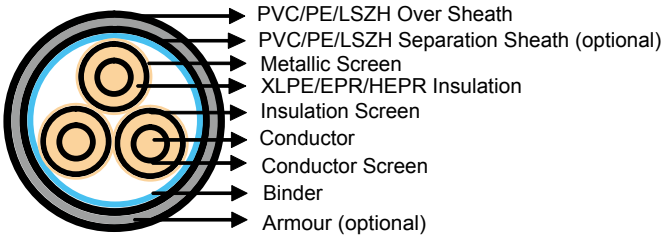
Three Core Cables to IEC 60502

APPLICATIONS:

The three core cables are designed for distribution of electrical power with nominal voltage Uo/U ranging from 1.8/3KV to 26/35KV and frequency 50Hz. They are suitable for installation mostly in power supply stations, indoors and in cable ducts, outdoors, underground and in water as well as for installation on cable trays for industries, switchboards and power stations.

STANDARD:

IEC 60502 Part 1(1.8/3KV)
IEC 60502 Part 2(3.6/6KV to 18/30KV)



CONSTRUCTION:

Conductor: Plain annealed copper or aluminium complying with IEC 60228 class 1 or 2.
Conductor Screen: The conductor screen consists of an extruded layer of non metallic, semi-conducting compound applied on top of a semi-conducting tape. The conductor screen is applied under triple extrusion process over the conductor along with the insulation and the insulation screen. The extruded semi-conducting compound is firmly bonded to the insulation to exclude all air voids and can be easily hand stripped on site. The conductor screen is not necessary for both PVC and EPR/HEPR insulated 1.8/3.6KV and 3.6/6KV cables.
Insulation: Insulation is of polyvinyl chloride (PVC) intended for 1.8/3.6KV and 3.6/6KV cables, cross-linked polyethylene compound (XLPE) or ethylene propylene rubber (EPR/HEPR).

Table 1. Insulation Thickness of XLPE or EPR/HEPR Insulation

Nom. Cross Section Area		Insulation Thickness at Nom. Voltage						
	1.8/3KV (Um=3.6KV)	3.6/6KV (Um=7.2KV)			6/10KV (Um=12KV)	8.7/15KV (Um=17KV)	12/20KV (Um=24KV)	18/30KV (Um=36KV)
mm²	mm	mm			mm	mm	mm	mm
	XLPE/EPR	XLPE	EPR		XLPE/EPR	XLPE/EPR	XLPE/EPR	XLPE/EPR
			Unscreened	Screened				
10	2.0	2.5	3.0	2.5	-	-	-	-
16	2.0	2.5	3.0	2.5	3.4	-	-	-
25	2.0	2.5	3.0	2.5	3.4	4.5	-	-
35	2.0	2.5	3.0	2.5	3.4	4.5	5.5	-
50 – 185	2.0	2.5	3.0	2.5	3.4	4.5	5.5	8.0
240	2.0	2.6	3.0	2.6	3.4	4.5	5.5	8.0
300	2.0	2.8	3.0	2.8	3.4	4.5	5.5	8.0
400	2.0	3.0	3.0	3.0	3.4	4.5	5.5	8.0
500 - 1600	2.2-2.8	3.2	3.2	3.2	3.4	4.5	5.5	8.0

Insulaton Screen: The insulation screen consists of an extruded layer of non metallic,

semi-conducting compound extruded over the insulation of each core. The extruded semi-conducting layer shall consist of bonded or cold strippable semi-conducting compound capable of removal for jointing or terminating. As an option, a semi-conducting tape may be applied over the individual cores or core assembly as a bedding for the metallic layer. The minimum thickness is 0.3 mm and the maximum resistivity is 500 Ohm-m at 90°C. The screen is tightly fitted to the insulation to exclude all air voids and can be easily hand stripped on site. The insulation screen is not necessary for both PVC and EPR/HEPR insulated 1.8/3.6KV and 3.6/6KV cables. The screen may be covered by semi-conductive water blocking swellable tape to ensure longitudinal watertightness.

Inner Covering & Fillers: For cables with a collective metallic layer or cables with a metallic layer over each individual cores with additional collective metallic layers, semi-conducting inner covering and fillers shall be applied over the laid up cores. The inner covering and fillers are made of non hygroscopic material like polypropylene, except if the cable is to be made longitudinally watertight. The inner covering is extruded in general but may be lapped if the interstices between the cores are filled.

The approximate thickness of extruded inner coverings is given in Table 2:

Table 2. Approximate Thickness of Extruded Inner Coverings

Ficititous Diameter over Laid Up Cores		Approx. Thickness of Extruded Inner Covering
mm		mm
>	<	
-	25	1.0
25	35	1.2
35	45	1.4
45	60	1.6
60	80	1.8
80	-	2.0

*The approximate thickness of lapped inner coverings shall be 0.4mm for fictitious diameters over the laid up cores up to and including 40mm and 0.6mm for larger diameter.

Metallic Layer: The metallic layer may be applied over the individual cores or the core assembly collectively. The following types of metallic layers are provided:

1) Metallic Screen
2) Concentric Conductor
3) Metallic Sheath
4) Metallic Armour

The metallic screen shall consist of either copper tapes or a concentric layer of copper wires or a combination of tapes and wires. The concentric conductor is applied directly over the inner covering. The metallic sheath consists of lead or lead alloy applied as a tightly fitting seamless tube. The metallic armour consists of either flat wire armour, round wire armour, and double tape armour.

