (Revised_07 March 2012)	Sl. No. 3 or 4 of Annexure-I
8	LT XLPE Fire Survival Power Cable	CUP	L4	L2	L3	L3 (Additional)	Sl. No. 3 or 4 of Annexure-I
9	LT XLPE Fire Survival Control Cable	CUC	--	L5	L6	L6 (Additional)	Sl. No. 3 or 4 of Annexure-I
10	LT EPR Fire Survival Power Cable	CUP	L4	L2	L3	L3 (Additional)	Sl. No. 3 or 4 of Annexure-I
11	LT EPR Fire Survival Control Cable	CUC	--	L5	L6	L6 (Additional)	Sl. No. 3 or 4 of Annexure-I
12	Screened control Cable (Overall screen)	Cu POS	--	--	Fe POS	Fe POS	Sl. No. 3 or 4 of Annexure-I
13	Screened control Cable (Individual & Overall screen)	Cu PIS	--	--	Fe PIS	Fe PIS	Sl. No. 3 or 4 of Annexure-I

Notes

(i) L3 (Additional) & L6 (Additional) tables shall be as per IEEMA circular No. 119/DIV/CAB/05 dated 01.07.2010.

(ii) P3 (Revised_07 March 2012) & P6 (Revised_07 March 2012) tables shall be as per IEEMA circular No. 50/PVC/CLAR/02 dated 07.03.2012.

(iii) Cu POS, Cu PIS, Fe POS & Fe PIS tables shall be as per IEEMA circular No. 89/DIV/Cable/05 dated 11.07.2014.

(iv) All other tables shall be as per IEEMA circular No. 36/DIV/CAB/05 dated 06.01.2007.

Terms used in PVC formulae:

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

Po= Price quoted/confirmed (in Rs./km).

1 **ALUMINIUM**

ALF = Variation factor for aluminum.

Al =Price of EC grade aluminium rods (Properzi rods).

Alo = Price of EC grade aluminium rods (Properzi rods).

2 **COPPER**

CuF =Variation factor for copper.

Cu = Price of CC copper rods.

Cuo = Price of CC copper rods.

3 **PVC COMPOUND /POLYMER**

Cc = Price of PVC compound.

Cco= Price of PVC compound.

CCFAL= Variation factor for PVC compound/Polymer for aluminum conductor cable.

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

4 **STEEL**

FeF =Variation factor for steel strip armouring.

FeW=Variation factor for round wire steel armouring.

Fe= Price of steel strips/steel wire.

Feo= Price of steel strips/steel wire.

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501 kakad chambers,
132 dr. a. b. road, worli,
mumbai 400 018
india

p 91 22 2493 0532
f 91 22 2493 2705
e mumbai@ieema.org
w www.ieema.org

IEEMA (PVC)/CABLE/2007 **Effective from: 1st January 2007**

Material Price Variation Clause For PVC And XLPE Insulated Cables

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

Terms used in price variation formulae:

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

Po Price quoted/confirmed (in Rs/Km)

ALUMINIUM

AlF Variation factor for aluminium

Al Price of EC grade aluminiujm rods (Properzi rods). This price is as applicable of first working day of the month, one month prior to the date of delivery.

Alo Price of EC grade aluminium rods (properzi rods). This price is as applicable on first working day of the month, one month prior to the date of tendering.

COPPER

CuF Variation factor for copper

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

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

PVC COMPOUND/POLYMER

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

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

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

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

delhi
804, surya kiran,
19, kasturba gandhi marg,
new delhi 110001, india
p +91-11-2373 3013/14,
f +91-11-2373 3015
e delhi@ieema.org

bangalore
204, swiss complex,
33, race course road,
bangalore 560 001, india
p +91-80-2220 1316/1318
f +91-80-2220 1317
e bangalore@ieema.org

kolkata
503a, oswal chambers,
2, church lane,
kolkata 700 001, india
p +91-33-22131326
f +91-33-22131326
e kolkata@ieema.org

IEEMA (PVC)/CABLE/2007 **Effective from: 1st January 2007**

STEEL

FeF	Variation factor for steel
FeW	Variation factor for round wire steel armouring
Fe	Price of Steel Strips/steel wire. This price is as applicable on the first working day of the month, one month prior to the date of delivery.
Feo	Price of steel strips/steel wire. This price is as applicable on first working day of the month, one month prior to the date of tendering.

The above prices and indices are as published by IEEMA vide Circular reference IEEMA(PVC)/CABLE/--/-- 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 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 are as under:

1 The price of aluminum (in Rs/MT) is the average ex-works price of EC grade aluminium rods quoted by the primary producers confirming to specification IS: 5484

2. Price of PVC Compound (in Rs/MT) is the ex-works price, as quoted by the manufacturer.

3. Price of CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.

4. Price of galvanized steel strip / steel wire (in Rs/MT) is ex-works price as quoted by the manufacturer for Round steel Wire and Flat steel strip (the relevant price of steel strip or steel wire is to be selected depending upon the type of armouring of the cable).

IEEMA (PVC)/CABLE/2007 Effective from: 1st January 2007

Price variation formulae for 'Power Cables'

A. Aluminum conductor PVC insulated 1.1 kV power cables

P = Po + AlF (AL – Alo) + CCFAl (CC – Cco) + FeF (Fe - Feo)

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

Table References:

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

B. Copper conductor PVC insulated 1.1 kV power cables

P = Po + CuF (Cu – Cuo) + CCFCu (CC – Cco) + Fef (Fe – Feo) + AlF (Al – Alo)

For steel armoured cables; AlF = 0 For aluminium armoured cables; FeF = 0
For unarmoured cables; FeF, AlF = 0

Tables References:

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

C. Copper conductor PVC insulated 1.1 kV control cables

P = Po + CuF (Cu – Cuo) + CCFCu (CC-Cco) + FeF (Fe-Feo)

For unarmoured cables; FeF = 0

Tables References:

