

Medium voltage cables

November 2015



This manual contains technical information on a wide variety of commonly used medium voltage (MV) power cables manufactured to Australian/New Zealand Standard AS/NZS 1429.1.

Full constructional and technical details are given for Prysmian's standard range of MV power cables. Other constructions and variants are available by special order.

Recommended use

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed installations up to the indicated rated voltage at a nominal power frequency in the range 49Hz to 61Hz.

Cables to AS/NZS 1429.1 and AS/NZS 4026 are intended for use either installed in air, directly buried in the ground or in ducts. Cables with LSOH sheath have improved fire performance when installed in air and are primarily intended for such locations. Reasonable protection against mechanical damage should be provided.

Cables in this technical manual are not specifically designed for use as self-supporting aerial cables, as submarine cables, where exposure to excessive heat or corrosive products or solvent substances is involved. In case of any doubt concerning the suitability of a particular cable type for a particular use, guidance should be sought from Prysmian's Customer Service Centre.



Whilst every care has been taken in the preparation of this publication, the Prysmian Group take no responsibility for any errors and or omissions. This booklet is intended as a guide only and reference must be made by any person using this booklet to the appropriate Australian/New Zealand Standard and or to local electricity supply authority rulings. The company reserves the right to make changes in product without notice. All rights reserved. Subject to change without notice.

Why do business with Prysmian?

Because it pays off.

You might ask yourself why you should choose cables from us, and not from somewhere else? It's a fair question. There are many very good reasons.

First of all we're New Zealanders. We've been producing tailor-made cables here since 1946. We know what it takes to deal with the many different challenges that tough New Zealand conditions require.

Second of all we combine this local knowledge with the strength of being a global market leader. Being the world's largest producer of power and telecommunication cables means we have the muscles to innovate and customise our solutions to perfectly match your needs. At our disposal we have 91 manufacturing plants, 17 research and development centres and around 19 000 employees.

In addition we co-operate with universities, scientific institutions and, perhaps most importantly, with you. Your satisfaction is our livelihood. Based on your needs and your feedback we constantly improve to make sure our offer fits the bill.

No matter what kind of cable you need, we have it. And if not, we'll invent it. And it doesn't end there. In our offer you'll find the best technical support on the market – before, during and after.

That's why doing business with us pays off.

Please accept this latest edition of the Medium voltage guide with our compliments.

All Prysmian plants manufacturing cables to Australian/New Zealand standards operate the same or similar management systems such as those applicable to New Zealand as below;

ISO 9001:2008

Quality Management Systems

AS/NZS 4801:2001

Occupational Health & Safety Management Systems

OHSAS 18001:2007

Assessment Specification for Occupational Health & Safety Management Systems

ISO 14001:2004

Environmental Management Systems



Do you always get what you see?

Probably not. And that's definitely true for cables.



Cables might look the same on the outside. But it's the inside that counts. And that can differ enormously. We have always worked with quality as our top priority, listened to our customers and customised our cables to perfectly fit their needs. Cause we have and always will continue to believe that quality pays off.

A brand of the

Prysmian
Group

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No need to go overseas.

We are here to serve you.



We've been producing tailor-made cables for New Zealand in New Zealand since 1946. And we will continue to do so. Our great staff of highly skilled and experienced people know what it takes to make cables that withstand everything from geothermal heat to crazy keas. Simply primo cables.

A brand of the

Prysmian
Group

Health, safety and environment

People are our greatest asset. We believe everyone has the right to work and live in a healthy and safe environment.

The Prysmian Group maintains our commitment to comply with all relevant Occupational Health, Safety and Environmental legislation, Australian and New Zealand Standards (AS/NZS 4801 and ISO 14001) Licences and Industry Codes of Practices.

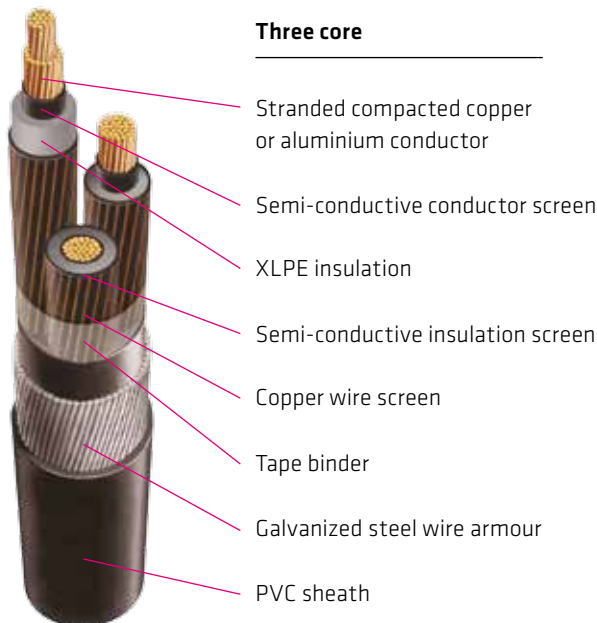
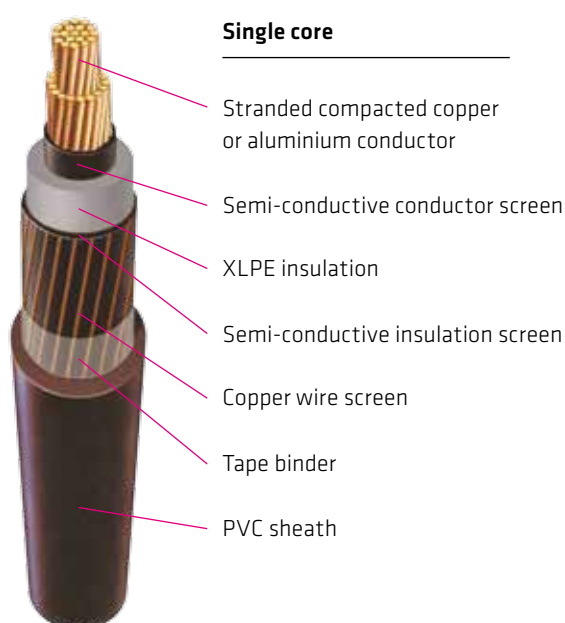
Our goal is an environmentally and socially sustainable business and we believe that a safe work environment is a sign of efficiency and quality. Accidents can be prevented and we commit to continually improve, to achieve zero incidents of work related injury, illness and environmental pollution.

We also aim to help our customers fulfil their environmental responsibilities by providing them with cables and associated products that we believe have been manufactured as efficiently, economically sound and environmentally sustainable as possible.

For additional support in this area we have dedicated technical staff available to provide specific product information and guidelines for use please contact:

sales.nz@prysmiangroup.com

Exploded cable view



Designations

Each cable type is identified by a reference type designation for ease of reference and a full order designation which fully identifies each cable and should be used on order documentation. Cables are metre marked for ease of installation and inventory control.

All cables are listed with the voltage rating for which the cable is designed, expressed in the form U_0/U , where U_0 is the nominal voltage between conductor(s) and earth and U is the nominal voltage between phase conductors.

When ordering, please quote the conductor nominal cross sectional area ahead of the product code which appears on each data sheet.

Product code

Example: 953CCUX11LDA:

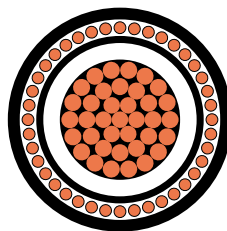
95 mm² three core, copper conductor, XLPE insulated, 11kV, light duty screen, armoured.

1.	2.	3.	4.	5.	6.	7.
95	3C	CU	X	11	LD	A
CSA	Product code					

- Conductor nominal cross sectional area:**
25, 35, 50, 70, 95, 120, 150, 185, 240, 300, 400, 500, 630
- Single or three core:** 1C, 3C
- Conductor material:** Copper – CU, Aluminium – AL
- Insulation material:** XLPE – X, EPR – E
- kV rating:** 3–1.9/3.3, 6–3.8/6.6, 11–6.35/11, 22–12.7/22, 33–19/33
- Screen type:** Light Duty – LD, Heavy Duty – HD
- Armouring:** Armoured – A, Unarmoured – blank

MEDIUM VOLTAGE CABLES

Copper 1.9/3.3kv – Single core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D
15D (HDPE/MDPE)
During installation: 18D
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation options:

Cross Linked Polyethylene (XLPE)
Ethylene Propylene Rubber (EPR)

Insulation screen:

Extruded, semi-conductive compound
Cold strippable

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath options:

Black 5V-90 PVC) – standard.
Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

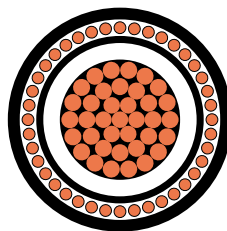
Physical & electrical characteristics

Copper 1.9/3.3kV – Single core light duty screened unarmoured													
Product code: 1CCUX3LD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4
Approx cable diameter mm	18.6	19.6	20.7	22.3	24.0	25.4	26.8	28.6	31.0	33.5	37.2	40.9	45.2
Approx mass kg/100m	65	75	90	110	135	160	190	225	280	340	430	535	675
Max pulling tension on conductor kN	1.8	2.5	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25
Max pulling tension on stocking grip kN	1.2	1.3	1.5	1.7	2.0	2.3	2.5	2.9	3.4	3.9	4.8	5.8	7.1
Min bending radius* during installation mm	340	350	370	400	430	460	480	510	560	600	670	740	810
Min bending radius* set in position mm	220	230	250	270	290	310	320	340	370	400	450	490	540
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0983	0.0794	0.0635	0.0513	0.0419
Inductance, trefoil touching mH/km	0.448	0.428	0.409	0.377	0.359	0.344	0.333	0.322	0.312	0.303	0.296	0.290	0.285
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.141	0.134	0.128	0.118	0.113	0.108	0.105	0.101	0.0981	0.0953	0.0930	0.0911	0.0896
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.66+ j0.0717	1.46+ j0.0669	1.32+ j0.0622	1.20+ j0.0540	1.13+ j0.0498	1.09+ j0.0461	1.06+ j0.0438	1.03+ j0.0413	1.01+ j0.0388	0.995+ j0.0367	0.982+ j0.0352	0.973+ j0.0340	0.965+ j0.0331
Capacitance, phase to earth µF/km	0.318	0.350	0.390	0.448	0.507	0.556	0.605	0.666	0.742	0.824	0.943	0.962	0.994
Min insulation resistance @ 20°C MOhm.km	8,200	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	3,000	2,700	2,600	2,500
Electric stress at conductor screen kV/mm	1.19	1.17	1.14	1.11	1.09	1.08	1.07	1.06	1.04	1.03	1.02	0.929	0.850
Charging current @ rated voltage & 50 Hz A/phase/km	0.190	0.209	0.233	0.267	0.303	0.332	0.361	0.398	0.443	0.492	0.563	0.574	0.594
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	90.1
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous Current Rating	In ground, direct buried A	156	186	219	267	318	360	403	454	523	588	664	833
	In ground, in singleway ducts A	154	183	214	259	307	345	383	428	488	545	612	768
	In free air, unenclosed & spaced from wall A	157	190	227	284	347	400	455	523	617	709	823	1089

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 1.9/3.3kV – Single core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath options:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

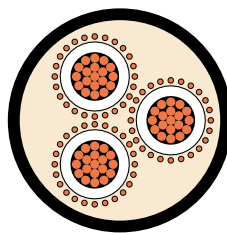
Physical & electrical characteristics

Copper 1.9/3.3kV – Single core heavy duty screened unarmoured													
Product code: 1CCUX3HD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4
Approx cable diameter mm	18.6	20.9	22.0	24.3	26.0	26.7	28.1	30.1	32.3	34.8	38.5	42.2	46.5
Approx mass kg/100m	70	90	115	155	185	205	235	270	325	385	475	580	720
Max pulling tension on conductor kN	1.8	2.5	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25
Max pulling tension on stocking grip kN	1.2	1.5	1.7	2.1	2.4	2.5	2.8	3.2	3.6	4.2	5.2	6.2	7.6
Min bending radius* during installation mm	340	380	400	440	470	480	510	540	580	630	690	760	840
Min bending radius* set in position mm	220	250	260	290	310	320	340	360	390	420	460	510	560
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0982	0.0793	0.0634	0.0511	0.0417
Inductance, trefoil touching mH/km	0.448	0.442	0.421	0.395	0.375	0.354	0.343	0.333	0.321	0.311	0.303	0.297	0.291
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.141	0.139	0.132	0.124	0.118	0.111	0.108	0.105	0.101	0.0978	0.0953	0.0932	0.0914
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.51+ j0.0717	1.09+ j0.0696	0.783+ j0.0647	0.560+ j0.0575	0.485+ j0.0530	0.435+ j0.0481	0.406+ j0.0456	0.381+ j0.0430	0.358+ j0.0404	0.343+ j0.0381	0.330+ j0.0365	0.320+ j0.0351	0.312+ j0.0342
Capacitance, phase to earth µF/km	0.318	0.350	0.390	0.448	0.507	0.556	0.605	0.666	0.742	0.824	0.943	0.962	0.994
Min insulation resistance @ 20°C MOhm.km	8,200	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	3,000	2,700	2,600	2,500
Electric stress at conductor screen kV/mm	1.19	1.17	1.14	1.11	1.09	1.08	1.07	1.06	1.04	1.03	1.02	0.929	0.850
Charging current @ rated voltage & 50 Hz A/phase/km	0.190	0.209	0.233	0.267	0.303	0.332	0.361	0.398	0.443	0.492	0.563	0.574	0.594
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	90.1
	Metallic screen kA, 1 sec	3.5	5.0	7.1	10	10	10	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	156	187	219	266	317	356	397	445	509	568	636	784
	In ground, in singleway ducts A	154	182	210	249	290	319	350	386	431	473	523	634
	In free air, unenclosed & spaced from wall A	157	194	232	290	353	401	454	519	608	694	798	1037

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 1.9/3.3kV – Three core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

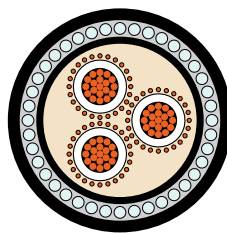
Physical & electrical characteristics

Copper 1.9/3.3kV – Three core light duty screened unarmoured										
Product code: 3CCUX3LD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Approx cable diameter mm	36.0	38.2	40.8	44.6	48.6	51.9	55.1	59.1	64.2	69.5
Approx mass kg/100m	160	195	235	305	390	475	560	675	855	1050
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	25
Max pulling tension on stocking grip kN	4.5	5.1	5.8	7.0	8.3	9.4	11	12	14	17
Min bending radius* during installation mm	650	690	730	800	880	930	990	1060	1160	1250
Min bending radius* set in position mm	430	460	490	540	580	620	660	710	770	830
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.128	0.0987	0.0800
Inductance mH/km	0.380	0.364	0.348	0.321	0.307	0.295	0.287	0.278	0.270	0.262
Inductive Reactance, @ 50Hz Ohm/km	0.119	0.114	0.109	0.101	0.0964	0.0926	0.0900	0.0874	0.0847	0.0824
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.46+ j0.0720	3.26+ j0.0671	3.12+ j0.0624	3.00+ j0.0542	2.93+ j0.0499	2.68+ j0.0463	2.47+ j0.0440	2.29+ j0.0415	2.13+ j0.0390	1.88+ j0.0368
Capacitance, phase to earth µF/km	0.319	0.352	0.391	0.449	0.509	0.558	0.607	0.668	0.745	0.827
Min insulation resistance @ 20°C MOhm.km	8,200	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	3,000
Electric stress at conductor screen kV/mm	1.19	1.17	1.14	1.11	1.09	1.08	1.07	1.06	1.04	1.03
Charging current @ rated voltage & 50 Hz A/phase/km	0.190	0.210	0.234	0.268	0.304	0.333	0.362	0.399	0.445	0.494
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.0	3.3	3.5	3.8	4.6
Continuous current rating	In ground, direct buried A	150	177	209	251	305	353	391	439	567
	In ground, in singleway ducts A	128	150	177	219	257	294	332	375	492
	In free air, unenclosed & spaced from wall A	149	176	209	259	308	369	413	473	633

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 1.9/3.3kV – Three core light duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

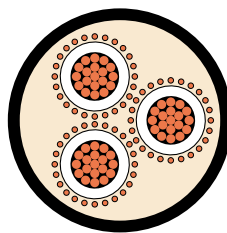
Physical & electrical characteristics

Copper 1.9/3.3kV – Three core light duty screened armoured										
Product code: 3CCUX3LDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Approx cable diameter mm	43.0	45.2	49.7	53.4	57.5	61.0	64.2	68.4	73.7	
Approx mass kg/100m	320	365	460	550	660	765	870	1010	1220	
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	
Max pulling tension on stocking grip kN	5.3	7.2	8.6	10.0	12	13	14	16	19	
Max pulling tension on armour wires kN	7.5	8.3	9.8	11	13	15	17	19	22	
Min bending radius* during installation mm	770	810	890	960	1040	1100	1160	1230	1330	
Min bending radius* set in position mm	520	540	600	640	690	730	770	820	880	
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.128	0.0987	
Inductance mH/km	0.380	0.364	0.348	0.321	0.307	0.295	0.287	0.278	0.270	
Inductive Reactance, @ 50Hz Ohm/km	0.119	0.114	0.109	0.101	0.0964	0.0926	0.0900	0.0874	0.0847	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.46+ j0.0720	3.26+ j0.0671	3.12+ j0.0624	3.00+ j0.0542	2.93+ j0.0499	2.68+ j0.0463	2.47+ j0.0440	2.29+ j0.0415	2.13+ j0.0390	
Capacitance, phase to earth µF/km	0.319	0.352	0.391	0.449	0.509	0.558	0.607	0.668	0.745	
Min insulation resistance @ 20°C MOhm.km	8,200	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	
Electric stress at conductor screen kV/mm	1.19	1.17	1.14	1.11	1.09	1.08	1.07	1.06	1.04	
Charging current @ rated voltage & 50 Hz A/phase/km	0.190	0.210	0.234	0.268	0.304	0.333	0.362	0.399	0.445	
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.0	3.3	3.5	3.8	4.0
Continuous current rating	In ground, direct buried A	150	177	209	251	305	353	391	439	508
	In ground, in singleway ducts A	128	150	177	219	257	294	332	375	433
	In free air, unenclosed & spaced from wall A	149	176	209	259	308	369	413	473	545

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 1.9/3.3kV – Three core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

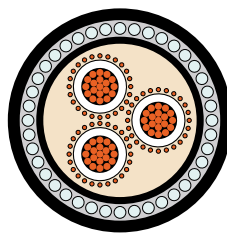
Physical & electrical characteristics

Copper 1.9/3.3kV – Three core heavy duty screened unarmoured										
Product code: 3CCUX3HD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Approx cable diameter mm	36.0	38.2	40.8	44.8	48.6	51.9	55.1	59.1	64.2	69.5
Approx mass kg/100m	165	210	260	350	435	515	600	715	890	1080
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	25
Max pulling tension on stocking grip kN	4.5	5.1	5.8	7.0	8.3	9.4	11	12	14	17
Min bending radius* during installation mm	650	690	730	810	880	930	990	1060	1160	1250
Min bending radius* set in position mm	430	460	490	540	580	620	660	710	770	830
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.128	0.0987	0.0800
Inductance mH/km	0.380	0.364	0.348	0.321	0.307	0.295	0.287	0.278	0.270	0.262
Inductive Reactance, @ 50Hz Ohm/km	0.119	0.114	0.109	0.101	0.0964	0.0926	0.0900	0.0874	0.0847	0.0824
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.07+ j0.0720	2.16+ j0.0671	1.56+ j0.0624	1.11+ j0.0542	1.03+ j0.0499	0.995+ j0.0463	0.966+ j0.0440	0.941+ j0.0415	0.917+ j0.0390	0.902+ j0.0368
Capacitance, phase to earth µF/km	0.319	0.352	0.391	0.449	0.509	0.558	0.607	0.668	0.745	0.827
Min insulation resistance @ 20°C MOhm.km	8,200	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	3,000
Electric stress at conductor screen kV/mm	1.19	1.17	1.14	1.11	1.09	1.08	1.07	1.06	1.04	1.03
Charging current @ rated voltage & 50 Hz A/phase/km	0.190	0.210	0.234	0.268	0.304	0.333	0.362	0.399	0.445	0.494
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.5	5.1	7.1	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	150	177	209	257	310	358	391	439	556
	In ground, in singleway ducts A	128	150	177	219	257	294	332	375	482
	In free air, unenclosed & spaced from wall A	149	176	209	264	319	374	418	479	649

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 1.9/3.3kV – Three core heavy duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

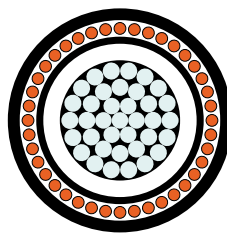
Physical & electrical characteristics

Copper 1.9/3.3kV – Three core heavy duty screened armoured										
Product code: 3CCUX3HDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Approx cable diameter mm	43.0	45.2	49.7	53.6	57.5	61.0	64.4	68.6	73.7	
Approx mass kg/100m	325	380	490	600	700	805	915	1050	1250	
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	
Max pulling tension on stocking grip kN	5.3	7.2	8.6	10	12	13	15	16	19	
Max Pulling Tension On Armour Wires kN	7.5	8.3	9.8	12	13	15	17	19	22	
Min bending radius*: during installation mm	770	810	890	970	1040	1100	1160	1230	1330	
Min bending radius*: set in position mm	520	540	600	640	690	730	770	820	880	
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.160	0.128	0.0987	
Inductance mH/km	0.380	0.364	0.348	0.321	0.307	0.295	0.287	0.278	0.270	
Inductive Reactance, @ 50Hz Ohm/km	0.119	0.114	0.109	0.101	0.0964	0.0926	0.0900	0.0874	0.0847	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.07+ j0.0720	2.16+ j0.0671	1.56+ j0.0624	1.11+ j0.0542	1.03+ j0.0499	0.995+ j0.0463	0.966+ j0.0440	0.941+ j0.0415	0.917+ j0.0390	
Capacitance, phase to earth µF/km	0.319	0.352	0.391	0.449	0.509	0.558	0.607	0.668	0.745	
Min insulation resistance @ 20°C MOhm.km	8,200	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	
Electric stress at conductor screen kV/mm	1.19	1.17	1.14	1.11	1.09	1.08	1.07	1.06	1.04	
Charging current @ rated voltage & 50 Hz A/phase/km	0.190	0.210	0.234	0.268	0.304	0.333	0.362	0.399	0.445	
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.5	5.1	7.1	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	150	177	209	257	310	358	391	439	508
	In ground, in singleway ducts A	128	150	177	219	257	294	332	375	428
	In free air, unenclosed & spaced from wall A	149	176	209	264	319	374	418	479	561

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 1.9/3.3kV – Single core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

