Nexans Olex New Zealand Power Cable Catalogue 2012 EDITION

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Nexans Olex New Zealand

Power Cable Catalogue

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Nexans Olex

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Power Cable Catalogue

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SECTION ONE - INTRODUCTION

COMPANY PROFILE

Power cables have been manufactured and tested at the Nexans Olex Bell Block factory on the outskirts of New Plymouth for more than 40 years. Established in 1967 as a joint venture between Tolley and Son and Canada Wire and Cable Company of Toronto, it was known as Canzac until 1984 when it was purchased by the Pacific Dunlop Group, one of Australia's largest international companies, and became part of the Pacific Dunlop Cables Group. In 1999 Olex Cables (New Zealand), together with other Pacific Dunlop Cables Group businesses, was bought by a Management Buyout Consortium (MBO), and then was known as Olex New Zealand Limited, a Subsidiary of Olex Holdings Pty Limited. It was in 2006 that the MBO consortium sold its shares in Olex Holdings to Nexans. The acquisition by Nexans became effective in December 2006.

Nexans Olex is a world leader in cable technology and production and has manufacturing facilities in New Plymouth and Melbourne. Each site has been designed to efficiently manufacture specific product groups to cater for the needs of the industry. With over 40 years experience behind it, Nexans Olex employs more than 1500 people and has the financial backing, the expertise and the commitment to maintain and expand its position as a world leader in cable technology, manufacturing and installation.

At its New Plymouth factory, Nexans Olex produces a wide range of electrical power cables, ranging from building wires and control cables to power cables with rated voltages up to 35 kV. Complementing this range is a wide selection of power and data/communications cables manufactured by other Nexans factories around the world.

Nexans Olex has proven its expertise and commitment to quality and service in fulfilling contracts in many New Zealand and international markets. The company has a strong commitment to further growth and expansion internationally.

With this background, Nexans Olex is well placed to retain its leading role in terms of customer service, quality and research.

TECHNICAL SERVICE AND SUPPORT

Nexans Olex's extensive technical resources mean that a cable can be designed to meet the exact needs of a customer. The standard range of cables may contain a cable that will do the required job, but Nexans Olex's commitment is to ensure that a cable's capabilities meet the precise requirements of the installation.

This may mean that a standard cable needs to be modified for optimum performance or have a new feature added - this is a normal part of the Nexans Olex service.

Nexans Olex's technical support does not finish with the successful design and production of the cable. In addition, a comprehensive cable advisory service is also offered. Technical staff are available to assist in providing expert solutions to all types of cable problems and inquiries.

QUALITY ASSURANCE

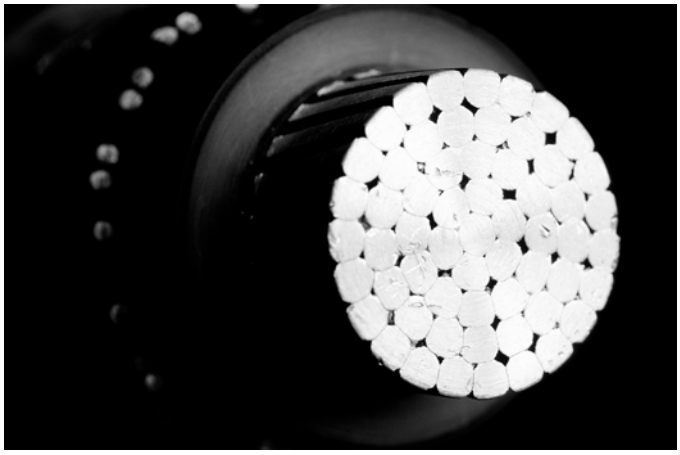
For Nexans Olex, quality means the ability to satisfy the needs of its customers, its employees and the proprietors. Accordingly, Nexans Olex recognises the nature of these relationships and has linked these three essential needs together to form a policy cornerstone.

Quality is important as its inherent cost effectiveness contributes to the competitiveness of the company's products and services, and to profitability and growth. The contribution of every member of the Nexans Olex team to the quality of products, to customer service and the company is essential to the goal of excellence through quality.

Nexans Olex has developed and implemented Quality Management using the AS/NZS/ISO 9001 standard as the model for quality assurance and the criteria for third party accreditation through Bureau Veritas Certification. There is flexibility to merge additional customer requirements into the routine Quality Verification Plans.

Whilst each company within Nexans is individually responsible for the quality of its own cable products and services, each has achieved third party accreditation to at least the ISO 9001 level. This parity in quality management provides Nexans Olex with the flexibility to access the entire product ranges of all companies within Nexans without compromising its own quality management standards

Nexans Olex offers only brand name accessory products from suppliers with a history of product quality and service. When required, details of the suppliers' quality systems and any third party accreditation to recognised Quality Assurance Standards can be supplied.



GENERAL TECHNICAL
INFORMATION

SECTION TWO - GENERAL TECHNICAL INFORMATION

INSTALLATION INFORMATION

General

All cables must be installed to comply with the latest New Zealand Wiring Regulations.

Moisture

Nexans Olex cables are manufactured in conditions that exclude moisture, as it is difficult to remove from a finished cable. It is important that precautions are taken during installation to ensure that moisture is not permitted to enter the cable. Cut ends or opened areas must be protected from moisture at all times, including during pulling in. Cables, after cutting, must be re-sealed for storage, by an effective method such as a heat shrinkable cable cap.

Single Core Cables

The following points relating to single core cables should be noted:
1. Single core cables carrying the phase currents of a single circuit must be installed as closely as possible together, to minimise inductive reactance and voltage drop. The preferred formation for three phase conductors is a "trefoil" or cloverleaf pattern although flat touching formation is also acceptable. Sheaths should be in contact with one another in either case.
2. A single core cable generates an alternating magnetic field around itself which can cause large increases in voltage drop and power loss due to "transformer effect" when ferrous metal (iron and steel) is allowed to encircle the cable. Steel racking or ladder will not induce this effect, but the following must be observed:
a. Cable cleats may be of wood, plastic, or non-ferrous metal but steel saddles should not be used on single cores.
b. Where three single phase cables pass through a steel bulkhead, they must all pass through the same hole. Where glanding is required, it is usual to cut out a panel and replace this with a non-ferrous (metal or plastic) plate in which the three or four glands are mounted.

Cable Support

Under fault conditions, single core cables used as phase conductors in a multi-phase system may be subjected to large electromechanical forces which tend to drive them apart. Generally, properly designed cleats spaced at 1500 mm intervals will provide adequate support to the cable under normal operating conditions. However special consideration may be required if fault currents in excess of 15 kA are anticipated.

Green Goo

Also known as “Green Slime”, this phenomenon is characterised by the appearance of a sticky green exudate leaking out of PVC-insulated wiring at locations such as switches, hot points and light fittings. It is a common occurrence in both Australia and New Zealand.
The green goo problem is predominantly associated with older (25+ years) TPS-type cables operating in a warm environment. The exudate comprises a plasticiser that has migrated out of the PVC insulation, coloured due to reaction with the copper conductor, and that has subsequently travelled - by capillary action and/or gravity – along the conductor to emerge at a termination point.
Due to its stickiness and unsightly colour, the goo has a high nuisance value, however it poses no significant health hazard. It may be cleaned from surfaces by wiping with a rag soaked in a petroleum- or alcohol-based solvent (such as meths).
The long-term consequence of the exudate is that it represents a de-plasticising of the insulation, meaning that as the process continues, the PVC will eventually become brittle, and crack.

INSTALLATION INFORMATION (CONT.)

TPS Cables in Polystyrene Thermal Insulation

With the increasing use of polystyrene block insulation in houses and caravans, it is important to explain the potential problem that arises when PVC sheathed and insulated cables come into direct contact with this material.
The plasticiser that is added to PVC to make it flexible, has a tendency to migrate out of the PVC and into materials with which it is in contact, particularly where those materials – such as polystyrene and polyurethane - have a great affinity for the plasticiser. This will lead to the PVCs becoming progressively harder and more brittle, while in contrast the polystyrene will appear to "melt" as it absorbs the plasticiser.
The rate of migration is dependent upon the relative thickness of the materials, the temperature, and the amount of surface area in direct contact. Accordingly, the rate of deterioration of the PVC cable can vary considerably under different circumstances.
To mitigate the problem it is recommended that the amount of direct contact between the cable and the polystyrene be reduced as much as possible. Effective ways of achieving this include positioning the cable with an air gap between the sheath and the polystyrene, or installing the cable within a rigid PVC or PE conduit.

UV Resistance

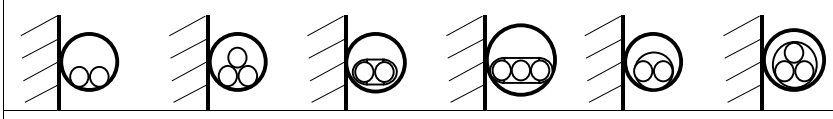
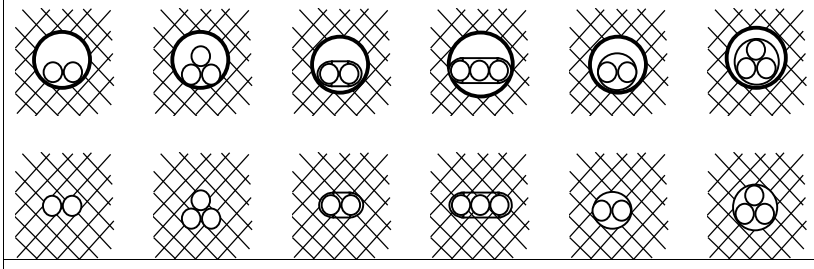
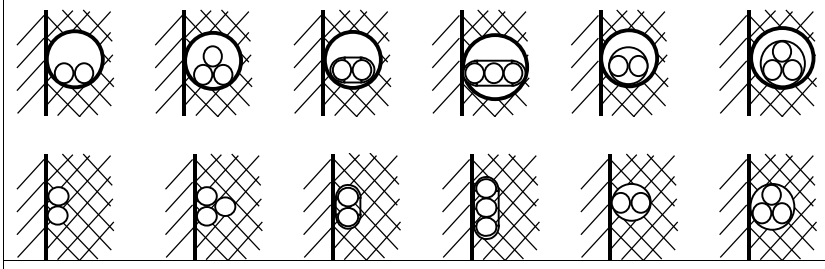
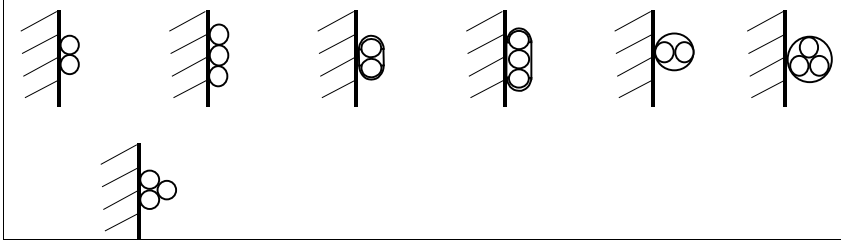
Many polymers, due to their molecular structure, are prone to attack by UV radiation, and because of this will degrade upon continued exposure to sunlight, eventually cracking and splitting. The polyolefin family of materials, such as PE (including XLPE or X-90) and PP is particularly susceptible to deterioration in this manner. PVC is also at risk but noticeably less so, partly because of its structure but also due to the mitigating effects of the fillers, plasticisers and stabilisers that are compounded with it.
A simple, effective and cheap material that can be added to plastic compounds to absorb UV radiation is carbon black. However, while this approach is appropriate for sheathing materials, it is not necessarily so for insulating materials as the carbon masks the core colour.
Nexans Olex recommends that the insulation of its cables be protected (covered) from solar radiation at all times, except in those instances where the material has been deliberately modified to guard against the effects of UV, eg, Aerial Bundled Cables (ABC). This covering may simply be the sheath of the cable.

Lugs and Links

Stranded compacted conductors, either round or sector shaped, must have lugs and links fitted that are manufactured for the same nominal cross-sectional area as the conductor. For example, a 150 mm^2 conductor must have a 150 mm^2 lug or link fitted, and the correct dies, as stated by the manufacturer, used to compress it.
Although the lug or link will appear to be loose on the conductor, this is simply because the initial compression of the joint has already taken place during the manufacture of the conductor; the final compression of the joint will be correct.
If, for example, a 120 mm^2 lug or link was fitted to a 150 mm^2 conductor, the joint would be over-compressed and likely to fail in service. In addition, the smaller lug in itself would be unable to carry the same maximum current as the larger conductor, particularly with respect to fault currents.
Nexans Olex manufactures conductors to be compatible with lugs and links normally available in New Zealand.

INSTALLATION METHODS

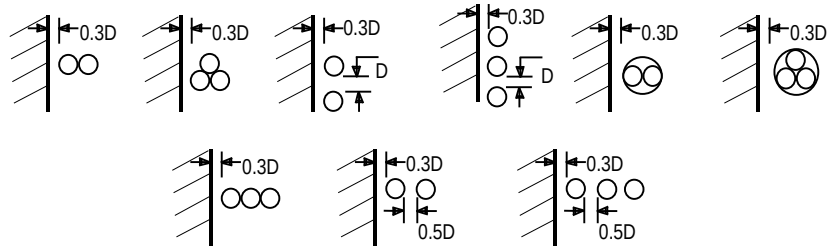
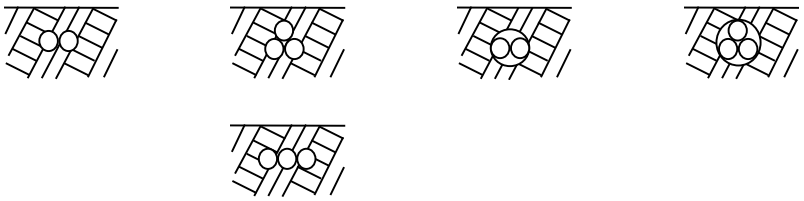
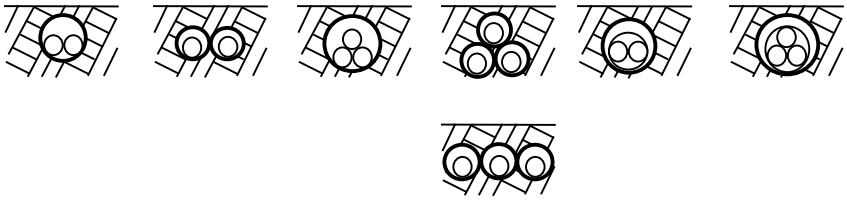
Figure 2.1 Graphical Representations of Methods of Installation

a) Enclosed 	Cables installed in conduit or trunking or other similar enclosure.
b) Completely Surrounded by Thermal Insulation 	Cables either within an enclosure or unenclosed, completely surrounded by thermal insulation
c) Partially Surrounded by Thermal Insulation 	Cables either within an enclosure or unenclosed, partially surrounded by thermal insulation
d) Unenclosed, Clipped Directly to a Surface 	Cables installed directly in air, fixed to a wall, floor, ceiling[1] or similar surface where air circulation around the cables is restricted.

Note:
1. Refer to Table 2.1 for derating factors which apply for single circuits of cables installed under a ceiling or similar horizontal surface.

INSTALLATION METHODS (CONT.)

Figure 2.1 (cont.) Graphical Representations of Methods of Installation

e) Unenclosed, Spaced Away from a Surface[1] 	Cables installed with minimum spacings as shown directly in air, and supported on ladders[2], racks, perforated[3] or unperforated trays[4] etc, or suspended from a catenary wire.
f) Buried Direct in the Ground 	Cables buried directly in the ground. The depth of burial is measured from the surface to the centre of the cable or group of cables.
g) Laid in Underground Ducts, Pipes or Conduits 	Cables installed in underground enclosures. The depth of burial is measured from the surface to the centre of the duct or group of ducts.

