

MV XLPE Insulated Power Cables (Non-armoured & Armoured Type)

(Rated voltage TFR-CV, TFR-CVAWAV, TFR-CVWAV)

SCOPE

This cable is designed for the purpose of using in power distribution lines.

APPLICATION STANDARDS

IEC 60502-2 Power cables with extruded insulation and their accessories for rated voltages

from 1 kV ($U_m = 1,2$ kV) up to 30 kV ($U_m = 36$ kV) - Part 2: Cables for rated voltages from 6 kV ($U_m = 7,2$ kV) up to 30 kV ($U_m = 36$ kV)

IEC 60332-3-24 Tests on electric cables under fire conditions - Part 3-24 : Test for vertical flame spread of vertically-mounted bunched wires or cables - Category C

MATERIALS & CONSTRUCTION

Conductor	Annealed copper wires Class 2 (Compacted circular stranded type)
Conductor Screen	Extruded semi-conducting compound layer
Insulation	XLPE (Max. operating conductor temperature, 90°C)
Insulation Screen	Extruded semi-conducting compound layer
Metallic Screen	Annealed copper tape
Separation Sheath	Extruded PVC (for armoured cables only)
Armour	Hard-drawn aluminum round wires for single core or galvanized steel round wires for multi-cores (for armoured cables only)
Oversheath	Flame retardant black PVC (FR-PVC/ST2)

CORE IDENTIFICATION

3cores Brown, Black and Gray

Generally, the cores will be identified with a narrow colored tapes between insulation screen and metallic screen.

OPTION

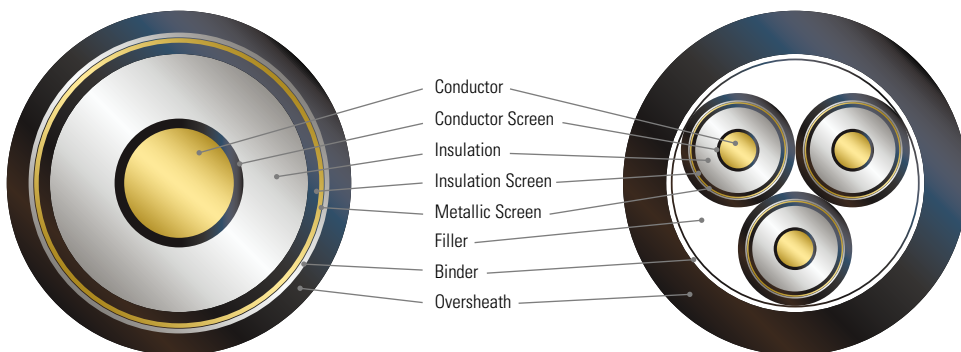
Different color of core identification and oversheath

Material of oversheath : Halogen free flame retardant polyolefin (ST8) or Polyethylene (ST7)

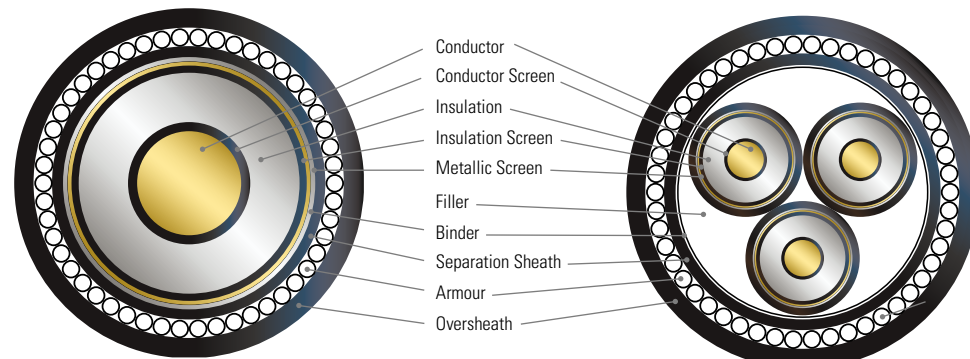
Flame Retardant : Cat. A or Cat. B in accordance with IEC 60332-3-22, -23