CUC	Copper conductor
P5	PVC compound
P6	Steel armour

D. Aluminium Conductor XLPE insulated 1.1 kV power cables

P = Po + AlF (AL – Alo) + CCFAl (CC – Cco) + FeF (Fe – Feo)

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

Table References:

ALPAluminium conductor in single core unarmoured & multicore cables

L1	Aluminium conductor + aluminium armour in single core armoured cables
L2	Polymer
L3	Steel armour

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E. Copper conductor XLPE insulated 1.1 kV power cables

P = Po + CuF (Cu – Cuo) + CCFCu (CC – Cco) + FeF (Fe – Feo) + AlF (Al – Alo)

For steel armoured cables; AlF = 0 For aluminium armoured cables; FeF = 0
For unarmoured cables; FeF, AlF = 0

Table References:

CUP	Copper conductor
L2	Polymer
L3	Steel armour
L4	Aluminium armour

F. Copper Conductor XLPE insulated 1.1 kV control cables

P = Po + CuF (Cu – Cuo) + CCFCu (CC – CCO) + FeF (Fe – Feo)
For unarmoured cables; FeF = 0

Table References:

CUC	Copper conductor
L5	Polymer
L6	Steel armour

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

P = Po + AlF (Al – Alo) + CCFAl (Cc – Cco) + FeF (Fe – Feo)

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

Table Refernces:

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

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

P = Po + CuF (Cu – Cuo) + CCFCu (CC – Cco) + FeF (Fe – Feo) + AlF (Al – Alo)

For steel armoured cables; AlF = 0 For aluminium armoured cables; FeF = 0
For unarmoured cables; FeF, AlF = 0

Table References:

CUP	Copper conductor
H2	Polymer
H3/H5	Steel armour (Flat/Round)
H4	Aluminium armour

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 CUC

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

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

TABLE P1

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

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

TABLE P2

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

Nominal cross Sectional Area (in Sq. mm)	1 core	2 core		3 core		3.5 core		4 core	
	Unarm	Unarm	arm	Unarm	arm	Unarm	arm	Unarm	arm
2.5	0.079	0.125	0.139	0.141	0.157	-	-	0.161	0.179
4	0.094	0.140	0.156	0.164	0.182	-	-	0.188	0.209
6	0.101	0.154	0.171	0.179	0.199	-	-	0.198	0.220
10	0.114	0.194	0.216	0.214	0.238	-	-	0.249	0.277
16	0.142	0.234	0.246	0.279	0.290	-	-	0.328	0.345
25	0.171	0.288	0.303	0.364	0.383	0.422	0.444	0.443	0.466
35	0.189	0.321	0.338	0.408	0.429	0.489	0.515	0.498	0.524
50	0.211	0.411	0.433	0.508	0.535	0.613	0.645	0.647	0.681
70	0.241	-	-	0.613	0.645	0.707	0.744	-	-
95	0.284	-	-	0.795	0.811	0.908	0.927	-	-
120	0.339	-	-	0.866	0.884	1.024	1.045	-	-
150	0.388	-	-	1.070	1.092	1.289	1.315	-	-
185	0.450	-	-	1.310	1.337	1.499	1.530	-	-
225	0.521	-	-	1.586	1.618	1.840	1.878	-	-
240	0.534	-	-	1.649	1.683	1.990	2.031	-	-
300	0.653	-	-	2.007	2.048	2.361	2.409	-	-
400	0.770	-	-	2.437	2.487	2.616	2.669	-	-
500	0.936	-	-	3.117	3.181	3.687	3.762	-	-
630	1.175	-	-	-	-	-	-	-	-
800	1.433	-	-	-	-	-	-	-	-
1000	1.642	-	-	-	-	-	-	-	-

TABLE P3

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

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

TABLE P4

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

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

TABLE P5

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

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

TABLE P6

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

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

TABLE L1

VARIATION FACTOR FOR ALUMINIUM (AIF)
ALULMINIUM ARMOURED SINGLE CORE XLPE INSULATED 1.1 KV CABLES

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

TABLE L2

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

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

TABLE L3

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

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

TABLE L4

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

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

TABLE L5

VARIATION FACTOR FOR POLYMER (CCFCu)
XLPE INSULATED CONTROL CABLES WITH COPPER CONDUCTOR

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

TABLE L6

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

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

TABLE H1

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

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

TABLE H2

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

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

Fillers added in PVC consumption

TABLE H3

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

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

TABLE H4

VARIATION FACTOR FOR ALUMINIUM (AIF)
XLPE INSULATED SINGLE CORE 3.3 TO 33 KV POWER CABLES WITH COPPER CONDUCTOR

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

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501 kakad chambers
132 dr. a. b. road, worli,
mumbai 400 018
india

p +91 22 2493 0532
f +91 22 2493 2705
e mumbai@ieema.org
w www.ieema.org

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Cir. No.: 119/DIV/CAB/05

1st July 2010

To Members of IEEMA Cable Division, All SEBs, Utilities & Listed purchasing organizations

Sub: Round Wire "W" Steel Factors for various types of Cables

IEEMA Cable division members have decided to evolve new Round Wire steel factors for LT & HT cables which are missing in the existing tables of factors since some of the users were procuring such types of cables and demanding these factors.

After collecting and compiling inputs from leading manufacturers and receiving approval from IEEMA Cable division; we are publishing the following Round Wire "W" steel factors (FeF) and accordingly enclosing following Additional tables of factors for your perusal and records.

- P3 - PVC insulated 1.1 KV Power Cables with Copper/ Aluminium Conductor
- L3 – XLPE insulated 1.1 KV Power Cables with Copper/ Aluminium Conductor
- P6 – PVC Insulated Control Cables with Copper Conductor
- L6 – XLPE Insulated Control Cables with Copper Conductor

We have also added factors for XLPE insulated 3.3 to 33 KV Power Cables with Copper/ Aluminium Conductor of 25 sq. mm. cross sectional area and only for 33KV (E) power cable of 50 sq. mm. cross sectional area. Accordingly, the updated Table H3 is also enclosed for your perusal and records.