Table 3. Minimum Total Cross Section of Metallic Screen

Nom. Cross-Section Area of Cable	Min. Cross-Section of Metallic Screen	DC Resistance of the Copper Wire Screen
mm²	mm²	mm
up to 120	16	1.06
150-300	25	0.72
400-630	35	0.51
800-1000	50	0.35

Separation Sheath (for armoured cable): The separation sheath comprises a layer of extruded PVC, PE or LSZH applied over the laid up cores under the armour. PVC is normally of grade ST2 and PE of grade ST7. The nominal thickness is calculated by 0.02Du + 0.6mm where Du is the fictitious diameter under the sheath in mm. For cables without a lead sheath, the nominal separation sheath thickness shall not be less than 1.2mm. For cables where the separation sheath is applied over the lead sheath, the nominal separation sheath thickness shall not be less than 1.0mm.

Tabel 4. Separation Thickness

Cores Diameter		Approx. Thickness of Inner Sheath
mm		mm
>	<	
35	45	1.4
45	60	1.6
60	80	1.8
80	-	2.0

Lapped Bedding (for armoured lead sheathed cable): The lapped bedding applied to the lead sheath consists of either impregnated/synthetic compounded paper tapes or a combination of two layers of these paper tapes followed by a few layers of compounded fabulous materials. The thickness is around 1.5mm.

Armour (for armoured cable): The armour is applied over the inner covering helically. It consists of either flat galvanized steel wire armour (strip), round galvanized steel wire armour, and double steel tape armour.

Table 5. Round Armour Wire Diameter

Fictitious Diameter under the Armour		Armour Wire Diameter
mm		mm
>	<	
-	10	0.8
10	15	1.25
15	25	1.6
25	35	2.0
35	60	2.5
60	-	3.15

Table 6. Armour Tape Thickness

Fictitious Diameter under the Armour		Galvanized Steel / Steel	Aluminum / Aluminium Alloy
mm		mm	mm
>	<		
-	30	0.2	0.5
30	70	0.5	0.5
70	-	0.8	0.8

For flat wire armour and fictitious diameter under the armour greater than 15mm, the nominal thickness of the flat steel wire diameter shall be 0.8mm.Cables with fictitious diameter under the armour up to and including 15mm, flat wire armour will not be used. The tape armour is applied helically in two layers so that the outer tape is approximately central over the gap of the inner tape. If tape armour is used, the inner covering shall be reinforced by taped bedding.

Over Sheath: Overall sheath comprises a layer of extruded either thermoplastic compound (PVC ST3 type or PE ST7 type or LSZH) or elastomeric compound (polychlorprene CSP or chlorosulfonated PE). The nominal over sheath thickness is calculated by 0.035D+1 where D is the fictitiuous diameter immediately under the over sheath in mm. For unarmoured cables and cables with the over sheath not applied over the armour, metallic screen or concentric conductor, the nominal over sheath thickness shall not be less than 1.4mm. And for cables with over sheath applied over the armour, metallic screen or concentric conductor, the nominal over sheath thickness shall not be less than 1.8mm.

PHYSICAL PROPERTIES:

Operating Temperature: up to 70°C (PVC insulation); up to 90°C (XLPE or EPR insulation)
Temperature Range: -5°C (PVC or LSZH sheath); -20°C (PE sheath)
Short Circuit Temperature(5 seconds maximum duration): 140-160 °C (PVC insulation); 250°C (XLPE or EPR insulation)
Bending Radius: 15 x OD

Table 7. Nominal /Operating /Testing Voltages

Rated Voltage Uo/U	Operating Voltage (Um)	Testing Voltage (rms)
1.8/3KV	3.6KV	6.5KV
3.6/6KV	7.2KV	12.5KV
6/10KV	12KV	21KV
8.7/15KV	17.5KV	30.5KV
12/20KV	24KV	42KV
18/30KV	36KV	63KV

*21/35KV and 26/35KV power frequency voltage test can be made under the following conditions: 2.5Uo x 30mins or 3.0Uo x 15mins. Numbers in brackets refer to the test values for 3.0Uo x 1.5mins.

Caledonian Medium Voltage Cables

Three Core 1.8/3KV (Um=3.6KV)
Dimensional Data

				Unarmoured Cables				Steel Round-Wire Armoured Cables					
Nom. Cross-Section Area	Nom. Insulation Thickness	Copper Tape Thickness	Copper Wire Screen Area*	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
						CU	AL					CU	AL
mm²	mm	mm	mm²	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
10	2.0	0.1	16	1.8	23	650	460	1.2	1.6	1.8	28	1480	1290
16	2.0	0.1	16	1.8	24	840	540	1.2	1.6	1.9	29	1720	1410
25	2.0	0.1	16	1.8	26	1160	680	1.2	1.6	1.9	32	2130	1650
35	2.0	0.1	16	1.8	29	1490	820	1.2	2.0	2.1	36	2810	2140
50	2.0	0.1	16	1.9	32	1900	1000	1.2	2.0	2.2	39	3340	2450
70	2.0	0.1	16	2.0	36	2580	1290	1.2	2.0	2.3	42	4200	2910
95	2.0	0.1	16	2.2	40	3440	1640	1.3	2.5	2.4	47	5620	3820
120	2.0	0.1	16	2.3	43	4220	1950	1.3	2.5	2.5	51	6580	4310
150	2.0	0.1	25	2.4	46	5090	2290	1.4	2.5	2.7	54	7680	4870
185	2.0	0.1	25	2.5	50	6240	2730	1.5	2.5	2.8	58	9060	5560
240	2.0	0.1	25	2.7	56	8030	3430	1.6	2.5	3.0	64	11200	6600
300	2.0	0.1	25	2.8	60	9890	4100	1.6	2.5	3.1	69	13590	7500
400	2.0	0.1	35	3.1	68	12530	5150	1.8	3.15	3.4	78	17260	9880
500	2.2	0.1	35	3.3	75.7	16680	7510	1.8	3.15	3.5	84.3	21780	13025
630	2.4	0.1	35	3.5	84.9	21770	10040	1.8	3.15	3.8	94.6	27400	16050

*Optional wire screen can be provided in combination of copper tapes. Nominal screen area, as stated in the table, can be supplied as standard.