Oil Resistance, Anti-termite, Anti-rodent, Ozone resistance

Non-armoured Type



Armoured Type



**6/10kV Non-armoured Cables (6/10kV CU/XLPE/PVC)
(6/10kV TFR-CV)**

Nos. of Core	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Size	Construction	Outer Dia. (approx.)						
	mm ²	Nos./mm	mm						
1	35	C.C	6.9	3.4	1.6	23	0.524	21	707
	50	C.C	8.1	3.4	1.6	24	0.387	21	853
	70	C.C	9.8	3.4	1.7	26	0.268	21	1102
	95	C.C	11.4	3.4	1.7	28	0.193	21	1388
	120	C.C	12.9	3.4	1.8	30	0.153	21	1670
	150	C.C	14.4	3.4	1.8	32	0.124	21	1972
	185	C.C	15.9	3.4	1.9	33	0.0991	21	2369
	240	C.C	18.3	3.4	2.0	36	0.0754	21	2987
	300	C.C	20.5	3.4	2.0	39	0.0601	21	3649
	400	C.C	23.2	3.4	2.2	43	0.0470	21	4550
	500	C.C	26.4	3.4	2.2	46	0.0366	21	5662
3	630	C.C	30.2	3.4	2.3	50	0.0283	21	7159
	35	C.C	6.9	3.4	2.3	46	0.524	21	2350
	50	C.C	8.1	3.4	2.4	49	0.387	21	2843
	70	C.C	9.8	3.4	2.5	53	0.268	21	3616
	95	C.C	11.4	3.4	2.6	57	0.193	21	4570
	120	C.C	12.9	3.4	2.7	61	0.153	21	5441
	150	C.C	14.4	3.4	2.8	65	0.124	21	6461
	185	C.C	15.9	3.4	2.9	68	0.0991	21	7710
240	C.C	18.3	3.4	3.1	74	0.0754	21	9786	
300	C.C	20.5	3.4	3.3	80	0.0601	21	11802	

Note) C.C : Compacted circular stranded type

**6/10kV Armoured Cables (6/10kV CU/XLPE/PVC/AWA/PVC, CU/XLPE/PVC/SWA/PVC)
(6/10kV TFR-CVAWAV, TFR-CVWAV)**

Rated voltage	Conductor			Thickness		Dia. of Wire (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia. (approx.)	Insulation (nom.)	Separation Sheath (nom.)					
	mm ²	-	mm	mm	mm					
6/10kV	1 x 35	C.C	6.9	3.4	1.2	1.6	1.8	31	0.524	1121
	1 x 50	C.C	8.1	3.4	1.2	1.6	1.8	32	0.387	1288
	1 x 70	C.C	9.8	3.4	1.2	1.6	1.9	34	0.268	1574
	1 x 95	C.C	11.4	3.4	1.2	1.6	2.0	36	0.193	1906
	1 x 120	C.C	12.9	3.4	1.2	2.0	2.0	38	0.153	2276
	1 x 150	C.C	14.4	3.4	1.2	2.0	2.1	41	0.124	2632
	1 x 185	C.C	15.9	3.4	1.2	2.0	2.1	42	0.0991	3046
	1 x 240	C.C	18.3	3.4	1.2	2.0	2.2	45	0.0754	3721
	1 x 300	C.C	20.5	3.4	1.2	2.0	2.3	48	0.0601	4457
	1 x 400	C.C	23.2	3.4	1.3	2.5	2.4	53	0.0470	5556
	1 x 500	C.C	26.4	3.4	1.3	2.5	2.5	57	0.0366	6787
	1 x 630	C.C	30.2	3.4	1.4	2.5	2.6	61	0.0283	8400
	3 x 35	C.C	6.9	3.4	1.3	2.5	2.5	57	0.524	3438
	3 x 50	C.C	8.1	3.4	1.4	2.5	2.6	60	0.387	5413
	3 x 70	C.C	9.8	3.4	1.4	2.5	2.8	64	0.268	6453
	3 x 95	C.C	11.4	3.4	1.5	2.5	2.9	69	0.193	7627
	3x 120	C.C	12.9	3.4	1.6	2.5	3.0	73	0.153	8765
	3 x 150	C.C	14.4	3.4	1.6	2.5	3.1	77	0.124	9773
	3 x 185	C.C	15.9	3.4	1.7	3.15	3.2	82	0.0991	12292
	3 x 240	C.C	18.3	3.4	1.8	3.15	3.4	89	0.0754	14774
3 x 300	C.C	20.5	3.4	1.9	3.15	3.6	94	0.0601	17213	