Notes:
1. D = Cable OD (or Width, in the case of a flat cable).
2. Ladder support is one where the supporting metalwork which provides impedance to air flow occupies less than 10% of the plan area under the cables.
3. Perforated trays are those in which not less than 30% of the surface area is removed by perforation.
4. Refer to Table 2.2 for derating factors which apply even for single circuits of cables installed on perforated or unperforated trays.
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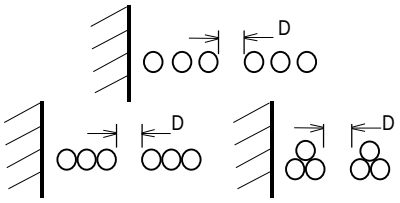
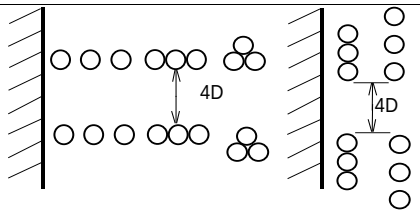
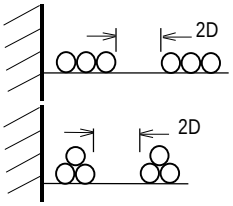
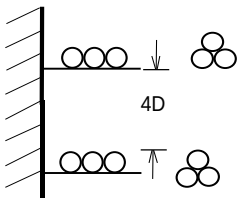
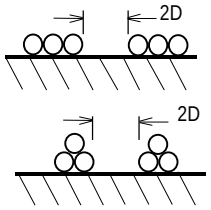
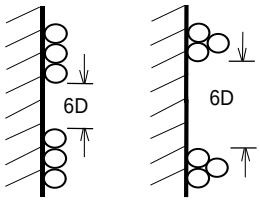
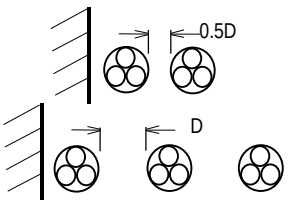
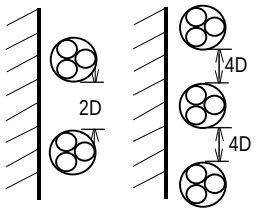
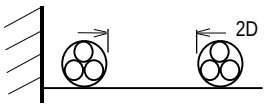
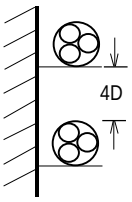
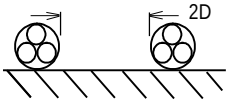
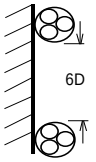
INSTALLATION METHODS (CONT.)

Figure 2.2 Minimum Spacings in Air to Avoid Derating

Method of Installation	Horizontal Spacings	Vertical Spacings
a) Single Core Cables		
Cables spaced away from surfaces and supported on ladders, racks, etc. or suspended from a catenary wire, such that impedance to air flow around the cables is not greater than 10%.		
Cables spaced away from surfaces and supported on perforated or unperforated trays such that air flow around the cables is partially restricted.		
Cables fixed directly to a wall, floor, ceiling or similar surface such that air circulation is restricted.		
b) Multicore Cables		
Cables spaced away from surfaces and supported on ladders, racks, etc. or suspended from a catenary wire, such that impedance to air flow around the cables is not greater than 10%.		
Cables spaced away from surfaces and supported on perforated or unperforated trays such that air flow around the cables is partially restricted.		
Cables fixed directly to a wall, floor, ceiling or similar surface such that air circulation is restricted.		

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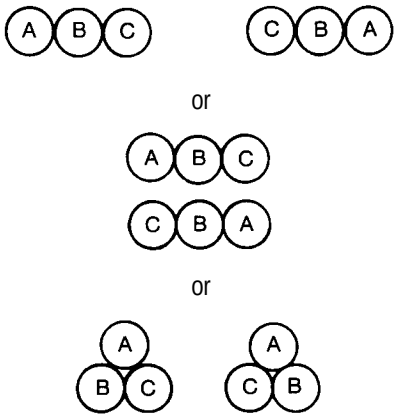
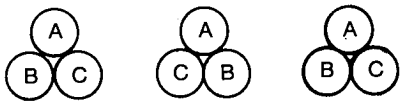
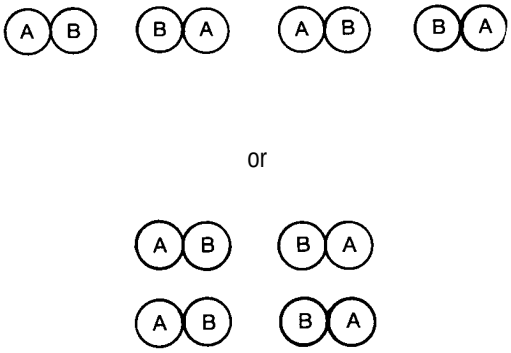
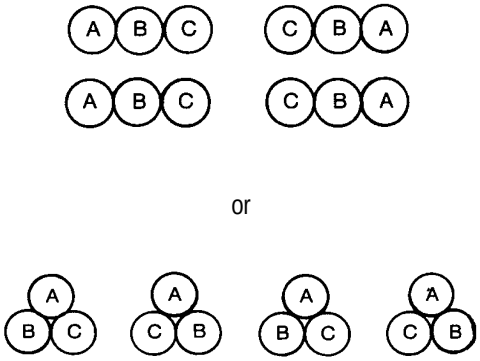
SINGLE CORE CABLES IN PARALLEL

The following are the recommended arrangements of single core cables in parallel. Non-symmetrical arrangements result in different impedances and hence unequal current sharing between parallel legs of the same phase. This should be avoided as it could lead to overheating of some cables.
Neutral conductors of Three phase circuits should be located so as not to disturb the symmetry of the groups.

Figure 2.3 Arrangements for Equal Current Sharing of Single Core Cables in Parallel

	Single Phase	Three Phase
Two Conductors per Phase		
Three Conductors per Phase	Not Recommended	
Four Conductors per Phase		

RATING FACTORS

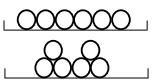
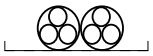
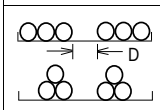
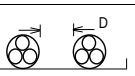
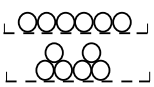
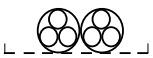
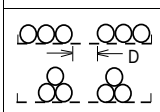
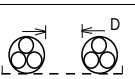
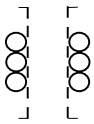
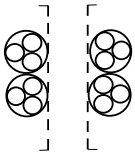
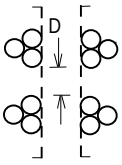
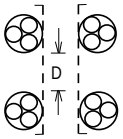
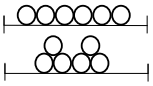
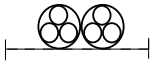
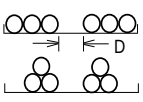
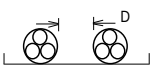
Table 2.1 Bunched Circuits of Single Core or Multicore Cables in Air or in Wiring Enclosures

No of Circuits[1]	Arrangement of Cables					
	Bunched in Air	Bunched on a Surface or Enclosed	Single Layer on Wall or Floor		Single Layer under a Ceiling	
			Touching	Spaced[2,3]	Touching	Spaced[2,3]
1	1.00	1.00	1.00	1.00	0.95	0.95
2	0.87	0.80	0.85	0.94	0.81	0.85
3	0.75	0.70	0.79	0.90	0.72	0.85
4	0.72	0.65	0.75	0.90	0.68	0.85
5	0.70	0.60	0.73	0.90	0.66	0.85
6	0.67	0.57	0.72	0.90	0.64	0.85
7	-	0.54	0.72	0.90	0.63	0.85
8	-	0.52	0.71	0.90	0.62	0.85
9	-	0.50	0.70	0.90	0.61	0.85
10	-	0.48	0.70	0.90	0.61	0.85
12	-	0.45	0.70	0.90	0.61	0.85
14	-	0.43	0.70	0.90	0.61	0.85
16	-	0.41	0.70	0.90	0.61	0.85
18	-	0.39	0.70	0.90	0.61	0.85
20 or more	-	0.38	0.70	0.90	0.61	0.85

Notes:
1. Where a bunch of cables consist of n loaded conductors, it may be considered as n/2 circuits of two loaded conductors or n/3 circuits of three loaded conductors.
2. Spaced refers to a clearance of one cable diameter between adjacent cables.
3. Refer to Figure 2.2 for spacings which avoid derating.

RATING FACTORS (CONT.)

Table 2.2 Cables on Trays, Racks or Other Supports

Type of Support	Single Core Cables					Multicore Cables							
	Arrangement	No. of Trays or Racks	No. of Circuits[1] per Tray or Rack			Arrangement	No. of Trays or Racks	No of Cables[1] per Tray or Rack					
			1	2	3			1	2	3	4	6	9
Unperfor-ated Trays[2]		1	0.95	0.85	0.84		1	0.97	0.85	0.78	0.75	0.71	0.68
		2	0.92	0.83	0.79		2	0.97	0.84	0.76	0.73	0.68	0.63
		3	0.91	0.82	0.76		3	0.97	0.83	0.75	0.72	0.66	0.61
		1	0.98	0.96	0.94		1	0.97	0.96	0.94	0.93	0.90	-
		2	0.95	0.91	0.87		2	0.97	0.95	0.92	0.90	0.86	-
		3	0.94	0.90	0.85		3	0.97	0.94	0.91	0.89	0.84	-
Perforated Trays[2]		1	0.97	0.89	0.87		1	1.0	0.88	0.82	0.78	0.76	0.73
		2	0.94	0.85	0.81		2	1.0	0.87	0.80	0.76	0.73	0.68
		3	0.93	0.84	0.79		3	1.0	0.86	0.79	0.75	0.71	0.66
		1	1.0	0.98	0.96		1	1.0	1.0	0.98	0.95	0.91	-
		2	0.97	0.93	0.89		2	1.0	0.99	0.96	0.92	0.87	-
		3	0.96	0.92	0.86		3	1.0	0.98	0.95	0.91	0.85	-
Vertical Perforated Trays[3]		1	0.94	0.85	-		1	1.0	0.88	0.82	0.77	0.73	0.72
		2	0.92	0.83	-		2	1.0	0.88	0.81	0.76	0.72	0.70
		1	1.0	0.91	0.89		1	1.0	0.91	0.89	0.88	0.87	-
		2	1.0	0.90	0.86		2	1.0	0.91	0.88	0.87	0.86	-
Ladder Racks, Cleats etc[2]		1	1.0	0.95	0.94		1	1.0	0.87	0.82	0.80	0.79	0.78
		2	0.95	0.90	0.88		2	1.0	0.86	0.80	0.78	0.76	0.73
		3	0.95	0.89	0.85		3	1.0	0.85	0.79	0.76	0.73	0.70
		1	1.0	1.0	1.0		1	1.0	1.0	1.0	1.0	1.0	-
		2	0.97	0.95	0.93		2	1.0	0.99	0.98	0.97	0.96	-
		3	0.97	0.94	0.90		3	1.0	0.98	0.97	0.96	0.93	-

The factors are to be applied to "spaced from surface in air" current ratings.

Notes:
1. The factors given apply to circuits consisting of groups of two or three loaded single core cables or multicore cables having two or three loaded conductors.
2. Trays or ladder type supports shall have a vertical spacing of not less than 300 mm.
3. Back to back vertical trays shall have a horizontal spacing of not less than 230 mm.
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BENDING RADII AND DUCT SIZES

Recommended Bending Radius Factors

The safe bending radius for an electric cable is limited by the flexibility of its insulation and sheathing material.
When a cable is being installed it may be pulled around several curves in different directions and subjected to dynamic stresses which could cause damage. Consequently the bending radius around which a cable may be pulled is greater than that into which it can be set in its final position.
The following recommended minimum bending radii are expressed as a function of the cable diameter and refer to the inside of the curve. In all cases, bending radii should be as large as practicable.

Recommended Minimum Bending Radii

Cable Type (choose the highest value of all relevant construction features)		During Installation (F)	Set (F)
All Cable Types	Nylon Covered	30	20
	HDPE Sheath	25	15
	Helical Copper or Brass taped	18	12
	Steel Wire Armoured	18	12
	Solid Aluminium Conductors	12	8
	Compacted or Shaped Stranded Conductors	12	8
MV XLPE Cables	Single Core and Multicore Cables	18	12
LV (0.6/1 kV) Cables	PVC/XLPE Insulation	9	6

Minimum Bending Radius

R = F * D where, R = Bending Radius (mm), D = Cable Diameter (mm), and F = Factor from above table.

Duct Sizes

Ducts are another important consideration affecting the pulling operation. Selection of the appropriate duct should be based on internal duct diameter to suit a cable size and wall thickness to prevent deformation during duct installation. The internal finish of the installed ducting should be smooth to prevent cable sheath damage during installation. During cable installation the use of graphite or other commercially available pulling lubricants can also prevent sheath damage and reduce pulling tensions. The following duct sizes are recommended:

Duct Selection

Heavy Duty Rigid PVC Conduit Nominal Size (mm)	Cable Diameter		
	Single Cable (mm)	Three Cables (mm)	Four Cables (mm)
50	Up to 30	-	-
63	30 to 38	-	-
65	38 to 47	Up to 24	Up to 21
80	47 to 52	24 to 27	21 to 23
100	52 to 69	27 to 35	23 to 31
150	69 to 99	35 to 51	31 to 44
200	99 to 142	51 to 73	44 to 63
250	Above 142	Above 73	Above 63

PULLING TENSION

Where a cable is to be pulled in using a winch and steel wire rope, the rope may be secured to the cable by any of the following:

1. A cable stocking of steel wire braid
2. A pulling eye attached to the cable conductor
3. A pulling eye over the complete cable end
4. A pulling eye formed from the armour wires

The maximum tension which may be used is limited by the tensile strength of the conductors or armour wires, or by the gripping capability of the cable stocking, depending on the method used.

Stress Limits for Cable Materials	
Material	Maximum Safe Tensile Stress (S) kN/mm^2
Stranded Copper Conductor	0.07
Stranded Aluminium Conductor	0.05
Solid Aluminium Conductor	0.03
Galvanised Mild Steel Armour	0.13
Aluminium Wire Armour	0.04

Method of Calculation

Using values of S from table above :

Limited by Conductor

$T_C = N * A_C * S$

Where T_C = Maximum Pulling Tension (kN), N = No. of Conductors, A_C = Cross-sectional Area of one Conductor (mm^2), and S = Maximum Safe Tensile Stress for Conductor (kN/mm^2).

Limited by Armour

$T_a = 2.47 * d_a * (D_a + d_a) * S$

Where T_a = Maximum Pulling Tension (kN), S = Maximum Safe Tensile Stress for Armour (kN/mm^2), d_a = Nominal Diameter of Armour Wire (mm), and D_a = Nominal Diameter under Armour (mm).

Limited by Stocking

$T_S = 0.120 * D$

Where T_S = Maximum Pulling Tension (kN), and D = the Overall Diameter of the Cable (mm).

Overall Limiting Tension	
Cable OD (mm)	Maximum Pulling Tension (kN)
0 to 15	5
15 to 25	10
25 to 50	15
50 and over	20

The safe pulling tension is the smallest of the calculated values.

SHORT CIRCUIT RATINGS

The short circuit capacity of a current carrying component of a cable is determined by the following factors:
1. The temperature prior to the short circuit, generally taken to be that corresponding with the maximum conductor operating temperature under normal conditions.
2. The energy produced by the short circuit, a function of both the magnitude and the duration of the current.
3. The limiting final temperature, generally determined by all materials in contact with the conducting component.
The adiabatic (no heat loss) equation for the temperature rise during a short circuit is as follows:

$I^2 * t = k^2 * S^2$

Where I = Short Circuit Current {r.m.s. over duration} (A.), t = Duration of Short Circuit (s), k = Constant depending on the material and the initial and final temperatures, and S = Cross-sectional Area of Current Carrying Component (mm^2). Rearrangement of the general equation gives the formulae for I_{sc}, the Short Circuit Rating for a particular Conductor Size, and for calculation of S_c, the Minimum Conductor Size to meet a specified short circuit level.

$$I_{sc} = \frac{k * S}{\sqrt{t}} (A)$$

$$S_c = \frac{I * \sqrt{t}}{k} (mm^2)$$ (Round up to the nearest standard conductor size.)

Values of k for Copper and Aluminium conductors and PVC and XLPE insulation materials, based on initial temperatures corresponding to the maximum continuous conductor operating temperatures are as follows:

Values of k for Cu and Al Conductors with PVC or XLPE Insulation

Insulation Type	Copper Conductor		Aluminium Conductor	
	Up to 300 mm^2	Over 300 mm^2	Up to 300 mm^2	Over 300 mm^2
PVC*	111	98.7	73.6	65.3
XLPE#	143	143	94.5	94.5

* Insulation material temperature limits for PVC of 75°C to 160°C up to 300 mm^2 and 75°C to 140°C above 300 mm^2 apply.

Insulation material temperature limits for XLPE of 90°C to 250°C apply.

These values are based on the limits imposed by the insulation material alone. Note that soldered joints impose an upper temperature limit of 160°C, while for mechanical (bolted) joints the manufacturer's recommendations should be observed. The above temperature limits are appropriate for durations of up to 5 seconds only.

One Second Short Circuit Ratings

In practice it is often convenient to work with short circuit ratings converted to a one second basis. Reference may then be made to Table 2.3 which gives one second short circuit ratings for Copper and Aluminium conductors with PVC and XLPE insulation materials respectively.

To convert a one second rating to a rating for t seconds, divide by $\sqrt{t}$, eg, 34 kA for 1s equals 20 kA for 3 s.

To convert a t second rating to a one second rating, multiply by $\sqrt{t}$, eg, 10 kA for 0.04s equals 2 kA for 1 s.

Other Considerations

In addition to the temperature rise, consideration should also be given to the thermomechanical (longitudinal) and electromechanical (lateral) forces which can be generated under short circuit conditions.