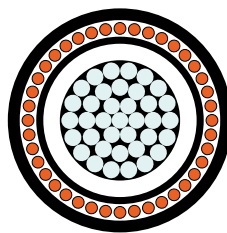
Physical & electrical characteristics

Aluminium 1.9/3.3kV – Single core light duty screened unarmoured													
Product code: 1CALX3LD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4
Approx cable diameter mm	18.6	19.6	20.6	22.3	24.0	25.4	26.7	28.5	30.8	33.5	37.2	40.9	45.1
Approx mass kg/100m	45	55	60	70	80	90	100	110	135	155	190	225	280
Max pulling tension on conductor kN	1.3	1.8	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25
Max pulling tension on stocking grip kN	1.2	1.3	1.5	1.7	2.0	2.3	2.5	2.8	3.3	3.9	4.8	5.8	7.1
Min bending radius* during installation mm	330	350	370	400	430	460	480	510	550	600	670	740	810
Min bending radius* set in position mm	220	240	250	270	290	300	320	340	370	400	450	490	540
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130	0.102	0.0805	0.0640
Inductance, trefoil touching mH/km	0.449	0.427	0.409	0.377	0.359	0.347	0.337	0.323	0.313	0.303	0.298	0.292	0.285
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.141	0.134	0.129	0.118	0.113	0.109	0.106	0.101	0.0983	0.0953	0.0935	0.0916	0.0896
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.37+ j0.0720	1.80+ j0.0665	1.57+ j0.0623	1.38+ j0.0540	1.25+ j0.0498	1.19+ j0.0471	1.14+ j0.0448	1.10+ j0.0415	1.06+ j0.0390	1.03+ j0.0367	1.01+ j0.0357	0.996+ j0.0344	0.982+ j0.0332
Capacitance, phase to earth µF/km	0.316	0.353	0.388	0.448	0.507	0.554	0.601	0.663	0.737	0.824	0.943	0.962	0.993
Min insulation resistance @ 20°C MOhm.km	8,300	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	3,000	2,700	2,600	2,500
Electric stress at conductor screen kV/mm	1.19	1.16	1.14	1.11	1.09	1.08	1.07	1.06	1.05	1.03	1.02	0.929	0.850
Charging current @ rated voltage & 50 Hz A/phase/km	0.189	0.211	0.232	0.267	0.303	0.331	0.359	0.395	0.440	0.492	0.563	0.574	0.593
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	59.5
	Metallic screen kA, 1 sec	2.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous current rating	In ground, direct buried A	121	144	170	207	247	281	314	355	410	463	528	681
	In ground, in singleway ducts A	121	143	168	204	242	273	304	342	392	439	498	636
	In free air, unenclosed & spaced from wall A	122	148	176	221	270	311	353	408	482	558	654	889

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 1.9/3.3kV – Single core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

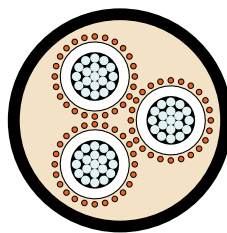
Physical & electrical characteristics

Aluminium 1.9/3.3kV – Single core heavy duty screened unarmoured													
Product code: 1CALX3HD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.2	2.4
Approx cable diameter mm	18.6	19.6	21.9	23.6	25.3	26.7	28.0	30.0	32.1	34.8	38.5	42.2	46.4
Approx mass kg/100m	45	55	70	95	120	135	145	160	180	200	235	270	325
Max pulling tension on conductor kN	1.3	1.8	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25
Max pulling tension on stocking grip kN	1.2	1.3	1.7	2.0	2.2	2.5	2.8	3.1	3.6	4.2	5.2	6.2	7.5
Min bending radius* during installation mm	330	350	390	430	460	480	500	540	580	630	690	760	840
Min bending radius* set in position mm	220	240	260	280	300	320	340	360	390	420	460	510	560
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130	0.102	0.0804	0.0638
Inductance, trefoil touching mH/km	0.449	0.427	0.422	0.389	0.370	0.357	0.347	0.334	0.322	0.311	0.305	0.298	0.291
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.141	0.134	0.133	0.122	0.116	0.112	0.109	0.105	0.101	0.0978	0.0958	0.0936	0.0915
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.37+ j0.0720	1.71+ j0.0665	1.24+ j0.0649	0.871+ j0.0563	0.635+ j0.0519	0.535+ j0.0490	0.488+ j0.0466	0.446+ j0.0432	0.407+ j0.0405	0.382+ j0.0381	0.360+ j0.0369	0.343+ j0.0356	0.330+ j0.0342
Capacitance, phase to earth µF/km	0.316	0.353	0.388	0.448	0.507	0.554	0.601	0.663	0.737	0.824	0.943	0.962	0.993
Min insulation resistance @ 20°C MOhm.km	8,300	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	3,000	2,700	2,600	2,500
Electric stress at conductor screen kV/mm	1.19	1.16	1.14	1.11	1.09	1.08	1.07	1.06	1.05	1.03	1.02	0.929	0.850
Charging current @ rated voltage & 50 Hz A/phase/km	0.189	0.211	0.232	0.267	0.303	0.331	0.359	0.395	0.440	0.492	0.563	0.574	0.593
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	59.5
	Metallic screen kA, 1 sec	2.4	3.3	4.7	6.6	8.9	10	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	121	144	171	208	247	279	311	351	404	453	515	654
	In ground, in singleway ducts A	121	143	168	201	234	260	287	319	361	399	447	554
	In free air, unenclosed & spaced from wall A	122	147	180	225	273	314	356	409	481	553	645	863

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 1.9/3.3kV – Three core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

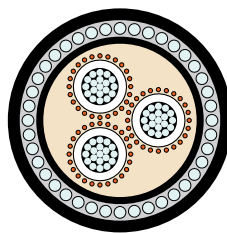
Physical & electrical characteristics

Aluminium 1.9/3.3kV – Three core light duty screened unarmoured										
Product code: 3CALX3LD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Approx cable diameter mm	35.9	38.4	40.7	44.6	48.6	51.8	54.9	58.8	63.9	69.5
Approx mass kg/100m	110	130	150	180	215	250	290	335	410	490
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	25
Max pulling tension on stocking grip kN	3.8	5.2	5.8	7.0	8.3	9.4	11	12	14	17
Min bending radius* during installation mm	650	690	730	800	880	930	990	1060	1150	1250
Min bending radius* set in position mm	430	460	490	540	580	620	660	710	770	830
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
Inductance mH/km	0.381	0.363	0.349	0.321	0.307	0.298	0.290	0.279	0.270	0.262
Inductive reactance, @ 50Hz Ohm/km	0.120	0.114	0.110	0.101	0.0964	0.0935	0.0910	0.0875	0.0849	0.0824
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.84+ j0.0722	3.60+ j0.0668	3.37+ j0.0626	3.18+ j0.0542	3.05+ j0.0499	2.78+ j0.0472	2.55+ j0.0449	2.35+ j0.0416	2.18+ j0.0391	1.92+ j0.0368
Capacitance, phase to earth µF/km	0.317	0.354	0.390	0.449	0.509	0.556	0.604	0.665	0.740	0.827
Min insulation resistance @ 20°C MOhm.km	8,300	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	3,000
Electric stress at conductor screen kV/mm	1.19	1.16	1.14	1.11	1.09	1.08	1.07	1.06	1.05	1.03
Charging current @ rated voltage & 50 Hz A/phase/km	0.189	0.212	0.233	0.268	0.304	0.332	0.360	0.397	0.442	0.494
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.3	3.0	3.0	3.0	3.0	3.3	3.5	3.8	4.6
Continuous current rating	In ground, direct buried A	118	134	161	198	241	273	305	342	449
	In ground, in singleway ducts A	96	118	139	171	198	230	262	289	391
	In free air, unenclosed & spaced from wall A	116	138	160	198	237	281	319	369	506

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 1.9/3.3kV – Three core light duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

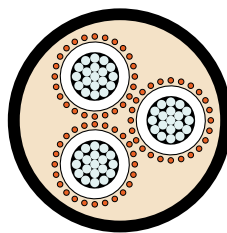
Physical & electrical characteristics

Aluminium 1.9/3.3kV – Three core light duty screened armoured										
Product code: 3CALX3LDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Approx cable diameter mm	43.0	45.4	49.6	53.4	57.5	60.9	64.0	68.2	73.4	
Approx mass kg/100m	270	300	375	425	485	540	595	665	770	
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	
Max pulling tension on stocking grip kN	3.8	5.3	7.5	10.0	12	13	14	16	19	
Max pulling tension on armour wires kN	7.4	8.3	9.8	11	13	15	17	19	22	
Min bending radius* during installation mm	770	820	890	960	1040	1100	1150	1230	1320	
Min bending radius* set in position mm	520	550	590	640	690	730	770	820	880	
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	
Inductance mH/km	0.381	0.363	0.349	0.321	0.307	0.298	0.290	0.279	0.270	
Inductive reactance, @ 50Hz Ohm/km	0.120	0.114	0.110	0.101	0.0964	0.0935	0.0910	0.0875	0.0849	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.84+ j0.0722	3.60+ j0.0668	3.37+ j0.0626	3.18+ j0.0542	3.05+ j0.0499	2.78+ j0.0472	2.55+ j0.0449	2.35+ j0.0416	2.18+ j0.0391	
Capacitance, phase to earth µF/km	0.317	0.354	0.390	0.449	0.509	0.556	0.604	0.665	0.740	
Min insulation resistance @ 20°C MOhm.km	8,300	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	
Electric stress at conductor screen kV/mm	1.19	1.16	1.14	1.11	1.09	1.08	1.07	1.06	1.05	
Charging current @ rated voltage & 50 Hz A/phase/km	0.189	0.212	0.233	0.268	0.304	0.332	0.360	0.397	0.442	
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.3	3.0	3.0	3.0	3.0	3.3	3.5	3.8	4.0
Continuous current rating	In ground, direct buried A	118	134	161	198	241	273	305	342	401
	In ground, in singleway ducts A	96	118	139	171	198	230	262	289	337
	In free air, unenclosed & spaced from wall A	116	138	160	198	237	281	319	369	440

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 1.9/3.3kV – Three core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

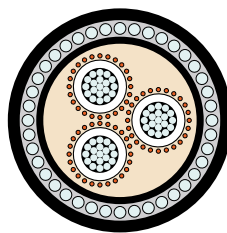
Physical & electrical characteristics

Aluminium 1.9/3.3kV – Three core heavy duty screened unarmoured										
Product code: 3CALX3HD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0
Approx cable diameter mm	35.9	38.4	40.7	44.8	48.6	51.8	54.9	58.8	63.9	69.5
Approx mass kg/100m	110	130	160	205	255	290	330	375	445	520
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	25
Max pulling tension on stocking grip kN	3.8	5.2	5.8	7.0	8.3	9.4	11	12	14	17
Min bending radius* during installation mm	650	690	730	810	880	930	990	1060	1150	1250
Min bending radius* set in position mm	430	460	490	540	580	620	660	710	770	830
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
Inductance mH/km	0.381	0.363	0.349	0.321	0.307	0.298	0.290	0.279	0.270	0.262
Inductive reactance, @ 50Hz Ohm/km	0.120	0.114	0.110	0.101	0.0964	0.0935	0.0910	0.0875	0.0849	0.0824
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.48+ j0.0722	3.39+ j0.0668	2.37+ j0.0626	1.70+ j0.0542	1.26+ j0.0499	1.09+ j0.0472	1.05+ j0.0449	1.01+ j0.0416	0.967+ j0.0391	0.942+ j0.0368
Capacitance, phase to earth µF/km	0.317	0.354	0.390	0.449	0.509	0.556	0.604	0.665	0.740	0.827
Min insulation resistance @ 20°C MOhm.km	8,300	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	3,000
Electric stress at conductor screen kV/mm	1.19	1.16	1.14	1.11	1.09	1.08	1.07	1.06	1.05	1.03
Charging current @ rated voltage & 50 Hz A/phase/km	0.189	0.212	0.233	0.268	0.304	0.332	0.360	0.397	0.442	0.494
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.5	3.3	4.8	6.6	8.9	10	10	10	10
Continuous current rating	In ground, direct buried A	118	134	161	198	241	273	305	342	401
	In ground, in singleway ducts A	96	118	139	171	198	230	257	289	337
	In free air, unenclosed & spaced from wall A	116	138	160	198	242	292	330	374	440

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 1.9/3.3kV – Three core heavy duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

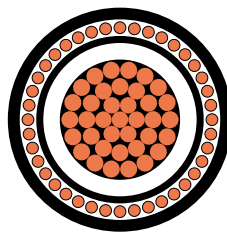
Physical & electrical characteristics

Aluminium 1.9/3.3kV – Three core heavy duty screened armoured										
Product code: 3CALX3HDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	
Nominal insulation thickness mm	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	2.0	
Approx cable diameter mm	43.0	45.4	49.6	53.6	57.5	60.9	64.2	68.4	73.4	
Approx mass kg/100m	270	300	385	455	520	580	640	705	810	
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	
Max pulling tension on stocking grip kN	3.8	5.3	7.5	10	12	13	14	16	19	
Max pulling tension on armour wires kN	7.4	8.3	9.8	12	13	15	17	19	22	
Min bending radius* during installation mm	770	820	890	970	1040	1100	1160	1230	1320	
Min bending radius* set in position mm	520	550	590	640	690	730	770	820	880	
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	
Inductance mH/km	0.381	0.363	0.349	0.321	0.307	0.298	0.290	0.279	0.270	
Inductive reactance, @ 50Hz Ohm/km	0.120	0.114	0.110	0.101	0.0964	0.0935	0.0910	0.0875	0.0849	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.48+ j0.0722	3.39+ j0.0668	2.37+ j0.0626	1.70+ j0.0542	1.26+ j0.0499	1.09+ j0.0472	1.05+ j0.0449	1.01+ j0.0416	0.967+ j0.0391	
Capacitance, phase to earth µF/km	0.317	0.354	0.390	0.449	0.509	0.556	0.604	0.665	0.740	
Min insulation resistance @ 20°C MOhm.km	8,300	7,300	6,600	5,700	5,000	4,600	4,200	3,800	3,400	
Electric stress at conductor screen kV/mm	1.19	1.16	1.14	1.11	1.09	1.08	1.07	1.06	1.05	
Charging current @ rated voltage & 50 Hz A/phase/km	0.189	0.212	0.233	0.268	0.304	0.332	0.360	0.397	0.442	
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.5	3.3	4.8	6.6	8.9	10	10	10	10
Continuous current rating	In ground, direct buried A	118	134	161	198	241	273	305	342	401
	In ground, in singleway ducts A	96	118	139	171	198	230	257	289	337
	In free air, unenclosed & spaced from wall A	116	138	160	198	242	292	330	374	440

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 3.8/6.6kV – Single core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

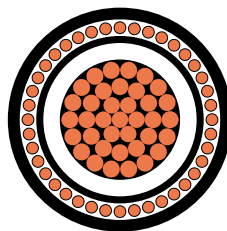
Physical & electrical characteristics

Copper 3.8/6.6kV – Single core light duty screened unarmoured													
Product code: 1CCUX6LD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	3.0	3.2	3.2
Approx cable diameter mm	19.6	20.6	21.7	23.3	25.0	26.4	27.8	29.8	32.2	35.1	39.2	43.1	47.0
Approx mass kg/100m	70	80	90	115	140	165	190	230	285	350	440	550	685
Max pulling tension on conductor kN	1.8	2.5	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25
Max pulling tension on stocking grip kN	1.3	1.5	1.6	1.9	2.2	2.4	2.7	3.1	3.6	4.3	5.4	6.5	7.7
Min bending radius* during installation mm	350	370	390	420	450	480	500	540	580	630	700	770	850
Min bending radius* set in position mm	240	250	260	280	300	320	330	360	390	420	470	520	560
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0982	0.0793	0.0633	0.0510	0.0416
Inductance, trefoil touching mH/km	0.459	0.439	0.418	0.386	0.367	0.352	0.341	0.331	0.320	0.313	0.307	0.301	0.293
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.144	0.138	0.131	0.121	0.115	0.110	0.107	0.104	0.101	0.0984	0.0965	0.0946	0.0922
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.66+ j0.0761	1.46+ j0.0710	1.32+ j0.0660	1.20+ j0.0575	1.13+ j0.0530	1.09+ j0.0491	1.06+ j0.0466	1.03+ j0.0439	1.01+ j0.0417	0.995+ j0.0401	0.982+ j0.0391	0.973+ j0.0375	0.965+ j0.0356
Capacitance, phase to earth µF/km	0.266	0.292	0.324	0.371	0.418	0.458	0.497	0.546	0.586	0.607	0.651	0.682	0.762
Min insulation resistance @ 20°C MOhm.km	9,700	8,800	8,000	6,900	6,100	5,500	5,100	4,600	4,300	4,100	3,800	3,700	3,300
Electric stress at conductor screen kV/mm	2.00	1.95	1.90	1.84	1.80	1.78	1.75	1.73	1.65	1.52	1.41	1.32	1.30
Charging current @ rated voltage & 50 Hz A/phase/km	0.317	0.349	0.387	0.443	0.499	0.546	0.593	0.651	0.699	0.725	0.777	0.814	0.910
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	90.1
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous current rating	In ground, direct buried A	156	186	219	267	318	360	403	454	524	589	665	836
	In ground, in singleway ducts A	154	183	214	259	307	345	384	429	490	547	615	771
	In free air, unenclosed & spaced from wall A	171	198	237	292	352	413	468	539	633	726	825	1084

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 3.8/6.6kV – Single core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

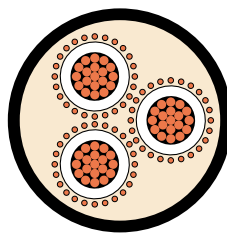
Physical & electrical characteristics

Copper 3.8/6.6kV – Single core heavy duty screened unarmoured													
Product code: 1CCUX6HD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	3.0	3.2	3.2
Approx cable diameter mm	19.6	21.9	23.0	25.3	27.0	27.7	29.1	31.1	33.7	36.6	40.7	44.4	48.3
Approx mass kg/100m	75	95	120	160	185	210	240	275	335	395	485	595	730
Max pulling tension on conductor kN	1.8	2.5	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25
Max pulling tension on stocking grip kN	1.3	1.7	1.8	2.2	2.6	2.7	3.0	3.4	4.0	4.7	5.8	6.9	8.1
Min bending radius* during installation mm	350	390	410	460	490	500	520	560	610	660	730	800	870
Min bending radius* set in position mm	240	260	280	300	320	330	350	370	400	440	490	530	580
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0981	0.0791	0.0631	0.0508	0.0414
Inductance, trefoil touching mH/km	0.459	0.451	0.431	0.403	0.383	0.362	0.350	0.340	0.330	0.322	0.315	0.307	0.299
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.144	0.142	0.135	0.127	0.120	0.114	0.110	0.107	0.104	0.101	0.0990	0.0965	0.0940
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.51+ j0.0761	1.09+ j0.0736	0.783+ j0.0684	0.560+ j0.0608	0.485+ j0.0560	0.435+ j0.0510	0.406+ j0.0483	0.381+ j0.0456	0.358+ j0.0432	0.343+ j0.0415	0.330+ j0.0403	0.320+ j0.0385	0.312+ j0.0366
Capacitance, phase to earth µF/km	0.266	0.292	0.324	0.371	0.418	0.458	0.497	0.546	0.586	0.607	0.651	0.682	0.762
Min insulation resistance @ 20°C MOhm.km	9,700	8,800	8,000	6,900	6,100	5,500	5,100	4,600	4,300	4,100	3,800	3,700	3,300
Electric stress at conductor screen kV/mm	2.00	1.95	1.90	1.84	1.80	1.78	1.75	1.73	1.65	1.52	1.41	1.32	1.30
Charging current @ rated voltage & 50 Hz A/phase/km	0.317	0.349	0.387	0.443	0.499	0.546	0.593	0.651	0.699	0.725	0.777	0.814	0.910
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	90.1
	Metallic screen kA, 1 sec	3.5	5.0	7.1	10	10	10	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	156	187	219	266	317	356	397	445	509	569	638	787
	In ground, in singleway ducts A	154	182	210	249	290	321	352	387	434	477	529	641
	In free air, unenclosed & spaced from wall A	165	198	237	297	358	413	468	528	627	715	814	1045

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 3.8/6.6kV – Three core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

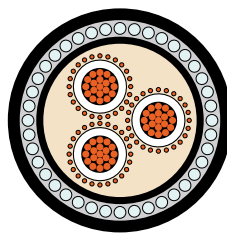
Physical & electrical characteristics

Copper 3.8/6.6kV – Three core light duty screened unarmoured										
Product code: 3CCUX6LD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8
Approx cable diameter mm	38.3	40.5	43.2	46.9	50.8	54.0	57.4	61.4	66.8	73.3
Approx mass kg/100m	170	210	250	320	405	485	575	695	880	1080
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	25
Max pulling tension on stocking grip kN	5.1	5.8	6.5	7.7	9.0	10	12	13	16	19
Min bending radius* during installation mm	690	730	780	840	910	970	1030	1110	1200	1320
Min bending radius* set in position mm	460	490	520	560	610	650	690	740	800	880
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0986	0.0797
Inductance mH/km	0.393	0.377	0.360	0.332	0.317	0.304	0.295	0.286	0.278	0.273
Inductive Reactance, @ 50Hz Ohm/km	0.124	0.118	0.113	0.104	0.0994	0.0954	0.0927	0.0899	0.0875	0.0857
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.46+ j0.0764	3.26+ j0.0713	3.12+ j0.0662	3.00+ j0.0577	2.72+ j0.0531	2.50+ j0.0493	2.47+ j0.0467	2.29+ j0.0441	2.13+ j0.0418	1.88+ j0.0402
Capacitance, phase to earth µF/km	0.267	0.293	0.325	0.372	0.420	0.459	0.499	0.548	0.588	0.610
Min insulation resistance @ 20°C MOhm.km	9,700	8,800	8,000	6,900	6,100	5,500	5,100	4,600	4,300	4,100
Electric stress at conductor screen kV/mm	2.00	1.95	1.90	1.84	1.80	1.78	1.75	1.73	1.65	1.52
Charging current @ rated voltage & 50 Hz A/phase/km	0.319	0.350	0.388	0.444	0.501	0.548	0.595	0.654	0.702	0.728
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.3	3.5	3.5	3.8	4.6
Continuous current rating	In ground, direct buried A	150	182	214	262	310	348	391	439	567
	In ground, in singleway ducts A	134	150	182	219	257	300	332	375	482
	In free air, unenclosed & spaced from wall A	154	176	209	253	319	369	418	473	649

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 3.8/6.6kV – Three core light duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