Executive Officer

Encl: as above

delhi
804, surya kiran,
19, kasturba gandhi marg,
new delhi 110001, india
p +91 11 2373 3013 / 14
f +91 11 2373 3015
e delhi@ieema.org

bangalore
204, swiss complex,
33, race course road,
bangalore 560 001, india
p +91 80 2220 1316 / 1318
f +91 80 2220 1317
e bangalore@ieema.org

kolkata
503a, oswal chambers,
2, church lane,
kolkata 700 001, india
p +91 33 6510 7855
f +91 33 2213 1326
e kolkata@ieema.org

TABLE P3 (Additional)

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

Nominal Cross Sectional Area (in sq. mm)	2 Core	3 Core	3 .5 Core	4 Core
1.5	0.247	0.259		0.288
2.5	0.273	0.301		0.329
4	0.305	0.335		0.363
6	0.348	0.363		0.407
10	0.392	0.407		0.533
16	0.439	0.523	0.014	0.573
25	0.526	0.625	0.664	0.685
35	0.591	0.685	0.729	0.761
50	0.661	0.790	0.864	1.108
70	0.745	1.122	1.200	1.256
95	1.085	1.286	1.376	1.443
120	1.147	1.386	1.479	1.562
150	1.267	1.526	1.684	2.173
185	1.403	2.090	2.315	2.421
240	1.994	2.397	2.641	2.722
300	2.180	2.642	3.670	3.842
400	2.987	3.728	4.126	4.292
500	3.517	4.226	5.958	6.301
630	4.774	6.018	6.737	7.141

TABLE L3 (Additional)

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

Nominal Cross Sectional Area (in sq. mm)	2 Core	3 Core	3.5 Core	4 Core
4	0.305	0.335		0.363
6	0.348	0.363		0.407
10	0.392	0.407		0.434
16	0.405	0.503	0.014	0.536
25	0.492	0.582	0.618	0.644
35	0.541	0.649	0.684	0.717
50	0.616	0.740	0.782	0.818
70	0.708	1.069	1.161	1.212
95	1.011	1.202	1.299	1.348
120	1.091	1.306	1.407	1.483
150	1.206	1.470	1.649	2.084
185	1.341	2.017	2.194	2.328
240	1.882	2.280	2.483	2.619
300	2.059	2.542	2.958	3.713
400	2.352	3.559	3.926	4.120
500	3.347	4.058	5.278	6.132
630	3.735	5.744	6.672	6.876

TABLE P6 (Additional)

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

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

TABLE L6 (Additional)

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

No. of Cores	Core size 1.5 sq mm	Core size 2.5 sq mm
2	0.243	0.277
3	0.257	0.289
4	0.277	0.314
5	0.303	0.342
6	0.329	0.379
7	0.329	0.379
8	0.408	0.404
9	0.411	0.430
10	0.423	0.557
12	0.434	0.563
14	0.458	0.595
16	0.557	0.621
19	0.581	0.659
24	0.682	0.779
27	0.697	0.779
30	0.715	0.812
33	0.758	0.856
37	0.812	1.016
44	0.864	1.238
48	0.849	1.222
52	0.904	1.298
56	0.900	1.275
61	1.206	1.374

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mumbai 400 018
india

p +91 22 2493 0532
f +91 22 2493 2705
e mumbai@ieema.org
w www.ieema.org

Cir. No. 50/PVC/CLAR/02 March 07, 2012

To members of Cable division, Utilities, SEBs, listed purchasing organizations

Sub: Revision in Table P3 and P6 providing Round Wire 'W' Steel Factors for various types of Cables.

We have issued Cir. No. 119/DIV/CAB/05 dated 1st July, 2010 providing Round Wire 'W' Steel Factors for various types of Cables.

It is observed that IEEMA factors for round wire steel (FeF) for 2 core and 3 core of 2.5 sq. mm. cross sectional area for Copper conductor PVC power cables (table P3) & Copper conductor PVC Control cables (table P6) are indicated different.

After discussion with IEEMA Cable division members during the meeting held on 21st February 2012, it has been decided to have identical/same factors for both these types of Cables. Accordingly revised and updated tables are enclosed herewith. We request members to use these tables henceforth. Revised table references are as under

P3 – PVC insulated 1.1 kV Power Cables with Copper/Aluminium Conductor
P6 – PVC insulated Control Cables with Copper Conductor

Assistant Director
PVC & Statistics

Encl: Revised tables P3 and P6

delhi
804, surya kiran,
19, kasturba gandhi marg,
new delhi 110 001, india
p +91 11 2373 3013 / 14
f +91 11 2373 3015
e delhi@ieema.org

bangalore
204, swiss complex,
33, race course road,
bangalore 560 001, india.
p +91 80 2220 1316 / 1318
f +91 80 2220 1317
e bangalore@ieema.org

kolkata
503a, oswal chambers,
2, church lane,
kolkata - 700 001, india
p +91 33 6510 7855
f +91 33 2213 1326
e kolkata@ieema.org

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TABLE P3 (Revised_07 March 2012)

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

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

TABLE P6 (Revised_07 March 2012)

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

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

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501, Kakad Chambers
132, Dr. Annie Besant Road, Worli
Mumbai 400018
India

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

Cir. No: 89/DIV/Cable/05 11 July 2014

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

Sub: Price Variation Clause for 'Instrumentation Cables'

Members of IEEMA Cable division especially Instrumentation Cable manufacturers had decided to evolve a new PV clause for 'Instrumentation Cables'. Members may recall IEEMA has circulated draft PV clause for 'Instrumentation Cables' after collection & compilation of all the necessary data from manufactures vide circular no. 40/DIV/Cable/05 dated 21st March 2014.

These PV formulae are derived on weight basis, the weight of raw materials like Copper and Steel is considered for following different type of Instrumentation Cables:

1. **Pair Instrumentation Over all Screen Cables**
2. **Pair Instrumentation Individual and Over all Screen Cables**
3. **Triad Instrumentation Over all Screen Cables**
4. **Triad Instrumentation Individual and Over all Screen Cables**

The weight factors of Copper & Steel for all the above four types of Cables are also enclosed along with draft PV clause.