CONDUCTOR SHORT CIRCUIT RATINGS

Table 2.3 Conductor Short Circuit Ratings (kA) for 1s Duration

Conductor Size	Copper Conductors		Aluminium Conductors	
($mm^{2)}$	PVC Insulation	XLPE Insulation	PVC Insulation	XLPE Insulation
1	0.111	0.143	-	-
1.5	0.167	0.215	-	-
2.5	0.278	0.358	-	-
4	0.444	0.572	-	-
6	0.666	0.858	-	-
10	1.11	1.43	-	-
16	1.78	2.29	1.18	1.51
25	2.78	3.58	1.84	2.36
35	3.89	5.01	2.58	3.31
50	5.55	7.15	3.68	4.73
70	7.77	10.0	5.15	6.62
95	10.5	13.6	6.99	8.98
120	13.3	17.2	8.83	11.3
150	16.7	21.5	11.0	14.2
185	20.5	26.5	13.6	17.5
240	26.6	34.3	17.7	22.7
300	33.3	42.9	22.1	28.4
400	39.5	57.2	26.1	37.8
500	49.4	71.5	32.7	47.3
630	62.2	90.1	41.1	59.5
800	-	-	-	75.6

Note:
1. Short circuit ratings for durations other than one second may be obtained by dividing the one second ratings by $\sqrt{t}$, where t is the required duration in seconds.

CONDUCTOR MAX DC RESISTANCES

Table 2.4 Conductor Maximum DC Resistances at 20°C (Ω/km)

Conductor Size (mm^2)	Plain Annealed Copper	Tinned Annealed Copper	Aluminium
1	18.1	18.2	-
1.5	13.6	13.8	-
2.5	7.41	7.56	-
4	4.61	4.70	-
6	3.08	3.11	-
10	1.83	1.84	-
16	1.15	1.16	1.91
25	0.727	0.734	1.20
35	0.524	0.529	0.868
50	0.387	0.391	0.641
70	0.268	0.270	0.443
95	0.193	0.195	0.320
120	0.153	0.154	0.253
150	0.124	0.126	0.206
185	0.0991	0.100	0.164
240	0.0754	0.0762	0.125
300	0.0601	0.0607	0.100
400	0.0470	0.0475	0.0778
500 *	0.0366	0.0369	0.0605
630 *	0.0283	0.0286	0.0469
800	-	-	0.0367

Notes:
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2. Values for hard drawn plain or hard drawn tinned copper conductors may be obtained by dividing the values for annealed conductors by 0.97.
3. The above values are for Class 2 stranded conductors except for 1 mm^2 which is Class 1.
4. Conductor sizes marked with an * are for single core cables only. For multi core cables multiply value by 1.02.

CONDUCTOR DIMENSIONS

Table 2.5 Copper Conductor Dimensions

Nominal Cross Sectional Area (mm^2)	Circular Nominal Diameter (mm)	Compacted Minimum Diameter (mm)	Three Core, 120° Sectored		Four Core, 90° Sectored	
			Nominal Depth (mm)	Max Width (mm)	Nominal Depth (mm)	Max Width (mm)
16	4.95	4.85	-	-	-	-
25	6.30	5.99	5.22	8.48	5.87	7.68
35	7.55	7.00	5.97	9.85	6.91	9.20
50	8.75	8.30	7.02	11.51	7.97	10.50
70	10.50	9.69	8.50	14.40	9.37	13.09
95	12.40	11.40	10.02	17.00	10.97	15.55
120	14.10	12.81	11.22	18.90	12.25	17.10
150	15.55	14.22	12.17	20.90	13.62	18.92
185	17.40	15.97	13.65	23.10	15.37	21.30
240	20.00	18.25	15.57	26.75	17.48	24.50
300	22.35	20.47	17.67	29.85	19.57	27.60
400	25.25	23.40	19.84	33.96	22.29	31.21
500	28.30	26.76	-	-	-	-
630	-	30.44	-	-	-	-

Table 2.6 Aluminium Conductor Dimensions

Nominal Cross Sectional Area (mm^2)	Circular Nominal Diameter (mm)	Compacted Minimum Diameter (mm)	Three Core, 120° Sectored		Four Core, 90° Sectored	
			Nominal Depth (mm)	Max Width (mm)	Nominal Depth (mm)	Max Width (mm)
16	5.15	-	-	-	-	-
25	6.30	5.99	5.22	8.48	5.87	7.68
35	7.60	6.95	5.97	9.85	6.91	9.20
50	8.80	8.20	7.02	11.51	7.97	10.50
70	10.45	9.69	8.50	14.40	9.37	13.09
95	12.40	11.40	10.02	17.00	10.97	15.55
120	14.15	12.81	11.22	18.90	12.25	17.10
150	15.60	14.22	12.17	20.90	13.62	18.92
185	17.35	15.97	13.65	23.10	15.17	21.30
240	20.25	18.32	15.57	26.75	17.48	24.50
300	22.50	20.33	17.67	29.85	19.57	27.60
400	25.40	23.06	19.84	33.96	22.29	31.21
500	28.55	26.10	-	-	-	-
630	-	29.70	-	-	-	-
800	-	34.30	-	-	-	-

Note:
1. Lugs and links must always be selected to match the nominal cross sectional area of the conductor. A lug or link for a 185 mm^2 circular conductor may fit on a 240 mm^2 compacted conductor but may not be rated to carry the load current associated with the larger conductor size; nor will it compress correctly if it is of the compression type.

WIRE AND CABLE SIZE COMPARISON

British Imperial		Equivalent Metric	Metric Size	American Wire
Number/Diameter of Wires Nº/inch	Nominal C/S Area sq inch	C/S Area mm²	mm²	Gauge AWG
		0.205		24
			0.22	
		0.324		22
			0.35	
			0.5	
		0.519		20
			0.75	
		0.826		18
1/0.044	0.0015	0.97		
			1	
3/0.029	0.0019	1.25		
		1.31		16
			1.5	
3/0.036	0.003	1.93		
		2.08		14
			2.5	
7/0.029	0.0045	2.93		
		3.31		12
			4	
7/0.036	0.007	4.52		
		5.26		10
			6	
		6.63		9
7/0.044	0.010	6.75		
		8.37		8
7/0.052	0.0146	9.43		
			10	
		10.6		7
		13.3		6
7/0.064	0.0225	14.3		
		16.8		5
			16	
19/0.044	0.03	18.3		
		21.1		4
			25	
19/0.052	0.04	25.5		
		26.7		3
		33.6		2
			35	
19/0.064	0.06	38.7		
		42.4		1
			50	
		53.5		1/0
19/0.083	0.10	65.1		
		67.4		2/0
			70	
37/0.064	0.12	75.3		
		85.0		3/0
			95	
37/0.072	0.15	95.3		
		107		4/0
			120	
37/0.083	0.20	127		

Table continued on next page.

WIRE AND CABLE SIZE COMPARISON (CONTINUED)

British Imperial		Equivalent Metric	Metric Size	American Wire Gauge
Number/Diameter of Wires Nº/inch	Nominal C/S Area sq inch	C/S Area mm²	mm²	kcmil
			120	
37/0.083	0.20	127		
		127		250
			150	
		152		300
37/0.093	0.25	159		
		177		350
			185	
37/0.103	0.30	195		
		203		400
		228		450
			240	
		253		500
61/0.093	0.40	262		
		279		550
			300	
		304		600
61/0.103	0.50	322		
		329		650
		355		700
		380		750
91/0.093	0.60	391		
			400	800
		405		800
		456		900
91/0.103	0.75	480		
			500	
		507		1000
			630	
127/0.103	1.00	669		

NOTES

LOW VOLTAGE
CABLES

SECTION THREE - LOW VOLTAGE CABLES

SECTION THREE – LOW VOLTAGE CABLES

NOTES

CONSTRUCTION

Nexans Olex low voltage cables are designed in accordance with relevant New Zealand, Australian or British Standards and specific customer requirements (where applicable) to provide optimum performance for the end application.

The standards referred to for PVC insulation are:

AS/NZS 4961

AS/NZS 5000.1

AS/NZS 5000.2

BS 6346

The standards referred to for XLPE insulation are:

AS/NZS 5000.1

AS/NZS 4026

AS/NZS 4961

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Component Detail

Conductor

Conductors are made from either plain or tinned copper or solid or stranded aluminium. Depending on the cable construction, conductors may be either circular, compacted or shaped.

Conductor Data								
Cross Sectional Area	1.5	2.5	4	6	10	16	25	35
Nominal Diameter and No. of Wires	3/0.75	7/0.67	7/0.85	7/1.04	7/1.35	7/1.70	7/2.14	19/1.53

Insulation

The insulation materials used are as follows:

1. PVC (Polyvinyl Chloride), meeting the requirements of: V-75 (AS/NZS 3808), V-90 (AS/NZS 3808), and TI1 (BS EN 50363-3.).

2. XLPE (Cross-linked Polyethylene), meeting the requirements of: X-90 (AS/NZS 3808, AS 3560) and GP8 (BS 7655: Section 1.3.).

Core Assembly

The cores of cables having flat profiles are laid side by side during the subsequent process. In circular cables, the cores are laid up and the interstices filled with a non-hygroscopic material where necessary to achieve a circular cable cross-section. The laid up core assembly may be bound with helically applied non-hygroscopic tapes.

Neutral Screen

In neutral screened cables, a screen of plain annealed copper or tinned annealed copper wires is helically applied over the core of a single core cable or the core assembly of a multicore cable.

Bedding and Armour (Multicore cables)

In multicore armoured cables, a bedding of PVC is extruded over the core assembly followed by a layer of helically applied galvanised mild steel wires.

Outer Sheath

A sheath of PVC with suitable temperature rating is extruded over the underlying components. Additional protective coverings may be applied depending on the environment in which the cable is installed, eg, a nylon oversheath and an additional sacrificial PVC layer are often specified for protection against termite attack.

CURRENT RATINGS

The current carrying capacity of a cable is determined by the following factors:

1. Current flowing in a conductor generates heat and causes the conductor temperature to rise above the ambient temperature.
2. Different methods of installation or the presence of external heat sources such as adjacent cables vary the rate of heat dissipation.
3. The insulation material determines the maximum conductor temperature which can be sustained continuously over the expected life of the cable.

In all cases, the ratings given are the single circuit ratings, corresponding to continuous loading at the maximum conductor temperature appropriate to the insulation material.

Environmental Conditions

The current ratings are based on the following operational conditions: ambient air temperature of 30°C, soil temperature of 15°C, soil thermal resistivity of 1.2 K.m/W and depth of burial of 0.5 m. Where conditions vary from those on which the ratings are based, appropriate rating factors from Tables 3.1 to 3.4 need to be applied.

Methods of Installation

The methods of installation for which the ratings are applicable are shown graphically in Figure 2.1 (Section 2 General Technical Information). Arrangements which are shown one above the other for the same installation method are deemed to have the same current carrying capacity.

Earthing conductors and lightly loaded neutral conductors of three phase circuits are ignored for current rating purposes and are generally not shown in the graphical representations of the cable and installation methods. Thus, where two single core cables or a two core cable is shown the current rating applies to single phase operation; where three single core cables or a three core cable is shown the current rating applies to two or three phase operation.

Groups of Circuits

For groups of circuits unenclosed in air, the spacings and arrangements which need to be maintained to prevent derating are given in Figure 2.2 (Section 2 General Technical Information). Where underground circuits are spaced by more than 2 m from adjacent circuits, no derating applies. Also, if adjacent circuits are operated at less than 35% of their current carrying capacity they may be excluded from considerations as their contribution to mutual heating will be small.

Where a number of circuits are installed in close proximity in such a way that they are not thermally independent, the appropriate rating factors from Tables 3.5, 3.6, (Section 3 Low Voltage ≥ 0.6/1 kV Cables) and Tables 2.1, 2.2 (Section 2 General Technical Information) need to be applied.

Cables in Parallel

For cables operated in parallel, each parallel leg is regarded as a separate circuit for current rating purposes and the appropriate rating factors for grouping are applicable. Refer also to Figure 2.3 (Section 2 General Technical Information) for the arrangements of single core cables so as to ensure equal current sharing between parallel legs of the same phase.

Solar Radiation

For cables exposed to direct sunlight, the effect of solar radiation is to increase the surface temperature of the cable and hence limit the temperature rise due to the load in the conductors. Where possible, cables should be shielded from the direct rays of the sun without restricting ventilation. Otherwise, the effect of solar radiation should be taken into account, either by calculation in accordance with IEC 60287, or as an approximation by adding 20°C to the ambient air temperature and applying the appropriate rating factor.

LOW VOLTAGE RATING FACTORS

Table 3.1 Ambient Air Temperature Variation

Insulation Type	Air Temperature (°C)								
	15	20	25	30	35	40	45	50	55
PVC	1.18	1.12	1.06	1.00	0.94	0.88	0.80	0.72	0.63
XLPE	1.15	1.09	1.05	1.00	0.95	0.91	0.85	0.80	0.74

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Table 3.2 Soil Temperature Variation

Insulation Type	Soil Temperature (°C)						
	10	15	20	25	30	35	40
PVC	1.04	1.00	0.95	0.91	0.86	0.81	0.75
XLPE	1.04	1.00	0.96	0.93	0.91	0.87	0.83

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Table 3.3 Depth of Burial Variation

Depth of Burial	Laid Direct			In Underground Ducts	
	Up to 50mm^2	Above 50mm^2 Up to 300mm^2	Above 300mm^2	Single Core	Multicore
0.5	1.00	1.00	1.00	1.00	1.00
0.6	0.99	0.98	0.97	0.98	0.99
0.8	0.97	0.96	0.94	0.95	0.97
1.0	0.95	0.94	0.92	0.93	0.96
1.25	0.94	0.92	0.90	0.90	0.95
1.5	0.93	0.91	0.89	0.89	0.94
1.75	0.92	0.89	0.87	0.88	0.94
2.0	0.91	0.88	0.86	0.87	0.93
2.5	0.90	0.87	0.85	0.86	0.93
3.0 (or deeper)	0.89	0.86	0.83	0.85	0.92

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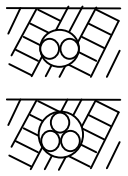
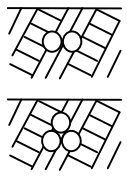
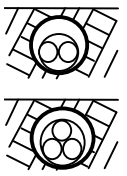
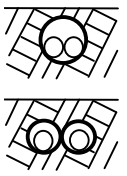
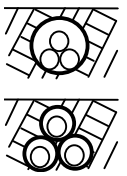
Table 3.4 Soil Thermal Resistivity Variation

Soil Thermal Resistivity (K.m/W)					
0.8	1.09	1.16	1.03	1.06	1.08
0.9	1.07	1.11	1.02	1.04	1.06
1.0	1.04	1.07	1.02	1.03	1.04
1.2	1.00	1.00	1.00	1.00	1.00
1.5	0.92	0.90	0.95	0.94	0.92
2.0	0.81	0.80	0.88	0.86	0.83
2.5	0.74	0.72	0.83	0.80	0.77
3.0	0.69	0.66	0.78	0.75	0.71

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LOW VOLTAGE RATING FACTORS

Table 3.5 Groups of Circuits Laid Direct

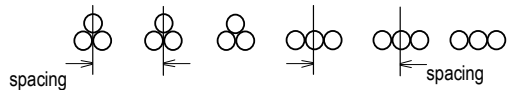
No. of Circuits	Single Core Cables 						Multicore Cables 				
	Touching		Spacing (m)				Touching	Spacing (m)			
	Trefoil	Flat	0.15	0.30	0.45	0.60		0.15	0.30	0.45	0.60
2	0.78	0.81	0.83	0.88	0.91	0.93	0.81	0.87	0.91	0.93	0.95
3	0.66	0.70	0.73	0.79	0.84	0.87	0.70	0.78	0.84	0.88	0.90
4	0.61	0.64	0.68	0.74	0.81	0.85	0.63	0.74	0.81	0.86	0.89
5	0.56	0.60	0.64	0.73	0.79	0.83	0.59	0.70	0.78	0.84	0.87
6	0.53	0.57	0.61	0.71	0.78	0.82	0.55	0.68	0.77	0.83	0.87
7	0.50	0.54	0.59	0.69	0.76	0.82	0.52	0.66	0.75	0.82	0.86
8	0.49	0.53	0.57	0.68	0.76	0.81	0.50	0.64	0.75	0.81	0.86
9	0.47	0.51	0.56	0.67	0.75	0.81	0.48	0.63	0.74	0.81	0.85
10	0.46	0.50	0.55	0.67	0.75	0.80	0.47	0.62	0.73	0.80	0.85
11	0.44	0.49	0.54	0.66	0.74	0.80	0.45	0.61	0.73	0.80	0.85
12	0.43	0.48	0.53	0.66	0.74	0.80	0.44	0.60	0.72	0.80	0.84

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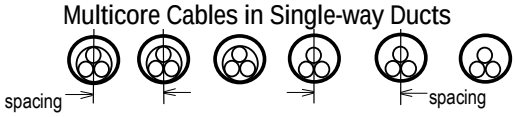
Table 3.6 Groups of Circuits In Underground Ducts

No. of Circuits	Single Core Cables in Multiway Ducts or Multicore Cables in Single-way Ducts 				Single Core Cables in Single-way Ducts 		
	Touching	Spacing (m)			Touching	Spacing (m)	
		0.30	0.45	0.60		0.45	0.60
2	0.90	0.93	0.95	0.96	0.87	0.91	0.93
3	0.83	0.88	0.91	0.93	0.78	0.84	0.87
4	0.79	0.85	0.89	0.92	0.74	0.81	0.85
5	0.75	0.83	0.88	0.91	0.70	0.79	0.83
6	0.73	0.82	0.87	0.90	0.69	0.78	0.82
7	0.71	0.81	0.86	0.89	0.67	0.76	0.82
8	0.70	0.80	0.85	0.89	0.66	0.76	0.81
9	0.68	0.79	0.85	0.89	0.65	0.75	0.81
10	0.67	0.79	0.85	0.89	0.64	0.75	0.80
11	0.66	0.78	0.84	0.88	0.63	0.74	0.80
12	0.66	0.78	0.84	0.88	0.63	0.74	0.80

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VOLTAGE DROPS

In order to ensure satisfactory operation of electrical equipment, it is necessary to maintain the voltage at which it is supplied within certain limits.