Note) C.C : Compacted circular stranded type

**8.7/15kV Non-armoured Cables (8.7/15kV CU/XLPE/PVC)
(8.7/15kV TFR-CV)**

Rated voltage	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia. (approx.)						
	mm ²	-	mm						
8.7/15kV	1 x 50	C.C	8.1	4.5	1.7	27	0.387	30.5	954
	1 x 70	C.C	9.8	4.5	1.7	29	0.268	30.5	1197
	1 x 95	C.C	11.4	4.5	1.8	31	0.193	30.5	1503
	1 x 120	C.C	12.9	4.5	1.9	33	0.153	30.5	1792
	1 x 150	C.C	14.4	4.5	1.9	34	0.124	30.5	2099
	1 x 185	C.C	15.9	4.5	2.0	36	0.0991	30.5	2504
	1 x 240	C.C	18.3	4.5	2.0	39	0.0754	30.5	3114
	1 x 300	C.C	20.5	4.5	2.1	41	0.0601	30.5	3782
	1 x 400	C.C	23.2	4.5	2.2	45	0.0470	30.5	4686
	1 x 500	C.C	26.4	4.5	2.3	49	0.0366	30.5	5842
	1 x 630	C.C	30.2	4.5	2.4	53	0.0283	30.5	7355
	3 x 50	C.C	8.1	4.5	2.5	54	0.387	30.5	3169
	3 x 70	C.C	9.8	4.5	2.7	59	0.268	30.5	3986
	3 x 95	C.C	11.4	4.5	2.8	63	0.193	30.5	4955
	3 x 120	C.C	12.9	4.5	2.9	66	0.153	30.5	5852
	3 x 150	C.C	14.4	4.5	3.0	70	0.124	30.5	6879
	3 x185	C.C	15.9	4.5	3.1	74	0.0991	30.5	8137
	3 x 240	C.C	18.3	4.5	3.3	80	0.0754	30.5	10280
	3 x 300	C.C	20.5	4.5	3.4	86	0.0601	30.5	12289

Note) C.C : Compacted circular stranded type

**8.7/15kV Armoured Cables (8.7/15kV CU/XLPE/PVC/AWA/PVC, CU/XLPE/PVC/SWA/PVC)
(8.7/15kV TFR-CVAWAV, TFR-CVWAV)**

Rated voltage	Conductor			Thickness		Dia. of Wire (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia. (approx.)	Insulation (nom.)	Separation Sheath (nom.)					
	mm ²	-	mm	mm	mm					
8.7/15kV	1 x 50	C.C	8.1	4.5	1.2	1.6	1.9	34	0.387	1437
	1 x 70	C.C	9.8	4.5	1.2	1.6	2.0	36	0.268	1725
	1 x 95	C.C	11.4	4.5	1.2	2.0	2.1	39	0.193	2150
	1 x 120	C.C	12.9	4.5	1.2	2.0	2.1	40	0.153	2453
	1 x 150	C.C	14.4	4.5	1.2	2.0	2.2	42	0.124	2807
	1 x 185	C.C	15.9	4.5	1.2	2.0	2.2	44	0.0991	3237
	1 x 240	C.C	18.3	4.5	1.2	2.0	2.3	47	0.0754	3923
	1 x 300	C.C	20.5	4.5	1.2	2.0	2.4	49	0.0601	4639
	1 x 400	C.C	23.2	4.5	1.3	2.5	2.5	54	0.0470	5788
	1 x 500	C.C	26.4	4.5	1.4	2.5	2.6	58	0.0366	7056
	1 x 630	C.C	30.2	4.5	1.4	2.5	2.7	62	0.0283	8662
	3 x 50	C.C	8.1	4.5	1.5	2.5	2.8	64	0.387	6112
	3 x 70	C.C	9.8	4.5	1.5	2.5	2.9	68	0.268	7149
	3 x 95	C.C	11.4	4.5	1.6	2.5	3.1	73	0.193	8422
	3 x 120	C.C	12.9	4.5	1.7	2.5	3.2	77	0.153	9553
	3 x 150	C.C	14.4	4.5	1.7	3.15	3.3	82	0.124	11601
	3 x 185	C.C	15.9	4.5	1.8	3.15	3.4	86	0.0991	13200
	3 x 240	C.C	18.3	4.5	1.9	3.15	3.6	92	0.0754	15778
	3 x 300	C.C	20.5	4.5	2.0	3.15	3.8	98	0.0601	18261