We are making this PV clause operational with effect from 1st July 2014. We request and recommend to incorporate this new PV clause in all your tenders/contracts of purchase/supply of Instrumentation Cables.

Deputy Director General

Encl: as above

New Delhi
Rishyamook Building, First Floor
85 A, Panchkuian Road
New Delhi 110001, India
P: +91 11 2336 3013/14
F: +91 11 2336 3015
E: delhi@ieema.org

Bangalore
204, Swiss Complex
33, Race Course Road
Bangalore 560001, India
P: +91 80 2220 1316/18
F: +91 80 2220 1317
E: bangalore@ieema.org

Kolkata
503 A, Oswal Chambers
2, Church Lane
Kolkata 700001, India
P: +91 33 6510 7855
F: +91 33 2213 1326
E: kolkata@ieema.org

ieema
your link to electricity

501, Kakad Chambers
132, Dr. Annie Besant Road, Worli
Mumbai 400018
India

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

IEEMA (PVC)/Instrumentation Cable/2014 **Effective from: 1st July 2014**

Material Price Variation Clause For Instrumentation Cables

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

Terms used in price variation formulae:

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

Po Price quoted/confirmed **(in Rs/Km)**

COPPER

CuF Variation factor for copper

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

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

STEEL

FeF Variation factor for steel

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.

Fe_o Price of steel strips/steel wire. This price is as applicable on first working day of the month, one month prior to the date of tendering.

The above prices and indices are as published by IEEMA vide Circular reference IEEMA(PVC)/CABLE/--/-- 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.

New Delhi
Rishyamook Building, First Floor
85 A, Panchkuian Road
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E: delhi@ieema.org

Bangalore
204, Swiss Complex
33, Race Course Road
Bangalore 560001, India
P: +91 80 2220 1316/18
F: +91 80 2220 1317
E: bangalore@ieema.org

Kolkata
503 A, Oswal Chambers
2, Church Lane
Kolkata 700001, India
P: +91 33 6510 7855
F: +91 33 2213 1326
E: kolkata@ieema.org

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IEEMA (PVC)/Instrumentation Cable/2014 **Effective from: 1st July 2014**

Notes

(a) All prices of raw materials 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 are as under:

1. Price of CC copper rods (in Rs/MT) is ex-works price as quoted by the primary producer.
2. 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 formula for 'Instrumentaion Cables'

P = Po + CuF (Cu – Cuo) + FeF (Fe – Feo)

1. **For Pair Instrumentation Over all Screen Cables**

Tables References:

Cu POS Copper Factor
Fe POS Steel Factor

2. **For Pair Instrumentation Individual and Over all Screen Cables**

Tables References:

Cu PIS Copper Factor
Fe PIS Steel Factor

3. **For Triad Instrumentation Over all Screen Cables**

Tables References:

Cu TOS Copper Factor
Fe TOS Steel Factor

4. **For Triad Instrumentation Individual & Overall Screen Cables**

Tables References:

Cu TIS Copper Factor
Fe TIS Steel Factor

Deputy Director General

Copper Factors for Instrumentation Cables - CuF

Cu POS

Pair Instrumentation Over all Screen Cables					
No. of Pairs Cable size in sq.mm	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.0142	0.0185	0.0233	0.0326	0.0500
2	0.0258	0.0345	0.0440	0.0625	0.0978
3	0.0353	0.0484	0.0626	0.0904	0.1433
4	0.0448	0.0623	0.0811	0.1183	0.1888
5	0.0578	0.0800	0.1022	0.1467	0.2356
6	0.0662	0.0926	0.1210	0.1768	0.2829
7	0.0756	0.1067	0.1378	0.2000	0.3245
8	0.0852	0.1204	0.1582	0.2327	0.3741
9	0.0933	0.1334	0.1734	0.2534	0.4134
10	0.1046	0.1485	0.1959	0.2893	0.4665
11	0.1111	0.1600	0.2089	0.3067	0.5023
12	0.1236	0.1764	0.2333	0.3452	0.5580
13	0.1289	0.1867	0.2445	0.3600	0.5912
14	0.1378	0.2000	0.2623	0.3867	0.6356
15	0.1467	0.2134	0.2800	0.4134	0.6801
16	0.1618	0.2322	0.3080	0.4573	0.7409
17	0.1645	0.2400	0.3156	0.4667	0.7690
18	0.1734	0.2534	0.3334	0.4934	0.8134
19	0.1822	0.2667	0.3512	0.5201	0.8579
20	0.1911	0.2800	0.3689	0.5467	0.9023
21	0.2000	0.2934	0.3867	0.5734	0.9468
22	0.2089	0.3067	0.4045	0.6001	0.9912
23	0.2178	0.3200	0.4223	0.6267	1.0357
24	0.2381	0.3437	0.4575	0.6813	1.1068
25	0.2356	0.3467	0.4578	0.6801	1.1246
26	0.2445	0.3600	0.4756	0.7068	1.1690
27	0.2534	0.3734	0.4934	0.7334	1.2135
28	0.2623	0.3867	0.5112	0.7601	1.2579
29	0.2711	0.4001	0.5290	0.7868	1.3024
30	0.2800	0.4134	0.5467	0.8134	1.3468
31	0.2889	0.4267	0.5645	0.8401	1.3913
32	0.2978	0.4401	0.5823	0.8668	1.4357
33	0.3067	0.4534	0.6001	0.8934	1.4802
34	0.3156	0.4667	0.6179	0.9201	1.5246
35	0.3245	0.4801	0.6356	0.9468	1.5691
36	0.3334	0.4934	0.6534	0.9735	1.6135
37	0.3423	0.5067	0.6712	1.0001	1.6580
38	0.3512	0.5201	0.6890	1.0268	1.7024
39	0.3600	0.5334	0.7068	1.0535	1.7469
40	0.3689	0.5467	0.7245	1.0801	1.7913
41	0.3778	0.5601	0.7423	1.1068	1.8358
42	0.3867	0.5734	0.7601	1.1335	1.8802
43	0.3956	0.5867	0.7779	1.1601	1.9247
44	0.4045	0.6001	0.7957	1.1868	1.9691
45	0.4134	0.6134	0.8134	1.2135	2.0136
46	0.4223	0.6267	0.8312	1.2402	2.0580
47	0.4312	0.6401	0.8490	1.2668	2.1025
48	0.4710	0.6759	0.9010	1.3410	2.2009