Voltage Drop Limitations

In New Zealand, the nominal supply system is 230/400 volts. The maximum voltage drop from the point of supply to any point in the installation is required to be no more than 5% of the nominal supply voltage, ie, 11.5 V for 230 V phase to earth or 20 V for 400 V phase to phase.

The voltage drop limitation applying to a circuit needs to be assessed taking account of the function of the circuit and its relationship with other circuits. For example, other voltage drop limits may apply in ELV circuits or may be dictated by motor starting considerations.

Also, the voltage drop in mains and submains circuits should take account of the voltage drop in final sub-circuits (and vice versa) to ensure the total voltage drop in the installation is within the required limits.

Use of Tabulated mV/A.m Figures

The voltage drop (mV/A.m) values given in this publication have been obtained from AS/NZS 3008.1.2. They represent the worst case conditions, whereby it is assumed that the cable is operating at maximum rated temperature and is supplying a load having a power factor equal to the power factor of the cable. For three phase circuits, balanced loading is assumed.

On this basis, where the cable size and type, load current and length of run are known, the voltage drop can be calculated from the following:

$$V_d = \frac{V_t * I * L}{1000} (V)$$

where: V_t = the Tabulated Voltage Drop Figure for the Cable (mV/A.m), I = the Load Current (A), and L = the Length of Run (m).

This formula is used to calculate the voltage drop in a circuit when the cable size is known.

Rearrangement of this equation gives the maximum mV/A.m value for compliance with a specific voltage drop.

$$V_C = \frac{1000 * V_d}{I * L} \text{ (mV/A.m)}$$

This formula should be used to select the cable size necessary to meet a specific voltage drop limitation. The size selected should have a tabulated mV/A.m figure not greater than the calculated value of V_C.

Unbalanced Three Phase Circuits

In many three phase circuits the loading on each phase is not equal. In these cases, current will flow in the neutral conductor and the tabulated three phase mV/A.m values will not strictly apply.

Where the imbalance is known to be small, a conservative method of voltage drop assessment is to assume balanced three phase load conditions but use the current flowing in the most heavily loaded phase.

However, where the imbalance is significant, or not readily determined, it may be necessary to revert to a single phase basis. The single phase voltage drop limit and the tabulated single phase mV/A.m should be used unless more precise calculations are performed using vector methods to calculate the neutral current and then geometrically summing the voltage drops in the phase and neutral conductors.

Voltage Drop Graphs

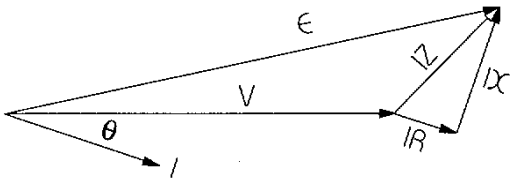
For quick calculations, Voltage Drop Graphs are also available for cables normally available ex stock from Nexans Olex.

VOLTAGE DROPS

Instances can arise where it is desired to make a more precise determination than would arise from the use of tabulated mV/A.m figures. The following methods can be used in these cases.

Phasor Diagram

The relationships between the various current and voltage elements in a cable circuit are shown in the following phasor diagram (lagging power fa



where: I = Current Flowing in C = E – V, IZ = Voltage Drop associated with Cable Impedance, and cos θ = Power Factor of Load.

Given values for E, I, R, X and θ, the magnitude of V can be determined vectorially and subtracted from E to give the difference in voltage between the supply and load ends of the circuit. As the magnitude of the permissible voltage drop is very much smaller than the supply and load voltages, the difference between E and V is approximately equal to the magnitude of IZ. The following formulae make use of this simplification. For additional information refer to AS/NZS 3008.1.2.

Circuit Impedance and Load Power Factor

In the cases where the load power factor is not known, the load power factor is assumed to be equal to the cable power factor and the voltage drop calculated in terms of the cable impedance as follows:

$$V_{d1f} = 2 * I * L * Z \quad \text{(V/m) Single phase}$$

$$V_{d3f} = \sqrt{3} * I * L * Z \quad \text{(V/m) Three phase}$$

where: I = Load Current (A), L = Length of Run (m), Z (Cable Impedance) = $\sqrt{R_c^2 + X_L^2}$ (Ω/m), R_c = Conductor Resistance (Ω/m), and X_L = Cable Inductive Reactance ((Ω/m) at operating temperature and frequency. (X_L = 0 for direct current operation) and values of R_c and X_L are given in Tables 3.25 to 3.28.

Where the load power factor cos θ is known, the relevant formulae are:

$$V_{d1f} = 2 * I * L * (R_c * \cos\theta \pm X_L * \sin\theta) \quad \text{(V/m)}$$

$$V_{d3f} = \sqrt{3} * I * L * (R_c * \cos\theta \pm X_L * \sin\theta) \quad \text{(V/m)}$$

In these formulae, the second term in brackets is added for lagging power factors and subtracted for leading power factors. For unity power factor, sin θ = 0 so the second term disappears.

Cables Operated Below Full Load

In many situations, cables are operated at loads considerably less than their full rated current. The conductor temperature in such cases will be less than the maximum figure on which the tabulated mV/A.m values are based. For a given load current, the actual conductor temperature θ_o (°C) can be calculated from the following:

$$\theta_o = \theta_a + (\theta_r - \theta_a) \times \left\{\frac{I_o}{I_r}\right\}^2$$

where I_o = Actual Load Current (A), I_r = Rated Current (A), θ_r = Rated Conductor Temperature (°C), and θ_a = Ambient Temperature (°C) corresponding to rated current.

The value of R_c to be used in the voltage drop calculations can then be obtained from Table 3.25 or 3.26 using the next higher value of conductor temperature.

Special computer programs are commercially available to calculate voltage drop allowing for cables that are not loaded at their full rated current.

SELECTION PROCEDURES

In accordance with AS/NZS 3008.1.2:2010 and AS/NZS 3000:2007, the four main factors which affect the minimum size of cable required for a particular installation are:

1. The cable current-carrying capacity, which is influenced by the cable materials and construction, the conditions of the cable environment and the method of installation due to their effects on the dissipation of heat from the conductors.
2. The voltage drop in the cable circuit, which is a function of load current, load power factor, and length of the cable run.
3. The temperature rise under short-circuit conditions, which is a function of both the magnitude and duration of the short-circuit current and is limited by the cable materials.
4. The maximum fault loop impedance which will still allow the protective device to trip within the specified time.

Procedures

To select the cable size required, based on the above considerations, follow the steps listed:

Current-Carrying Capacity

1. Determine the minimum current for which the cable is to be rated, taking account of the maximum demand of the circuit and the type and rating of the overcurrent protection device.
2. Ascertain how the cables are to be installed, and the conditions in the cable environment. From the tables of rating factors, select any rating factor(s) which are applicable.
3. Divide the rating from step 1. by the appropriate factor(s).
4. From the current rating tables, select a cable which, for the appropriate method of installation, has a tabulated rating not less than the value obtained from 3.

Voltage Drop

1. Determine the Load Current I (A) to be carried by the cable, and the Route Length L (m) of the circuit.
2. Establish the maximum voltage drop V_d (V) permitted in the circuit (taking account of any other voltage drops in series).
3. Evaluate the equation $Vc = \frac{1000 * Vd}{I * L}$ (mV/A.m). This value is the maximum mV/A.m figure which will give the required voltage drop.
4. From the voltage drop tables, select a cable for the appropriate method of installation which has a tabulated mV/A.m figure not greater than this value.

Short Circuit Temperature

1. Determine the Maximum Duration t (s) and Magnitude I_{SC} (A) of the prospective Short Circuit Current.
2. Evaluate the equation $I_1 = I_{SC} * \sqrt{t}$ (A). This is the required short circuit rating converted to a one second basis.
3. From the conductor short-circuit ratings tables, select a cable with a rating not less than the value obtained from 2.

Fault Loop Impedance

1. Determine the maximum fault loop impedance which will still allow the protective device to trip within the specified time.
2. From the above calculate the maximum length of cable run to comply with the maximum fault loop impedance. Refer to AS/NZS 3000:2007, Clause 1.7.4.3 and Appendix B.

General

For any circuit, the cable size selected should not be less than the largest of the sizes calculated to meet the above limitations (this is the smallest size which will meet all of the requirements).

In practice, the current-carrying capacity will be found to prevail in short-run/high-current circuits while voltage drop considerations will usually prevail in long-run/low-current circuits. It is unusual for short-circuit temperature requirements to determine the conductor size required for low voltage cable circuits.

MINIMUM COPPER EARTHING CONDUCTOR SIZE

Nominal Size of Active Conductor mm²	NOMINAL SIZE OF COPPER EARTHING CONDUCTOR	
	With Copper Active Conductors mm²	With Aluminium Active Conductors mm²
1	1 *	-
1.5	1.5 *	-
2.5	2.5	-
4	2.5	-
6	2.5	2.5
10	4	2.5
16	6	4
25	6	6
35	10	6
50	16	10
70	25	10
95	25	16
120	35	25
150	50	25
185	70	35
240	95	50
300	120	70
400	≥120†	≥95†
500	≥120†	≥95†
630	≥120†	≥120†

* These earthing conductors may be used only where incorporated in a multicore cable or flexible cord, other than a lift travelling cable, in accordance with Clause 5.3.3.4 (b) and (c) of AS/NZS 3000:2007.

† A larger earthing conductor may be required to satisfy Clause 5.3.3.1.1 of AS/NZS 3000:2007.

Disclaimer

Nexans Olex has taken every precaution to ensure that the information contained in the above table is in line with the requirements of the appropriate New Zealand Standards and correct electrical practice. However, we accept no liability of any kind with respect to the information presented here.

It is the responsibility of the Electrician signing the Certificate of Compliance to ensure that all the requirements of the Wiring Regulations are met.

CONDUIT WIRES

Circular construction
Copper conductor
PVC insulation

Product Sheet No. 010-01 A			
Conductor Size (mm^2)	Thickness of Insulation (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
V90 Insulation			
1.0*	0.8	2.8	0.017
1.5	0.8	3.3	0.022
2.5	0.8	3.8	0.034
4	1.0	4.7	0.055
V75 Insulation			
6	1.0	5.3	0.076
10	1.0	6.2	0.12
16	1.0	7.2	0.18
25	1.2	8.9	0.28
35	1.2	10.1	0.38
50	1.4	11.7	0.51
70	1.4	13.5	0.72
95	1.6	15.8	1.0
120	1.6	17.5	1.2
150	1.8	19.4	1.7
GN/YE Earthing Conductors			
1.5	0.6	2.8	0.020
2.5	0.7	3.6	0.032
Issue: January 2012 0.6/1 kV. Made to AS/NZS 5000.1			

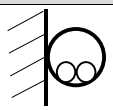
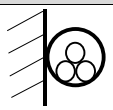
* Solid conductor

Notes:
1. Conductors 1.5 mm^2 and above are circular stranded.
2. Standard colours: Red, White, Blue, Black, Green/Yellow (other colours can be supplied if required).
3. Subject to confirmation, similar cables can be manufactured to other specifications.

CONDUIT WIRES

Circular construction
Copper conductor
PVC insulation
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 010-01 B

Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.0	15	51.6	14	44.7
1.5	21	33.0	17	28.6
2.5	27	18.0	24	15.6
4	36	11.2	32	9.71
6	47	7.50	40	6.49
10	62	4.46	54	3.86
16	80	2.81	71	2.43
25	107	1.78	92	1.54
35	128	1.29	114	1.12
50	157	0.963	136	0.834
70	194	0.680	173	0.589
95	242	0.507	209	0.439
120	276	0.415	247	0.359
150	321	0.352	278	0.305

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

SINGLE CORE CU TPS CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath

Product Sheet No. 020-01 A				
Conductor Size (mm2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
1.0*	0.6	0.8	3.8	0.026
1.5#	0.6	0.8	4.3	0.034
2.5	0.7	0.8	4.9	0.048
4	0.8	0.9	6.0	0.073
6	0.8	0.9	6.5	0.096
10	1.0	0.9	7.8	0.15
16	1.0	1.0	9.3	0.22
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

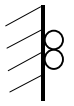
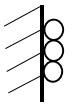
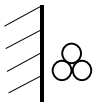
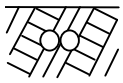
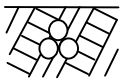
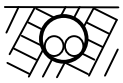
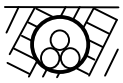
* Solid conductor
# 3 wire conductor

Notes:
1. Conductors 2.5 mm^2 and above are circular stranded.
2. Standard colours: Insulation - Red or Black; Sheath - White. Other colours can be supplied if required.
3. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE CU TPS CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 020-01 B

Conductor Size														
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.0	15	51.6	15	44.7	16	44.7	24	51.6	18	44.7	20	51.6	18	44.7
1.5	18	33.0	18	28.6	19	28.6	31	33.0	22	28.6	25	33.0	22	28.6
2.5	26	18.0	26	15.6	29	15.6	43	18.0	30	15.6	35	18.0	30	15.6
4	35	11.2	35	9.71	38	9.71	56	11.2	40	9.71	45	11.2	40	9.71
6	46	7.50	46	6.49	48	6.49	71	7.50	50	6.49	57	7.50	50	6.49
10	62	4.46	62	3.86	66	3.86	94	4.46	65	3.86	76	4.46	65	3.86
16	82	2.81	82	2.43	88	2.43	134	2.81	114	2.43	98	2.81	86	2.43

Issue: January 2012

450/750 V. Made to AS/NZS 5000.2

Notes:

1. Refer to Product Sheet 010-01 B for current ratings and voltage drops for these cables enclosed in conduit or trunking.
2. Content from AS/NZS 3008.1.2:2010 has been reproduced with the permission from Standards New Zealand under Copyright Licence 000926. Please see the Standard for full details.

The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

TWO CORE CU TPS CABLES

Flat construction
Copper conductor
PVC insulation
PVC sheath

Product Sheet No. 020-02 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Size (mm)	Linear Mass (kg/m)
1.0*	0.6	0.9	6.3 x 4.0	0.050
1.5#	0.6	0.9	7.3 x 4.6	0.065
2.5	0.7	1.0	8.7 x 5.3	0.096
4	0.8	1.1	10.5 x 6.3	0.15
6	0.8	1.1	11.6 x 7.0	0.20
10	1.0	1.2	14.3 x 8.4	0.31
16	1.0	1.3	17.2 x 10.0	0.46
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

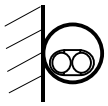
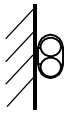
Product Sheet No. 020-02 A (with Pilot)				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Size (mm)	Linear Mass (kg/m)
2 x 16 + 2.5	1.0	1.3	9.9 x 20.4	0.50
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

* Solid conductor
# 3 wire conductor

Notes:
1. Conductors 2.5 mm^2 and above are circular stranded.
2. Standard colours: Insulation - Red, Black, Orange (pilot); Sheath - White. Other colours can be supplied if required.
3. Subject to confirmation, similar cables can be manufactured to other specifications.

TWO CORE CU TPS CABLES

Flat construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 020-02 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.0	15	51.6	16	51.6
1.5	18	33.0	21	33.0
2.5	26	18.0	30	18.0
4	34	11.2	39	11.2
6	44	7.50	50	7.50
10	59	4.46	68	4.46
16	78	2.81	91	2.81
25	103	1.78	122	1.78
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

TWO CORE & EARTH CU TPS CABLES

Flat construction
Copper conductor
PVC insulation
PVC sheath

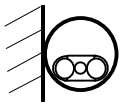
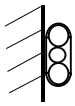
Product Sheet No. 020-03 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Size (mm)	Linear Mass (kg/m)
1.0*	0.6	0.9	8.6 x 4.0	0.070
1.5#	0.6	0.9	10.1 x 4.6	0.090
2.5	0.7	1.0	11.9 x 5.3	0.14
4 (2.5)	0.8	1.1	14.8 x 6.4	0.19
6 (2.5)	0.8	1.1	16.4 x 6.9	0.24
10 (4)	1.0	1.2	18.8 x 8.4	0.37
16 (6)	1.0	1.3	24.0 x 9.8	0.59
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

* Solid conductor
# 3 wire conductor

Notes:
1. Conductors 2.5 mm^2 and above are circular stranded.
2. Standard colours: Insulation - Black, Red, Green/Yellow (earth); Sheath - White. Other colours can be supplied if required.
3. Reduced earth size shown in brackets ( ).
4. Subject to confirmation, similar cables can be manufactured to other specifications.