Note) C.C : Compacted circular stranded type

**12/20kV Non-armoured Cables (12/20kV CU/XLPE/PVC)
(12/20kV TFR-CV)**

Rated voltage	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia. (approx.)						
	mm ²	-	mm						
12/20kV	1 x 50	C.C	8.1	5.5	1.8	30	0.387	42	1055
	1 x 70	C.C	9.8	5.5	1.8	32	0.268	42	1304
	1 x 95	C.C	11.4	5.5	1.9	34	0.193	42	1617
	1 x 120	C.C	12.9	5.5	1.9	36	0.153	42	1896
	1 x 150	C.C	14.4	5.5	2.0	38	0.124	42	2225
	1 x 185	C.C	15.9	5.5	2.0	39	0.0991	42	2619
	1 x 240	C.C	18.3	5.5	2.1	42	0.0754	42	3255
	1 x 300	C.C	20.5	5.5	2.2	45	0.0601	42	3932
	1 x 400	C.C	23.2	5.5	2.3	49	0.0470	42	4848
	1 x 500	C.C	26.4	5.5	2.4	53	0.0366	42	6017
	1 x 630	C.C	30.2	5.5	2.5	57	0.0283	42	7544
	3 x 50	C.C	8.1	5.5	2.7	61	0.387	42	3546
	3 x 70	C.C	9.8	5.5	2.8	65	0.268	42	4396
	3 x 95	C.C	11.4	5.5	2.9	70	0.193	42	5439
	3 x 120	C.C	12.9	5.5	3.0	73	0.153	42	6317
	3 x 150	C.C	14.4	5.5	3.1	77	0.124	42	7362
	3 x 185	C.C	15.9	5.5	3.2	81	0.0991	42	8637
	3 x 240	C.C	18.3	5.5	3.4	87	0.0754	42	10752
	3 x 300	C.C	20.5	5.5	3.6	93	0.0601	42	12827

Note) C.C : Compacted circular stranded type

**12/20kV Armoured Cables (12/20kV CU/XLPE/PVC/AWA/PVC, CU/XLPE/PVC/SWA/PVC)
(12/20kV TFR-CVAWAV, TFR-CVWAV)**

Rated voltage	Conductor			Thickness		Dia. of Wire (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia. (approx.)	Insulation (nom.)	Separation Sheath (nom.)					
	mm ²	-	mm	mm	mm					
12/20kV	1 x 50	C.C	8.1	5.5	1.2	2.0	2.0	38	0.387	1654
	1 x 70	C.C	9.8	5.5	1.2	2.0	2.1	40	0.268	1952
	1 x 95	C.C	11.4	5.5	1.2	2.0	2.1	42	0.193	2290
	1 x 120	C.C	12.9	5.5	1.2	2.0	2.2	44	0.153	2617
	1 x 150	C.C	14.4	5.5	1.2	2.0	2.2	46	0.124	2969
	1 x 185	C.C	15.9	5.5	1.2	2.0	2.3	48	0.0991	3601
	1 x 240	C.C	18.3	5.5	1.2	2.0	2.4	51	0.0754	4108
	1 x 300	C.C	20.5	5.5	1.3	2.5	2.5	55	0.0601	5008
	1 x 400	C.C	23.2	5.5	1.3	2.5	2.6	58	0.0470	6011
	1 x 500	C.C	26.4	5.5	1.4	2.5	2.7	62	0.0366	7291
	1 x 630	C.C	30.2	5.5	1.5	2.5	2.8	67	0.0283	8937
	3 x 50	C.C	8.1	5.5	1.6	2.5	3.0	71	0.387	6798
	3 x 70	C.C	9.8	5.5	1.6	2.5	3.1	76	0.268	7900
	3 x 95	C.C	11.4	5.5	1.7	2.5	3.2	80	0.193	9172
	3 x 120	C.C	12.9	5.5	1.8	3.15	3.4	86	0.153	11168
	3 x 150	C.C	14.4	5.5	1.8	3.15	3.5	90	0.124	12513
	3 x 185	C.C	15.9	5.5	1.9	3.15	3.6	94	0.0991	14067
	3 x 240	C.C	18.3	5.5	2.0	3.15	3.8	100	0.0754	16679
	3 x 300	C.C	20.5	5.5	2.1	3.15	3.9	106	0.0601	19091