Copper Factors for Instrumentation Cables - CuF

Cu PIS

Pair Instrumentation Individual and Over all Screen Cables					
No. of Pairs Cable size in sq.mm	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.0133	0.0178	0.0222	0.0311	0.0489
2	0.0349	0.0437	0.0531	0.0717	0.1069
3	0.0490	0.0621	0.0763	0.1041	0.1570
4	0.0630	0.0806	0.0994	0.1389	0.2071
5	0.0800	0.1022	0.1245	0.1689	0.2578
6	0.0937	0.1200	0.1484	0.2042	0.3103
7	0.1067	0.1378	0.1689	0.2311	0.3556
8	0.1218	0.1569	0.1948	0.2692	0.4107
9	0.1334	0.1734	0.2134	0.2934	0.4534
10	0.1503	0.1943	0.2417	0.3349	0.5122
11	0.1600	0.2089	0.2578	0.3556	0.5512
12	0.1785	0.2313	0.2882	0.4001	0.6128
13	0.1867	0.2445	0.3023	0.4178	0.6490
14	0.2000	0.2623	0.3245	0.4489	0.6979
15	0.2134	0.2800	0.3467	0.4801	0.7468
16	0.2350	0.3053	0.3812	0.5305	0.8141
17	0.2400	0.3156	0.3912	0.5423	0.8446
18	0.2534	0.3334	0.4134	0.5734	0.8934
19	0.2667	0.3512	0.4356	0.6045	0.9423
20	0.2800	0.3689	0.4578	0.6356	0.9912
21	0.2934	0.3867	0.4801	0.6668	1.0401
22	0.3067	0.4045	0.5023	0.6979	1.0890
23	0.3200	0.4223	0.5245	0.7290	1.1379
24	0.3479	0.4535	0.5673	0.7911	1.2165
25	0.3467	0.4578	0.5690	0.7912	1.2357
26	0.3600	0.4756	0.5912	0.8223	1.2846
27	0.3734	0.4934	0.6134	0.8534	1.3335
28	0.3867	0.5112	0.6356	0.8846	1.3824
29	0.4001	0.5290	0.6579	0.9157	1.4313
30	0.4134	0.5467	0.6801	0.9468	1.4802
31	0.4267	0.5645	0.7023	0.9779	1.5291
32	0.4401	0.5823	0.7245	1.0090	1.5780
33	0.4534	0.6001	0.7468	1.0401	1.6269
34	0.4667	0.6179	0.7690	1.0712	1.6758
35	0.4801	0.6356	0.7912	1.1024	1.7247
36	0.4934	0.6534	0.8134	1.1335	1.7736
37	0.5067	0.6712	0.8357	1.1646	1.8225
38	0.5201	0.6890	0.8579	1.1957	1.8713
39	0.5334	0.7068	0.8801	1.2268	1.9202
40	0.5467	0.7245	0.9023	1.2579	1.9691
41	0.5601	0.7423	0.9246	1.2891	2.0180
42	0.5734	0.7601	0.9468	1.3202	2.0669
43	0.5867	0.7779	0.9690	1.3513	2.1158
44	0.6001	0.7957	0.9912	1.3824	2.1647
45	0.6134	0.8134	1.0135	1.4135	2.2136
46	0.6267	0.8312	1.0357	1.4446	2.2625
47	0.6401	0.8490	1.0579	1.4757	2.3114
48	0.6887	0.8936	1.1186	1.5587	2.4186

Copper Factors for Instrumentation Cables - CuF

Cu TOS

Triad Instrumentation Over all Screen Cables					
No. of Pairs Cable size in sq.mm	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.0190	0.0255	0.0326	0.0466	0.0728
2	0.0400	0.0533	0.0667	0.0933	0.1467
3	0.0533	0.0733	0.0933	0.1334	0.2134
4	0.0662	0.0926	0.1209	0.1768	0.2806
5	0.0800	0.1133	0.1467	0.2134	0.3467
6	0.0948	0.1343	0.1769	0.2606	0.4197
7	0.1067	0.1534	0.2000	0.2934	0.4801
8	0.1236	0.1764	0.2333	0.3452	0.5579
9	0.1334	0.1934	0.2534	0.3734	0.6134
10	0.1522	0.2182	0.2894	0.4293	0.6952
11	0.1600	0.2334	0.3067	0.4534	0.7468
12	0.1808	0.2601	0.3454	0.5133	0.8324
13	0.1867	0.2734	0.3600	0.5334	0.8801
14	0.2000	0.2934	0.3867	0.5734	0.9468
15	0.2134	0.3134	0.4134	0.6134	1.0135
16	0.2267	0.3334	0.4401	0.6534	1.0801
17	0.2400	0.3534	0.4667	0.6934	1.1468
18	0.2534	0.3734	0.4934	0.7334	1.2135
19	0.2667	0.3934	0.5201	0.7734	1.2802
20	0.2800	0.4134	0.5467	0.8134	1.3468
21	0.2934	0.4334	0.5734	0.8534	1.4135
22	0.3067	0.4534	0.6001	0.8934	1.4802
23	0.3200	0.4734	0.6267	0.9335	1.5469
24	0.3334	0.4934	0.6534	0.9735	1.6135
25	0.3467	0.5134	0.6801	1.0135	1.6802
26	0.3600	0.5334	0.7068	1.0535	1.7469
27	0.3734	0.5534	0.7334	1.0935	1.8136
28	0.3867	0.5734	0.7601	1.1335	1.8802
29	0.4001	0.5934	0.7868	1.1735	1.9469
30	0.4134	0.6134	0.8134	1.2135	2.0136
31	0.4267	0.6334	0.8401	1.2535	2.0803
32	0.4401	0.6534	0.8668	1.2935	2.1469
33	0.4534	0.6734	0.8934	1.3335	2.2136
34	0.4667	0.6934	0.9201	1.3735	2.2803
35	0.4801	0.7134	0.9468	1.4135	2.3470
36	0.4934	0.7334	0.9735	1.4535	2.4136
37	0.5067	0.7534	1.0001	1.4935	2.4803
38	0.5201	0.7734	1.0268	1.5335	2.5470
39	0.5334	0.7934	1.0535	1.5735	2.6137
40	0.5467	0.8134	1.0801	1.6135	2.6803
41	0.5601	0.8334	1.1068	1.6535	2.7470
42	0.5734	0.8534	1.1335	1.6935	2.8137
43	0.5867	0.8734	1.1601	1.7336	2.8804
44	0.6001	0.8934	1.1868	1.7736	2.9470
45	0.6134	0.9134	1.2135	1.8136	3.0137
46	0.6267	0.9335	1.2402	1.8536	3.0804
47	0.6401	0.9535	1.2668	1.8936	3.1471
48	0.6534	0.9735	1.2935	1.9336	3.2137