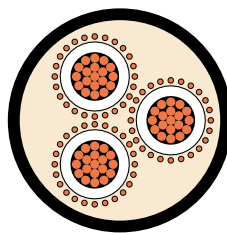
Physical & electrical characteristics

Copper 3.8/6.6kV – Three core light duty screened armoured										
Product code: 3CCUX6LDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	
Approx cable diameter mm	45.4	49.2	51.8	55.8	60.2	63.4	66.8	70.8	78.0	
Approx mass kg/100m	340	435	490	580	695	790	900	1040	1340	
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	
Max pulling tension on stocking grip kN	5.3	7.4	9.4	11	13	14	16	18	21	
Max pulling tension on amour wires kN	8.3	9.7	11	13	15	16	18	21	25	
Min bending radius* during installation mm	820	890	930	1000	1080	1140	1200	1270	1400	
Min bending radius* set in position mm	540	590	620	670	720	760	800	850	940	
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0986	
Inductance mH/km	0.393	0.377	0.360	0.332	0.317	0.304	0.295	0.286	0.278	
Inductive Reactance, @ 50Hz Ohm/km	0.124	0.118	0.113	0.104	0.0994	0.0954	0.0927	0.0899	0.0875	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.46+ j0.0764	3.26+ j0.0713	3.12+ j0.0662	3.00+ j0.0577	2.72+ j0.0531	2.50+ j0.0493	2.47+ j0.0467	2.29+ j0.0441	2.13+ j0.0418	
Capacitance, phase to earth µF/km	0.267	0.293	0.325	0.372	0.420	0.459	0.499	0.548	0.588	
Min insulation resistance @ 20°C MOhm.km	9,700	8,800	8,000	6,900	6,100	5,500	5,100	4,600	4,300	
Electric stress at conductor screen kV/mm	2.00	1.95	1.90	1.84	1.80	1.78	1.75	1.73	1.65	
Charging current @ rated voltage & 50 Hz A/phase/km	0.319	0.350	0.388	0.444	0.501	0.548	0.595	0.654	0.702	
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.3	3.5	3.5	3.8	4.0
Contin- uous current rating	In ground, direct buried A	150	182	214	262	310	348	391	439	498
	In ground, in singleway ducts A	134	150	182	219	257	300	332	375	433
	In free air, unenclosed & spaced from wall A	154	176	209	253	319	369	418	473	561

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 3.8/6.6kV – Three core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

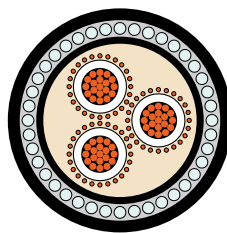
Physical & electrical characteristics

Copper 3.8/6.6kV – Three core heavy duty screened unarmoured										
Product code: 3CCUX6HD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8
Approx cable diameter mm	38.3	40.5	43.2	46.9	51.0	54.2	57.4	61.4	67.0	73.3
Approx mass kg/100m	175	220	275	360	450	530	615	735	920	1120
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	25
Max pulling tension on stocking grip kN	5.1	5.8	6.5	7.7	9.1	10	12	13	16	19
Min bending radius* during installation mm	690	730	780	840	920	980	1030	1110	1210	1320
Min bending radius* set in position mm	460	490	520	560	610	650	690	740	800	880
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0986	0.0797
Inductance mH/km	0.393	0.377	0.360	0.332	0.317	0.304	0.295	0.286	0.278	0.273
Inductive Reactance, @ 50Hz Ohm/km	0.124	0.118	0.113	0.104	0.0994	0.0954	0.0927	0.0899	0.0875	0.0857
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.07+ j0.0764	2.16+ j0.0713	1.56+ j0.0662	1.11+ j0.0577	1.03+ j0.0531	0.995+ j0.0493	0.966+ j0.0467	0.941+ j0.0441	0.917+ j0.0418	0.902+ j0.0402
Capacitance, phase to earth µF/km	0.267	0.293	0.325	0.372	0.420	0.459	0.499	0.548	0.588	0.610
Min insulation resistance @ 20°C MOhm.km	9,700	8,800	8,000	6,900	6,100	5,500	5,100	4,600	4,300	4,100
Electric stress at conductor screen kV/mm	2.00	1.95	1.90	1.84	1.80	1.78	1.75	1.73	1.65	1.52
Charging current @ rated voltage & 50 Hz A/phase/km	0.319	0.350	0.388	0.444	0.501	0.548	0.595	0.654	0.702	0.728
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.5	5.1	7.1	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	150	182	214	262	310	348	396	439	508
	In ground, in singleway ducts A	128	155	182	219	257	300	332	375	433
	In free air, unenclosed & spaced from wall A	149	182	215	270	325	374	424	479	561

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 3.8/6.6kV – Three core heavy duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

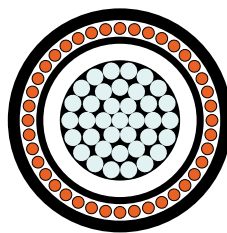
Physical & electrical characteristics

Copper 3.8/6.6kV – Three core heavy duty screened armoured										
Product code: 3CCUX6HDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	
Approx cable diameter mm	45.4	49.4	52.0	56.0	60.2	63.4	66.8	71.0	78.4	
Approx mass kg/100m	345	450	515	625	735	830	940	1080	1390	
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	
Max pulling tension on stocking grip kN	5.3	7.4	9.5	11	13	14	16	18	22	
Max pulling tension on amour wires kN	8.3	9.7	11	13	15	16	18	21	25	
Min bending radius* during installation mm	820	890	940	1010	1080	1140	1200	1280	1410	
Min bending radius* set in position mm	540	590	620	670	720	760	800	850	940	
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0986	
Inductance mH/km	0.393	0.377	0.360	0.332	0.317	0.304	0.295	0.286	0.278	
Inductive Reactance, @ 50Hz Ohm/km	0.124	0.118	0.113	0.104	0.0994	0.0954	0.0927	0.0899	0.0875	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.07+ j0.0764	2.16+ j0.0713	1.56+ j0.0662	1.11+ j0.0577	1.03+ j0.0531	0.995+ j0.0493	0.966+ j0.0467	0.941+ j0.0441	0.917+ j0.0418	
Capacitance, phase to earth µF/km	0.267	0.293	0.325	0.372	0.420	0.459	0.499	0.548	0.588	
Min insulation resistance @ 20°C MOhm.km	9,700	8,800	8,000	6,900	6,100	5,500	5,100	4,600	4,300	
Electric stress at conductor screen kV/mm	2.00	1.95	1.90	1.84	1.80	1.78	1.75	1.73	1.65	
Charging current @ rated voltage & 50 Hz A/phase/km	0.319	0.350	0.388	0.444	0.501	0.548	0.595	0.654	0.702	
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.5	5.1	7.1	10	10	10	10	10	10
Contin-uous current rating	In ground, direct buried A	150	182	214	262	310	348	396	439	508
	In ground, in singleway ducts A	128	155	182	219	257	300	332	375	433
	In free air, unenclosed & spaced from wall A	149	182	215	270	325	374	424	479	561

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 3.8/6.6kV – Single core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

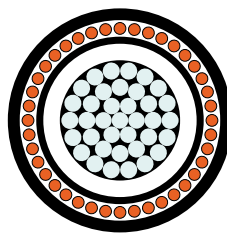
Physical & electrical characteristics

Aluminium 3.8/6.6kV – Single core light duty screened unarmoured													
Product code: 1CALX6LD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	3.0	3.2	3.2
Approx cable diameter mm	19.6	20.6	21.6	23.3	25.0	26.4	27.7	29.7	32.0	35.1	39.2	43.1	46.9
Approx mass kg/100m	50	60	65	70	85	90	100	120	140	165	200	240	290
Max pulling tension on conductor kN	1.3	1.8	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25
Max pulling tension on stocking grip kN	1.3	1.5	1.6	1.9	2.2	2.4	2.7	3.1	3.6	4.3	5.4	6.5	7.7
Min bending radius* during installation mm	350	370	390	420	450	470	500	530	580	630	700	770	840
Min bending radius* set in position mm	230	250	260	280	300	320	330	360	380	420	470	520	560
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130	0.102	0.0803	0.0638
Inductance, trefoil touching mH/km	0.460	0.437	0.419	0.386	0.367	0.355	0.344	0.331	0.321	0.313	0.309	0.303	0.293
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.144	0.137	0.132	0.121	0.115	0.111	0.108	0.104	0.101	0.0984	0.0970	0.0950	0.0922
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.37+ j0.0764	1.80+ j0.0706	1.57+ j0.0662	1.38+ j0.0575	1.25+ j0.0530	1.19+ j0.0500	1.14+ j0.0476	1.10+ j0.0441	1.06+ j0.0418	1.03+ j0.0401	1.01+ j0.0395	0.996+ j0.0379	0.982+ j0.0357
Capacitance, phase to earth µF/km	0.265	0.295	0.323	0.371	0.418	0.456	0.494	0.543	0.582	0.607	0.651	0.682	0.761
Min insulation resistance @ 20°C MOhm.km	9,900	8,800	8,000	6,900	6,100	5,600	5,100	4,600	4,300	4,100	3,800	3,700	3,300
Electric stress at conductor screen kV/mm	2.00	1.94	1.90	1.84	1.80	1.78	1.76	1.73	1.65	1.52	1.41	1.32	1.30
Charging current @ rated voltage & 50 Hz A/phase/km	0.316	0.352	0.385	0.443	0.499	0.545	0.590	0.648	0.695	0.725	0.777	0.814	0.909
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	59.5
	Metallic screen kA, 1 sec	2.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous current rating	In ground, direct buried A	121	144	170	207	247	281	314	355	410	463	529	682
	In ground, in singleway ducts A	121	143	168	204	242	273	304	342	392	440	499	638
	In free air, unenclosed & spaced from wall A	127	154	182	226	270	319	363	418	501	572	660	891

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 3.8/6.6kV – Single core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

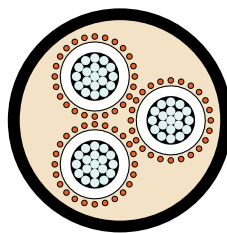
Physical & electrical characteristics

Aluminium 3.8/6.6kV – Single core heavy duty screened unarmoured													
Product code: 1CALX6HD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8	3.0	3.2	3.2
Approx cable diameter mm	19.6	20.6	21.6	23.3	25.0	26.4	27.7	29.7	32.0	35.1	39.2	43.1	46.9
Approx mass kg/100m	50	60	65	70	85	90	100	120	140	165	200	240	290
Max pulling tension on conductor kN	1.3	1.8	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25
Max pulling tension on stocking grip kN	1.3	1.5	1.6	1.9	2.2	2.4	2.7	3.1	3.6	4.3	5.4	6.5	7.7
Min bending radius* during installation mm	350	370	390	420	450	470	500	530	580	630	700	770	840
Min bending radius* set in position mm	230	250	260	280	300	320	330	360	380	420	470	520	560
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130	0.102	0.0803	0.0638
Inductance, trefoil touching mH/km	0.460	0.437	0.419	0.386	0.367	0.355	0.344	0.331	0.321	0.313	0.309	0.303	0.293
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.144	0.137	0.132	0.121	0.115	0.111	0.108	0.104	0.101	0.0984	0.0970	0.0950	0.0922
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.37+ j0.0764	1.80+ j0.0706	1.57+ j0.0662	1.38+ j0.0575	1.25+ j0.0530	1.19+ j0.0500	1.14+ j0.0476	1.10+ j0.0441	1.06+ j0.0418	1.03+ j0.0401	1.01+ j0.0395	0.996+ j0.0379	0.982+ j0.0357
Capacitance, phase to earth µF/km	0.265	0.295	0.323	0.371	0.418	0.456	0.494	0.543	0.582	0.607	0.651	0.682	0.761
Min insulation resistance @ 20°C MOhm.km	9,900	8,800	8,000	6,900	6,100	5,600	5,100	4,600	4,300	4,100	3,800	3,700	3,300
Electric stress at conductor screen kV/mm	2.00	1.94	1.90	1.84	1.80	1.78	1.76	1.73	1.65	1.52	1.41	1.32	1.30
Charging current @ rated voltage & 50 Hz A/phase/km	0.316	0.352	0.385	0.443	0.499	0.545	0.590	0.648	0.695	0.725	0.777	0.814	0.909
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	59.5
	Metallic screen kA, 1 sec	2.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous current rating	In ground, direct buried A	121	144	171	208	247	279	311	351	404	454	515	655
	In ground, in singleway ducts A	121	143	168	201	234	261	288	320	362	401	450	558
	In free air, unenclosed & spaced from wall A	127	154	182	231	281	319	363	418	501	572	660	869

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 3.8/6.6kV – Three core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

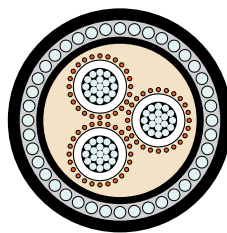
Physical & electrical characteristics

Aluminium 3.8/6.6kV – Three core light duty screened unarmoured										
Product code: 3CALX6LD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8
Approx cable diameter mm	38.3	40.7	43.1	46.9	50.8	53.9	57.2	61.2	66.5	73.3
Approx mass kg/100m	120	140	160	195	230	265	305	355	430	525
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	25
Max pulling tension on stocking grip kN	3.8	5.3	6.5	7.7	9.0	10	11	13	15	19
Min bending radius* during installation mm	690	730	780	840	910	970	1030	1100	1200	1320
Min bending radius* set in position mm	460	490	520	560	610	650	690	730	800	880
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
Inductance mH/km	0.394	0.375	0.360	0.332	0.317	0.307	0.298	0.287	0.279	0.273
Inductive Reactance, @ 50Hz Ohm/km	0.124	0.118	0.113	0.104	0.0994	0.0964	0.0937	0.0901	0.0876	0.0857
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.84+ j0.0766	3.60+ j0.0709	3.37+ j0.0664	3.18+ j0.0577	2.84+ j0.0531	2.60+ j0.0502	2.55+ j0.0477	2.35+ j0.0442	2.18+ j0.0420	1.92+ j0.0402
Capacitance, phase to earth µF/km	0.266	0.296	0.324	0.372	0.420	0.458	0.496	0.545	0.584	0.610
Min insulation resistance @ 20°C MOhm.km	9,900	8,800	8,000	6,900	6,100	5,600	5,100	4,600	4,300	4,100
Electric stress at conductor screen kV/mm	2.00	1.94	1.90	1.84	1.80	1.78	1.76	1.73	1.65	1.52
Charging current @ rated voltage & 50 Hz A/phase/km	0.317	0.353	0.387	0.444	0.501	0.547	0.592	0.650	0.697	0.728
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.3	3.0	3.0	3.0	3.3	3.5	3.5	3.8	4.6
Continuous current rating	In ground, direct buried A	118	139	166	203	241	273	305	342	449
	In ground, in singleway ducts A	102	118	139	171	198	230	262	294	385
	In free air, unenclosed & spaced from wall A	116	138	160	198	242	281	319	363	495

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 3.8/6.6kV – Three core light duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

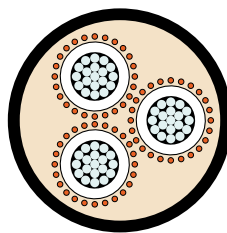
Physical & electrical characteristics

Aluminium 3.8/6.6kV – Three core light duty screened armoured										
Product code: 3CALX6LDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	
Approx cable diameter mm	45.3	49.4	51.7	55.8	60.2	63.3	66.6	70.5	77.7	
Approx mass kg/100m	290	365	400	455	520	565	630	700	895	
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	
Max pulling tension on stocking grip kN	3.8	5.3	7.5	11	13	14	16	17	21	
Max pulling tension on amour wires kN	8.3	9.8	11	13	15	16	18	20	25	
Min bending radius* during installation mm	820	890	930	1000	1080	1140	1200	1270	1400	
Min bending radius* set in position mm	540	590	620	670	720	760	800	850	930	
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	
Inductance mH/km	0.394	0.375	0.360	0.332	0.317	0.307	0.298	0.287	0.279	
Inductive Reactance, @ 50Hz Ohm/km	0.124	0.118	0.113	0.104	0.0994	0.0964	0.0937	0.0901	0.0876	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.84+ j0.0766	3.60+ j0.0709	3.37+ j0.0664	3.18+ j0.0577	2.84+ j0.0531	2.60+ j0.0502	2.55+ j0.0477	2.35+ j0.0442	2.18+ j0.0420	
Capacitance, phase to earth µF/km	0.266	0.296	0.324	0.372	0.420	0.458	0.496	0.545	0.584	
Min insulation resistance @ 20°C MOhm.km	9,900	8,800	8,000	6,900	6,100	5,600	5,100	4,600	4,300	
Electric stress at conductor screen kV/mm	2.00	1.94	1.90	1.84	1.80	1.78	1.76	1.73	1.65	
Charging current @ rated voltage & 50 Hz A/phase/km	0.317	0.353	0.387	0.444	0.501	0.547	0.592	0.650	0.697	
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.3	3.0	3.0	3.0	3.3	3.5	3.5	3.8	4.0
Contin-uous current rating	In ground, direct buried A	118	139	166	203	241	273	305	342	396
	In ground, in singleway ducts A	102	118	139	171	198	230	262	294	342
	In free air, unenclosed & spaced from wall A	116	138	160	198	242	281	319	363	435

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 3.8/6.6kV – Three core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

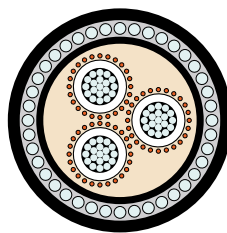
Physical & electrical characteristics

Aluminium 3.8/6.6kV – Three core heavy duty screened unarmoured										
Product code: 3CALX6HD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	2.8
Approx cable diameter mm	38.3	40.7	43.1	46.9	51.0	54.1	57.2	61.2	66.7	73.3
Approx mass kg/100m	120	145	170	215	270	305	345	395	470	560
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	25
Max pulling tension on stocking grip kN	3.8	5.3	6.5	7.7	9.1	10	11	13	16	19
Min bending radius* during installation mm	690	730	780	840	920	970	1030	1100	1200	1320
Min bending radius* set in position mm	460	490	520	560	610	650	690	730	800	880
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
Inductance mH/km	0.394	0.375	0.360	0.332	0.317	0.307	0.298	0.287	0.279	0.273
Inductive Reactance, @ 50Hz Ohm/km	0.124	0.118	0.113	0.104	0.0994	0.0964	0.0937	0.0901	0.0876	0.0857
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.48+ j0.0766	3.39+ j0.0709	2.46+ j0.0664	1.70+ j0.0577	1.26+ j0.0531	1.09+ j0.0502	1.05+ j0.0477	1.01+ j0.0442	0.967+ j0.0420	0.942+ j0.0402
Capacitance, phase to earth µF/km	0.266	0.296	0.324	0.372	0.420	0.458	0.496	0.545	0.584	0.610
Min insulation resistance @ 20°C MOhm.km	9,900	8,800	8,000	6,900	6,100	5,600	5,100	4,600	4,300	4,100
Electric stress at conductor screen kV/mm	2.00	1.94	1.90	1.84	1.80	1.78	1.76	1.73	1.65	1.52
Charging current @ rated voltage & 50 Hz A/phase/km	0.317	0.353	0.387	0.444	0.501	0.547	0.592	0.650	0.697	0.728
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.5	3.3	4.6	6.6	8.9	10	10	10	10
Continuous current rating	In ground, direct buried A	118	139	166	203	241	273	305	348	401
	In ground, in singleway ducts A	102	118	139	171	203	230	257	294	342
	In free air, unenclosed & spaced from wall A	116	138	160	198	248	286	330	374	446

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 3.8/6.6kV – Three core heavy duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

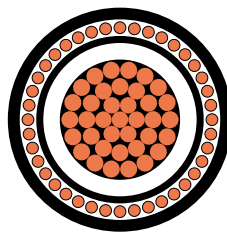
Physical & electrical characteristics

Aluminium 3.8/6.6kV – Three core heavy duty screened armoured										
Product code: 3CALX6HDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	
Nominal insulation thickness mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.5	2.6	
Approx cable diameter mm	45.3	49.4	51.9	56.0	60.2	63.3	66.6	70.7	78.1	
Approx mass kg/100m	290	370	415	480	555	605	670	740	940	
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	
Max pulling tension on stocking grip kN	3.8	5.3	7.5	11	13	14	16	18	21	
Max pulling tension on amour wires kN	8.3	9.8	11	13	15	16	18	21	25	
Min bending radius* during installation mm	820	890	930	1010	1080	1140	1200	1270	1410	
Min bending radius* set in position mm	540	590	620	670	720	760	800	850	940	
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	
Inductance mH/km	0.394	0.375	0.360	0.332	0.317	0.307	0.298	0.287	0.279	
Inductive Reactance, @ 50Hz Ohm/km	0.124	0.118	0.113	0.104	0.0994	0.0964	0.0937	0.0901	0.0876	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.48+ j0.0766	3.39+ j0.0709	2.46+ j0.0664	1.70+ j0.0577	1.26+ j0.0531	1.09+ j0.0502	1.05+ j0.0477	1.01+ j0.0442	0.967+ j0.0420	
Capacitance, phase to earth µF/km	0.266	0.296	0.324	0.372	0.420	0.458	0.496	0.545	0.584	
Min insulation resistance @ 20°C MOhm.km	9,900	8,800	8,000	6,900	6,100	5,600	5,100	4,600	4,300	
Electric stress at conductor screen kV/mm	2.00	1.94	1.90	1.84	1.80	1.78	1.76	1.73	1.65	
Charging current @ rated voltage & 50 Hz A/phase/km	0.317	0.353	0.387	0.444	0.501	0.547	0.592	0.650	0.697	
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.5	3.3	4.6	6.6	8.9	10	10	10	10
Contin-uous current rating	In ground, direct buried A	118	139	166	203	241	273	305	348	401
	In ground, in singleway ducts A	102	118	139	171	203	230	257	294	342
	In free air, unenclosed & spaced from wall A	116	138	160	198	248	286	330	374	446

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 6.35/11kV – Single core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

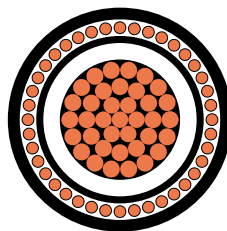
Physical & electrical characteristics

Copper 6.35/11kV – Single core light duty screened unarmoured													
Product code: 1CCUX11LD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Approx cable diameter mm	21.4	22.4	23.5	25.1	26.8	28.2	29.8	31.6	34.0	36.7	40.4	43.7	47.6
Approx mass kg/100m	75	85	100	120	150	175	200	240	295	360	445	555	690
Max pulling tension on conductor kN	1.8	2.5	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25
Max pulling tension on stocking grip kN	1.6	1.7	1.9	2.2	2.5	2.8	3.1	3.5	4.0	4.7	5.7	6.7	7.9
Min bending radius* during installation mm	390	400	420	450	480	510	540	570	610	660	730	790	860
Min bending radius* set in position mm	260	270	280	300	320	340	360	380	410	440	480	520	570
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0981	0.0791	0.0632	0.0509	0.0415
Inductance, trefoil touching mH/km	0.477	0.456	0.435	0.402	0.382	0.365	0.355	0.343	0.332	0.322	0.314	0.304	0.296
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.150	0.143	0.137	0.126	0.120	0.115	0.112	0.108	0.104	0.101	0.0985	0.0955	0.0930
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.66+ j0.0833	1.46+ j0.0778	1.32+ j0.0724	1.20+ j0.0633	1.13+ j0.0583	1.09+ j0.0541	1.06+ j0.0513	1.03+ j0.0483	1.01+ j0.0453	0.995+ j0.0430	0.982+ j0.0409	0.973+ j0.0385	0.965+ j0.0366
Capacitance, phase to earth µF/km	0.211	0.230	0.254	0.289	0.324	0.353	0.382	0.418	0.463	0.516	0.586	0.650	0.725
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	4,900	4,300	3,900	3,400
Electric stress at conductor screen kV/mm	2.64	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	2.14	2.11	2.08	2.06
Charging current @ rated voltage & 50 Hz A/phase/km	0.420	0.460	0.507	0.576	0.646	0.704	0.762	0.834	0.924	1.03	1.17	1.30	1.45
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	90.1
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous current rating	In ground, direct buried A	156	186	219	267	318	361	403	455	524	589	666	837
	In ground, in singleway ducts A	154	183	215	260	308	346	385	430	491	548	617	772
	In free air, unenclosed & spaced from wall A	161	194	232	290	353	407	462	530	624	717	831	1097