TWO CORE & EARTH CU TPS CABLES

Flat construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 020-03 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.0	15	51.6	16	51.6
1.5	18	33.0	21	33.0
2.5	26	18.0	30	18.0
4	34	11.2	39	11.2
6	44	7.50	50	7.50
10	59	4.46	68	4.46
16	78	2.81	91	2.81
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

THREE CORE CU TPS CABLES

Flat construction
Copper conductor
PVC insulation
PVC sheath

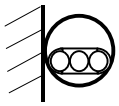
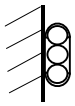
Product Sheet No. 020-04 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Size (mm)	Linear Mass (kg/m)
1.0*	0.6	0.9	8.6 x 4.0	0.071
1.5#	0.6	0.9	10.1 x 4.6	0.090
2.5	0.7	1.0	12.0 x 5.3	0.14
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

* Solid conductor
# 3 wire conductor

Notes:
1. Conductors 2.5 mm^2 and above are circular stranded.
2. Standard colours: Insulation - Red, White, Blue; Sheath - White. Other colours can be supplied if required.
3. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE CU TPS CABLES

Flat construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 020-04 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.0	13	44.7	14	44.7
1.5	16	28.6	17	28.6
2.5	23	15.6	25	15.6
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

THREE CORE & EARTH CU TPS CABLES

Flat construction
Copper conductor
PVC insulation
PVC sheath

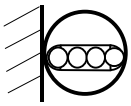
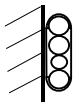
Product Sheet No. 020-05 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Size (mm)	Linear Mass (kg/m)
1.0*	0.6	0.9	10.9 x 4.0	0.093
1.5#	0.6	0.9	13.0 x 4.6	0.12
2.5	0.7	1.0	15.4 x 5.3	0.18
4 (2.5)	0.8	1.1	18.2 x 6.4	0.26
6 (2.5)	0.8	1.1	19.9 x 7.1	0.33
10 (4)	1.0	1.2	24.8 x 8.4	0.51
16 (6)	1.0	1.3	31.0 x 9.7	0.80
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

* Solid conductor
# 3 wire conductor

Notes:
1. Conductors 2.5 mm^2 and above are circular stranded.
2. Standard colours: Insulation - Red, White, Blue, Green/Yellow (earth); Sheath - White. Other colours can be supplied if required.
3. Reduced earth size shown in brackets ( ).
4. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE & EARTH CU TPS CABLES

Flat construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 020-05 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.0	13	44.7	14	44.7
1.5	16	28.6	17	28.6
2.5	23	15.6	25	15.6
4	29	9.71	33	9.71
6	38	6.49	42	6.49
10	50	3.86	58	3.86
16	66	2.43	78	2.43
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

FOUR CORE CU TPS CABLES

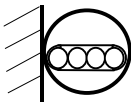
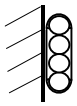
Flat construction
Copper conductor
PVC insulation
PVC sheath

Product Sheet No. 020-06 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Size (mm)	Linear Mass (kg/m)
2.5	0.7	1.0	15.4 x 5.3	0.18
4	0.8	1.1	19.1 x 6.5	0.29
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Notes:
1. Conductors 2.5 mm^2 and above are circular stranded.
2. Standard colours: Insulation - Red, White, Blue, Black; Sheath - White. Other colours can be supplied if required.
3. Subject to confirmation, similar cables can be manufactured to other specifications.

FOUR CORE CU TPS CABLES

Flat construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 020-06 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	23	15.6	25	15.6
4	39	9.71	33	9.71
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

SINGLE CORE CU PVC NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
PVC insulation
Copper neutral screen
PVC sheath

Product Sheet No. 080-01 A

Conductor Size (mm^2)	Thickness of Insulation (mm)	Neutral Screen		Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
		Physical Area (mm^2)	Nominal No. & Size (mm)			
2.5	0.8	4	20x 0.53	3.2	11.5	0.20
4	1.0	6	25 x 0.53	3.2	12.5	0.24
6	1.0	6	27 x 0.53	3.2	13.1	0.28
10	1.0	10	29 x 0.67	3.2	14.2	0.38
16	1.0	16	20 x 1.01	3.2	15.9	0.51
25	1.2	25	25 x 1.13	3.2	17.9	0.73
35	1.2	35	24 x 1.36	3.2	19.5	0.93
50	1.4	48	21 x 1.70	3.2	21.8	1.2

Issue: September 2012

0.6/1 kV. Made to AS/NZS 4961

Product Sheet No. 080-01 A (with Pilot)

Conductor Size (mm^2)	Thickness of Insulation (mm)	Neutral Screen		Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
		Physical Area (mm^2)	Nominal No. & Size (mm)			
16 + 4P	1.0	16	46 x 0.67	3.2	22.2 x 15.2	0.67
25 + 4P	1.2	26	44 x 0.86	3.2	26.2 x 17.3	0.93

Issue: January 2012

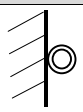
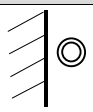
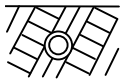
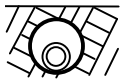
0.6/1 kV. Made to AS/NZS 4961

Notes:
1. Conductors are circular stranded.
2. Standard colours: Insulation – Red, Orange (pilot); Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Only Neutral Screen cable with a 3.2 mm sheath can be direct buried in accordance with AS/NZS 3000 without further mechanical protection.

SINGLE CORE CU PVC NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
PVC insulation
Copper neutral screen
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 080-01 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	30	18.0	31	18.0	33	18.0	33	18.0
4	39	11.2	42	11.2	43	11.2	43	11.2
6	50	7.50	52	7.50	55	7.50	55	7.50
10	68	4.46	73	4.46	73	4.46	73	4.46
16	91	2.81	97	2.81	125	2.81	95	2.81
25	122	1.78	129	1.78	162	1.78	123	1.78
35	149	1.28	158	1.28	196	1.28	150	1.28
50	181	0.958	194	0.958	232	0.958	178	0.958

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

TWO CORE CU PVC NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
PVC insulation
Copper neutral screen
PVC sheath

Product Sheet No. 080-02 A

Conductor Size (mm^2)	Thickness of Insulation (mm)	Neutral Screen		Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
		Physical Area (mm^2)	Nominal No. & Size (mm)			
2.5	0.8	5	24 x 0.53	3.2	15.2 x 11.6	0.28
4	1.0	6	29 x 0.53	3.2	17.2 x 12.5	0.35
6	1.0	7	32 x 0.53	3.2	18.0 x 13.0	0.42
10	1.0	10	47 x 0.53	3.2	20.1 x 14.0	0.56
16	1.0	16	46 x 0.67	3.2	22.2 x 15.2	0.76
25	1.2	26	44 x 0.86	3.2	26.1 x 17.3	1.1
35	1.2	35	44 x 1.01	3.2	28.9 x 18.8	1.4

Issue: September 2012

0.6/1 kV. Made to AS/NZS 4961

Product Sheet No. 080-02 A (with Pilot)

Conductor Size (mm^2)	Thickness of Insulation (mm)	Neutral Screen		Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
		Physical Area (mm^2)	Nominal No. & Size (mm)			
2 x 16 + 4P	1.0	16	46 x 0.67	3.2	23.3	0.92

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

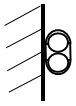
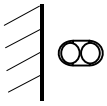
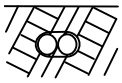
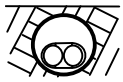
Notes:

1. Conductors are circular stranded.
2. Standard colours: Insulation – Red, White, Orange (pilot); Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Only Neutral Screen cable with a 3.2 mm sheath can be direct buried in accordance with AS/NZS 3000 without further mechanical protection.

TWO CORE CU PVC NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
PVC insulation
Copper neutral screen
PVC sheath
Current ratings (A) and voltage drops (mV/A.m) *

Product Sheet No. 080-02 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/Am)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	25	15.6	26	15.6	28	15.6	28	15.6
4	33	9.71	35	9.71	36	9.71	36	9.71
6	42	6.49	46	6.49	46	6.49	46	6.49
10	58	3.86	62	3.86	61	3.86	61	3.86
16	78	2.43	82	2.43	106	2.43	80	2.43
25	104	1.54	111	1.54	138	1.54	103	1.54
35	128	1.11	137	1.11	165	1.11	125	1.11

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

* This table relates to two and three phase operation - for single phase operation Product Sheet 080-01B is applicable

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30 °C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

THREE CORE CU PVC NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
PVC insulation
Copper neutral screen
PVC sheath

Product Sheet No. 080-03 A

Conductor Size (mm^2)	Thickness of Insulation (mm)	Neutral Screen		Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
		Physical Area (mm^2)	Nominal No. & Size (mm)			
2.5	0.8	7	30 x 0.53	3.2	16.0	0.36
4	1.0	8	37 x 0.53	3.2	18.1	0.47
6	1.0	9	42 x 0.53	3.2	19.1	0.56
10	1.0	11	48 x 0.53	3.2	21.0	0.74
16	1.0	16	46 x 0.67	3.2	23.6	1.01

Issue: September 2012

0.6/1 kV. Made to AS/NZS 4961

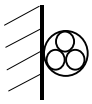
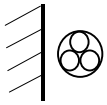
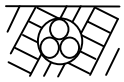
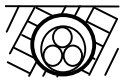
Notes:

1. Conductors are circular stranded.
2. Standard Colours: Insulation - Red, White, Blue; Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Only Neutral Screen cable with a 3.2 mm sheath can be direct buried in accordance with AS/NZS 3000 without further mechanical protection.

THREE CORE CU PVC NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
PVC insulation
Copper neutral screen
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 080-03 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	25	15.6	26	15.6	28	15.6	28	15.6
4	33	9.71	35	9.71	36	9.71	36	9.71
6	42	6.49	46	6.49	46	6.49	46	6.49
10	58	3.86	62	3.86	61	3.86	61	3.86
16	78	2.43	82	2.43	106	2.43	80	2.43

Issue: September 2012

0.6/1 kV. Made to AS/NZS 4961

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

FOUR CORE CU PVC NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
PVC insulation
Copper neutral screen
PVC sheath

Product Sheet No. 080-04 A

Conductor Size (mm^2)	Thickness of Insulation (mm)	Neutral Screen		Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
		Physical Area (mm^2)	Nominal No. & Size (mm)			
2.5	0.8	8	34 x 0.53	3.2	17.0	0.41
4	1.0	9	42 x 0.53	3.2	19.3	0.55
6	1.0	10	46 x 0.53	3.2	20.6	0.66
10	1.0	12	54 x 0.53	3.2	22.6	0.88
16	1.0	17	47 x 0.67	3.2	25.4	1.22

Issue: September 2012

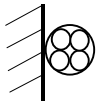
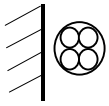
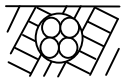
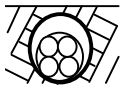
0.6/1 kV. Made to AS/NZS 4961

Notes:
1. Circular stranded conductor.
2. Standard colours: Insulation - Red, White, Blue, Black; Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Only Neutral Screen cable with a 3.2 mm sheath can be direct buried in accordance with AS/NZS 3000 without further mechanical protection.

FOUR CORE CU PVC NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
PVC insulation
Copper neutral screen
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 080-04 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	25	15.6	26	15.6	28	15.6	28	15.6
4	33	9.71	35	9.71	36	9.71	36	9.71
6	42	6.49	46	6.49	46	6.49	46	6.49
10	58	3.86	62	3.86	61	3.86	61	3.86
16	78	2.43	82	2.43	106	2.43	80	2.43

Issue: September 2012

0.6/1 kV. Made to AS/NZS 4961

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

THREE CORE CU XLPE NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
XLPE insulation
Copper neutral screen
PVC sheath

Product Sheet No. 081-03 A

Conductor Size	Thickness of Insulation	Neutral Screen		Thickness of Sheath	Nominal Overall Diameter	Linear Mass
		Physical Area	Nominal No. & Size			
(mm^2)	(mm)	(mm^2)	(mm)	(mm)	(mm)	(kg/m)
16*	0.7	16	46 x 0.67	3.2	23.0	0.97
25*	0.9	26	44 x 0.86	3.2	25.6	1.3
35	0.9	35	44 x 1.01	3.2	26.0	1.7
50	1.0	48	48 x 1.13	3.2	29.0	2.2
70	1.1	68	47 x 1.36	3.2	33.1	3.1
95	1.1	95	42 x 1.70	3.2	37.0	4.1

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

Product Sheet No. 081-03 A (with Pilot)

Conductor Size	Thickness of Insulation	Neutral Screen		Thickness of Sheath	Nominal Overall Diameter	Linear Mass
		Physical Area	Nominal No. & Size			
(mm^2)	(mm)	(mm^2)	(mm)	(mm)	(mm)	(kg/m)
3 x 16 + 4P	0.7	17	48 x 0.67	3.2	24.8	1.1

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

* Circular stranded conductor

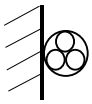
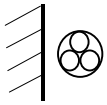
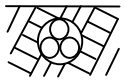
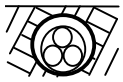
Notes:

1. Conductors 35 mm^2 and above are shaped stranded.
2. Standard colours: Insulation - Red, White, Blue, Orange (pilot); Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Only Neutral Screen cable with a 3.2 mm sheath can be direct buried in accordance with AS/NZS 3000 without further mechanical protection.

THREE CORE CU XLPE NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
XLPE insulation
Copper neutral screen
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 081-03 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
16	91	2.55	97	2.55	118	2.55	87	2.55
25	122	1.61	131	1.61	153	1.61	114	1.61
35	151	1.17	162	1.17	184	1.17	139	1.17
50	185	0.868	198	0.868	218	0.868	166	0.868
70	234	0.609	252	0.609	269	0.609	207	0.609
95	289	0.450	311	0.450	323	0.450	249	0.450

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

FOUR CORE CU XLPE NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
XLPE insulation
Copper neutral screen
PVC sheath

Product Sheet No. 081-04 A						
Conductor Size	Thickness of Insulation	Neutral Screen		Thickness of Sheath	Nominal Overall Diameter	Linear Mass
		Physical Area	Nominal No. & Size			
(mm^2)	(mm)	(mm^2)	(mm)	(mm)	(mm)	(kg/m)
16#	0.7	16	46 x 0.67	3.2	24.1	1.1
25*	0.9	26	44 x 0.86	3.2	28.0	1.6
35	0.9	35	44 x 1.01	3.2	29.4	2.1
50	1.0	48	48 x 1.13	3.2	32.3	2.7
70	1.1	68	47 x 1.36	3.2	36.7	3.8
95	1.1	94	65 x 1.36	3.2	40.3	5.2
Issue: January 2012 0.6/1 kV. Made to AS/NZS 4961						

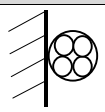
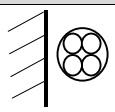
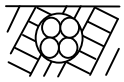
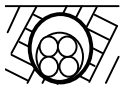
Circular stranded conductor
* Circular compacted conductor

Notes:
1. Conductors 35 mm^2 and above are shaped stranded.
2. Standard colours: Insulation - Red, White, Blue, Black; Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Only Neutral Screen cable with a 3.2 mm sheath can be direct buried in accordance with AS/NZS 3000 without further mechanical protection.

FOUR CORE CU XLPE NEUTRAL SCREEN CABLES

Circular construction
Copper conductor
XLPE insulation
Copper neutral screen
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 081-04 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
16	91	2.55	97	2.55	118	2.55	87	2.55
25	122	1.61	131	1.61	153	1.61	114	1.61
35	151	1.17	162	1.17	184	1.17	139	1.17
50	185	0.868	198	0.868	218	0.868	166	0.868
70	234	0.609	252	0.609	269	0.609	207	0.609
95	289	0.450	311	0.450	323	0.450	249	0.450

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

SINGLE CORE AL XLPE NEUTRAL SCREEN CABLES

Circular construction
Aluminium conductor
XLPE insulation
Copper neutral screen
PVC sheath

Product Sheet No. 082-01 A

Conductor Size	Thickness of Insulation	Neutral Screen		Thickness of Sheath	Nominal Overall Diameter	Linear Mass
		Physical Area	Nominal No. & Size			
(mm^2)	(mm)	(mm^2)	(mm)	(mm)	(mm)	(kg/m)
70	1.1	41	28 x 1.36	3.2	21.5	0.87
95	1.1	57	25 x 1.70	3.2	23.9	1.1
120	1.2	71	22 x 2.03	3.2	26.1	1.4
185	1.6	110	22 x 2.52	3.2	31.1	2.0

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

Product Sheet No. 082-01 A (with Pilot)

Conductor Size	Thickness of Insulation	Neutral Screen		Thickness of Sheath	Nominal Overall Diameter	Linear Mass
		Physical Area	Nominal No. & Size			
(mm^2)	(mm)	(mm^2)	(mm)	(mm)	(mm)	(kg/m)
70 + 4P	1.1	42	29 x 1.36	3.2	28.6 x 21.2	1.1

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

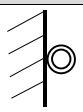
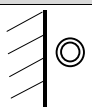
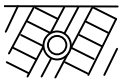
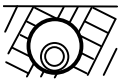
Notes:

1. Conductors are compacted stranded.
2. Standard colours: Insulation - Red, Orange (pilot); Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Only Neutral Screen cable with a 3.2 mm sheath can be direct buried in accordance with AS/NZS 3000 without further mechanical protection.