Copper Factors for Instrumentation Cables - CuF

Cu TIS

Triad Instrumentation Individual & Overall Screen Cables					
No. of Pairs Cable size in sq.mm	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.0178	0.0245	0.0312	0.0446	0.0715
2	0.0489	0.0622	0.0756	0.1022	0.1556
3	0.0667	0.0867	0.1067	0.1467	0.2267
4	0.0845	0.1108	0.1393	0.1951	0.3012
5	0.1022	0.1356	0.1689	0.2356	0.3689
6	0.1222	0.1617	0.2043	0.2880	0.4423
7	0.1378	0.1845	0.2311	0.3245	0.5112
8	0.1602	0.2130	0.2699	0.3818	0.5881
9	0.1734	0.2334	0.2934	0.4134	0.6534
10	0.1980	0.2640	0.3351	0.4750	0.7328
11	0.2089	0.2823	0.3556	0.5023	0.7957
12	0.2357	0.3149	0.4003	0.5682	0.8776
13	0.2445	0.3312	0.4178	0.5912	0.9379
14	0.2623	0.3556	0.4489	0.6356	1.0090
15	0.2800	0.3800	0.4801	0.6801	1.0801
16	0.2978	0.4045	0.5112	0.7245	1.1513
17	0.3156	0.4289	0.5423	0.7690	1.2224
18	0.3334	0.4534	0.5734	0.8134	1.2935
19	0.3512	0.4778	0.6045	0.8579	1.3646
20	0.3689	0.5023	0.6356	0.9023	1.4357
21	0.3867	0.5267	0.6668	0.9468	1.5069
22	0.4045	0.5512	0.6979	0.9912	1.5780
23	0.4223	0.5756	0.7290	1.0357	1.6491
24	0.4401	0.6001	0.7601	1.0801	1.7202
25	0.4578	0.6245	0.7912	1.1246	1.7913
26	0.4756	0.6490	0.8223	1.1690	1.8625
27	0.4934	0.6734	0.8534	1.2135	1.9336
28	0.5112	0.6979	0.8846	1.2579	2.0047
29	0.5290	0.7223	0.9157	1.3024	2.0758
30	0.5467	0.7468	0.9468	1.3468	2.1469
31	0.5645	0.7712	0.9779	1.3913	2.2181
32	0.5823	0.7957	1.0090	1.4357	2.2892
33	0.6001	0.8201	1.0401	1.4802	2.3603
34	0.6179	0.8446	1.0712	1.5246	2.4314
35	0.6356	0.8690	1.1024	1.5691	2.5025
36	0.6534	0.8934	1.1335	1.6135	2.5737
37	0.6712	0.9179	1.1646	1.6580	2.6448
38	0.6890	0.9423	1.1957	1.7024	2.7159
39	0.7068	0.9668	1.2268	1.7469	2.7870
40	0.7245	0.9912	1.2579	1.7913	2.8581
41	0.7423	1.0157	1.2891	1.8358	2.9293
42	0.7601	1.0401	1.3202	1.8802	3.0004
43	0.7779	1.0646	1.3513	1.9247	3.0715
44	0.7957	1.0890	1.3824	1.9691	3.1426
45	0.8134	1.1135	1.4135	2.0136	3.2137
46	0.8312	1.1379	1.4446	2.0580	3.2849
47	0.8490	1.1624	1.4757	2.1025	3.3560
48	0.8668	1.1868	1.5069	2.1469	3.4271