	Steel Flat Wire Armoured Cables						Double Steel Tape Armoured Cables					
Nom. Cross-Section Area	Nom. Bedding Thickness	Armour Wire Size	Nom.Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	No of Steel Tapes x Nom Tape Thickness	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL					CU	AL
mm²	mm	mm	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
10	1.2	0.8	1.8	24.5	1245	1065	1.2	2 x 0.2	1.8	23.6	925	750
16	1.2	0.8	1.8	27.1	1565	1280	1.2	2 x 0.2	1.8	26.2	1205	925
25	1.2	0.8	1.8	29.7	1975	1525	1.2	2 x 0.2	1.9	29.0	1590	1145
35	1.2	0.8	1.9	32.5	2420	1805	1.2	2 x 0.2	1.9	31.6	1985	1370
50	1.2	0.8	2.0	35	2860	2080	1.2	2 x 0.2	2.0	34.1	2400	1605
70	1.2	0.8	2.1	38.7	3685	2525	1.2	2 x 0.5	2.2	39.5	3570	2410
95	1.3	0.8	2.2	42.9	4695	3080	1.3	2 x 0.5	2.3	43.7	4570	2950
120	1.3	0.8	2.3	46.4	5650	3585	1.3	2 x 0.5	2.4	46.1	5510	3440
150	1.4	0.8	2.4	49.6	6630	4085	1.4	2 x 0.5	2.6	50.6	6500	3955
185	1.5	0.8	2.6	54.1	7990	4820	1.5	2 x 0.5	2.7	54.9	7825	4650
240	1.6	0.8	2.7	59.2	10060	5790	1.6	2 x 0.5	2.8	60.0	9825	5600
300	1.6	0.8	2.9	64.6	12230	6865	1.6	2 x0.5	3.0	65.4	12030	6660
400	1.8	0.8	3.1	71.0	15200	8280	1.8	2 x 0.5	3.2	71.8	14970	8055
500	1.8	0.8	3.3	79.5	19090	10255	1.8	2 x 0.8	3.5	80.5	18880	10035
630	1.8	0.8	3.6	89.8	24400	12920	1.8	2 x 0.8	3.8	92.3	25070	13620

Electrical Data

Nom. Cross-Section Area	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capaci-tance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reactance	Inductance
mm²	μΩ/m	μΩ/m	kA	pF/m	mA/m	kA	kA	μΩ/m	nH/m
10	1830/3080	2330/3920	1.4/0.9	160	0.25	4.8	8.2	101	390
16	1150/1910	1460/2420	2.2/1.4	180	0.27	4.8	8.2	98	370
25	727/1200	929/1538	3.6/2.3	220	0.29	4.8	8.2	95	350
35	524/868	668/1113	5.0/3.2	250	0.31	4.8	8.2	92	330
50	387/641	494/822	6.8/4.4	270	0.33	4.8	8.2	88	310
70	268/443	343/568	9.8/6.3	310	0.35	4.8	8.2	84	290
95	193/320	248/410	13.3/8.5	350	0.38	4.8	8.2	81	270
120	153/253	196/325	17.2/11.0	380	0.46	4.8	8.2	79	250
150	124/206	159/265	21.2/13.5	420	0.50	4.8	8.2	77	260
185	99.1/164	128/211	26.6/17.0	460	0.56	4.8	8.2	76	250
240	75.4/125	98/161	34.9/22.3	510	0.61	4.8	8.2	74	240
300	60.1/100	80/130	43.8/28.0	570	0.68	4.8	8.2	73	250
400	47.0/77.8	64/102	57.3/36.6	590	0.70	4.8	8.2	71	240
500	36.6/60.5	57/81	72.3/46.2	610	0.72	4.8	8.2	69	230
630	28.3/46.9	42/64	91.2/58.3	630	0.74	4.8	8.2	67	220