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 6.35/11kV – Single core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

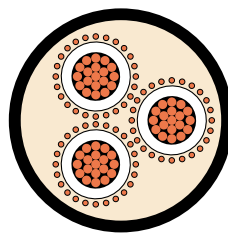
Physical & electrical characteristics

Copper 6.35/11kV – Single core heavy duty screened unarmoured													
Product code: 1CCUX11HD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Approx cable diameter mm	21.4	23.7	24.8	27.1	28.1	29.5	31.1	32.9	35.3	38.0	41.7	45.0	48.9
Approx mass kg/100m	80	100	125	165	195	220	245	285	340	405	495	600	735
Max pulling tension on conductor kN	1.8	2.5	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25
Max pulling tension on stocking grip kN	1.6	2.0	2.1	2.6	2.8	3.1	3.4	3.8	4.4	5.1	6.1	7.1	8.4
Min bending radius* during installation mm	390	430	450	490	510	530	560	590	630	680	750	810	880
Min bending radius* set in position mm	260	280	300	330	340	350	370	390	420	460	500	540	590
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0980	0.0790	0.0630	0.0507	0.0413
Inductance, trefoil touching mH/km	0.477	0.468	0.447	0.418	0.392	0.375	0.364	0.352	0.339	0.330	0.320	0.310	0.302
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.150	0.147	0.140	0.131	0.123	0.118	0.114	0.110	0.107	0.104	0.101	0.0974	0.0948
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.51+ j0.0833	1.09+ j0.0801	0.783+ j0.0745	0.560+ j0.0663	0.475+ j0.0601	0.435+ j0.0559	0.406+ j0.0529	0.381+ j0.0498	0.358+ j0.0467	0.343+ j0.0443	0.330+ j0.0421	0.320+ j0.0395	0.312+ j0.0375
Capacitance, phase to earth µF/km	0.211	0.230	0.254	0.289	0.324	0.353	0.382	0.418	0.463	0.516	0.586	0.650	0.725
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	4,900	4,300	3,900	3,400
Electric stress at conductor screen kV/mm	2.64	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	2.14	2.11	2.08	2.06
Charging current @ rated voltage & 50 Hz A/phase/km	0.420	0.460	0.507	0.576	0.646	0.704	0.762	0.834	0.924	1.03	1.17	1.30	1.45
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	90.1
	Metallic screen kA, 1 sec	3.5	5.0	7.1	10	10	10	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	156	187	219	266	316	357	397	446	510	570	639	788
	In ground, in singleway ducts A	154	182	211	250	290	323	354	391	438	481	532	643
	In free air, unenclosed & spaced from wall A	161	198	236	295	355	407	461	526	615	702	807	1045

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 6.35/11kV – Three core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

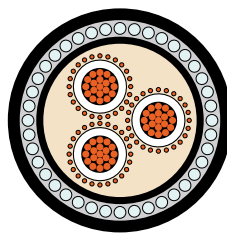
Physical & electrical characteristics

Copper 6.35/11kV – Three core light duty screened unarmoured										
Product code: 3CCUX11LD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Approx cable diameter mm	42.6	44.6	47.3	51.2	55.1	58.3	61.5	65.5	70.6	76.3
Approx mass kg/100m	195	230	270	345	440	520	610	730	915	1110
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	25
Max pulling tension on stocking grip kN	5.3	7.0	7.8	9.2	11	12	13	15	17	20
Min bending radius* during installation mm	770	800	850	920	990	1050	1110	1180	1270	1370
Min bending radius* set in position mm	510	540	570	610	660	700	740	790	850	920
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0984	0.0796
Inductance mH/km	0.415	0.397	0.379	0.350	0.333	0.319	0.310	0.300	0.290	0.282
Inductive reactance, @ 50Hz Ohm/km	0.130	0.125	0.119	0.110	0.105	0.100	0.0973	0.0942	0.0910	0.0885
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.46+ j0.0836	3.26+ j0.0781	3.12+ j0.0726	2.79+ j0.0635	2.54+ j0.0585	2.34+ j0.0543	2.17+ j0.0515	2.03+ j0.0485	1.90+ j0.0454	1.70+ j0.0431
Capacitance, phase to earth µF/km	0.212	0.231	0.255	0.290	0.325	0.354	0.383	0.419	0.465	0.518
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	4,900
Electric stress at conductor screen kV/mm	2.64	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	2.14
Charging current @ rated voltage & 50 Hz A/phase/km	0.422	0.461	0.509	0.578	0.648	0.706	0.764	0.837	0.927	1.03
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.3	3.5	3.8	4.0	4.3	5.1
Continuous current rating	In ground, direct buried A	150	177	209	251	300	348	391	439	508
	In ground, in singleway ducts A	128	155	182	219	257	300	332	375	433
	In free air, unenclosed & spaced from wall A	149	176	209	259	314	363	418	479	561

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 6.35/11kV – Three core light duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench

MEDIUM VOLTAGE CABLES

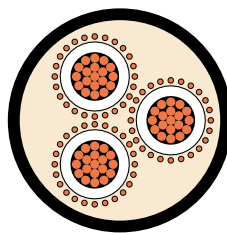
Physical & electrical characteristics

Copper 6.35/11kV – Three core light duty screened armoured										
Product code: 3CCUX11LDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	
Approx cable diameter mm	51.3	53.5	56.3	60.4	64.2	67.7	71.1	75.2	82.1	
Approx mass kg/100m	430	475	535	630	745	850	955	1100	1400	
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	
Max pulling tension on stocking grip kN	5.3	7.4	11	13	14	16	18	20	24	
Max pulling tension on amour wires kN	11	12	13	15	17	19	21	23	25	
Min bending radius* during installation mm	920	960	1010	1090	1160	1220	1280	1350	1480	
Min bending radius* set in position mm	620	640	680	720	770	810	850	900	980	
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0984	
Inductance mH/km	0.415	0.397	0.379	0.350	0.333	0.319	0.310	0.300	0.290	
Inductive reactance, @ 50Hz Ohm/km	0.130	0.125	0.119	0.110	0.105	0.100	0.0973	0.0942	0.0910	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.46+ j0.0836	3.26+ j0.0781	3.12+ j0.0726	2.79+ j0.0635	2.54+ j0.0585	2.34+ j0.0543	2.17+ j0.0515	2.03+ j0.0485	1.90+ j0.0454	
Capacitance, phase to earth µF/km	0.212	0.231	0.255	0.290	0.325	0.354	0.383	0.419	0.465	
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	
Electric stress at conductor screen kV/mm	2.64	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	
Charging current @ rated voltage & 50 Hz A/phase/km	0.422	0.461	0.509	0.578	0.648	0.706	0.764	0.837	0.927	
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.3	3.5	3.8	4.0	4.3	4.6
Contin-uous current rating	In ground, direct buried A	150	177	209	251	300	348	391	439	508
	In ground, in singleway ducts A	128	155	182	219	257	300	332	375	433
	In free air, unenclosed & spaced from wall A	149	176	209	259	314	363	418	479	561

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 6.35/11kV – Three core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

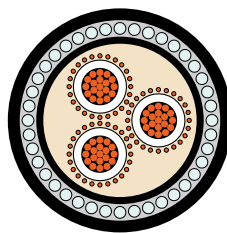
Physical & electrical characteristics

Copper 6.35/11kV – Three core heavy duty screened unarmoured										
Product code: 3CCUX11HD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Approx cable diameter mm	42.6	44.8	47.5	51.2	55.1	58.3	61.5	65.5	70.6	76.3
Approx mass kg/100m	195	245	300	390	480	560	645	765	945	1140
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	25
Max pulling tension on stocking grip kN	5.3	7.0	7.9	9.2	11	12	13	15	17	20
Min bending radius* during installation mm	770	810	850	920	990	1050	1110	1180	1270	1370
Min bending radius* set in position mm	510	540	570	610	660	700	740	790	850	920
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0984	0.0796
Inductance mH/km	0.415	0.397	0.379	0.350	0.333	0.319	0.310	0.300	0.290	0.282
Inductive reactance, @ 50Hz Ohm/km	0.130	0.125	0.119	0.110	0.105	0.100	0.0973	0.0942	0.0910	0.0885
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.07+ j0.0836	2.16+ j0.0781	1.56+ j0.0726	1.11+ j0.0635	1.03+ j0.0585	0.995+ j0.0543	0.966+ j0.0515	0.941+ j0.0485	0.917+ j0.0454	0.902+ j0.0431
Capacitance, phase to earth µF/km	0.212	0.231	0.255	0.290	0.325	0.354	0.383	0.419	0.465	0.518
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	4,900
Electric stress at conductor screen kV/mm	2.64	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	2.14
Charging current @ rated voltage & 50 Hz A/phase/km	0.422	0.461	0.509	0.578	0.648	0.706	0.764	0.837	0.927	1.03
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.5	5.1	7.1	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	144	177	209	262	310	353	396	439	567
	In ground, in singleway ducts A	128	155	182	219	262	300	332	375	492
	In free air, unenclosed & spaced from wall A	149	182	215	270	325	380	424	484	649

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 6.35/11kV – Three core heavy duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC - inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

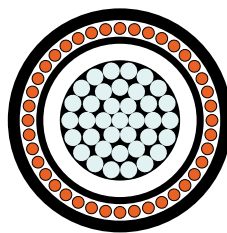
Physical & electrical characteristics

Copper 6.35/11kV – Three core heavy duty screened armoured										
Product code: 3CCUX11HDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	
Approx cable diameter mm	51.3	53.7	56.3	60.4	64.4	67.9	71.3	76.7	82.1	
Approx mass kg/100m	430	495	560	675	795	890	995	1220	1440	
Max pulling tension on conductors kN	5.3	7.4	11	15	20	25	25	25	25	
Max pulling tension on stocking grip kN	5.3	7.4	11	13	15	16	18	21	24	
Max pulling tension on amour wires kN	11	12	13	15	17	19	21	24	25	
Min bending radius* during installation mm	920	970	1010	1090	1160	1220	1280	1380	1480	
Min bending radius* set in position mm	620	640	680	720	770	810	860	920	980	
Max conductor resistance, dc @ 20°C Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0984	
Inductance mH/km	0.415	0.397	0.379	0.350	0.333	0.319	0.310	0.300	0.290	
Inductive reactance, @ 50Hz Ohm/km	0.130	0.125	0.119	0.110	0.105	0.100	0.0973	0.0942	0.0910	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.07+ j0.0836	2.16+ j0.0781	1.56+ j0.0726	1.11+ j0.0635	1.03+ j0.0585	0.995+ j0.0543	0.966+ j0.0515	0.941+ j0.0485	0.917+ j0.0454	
Capacitance, phase to earth µF/km	0.212	0.231	0.255	0.290	0.325	0.354	0.383	0.419	0.465	
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	
Electric stress at conductor screen kV/mm	2.64	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	
Charging current @ rated voltage & 50 Hz A/phase/km	0.422	0.461	0.509	0.578	0.648	0.706	0.764	0.837	0.927	
Short circuit rating	Phase conductor kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.5	5.1	7.1	10	10	10	10	10	10
Contin-uous current rating	In ground, direct buried A	144	177	209	262	310	353	396	439	508
	In ground, in singleway ducts A	128	155	182	219	262	300	332	375	439
	In free air, unenclosed & spaced from wall A	149	182	215	270	325	380	424	484	572

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 6.35/11kV – Single core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

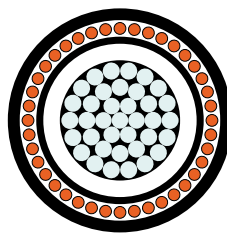
Physical & electrical characteristics

Aluminium 6.35/11kV – Single core light duty screened unarmoured													
Product code: 1CALX11LD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Approx cable diameter mm	21.4	22.4	23.4	25.1	26.8	28.2	29.7	31.5	33.8	36.7	40.4	43.7	47.5
Approx mass kg/100m	55	65	70	80	90	100	110	125	150	175	210	245	295
Max pulling tension on conductor kN	1.3	1.8	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25
Max pulling tension on stocking grip kN	1.3	1.8	1.9	2.2	2.5	2.8	3.1	3.5	4.0	4.7	5.7	6.7	7.9
Min bending radius* during installation mm	380	400	420	450	480	510	540	570	610	660	730	790	860
Min bending radius* set in position mm	260	270	280	300	320	340	360	380	410	440	480	520	570
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130	0.102	0.0803	0.0637
Inductance, trefoil touching mH/km	0.478	0.455	0.436	0.402	0.382	0.369	0.359	0.344	0.332	0.322	0.315	0.305	0.296
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.150	0.143	0.137	0.126	0.120	0.116	0.113	0.108	0.104	0.101	0.0990	0.0960	0.0930
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.37+ j0.0836	1.80+ j0.0774	1.57+ j0.0726	1.38+ j0.0633	1.25+ j0.0583	1.19+ j0.0551	1.14+ j0.0523	1.10+ j0.0485	1.06+ j0.0454	1.03+ j0.0430	1.01+ j0.0413	0.996+ j0.0389	0.982+ j0.0366
Capacitance, phase to earth µF/km	0.210	0.232	0.253	0.289	0.324	0.352	0.380	0.416	0.460	0.516	0.586	0.650	0.724
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	4,900	4,300	3,900	3,400
Electric stress at conductor screen kV/mm	2.65	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	2.14	2.11	2.08	2.06
Charging current @ rated voltage & 50 Hz A/phase/km	0.419	0.463	0.505	0.576	0.646	0.702	0.758	0.830	0.918	1.03	1.17	1.30	1.44
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	59.5
	Metallic screen kA, 1 sec	2.4	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous current rating	In ground, direct buried A	121	144	170	207	247	281	314	355	410	463	529	683
	In ground, in singleway ducts A	120	143	168	204	242	273	304	342	393	440	500	639
	In free air, unenclosed & spaced from wall A	125	151	180	225	274	316	359	413	488	564	660	893

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 6.35/11kV – Single core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

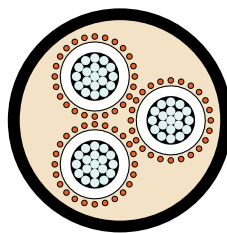
Physical & electrical characteristics

Aluminium 6.35/11kV – Single core heavy duty screened unarmoured													
Product code: 1CALX11HD													
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Approx cable diameter mm	21.4	22.4	24.7	26.4	28.1	29.5	31.0	32.8	35.1	38.0	41.7	45.0	48.8
Approx mass kg/100m	55	65	80	100	130	145	155	170	195	220	255	290	340
Max pulling tension on conductor kN	1.3	1.8	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25
Max pulling tension on stocking grip kN	1.3	1.8	2.1	2.4	2.8	3.0	3.4	3.8	4.3	5.1	6.1	7.1	8.3
Min bending radius* during installation mm	380	400	450	480	510	530	560	590	630	680	750	810	880
Min bending radius* set in position mm	260	270	300	320	340	350	370	390	420	460	500	540	590
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130	0.102	0.0802	0.0636
Inductance, trefoil touching mH/km	0.478	0.455	0.447	0.412	0.392	0.378	0.368	0.352	0.340	0.330	0.322	0.312	0.302
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.150	0.143	0.141	0.129	0.123	0.119	0.116	0.111	0.107	0.104	0.101	0.0979	0.0948
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.37+ j0.0836	1.71+ j0.0774	1.24+ j0.0747	0.871+ j0.0653	0.635+ j0.0601	0.535+ j0.0568	0.488+ j0.0539	0.446+ j0.0500	0.407+ j0.0469	0.382+ j0.0443	0.360+ j0.0425	0.343+ j0.0400	0.330+ j0.0376
Capacitance, phase to earth µF/km	0.210	0.232	0.253	0.289	0.324	0.352	0.380	0.416	0.460	0.516	0.586	0.650	0.724
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	4,900	4,300	3,900	3,400
Electric stress at conductor screen kV/mm	2.65	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	2.14	2.11	2.08	2.06
Charging current @ rated voltage & 50 Hz A/phase/km	0.419	0.463	0.505	0.576	0.646	0.702	0.758	0.830	0.918	1.03	1.17	1.30	1.44
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	59.5
	Metallic screen kA, 1 sec	2.4	3.3	4.7	6.6	8.9	10	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	121	144	170	208	247	279	311	351	404	454	516	656
	In ground, in singleway ducts A	120	143	167	201	235	262	289	321	364	403	452	560
	In free air, unenclosed & spaced from wall A	125	151	183	229	277	318	360	414	486	559	650	867

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 6.35/11kV – Three core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

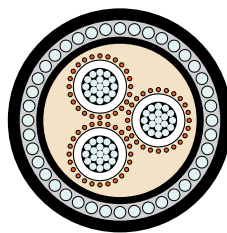
Physical & electrical characteristics

Aluminium 6.35/11kV – Three core light duty screened unarmoured										
Product code: 3CALX11LD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Approx cable diameter mm	42.3	44.8	47.2	51.2	55.1	58.2	61.3	65.3	70.3	76.3
Approx mass kg/100m	140	160	185	220	265	295	340	390	465	550
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	25
Max pulling tension on stocking grip kN	3.8	5.3	7.5	9.2	11	12	13	15	17	20
Min bending radius* during installation mm	760	810	850	920	990	1050	1100	1170	1270	1370
Min bending radius* set in position mm	510	540	570	610	660	700	740	780	840	920
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
Inductance mH/km	0.416	0.396	0.380	0.350	0.333	0.322	0.313	0.300	0.290	0.282
Inductive reactance, @ 50Hz Ohm/km	0.131	0.124	0.119	0.110	0.105	0.101	0.0983	0.0944	0.0912	0.0885
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.48+ j0.0839	3.60+ j0.0777	3.37+ j0.0728	2.97+ j0.0635	2.66+ j0.0585	2.44+ j0.0553	2.26+ j0.0525	2.09+ j0.0487	1.95+ j0.0456	1.74+ j0.0431
Capacitance, phase to earth µF/km	0.211	0.233	0.254	0.290	0.325	0.353	0.381	0.417	0.462	0.518
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	4,900
Electric stress at conductor screen kV/mm	2.65	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	2.14
Charging current @ rated voltage & 50 Hz A/phase/km	0.420	0.465	0.507	0.578	0.648	0.704	0.760	0.833	0.921	1.03
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.5	3.0	3.0	3.3	3.5	3.8	4.0	4.3	5.1
Continuous current rating	In ground, direct buried A	118	139	166	198	235	268	305	348	449
	In ground, in singleway ducts A	102	118	139	171	198	230	262	294	385
	In free air, unenclosed & spaced from wall A	116	138	160	198	242	281	319	374	506

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 6.35/11kV – Three core light duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

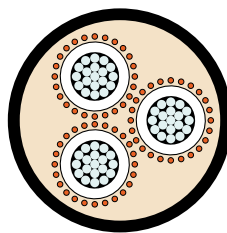
Physical & electrical characteristics

Aluminium 6.35/11kV – Three core light duty screened armoured										
Product code: 3CALX11LDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	
Approx cable diameter mm	51.2	53.7	56.2	60.4	64.2	67.5	70.9	75.0	81.8	
Approx mass kg/100m	375	415	450	505	570	625	685	760	960	
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	
Max pulling tension on stocking grip kN	3.8	5.3	7.5	11	14	16	18	20	23	
Max pulling tension on amour wires kN	11	12	13	15	17	19	21	23	25	
Min bending radius* during installation mm	920	970	1010	1090	1160	1220	1280	1350	1470	
Min bending radius* set in position mm	610	640	670	720	770	810	850	900	980	
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	
Inductance mH/km	0.416	0.396	0.380	0.350	0.333	0.322	0.313	0.300	0.290	
Inductive reactance, @ 50Hz Ohm/km	0.131	0.124	0.119	0.110	0.105	0.101	0.0983	0.0944	0.0912	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.48+ j0.0839	3.60+ j0.0777	3.37+ j0.0728	2.97+ j0.0635	2.66+ j0.0585	2.44+ j0.0553	2.26+ j0.0525	2.09+ j0.0487	1.95+ j0.0456	
Capacitance, phase to earth µF/km	0.211	0.233	0.254	0.290	0.325	0.353	0.381	0.417	0.462	
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	
Electric stress at conductor screen kV/mm	2.65	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	
Charging current @ rated voltage & 50 Hz A/phase/km	0.420	0.465	0.507	0.578	0.648	0.704	0.760	0.833	0.921	
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.5	3.0	3.0	3.3	3.5	3.8	4.0	4.3	4.6
Contin-uous current rating	In ground, direct buried A	118	139	166	198	235	268	305	348	396
	In ground, in singleway ducts A	102	118	139	171	198	230	262	294	342
	In free air, unenclosed & spaced from wall A	116	138	160	198	242	281	319	374	440

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 6.35/11kV – Three core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

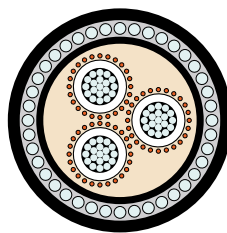
Physical & electrical characteristics

Aluminium 6.35/11kV – Three core heavy duty screened unarmoured										
Product code: 3CALX11HD										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4
Approx cable diameter mm	42.5	44.8	47.4	51.2	55.1	58.2	61.3	65.3	70.3	76.3
Approx mass kg/100m	145	165	195	240	300	335	375	425	500	585
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	25
Max pulling tension on stocking grip kN	3.8	5.3	7.5	9.2	11	12	13	15	17	20
Min bending radius* during installation mm	770	810	850	920	990	1050	1100	1170	1270	1370
Min bending radius* set in position mm	510	540	570	610	660	700	740	780	840	920
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	0.130
Inductance mH/km	0.416	0.396	0.380	0.350	0.333	0.322	0.313	0.300	0.290	0.282
Inductive reactance, @ 50Hz Ohm/km	0.131	0.124	0.119	0.110	0.105	0.101	0.0983	0.0944	0.0912	0.0885
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.18+ j0.0839	3.39+ j0.0777	2.46+ j0.0728	1.70+ j0.0635	1.26+ j0.0585	1.09+ j0.0553	1.05+ j0.0525	1.01+ j0.0487	0.967+ j0.0456	0.942+ j0.0431
Capacitance, phase to earth µF/km	0.211	0.233	0.254	0.290	0.325	0.353	0.381	0.417	0.462	0.518
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	4,900
Electric stress at conductor screen kV/mm	2.65	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	2.14
Charging current @ rated voltage & 50 Hz A/phase/km	0.420	0.465	0.507	0.578	0.648	0.704	0.760	0.833	0.921	1.03
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.8	3.3	4.6	6.6	8.9	10	10	10	10
Continuous current rating	In ground, direct buried A	118	139	166	203	241	273	305	348	449
	In ground, in singleway ducts A	102	118	139	171	198	230	262	294	385
	In free air, unenclosed & spaced from wall A	116	143	165	209	253	292	330	380	512