SINGLE CORE AL XLPE NEUTRAL SCREEN CABLES

Circular construction
Aluminium conductor
XLPE insulation
Copper neutral screen
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 082-01 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
70	213	1.15	229	1.15	249	1.15	189	1.15
95	263	0.835	283	0.835	299	0.835	231	0.835
120	307	0.666	329	0.666	341	0.666	264	0.666
185	406	0.448	436	0.448	433	0.448	345	0.448

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

THREE CORE AL XLPE NEUTRAL SCREEN CABLES

Circular construction
Aluminium conductor
XLPE insulation
Copper neutral screen
PVC sheath

Product Sheet No. 082-03 A

Conductor Size	Thickness of Insulation	Neutral Screen		Thickness of Sheath	Nominal Overall Diameter	Linear Mass
		Physical Area	Nominal No. & Size			
(mm^2)	(mm)	(mm^2)	(mm)	(mm)	(mm)	(kg/m)
35*	0.9	26	44 x 0.86	3.2	28.1	1.0
50*	1.0	29	50 x 0.86	3.2	31.0	1.2
70	1.1	42	52 x 1.01	3.2	32.4	1.6
95	1.1	57	57 x 1.13	3.2	35.9	2.0
185	1.6	116	50 x 1.70	3.2	47.0	3.7

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

Product Sheet No. 082-03 A (With Pilot)

Conductor Size	Thickness of Insulation	Neutral Screen		Thickness of Sheath	Nominal Overall Diameter	Linear Mass
		Physical Area	Nominal No. & Size			
(mm^2)	(mm)	(mm^2)	(mm)	(mm)	(mm)	(kg/m)
95 + 10P	1.1	57	57 x 1.13	3.2	39.0	2.2
120 + 10P	1.2	73	50 x 1.36	3.2	39.6	2.5
185 + 10P	1.6	114	50 x 1.70	3.2	48.0	3.7
300 + 10P	1.8	185	57 x 2.03	3.2	57.4	5.6

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

* Circular compacted conductor

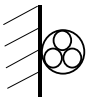
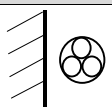
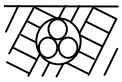
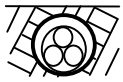
Notes:

1. Conductors 70 mm² and above are shaped stranded conductor.
2. Standard colours: Insulation - Red, White, Blue; Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Only Neutral Screen cable with a 3.2 mm sheath can be direct buried in accordance with AS/NZS 3000 without further mechanical protection.

THREE CORE AL XLPE NEUTRAL SCREEN CABLES

Circular construction
Aluminium conductor
XLPE insulation
Copper neutral screen
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 082-03 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
35	117	1.93	125	1.93	142	1.93	108	1.93
50	143	1.43	154	1.43	170	1.43	128	1.43
70	182	0.993	196	0.993	209	0.993	161	0.993
95	224	0.723	242	0.723	250	0.723	194	0.723
120	262	0.577	282	0.577	286	0.577	225	0.577
185	347	0.388	374	0.388	364	0.388	291	0.388
300	475	0.258	514	0.258	477	0.258	391	0.258

Issue: January 2012

0.6/1 kV. Made to AS/NZS 4961

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

SINGLE CORE CU VINTOL CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath

Product Sheet No. 110-01 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
4	1.0	1.4	7.7	0.10
16	1.0	1.4	10.0	0.23
25	1.2	1.4	11.8	0.35
35	1.2	1.4	13.0	0.45
50	1.4	1.4	14.6	0.57
70	1.4	1.4	16.4	0.82
Issue: January 2012 0.6/1 kV. Made to AS/NZS 5000.1				

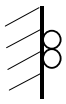
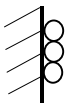
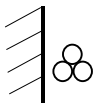
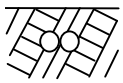
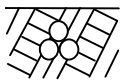
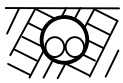
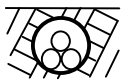
Notes:

1. Conductors are circular stranded.
2. Standard colours: Insulation - Natural; Sheath – Red, White, Blue, Black.

SINGLE CORE CU VINTOL CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 110-01 B

Conductor Size														
(mm2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
4	35	11.2	35	9.71	38	9.71	56	11.2	40	9.71	45	11.2	40	9.71
16	82	2.81	82	2.43	88	2.43	134	2.81	114	2.43	98	2.81	86	2.43
25	111	1.78	111	1.55	117	1.54	174	1.78	147	1.54	128	1.78	110	1.54
35	136	1.29	136	1.12	145	1.12	209	1.29	176	1.12	153	1.29	134	1.12
50	166	0.963	166	0.840	178	0.834	248	0.963	209	0.834	185	0.963	158	0.834
70	210	0.680	210	0.597	225	0.589	305	0.680	256	0.589	227	0.680	198	0.589

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

SINGLE CORE AL VINTOL CABLES

Circular construction
Aluminium conductor
PVC insulation
PVC sheath

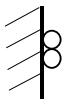
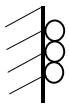
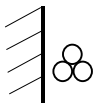
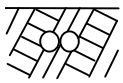
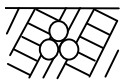
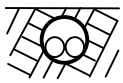
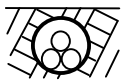
Product Sheet No. 110-01 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
25	1.2	1.4	11.7	0.18
35	1.2	1.4	13.4	0.24
50	1.4	1.4	14.7	0.29
70	1.4	1.4	16.4	0.39
95	1.6	1.5	19.0	0.52
120	1.6	1.5	20.7	0.62
150	1.8	1.6	22.8	0.75
185	2.0	1.7	25.1	0.92
240	2.2	1.8	26.8	1.1
Issue: January 2012 0.6/1 kV. Made to AS/NZS 5000.1				

Notes:
1. Conductors are circular stranded.
2. Standard colours: Insulation - Natural; Sheath – Red, White, Blue, Black.

SINGLE CORE AL VINTOL CABLES

Circular construction
Aluminium conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 110-01 B

Conductor Size														
($mm^{2)}$	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
25	86	2.95	86	2.55	91	2.55	135	2.95	114	2.55	99	2.95	86	2.55
35	105	2.14	105	1.85	112	1.85	162	2.14	136	1.85	119	2.14	103	1.85
50	129	1.58	129	1.37	138	1.37	191	1.58	162	1.37	143	1.58	123	1.37
70	163	1.10	163	0.956	174	0.952	237	1.10	199	0.952	176	1.10	154	0.952
95	203	0.804	203	0.702	218	0.696	283	0.811	238	0.696	215	0.811	185	0.696
120	237	0.645	237	0.565	254	0.558	323	0.653	272	0.558	245	0.653	216	0.558
150	272	0.535	272	0.472	292	0.463	362	0.545	304	0.463	281	0.545	242	0.463
185	318	0.439	317	0.391	341	0.380	411	0.452	344	0.380	320	0.452	278	0.380
240	381	0.352	381	0.319	408	0.305	477	0.368	400	0.305	376	0.368	325	0.305

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

SINGLE CORE CU CANTOL CABLES

Circular construction
Copper conductor
XLPE insulation
PVC sheath

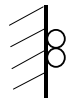
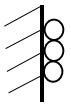
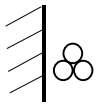
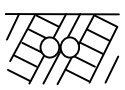
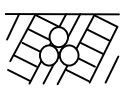
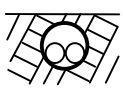
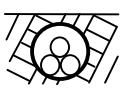
Product Sheet No. 120-01 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
16	0.7	1.4	9.4	0.21
25	0.9	1.4	10.9	0.31
35	0.9	1.4	11.9	0.41
50	1.0	1.4	13.4	0.54
70	1.1	1.4	15.0	0.75
95	1.1	1.5	16.9	1.0
120	1.2	1.5	18.6	1.3
150	1.4	1.6	20.6	1.6
185	1.6	1.6	22.8	1.9
240	1.7	1.7	25.5	2.5
300	1.8	1.8	28.1	3.1
400	2.0	1.9	31.8	4.0
500	2.2	2.0	35.7	5.0
630	2.4	2.2	40.1	6.4
Issue: January 2012 0.6/1 kV. Made to AS/NZS 5000.1				

Notes:
1. Conductors are compact circular stranded.
2. Standard colours: Insulation - Natural; Sheath - Black. Other colours can be supplied if required.
3. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE CU CANTOL CABLES

Circular construction
Copper conductor
XLPE insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 120-01 B

Conductor Size														
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
16	95	2.95	95	2.55	101	2.55	149	2.95	125	2.55	107	2.95	925	2.55
25	129	1.87	129	1.62	138	1.62	192	1.87	162	1.62	140	1.87	121	1.62
35	158	1.35	158	1.18	169	1.17	230	1.35	193	1.17	168	1.35	147	1.17
50	194	1.01	194	0.878	207	0.872	273	1.01	229	0.872	202	1.01	174	0.872
70	246	0.710	246	0.623	264	0.615	335	0.710	280	0.615	249	0.710	217	0.615
95	306	0.528	306	0.467	328	0.457	401	0.528	335	0.457	305	0.528	261	0.457
120	358	0.431	358	0.385	384	0.373	457	0.431	381	0.373	348	0.431	304	0.373
150	413	0.365	413	0.330	443	0.316	514	0.365	428	0.316	391	0.365	342	0.316
185	480	0.311	479	0.285	515	0.269	581	0.311	484	0.269	453	0.311	388	0.269
240	574	0.262	573	0.245	616	0.227	674	0.262	560	0.227	532	0.262	456	0.227
300	666	0.233	662	0.222	713	0.202	761	0.233	630	0.202	601	0.233	525	0.202
400	779	0.211	772	0.205	832	0.183	865	0.211	715	0.183	699	0.211	596	0.183
500	903	0.196	893	0.193	961	0.170	977	0.196	805	0.170	791	0.196	693	0.170
630	1045	0.184	1032	0.182	1111	0.159	1098	0.184	902	0.159	916	0.184	778	0.159

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

SINGLE CORE AL CANTOL CABLES

Circular construction
Aluminium conductor
XLPE insulation
PVC sheath

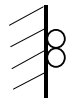
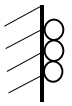
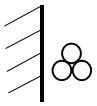
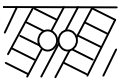
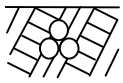
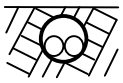
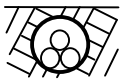
Product Sheets No. 130-01 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
25	0.9	1.4	10.9	0.15
35	0.9	1.4	11.8	0.18
50	1.0	1.4	13.3	0.24
70	1.1	1.4	15.0	0.32
95	1.1	1.5	16.9	0.42
120	1.2	1.5	18.5	0.51
150	1.4	1.6	20.6	0.62
185	1.6	1.6	22.7	0.76
240	1.7	1.7	25.5	0.97
300	1.8	1.8	27.9	1.2
400	2.0	1.9	31.3	1.5
500	2.2	2.0	35.0	1.9
630	2.4	2.2	39.4	2.4
800	2.6	2.3	44.7	3.0
Issue: January 2012 0.6/1 kV. Made to AS/NZS 5000.1				

Notes:
1. Conductors are compact circular stranded.
2. Standard colours: Insulation - Natural; Sheath - Black. Other colours can be supplied if required.
3. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE AL CANTOL CABLES

Circular construction
Aluminium conductor
XLPE insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 130-01 B

Conductor Size														
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
25	100	3.08	100	2.67	107	2.67	149	3.08	125	2.67	109	3.08	93	2.67
35	122	2.24	122	1.94	131	1.94	179	2.24	150	1.94	131	2.24	113	1.94
50	150	1.65	150	1.44	161	1.43	212	1.65	178	1.43	157	1.65	135	1.43
70	191	1.15	191	1.00	205	0.997	260	1.15	217	0.997	194	1.15	169	0.997
95	238	0.840	238	0.733	255	0.727	311	0.840	260	0.727	236	0.840	203	0.727
120	278	0.672	278	0.589	298	0.582	355	0.672	296	0.582	270	0.672	236	0.582
150	320	0.557	320	0.491	344	0.482	398	0.557	332	0.482	303	0.557	266	0.482
185	374	0.455	373	0.404	402	0.394	453	0.455	377	0.394	352	0.455	303	0.394
240	449	0.363	448	0.327	482	0.314	526	0.363	438	0.314	415	0.363	356	0.314
300	520	0.307	519	0.281	559	0.266	595	0.307	495	0.266	471	0.307	412	0.266
400	615	0.261	613	0.243	659	0.226	683	0.261	567	0.226	552	0.261	473	0.226
500	722	0.228	717	0.216	773	0.197	780	0.228	646	0.197	631	0.228	556	0.197
630	849	0.204	842	0.198	906	0.177	891	0.204	736	0.177	744	0.204	635	0.177
800	-	-	964	0.182	1037	0.161	-	-	825	0.161	-	-	706	0.161

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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(Does not include 800mm²)

The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

TWO CORE & EARTH CU REMOLEX CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath

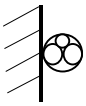
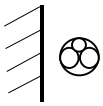
Product Sheet No. 021-02 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
1.5*	0.6	1.2	8.8	0.12
2.5	0.7	1.2	9.7	0.16
4 (2.5)	0.8	1.3	11.3	0.21
6 (2.5)	0.8	1.3	12.2	0.26
10 (4)	1.0	1.3	16.1	0.44
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

* 3 wire conductor

Notes:
1. Conductors 2.5 mm^2 and above are circular stranded.
2. Standard colours: Insulation - Red, Black, Green/Yellow (earth); Sheath – Black.
3. Reduced earth size shown in brackets ( ).
4. Subject to confirmation, similar cables can be manufactured to other specifications.

TWO CORE & EARTH CU REMOLEX CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 021-02 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.5	21	33.0	22	33.0
2.5	30	18.0	31	18.0
4	39	11.2	42	11.2
6	50	7.50	52	7.50
10	68	4.46	73	4.46
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

THREE CORE & EARTH CU REMOLEX CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath

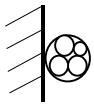
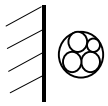
Product Sheet No. 021-03 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
1.5*	0.6	1.2	9.6	0.15
2.5	0.7	1.3	10.8	0.20
4 (2.5)	0.8	1.3	12.4	0.27
6 (2.5)	0.8	1.3	13.5	0.34
10 (4)	1.0	1.4	16.6	0.54
16 (6)	1.0	1.5	19.0	0.76
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

* 3 wire conductor

Notes:
1. Conductors 2.5 mm^2 and above are circular stranded.
2. Standard colours: Insulation - Red, White, Blue, Green/Yellow (earth); Sheath - Black.
3. Reduced earth size shown in brackets ( ).
4. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE & EARTH CU REMOLEX CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 021-03 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.5	17	28.6	18	28.6
2.5	25	15.6	26	15.6
4	33	9.71	35	9.71
6	42	6.49	46	6.49
10	58	3.86	62	3.86
16	78	2.43	82	2.43
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

FOUR CORE & EARTH CU REMOLEX CABLES

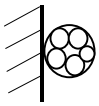
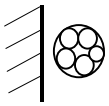
Circular construction
Copper conductor
PVC insulation
PVC sheath

Product Sheet No. 021-04 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
1.5	0.6	1.2	10.4	0.17
2.5	0.7	1.3	11.8	0.24
4 (2.5)	0.8	1.4	13.9	0.34
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Notes:
1. Conductors 2.5 mm^2 and above are circular stranded.
2. Standard colours: Insulation - Red, White, Blue, Black, Green/Yellow (earth); Sheath – Black.
3. Reduced earth size shown in brackets ( ).
4. Subject to confirmation, similar cables can be manufactured to other specifications.