Three Core 3.8/6.6KV (Um=7.2KV)
Dimensional Data

				Unarmoured Cables				Steel Round-Wire Armoured Cables					
Nom. Cross-Section Area	Nom. Insulation Thickness	Copper Tape Thickness	Copper Wire Screen Area*	Nom. Sheath Thickness	Approx. Overall Diameter	Approx.Weight		Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
						CU	AL					CU	AL
mm²	mm	mm	mm²	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
10	2.5	0.1	16	2.0	30	980	790	1.2	2.0	2.1	36	2310	2120
16	2.5	0.1	16	2.0	31	1190	890	1.2	2.0	2.2	38	2600	2290
25	2.5	0.1	16	2.1	34	1560	1080	1.2	2.0	2.3	41	3080	2600
35	2.5	0.1	16	2.2	37	1930	1270	1.3	2.5	2.4	45	3950	3280
50	2.5	0.1	16	2.3	40	2370	1480	1.3	2.5	2.5	47	4530	3630
70	2.5	0.1	16	2.4	43	3110	1820	1.4	2.5	2.6	51	5510	4210
95	2.5	0.1	16	2.5	47	4000	2200	1.5	2.5	2.8	55	6660	4860
120	2.5	0.1	16	2.6	50	4820	2550	1.5	2.5	2.9	59	7630	5360
150	2.5	0.1	25	2.8	54	5770	2970	1.6	2.5	3.0	62	8800	6000
185	2.5	0.1	25	2.9	58	6960	3460	1.6	2.5	3.1	66	10180	6670
240	2.6	0.1	25	3.1	65	8940	4340	1.8	3.15	3.4	75	13480	8870
300	2.8	0.1	25	3.3	70	10980	5190	1.9	3.15	3.6	81	15920	10130
400	3.0	0.1	35	3.5	79	13820	6440	2.0	3.5	3.9	90	19980	12590
500	3.2	0.1	35	3.7	87	19100	10755	2.1	3.5	4.1	98	24160	14820
630	3.2	0.1	35	4.0	95	30470	13150	2.2	3.5	4.4	107	29650	17710

*Optional wire screen can be provided in combination of copper tapes. Nominal screen area, as stated in the table, can be supplied as standard.

Caledonian Medium Voltage Cables

	Steel Flat Wire Armoured Cables						Double Steel Tape Armoured Cables					
Nom. Cross-Section Area	Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	No of Steel tapes x nom tape thickness	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL					CU	AL
mm²	mm	mm	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
10	1.2	0.8	1.8	26.9	1415	1235	1.2	2X0.2	1.8	26	1060	885
16	1.2	0.8	1.8	29.2	1725	1445	1.2	2X0.2	1.8	28.3	1340	1055
25	1.2	0.8	1.9	32.2	2165	1735	1.2	2X0.2	1.9	31.3	1735	1305
35	1.3	0.8	2.0	35.0	2645	2025	1.3	2X0.2	2.0	34.1	2170	1555
50	1.3	0.8	2.1	37.4	3075	2295	1.3	2X0.5	2.1	38.0	2950	2170
70	1.4	0.8	2.2	41.0	3915	2755	1.4	2X0.5	2.3	41.8	3795	2635
95	1.5	0.8	2.3	45.3	4840	3335	1.5	2X0.5	2.4	46.1	4810	3200
120	1.5	0.8	2.4	48.7	5915	3855	1.5	2X0.5	2.5	49.5	5770	3705
150	1.6	0.8	2.5	52.1	6930	4395	1.6	2X0.5	2.6	52.9	6775	4235
185	1.6	0.8	2.6	56.2	8265	5100	1.6	2X0.5	2.8	57.2	8120	4950
240	1.8	0.8	2.8	62.2	10440	6220	1.8	2X0.5	2.9	63.0	10250	6025
300	1.9	0.8	3.0	68.2	12780	7420	1.9	2X0.5	3.1	69.0	12570	7200
400	2.0	0.8	3.3	75.9	15970	9110	2.0	2X0.5	3.4	76.7	15740	8870
500	2.1	0.8	3.5	84.2	19940	11130	2.1	2X0.8	3.6	86.5	20550	11750
630	2.2	0.8	3.7	93.5	25120	13670	2.2	2X0.8	3.9	96.0	25830	14400

Electrical Data

Nom. Cross-Section Area	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capaci-tance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reactance	Inductance
mm²	µΩ/m	µΩ/m	kA	pF/m	mA/m	kA	kA	µΩ/m	nH/m
10	1830/3080	2330/3920	1.4/0.9	212	0.27	4.8	8.2	132	410
16	1150/1910	1470/2420	2.2/1.4	242	0.30	4.8	8.2	124	390
25	727/1200	927/1538	3.6/2.3	272	0.33	4.8	8.2	116	370
35	524/868	668/1113	5.0/3.2	301	0.36	4.8	8.2	108	350
50	387/641	494/822	6.8/4.4	332	0.40	4.8	8.2	102	330
70	268/443	343/568	9.8/6.3	383	0.46	4.8	8.2	97	310
95	193/320	248/410	13.3/8.5	432	0.52	4.8	8.2	92	290
120	153/253	196/325	17.2/11.0	474	0.57	4.8	8.2	89	280
150	124/206	159/265	21.2/13.5	511	0.61	4.8	8.2	87	280
185	99.1/164	128/211	26.6/17.0	562	0.67	4.8	8.2	86	270
240	75.4/125	98/161	34.9/22.3	602	0.72	4.8	8.2	83	260
300	60.1/100	80/130	43.8/28.0	622	0.75	4.8	8.2	82	260
400	47.0/77.8	64/102	57.3/36.6	648	0.78	4.8	8.2	80	250
500	36.6/60.5	51/81	72.3/46.2	668	0.82	4.8	8.2	78	250
630	28.3/46.9	42/64	91.2/58.3	758	0.92	4.8	8.2	76	240

