

ABERDARE
— A MEMBER OF HENGTONG GROUP —

*ENLIGHTENING
THE FUTURE*

VULTEX XLPE®

LARGE SINGLE CORE CABLES
MEDIUM VOLTAGE ELECTRIC CABLE 6,6 kV TO 33 kV



MEDIUM VOLTAGE ELECTRIC CABLE (6,6 kV to 33 kV)

LARGE SINGLE CORE CABLES

(630 mm², 800 mm² & 1000 mm²)

Cable Description

Medium voltage XLPE insulated cables are manufactured to the highest quality standards in accordance with either the SANS 1339 compulsory standard or the IEC 60502-2 standard for export purposes. These cables are insulated with top quality insulation systems which are triple extruded using a CCV line with X-ray technology measurement for accurate dimensional control and cured using nitrogen in a dry curing environment. The material handling system for the insulation and screen materials incorporates a pressurised clean room system with controls to prevent contamination of the XLPE insulation.

Insulation systems are tested at Aberdare's accelerated ageing test facility in Port Elizabeth (Ggeberha) at either 50 Hz (2 years at 3 U₀) or alternatively 500 Hz (3000 hrs at 3 U₀) in order to determine the resistance of the insulation system to water tree growth and to demonstrate the long-term reliability of the materials used, after processing.

Partial discharge (PD) testing is carried out as a final release inspection on each length of MV XLPE cable manufactured, by testing at a voltage level of 1.73 U₀ with a maximum allowable PD level of 5 pC.

The expanded range of larger single core MV cables enhances the established range of cables manufactured at Aberdare's Port Elizabeth plant and includes cables up to 19/33 kV, (with High voltage up to 76/132 kV). These cables are available with either copper tape screens (CUT) or copper wire screens (CWS) of which the screen area could be increased for higher earth fault rating, should it be required. Note: 33 kV cables of sizes 400 mm² and larger are designed only with copper wire screens to cater for cyclic load operation. Three core cables are available only in copper tape screened designs.

All PVC, EVA and PE sheathed cables have UV weathering resistant outer sheaths.

Design options which are available include the following:

Note: To be stated when requesting a quotation.

- Copper or Aluminium conductors
- Increased metallic screen cross sectional sizes to match specific requirements
- Unarmoured or Aluminium wire armoured (AWA)
- Fire retardant PVC outer sheath, Reduced Halogen FR, Halogen Free Low Smoke FR to SANS IEC 60332-3-24 or Non-FR MDPE or HDPE outer sheath.
- Non-water blocked or Full longitudinal water blocking to SANS 1339
- Radial water blocked design options with metallic sheaths of either Corrugated Seamless Aluminium (CSA) or Lead.
- Sheathed only or with a Graphite coating applied over the outer sheath for sheath voltage withstand testing (cable not length marked).
- Alternative anti-termite and anti-rodent outer sheath materials.
- Unique sequential conductor marking for traceability purposes.
- Special drum lengths can be offered for project specific requirements.
- Current rating calculations for alternative installation conditions, together with the appropriate data sheets.

Application Information

Life Expectancy:

Even the best cables, installed in ideal conditions, and never abused during their service life, must invariably reach the end of their designed life. This life is approximately 40 years on modern XLPE cable using the best material available, designed to prevent water tree growth, processed on a dry cure line and using a triple extrusion head.

Failure Mechanisms:

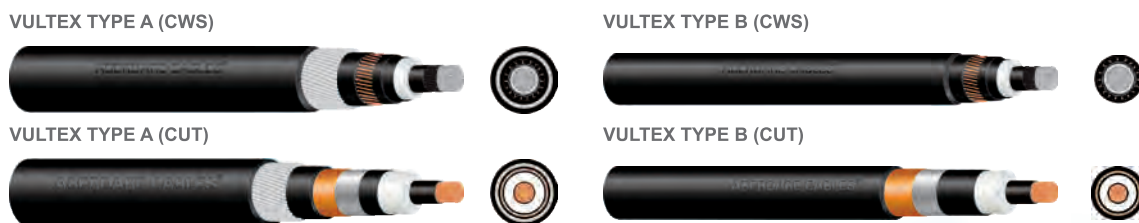
It must be stressed that most failures of power cables are caused by external factors, primarily as a result of damage sustained during transport, handling, and particularly during installation and later the mishandling of these cables. On XLPE cable water ingress due to mechanical damage can lead to reduced life expectancy.