Note) C.C : Compacted circular stranded type

**18/30kV Non-armoured Cables (18/30kV CU/XLPE/PVC)
(18/30kV TFR-CV)**

Rated voltage	Conductor			Thick. of Insulation (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	A.C Voltage Test	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia. (approx.)						
	mm ²	-	mm						
18/30kV	1 x 50	C.C	8.1	8.0	1.9	36	0.387	63	1320
	1 x 70	C.C	9.8	8.0	2.0	38	0.268	63	1600
	1 x 95	C.C	11.4	8.0	2.1	40	0.193	63	1930
	1 x 120	C.C	12.9	8.0	2.1	42	0.153	63	2222
	1 x 150	C.C	14.4	8.0	2.1	43	0.124	63	2547
	1 x 185	C.C	15.9	8.0	2.2	45	0.0991	63	2973
	1 x 240	C.C	18.3	8.0	2.3	48	0.0754	63	3632
	1 x 300	C.C	20.5	8.0	2.4	51	0.0601	63	4331
	1 x 400	C.C	23.2	8.0	2.5	55	0.0470	63	5277
	1 x 500	C.C	26.4	8.0	2.5	58	0.0366	63	6449
	1 x 630	C.C	30.2	8.0	2.7	63	0.0283	63	8038
	3 x 50	C.C	8.1	8.0	3.1	74	0.387	63	4724
	3 x 70	C.C	9.8	8.0	3.2	78	0.268	63	5505
	3 x 95	C.C	11.4	8.0	3.3	83	0.193	63	6653
	3 x 120	C.C	12.9	8.0	3.4	86	0.153	63	7522
	3 x 150	C.C	14.4	8.0	3.5	90	0.124	63	8615
	3 x 185	C.C	15.9	8.0	3.6	94	0.0991	63	9991
	3 x 240	C.C	18.3	8.0	3.8	101	0.0754	63	12315
	3 x 300	C.C	20.5	8.0	3.9	106	0.0601	63	14358

Note) C.C : Compacted circular stranded type

**18/30kV Armoured Cables (18/30kV CU/XLPE/PVC/AWA/PVC, CU/XLPE/PVC/SWA/PVC)
(18/30kV TFR-CVAWAV, TFR-CVWAV)**

Rated voltage	Conductor			Thickness		Dia. of Wire (nom.)	Thick. of Oversheath (nom.)	Overall Diameter (approx.)	Max. DC Conductor Resistance at 20°C	Net weight (approx.)
	Core x Conductor Size	Shape	Outer Dia. (approx.)	Insulation (nom.)	Separation Sheath (nom.)					
	mm ²	-	mm	mm	mm					
18/30kV	1 x 50	C.C	8.1	8.0	1.2	2.0	2.2	39	0.387	1995
	1 x 70	C.C	9.8	8.0	1.2	2.0	2.2	46	0.268	2347
	1 x 95	C.C	11.4	8.0	1.2	2.0	2.3	48	0.193	2718
	1 x 120	C.C	12.9	8.0	1.2	2.0	2.4	50	0.153	3062
	1 x 150	C.C	14.4	8.0	1.3	2.5	2.4	53	0.124	3581
	1 x 185	C.C	15.9	8.0	1.3	2.5	2.5	55	0.0991	4051
	1 x 240	C.C	18.3	8.0	1.3	2.5	2.6	58	0.0754	4778
	1 x 300	C.C	20.5	8.0	1.4	2.5	2.7	61	0.0601	5566
	1 x 400	C.C	23.2	8.0	1.5	2.5	2.8	65	0.0470	6626
	1 x 500	C.C	26.4	8.0	1.5	2.5	2.9	69	0.0366	7915
	3 x 50	C.C	8.1	8.0	1.8	3.15	3.4	86	0.387	9614
	3 x 70	C.C	9.8	8.0	1.8	3.15	3.5	91	0.268	10636
	3 x 95	C.C	11.4	8.0	1.9	3.15	3.7	95	0.193	12167
	3 x 120	C.C	12.9	8.0	2.0	3.15	3.8	99	0.153	13382
	3 x 150	C.C	14.4	8.0	2.0	3.15	3.9	103	0.124	14711
	3 x 185	C.C	15.9	8.0	2.1	3.15	4.0	107	0.0991	16377
	3 x 240	C.C	18.3	8.0	2.2	3.15	4.2	114	0.0754	19217
	3 x 300	C.C	20.5	8.0	2.3	3.15	4.3	120	0.0601	21639

Note) C.C : Compacted circular stranded type