Steel Factors for Instrumentation Cables - FeF

Fe POS

Pair Instrumentation Over all Screen Cables

No. of Pairs Cable size in sq.mm	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.1490	0.1565	0.1635	0.1735	0.1930
2	0.2190	0.2335	0.2470	0.2665	0.2595
3	0.2360	0.2545	0.2690	0.2900	0.2680
4	0.2390	0.2580	0.2715	0.2945	0.2830
5	0.2630	0.2820	0.2420	0.2805	0.3155
6	0.2840	0.3160	0.2805	0.2995	0.3430
7	0.2840	0.2595	0.2805	0.2995	0.3430
8	0.3235	0.2930	0.3030	0.3315	0.3780
9	0.2805	0.3180	0.3290	0.3590	0.4205
10	0.2970	0.3215	0.3455	0.3755	0.4385
11	0.3005	0.3255	0.3490	0.3805	0.4435
12	0.3055	0.3440	0.3680	0.3880	0.4520
13	0.3265	0.3530	0.3780	0.4105	0.4785
14	0.3265	0.3530	0.3780	0.4105	0.4785
15	0.3490	0.3765	0.4015	0.4365	0.5195
16	0.3490	0.3765	0.4015	0.4365	0.5195
17	0.3590	0.4005	0.4140	0.4635	0.5470
18	0.3590	0.4005	0.4265	0.4635	0.5470
19	0.3590	0.4005	0.4265	0.4635	0.5470
20	0.3830	0.4240	0.4535	0.4920	0.5760
21	0.3830	0.4240	0.4535	0.4920	0.5760
22	0.4065	0.4520	0.4785	0.5310	0.6190
23	0.4065	0.4520	0.4810	0.5310	0.6190
24	0.4305	0.4770	0.5070	0.5595	0.6475
25	0.4305	0.4770	0.5070	0.5595	0.6475
26	0.4305	0.4770	0.5070	0.5595	0.6475
27	0.4355	0.4820	0.5245	0.5660	0.6700
28	0.4570	0.5045	0.5345	0.5895	0.6950
29	0.4570	0.5045	0.5345	0.5895	0.6950
30	0.4570	0.5045	0.5345	0.5895	0.6950
31	0.4795	0.5285	0.5595	0.6150	0.7225
32	0.4820	0.5285	0.5595	0.6150	0.7225
33	0.4820	0.5285	0.5595	0.6150	0.7225
34	0.4920	0.5520	0.5835	0.6410	0.7500
35	0.4920	0.5520	0.5835	0.6410	0.7500
36	0.4920	0.5520	0.5835	0.6410	0.7500
37	0.4920	0.5520	0.5835	0.6410	0.7500
38	0.5145	0.5760	0.6225	0.6550	0.7805
39	0.5145	0.5760	0.6225	0.6550	0.7805
40	0.5145	0.5760	0.6225	0.6550	0.7805
41	0.5395	0.6025	0.6475	0.6975	0.8230
42	0.5395	0.6025	0.6475	0.6975	0.8230
43	0.5395	0.6025	0.6475	0.6975	0.8230
44	0.5635	0.6265	0.6735	0.7250	0.8540
45	0.5635	0.6265	0.6760	0.7250	0.8540
46	0.5635	0.6265	0.6760	0.7250	0.8540
47	0.5635	0.6265	0.6760	0.7250	0.8540
48	0.5635	0.6265	0.6760	0.7375	0.8665

Steel Factors for Instrumentation Cables - FeF

Fe PIS

Pair Instrumentation Individual and Over all Screen Cables

No. of Pairs Cable size in sq.mm	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.1880	0.1980	0.2070	0.2220	0.2410
2	0.2315	0.2460	0.2595	0.2815	0.2755
3	0.2505	0.2690	0.2820	0.2495	0.2830
4	0.2645	0.2830	0.2420	0.2805	0.3155
5	0.2895	0.2730	0.2805	0.3005	0.3430
6	0.2755	0.2980	0.3005	0.3280	0.3730
7	0.2755	0.2980	0.3005	0.3280	0.3730
8	0.2980	0.3215	0.3455	0.3740	0.4230
9	0.3230	0.3490	0.3730	0.4040	0.4685
10	0.3405	0.3655	0.3765	0.4215	0.4885
11	0.3430	0.3690	0.3815	0.4265	0.4945
12	0.3490	0.3765	0.4015	0.4470	0.5160
13	0.3715	0.3990	0.4255	0.4720	0.5420
14	0.3715	0.3990	0.4255	0.4720	0.5420
15	0.3955	0.4240	0.4510	0.5020	0.5720
16	0.3955	0.4240	0.4510	0.5020	0.5720
17	0.4190	0.4495	0.4795	0.5295	0.6150
18	0.4190	0.4495	0.4795	0.5295	0.6150
19	0.4190	0.4495	0.4795	0.5295	0.6150
20	0.4445	0.4770	0.5060	0.5570	0.6450
21	0.4445	0.4895	0.5060	0.5695	0.6450
22	0.4695	0.5045	0.5345	0.5870	0.6885
23	0.4695	0.5045	0.5345	0.5870	0.6885
24	0.4970	0.5310	0.5620	0.6285	0.7210
25	0.4970	0.5310	0.5620	0.6285	0.7210
26	0.4970	0.5310	0.5620	0.6285	0.7210
27	0.5035	0.5495	0.5810	0.6360	0.7410
28	0.5135	0.5610	0.6050	0.6610	0.7690
29	0.5135	0.5610	0.6050	0.6610	0.7690
30	0.5260	0.5610	0.6050	0.6610	0.7690
31	0.5495	0.5845	0.6300	0.6885	0.7990
32	0.5495	0.5845	0.6300	0.6885	0.7990
33	0.5495	0.5845	0.6300	0.6885	0.7990
34	0.5735	0.6225	0.6585	0.7285	0.8405
35	0.5735	0.6225	0.6585	0.7285	0.8405
36	0.5735	0.6225	0.6585	0.7285	0.8405
37	0.5735	0.6225	0.6585	0.7285	0.8405
38	0.5990	0.6485	0.6850	0.7575	0.8740
39	0.5990	0.6485	0.6850	0.7575	0.8740
40	0.5990	0.6485	0.6850	0.7575	0.8740
41	0.6250	0.6775	0.7135	0.7880	0.9180
42	0.6250	0.6775	0.7135	0.7880	0.9180
43	0.6250	0.6775	0.7135	0.7880	0.9180
44	0.6485	0.7050	0.7410	0.8165	0.9495
45	0.6485	0.7050	0.7410	0.8165	0.9495
46	0.6485	0.7050	0.7410	0.8165	0.9495
47	0.6485	0.7050	0.7410	0.8165	0.9495
48	0.6485	0.7050	0.7535	0.8290	0.9620