Three Core 6/10KV (Um=12KV)
Dimensional Data

				Unarmoured Cables				Steel Round-Wire Armoured Cables					
Nom. Cross-Section Area	Nom. Insulation Thickness	Copper Tape Thickness	Copper Wire Screen Area*	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx Overall Diameter	Approx. Weight	
						CU	AL					CU	AL
mm²	mm	mm	mm²	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
16	3.4	0.1	16	2.2	36	1410	1110	1.2	2.0	2.4	42	3000	2700
25	3.4	0.1	16	2.3	39	1800	1320	1.3	2.5	2.5	46	3900	3430
35	3.4	0.1	16	2.3	41	2170	1500	1.3	2.5	2.6	49	4430	3770
50	3.4	0.1	16	2.4	44	2630	1730	1.4	2.5	2.7	52	5080	4190
70	3.4	0.1	16	2.6	48	3400	2110	1.5	2.5	2.8	56	6050	4750
95	3.4	0.1	16	2.7	52	4310	2510	1.5	2.5	2.9	60	7180	5380
120	3.4	0.1	16	2.8	55	5150	2890	1.6	2.5	3.0	63	8230	5960
150	3.4	0.1	25	2.9	58	6100	3300	1.7	2.5	3.1	67	9380	6580
185	3.4	0.1	25	3.0	62	7310	3810	1.7	3.15	3.3	72	11610	8110
240	3.4	0.1	25	3.2	69	9290	4680	1.8	3.15	3.5	79	14110	9510
300	3.4	0.1	25	3.3	73	11240	5450	1.9	3.15	3.7	84	16420	10630
400	3.4	0.1	35	3.6	81	14040	6660	2.0	3.5	3.9	92	20620	12880
500	3.4	0.1	35	3.7	88	17830	8450	2.1	3.5	4.0	99.	25090	16530
630	3.4	0.1	35	3.9	96	20030	10895	2.2	3.5	4.1	109	30880	19670

*Optional wire screen can be provided in combination of copper tapes. Nominal screen area, as stated in the table, can be supplied as standard.

	Steel Flat Wire Armoured Cables						Double Steel Tape Armoured Cables					
Nom. Cross-Section Area	Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	No of Steel tapes x nom tape thickness	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL					CU	AL
mm²	mm	mm	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
16	1.2	0.8	2.2	39.7	2795	2515	1.2	2x0.5	2.3	40.5	2680	2395
25	1.3	0.8	2.2	42.7	3305	2885	1.3	2x0.5	2.4	43.7	3195	2775
35	1.3	0.8	2.3	45.2	3835	3215	1.3	2x0.5	2.5	46.2	3720	3100
50	1.4	0.8	2.4	47.8	4325	3570	1.4	2x0.5	2.6	48.8	4200	3445
70	1.5	0.8	2.5	51.8	5320	4185	1.5	2x0.5	2.7	52.8	5185	4050
95	1.5	0.8	2.7	56.1	6450	4875	1.5	2x0.5	2.8	56.9	6280	4700
120	1.6	0.8	2.8	59.7	7545	5510	1.6	2x0.5	2.9	60.5	7360	5325
150	1.7	0.8	2.9	63.1	8610	6150	1.7	2x0.5	3.0	63.9	8420	5950
185	1.7	0.8	3.0	67.4	10120	6995	1.7	2x0.5	3.1	68.2	9910	6780
240	1.8	0.8	3.2	73.0	12430	8205	1.8	2x0.5	3.3	73.8	12200	7970
300	1.9	0.8	3.3	78.3	14775	9455	1.9	2x0.5	3.4	79.1	14530	9200
400	2.0	0.8	3.5	85.2	17950	11190	2.0	2x0.8	3.7	87.7	18600	11850
500	2.1	0.8	3.7	92.8	21970	13270	2.1	2x0.8	3.9	95.3	22680	13990
630	2.2	0.8	4.0	102.7	27480	16160	2.2	2x0.8	4.1	105.0	28200	16910

Electrical Data

Nom. Cross-Section Area	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capaci-tance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Reactance	Inductance
mm²	μΩ/m	μΩ/m	kA	pF/m	mA/m	kA	kA	μΩ/m	nH/m
16	1150/1910	1470/2420	2.2/1.4	186	0.40	4.8	8.2	131	410
25	727/1200	927/1538	3.6/2.3	216	0.43	4.8	8.2	123	390
35	524/868	668/1113	5.0/3.2	237	0.47	4.8	8.2	115	370
50	387/641	494/822	6.8/4.4	266	0.52	4.8	8.2	109	350
70	268/443	343/568	9.8/6.3	298	0.60	4.8	8.2	103	330
95	193/320	248/410	13.3/8.5	334	0.67	4.8	8.2	99	320
120	153/253	196/325	17.2/11.0	365	0.73	4.8	8.2	96	310
150	124/206	159/265	21.2/13.5	392	0.78	4.8	8.2	93	300
185	99.1/164	128/211	26.6/17.0	430	0.86	4.8	8.2	90	290
240	75.4/125	98/161	34.9/22.3	476	0.95	4.8	8.2	87	280
300	60.1/100	80/130	43.8/28.0	524	1.05	4.8	8.2	85	270
400	47.0/77.8	64/102	57.3/36.6	580	1.16	4.8	8.2	81	260
500	36.6/60.5	51/81	72.3/46.2	630	1.26	4.8	8.2	78	250
630	28.3/46.9	42/64	91.2/58.3	690	1.36	4.8	8.2	76	240