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 6.35/11kV – Three core heavy duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

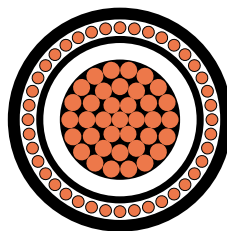
Physical & electrical characteristics

Aluminium 6.35/11kV – Three core heavy duty screened armoured										
Product code: 3CALX11HDA										
Nominal conductor area mm ²	25	35	50	70	95	120	150	185	240	
Nominal conductor diameter mm	6.1	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	
Nominal insulation thickness mm	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	3.4	
Approx cable diameter mm	51.2	53.7	56.2	60.4	64.4	67.7	71.1	76.5	81.8	
Approx mass kg/100m	380	415	460	525	610	665	725	880	990	
Max pulling tension on conductors kN	3.8	5.3	7.5	11	14	18	23	25	25	
Max pulling tension on stocking grip kN	3.8	5.3	7.5	11	14	16	18	20	23	
Max pulling tension on amour wires kN	11	12	13	15	17	19	21	24	25	
Min bending radius* during installation mm	920	970	1010	1090	1160	1220	1280	1380	1470	
Min bending radius* set in position mm	610	640	670	720	770	810	850	920	980	
Max conductor resistance, dc @ 20°C Ohm/km	1.20	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.54	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.162	
Inductance mH/km	0.416	0.396	0.380	0.350	0.333	0.322	0.313	0.300	0.290	
Inductive reactance, @ 50Hz Ohm/km	0.131	0.124	0.119	0.110	0.105	0.101	0.0983	0.0944	0.0912	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	4.18+ j0.0839	3.39+ j0.0777	2.46+ j0.0728	1.70+ j0.0635	1.26+ j0.0585	1.09+ j0.0553	1.05+ j0.0525	1.01+ j0.0487	0.967+ j0.0456	
Capacitance, phase to earth µF/km	0.211	0.233	0.254	0.290	0.325	0.353	0.381	0.417	0.462	
Min insulation resistance @ 20°C MOhm.km	12,000	11,000	10,000	8,900	7,900	7,200	6,600	6,000	5,400	
Electric stress at conductor screen kV/mm	2.65	2.56	2.49	2.40	2.33	2.29	2.25	2.22	2.18	
Charging current @ rated voltage & 50 Hz A/phase/km	0.420	0.465	0.507	0.578	0.648	0.704	0.760	0.833	0.921	
Short circuit rating	Phase conductor kA, 1 sec	2.4	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	2.8	3.3	4.6	6.6	8.9	10	10	10	10
Contin- uous current rating	In ground, direct buried A	118	139	166	203	241	273	305	348	396
	In ground, in singleway ducts A	102	118	139	171	198	230	262	294	342
	In free air, unenclosed & spaced from wall A	116	143	165	209	253	292	330	380	446

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 12.7/22kV – Single core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

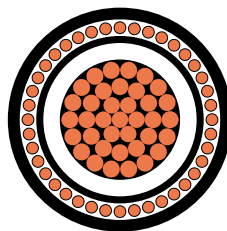
Physical & electrical characteristics

Copper 12.7/22kV – Single core light duty screened unarmoured												
Product code: 1CCUX22LD												
Nominal conductor area mm ²	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Approx cable diameter mm	26.6	27.7	29.5	31.2	32.8	34.2	36.2	38.4	41.1	44.8	48.1	52.0
Approx mass kg/100m	100	115	140	165	195	225	265	320	385	475	585	725
Max pulling tension on conductor kN	2.5	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25
Max pulling tension on stocking grip kN	2.5	2.7	3.1	3.4	3.8	4.1	4.6	5.2	5.9	7.0	8.1	9.4
Min bending radius* during installation mm	480	500	530	560	590	620	650	690	740	810	860	940
Min bending radius* set in position mm	320	330	350	370	390	410	430	460	490	540	580	620
Max conductor resistance, dc @ 20°C Ohm/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0978	0.0788	0.0628	0.0504	0.0410
Inductance, trefoil touching mH/km	0.492	0.470	0.435	0.414	0.397	0.384	0.372	0.357	0.346	0.335	0.324	0.315
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.155	0.148	0.137	0.130	0.125	0.121	0.117	0.112	0.109	0.105	0.102	0.0988
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.46+ j0.0913	1.32+ j0.0851	1.20+ j0.0751	1.13+ j0.0693	1.09+ j0.0645	1.06+ j0.0611	1.03+ j0.0575	1.01+ j0.0538	0.995+ j0.0509	0.982+ j0.0481	0.973+ j0.0451	0.965+ j0.0426
Capacitance, phase to earth µF/km	0.164	0.179	0.200	0.223	0.241	0.259	0.282	0.310	0.343	0.386	0.426	0.473
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900	8,100	7,300	6,500	5,900	5,300
Electric stress at conductor screen kV/mm	3.64	3.49	3.33	3.21	3.12	3.06	2.99	2.91	2.85	2.78	2.73	2.68
Charging current @ rated voltage & 50 Hz A/phase/km	0.652	0.713	0.799	0.888	0.961	1.03	1.12	1.24	1.37	1.54	1.70	1.89
Short circuit rating	Phase conductor kA, 1 sec	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	90.1
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous current rating	In ground, direct buried A	186	219	267	319	361	404	455	525	591	669	844
	In ground, in singleway ducts A	183	215	260	308	347	386	432	495	553	622	780
	In free air, unenclosed & spaced from wall A	199	238	296	360	414	470	538	633	726	840	1108

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 12.7/22kV – Single core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

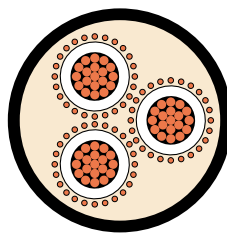
Physical & electrical characteristics

Copper 12.7/22kV – Single core heavy duty screened unarmoured												
Product code: 1CCUX22HD												
Nominal conductor area mm ²	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Approx cable diameter mm	27.9	29.0	30.8	32.5	34.1	35.5	37.5	39.9	42.4	46.3	49.4	53.5
Approx mass kg/100m	115	140	185	215	240	270	310	370	430	525	630	770
Max pulling tension on conductor kN	2.5	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25
Max pulling tension on stocking grip kN	2.5	2.9	3.3	3.7	4.1	4.4	4.9	5.6	6.3	7.5	8.5	10
Min bending radius* during installation mm	500	520	550	590	610	640	670	720	760	830	890	960
Min bending radius* set in position mm	330	350	370	390	410	430	450	480	510	560	590	640
Max conductor resistance, dc @ 20°C Ohm/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0978	0.0788	0.0627	0.0503	0.0408
Inductance, trefoil touching mH/km	0.502	0.479	0.444	0.422	0.405	0.392	0.379	0.365	0.353	0.342	0.330	0.321
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.158	0.151	0.140	0.133	0.127	0.123	0.119	0.115	0.111	0.108	0.104	0.101
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.09+ j0.0931	0.783+ j0.0868	0.550+ j0.0767	0.475+ j0.0708	0.435+ j0.0660	0.406+ j0.0625	0.381+ j0.0589	0.358+ j0.0550	0.343+ j0.0520	0.330+ j0.0491	0.320+ j0.0460	0.312+ j0.0435
Capacitance, phase to earth µF/km	0.164	0.179	0.200	0.223	0.241	0.259	0.282	0.310	0.343	0.386	0.426	0.473
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900	8,100	7,300	6,500	5,900	5,300
Electric stress at conductor screen kV/mm	3.64	3.49	3.33	3.21	3.12	3.06	2.99	2.91	2.85	2.78	2.73	2.68
Charging current @ rated voltage & 50 Hz A/phase/km	0.652	0.713	0.799	0.888	0.961	1.03	1.12	1.24	1.37	1.54	1.70	1.89
Short circuit rating	Phase conductor kA, 1 sec	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	90.1
	Metallic screen kA, 1 sec	5.0	7.1	10	10	10	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	186	219	266	316	357	398	446	512	572	642	794
	In ground, in singleway ducts A	182	211	250	293	326	359	397	445	491	543	659
	In free air, unenclosed & spaced from wall A	202	241	298	361	414	468	534	623	711	816	1057

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 12.7/22kV – Three core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

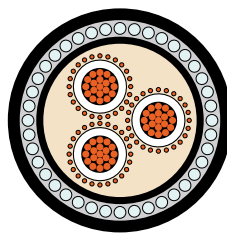
Physical & electrical characteristics

Copper 12.7/22kV – Three core light duty screened unarmoured									
Product code: 3CCUX22LD									
Nominal conductor area mm ²	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Approx cable diameter mm	54.5	57.1	60.9	64.7	68.0	71.2	75.1	80.3	86.2
Approx mass kg/100m	300	340	420	515	605	690	820	1010	1220
Max pulling tension on conductors kN	7.4	11	15	20	25	25	25	25	25
Max pulling tension on stocking grip kN	7.4	11	13	15	16	18	20	23	25
Min bending radius* during installation mm	980	1030	1100	1170	1220	1280	1350	1440	1550
Min bending radius* set in position mm	650	690	730	780	820	850	900	960	1030
Max conductor resistance, dc @ 20°C Ohm/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0981	0.0791
Inductance mH/km	0.438	0.418	0.386	0.367	0.351	0.340	0.328	0.316	0.306
Inductive reactance, @ 50Hz Ohm/km	0.138	0.131	0.121	0.115	0.110	0.107	0.103	0.0993	0.0962
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.87+ j0.0916	2.73+ j0.0854	2.45+ j0.0754	2.24+ j0.0695	2.08+ j0.0647	1.95+ j0.0613	1.83+ j0.0577	1.64+ j0.0540	1.55+ j0.0511
Capacitance, phase to earth µF/km	0.164	0.179	0.201	0.223	0.242	0.260	0.283	0.311	0.344
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900	8,100	7,300
Electric stress at conductor screen kV/mm	3.64	3.49	3.33	3.21	3.12	3.06	2.99	2.91	2.85
Charging current @ rated voltage & 50 Hz A/phase/km	0.655	0.715	0.802	0.891	0.964	1.04	1.13	1.24	1.37
Short circuit rating	Phase conductor kA, 1 sec	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	3.5	3.5	3.8	4.0	4.3	4.6	4.8	5.3
Continuous current rating	In ground, direct buried A	177	203	251	294	348	385	439	567
	In ground, in singleway ducts A	155	182	219	262	300	337	385	492
	In free air, unenclosed & spaced from wall A	176	209	264	319	369	418	473	644

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 12.7/22kV – Three core light duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

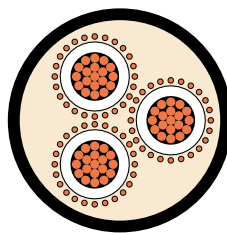
Physical & electrical characteristics

Copper 12.7/22kV – Three core light duty screened armoured									
Product code: 3CCUX22LDA									
Nominal conductor area mm ²	35	50	70	95	120	150	185		
Nominal conductor diameter mm	7.0	8.2	9.8	11.5	12.9	14.3	16.1		
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5		
Approx cable diameter mm	63.6	66.5	70.2	74.3	79.4	82.6	87.0		
Approx mass kg/100m	605	660	760	875	1080	1190	1350		
Max pulling tension on conductors kN	7.4	11	15	20	25	25	25		
Max pulling tension on stocking grip kN	7.4	11	15	19	22	24	25		
Max pulling tension on armour wires kN	17	18	20	23	25	25	25		
Min bending radius* during installation mm	1150	1200	1260	1340	1430	1490	1570		
Min bending radius* set in position mm	760	800	840	890	950	990	1040		
Max conductor resistance, dc @ 20°C Ohm/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991		
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.668	0.494	0.342	0.247	0.196	0.159	0.128		
Inductance mH/km	0.438	0.418	0.386	0.367	0.351	0.340	0.328		
Inductive reactance, @ 50Hz Ohm/km	0.138	0.131	0.121	0.115	0.110	0.107	0.103		
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.87+ j0.0916	2.73+ j0.0854	2.45+ j0.0754	2.24+ j0.0695	2.08+ j0.0647	1.95+ j0.0613	1.83+ j0.0577		
Capacitance, phase to earth µF/km	0.164	0.179	0.201	0.223	0.242	0.260	0.283		
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900		
Electric stress at conductor screen kV/mm	3.64	3.49	3.33	3.21	3.12	3.06	2.99		
Charging current @ rated voltage & 50 Hz A/phase/km	0.655	0.715	0.802	0.891	0.964	1.04	1.13		
Short circuit rating	Phase conductor kA, 1 sec	5.0	7.2	10.0	13.6	17.2	21.5	26.5	
	Metallic screen kA, 1 sec	3.5	3.5	3.8	4.0	4.3	4.6	4.8	
Contin- uous current rating	In ground, direct buried A	177	203	251	294	348	385	439	
	In ground, in singleway ducts A	155	182	219	262	300	337	385	
	In free air, unenclosed & spaced from wall A	176	209	264	319	369	418	473	

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 12.7/22kV – Three core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

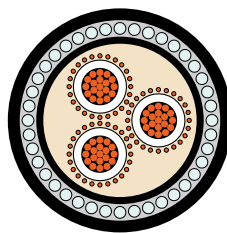
Physical & electrical characteristics

Copper 12.7/22kV – Three core heavy duty screened unarmoured									
Product code: 3CCUX22HD									
Nominal conductor area mm ²	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	7.0	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Approx cable diameter mm	54.5	57.1	60.9	64.7	68.0	71.2	75.1	80.3	86.2
Approx mass kg/100m	310	360	455	550	640	725	850	1040	1240
Max pulling tension on conductors kN	7.4	11	15	20	25	25	25	25	25
Max pulling tension on stocking grip kN	7.4	11	13	15	16	18	20	23	25
Min bending radius* during installation mm	980	1030	1100	1170	1220	1280	1350	1440	1550
Min bending radius* set in position mm	650	690	730	780	820	850	900	960	1030
Max conductor resistance, dc @ 20°C Ohm/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0981	0.0791
Inductance mH/km	0.438	0.418	0.386	0.367	0.351	0.340	0.328	0.316	0.306
Inductive reactance, @ 50Hz Ohm/km	0.138	0.131	0.121	0.115	0.110	0.107	0.103	0.0993	0.0962
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.16+ j0.0916	1.56+ j0.0854	1.11+ j0.0754	1.03+ j0.0695	0.995+ j0.0647	0.966+ j0.0613	0.941+ j0.0577	0.917+ j0.0540	0.902+ j0.0511
Capacitance, phase to earth µF/km	0.164	0.179	0.201	0.223	0.242	0.260	0.283	0.311	0.344
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900	8,100	7,300
Electric stress at conductor screen kV/mm	3.64	3.49	3.33	3.21	3.12	3.06	2.99	2.91	2.85
Charging current @ rated voltage & 50 Hz A/phase/km	0.655	0.715	0.802	0.891	0.964	1.04	1.13	1.24	1.37
Short circuit rating	Phase conductor kA, 1 sec	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
	Metallic screen kA, 1 sec	5.1	7.1	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	182	214	257	310	353	391	439	508
	In ground, in singleway ducts A	155	182	225	262	305	342	385	444
	In free air, unenclosed & spaced from wall A	187	220	275	336	385	429	490	572

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 12.7/22kV – Three core heavy duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

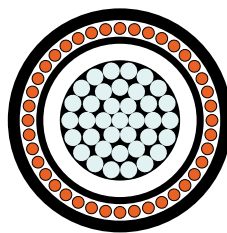
Physical & electrical characteristics

Copper 12.7/22kV – Three core heavy duty screened armoured									
Product code: 3CCUX22HDA									
Nominal conductor area mm ²	35	50	70	95	120	150	185		
Nominal conductor diameter mm	7.0	8.2	9.8	11.5	12.9	14.3	16.1		
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5		
Approx cable diameter mm	63.6	66.5	70.6	74.5	79.4	82.8	87.0		
Approx mass kg/100m	615	680	805	915	1110	1230	1380		
Max pulling tension on conductors kN	7.4	11	15	20	25	25	25		
Max pulling tension on stocking grip kN	7.4	11	15	19	22	24	25		
Max pulling tension on armour wires kN	17	18	20	23	25	25	25		
Min bending radius* during installation mm	1150	1200	1270	1340	1430	1490	1570		
Min bending radius* set in position mm	760	800	850	890	950	990	1040		
Max conductor resistance, dc @ 20°C Ohm/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991		
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.668	0.494	0.342	0.247	0.196	0.159	0.128		
Inductance mH/km	0.438	0.418	0.386	0.367	0.351	0.340	0.328		
Inductive reactance, @ 50Hz Ohm/km	0.138	0.131	0.121	0.115	0.110	0.107	0.103		
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.16+ j0.0916	1.56+ j0.0854	1.11+ j0.0754	1.03+ j0.0695	0.995+ j0.0647	0.966+ j0.0613	0.941+ j0.0577		
Capacitance, phase to earth µF/km	0.164	0.179	0.201	0.223	0.242	0.260	0.283		
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900		
Electric stress at conductor screen kV/mm	3.64	3.49	3.33	3.21	3.12	3.06	2.99		
Charging current @ rated voltage & 50 Hz A/phase/km	0.655	0.715	0.802	0.891	0.964	1.04	1.13		
Short circuit rating	Phase conductor kA, 1 sec	5.0	7.2	10.0	13.6	17.2	21.5	26.5	
	Metallic screen kA, 1 sec	5.1	7.1	10	10	10	10	10	
Contin-uous current rating	In ground, direct buried A	182	214	257	310	353	391	439	
	In ground, in singleway ducts A	155	182	225	262	305	342	385	
	In free air, unenclosed & spaced from wall A	187	220	275	336	385	429	490	

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 12.7/22kV – Single core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

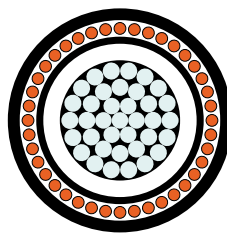
Physical & electrical characteristics

Aluminium 12.7/22kV – Single core light duty screened unarmoured												
Product code: 1CALX22LD												
Nominal conductor area mm ²	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Approx cable diameter mm	26.6	27.6	29.5	31.2	32.8	34.1	36.1	38.2	41.1	44.8	48.1	51.9
Approx mass kg/100m	80	85	95	110	120	130	150	170	200	235	275	330
Max pulling tension on conductor kN	1.8	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25
Max pulling tension on stocking grip kN	1.8	2.5	3.1	3.4	3.8	4.1	4.6	5.1	5.9	7.0	8.1	9.4
Min bending radius* during installation mm	480	500	530	560	590	610	650	690	740	810	860	930
Min bending radius* set in position mm	320	330	350	370	390	410	430	460	490	540	580	620
Max conductor resistance, dc @ 20°C Ohm/km	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130	0.102	0.0800	0.0634
Inductance, trefoil touching mH/km	0.491	0.471	0.435	0.414	0.400	0.388	0.372	0.358	0.346	0.337	0.326	0.315
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.154	0.148	0.137	0.130	0.126	0.122	0.117	0.112	0.109	0.106	0.102	0.0989
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.80+ j0.0908	1.57+ j0.0853	1.38+ j0.0751	1.25+ j0.0693	1.19+ j0.0654	1.14+ j0.0622	1.10+ j0.0577	1.06+ j0.0540	1.03+ j0.0509	1.01+ j0.0485	0.996+ j0.0455	0.982+ j0.0426
Capacitance, phase to earth µF/km	0.165	0.178	0.200	0.223	0.240	0.258	0.280	0.308	0.343	0.386	0.426	0.472
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900	8,100	7,300	6,500	5,900	5,300
Electric stress at conductor screen kV/mm	3.63	3.50	3.33	3.21	3.13	3.06	2.99	2.92	2.85	2.78	2.73	2.68
Charging current @ rated voltage & 50 Hz A/phase/km	0.657	0.710	0.799	0.888	0.958	1.03	1.12	1.23	1.37	1.54	1.70	1.88
Short circuit rating	Phase conductor kA, 1 sec	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	59.5
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous current rating	In ground, direct buried A	144	170	207	247	281	314	355	411	464	530	685
	In ground, in singleway ducts A	143	167	204	242	273	304	343	394	442	502	642
	In free air, unenclosed & spaced from wall A	155	184	230	280	322	365	419	494	569	665	899

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 12.7/22kV – Single core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

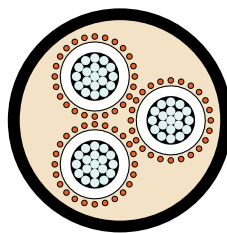
Physical & electrical characteristics

Aluminium 12.7/22kV – Single core heavy duty screened unarmoured												
Product code: 1CALX22HD												
Nominal conductor area mm ²	35	50	70	95	120	150	185	240	300	400	500	630
Nominal conductor diameter mm	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Approx cable diameter mm	26.6	28.9	30.8	32.5	34.1	35.4	37.4	39.7	42.4	46.3	49.4	53.4
Approx mass kg/100m	80	95	120	150	165	180	195	220	245	285	320	375
Max pulling tension on conductor kN	1.8	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25
Max pulling tension on stocking grip kN	1.8	2.5	3.3	3.7	4.1	4.4	4.9	5.5	6.3	7.5	8.5	10
Min bending radius* during installation mm	480	520	550	590	610	640	670	720	760	830	890	960
Min bending radius* set in position mm	320	350	370	390	410	430	450	480	510	560	590	640
Max conductor resistance, dc @ 20°C Ohm/km	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130	0.101	0.0799	0.0633
Inductance, trefoil touching mH/km	0.491	0.480	0.444	0.422	0.409	0.396	0.380	0.366	0.353	0.344	0.331	0.321
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.154	0.151	0.140	0.133	0.128	0.124	0.119	0.115	0.111	0.108	0.104	0.101
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.71+ j0.0908	1.24+ j0.0871	0.871+ j0.0767	0.635+ j0.0708	0.535+ j0.0669	0.488+ j0.0636	0.446+ j0.0590	0.407+ j0.0553	0.382+ j0.0520	0.360+ j0.0495	0.343+ j0.0465	0.330+ j0.0435
Capacitance, phase to earth µF/km	0.165	0.178	0.200	0.223	0.240	0.258	0.280	0.308	0.343	0.386	0.426	0.472
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900	8,100	7,300	6,500	5,900	5,300
Electric stress at conductor screen kV/mm	3.63	3.50	3.33	3.21	3.13	3.06	2.99	2.92	2.85	2.78	2.73	2.68
Charging current @ rated voltage & 50 Hz A/phase/km	0.657	0.710	0.799	0.888	0.958	1.03	1.12	1.23	1.37	1.54	1.70	1.88
Short circuit rating	Phase conductor kA, 1 sec	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	59.5
	Metallic screen kA, 1 sec	3.3	4.7	6.6	8.9	10	10	10	10	10	10	10
Continuous current rating	In ground, direct buried A	144	170	208	247	279	312	352	405	455	517	658
	In ground, in singleway ducts A	143	167	202	236	263	291	324	368	409	458	569
	In free air, unenclosed & spaced from wall A	155	187	233	282	323	365	419	492	564	655	873

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 12.7/22kV – Three core light duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