FOUR CORE & EARTH CU REMOLEX CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 021-04 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.5	17	28.6	18	28.6
2.5	25	15.6	26	15.6
4	33	9.71	35	9.71
Issue: January 2012 450/750 V. Made to AS/NZS 5000.2				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

THREE CORE & EARTH CU CEMPEX CABLES

Circular construction
Copper conductor
XLPE insulation
PVC sheath

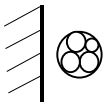
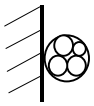
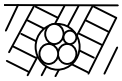
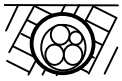
Product Sheet No. 161-03 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
4 (2.5)	0.7 (0.7)	1.8	13.3	0.28
6 (2.5)	0.7 (0.7)	1.8	14.2	0.35
10 (4)	0.7 (0.7)	1.8	16.3	0.52
16 (6)	0.7 (0.7)	1.8	18.6	0.71
25 (6)	0.9 (0.7)	1.8	21.5	1.0
35 (10)	0.9 (0.7)	1.8	24.1	1.4
50 (16)	1.0 (0.7)	1.8	27.2	1.8
70 (25)	1.1 (0.9)	1.9	31.2	2.6
95 (25)	1.1 (0.9)	2.0	35.6	3.4
Issue: January 2012 0.6/1 kV. Made to AS/NZS 5000.1				

Notes:
1. Conductors are circular stranded, sizes 16 mm^2 and above are compacted.
2. Standard colours: Insulation - Red, White, Blue, Green/Yellow (earth); Sheath – Black.
3. Earth size and insulation thickness shown in brackets ( ).
4. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE & EARTH CU CEMPEX CABLES

Circular construction
Copper conductor
XLPE insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 161-03 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
4	42	10.2	39	10.2	40	10.2	40	10.2
6	53	6.80	50	6.80	49	6.80	49	6.80
10	73	4.05	68	4.05	67	4.05	67	4.05
16	97	2.55	91	2.55	118	2.55	87	2.55
25	131	1.61	122	1.61	153	1.61	114	1.61
35	162	1.17	151	1.17	184	1.17	139	1.17
50	198	0.868	185	0.868	218	0.868	166	0.868
70	252	0.609	234	0.609	269	0.609	207	0.609
95	311	0.450	289	0.450	323	0.450	249	0.450

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

FOUR CORE & EARTH CU CEMPEX CABLES

Circular construction
Copper conductor
XLPE insulation
PVC sheath

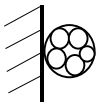
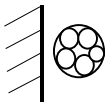
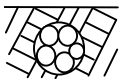
Product Sheet No. 161-04 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
2.5	0.7	1.8	14.5	0.30
4 (2.5)	0.7 (0.7)	1.8	15.6	0.37
6 (2.5)	0.7 (0.7)	1.8	15.7	0.43
10 (4)	0.7 (0.7)	1.8	19.2	0.66
16 (6)	0.7 (0.7)	1.8	20.5	0.90
25 (6)	0.9 (0.7)	1.8	23.9	1.3
35 (10)	0.9 (0.7)	1.8	26.6	1.7
50 (16)	1.0 (0.7)	1.8	30.3	2.3
70 (25)	1.1 (0.9)	2.0	34.9	3.3
95 (25)	1.1 (0.9)	2.1	39.0	4.4
Issue: January 2012 0.6/1 kV. Made to AS/NZS 5000.1				

Notes:
1. Conductors are circular stranded, sizes 16 mm^2 and above are compacted.
2. Standard colours: Insulation - Red, White, Blue, Black, Green/Yellow (earth); Sheath – Black.
3. Earth size and insulation thickness shown in brackets ( ).
4. Subject to confirmation, similar cables can be manufactured to other specifications.

FOUR CORE & EARTH CU CEMPEX CABLES

Circular construction
Copper conductor
XLPE insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 161-04 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	29	16.4	31	16.4	31	16.4	31	16.4
4	39	10.2	42	10.2	40	10.2	40	10.2
6	50	6.80	53	6.80	49	6.80	49	6.80
10	68	4.05	73	4.05	67	4.05	67	4.05
16	91	2.55	97	2.55	118	2.55	87	2.55
25	122	1.61	131	1.61	153	1.61	114	1.61
35	151	1.17	162	1.17	184	1.17	139	1.17
50	185	0.868	198	0.868	218	0.868	166	0.868
70	234	0.609	252	0.609	269	0.609	207	0.609
95	289	0.450	311	0.450	323	0.450	249	0.450

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

TWO CORE CU PVC ARMOURED MAINS CABLES

Circular construction
Copper conductor
PVC insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath

Product Sheet No. 140-02 A

Conductor Size	Thickness of		Armour Wire Size	Thickness of Sheath	Nominal Diameters		Linear Mass
	Insulation	Bedding			Bedding	Overall	
(mm^2)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg/m)
2.5*	0.8	1.0	0.9	1.8	9.6	14.9	0.43
4*	1.0	1.0	0.9	1.8	11.5	17.1	0.58
6*	1.0	1.0	1.25	1.8	12.6	18.9	0.74

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

* Circular stranded conductor

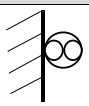
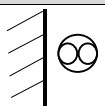
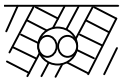
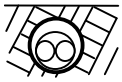
Notes:

1. Standard Colours: Insulation – Red, Black; Sheath – Black.
2. Subject to confirmation, similar cables can be manufactured to other specifications.

TWO CORE CU PVC ARMOURED MAINS CABLES

Circular construction
Copper conductor
PVC insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 140-02 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	30	18.0	31	18.0	33	18.0	33	18.0
4	39	11.2	42	11.2	43	11.2	43	11.2
6	50	7.50	52	7.50	55	7.50	55	7.50

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

THREE CORE CU PVC ARMOURED MAINS CABLES

Circular construction
Copper conductor
PVC insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath

Product Sheet No. 140-03 A

Conductor Size	Thickness of		Armour Wire Size	Thickness of Sheath	Nominal Diameters		Linear Mass
	Insulation	Bedding			Bedding	Overall	
(mm^2)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg/m)
2.5*	0.8	1.0	0.9	1.8	10.2	15.8	0.48
4*	1.0	1.0	1.25	1.8	12.2	18.5	0.71
6*	1.0	1.0	1.25	1.8	13.4	19.7	0.83
10*	1.0	1.0	1.25	1.8	15.3	21.6	1.0
16*	1.0	1.0	1.25	1.8	17.5	23.8	1.3
25^	1.2	1.0	1.6	1.8	19.0	26.0	1.8

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

* Circular stranded conductor

^ Shaped stranded conductor

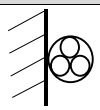
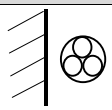
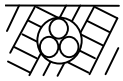
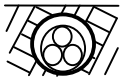
Notes:

1. Standard Colours: Insulation – Red, White, Blue; Sheath – Black.
2. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE CU PVC ARMOURED MAINS CABLES

Circular construction
Copper conductor
PVC insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 140-03 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	25	15.6	26	15.6	28	15.6	28	15.6
4	33	9.71	35	9.71	36	9.71	36	9.71
6	42	6.49	46	6.49	46	6.49	46	6.49
10	58	3.86	62	3.86	61	3.86	61	3.86
16	78	2.43	82	2.43	106	2.43	80	2.43
25	104	1.54	111	1.54	138	1.54	103	1.54

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

FOUR CORE CU PVC ARMOURED MAINS CABLES

Circular construction
Copper conductor
PVC insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath

Product Sheet No. 140-04 A

Conductor Size	Thickness of		Armour Wire Size	Thickness of Sheath	Nominal Diameters		Linear Mass
	Insulation	Bedding			Bedding	Overall	
(mm^2)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg/m)
2.5*	0.8	1.0	0.9	1.8	11.2	16.7	0.54
4*	1.0	1.0	1.25	1.8	13.5	19.7	0.81
6*	1.0	1.0	1.25	1.8	14.8	21.1	0.96
10*	1.0	1.0	1.25	1.8	16.9	23.2	1.2

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

* Circular stranded conductor

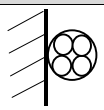
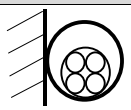
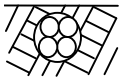
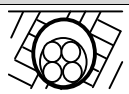
Notes:

1. Standard Colours: Insulation – Red, White, Blue, Black; Sheath – Black.
2. Subject to confirmation, similar cables can be manufactured to other specifications.

FOUR CORE CU PVC ARMOURED MAINS CABLES

Circular construction
Copper conductor
PVC insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 140-04 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	25	15.6	23	15.6	28	15.6	28	15.6
4	33	9.71	29	9.71	36	9.71	36	9.71
6	42	6.49	38	6.49	46	6.49	46	6.49
10	58	3.86	50	3.86	61	3.86	61	3.86

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

FOUR CORE CU XLPE ARMOURED MAINS CABLES

Circular construction
Copper conductor
XLPE insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath

Product Sheet No. 160-04 A

Conductor Size	Thickness of		Armour Wire Size	Thickness of Sheath	Nominal Diameters		Linear Mass
	Insulation	Bedding			Bedding	Overall	
(mm^2)	(mm)	(mm)	(mm)	(mm)	(mm)	(mm)	(kg/m)
16*	0.7	1.0	1.25	1.8	17.9	24.2	1.4
25^	0.9	1.0	1.6	1.8	21.3	28.3	2.0
35^	0.9	1.0	1.6	1.9	22.7	29.9	2.5
50	1.0	1.0	1.6	2.0	25.6	33.0	3.1
70	1.1	1.2	2.0	2.2	29.7	38.3	4.4
95	1.1	1.2	2.0	2.3	33.4	42.3	5.6
120	1.2	1.4	2.5	2.5	37.2	47.5	7.2
150	1.4	1.4	2.5	2.6	43.7	54.1	8.9
185	1.6	1.4	2.5	2.8	46.7	57.6	11
240	1.7	1.6	2.5	3.0	52.2	63.5	13
300	1.8	1.6	2.5	3.2	57.5	69.2	16
400	2.0	1.8	3.15	3.5	65.0	78.5	21

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

* Circular stranded conductor

^ Shaped stranded conductor

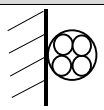
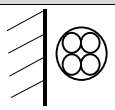
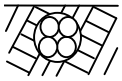
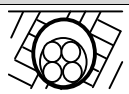
Notes:

1. Conductors 50 mm^2 and above are shaped stranded.
2. Standard Colours: Insulation – Red, White, Blue, Black; Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.

FOUR CORE CU XLPE ARMOURED MAINS CABLES

Circular construction
Copper conductor
XLPE insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 160-04 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
16	91	2.55	97	2.55	118	2.55	87	2.55
25	122	1.61	131	1.61	153	1.61	114	1.61
35	151	1.17	162	1.17	184	1.17	139	1.17
50	185	0.868	198	0.868	218	0.868	166	0.868
70	234	0.609	252	0.609	269	0.609	207	0.609
95	289	0.450	311	0.450	323	0.450	249	0.450
120	337	0.366	363	0.366	368	0.366	289	0.366
150	385	0.307	415	0.307	412	0.307	325	0.307
185	444	0.259	480	0.259	465	0.259	372	0.259
240	527	0.216	569	0.216	539	0.216	440	0.216
300	604	0.190	653	0.190	607	0.190	495	0.190
400	695	0.171	754	0.171	685	0.171	561	0.171

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Note:
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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

MULTICORE CONTROL CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath

Product Sheet No. 050-01 A

Number of Cores	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
1.5mm^2 (3W) Conductor Size				
2	0.6	1.2	8.5	0.11
3	0.6	1.2	8.9	0.12
4	0.6	1.2	9.7	0.15
7	0.6	1.3	11.7	0.23
12	0.6	1.4	15.3	0.38
19	0.6	1.5	18.1	0.56
27	0.6	1.6	22.0	0.75
37	0.6	1.6	24.6	0.99
2.5mm^2 (7W) Conductor Size				
2	0.7	1.2	9.6	0.14
3	0.7	1.2	10.2	0.17
4	0.7	1.3	11.3	0.21
7	0.7	1.3	13.3	0.32
12	0.7	1.5	17.9	0.55
19	0.7	1.6	21.1	0.80
27	0.7	1.7	25.7	1.07
37	0.7	1.8	28.9	1.43

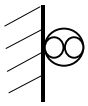
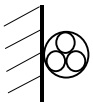
Issue: January 2012

450/750 V. Made to AS/NZS 5000.3

Notes:
1. Other core configurations can be supplied if required.
2. Core identification is by the means of numbers.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Multicore Control Cables can also be manufactured with a Green/Yellow earth.

MULTICORE CONTROL CABLES

Circular construction
Copper conductor
PVC insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 050-01 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.5	21	33.0	17	28.6
2.5	30	18.0	25	15.6
Issue: January 2012 450/750 V. Made to NZS 5000.3				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

Multi Circuit Operation

The current ratings given above are single circuit ratings, i.e, they relate to a single set of 2 or 3 loaded conductors. Whilst these cables are not intended for use as power cables, if they are to be operated with more than one set of conductors loaded for significant periods, the ratings given above should be reduced by application of an appropriate rating factor from the following table:

Rating Factors for No. of Circuits												
No. of circuits	2	3	4	5	6	8	10	12	14	16	18	20 or more
Rating factor	0.80	0.70	0.65	0.60	0.57	0.52	0.48	0.45	0.43	0.41	0.39	0.38

A cable consisting of *n* loaded conductors should be considered as *n/2* circuits of two loaded conductors or *n/3* circuits of three loaded conductors as applicable.

MULTICORE ARMOURED CONTROL

Circular construction
Copper conductor
PVC insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath

Product Sheet No. Cables 060-01 A

Number of Cores	Thickness of		Armour Wire Size	Thickness of Sheath	Nominal Diameters		Linear Mass
	Insulation (mm)	Bedding (mm)	(mm)	(mm)	Bedding (mm)	Overall (mm)	(kg/m)
1.5mm² (3W) Conductor Size							
2	0.6	0.8	0.9	1.4	7.7	12.4	0.32
3	0.6	0.8	0.9	1.4	8.1	12.9	0.33
4	0.6	0.8	0.9	1.4	8.9	13.7	0.38
7	0.6	0.8	0.9	1.4	10.7	15.4	0.49
12	0.6	0.8	1.25	1.5	14.1	19.7	0.85
19	0.6	0.8	1.25	1.6	16.7	22.5	1.1
27	0.6	1.0	1.6	1.7	20.8	27.5	1.6
37	0.6	1.0	1.6	1.8	23.3	30.3	1.9
2.5mm² (7W) Conductor Size							
2	0.7	0.8	0.9	1.4	8.8	13.5	0.36
3	0.7	0.8	0.9	1.4	9.3	14.1	0.41
4	0.7	0.8	0.9	1.4	10.2	15.0	0.47
7	0.7	0.8	1.25	1.5	12.3	18.0	0.73
12	0.7	0.8	1.25	1.6	16.4	22.3	1.1
19	0.7	1.0	1.6	1.7	19.8	26.6	1.6
27	0.7	1.0	1.6	1.8	24.2	31.2	2.1
37	0.7	1.0	1.6	1.9	27.2	34.4	2.5

Issue: January 2012

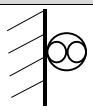
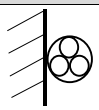
0.6/1 kV. Made to BS 6346

Notes:

1. Other core configurations can be supplied if required.
2. Core identification is by the means of numbers.
3. Subject to confirmation, similar cables can be manufactured to other specifications.
4. Multicore Control Cables can also be manufactured with a Green/Yellow earth.

MULTICORE ARMOURED CONTROL

Circular construction
Copper conductor
PVC insulation
Extruded bedding
Galvanised steel wire armour
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. Cables 060-01 B				
Conductor Size				
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)
1.5	21	33.0	17	28.6
2.5	30	18.0	25	15.6
Issue: January 2012 0.6/1 kV. Made to BS 6346				

Note:
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The values in this table are for typical New Zealand installation conditions of:-
Ambient Air Temperature 30°C

Multi Circuit Operation

The current ratings given above are single circuit ratings, i.e they relate to a single set of 2 or 3 loaded conductors. Whilst these cables are not intended for use as power cables, if they are to be operated with more than one set of conductors loaded for significant periods, the ratings given above should be reduced by application of an appropriate rating factor from the following table:

Rating Factors for No. of Circuits												
No. of circuits	2	3	4	5	6	8	10	12	14	16	18	20 or more
Rating factor	0.80	0.70	0.65	0.60	0.57	0.52	0.48	0.45	0.43	0.41	0.39	0.38

A cable consisting of *n* loaded conductors should be considered as *n/2* circuits of two loaded conductors or *n/3* circuits of three loaded conductors as applicable.

VAROLEX CABLES

Circular construction
Copper conductor
XLPE insulation
PVC bedding
Copper tape
PVC sheath

Product Sheet No. 070-01 A

Conductor Size (mm^2)	Thickness of Insulation (mm)	Combined Earth Size (mm^2)	Nominal Diameter Over Tape (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
2.5*	0.7	2.5*	10.9	14.6	0.32
4	0.7	4.5	13.0	16.6	0.44
6	0.7	4.5	13.8	17.5	0.51
10	0.7	4.5	14.8	18.5	0.62
16	0.8	7.5	17.0	20.6	0.86
25	0.9	12	19.2	22.8	1.2
35	0.9	18	21.9	25.6	1.6
50	1.0	30	25.1	28.8	2.1
70	1.1	30	28.1	32.0	2.8
95	1.1	48	33.9	38.0	3.9
120	1.2	48	38.9	43.2	4.7
150	1.4	75	42.6	47.3	5.9
185	1.6	75	47.5	52.0	7.1
240	1.7	105	53.6	58.9	9.2

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

* Split earth not feasible, therefore a single earth conductor is utilised.