Three Core 8.7/15KV (Um=17.5KV)
Dimensional Data

				Unarmoured Cables				Steel Round-Wire Armoured Cables					
Nom. Cross-Section Area	Nom. Insulation Thickness	Copper Tape Thickness	Copper Wire Screen Area*	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
						CU	AL					CU	AL
mm²	mm	mm	mm²	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
25	4.5	0.1	16	2.4	44	2100	1620	1.4	2.5	2.7	52	4560	4080
35	4.5	0.1	16	2.5	46	2510	1840	1.4	2.5	2.7	54	5080	4410
50	4.5	0.1	16	2.6	49	2980	2080	1.5	2.5	2.9	57	5740	4840
70	4.5	0.1	16	2.7	53	3760	2470	1.6	2.5	3.0	62	6770	5480
95	4.5	0.1	16	2.8	57	4700	2900	1.6	2.5	3.1	65	7890	6100
120	4.5	0.1	16	3.0	60	5590	3320	1.7	2.5	3.2	69	8970	6700
150	4.5	0.1	25	3.1	64	6560	3760	1.8	3.15	3.4	74	11030	8220
185	4.5	0.1	25	3.2	67	7800	4300	1.8	3.15	3.5	78	12490	8980
240	4.5	0.1	25	3.4	74	9820	5220	1.9	3.15	3.7	84	15040	10440
300	4.5	0.1	25	3.5	79	11800	6010	2.0	3.5	3.8	90	17920	12130
400	4.5	0.1	35	3.7	86	14620	7240	2.1	3.5	4.1	98	21360	13970
500	4.5	0.1	35	3.8	93	18160	9355	2.2	3.5	4.3	106	26490	17830

*Optional wire screen can be provided in combination of copper tapes. Nominal screen area, as stated in the table, can be supplied as standard.

	Steel Flat Wire Armoured Cables						Double Steel Tape Armoured Cables					
Nom. Cross-Section Area	Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	No of Steel tapes x Nom Tape Thickness	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL					CU	AL
mm²	mm	mm	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
25	1.4	0.8	2.4	48.0	3915	3495	1.4	2x0.5	2.5	48.8	3770	3345
35	1.4	0.8	2.5	50.8	4510	3890	1.4	2x0.5	2.6	51.6	4350	3735
50	1.5	0.8	2.6	53.3	5020	4270	1.5	2x0.5	2.7	54.1	4855	4105
70	1.6	0.8	2.7	57.0	5990	4870	1.6	2x0.5	2.8	57.8	5815	4690
95	1.6	0.8	2.8	61.2	7170	5600	1.6	2x0.5	3.0	62.2	7010	5435
120	1.7	0.8	2.9	65.1	8340	6320	1.7	2x0.5	3.1	66.1	8170	6145
150	1.8	0.8	3.0	68.3	9440	6955	1.8	2x0.5	3.2	69.3	9260	6770
185	1.8	0.8	3.2	72.8	10990	7880	1.8	2x0.5	3.3	73.6	10760	7650
240	1.9	0.8	3.3	78.3	13370	9155	1.9	2x0.5	3.4	79.1	13120	8900
300	2.0	0.8	3.5	83.7	15760	10460	2.0	2x0.8	3.6	86.0	16360	11070
400	2.1	0.8	3.7	90.5	19050	12260	2.1	2x0.8	3.9	93.0	19750	12960
500	2.2	0.8	3.9	98.2	23160	14430	2.2	2x0.8	4.1	100.7	23900	15190

Caledonian Medium Voltage Cables

Electrical Data

Nom. Cross-Section Area	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capacitance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reactance	Inductance
mm²	μΩm	μΩ/m	kA	pF/m	mA/m	kA	kA	μΩm	nH/m
25	727/1200	927/1538	3.6/2.3	176	0.48	4.8	8.2	132	410
35	524/868	668/1113	5.0/3.2	193	0.53	4.8	8.2	123	390
50	387/641	494/822	6.8/4.4	211	0.58	4.8	8.2	116	370
70	268/443	343/568	9.8/6.3	240	0.65	4.8	8.2	110	350
95	193/320	248/410	13.3/8.5	267	0.73	4.8	8.2	105	330
120	153/253	196/325	17.2/11.0	291	0.79	4.8	8.2	102	320
150	124/206	159/265	21.2/13.5	312	0.85	4.8	8.2	98	310
185	99.1/164	128/211	26.6/17.0	340	0.93	4.8	8.2	95	300
240	75.4/125	98/161	34.9/22.3	375	1.02	4.8	8.2	91	290
300	60.1/100	80/130	43.8/28.0	411	1.12	4.8	8.2	89	280
400	47.0/77.8	64/102	57.3/36.6	454	1.24	4.8	8.2	84	270
500	36.6/60.5	51/81	72.3/46.2	504	1.34	4.8	8.2	78	250

Three Core12/20KV (Um=24KV)
Dimensional Data

				Unarmoured Cables				Steel Round-Wire Armoured Cables					
Nom. Cross-Section Area	Nom. Insulation Thickness	Copper Tape Thickness	Copper Wire Screen Area*	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
						CU	AL					CU	AL
mm²	mm	mm	mm²	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
35	5.5	0.1	16	2.7	51	2850	2180	1.5	2.5	2.9	60	5700	5010
50	5.5	0.1	16	2.8	54	3340	2450	1.6	2.5	3.0	62	6370	5480
70	5.5	0.1	16	2.9	58	4150	2850	1.6	2.5	3.1	66	7370	6070
95	5.5	0.1	16	3.0	62	5110	3310	1.7	3.15	3.3	72	9400	7600
120	5.5	0.1	16	3.1	65	5990	3730	1.8	3.15	3.4	75	10530	8270
150	5.5	0.1	25	3.2	68	6980	4180	1.8	3.15	3.5	80	11800	8940
185	5.5	0.1	25	3.3	72	8240	4740	1.9	3.15	3.7	83	13350	9850
240	5.5	0.1	25	3.6	79	10310	5700	2.0	3.5	3.8	90	16430	11820
300	5.5	0.1	25	3.7	84	12360	6570	2.1	3.5	4.0	95	18870	13080
400	5.5	0.1	35	3.9	91	15220	7830	2.2	4.0	4.3	103	23260	15930
500	5.5	0.1	35	4.1	97	19105	10325	2.3	4.2	4.5	110	27800	19170

*Optional wire screen can be provided in combination of copper tapes. Nominal screen area, as stated in the table, can be supplied as standard.