A lesser but still significant cause of power cable failure, is poor system design, mainly with respect to the application of inadequate derating factors. The particular thermal environment in which an electric cable is installed has a dramatic effect on the continuous current rating of the particular cable. Sizing XLPE cable using its 90 °C continuous rating attribute is therefore not recommended, particularly in buried installations where dying out of soil can occur.

Further causes of failure of electric cables are:

- System voltage surges where there is inadequate surge protection,
- Overload,
- The application of inappropriate or excessively high test voltage after failure, or after cable system alteration.

XLPE cable is particularly susceptible to the latter when high voltage DC is applied to aged XLPE cable.



Current ratings are based on these parameters:

Maximum sustained conductor temperature	90°C
Ground Temperature	25°C
Ambient air temperature (free air-shaded)	30°C
Ground Thermal Resistivity	1,2 K.m/W
Depth of laying to top of cable or duct	800mm
Conductor temperature after short circuit	250 °C

- The minimum installation bending radius for these single core cable is 20 x D where 'D' is the outside diameter of the cable.
- Cables installed in Flat formation are touching (no spacing)
- Cables in Ducts have one individual single core cable per duct
- Ducts may be filled with Bentonite slurry after installation, which results in a current rating equal to that of directly buried cables
- Joints and terminations must be specifically designed to cater for circulating currents which are induced in the armour and metallic screens when cable systems' screens and/or armour are earthed on both sides.

VULTEX TYPE A (AWA)

LARGE SINGLE CORE CABLES

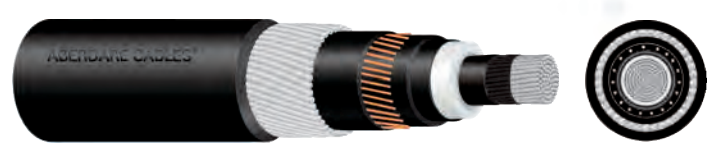
(630 mm², 800 mm² and 1000 mm²)

TECHNICAL DATA - (6,35/11 kV)

VULTEX TYPE A (CUT)



VULTEX TYPE A (CWS)



Physical Properties (CWS)

Constructional Data (Nominal Values)			Copper & Aluminium Conductors						
Conductor Size	Diameter Over Conductor	XLPE Insulation Thickness	Diameter Over Bedding	AWA Diameter	Diameter Overall	Cable Mass		Gross Mass Per 300m Drum	
						kg/km		kg	
mm ²	mm	mm	mm	mm	mm	Cu	Al	Cu	Al
630	30,3	3,4	43,8	2,6	54,6	8295	4428	3174	2027
800	34,7	3,4	48,6	2,6	59,6	10450	5236	3932	2368
1000	38,5	3,4	53,6	2,6	65,0	12337	6281	4625	2808

Electrical Properties (CWS)

Constructional Data (Nominal Values)	Electrical Properties							
	DC Resistance @ 20°C		AC Resistance @ 90°C @ 50 Hz		Reactance per Phase @ 50 Hz		Capacitance per Phase @ 50 Hz	
Conductor Size	Ω/km		Ω/km		Ω/km		nF/km	
	Cu	Al	Cu	Al	TRF	FLT	Cu	Al
630	0,0283	0,0400	0,0400	0,0600	0,0960	0,1140	768	794
800	0,0221	0,0339	0,0339	0,0511	0,0940	0,1080	817	817
1000	0,0176	0,0290	0,0290	0,0422	0,0920	0,1070	915	921

Current Ratings (CWS)

Conductor Size	Ground 25°C															
	A															
	Trefoil								Flat							
	Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)		Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)	
mm ²	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded
630	797	677	651	580	677	569	556	493	790	650	652	566	670	546	556	481
800	879	733	725	631	744	614	618	533	866	699	721	612	731	585	613	516
1000	943	761	798	679	795	636	678	571	915	723	787	655	769	604	666	550