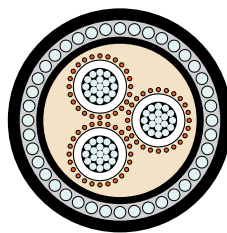
Physical & electrical characteristics

Aluminium 12.7/22kV – Three core light duty screened unarmoured									
Product code: 3CALX22LD									
Nominal conductor area mm ²	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Approx cable diameter mm	54.7	57.0	60.9	64.7	67.8	71.0	74.9	80.0	86.2
Approx mass kg/100m	230	255	295	340	380	420	480	565	660
Max pulling tension on conductors kN	5.3	7.5	11	14	18	23	25	25	25
Max pulling tension on stocking grip kN	5.3	7.5	11	14	16	18	20	22	25
Min bending radius* during installation mm	980	1030	1100	1170	1220	1280	1350	1440	1550
Min bending radius* set in position mm	660	680	730	780	810	850	900	960	1030
Max conductor resistance, dc @ 20°C Ohm/km	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130
Inductance mH/km	0.437	0.419	0.386	0.367	0.354	0.343	0.329	0.317	0.306
Inductive reactance, @ 50Hz Ohm/km	0.137	0.132	0.121	0.115	0.111	0.108	0.103	0.0995	0.0962
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.21+ j0.0911	2.98+ j0.0856	2.63+ j0.0754	2.37+ j0.0695	2.18+ j0.0657	2.03+ j0.0624	1.89+ j0.0579	1.69+ j0.0542	1.59+ j0.0511
Capacitance, phase to earth µF/km	0.165	0.179	0.201	0.223	0.241	0.259	0.281	0.309	0.344
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900	8,100	7,300
Electric stress at conductor screen kV/mm	3.63	3.50	3.33	3.21	3.13	3.06	2.99	2.92	2.85
Charging current @ rated voltage & 50 Hz A/phase/km	0.659	0.712	0.802	0.891	0.962	1.03	1.12	1.23	1.37
Short circuit rating	Phase conductor kA, 1 sec	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	3.5	3.5	3.8	4.0	4.3	4.6	4.8	5.3
Continuous current rating	In ground, direct buried A	134	155	203	251	273	305	342	449
	In ground, in singleway ducts A	118	139	171	203	235	262	294	385
	In free air, unenclosed & spaced from wall A	138	160	209	253	292	330	380	512

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 12.7/22kV – Three core light duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

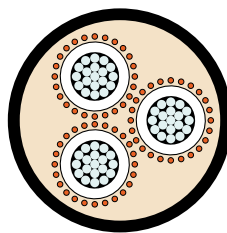
Physical & electrical characteristics

Aluminium 12.7/22kV – Three core light duty screened armoured									
Product code: 3CALX22LDA									
Nominal conductor area mm ²	35	50	70	95	120	150	185		
Nominal conductor diameter mm	7.1	8.1	9.8	11.5	12.9	14.2	16.0		
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5		
Approx cable diameter mm	63.8	66.4	70.2	74.3	79.3	82.4	86.8		
Approx mass kg/100m	535	570	630	700	855	920	1010		
Max pulling tension on conductors kN	5.3	7.5	11	14	18	23	25		
Max pulling tension on stocking grip kN	5.3	7.5	11	14	18	23	25		
Max pulling tension on amour wires kN	17	18	20	23	25	25	25		
Min bending radius* during installation mm	1150	1190	1260	1340	1430	1480	1560		
Min bending radius* set in position mm	770	800	840	890	950	990	1040		
Max conductor resistance, dc @ 20°C Ohm/km	0.868	0.641	0.443	0.320	0.253	0.206	0.164		
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.11	0.822	0.568	0.411	0.325	0.265	0.211		
Inductance mH/km	0.437	0.419	0.386	0.367	0.354	0.343	0.329		
Inductive reactance, @ 50Hz Ohm/km	0.137	0.132	0.121	0.115	0.111	0.108	0.103		
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.21+ j0.0911	2.98+ j0.0856	2.63+ j0.0754	2.37+ j0.0695	2.18+ j0.0657	2.03+ j0.0624	1.89+ j0.0579		
Capacitance, phase to earth µF/km	0.165	0.179	0.201	0.223	0.241	0.259	0.281		
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900		
Electric stress at conductor screen kV/mm	3.63	3.50	3.33	3.21	3.13	3.06	2.99		
Charging current @ rated voltage & 50 Hz A/phase/km	0.659	0.712	0.802	0.891	0.962	1.03	1.12		
Short circuit rating	Phase conductor kA, 1 sec	3.3	4.7	6.6	9.0	11.3	14.2	17.5	
	Metallic screen kA, 1 sec	3.5	3.5	3.8	4.0	4.3	4.6	4.8	
Contin- uous current rating	In ground, direct buried A	134	155	203	251	273	305	342	
	In ground, in singleway ducts A	118	139	171	203	235	262	294	
	In free air, unenclosed & spaced from wall A	138	160	209	253	292	330	380	

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 12.7/22kV – Three core heavy duty screened unarmoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

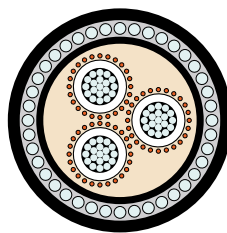
Physical & electrical characteristics

Aluminium 12.7/22kV – Three core heavy duty screened unarmoured									
Product code: 3CALX22HD									
Nominal conductor area mm ²	35	50	70	95	120	150	185	240	300
Nominal conductor diameter mm	7.1	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5	5.5
Approx cable diameter mm	54.7	57.0	60.9	64.7	67.8	71.0	74.9	80.0	86.2
Approx mass kg/100m	230	260	310	370	415	455	510	590	685
Max pulling tension on conductors kN	5.3	7.5	11	14	18	23	25	25	25
Max pulling tension on stocking grip kN	5.3	7.5	11	14	16	18	20	22	25
Min bending radius* during installation mm	980	1030	1100	1170	1220	1280	1350	1440	1550
Min bending radius* set in position mm	660	680	730	780	810	850	900	960	1030
Max conductor resistance, dc @ 20°C Ohm/km	0.868	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.11	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130
Inductance mH/km	0.437	0.419	0.386	0.367	0.354	0.343	0.329	0.317	0.306
Inductive reactance, @ 50Hz Ohm/km	0.137	0.132	0.121	0.115	0.111	0.108	0.103	0.0995	0.0962
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.21+ j0.0911	2.46+ j0.0856	1.76+ j0.0754	1.26+ j0.0695	1.09+ j0.0657	1.05+ j0.0624	1.01+ j0.0579	0.967+ j0.0542	0.942+ j0.0511
Capacitance, phase to earth µF/km	0.165	0.179	0.201	0.223	0.241	0.259	0.281	0.309	0.344
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900	8,100	7,300
Electric stress at conductor screen kV/mm	3.63	3.50	3.33	3.21	3.13	3.06	2.99	2.92	2.85
Charging current @ rated voltage & 50 Hz A/phase/km	0.659	0.712	0.802	0.891	0.962	1.03	1.12	1.23	1.37
Short circuit rating	Phase conductor kA, 1 sec	3.3	4.7	6.6	9.0	11.3	14.2	17.5	22.7
	Metallic screen kA, 1 sec	3.5	4.6	6.3	8.9	10	10	10	10
Continuous current rating	In ground, direct buried A	134	155	203	241	268	305	348	449
	In ground, in singleway ducts A	118	139	171	203	241	268	300	391
	In free air, unenclosed & spaced from wall A	138	160	209	253	292	336	385	517

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 12.7/22kV – Three core heavy duty screened armoured



Application

Electricity distribution network cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

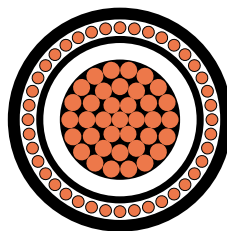
Physical & electrical characteristics

Aluminium 12.7/22kV – Three core heavy duty screened armoured									
Product code: 3CALX22HDA									
Nominal conductor area mm ²	35	50	70	95	120	150	185		
Nominal conductor diameter mm	7.1	8.1	9.8	11.5	12.9	14.2	16.0		
Nominal insulation thickness mm	5.5	5.5	5.5	5.5	5.5	5.5	5.5		
Approx cable diameter mm	63.8	66.4	70.4	74.5	79.3	82.6	86.8		
Approx mass kg/100m	535	580	655	735	890	955	1040		
Max pulling tension on conductors kN	5.3	7.5	11	14	18	23	25		
Max pulling tension on stocking grip kN	5.3	7.5	11	14	18	23	25		
Max pulling tension on amour wires kN	17	18	20	23	25	25	25		
Min bending radius* during installation mm	1150	1190	1270	1340	1430	1490	1560		
Min bending radius* set in position mm	770	800	850	890	950	990	1040		
Max conductor resistance, dc @ 20°C Ohm/km	0.868	0.641	0.443	0.320	0.253	0.206	0.164		
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	1.11	0.822	0.568	0.411	0.325	0.265	0.211		
Inductance mH/km	0.437	0.419	0.386	0.367	0.354	0.343	0.329		
Inductive reactance, @ 50Hz Ohm/km	0.137	0.132	0.121	0.115	0.111	0.108	0.103		
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	3.21+ j0.0911	2.46+ j0.0856	1.76+ j0.0754	1.26+ j0.0695	1.09+ j0.0657	1.05+ j0.0624	1.01+ j0.0579		
Capacitance, phase to earth µF/km	0.165	0.179	0.201	0.223	0.241	0.259	0.281		
Min insulation resistance @ 20°C MOhm.km	16,000	14,000	13,000	11,000	10,000	9,700	8,900		
Electric stress at conductor screen kV/mm	3.63	3.50	3.33	3.21	3.13	3.06	2.99		
Charging current @ rated voltage & 50 Hz A/phase/km	0.659	0.712	0.802	0.891	0.962	1.03	1.12		
Short circuit rating	Phase conductor kA, 1 sec	3.3	4.7	6.6	9.0	11.3	14.2	17.5	
	Metallic screen kA, 1 sec	3.5	4.6	6.3	8.9	10	10	10	
Contin-uous current rating	In ground, direct buried A	134	155	203	241	268	305	348	
	In ground, in singleway ducts A	118	139	171	203	241	268	300	
	In free air, unenclosed & spaced from wall A	138	160	209	253	292	336	385	

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 19/33kV – Single core light duty screened unarmoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

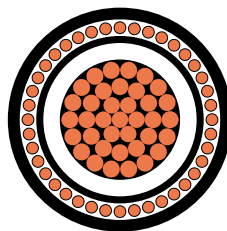
Physical & electrical characteristics

Copper 19/33kV – Single core light duty screened unarmoured												
Product code: 1CCUX33LD												
Nominal conductor area mm ²	50	70	95	120	150	185	240	300	400	500	630	
Nominal conductor diameter mm	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3	
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Approx cable diameter mm	33.1	34.7	36.6	38.0	39.6	41.4	43.8	46.5	50.2	53.5	57.4	
Approx mass kg/100m	140	165	195	225	255	295	355	420	515	625	770	
Max pulling tension on conductor kN	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25	
Max pulling tension on stocking grip kN	3.5	4.2	4.7	5.1	5.5	6.0	6.7	7.6	8.8	10	12	
Min bending radius* during installation mm	600	630	660	680	710	740	790	840	900	960	1030	
Min bending radius* set in position mm	400	420	440	460	480	500	530	560	600	640	690	
Max conductor resistance, dc @ 20°C Ohm/km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.494	0.342	0.247	0.196	0.159	0.127	0.0976	0.0786	0.0625	0.0500	0.0405	
Inductance, trefoil touching mH/km	0.507	0.469	0.447	0.428	0.415	0.400	0.385	0.372	0.359	0.346	0.335	
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.159	0.147	0.140	0.134	0.130	0.126	0.121	0.117	0.113	0.109	0.105	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.32+ j0.0975	1.20+ j0.0868	1.13+ j0.0802	1.09+ j0.0749	1.06+ j0.0711	1.03+ j0.0670	1.01+ j0.0627	0.995+ j0.0591	0.982+ j0.0556	0.973+ j0.0521	0.965+ j0.0491	
Capacitance, phase to earth µF/km	0.139	0.155	0.170	0.183	0.196	0.212	0.231	0.254	0.284	0.312	0.344	
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000	12,000	11,000	9,900	8,800	8,000	7,200	
Electric stress at conductor screen kV/mm	4.07	3.85	3.67	3.55	3.46	3.36	3.26	3.16	3.06	2.99	2.93	
Charging current @ rated voltage & 50 Hz A/phase/km	0.831	0.923	1.02	1.09	1.17	1.26	1.38	1.52	1.70	1.86	2.06	
Short circuit rating	Phase conductor kA, 1 sec	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	71.5	90.1
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0
Continuous current rating	In ground, direct buried A	219	267	319	361	404	456	526	592	671	756	849
	In ground, in singleway ducts A	214	260	309	348	387	434	497	556	626	703	788
	In free air, unenclosed & spaced from wall A	243	301	366	420	476	544	639	732	846	973	1117

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 19/33kV – Single core heavy duty screened unarmoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

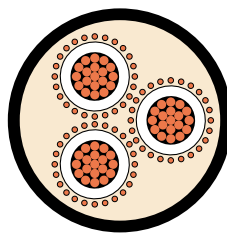
Physical & electrical characteristics

Copper 19/33kV – Single core heavy duty screened unarmoured												
Product code: 1CCUX33HD												
Nominal conductor area mm ²	50	70	95	120	150	185	240	300	400	500	630	
Nominal conductor diameter mm	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	23.5	26.6	30.3	
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Approx cable diameter mm	34.4	36.2	37.9	39.5	40.9	42.9	45.1	47.8	51.5	54.8	58.7	
Approx mass kg/100m	165	210	240	270	300	340	400	465	560	675	815	
Max pulling tension on conductor kN	3.5	4.9	6.7	8.4	11	13	17	21	25	25	25	
Max pulling tension on stocking grip kN	3.5	4.6	5.0	5.5	5.9	6.4	7.1	8.0	9.3	10	12	
Min bending radius* during installation mm	620	650	680	710	740	770	810	860	930	990	1060	
Min bending radius* set in position mm	410	430	460	470	490	510	540	570	620	660	700	
Max conductor resistance, dc @ 20°C Ohm/km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	0.0470	0.0366	0.0283	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.494	0.342	0.247	0.196	0.159	0.127	0.0976	0.0785	0.0624	0.0500	0.0404	
Inductance, trefoil touching mH/km	0.515	0.478	0.454	0.436	0.422	0.407	0.391	0.378	0.365	0.352	0.340	
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.162	0.150	0.143	0.137	0.133	0.128	0.123	0.119	0.115	0.110	0.107	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	0.783+ j0.0989	0.550+ j0.0881	0.475+ j0.0815	0.435+ j0.0762	0.406+ j0.0723	0.381+ j0.0681	0.358+ j0.0638	0.343+ j0.0601	0.330+ j0.0566	0.320+ j0.0530	0.312+ j0.0499	
Capacitance, phase to earth µF/km	0.139	0.155	0.170	0.183	0.196	0.212	0.231	0.254	0.284	0.312	0.344	
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000	12,000	11,000	9,900	8,800	8,000	7,200	
Electric stress at conductor screen kV/mm	4.07	3.85	3.67	3.55	3.46	3.36	3.26	3.16	3.06	2.99	2.93	
Charging current @ rated voltage & 50 Hz A/phase/km	0.831	0.923	1.02	1.09	1.17	1.26	1.38	1.52	1.70	1.86	2.06	
Short circuit rating	Phase conductor kA, 1 sec	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9	57.2	71.5	90.1
	Metallic screen kA, 1 sec	7.1	10	10	10	10	10	10	10	10	10	
Continuous current rating	In ground, direct buried A	219	266	316	357	398	447	513	574	645	721	801
	In ground, in singleway ducts A	211	252	295	330	363	402	453	500	555	613	676
	In free air, unenclosed & spaced from wall A	245	302	366	419	473	540	630	718	824	940	1069

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 19/33kV – Three core light duty screened unarmoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

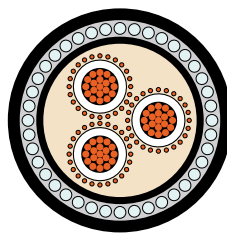
Physical & electrical characteristics

Copper 19/33kV – Three core light duty screened unarmoured									
Product code: 3CCUX33LD									
Nominal conductor area mm ²	50	70	95	120	150	185	240	300	
Nominal conductor diameter mm	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Approx cable diameter mm	68.5	72.4	76.3	79.5	82.7	86.7	91.8	97.6	
Approx mass kg/100m	435	525	620	715	810	940	1140	1350	
Max pulling tension on conductors kN	11	15	20	25	25	25	25	25	
Max pulling tension on stocking grip kN	11	15	20	22	24	25	25	25	
Min bending radius* during installation mm	1230	1300	1370	1430	1490	1560	1650	1760	
Min bending radius* set in position mm	820	870	920	950	990	1040	1100	1170	
Max conductor resistance, dc @ 20°C Ohm/km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.494	0.342	0.247	0.196	0.159	0.128	0.0978	0.0788	
Inductance mH/km	0.457	0.422	0.401	0.384	0.371	0.358	0.344	0.332	
Inductive reactance, @ 50Hz Ohm/km	0.143	0.133	0.126	0.121	0.117	0.112	0.108	0.104	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.32+ j0.0978	2.09+ j0.0871	1.92+ j0.0805	1.79+ j0.0752	1.69+ j0.0714	1.59+ j0.0672	1.44+ j0.0629	1.37+ j0.0593	
Capacitance, phase to earth pF/km	0.140	0.155	0.171	0.184	0.197	0.212	0.232	0.255	
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000	12,000	11,000	9,900	
Electric stress at conductor screen kV/mm	4.07	3.85	3.67	3.55	3.46	3.36	3.26	3.16	
Charging current @ rated voltage & 50 Hz A/phase/km	0.834	0.927	1.02	1.10	1.17	1.27	1.39	1.52	
Short circuit rating	Phase conductor kA, 1 sec	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9
	Metallic screen kA, 1 sec	4.3	4.6	4.8	5.1	5.3	5.6	6.1	6.3
Continuous current rating	In ground, direct buried A	203	251	300	342	391	439	514	583
	In ground, in singleway ducts A	182	225	262	300	332	380	428	482
	In free air, unenclosed & spaced from wall A	215	270	325	374	429	484	594	682

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 19/33kV – Three core light duty screened armoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

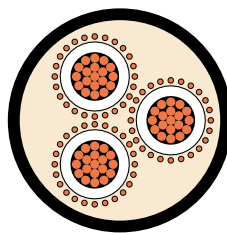
Physical & electrical characteristics

Copper 19/33kV – Three core light duty screened armoured									
Product code: 3CCUX33LDA									
Nominal conductor area mm ²	50	70	95	120	150				
Nominal conductor diameter mm	8.2	9.8	11.5	12.9	14.3				
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0				
Approx cable diameter mm	79.9	84.1	88.0	91.4	94.8				
Approx mass kg/100m	920	1040	1160	1280	1400				
Max pulling tension on conductors kN	11	15	20	25	25				
Max pulling tension on stocking grip kN	11	15	20	25	25				
Max pulling tension on amour wires kN	25	25	25	25	25				
Min bending radius* during installation mm	1440	1510	1580	1640	1710				
Min bending radius* set in position mm	960	1010	1060	1100	1140				
Max conductor resistance, dc @ 20°C Ohm/km	0.387	0.268	0.193	0.153	0.124				
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.494	0.342	0.247	0.196	0.159				
Inductance mH/km	0.457	0.422	0.401	0.384	0.371				
Inductive reactance, @ 50Hz Ohm/km	0.143	0.133	0.126	0.121	0.117				
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.32+ j0.0978	2.09+ j0.0871	1.92+ j0.0805	1.79+ j0.0752	1.69+ j0.0714				
Capacitance, phase to earth µF/km	0.140	0.155	0.171	0.184	0.197				
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000				
Electric stress at conductor screen kV/mm	4.07	3.85	3.67	3.55	3.46				
Charging current @ rated voltage & 50 Hz A/phase/km	0.834	0.927	1.02	1.10	1.17				
Short circuit rating	Phase conductor kA, 1 sec	7.2	10.0	13.6	17.2	21.5			
	Metallic screen kA, 1 sec	4.3	4.6	4.8	5.1	5.3			
Contin-uous current rating	In ground, direct buried A	203	251	300	342	391			
	In ground, in singleway ducts A	182	225	262	300	332			
	In free air, unenclosed & spaced from wall A	215	270	325	374	429			

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 19/33kV – Three core heavy duty screened unarmoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

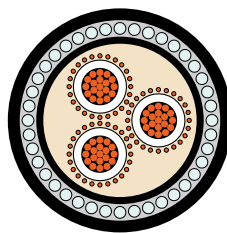
Physical & electrical characteristics

Copper 19/33kV – Three core heavy duty screened unarmoured									
Product code: 3CCUX33HD									
Nominal conductor area mm ²	50	70	95	120	150	185	240	300	
Nominal conductor diameter mm	8.2	9.8	11.5	12.9	14.3	16.1	18.2	20.6	
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Approx cable diameter mm	68.7	72.4	76.3	79.5	82.7	86.7	91.8	97.6	
Approx mass kg/100m	455	560	655	745	840	970	1160	1380	
Max pulling tension on conductors kN	11	15	20	25	25	25	25	25	
Max pulling tension on stocking grip kN	11	15	20	22	24	25	25	25	
Min bending radius* during installation mm	1240	1300	1370	1430	1490	1560	1650	1760	
Min bending radius* set in position mm	820	870	920	950	990	1040	1100	1170	
Max conductor resistance, dc @ 20°C Ohm/km	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754	0.0601	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.494	0.342	0.247	0.196	0.159	0.128	0.0978	0.0788	
Inductance mH/km	0.457	0.422	0.401	0.384	0.371	0.358	0.344	0.332	
Inductive reactance, @ 50Hz Ohm/km	0.143	0.133	0.126	0.121	0.117	0.112	0.108	0.104	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.56+ j0.0978	1.11+ j0.0871	1.03+ j0.0805	0.995+ j0.0752	0.966+ j0.0714	0.941+ j0.0672	0.917+ j0.0629	0.902+ j0.0593	
Capacitance, phase to earth µF/km	0.140	0.155	0.171	0.184	0.197	0.212	0.232	0.255	
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000	12,000	11,000	9,900	
Electric stress at conductor screen kV/mm	4.07	3.85	3.67	3.55	3.46	3.36	3.26	3.16	
Charging current @ rated voltage & 50 Hz A/phase/km	0.834	0.927	1.02	1.10	1.17	1.27	1.39	1.52	
Short circuit rating	Phase conductor kA, 1 sec	7.2	10.0	13.6	17.2	21.5	26.5	34.3	42.9
	Metallic screen kA, 1 sec	7.1	10	10	10	10	10	10	
Continuous current rating	In ground, direct buried A	209	257	305	353	396	439	519	583
	In ground, in singleway ducts A	182	225	268	300	342	385	428	482
	In free air, unenclosed & spaced from wall A	215	275	336	385	435	495	605	688

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Copper 19/33kV – Three core heavy duty screened armoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Plain circular compacted copper