Nom. Cross-Section Area	Steel Flat Wire Armoured Cables						Double Steel Tape Armoured Cables					
	Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	No of Steel tapes x nom tape thickness	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL					CU	AL
mm²	mm	mm	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
35	1.5	0.8	2.7	55.7	5150	4530	1.5	2x0.5	2.8	56.5	4975	4355
50	1.6	0.8	2.8	58.2	5675	4935	1.6	2x0.5	2.9	59.0	5495	4750
70	1.6	0.8	2.9	61.9	6685	5570	1.6	2x0.5	3.0	62.7	6490	5375
95	1.7	0.8	3.0	66.4	7945	6390	1.7	2x0.5	3.1	67.2	7735	6180
120	1.8	0.8	3.1	70.0	9110	7103	1.8	2x0.5	3.2	70.8	8890	6880
150	1.8	0.8	3.2	73.2	10240	7770	1.8	2x0.5	3.3	74.0	10010	7535
185	1.9	0.8	3.3	77.7	11840	8750	1.9	2x0.5	3.4	78.5	11600	8500
240	2.0	0.8	3.5	83.2	14270	10070	2.0	2x0.8	3.6	85.5	14870	10680
300	2.1	0.8	3.6	88.6	16730	11440	2.1	2x0.8	3.8	91.1	17400	12130
400	2.2	0.8	3.9	95.6	20130	13350	2.2	2x0.8	4.0	97.9	20820	14050
500	2.3	0.8	4.1	103.3	24310	15600	2.3	2x0.8	4.2	105.6	25050	16350

Electrical Data

Nom. Cross-Section Area	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capaci-tance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reactance	Inductance
mm²	µΩ/m	µΩ/m	kA	pF/m	mA/m	kA	kA	µΩ/m	nH/m
35	524/868	668/1113	5.0/3.2	168	0.67	4.8	8.2	129	410
50	387/641	494/822	6.8/4.4	183	0.73	4.8	8.2	122	390
70	268/443	343/568	9.8/6.3	207	0.83	4.8	8.2	115	370
95	193/320	248/410	13.3/8.5	229	0.92	4.8	8.2	110	350
120	153/253	196/325	17.2/11.0	249	1.00	4.8	8.2	106	340
150	124/206	159/265	21.2/13.5	266	1.06	4.8	8.2	103	330
185	99.1/164	128/211	26.6/17.0	289	1.16	4.8	8.2	100	320
240	75.4/125	98/161	34.9/22.3	318	1.27	4.8	8.2	95	300
300	60.1/100	80/130	43.8/28.0	348	1.39	4.8	8.2	93	290
400	47.0/77.8	64/102	57.3/36.6	388	1.53	4.8	8.2	87	280
500	36.6/60.5	51/81	72.3/46.2	422	1.67	4.8	8.2	78	250

Caledonian Medium Voltage Cables

Three Core 18/30KV (Um=36KV)
Dimensional Data

				Unarmoured Cables				Steel Round-Wire Armoured Cables					
Nom. Cross-Section Area	Nom. Insulation Thickness	Copper Tape Thickness	Copper Wire Screen Area*	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight		Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
						CU	AL					CU	AL
mm²	mm	mm	mm²	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
50	8.0	0.1	16	3.2	65	4340	3460	1.8	3.15	3.5	75	8950	8080
70	8.0	0.1	16	3.3	70	5220	3930	1.9	3.15	3.6	80	10150	8860
95	8.0	0.1	16	3.4	74	6240	4440	1.9	3.15	3.7	84	11390	9590
120	8.0	0.1	16	3.5	77	7180	4910	2.0	3.5	3.8	89	13200	10860
150	8.0	0.1	25	3.6	80	8220	5420	2.1	3.5	4.0	92	14520	11720
185	8.0	0.1	25	3.7	84	9540	6040	2.1	4.0	4.1	97	17020	13510
240	8.0	0.1	25	3.9	91	11720	7110	2.2	4.0	4.3	104	19810	15200
300	8.0	0.1	25	4.0	95	13790	8000	2.3	4.5	4.5	108	23310	17470
400	8.0	0.1	35	4.3	103	16820	9430	2.4	4.5	4.7	117	27010	19620
500	8.0	0.1	35	4.5	110	21550	12880	2.5	4.5	4.9	124	31130	22610

*Optional wire screen can be provided in combination of copper tapes. Nominal screen area, as stated in the table, can be supplied as standard.