Conductor Size	Duct 25°C															
	A															
	Trefoil								Flat							
	Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)		Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)	
mm ²	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded
630	783	655	639	569	665	559	545	484	776	637	639	555	657	535	545	471
800	860	717	709	617	728	601	604	521	845	682	704	598	713	570	598	504
1000	931	752	789	670	758	628	670	564	903	713	776	645	758	596	656	543

Conductor Size	Air 30°C															
	A															
	Trefoil								Flat							
	Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)		Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)	
mm ²	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded
630	1137	980	934	841	915	780	754	676	1136	950	941	829	912	755	760	666
800	1285	1090	1058	934	1031	864	855	747	1276	1050	1060	915	1021	832	854	731
1000	1403	1156	1188	1026	1122	915	956	818	1976	1110	1180	1000	1096	878	947	797

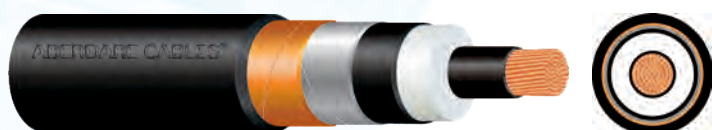
VULTEX TYPE B

LARGE SINGLE CORE CABLES

(630 mm², 800 mm² and 1000 mm²)

TECHNICAL DATA - (6,35/11 kV)

VULTEX TYPE B (CUT)



VULTEX TYPE B (CWS)



Physical Properties (CWS)

Constructional Data (Nominal Values)			Copper & Aluminium Conductors				
Conductor Size	Diameter Over Conductor	XLPE Insulation Thickness	Diameter Overall	Cable Mass		Gross Mass Per 300m Drum	
				kg/km		kg	
mm ²	mm	mm	mm	Cu	Al	Cu	Al
630	30,3	3,4	45,6	7174	3283	2693	1526
800	34,7	3,4	51,2	9323	4032	3427	1838
1000	38,5	3,4	56,0	10918	4845	3974	2250

Electrical Properties (CWS)

Constructional Data (Nominal Values)	Electrical Properties							
	DC Resistance @ 20°C		AC Resistance @ 90°C @ 50 Hz		Reactance per Phase @ 50 Hz		Capacitance per Phase @ 50 Hz	
Conductor Size	Ω/km		Ω/km		Ω/km		nF/km	
	Cu	Al	Cu	Al	TRF	FLT	Cu	Al
630	0,0283	0,0469	0,0400	0,0600	0,0850	0,1060	768	794
800	0,0221	0,0367	0,0335	0,0492	0,0840	0,0990	817	817
1000	0,0176	0,0291	0,0302	0,0432	0,0830	0,0980	915	921

Current Ratings (CWS)

Conductor Size	Ground 25°C															
	A															
	Trefoil								Flat							
	Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)		Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)	
mm ²	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded
630	811	777	654	643	690	659	559	548	823	773	668	651	700	653	570	554
800	888	859	733	716	755	728	625	610	903	859	748	722	767	726	638	614
1000	968	930	814	791	819	784	693	671	982	924	828	793	830	777	705	671

Conductor Size	Duct 25°C															
	A															
	Trefoil								Flat							
	Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)		Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)	
mm ²	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded
630	799	766	646	636	681	650	552	548	810	761	659	642	689	643	563	547
800	875	846	722	706	744	717	616	601	889	845	735	710	755	714	627	604
1000	949	912	798	775	803	769	679	658	961	905	810	776	812	761	690	657

Conductor Size	Air 30°C															
	A															
	Trefoil								Flat							
	Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)		Cu (90°C)		Al (90°C)		Cu (70°C)		Al (70°C)	
mm ²	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded	Single Point Bonded	Double Point Bonded
630	1145	1103	920	906	922	885	743	730	1168	1106	945	923	941	885	763	743
800	1274	1238	1051	1030	1024	991	848	829	1303	1247	1078	1045	1048	997	870	840
1000	1418	1369	1193	1163	1134	1091	961	934	1447	1373	1222	1176	1158	1092	984	942

ENLIGHTENING THE FUTURE

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