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

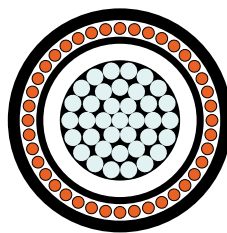
Physical & electrical characteristics

Copper 19/33kV – Three core heavy duty screened armoured									
Product code: 3CCUX33HDA									
Nominal conductor area mm ²	50	70	95	120	150				
Nominal conductor diameter mm	8.2	9.8	11.5	12.9	14.3				
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0				
Approx cable diameter mm	80.1	84.1	88.0	91.4	94.8				
Approx mass kg/100m	940	1070	1190	1310	1430				
Max pulling tension on conductors kN	11	15	20	25	25				
Max pulling tension on stocking grip kN	11	15	20	25	25				
Max pulling tension on armour wires kN	25	25	25	25	25				
Min bending radius* during installation mm	1440	1510	1580	1640	1710				
Min bending radius* set in position mm	960	1010	1060	1100	1140				
Max conductor resistance, dc @ 20°C Ohm/km	0.387	0.268	0.193	0.153	0.124				
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.494	0.342	0.247	0.196	0.159				
Inductance mH/km	0.457	0.422	0.401	0.384	0.371				
Inductive reactance, @ 50Hz Ohm/km	0.143	0.133	0.126	0.121	0.117				
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.56+ j0.0978	1.11+ j0.0871	1.03+ j0.0805	0.995+ j0.0752	0.966+ j0.0714				
Capacitance, phase to earth µF/km	0.140	0.155	0.171	0.184	0.197				
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000				
Electric stress at conductor screen kV/mm	4.07	3.85	3.67	3.55	3.46				
Charging current @ rated voltage & 50 Hz A/phase/km	0.834	0.927	1.02	1.10	1.17				
Short circuit rating	Phase conductor kA, 1 sec	7.2	10.0	13.6	17.2	21.5			
	Metallic screen kA, 1 sec	7.1	10	10	10	10			
Continuous current rating	In ground, direct buried A	209	257	305	353	396			
	In ground, in singleway ducts A	182	225	268	300	342			
	In free air, unenclosed & spaced from wall A	215	275	336	385	435			

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 19/33kV – Single core light duty screened unarmoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

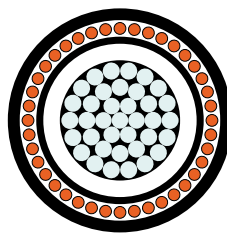
Physical & electrical characteristics

Aluminium 19/33kV – Single core light duty screened unarmoured												
Product code: 1CALX33LD												
Nominal conductor area mm ²	50	70	95	120	150	185	240	300	400	500	630	
Nominal conductor diameter mm	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2	
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Approx cable diameter mm	33.0	34.7	36.6	38.0	39.5	41.3	43.6	46.5	50.2	53.5	57.3	
Approx mass kg/100m	110	120	135	150	165	180	205	235	275	320	375	
Max pulling tension on conductor kN	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25	
Max pulling tension on stocking grip kN	2.5	3.5	4.7	5.0	5.5	6.0	6.7	7.6	8.8	10	11	
Min bending radius* during installation mm	590	630	660	680	710	740	790	840	900	960	1030	
Min bending radius* set in position mm	400	420	440	460	470	500	520	560	600	640	690	
Max conductor resistance, dc @ 20°C Ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.129	0.101	0.0797	0.0630	
Inductance, trefoil touching mH/km	0.508	0.469	0.447	0.431	0.419	0.401	0.386	0.372	0.361	0.348	0.336	
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.160	0.147	0.140	0.136	0.132	0.126	0.121	0.117	0.113	0.109	0.105	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.57+ j0.0978	1.38+ j0.0868	1.25+ j0.0802	1.19+ j0.0759	1.14+ j0.0722	1.10+ j0.0672	1.06+ j0.0629	1.03+ j0.0591	1.01+ j0.0561	0.996+ j0.0526	0.982+ j0.0492	
Capacitance, phase to earth µF/km	0.139	0.155	0.170	0.183	0.195	0.211	0.230	0.254	0.284	0.312	0.344	
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000	12,000	11,000	9,900	8,800	8,000	7,200	
Electric stress at conductor screen kV/mm	4.08	3.85	3.67	3.56	3.46	3.36	3.26	3.16	3.06	2.99	2.93	
Charging current @ rated voltage & 50 Hz A/phase/km	0.828	0.923	1.02	1.09	1.16	1.26	1.37	1.52	1.70	1.86	2.05	
Short circuit rating	Phase conductor kA, 1 sec	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	47.2	59.5
	Metallic screen kA, 1 sec	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	3.0	
Continuous current rating	In ground, direct buried A	170	207	247	281	314	355	411	464	531	605	688
	In ground, in singleway ducts A	167	203	242	273	304	343	394	443	503	570	646
	In free air, unenclosed & spaced from wall A	188	234	284	326	369	424	499	574	669	777	902

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 19/33kV – Single core heavy duty screened unarmoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

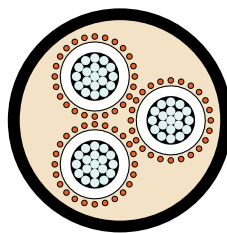
Physical & electrical characteristics

Aluminium 19/33kV – Single core heavy duty screened unarmoured												
Product code: 1CALX33HD												
Nominal conductor area mm ²	50	70	95	120	150	185	240	300	400	500	630	
Nominal conductor diameter mm	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	23.5	26.6	30.2	
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Approx cable diameter mm	34.3	36.2	37.9	39.5	40.8	42.8	44.9	47.8	51.5	54.8	58.6	
Approx mass kg/100m	125	150	175	195	210	230	250	280	320	365	420	
Max pulling tension on conductor kN	2.5	3.5	4.8	6.0	7.5	9.3	12	15	20	25	25	
Max pulling tension on stocking grip kN	2.5	3.5	4.8	5.5	5.8	6.4	7.1	8.0	9.3	10	12	
Min bending radius* during installation mm	620	650	680	710	730	770	810	860	930	990	1050	
Min bending radius* set in position mm	410	430	460	470	490	510	540	570	620	660	700	
Max conductor resistance, dc @ 20°C Ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	0.0778	0.0605	0.0469	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.129	0.101	0.0797	0.0629	
Inductance, trefoil touching mH/km	0.516	0.478	0.454	0.439	0.426	0.408	0.392	0.378	0.366	0.353	0.340	
Inductive reactance, trefoil touching @ 50Hz Ohm/km	0.162	0.150	0.143	0.138	0.134	0.128	0.123	0.119	0.115	0.111	0.107	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	1.24+ j0.0992	0.871+ j0.0881	0.635+ j0.0815	0.535+ j0.0771	0.488+ j0.0734	0.446+ j0.0683	0.407+ j0.0640	0.382+ j0.0601	0.360+ j0.0570	0.343+ j0.0534	0.330+ j0.0500	
Capacitance, phase to earth µF/km	0.139	0.155	0.170	0.183	0.195	0.211	0.230	0.254	0.284	0.312	0.344	
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000	12,000	11,000	9,900	8,800	8,000	7,200	
Electric stress at conductor screen kV/mm	4.08	3.85	3.67	3.56	3.46	3.36	3.26	3.16	3.06	2.99	2.93	
Charging current @ rated voltage & 50 Hz A/phase/km	0.828	0.923	1.02	1.09	1.16	1.26	1.37	1.52	1.70	1.86	2.05	
Short circuit rating	Phase conductor kA, 1 sec	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3	37.8	47.2	59.5
	Metallic screen kA, 1 sec	4.7	6.6	8.9	10	10	10	10	10	10	10	
Continuous current rating	In ground, direct buried A	170	208	247	279	312	352	405	456	518	586	662
	In ground, in singleway ducts A	167	201	236	264	293	327	372	413	464	519	579
	In free air, unenclosed & spaced from wall A	190	236	285	327	369	423	496	568	659	762	878

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 19/33kV – Three core light duty screened unarmoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

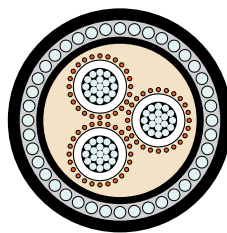
Physical & electrical characteristics

Aluminium 19/33kV – Three core light duty screened unarmoured									
Product code: 3CALX33LD									
Nominal conductor area mm ²	50	70	95	120	150	185	240	300	
Nominal conductor diameter mm	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Approx cable diameter mm	68.4	72.4	76.3	79.4	82.5	86.5	91.5	97.6	
Approx mass kg/100m	350	400	445	490	535	600	690	795	
Max pulling tension on conductors kN	7.5	11	14	18	23	25	25	25	
Max pulling tension on stocking grip kN	7.5	11	14	18	23	25	25	25	
Min bending radius* during installation mm	1230	1300	1370	1430	1490	1560	1650	1760	
Min bending radius* set in position mm	820	870	920	950	990	1040	1100	1170	
Max conductor resistance, dc @ 20°C Ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130	
Inductance mH/km	0.457	0.422	0.401	0.387	0.375	0.359	0.345	0.332	
Inductive reactance, @ 50Hz Ohm/km	0.144	0.133	0.126	0.121	0.118	0.113	0.108	0.104	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.57+ j0.0981	2.27+ j0.0871	2.05+ j0.0805	1.89+ j0.0762	1.77+ j0.0724	1.66+ j0.0674	1.49+ j0.0632	1.41+ j0.0593	
Capacitance, phase to earth µF/km	0.139	0.155	0.171	0.183	0.196	0.211	0.231	0.255	
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000	12,000	11,000	9,900	
Electric stress at conductor screen kV/mm	4.08	3.85	3.67	3.56	3.46	3.36	3.26	3.16	
Charging current @ rated voltage & 50 Hz A/phase/km	0.831	0.927	1.02	1.09	1.17	1.26	1.38	1.52	
Short circuit rating	Phase conductor kA, 1 sec	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3
	Metallic screen kA, 1 sec	4.3	4.6	4.8	5.1	5.3	5.6	6.1	6.3
Continuous current rating	In ground, direct buried A	161	193	235	268	300	337	401	455
	In ground, in singleway ducts A	139	171	203	241	268	294	332	375
	In free air, unenclosed & spaced from wall A	171	209	253	297	330	374	462	528

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 19/33kV – Three core light duty screened armoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for low fault level or fast fault clearing cable systems.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 3kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC - inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

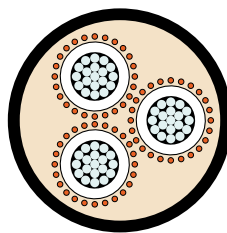
Physical & electrical characteristics

Aluminium 19/33kV – Three core light duty screened armoured									
Product code: 3CALX33LDA									
Nominal conductor area mm ²	50	70	95	120	150				
Nominal conductor diameter mm	8.1	9.8	11.5	12.9	14.2				
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0				
Approx cable diameter mm	79.8	84.1	88.0	91.3	94.6				
Approx mass kg/100m	830	910	980	1050	1120				
Max pulling tension on conductors kN	7.5	11	14	18	23				
Max pulling tension on stocking grip kN	7.5	11	14	18	23				
Max pulling tension on armour wires kN	25	25	25	25	25				
Min bending radius* during installation mm	1440	1510	1580	1640	1700				
Min bending radius* set in position mm	960	1010	1060	1100	1140				
Max conductor resistance, dc @ 20°C Ohm/km	0.641	0.443	0.320	0.253	0.206				
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.822	0.568	0.411	0.325	0.265				
Inductance mH/km	0.457	0.422	0.401	0.387	0.375				
Inductive reactance, @ 50Hz Ohm/km	0.144	0.133	0.126	0.121	0.118				
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.57+ j0.0981	2.27+ j0.0871	2.05+ j0.0805	1.89+ j0.0762	1.77+ j0.0724				
Capacitance, phase to earth µF/km	0.139	0.155	0.171	0.183	0.196				
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000				
Electric stress at conductor screen kV/mm	4.08	3.85	3.67	3.56	3.46				
Charging current @ rated voltage & 50 Hz A/phase/km	0.831	0.927	1.02	1.09	1.17				
Short circuit rating	Phase conductor kA, 1 sec	4.7	6.6	9.0	11.3	14.2			
	Metallic screen kA, 1 sec	4.3	4.6	4.8	5.1	5.3			
Contin- uous current rating	In ground, direct buried A	161	193	235	268	300			
	In ground, in singleway ducts A	139	171	203	241	268			
	In free air, unenclosed & spaced from wall A	171	209	253	297	330			

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 19/33kV – Three core heavy duty screened unarmoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Light (PVC only)
Heavy (HDPE or MDPE)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground with protection

MEDIUM VOLTAGE CABLES

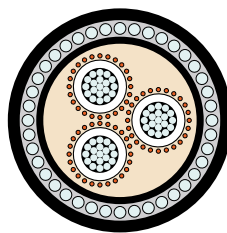
Physical & electrical characteristics

Aluminium 19/33kV – Three core heavy duty screened unarmoured									
Product code: 3CALX33HD									
Nominal conductor area mm ²	50	70	95	120	150	185	240	300	
Nominal conductor diameter mm	8.1	9.8	11.5	12.9	14.2	16.0	18.1	20.6	
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0	8.0	8.0	8.0	
Approx cable diameter mm	68.6	72.4	76.3	79.4	82.5	86.5	91.5	97.6	
Approx mass kg/100m	355	410	470	520	565	630	715	820	
Max pulling tension on conductors kN	7.5	11	14	18	23	25	25	25	
Max pulling tension on stocking grip kN	7.5	11	14	18	23	25	25	25	
Min bending radius* during installation mm	1230	1300	1370	1430	1490	1560	1650	1760	
Min bending radius* set in position mm	820	870	920	950	990	1040	1100	1170	
Max conductor resistance, dc @ 20°C Ohm/km	0.641	0.443	0.320	0.253	0.206	0.164	0.125	0.100	
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.822	0.568	0.411	0.325	0.265	0.211	0.161	0.130	
Inductance mH/km	0.457	0.422	0.401	0.387	0.375	0.359	0.345	0.332	
Inductive reactance, @ 50Hz Ohm/km	0.144	0.133	0.126	0.121	0.118	0.113	0.108	0.104	
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.46+ j0.0981	1.76+ j0.0871	1.28+ j0.0805	1.09+ j0.0762	1.05+ j0.0724	1.01+ j0.0674	0.967+ j0.0632	0.942+ j0.0593	
Capacitance, phase to earth µF/km	0.139	0.155	0.171	0.183	0.196	0.211	0.231	0.255	
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000	12,000	11,000	9,900	
Electric stress at conductor screen kV/mm	4.08	3.85	3.67	3.56	3.46	3.36	3.26	3.16	
Charging current @ rated voltage & 50 Hz A/phase/km	0.831	0.927	1.02	1.09	1.17	1.26	1.38	1.52	
Short circuit rating	Phase conductor kA, 1 sec	4.7	6.6	9.0	11.3	14.2	17.5	22.7	28.3
	Metallic screen kA, 1 sec	4.6	6.3	8.6	10	10	10	10	10
Continuous current rating	In ground, direct buried A	155	203	241	273	305	342	407	455
	In ground, in singleway ducts A	139	171	209	241	268	300	332	375
	In free air, unenclosed & spaced from wall A	165	204	259	297	336	385	473	539

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

MEDIUM VOLTAGE CABLES

Aluminium 19/33kV – Three core heavy duty screened armoured



Application

Electricity distribution or sub-transmission networks cable typically used as primary supply to Commercial, Industrial and urban residential networks. Suitable for high fault level systems rated up to 10kA/1sec. Higher fault current rated constructions are available on request.

Approvals

Approved by most major power utilities and industrial customers in New Zealand.

Behaviour in flame and fire:

PVC or LSOH outer sheath exceeds the requirements of IEC 60332-1.

Temperature range

Minimum installation temperature: 0 °C
Maximum operating temperature: +90 °C
Minimum operating temperature: -25 °C

Minimum bending radius

Installed cables: 12D (PVC only)
15D (HDPE/MDPE)
During installation: 18D (PVC only)
25D (HDPE/MDPE)

Resistance to

Chemical exposure: Accidental
Mechanical impact: Heavy (Armoured)
Water exposure: XLPE – Spray
EPR – Immersion/Temporary coverage
Solar radiation and weather exposure: Suitable for direct exposure.

Cable design

Conductor:

Circular compacted aluminium

Conductor screen:

Extruded semi-conductive compound, bonded to the insulation and applied in the same operations as the insulation.

Insulation:

Cross Linked Polyethylene (XLPE) – standard
Ethylene Propylene Rubber (EPR) – alternative

Insulation screen:

Extruded, semi-conductive compound

Metallic screen:

Plain annealed copper wire: nominal 10kA for 1 second.
See table next page.

Armouring:

Galvanised steel wires

Sheath:

Orange 5V-90 PVC – inner plus black high density polyethylene (HDPE) outer – alternative.
Orange 5V-90 PVC – inner plus medium density polyethylene (MDPE) outer – alternative.
Low smoke zero halogen (LSOH) – alternative.

Installation conditions

In free air
In duct
In trench
In ground

MEDIUM VOLTAGE CABLES

Physical & electrical characteristics

Aluminium 19/33kV – Three core heavy duty screened armoured									
Product code: 3CALX33HDA									
Nominal conductor area mm ²	50	70	95	120	150				
Nominal conductor diameter mm	8.1	9.8	11.5	12.9	14.2				
Nominal insulation thickness mm	8.0	8.0	8.0	8.0	8.0				
Approx cable diameter mm	80.0	84.1	88.0	91.3	94.6				
Approx mass kg/100m	835	920	1010	1080	1150				
Max pulling tension on conductors kN	7.5	11	14	18	23				
Max pulling tension on stocking grip kN	7.5	11	14	18	23				
Max pulling tension on armour wires kN	25	25	25	25	25				
Min bending radius* during installation mm	1440	1510	1580	1640	1700				
Min bending radius* set in position mm	960	1010	1060	1100	1140				
Max conductor resistance, dc @ 20°C Ohm/km	0.641	0.443	0.320	0.253	0.206				
Conductor resistance, ac @ 90°C & 50 Hz Ohm/km	0.822	0.568	0.411	0.325	0.265				
Inductance mH/km	0.457	0.422	0.401	0.387	0.375				
Inductive reactance, @ 50Hz Ohm/km	0.144	0.133	0.126	0.121	0.118				
Zero seq. impedance @ 20°C & 50 Hz Ohm/km	2.46+ j0.0981	1.76+ j0.0871	1.28+ j0.0805	1.09+ j0.0762	1.05+ j0.0724				
Capacitance, phase to earth µF/km	0.139	0.155	0.171	0.183	0.196				
Min insulation resistance @ 20°C MOhm.km	18,000	16,000	15,000	14,000	13,000				
Electric stress at conductor screen kV/mm	4.08	3.85	3.67	3.56	3.46				
Charging current @ rated voltage & 50 Hz A/phase/km	0.831	0.927	1.02	1.09	1.17				
Short circuit rating	Phase conductor kA, 1 sec	4.7	6.6	9.0	11.3	14.2			
	Metallic screen kA, 1 sec	4.6	6.3	8.6	10	10			
Continuous current rating	In ground, direct buried A	155	203	241	273	305			
	In ground, in singleway ducts A	139	171	209	241	268			
	In free air, unenclosed & spaced from wall A	165	204	259	297	336			

The cables described in this technical manual are designed to be used for the supply of electrical energy in fixed applications up to the rated voltages at a nominal power frequency between 49Hz and 61Hz. All values in this catalogue are for XLPE cables only. *Increased radius required for HDPE and nylon incorporating designs.

Technical information

Cable Selection

Cables should be selected and used such that the product does not present an unacceptable risk or danger to life or property when used in its intended manner.

Cables should also be selected so that they are suitable for the operating environment conditions e.g. use in petrochemical works, need for fire performance, the need for protection against attack by rodents, termites, etc, equipment classification and any other external influences which may exist.

They should also be selected according to the appropriate rated voltage and the cross-sectional area of every conductor such that its current carrying capacity is not less than the maximum sustained current which would normally flow through it, and the short circuit current rating of conductor and screen is adequate for the prospective short circuit and time for which it persists.

In addition, consideration should be given to other relevant factors, such as:

- voltage drop requirements
- operating characteristics of connected equipment
- economics

Environmental protection

The standard cable finishes are adequate for normal environmental conditions. However, there are many installations where conditions are much more onerous than normal and some brief notes for protection of cables against hostile environments are given below. Once the type of protective covering to meet environmental conditions has been decided, it is generally possible taking voltage and current ratings into account, to arrive at the type of cable insulation to be used.

Oil refineries and chemical plants

Polymeric and elastomeric cables are not compatible with hydrocarbon oils and organic solvents. Such oils and solvents particularly at elevated temperatures are absorbed by the insulation and sheathing materials leading to swelling and resultant damage.

Semi-conductive components on high voltage cables may lose their conductive properties. It follows that where polymeric and elastomeric cables are used in locations where exposure to hydrocarbon oils and organic solvents is likely, a lead sheath is required. The most satisfactory protection for the lead sheath would be a high density polyethylene sheath with steel wire armour.

For casual contact with oil spills, a Nitrile or CSP rubber sheath can be used.

PVC sheaths offer good protection against chemical attack. Specifiers should contact Prysmian for recommendations regarding the protection of cables against harsh chemical environments.

Termites, teredoes & rodents

Special constructions are necessary to resist insects such as termites, as all cables with normal finishes are susceptible to their attack. If cables are installed in locations where termite attack is likely, protection may take the form of one of the following:

- Two helically applied brass tapes, the upper one overlapping the gap in the lower one, may be incorporated into the cable design. In the case of armoured cable the brass tapes may be applied under the bedding of the armour. For unarmoured cable the brass tapes can be applied over the normal PVC or other extruded sheath followed by a PVC sheath over the brass tapes.
- A nylon jacket may be applied over the PVC or other extruded sheath followed by a sacrificial layer of extruded PVC over the nylon to protect it from damage during installation.
- Termitex™ technology incorporated into the cable design, for long term protection.

Chemical treatment of the backfill is no longer recommended because of damage to the environment and the risk to health.

The teredo worm is prevalent in tropical, subtropical and temperate oceans and estuaries. Protection is usually attained by incorporating two brass tapes under the armour of all submarine cables.

In areas liable to attack by rodents, galvanised steel wire armour provides an effective barrier. A layer of nylon covering under the armour provides additional protection from insects.

Prysmian have expertise in designing cables to resist boring insect and rodent attack. Please call the Customer Service Team for advice.

MEDIUM VOLTAGE CABLES

Exposure to mechanical damage

1. Slight exposure to impact and to tensile stresses.

The application of a medium or high density polyethylene sheath can give appreciable added mechanical protection to cables with the normal PVC sheath. This method is suitable for single and multi-core cables.

2. Moderate exposure to impact and to tensile stresses.

Single core cables can be armoured with non-ferrous armour wire, usually hard drawn aluminium. For Multicore cables a single layer of galvanised steel wire armour is recommended. The steel wire is necessary if there is likely to be a moderate tensile stress applied to the cable during pulling in or during service. Steel wire armoured cables offer good protection against rugged installation conditions.

3. Severe exposure to impact and tensile stresses.

The double wire armour finish offers a very high level of protection against mechanical damage whether it be impact or longitudinal tensile stress such as in subsidence areas and submarine installations on an uneven sea floor.