	Steel Flat Wire Armoured Cables						Double Steel Tape Armoured Cables					
Nom. Cross-Section Area	Nom. Bedding Thickness	Armour Wire Size	Nom. Sheath Thickness	Approx. Oveall Diameter	Approx. Weight		Nom. Bedding Thickness	No of Steel tapes x nom tape thickness	Nom. Sheath Thickness	Approx. Overall Diameter	Approx. Weight	
					CU	AL					CU	AL
mm²	mm	mm	mm	mm	kg/km		mm	mm	mm	mm	kg/km	
50	1.8	0.8	3.1	70.2	7490	6775	1.8	2x0.5	3.3	71.2	7300	6585
70	1.9	0.8	3.2	74.0	8590	7540	1.9	2x0.5	3.4	75.0	8390	7335
95	1.9	0.8	3.4	78.5	9990	8460	1.9	2x0.5	3.5	79.3	9740	8210
120	2.0	0.8	3.5	82.2	11250	9270	2.0	2x0.8	3.6	84.5	11845	9875
150	2.1	0.8	3.6	85.6	12510	10070	2.1	2x0.8	3.7	87.9	13120	10700
185	2.1	0.8	3.7	89.8	14155	11100	2.1	2x0.8	3.9	92.3	14850	11800
240	2.2	0.8	3.8	95.4	16740	12575	2.2	2x0.8	4.0	97.9	17480	13320
300	2.3	0.8	4.0	100.9	19310	14120	2.3	2x0.8	4.2	103.4	20080	14900
400	2.4	0.8	4.2	107.8	22840	16170	2.4	2x0.8	4.4	110.3	23660	17000
500	2.5	0.8	4.4	115.5	27200	18610	2.5	2x0.8	4.6	118.0	28080	19510

Electrical Data

Nom. Cross-Section Area	D C Resistance CU / AL	A C Resistance CU / AL	Short Circuit Rating of Conductor CU / AL 1 sec	Capacitance	Charging Current	Short Circuit Rating of Copper Wire Screen Per Core 1 sec	Short Circuit Rating of Copper Tape Screen Per Core 1 sec	Reactance	Inductance
mm²	µΩ/m	µΩ/m	kA	pF/m	mA/m	kA	kA	µΩ/m	nH/m
50	387/641	494/822	6.8/4.4	142	0.85	4.8	8.2	134	430
70	268/443	343/568	9.8/6.3	159	0.95	4.8	8.2	127	400
95	193/320	248/410	13.3/8.5	175	1.05	4.8	8.2	121	390
120	153/253	196/325	17.2/11.0	189	1.13	4.8	8.2	117	370
150	124/206	159/265	21.2/13.5	201	1.21	4.8	8.2	113	360
185	99.1/164	128/211	26.6/17.0	217	1.3	4.8	8.2	109	350
240	75.4/125	98/161	34.9/22.3	237	1.42	4.8	8.2	104	330
300	60.1/100	80/130	43.8/28.0	258	1.55	4.8	8.2	101	320
400	47.0/77.8	64/102	57.3/36.6	282	1.69	4.8	8.2	96	290
500	36.6/60.5	51/81	72.3/46.2	302	1.79	4.8	8.2	78	250

Current Rating for Three Core 3.6/6KV(Um=7.2)KV to 18/30KV(Um=36KV) XLPE Insulation

Nom. Cross-Section Area	Unarmored						Armored					
	Buried direct in Ground		Laid in Single Way Duct		Laid in Air		Buried direct in Ground		Laid in Single Way Duct		Laid in Air	
	CU	AL	CU	AL	CU	AL	CU	AL	CU	AL	CU	AL
mm²	A		A		A		A		A		A	
10	76	53	62	42	87	62	76	53	63	43	88	63
16	101	78	87	67	109	84	101	78	88	68	110	85
25	129	100	112	87	142	110	129	100	112	87	143	111
35	153	119	133	103	170	132	154	119	134	104	172	133
50	181	140	158	122	204	158	181	140	158	123	205	159
70	221	171	193	150	253	196	220	171	194	150	253	196
95	262	203	231	179	304	236	263	204	232	180	307	238
120	298	232	264	205	351	273	298	232	264	206	352	274
150	334	260	297	231	398	309	332	259	296	231	397	309
185	377	294	336	262	455	355	374	293	335	262	453	354
240	434	340	390	305	531	415	431	338	387	304	529	415
300	489	384	441	346	606	475	482	380	435	343	599	472
400	553	438	501	398	696	552	541	432	492	393	683	545
500	613	498	541	451	786	652	601	492	532	446	773	645
630	663	568	591	501	896	762	651	562	582	496	883	755

Current Rating for Three Core 3.6/6KV(Um=7.2)KV to 18/30KV(Um=36KV) EPR Insulation

Nom. Cross-Section Area	Unarmored						Armored					
	Buried direct in Ground		Laid in Single Way Duct		Laid in Air		Buried direct in Ground		Laid in Single Way Duct		Laid in Air	
	CU	AL	CU	AL	CU	AL	CU	AL	CU	AL	CU	AL
mm²	A		A		A		A		A		A	
10	73	51	59	40	82	58	73	51	60	41	82	59
16	98	76	84	65	104	80	98	76	85	66	104	81
25	125	97	109	84	135	105	125	97	109	85	136	105
35	150	116	130	101	164	127	150	116	131	101	164	127
50	176	137	154	119	195	151	177	137	155	120	197	153
70	216	167	189	147	243	189	216	168	190	147	244	190
95	258	200	227	176	296	229	257	200	227	176	296	230
120	292	227	258	201	339	263	292	227	259	201	339	264
150	328	255	291	226	385	299	327	254	291	226	385	300
185	371	289	330	257	441	343	368	288	328	257	439	343
240	429	335	384	300	519	406	424	332	381	299	513	402
300	482	378	434	340	590	462	475	374	429	338	583	459
400	545	432	494	392	678	538	534	426	485	387	666	530
500	605	492	534	445	768	638	594	486	525	440	756	630
630	655	562	584	495	878	749	644	556	575	490	862	741

Current Rating Conditions:

Ground Temperature: 20°C
Ambient Temperature (air): 30°C
Depth of Soil: 0.8 m
Thermal Resistance of Soil: 1.5K•m/W