Steel Factors for Instrumentation Cables - FeF

Fe TOS

Triad Instrumentation Overall Screen Cables

No. of Pairs Cable size in sq.mm	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.1550	0.1635	0.1735	0.1855	0.2065
2	0.2400	0.2555	0.2715	0.2965	0.2945
3	0.2595	0.2790	0.2955	0.2805	0.3145
4	0.2730	0.2925	0.3260	0.2955	0.3305
5	0.3060	0.2730	0.2955	0.3145	0.3590
6	0.2755	0.2920	0.3145	0.3415	0.4005
7	0.2755	0.2920	0.3145	0.3415	0.4005
8	0.3105	0.3355	0.3590	0.3890	0.4535
9	0.3365	0.3630	0.3880	0.4320	0.4995
10	0.3530	0.3790	0.4040	0.4495	0.5185
11	0.3565	0.3830	0.4090	0.4545	0.5235
12	0.3630	0.3905	0.4165	0.4635	0.5445
13	0.3855	0.4140	0.4410	0.4895	0.5725
14	0.3855	0.4140	0.4410	0.4895	0.5725
15	0.4080	0.4385	0.4660	0.5295	0.6150
16	0.4080	0.4385	0.4660	0.5295	0.6150
17	0.4335	0.4635	0.5060	0.5570	0.6450
18	0.4335	0.4635	0.5060	0.5570	0.6450
19	0.4335	0.4635	0.5060	0.5570	0.6450
20	0.4585	0.4920	0.5335	0.5875	0.6885
21	0.4585	0.4920	0.5335	0.6040	0.6885
22	0.4835	0.5310	0.5610	0.6290	0.7355
23	0.4835	0.5310	0.5610	0.6460	0.7355
24	0.5085	0.5585	0.6025	0.6585	0.7665
25	0.5085	0.5585	0.6025	0.6585	0.7665
26	0.5085	0.5585	0.6025	0.6660	0.7665
27	0.5145	0.5635	0.6090	0.6935	0.7880
28	0.5395	0.5875	0.6325	0.7060	0.8165
29	0.5395	0.5875	0.6325	0.7060	0.8165
30	0.5395	0.5875	0.6325	0.7060	0.8165
31	0.5635	0.6125	0.6560	0.7335	0.8565
32	0.5635	0.6125	0.6560	0.7335	0.8565
33	0.5635	0.6125	0.6560	0.7335	0.8565
34	0.5875	0.6375	0.6850	0.7730	0.8890
35	0.5875	0.6375	0.6850	0.7730	0.8890
36	0.5875	0.6375	0.6850	0.7730	0.8890
37	0.5875	0.6375	0.6850	0.7730	0.8890
38	0.6125	0.6760	0.7150	0.8030	0.9345
39	0.6125	0.6760	0.7150	0.8030	0.9345
40	0.6125	0.6760	0.7150	0.8030	0.9345
41	0.6500	0.7050	0.7555	0.8315	0.9785
42	0.6500	0.7050	0.7555	0.8315	0.9785
43	0.6500	0.7050	0.7555	0.8315	0.9785
44	0.6760	0.7310	0.7815	0.8765	1.0230
45	0.6760	0.7310	0.7815	0.8765	1.0230
46	0.6760	0.7310	0.7815	0.8765	1.0230
47	0.6760	0.7310	0.7815	0.8765	1.0230
48	0.6760	0.7310	0.7940	0.8765	1.0230

Steel Factors for Instrumentation Cables - FeF

Fe TIS

Triad Instrumentation Individual and Overall Screen Cables

No. of Pairs Cable size in sq.mm	0.5 sq.mm	0.75 sq.mm	1.0 sq.mm	1.5 sq.mm	2.5 sq.mm
1	0.195	0.207	0.217	0.231	0.253
2	0.252	0.270	0.284	0.270	0.309
3	0.276	0.293	0.272	0.297	0.332
4	0.309	0.276	0.296	0.315	0.359
5	0.278	0.293	0.315	0.343	0.389
6	0.296	0.321	0.343	0.372	0.433
7	0.296	0.321	0.343	0.372	0.433
8	0.341	0.366	0.391	0.436	0.504
9	0.368	0.396	0.434	0.469	0.537
10	0.354	0.413	0.439	0.489	0.570
11	0.389	0.417	0.445	0.494	0.576
12	0.408	0.439	0.465	0.515	0.599
13	0.432	0.462	0.492	0.542	0.627
14	0.432	0.462	0.492	0.542	0.627
15	0.457	0.491	0.519	0.571	0.671
16	0.457	0.491	0.519	0.571	0.671
17	0.484	0.517	0.547	0.613	0.705
18	0.484	0.517	0.547	0.613	0.705
19	0.484	0.517	0.547	0.613	0.705
20	0.512	0.545	0.589	0.645	0.751
21	0.512	0.545	0.589	0.645	0.751
22	0.540	0.588	0.619	0.691	0.798
23	0.540	0.588	0.619	0.691	0.798
24	0.566	0.615	0.661	0.721	0.844
25	0.566	0.615	0.661	0.721	0.844
26	0.566	0.615	0.661	0.721	0.844
27	0.585	0.648	0.670	0.743	0.854
28	0.610	0.648	0.696	0.771	0.873
29	0.610	0.660	0.696	0.771	0.873
30	0.610	0.660	0.696	0.771	0.898
31	0.634	0.689	0.736	0.812	0.929
32	0.634	0.689	0.736	0.812	0.929
33	0.634	0.689	0.736	0.812	0.929
34	0.660	0.715	0.764	0.841	0.974
35	0.660	0.715	0.764	0.841	0.974
36	0.660	0.715	0.764	0.841	0.974
37	0.660	0.715	0.764	0.841	0.974
38	0.689	0.743	0.793	0.887	1.020
39	0.689	0.743	0.793	0.887	1.020
40	0.689	0.743	0.793	0.887	1.020
41	0.716	0.784	0.836	0.919	1.070
42	0.716	0.784	0.836	0.919	1.070
43	0.716	0.784	0.836	0.919	1.070
44	0.756	0.813	0.867	0.962	1.103
45	0.756	0.813	0.867	0.962	1.103
46	0.756	0.813	0.867	0.962	1.103
47	0.756	0.813	0.867	0.962	1.103
48	0.756	0.826	0.879	0.962	1.116