4. Polymeric protection against impact.

Prysmian developed AIRBAG™, which provides enhanced mechanical/impact protection keeping the handling and installation characteristics of unprotected cables.

Exposure to ultra violet radiation

Prysmian has special materials designed to prevent UV degradation when exposed to sunlight. To be sure the correct material is used it is necessary to state at the time of enquiry and ordering that the cable will be exposed to sunlight.

Fire situations

The performance of a cable in a fire situation can be a major factor in the choice of cable type. When correctly selected, located and installed cables do not present a fire hazard but in the case of fire initiated elsewhere, cables provide a source of fuel and a possible means of propagation along its length.

Additionally cables can contribute to the emission of smoke and noxious gases injurious to equipment and human health. Evolution of smoke can reduce visibility, which can cause panic and create serious problems in evacuating personnel. The presence of acid gas in the smoke can result in corrosion, damage of electronic and other equipment and can cause intense irritation to the eyes and lungs.

Cables manufactured from PVC and some other traditional materials when exposed to fire will produce dense black smoke and harmful fumes and may propagate fire when installed in bundles. Where these factors are of concern, the use of LSOH sheathed cables is recommended.

On the basis of standards in current use, cables can be divided into the following categories in relation to their behaviour in the presence of fire:

Flame propagation (single cable) – when tested singly, the cable should self-extinguish within a short period of time and within a short distance from the point of application of a Bunsen burner flame. Such cables meet AS/NZS 1660.5.6 and IEC 60332 Part 1 and are often called flame retardant. Such cables will not necessarily prevent propagation along bunches of cables installed together on vertical racks and exposed to a large-scale fire source.

Flame propagation (cable bunches) – when tested installed in defined bunches on a vertical ladder, the cables should not propagate flame more than a limited distance from the point of application of a ribbon burner flame front. Such cables meet AS/NZS 1660.5.1 and IEC 60332 Part 3 and are often called reduced propagation.

Three categories exist in AS/NZS 1660.5.1 according to the volume of combustible material tested, Category A (7 l/m), Category B (3.5 l/m) and Category C (1.5 l/m). It should however be noted that propagation of fire is often a function of installation conditions and appropriate care should be taken to ensure that the test category chosen is representative of the actual installed condition.

Low smoke zero halogen cables – have controlled limits on smoke evolution when cable samples are burnt in a closed 3m cube smoke chamber and controlled limits on acidic and corrosive gases when subject to material pyrolysis in a tube furnace. Such cables meet AS/NZS 1660.5.2 (IEC 61034) for smoke emission and AS/NZS 1660.5.4 (IEC 754-2) for determination of degree of acidity by measurement of pH and conductivity and are often called LSOH.

By nature of their typical intended use the MV power cables of this type may be used where the performance of the cable in case of fire is important, either for limitation of the propagation of flame along cable bunches or the limitation of smoke and corrosive gas emissions.

Reduced flame propagation variants of all cables in this technical manual can be supplied with LSOH sheaths for situations where limiting the emission of smoke and corrosive gas from the cables if affected by fire is desirable.

MEDIUM VOLTAGE CABLES

Voltage rating

It is important to know whether the system to which the cable is connected is classified as earthed or unearthed. Supply authority systems are generally, though not always, earthed design. Mining systems are usually the unearthed design. Prysmian products are suitable for voltages that are commonly used in New Zealand. Voltage is usually expressed in the form U_0/U and U_m .

U_0 is the rms power frequency voltage between phase and earth.

U is the rms power frequency voltage between phases.

U_m is the maximum continuous rms power frequency voltage between any two phases for which the cable is designed. It excludes momentary variations due to fault conditions or sudden disconnection of large loads.

Cable voltages

Rated voltages of cables		Max continuous operating voltage U_m kV
General cables U_0/U kV	Mining cables U_0/U kV	
1.9/3.3	3.3/3.3	3.6
3.8/6.6	6.6/6.6	7.2
6.35/11	11/11	12
12.7/22	22/22	24
19/33	33/33	36
38/66	–	72

The selection of standard cables for particular supply systems depends on the system voltage and earthing arrangements.

Category A – system in which any phase conductor that comes in contact with earth or an earth conductor is disconnected from the system within 1 minute.

Category B – system which, under fault conditions, is operated for a short time with one phase earthed, not exceeding 8 hours on any occasion and total duration of earth faults in any year not exceeding 125 hours.

Category C – system which does not fall into Categories A and B.

Cable selection

Max system voltage (U_m) kV	Min rated (phase to earth) Voltage of cable (U_0) kV	
	Category A & B	Category C
3.6	1.9	3.8
7.2	3.8	6.35
12.0	6.35	12.7
24.0	12.7	19

Note: If an earth fault is not automatically and promptly isolated, the extra stresses on the cable insulation during the fault reduce the life of the cable to a certain degree. If the system is expected to be operated fairly often with a permanent earth fault, it may be advisable to classify the system in Category C.

Current ratings

The current ratings indicated in this manual have been based on the calculation procedures as recommended in IEC 60287 and the following assumptions. Rating factors should be applied to cover any variation.

- Max. continuous conductor temp. = 90 °C
- Ambient air temperature = 40 °C
- Ambient ground temperature = 25 °C
- Depth of laying = 0.8 m
- Thermal resistivity of soil = 1.2 °C.m/W
- Balanced load, comprising either a single three core cable or three single core cables, in trefoil formation touching throughout, with the screens bonded at both ends of the route.
- Installation conditions:
 1. **Direct Buried:**
Cables are installed direct in the ground, with suitable compacted backfill
 2. **Buried Singleway Ducts:**
Cables are installed with one cable per duct
 3. **In Free Air:**
Cables installed shielded from direct sunlight and with a minimum clearance from any vertical wall of 0.3xCable Dia. and 0.5xCable Dia. for single and three core cables respectively to ensure free air circulation.

In order to select the appropriate cable for a given application, consideration must be given to the nature of the installation. It is not possible to provide a definitive guide to specifying the correct cable type for every situation, this choice must be made by the specifier and/or installer based upon a knowledge of the installation, applicable regulations and the characteristics of available cable designs. General guidance on the use of cable types included has been given above, but for further information and guidance it is recommended to make reference to the appropriate cable standard (e.g. AS/NZS 1429.1 or AS/NZS 4026).

Temperature limits

In respect of thermal effects the temperature limit given for each cable type is the maximum temperature due to any combination of the heating effect of current in the conductors and ambient conditions. All insulation and sheathing materials become stiffer as their temperature is lowered and due regard has been taken of this factor in the guidance on minimum installation temperature.

The materials used for these cables are compatible with temperatures of 90 °C for continuous operation and 250 °C for short circuit conditions of up to 5 seconds.

The fault ratings for the conductors and the metallic screens are provided for a time period of 1 second. When other times (t) between 0.2 and 5 seconds are required, the appropriate rating may be obtained by multiplying the 1 second rating by the factor: $1/\sqrt{t}$.

The ratings for the screens are based upon the traditional adiabatic method, which provides a substantial safety margin when account is taken of the heat loss occurring in practice. The non-adiabatic method to IEC standards can be used according to AS/NZS 1429.1 when agreed between the purchaser and supplier. This can provide substantial systems savings.

Short circuit capacity that is related to the energy expended during a short circuit. It is equated to the mass x specified heat capacity x temperature change in the conductor. Two types of conditions have to be considered – symmetrical and earth short circuit currents. Various cable designs have different nominated maximum temperatures after short circuit, depending usually on the type of insulation and sheathing, and these temperatures should not be exceeded.

Economics important criteria related to cable economics are the initial system cost and annual cost of losses. Economics are generally considered on a present value calculation based on initial cost and discounted cost of losses. Data provided in the tables assists specifiers to estimate purchase and running costs.

MEDIUM VOLTAGE CABLES

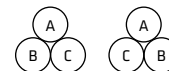
Cable installation

It is recommended that all cables described in this manual be installed in accordance with the Electricity supply authority Specifications or Regulations, the Wiring Rules and any other appropriate national regulations or legislation.

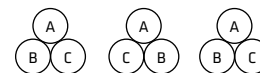
In installing cables, care should be taken to ensure that the ambient and cable temperature has been above 0°C for the previous 24 hours to avoid the risk of cracking of the oversheath.

For groups of parallel single core circuits, the cables should be installed in trefoil touching formation as hereunder:

i) Two conductors per phase.



ii) Three conductors per phase.



Recommended minimum bending radii

It is good practice when planning ducts or trenches to prescribe a bending radius of 3 metres for 11kV, 22kV and 33kV cables and 2 metres for cables below 11kV.

The following tables set out the recommended minimum bending radii for single or multicore polymeric insulated cables greater than 1.1/1.1kV:

Cable description	During installation	Setting at final position or location
Nylon Jacketed	30D*	20D*
HDPE/MDPE Sheathed	25D	15D
PVC Sheathed and LSOH Sheathed	18D	12D

Where: D = Overall diameter of cable in mm.

D* = Diameter over Nylon jacket component in mm.

The radius is related to the inner surface of the cable and not the axis.

The recommendation for installation allows for the cable to be pulled under tension. Where cables are placed in position adjacent to joints and terminations and the bending is carefully controlled, the controlled bending radius as given in the data tables may be used. Sidewall Bearing Pressures need to be considered also.

Duct sizes

Recommended duct sizes are given in the following table:

Nominal internal duct diameter (mm)	Cable diameter (mm)
100	Up to 65
125	Over 65, up to 90
150	Over 90, up to 115

Maximum recommended pulling tensions

Using a pulling eye on the conductor:

Copper – 0.07 kN/mm² of conductor
Aluminium, Stranded – 0.05 kN/mm² of conductor

Using a pulling eye on the Steel wire armour:

$$P = 0.005 D^2$$

Using a Stocking grip: $P = 0.0035 D^2$

Where: P = Tension in kN

D = Cable diameter in mm

Notes:

1. When considering the use of a stocking grip the tension should not exceed the values given for a pulling eye on the conductor(s).
2. Refer also to Maximum Sidewall Bearing Pressure.

Using bond pulling:

By this method the cable is tied at intervals to a steel hawser which is coiled onto a take-up winch in the normal manner. The hawser would be twice the length of the cable being pulled. In this way the pulling load on the cable is kept to a low value and risk of damage to the cable is minimised.

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Maximum sidewall bearing pressure

Another factor which can limit the maximum tension that a cable can withstand is the sidewall bearing pressure exerted on a cable in duct bends and elbows. The sidewall bearing pressure formula is expressed as:

$$\text{SWBP} = [W^2 + (T/(0.0098 \times R))^2] \quad (\text{equation 1})$$

as most of the time, $[T/(0.0098 \times R)]^2 \gg W^2$

equation 1 can therefore be simplified as follows:

$$\text{SWBP} \approx T/(0.0098 \times R) \quad (\text{equation 2})$$

$$\text{From eqn. 2} \Rightarrow T = 0.0098 \times R \times \text{SWBP} \quad (\text{equation 3})$$

$$\text{From eqn. 2} \Rightarrow R = T / (0.0098 \times \text{SWBP}) \quad (\text{equation 4})$$

Where: SWBP = sidewall bearing pressure (kg/m)
W = weight of cable per unit length (kg/m)
T = cable pulling tension (kN)
R = radius of the bend or elbow (m)

The recommended maximum SWBP for sheathed cables shall be 1450kg/m.

Examples:

To find out the maximum pulling tension of a 12.7/22kV 240mm² copper single core PVC sheathed cable based on its minimum recommended bending radius:

1. First calculate the minimum recommended bending radius without considering SWBP:

$$\begin{aligned} &= 18 \times \text{Cable diameter} \\ &= 18 \times 40.5\text{mm} \\ &= 729\text{mm} \end{aligned}$$

Then calculate the maximum pulling tensions:

- a) Maximum pulling tension for straight pull:

$$\begin{aligned} T &= 0.07 \text{ kN/mm}^2 \times 240 \text{ mm}^2 \\ &= 16.8 \text{ kN} \end{aligned}$$

- b) Maximum pulling tension when taking maximum SWBP into consideration.

$$\begin{aligned} \text{From Equation 3: } T &= 0.0098 \times 0.729 \times 1450 \\ &= 10.4 \text{ kN} \end{aligned}$$

We have to select the lesser of the two pulling tensions, i.e. 10.4kN. In this example, the maximum SWBP dictates the maximum pulling tension.

2. To find out the minimum bending radius for the same cable if we do need a pulling tension of 16.8kN:

$$\begin{aligned} \text{From Equation 4: } R &= 16.8 / (0.0098 \times 1450) \\ &= 1.2\text{m} \end{aligned}$$

Joints and terminations

Whilst jointing and terminating of Medium Voltage Polymeric Cables is routine, care is needed to maintain clean working conditions and in ensuring that the insulation semiconducting screen is completely removed and properly connected at the stress control areas. Reference should be made to literature for suitable systems available from Prysmian.

Tests after installation

High Voltage d.c. testing of primary insulation is not recommended and can be detrimental to the cable and accessories. AS/NZS 1429.1 describes an a.c. voltage test at power frequency that should be applied for 24 hours at the normal operating voltage of the system. A sheath integrity test (e.g. with a 1000 Volt minimum rated insulation resistance tester) may be applied between the outer-most metallic layer and the earth to identify post-installation damage, provided the metallic layer is isolated from earth at the joints, terminations, etc.

Short circuit forces

When single core cables are installed touching, special attention should be given to cleating and strapping arrangements to contain the repulsive forces under short circuit conditions. Longitudinal thrust and tensions in cable conductors may be considerable and may cause buckling of conductors and other damage in a joint or termination. When cables are installed, provision should be made to accommodate the resulting longitudinal forces on terminations and joints. Sharp bends and fixings at a bend should be avoided.

Prevention of moisture ingress

Care should be exercised during installation to avoid any damage to cable coverings. This is important in wet or other aggressive environments. The protective cap should not be removed from the ends of the cable until immediately prior to termination or jointing. When the caps have been removed the unprotected ends of the cable should not be exposed to moisture.

The possibility of damage to moisture seals during handling and installation or during storage of the cable should be considered and where such damage may have occurred, the seals should be inspected and remade if necessary.

MEDIUM VOLTAGE CABLES

Cable design service

Prysmian offer their customers a full cable design service, either to give advice on the selection of the most appropriate cable from this technical manual for a particular application or to design a specific cable for any particular installation condition. This service is backed by an experienced team of design engineers working under a Quality Management System approved to AS/NZS ISO 9001.

The Prysmian commitment to new product introduction and development ensures effective and reliable designs are developed and assessed in our own research laboratories.

Prysmian is also able to offer aerial cables including OPGW, water blocked designs and high voltage cables to 400kV. Cable termination and identification systems are also available as part of the Prysmian systems approach.

Quality assurance

All Prysmian MV power cables are manufactured under the Prysmian Quality Management System. This system has received certification by Quality Assurance Services that it meets the requirements of AS/NZS ISO 9001.



Ratings information

Rating factors – 1.9/3.3kV to 19/33kV, single and three core cables, armoured or unarmoured

1. Cables buried direct in the ground:

Variation in ground temperature							
Ground temperature °C	10	15	20	25	30	35	40
Rating factor	1.04	1.00	0.96	0.93	0.91	0.87	0.83

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Variation in thermal resistivity of soil		Values of 'g' °C m/W							
Nominal area of conductor mm ²		0.8	0.9	1.0	1.2	1.5	2.0	2.5	3.0
Rating factor									
Single core cables	Up to 150	1.16	1.11	1.07	1.00	0.91	0.81	0.73	0.67
	From 185 - 400	1.17	1.12	1.07	1.00	0.90	0.80	0.72	0.66
	Above 400	1.18	1.13	1.08	1.00	0.90	0.79	0.71	0.65
Three core cables	Up to 16	1.09	1.06	1.04	1.00	0.95	0.87	0.79	0.74
	From 25 - 150	1.14	1.10	1.07	1.00	0.93	0.84	0.76	0.70
	From 185 - 400	1.16	1.11	1.07	1.00	0.92	0.82	0.74	0.68

Variation in depth of laying		
*Depth of laying m	Up to 300 mm ²	Above 300 mm ²
0.8	1	1
1	0.98	0.97
1.25	0.96	0.95
1.5	0.95	0.94
1.75	0.94	0.92
2	0.92	0.90
2.5	0.91	0.89
3.0 or more	0.90	0.88

*Measured to centre of cable or trefoil group of cables.

Variation in depth of laying		
*Depth of laying m	Up to 300 mm ²	Above 300 mm ²
0.8	1	1
1	0.98	0.97
1.25	0.96	0.95
1.5	0.95	0.94
1.75	0.94	0.92
2	0.92	0.90
2.5	0.91	0.89
3.0 or more	0.90	0.88

*Measured to centre of cable or trefoil group of cables.

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Group rating factors for circuits of three single core cables, in trefoil touching, horizontal formation			Circuit spacing – metres			
Voltage range of cables	No. of circuits	Touching	0.15*	0.30	0.45	0.60
From 1.9/3.3kV to 12.7/22kV	2	0.78	0.81	0.85	0.88	0.90
	3	0.66	0.71	0.76	0.80	0.83
	4	0.60	0.65	0.72	0.76	0.80
19/33kV	2	0.79	0.81	0.85	0.88	0.90
	3	0.67	0.71	0.76	0.80	0.83
	4	0.62	0.65	0.72	0.76	0.80

*These spacings may not be possible for some of the larger diameter cables.

Group rating factors for three core cables, in horizontal formation			Circuit spacing – metres			
Voltage range of cables	No. of circuits in group	Touching	0.15*	0.30	0.45	0.60
From 1.9/3.3kV to 12.7/22kV	2	0.80	0.85	0.89	0.90	0.92
	3	0.69	0.75	0.80	0.84	0.86
	4	0.63	0.70	0.77	0.80	0.84
19/33kV	2	0.80	0.83	0.87	0.89	0.91
	3	0.70	0.73	0.78	0.82	0.85
	4	0.64	0.68	0.74	0.78	0.82

*These spacings may not be possible for some of the larger diameter cables.

2. Cables in singleway ducts, buried direct in the ground:

Variation in ground temperature							
Ground temperature °C	10	15	20	25	30	35	40
Rating factor	1.04	1.00	0.96	0.93	0.91	0.87	0.83

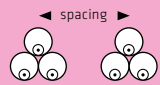
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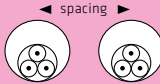
Variation in thermal resistivity of soil		Values of 'g' °C m/W							
Nominal area of conductor mm ²		0.8	0.9	1.0	1.2	1.5	2.0	2.5	3.0
Rating factor									
Single core cables	Up to 150	1.10	1.07	1.05	1.00	0.94	0.87	0.81	0.75
	From 185 - 400	1.11	1.08	1.06	1.00	0.94	0.86	0.79	0.73
	Above 400	1.13	1.09	1.06	1.00	0.93	0.84	0.77	0.70
Three core cables	Up to 16	1.05	1.04	1.03	1.00	0.97	0.92	0.87	0.83
	From 25 - 150	1.07	1.05	1.03	1.00	0.96	0.90	0.85	0.78
	From 185 - 400	1.09	1.06	1.04	1.00	0.95	0.87	0.82	0.76

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Variation in depth of laying	Rating factors	
*Depth of Laying m	Single core	Multicore
0.8	1	1
1	0.98	0.99
1.25	0.95	0.97
1.5	0.93	0.96
1.75	0.92	0.95
2	0.90	0.94
2.5	0.89	0.93
3.0 or more	0.88	0.92

*Measured to centre of cable or trefoil group of cables.

Group rating factors for single core cables in single way ducts, laid in trefoil touching, horizontal formation			Circuit spacing – metres	
				
Voltage range of cables	No. of circuits	Touching	0.45	0.60
From 1.9/3.3kV to 12.7/22kV	2	0.85	0.88	0.90
	3	0.75	0.80	0.83
	4	0.70	0.76	0.80
19/33kV	2	0.85	0.88	0.90
	3	0.76	0.80	0.83
	4	0.71	0.76	0.80

Group rating factors for three core cables in singleway ducts, in horizontal formation			Circuit spacing – metres		
					
Voltage range of cables	No. of ducts in group	Touching	0.30	0.45	0.60
From 1.9/3.3kV to 12.7/22kV	2	0.88	0.91	0.93	0.94
	3	0.80	0.84	0.87	0.89
	4	0.75	0.81	0.84	0.87
19/33kV	2	0.87	0.89	0.92	0.93
	3	0.78	0.82	0.85	0.87
	4	0.73	0.78	0.82	0.85

MEDIUM VOLTAGE CABLES

3. Cables installed in free air:

Variation in ambient air temperature								
Ambient air temperature °C	15	20	25	30	35	40	45	50
Rating factor	1.15	1.09	1.05	1.00	0.95	0.91	0.85	0.80

Grouping of cables in air:

Derating is not necessary if the following minimum clearance between adjacent circuits can be maintained

- 1 The horizontal clearance is not less than twice the diameter of an individual cable.
- 2 The vertical clearance is not less than four times the diameter of an individual cable.
- 3 Where the number of circuits is more than three, they are installed in a horizontal plane.

General information

AS 1018	Partial discharge measurements
AS/NZS 1026	Electric cables – Impregnated paper insulated for working voltages up to and including 19/33 (36)kV
AS/NZS 1125	Conductors in insulated electric cables and flexible cords
AS/NZS 1429.1	Electric cables – Polymeric insulated Part 1: electric cables for working voltages 1.9/3.3 (3.6)kV up to and including 19/33 (36)kV
AS/NZS 1660	Test methods for electric cables, cords and conductors
AS 1931	High-voltage testing techniques
AS/NZS 2857	Timber drums for insulated electric cables and bare conductors
AS/NZS 2893	Electric cables – lead and lead alloy sheaths – composition
AS/NZS 3008	Electrical installations – selection of cables
AS/NZS 3808	Insulating and sheathing materials for electric cables
AS/NZS 3863	Galvanized mild steel wire for armouring cables
AS 3983	Metal drums for insulated electric cables and bare conductors
AS/NZS 4026	Electric cables – for underground residential distribution systems
IEC 60754-1	Test on gases evolved during combustion of materials from cables - Part 1: Determination of the halogen acid gas content
IEC 60754-2	Test on gases evolved during combustion of materials from cables - Part 2: Determination of acidity (by pH measurement) and conductivity
IEC 60287	Electric cables – calculation of the current rating
IEC 60332-1	Tests on electric and optical fibre cables under fire conditions, Part 1: Test for vertical flame propagation for a single insulated wire or cable
IEC 60332-3	Tests on electric cables under fire conditions, Part 3: Test for vertical flame spread of vertically-mounted bunched wires or cables
IEC 60502-2	Power cables with extruded insulation and their accessories for rated voltages from 1kV (Um = 1.2kV) up to 30kV (Um = 36kV) - Part 2: Cables for rated voltages from 6kV (Um = 7.2kV) up to 30kV (Um = 36kV)
IEC 60949	Calculation of thermally permissible short-circuit currents, taking into account non-adiabatic heating effects
IEC 60986	Short-circuit temperature limits of electric cables with a rated voltages from 6kV (Um = 7.2kV) up to 30kV (Um = 36kV)
IEC 61034	Measurement of smoke density of cables burning under defined conditions

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