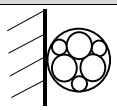
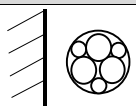
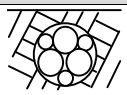
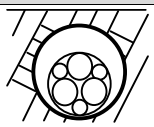
Notes:

1. Conductors are circular stranded.
2. Standard colours: Insulation - Red, White, Blue, Green/Yellow (earth); Sheath – Black.
3. These cables are specifically designed to suit the wide range of requirements of Variable Speed Drives. All features reducing the transmission of electromagnetic interference have been considered: the cable minimises capacitance of the power conductors, has an electrically balanced construction including split earths and has a copper screen.

VAROLEX CABLES

Circular construction
Copper conductor
XLPE insulation
PVC bedding
Copper tape
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 070-01 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
2.5	29	16.4	31	16.4	31	16.4	31	16.4
4	39	10.2	42	10.2	40	10.2	40	10.2
6	50	6.80	53	6.80	49	6.80	49	6.80
10	68	4.05	73	4.05	67	4.05	67	4.05
16	91	2.55	97	2.55	118	2.55	87	2.55
25	122	1.61	131	1.61	153	1.61	114	1.61
35	151	1.17	162	1.17	184	1.17	139	1.17
50	185	0.868	198	0.868	218	0.868	166	0.868
70	234	0.609	252	0.609	269	0.609	207	0.609
95	289	0.450	311	0.450	323	0.450	249	0.450
120	337	0.366	363	0.366	368	0.366	289	0.366
150	385	0.307	415	0.307	412	0.307	325	0.307
185	444	0.259	480	0.259	465	0.259	372	0.259
240	527	0.216	569	0.216	539	0.216	440	0.216

Issue: January 2012

0.6/1 kV. Made to AS/NZS 5000.1

Notes:

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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C	Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m	Soil Temperature	15°C

2. The cable size should be confirmed with the Drive manufacturer before installation due to the possible derating caused by Harmonics.

FOUR CORE AL XLPE URD CABLES

Circular construction
Aluminium conductor
XLPE insulation
PVC sheath

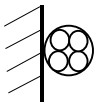
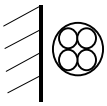
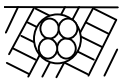
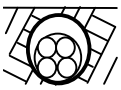
Product Sheet No. 171-04 A				
Conductor Size (mm^2)	Thickness of Insulation (mm)	Thickness of Sheath (mm)	Nominal Overall Diameter (mm)	Linear Mass (kg/m)
50	1.0	1.8	29.1	0.94
70	1.1	2.0	32.0	1.3
95	1.1	2.1	36.6	1.6
120	1.2	2.3	39.8	2.0
185	1.6	2.6	49.6	3.1
240	1.7	2.8	55.3	3.9
300	1.8	3.0	60.2	4.9
Issue: January 2012 0.6/1 kV. Made to AS 4026				

Notes:
1. Conductors 70 mm² and above are shaped stranded.
2. Standard Colours: Insulation – Red, White, Blue, Black; Sheath – Black.
3. Subject to confirmation, similar cables can be manufactured to other specifications.

FOUR CORE AL XLPE URD CABLES

Circular construction
Aluminium conductor
XLPE insulation
PVC sheath
Current ratings (A) and voltage drops (mV/A.m)

Product Sheet No. 171-04 B

Conductor Size								
(mm^2)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)	(A)	(mV/A.m)
50	143	1.43	154	1.43	170	1.43	128	1.43
70	182	0.993	196	0.993	209	0.993	161	0.993
95	224	0.723	242	0.723	250	0.723	194	0.723
120	262	0.577	282	0.577	286	0.577	225	0.577
185	347	0.388	374	0.388	364	0.388	291	0.388
240	413	0.307	446	0.307	423	0.307	345	0.307
300	475	0.258	514	0.258	477	0.258	391	0.258

Issue: January 2012

0.6/1 kV. Made to AS 4026

Note:
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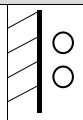
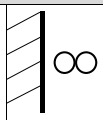
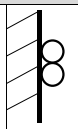
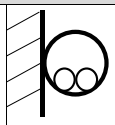
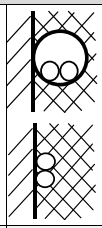
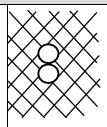
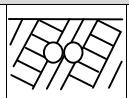
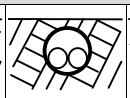
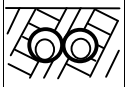
The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Copper conductor
PVC insulation
Unarmoured
Sheathed or unsheathed

Table 3.7 Single Conductor Cu PVC Cables - Single Phase Ratings (A)

Conductor Size (mm^2)									
1	18	18	15	15	13	7	24	20	23
1.5	24	24	18	21	16	9	31	25	29
2.5	34	33	26	27	23	14	43	35	40
4	46	44	35	36	29	18	56	45	52
6	58	56	46	47	38	23	71	57	64
10	79	76	62	62	50	31	94	76	85
16	105	101	82	80	64	41	134	98	109
25	141	136	111	107	86	55	174	128	142
35	174	165	136	128	103	67	209	153	171
50	213	202	166	157	125	-	248	185	205
70	271	254	210	194	155	-	305	227	251
95	336	315	262	242	193	-	365	277	306
120	392	366	304	276	220	-	416	316	348
150	450	418	351	321	257	-	466	362	389
185	523	483	408	365	292	-	528	410	449
240	626	576	488	434	348	-	612	482	519
300	725	663	564	-	-	-	691	546	601
400	848	771	658	-	-	-	784	633	683
500	988	889	762	-	-	-	886	714	793
630	1156	1023	878	-	-	-	994	825	898

Note:

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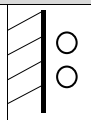
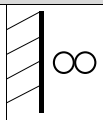
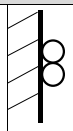
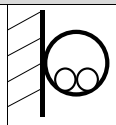
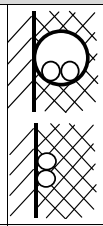
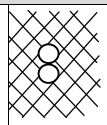
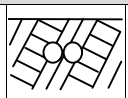
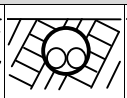
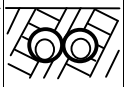
The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C	Soil Thermal Resistivity	1.2 K.m/W
Soil Temperature	15°C	Depth of Burial	0.5 m

CURRENT RATINGS

Aluminium conductor
PVC insulation
Unarmoured
Sheathed or unsheathed

Table 3.8 Single Conductor Al PVC Cables – Single Phase Ratings (A)

Conductor Size (mm^2)									
16	82	79	64	62	49	32	105	76	85
25	109	105	86	83	66	42	135	99	110
35	136	129	105	99	80	52	162	119	132
50	165	156	129	122	98	-	191	143	160
70	210	197	163	150	120	-	237	176	195
95	261	244	203	187	149	-	283	215	237
120	304	284	237	214	171	-	323	245	270
150	350	325	272	250	200	-	362	281	301
185	407	377	318	284	227	-	411	320	349
240	487	449	381	340	271	-	477	376	405
300	564	520	442	-	-	-	540	427	468
400	665	610	520	-	-	-	620	499	536
500	781	711	610	-	-	-	708	572	627
630	921	832	715	-	-	-	811	672	717

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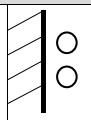
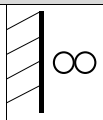
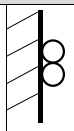
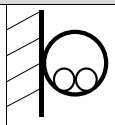
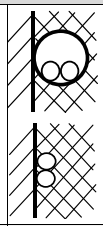
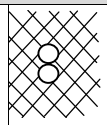
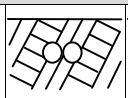
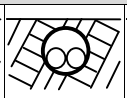
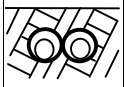
The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Copper conductor
XLPE insulation
Unarmoured
Sheathed or unsheathed

Table 3.9 Single Conductor Cu XLPE Cables – Single Phase Ratings (A)

Conductor Size (mm^2)									
1	22	22	18	18	14	9	21	21	26
1.5	29	28	22	23	18	11	28	28	32
2.5	40	40	31	33	26	15	39	39	44
4	53	52	41	42	33	21	49	49	57
6	67	66	52	52	42	26	62	62	71
10	92	90	72	72	57	35	83	83	93
16	123	119	95	92	74	47	149	107	120
25	166	160	129	124	99	64	192	140	156
35	205	195	158	149	119	79	230	168	187
50	251	238	194	183	146	-	273	202	226
70	320	300	246	224	180	-	335	249	276
95	397	372	306	281	224	-	401	305	331
120	464	432	358	321	256	-	457	348	383
150	535	496	413	362	289	-	514	391	429
185	622	574	480	426	340	-	581	453	495
240	746	684	574	507	406	-	674	532	574
300	866	790	666	-	-	-	761	601	663
400	1015	920	779	-	-	-	865	699	755
500	1186	1063	903	-	-	-	977	791	856
630	1387	1224	1045	-	-	-	1098	916	995

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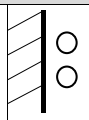
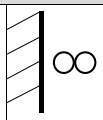
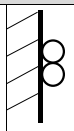
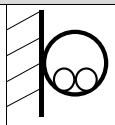
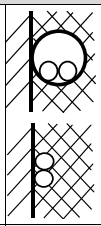
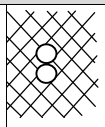
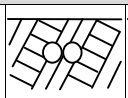
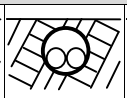
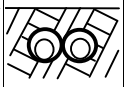
The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C	Soil Thermal Resistivity	1.2 K.m/W
Soil Temperature	15°C	Depth of Burial	0.5 m

CURRENT RATINGS

Aluminium conductor
XLPE insulation
Unarmoured
Sheathed or unsheathed

Table 3.10 Single Conductor Al XLPE Cables – Single Phase Ratings (A)

Conductor Size (mm^2)									
16	96	92	74	72	57	36	114	83	93
25	129	123	100	96	77	50	149	109	122
35	158	151	122	116	92	62	179	131	146
50	195	184	150	142	113	-	212	157	175
70	249	233	191	175	140	-	260	194	214
95	308	288	238	218	174	-	311	236	256
120	361	336	278	249	199	-	355	270	297
150	415	385	320	281	224	-	398	303	333
185	483	447	374	331	265	-	453	352	384
240	580	534	449	396	317	-	526	415	446
300	673	618	520	-	-	-	595	471	516
400	795	726	615	-	-	-	683	552	592
500	935	849	722	-	-	-	780	631	676
630	1103	994	849	-	-	-	891	744	792

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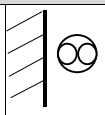
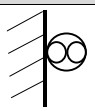
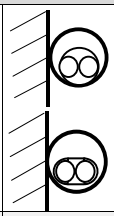
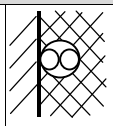
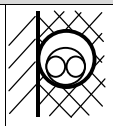
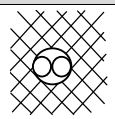
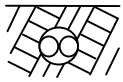
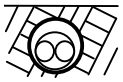
The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Copper conductors
PVC insulation
Armoured or unarmoured -(including Neutral Screened cables)

Table 3.11 Two Conductor Cu PVC Cables – Single Phase Ratings (A)

Conductor Size (mm^2)								
1	17	16	15	13	11	8	19	19
1.5	22	21	18	16	15	10	23	23
2.5	31	30	26	23	22	15	33	33
4	42	39	34	31	27	19	43	43
6	52	50	44	40	35	25	55	55
10	73	68	59	55	48	34	73	73
16	97	91	78	73	62	46	125	95
25	129	122	103	97	82	60	162	123
35	158	149	128	120	103	74	196	150
50	194	181	152	145	122	-	232	178
70	245	229	194	184	155	-	285	222
95	302	283	233	226	186	-	342	267
120	350	328	275	262	219	-	391	310
150	400	374	309	300	247	-	438	349
185	459	430	357	344	285	-	494	399
240	544	508	415	407	332	-	572	463
300	624	583	483	466	388	-	645	531
400	719	671	549	537	440	-	729	603

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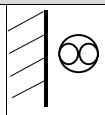
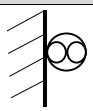
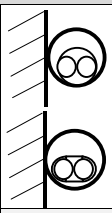
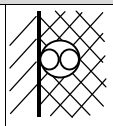
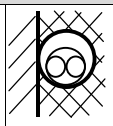
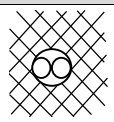
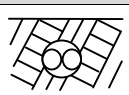
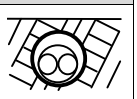
The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Aluminium conductors
PVC insulation
Armoured or unarmoured - (including Neutral Screened cables)

Table 3.12 Two Conductor Al PVC Cables – Single Phase Ratings (A)

Conductor Size (mm^2)								
16	75	71	59	56	48	35	97	73
25	100	95	80	75	64	47	125	96
35	123	115	99	92	80	58	152	117
50	150	141	117	113	95	-	179	139
70	190	178	150	143	120	-	221	173
95	234	219	180	176	145	-	265	208
120	272	255	213	204	171	-	304	242
150	310	291	239	233	192	-	340	271
185	358	335	278	268	222	-	385	311
240	425	398	325	318	260	-	447	362
300	489	457	380	366	303	-	506	417
400	570	532	437	425	349	-	579	477

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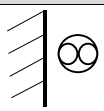
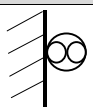
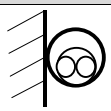
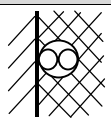
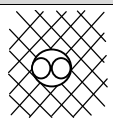
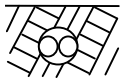
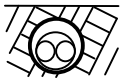
Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Copper conductors
XLPE insulation
Armoured or unarmoured - (including Neutral Screened cables)

Table 3.13 Two Conductor Cu XLPE Cables – Single Phase Ratings (A)

Conductor Size (mm^2)							
1	20	19	18	15	10	20	20
1.5	26	24	22	20	12	26	26
2.5	37	34	31	28	18	36	36
4	50	46	41	36	23	48	48
6	63	58	51	46	30	60	60
10	86	80	69	64	40	80	80
16	114	107	90	86	54	141	105
25	154	144	121	116	73	182	137
35	190	178	145	142	89	219	165
50	232	217	178	174	-	261	198
70	295	275	220	220	-	321	244
95	364	340	275	272	-	385	299
120	424	395	314	316	-	439	340
150	485	452	365	361	-	492	391
185	560	520	415	417	-	556	442
240	664	618	493	494	-	645	519
300	763	710	575	568	-	728	597
400	884	820	656	656	-	825	677

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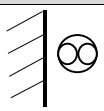
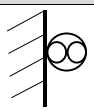
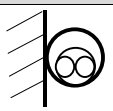
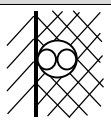
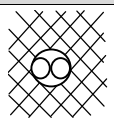
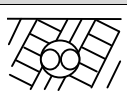
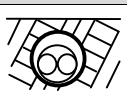
Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Aluminium conductors
XLPE insulation
Armoured or unarmoured - (including Neutral Screened cables)

Table 3. 14 Two Conductor Al XLPE Cables – Single Phase Ratings (A)

Conductor Size (mm^2)							
16	89	83	69	66	42	109	80
25	120	112	94	89	56	141	106
35	147	138	112	110	69	170	127
50	179	168	139	134	-	202	154
70	229	213	171	171	-	249	189
95	283	263	213	211	-	299	231
120	329	307	244	245	-	341	264
150	376	351	283	281	-	382	303
185	436	406	322	325	-	433	345
240	519	483	385	386	-	504	406
300	598	556	451	444	-	570	468
400	700	649	519	519	-	653	536

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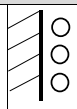
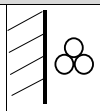
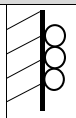
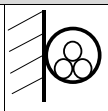
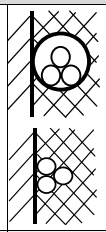
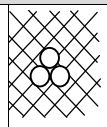
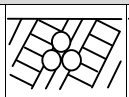
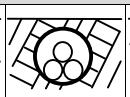
Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Copper conductor
PVC insulation
Unarmoured
Sheathed or unsheathed

Table 3.15 Single Conductor Cu PVC Cables – Three Phase Ratings (A)

Conductor Size (mm^2)									
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1.5	23	19	18	17	14	9	22	22	26
2.5	33	29	26	24	19	14	30	30	36
4	43	38	35	32	26	18	40	40	47
6	56	48	46	40	32	23	50	50	58
10	76	66	62	54	42	31	65	65	77
16	101	88	82	71	57	41	114	86	99
25	137	117	111	92	73	55	147	110	129
35	169	145	136	114	91	67	176	134	154
50	206	178	166	136	108	-	209	158	185
70	262	225	210	173	139	-	256	198	226
95	327	280	262	209	168	-	307	239	275
120	382	327	304	247	197	-	349	277	311
150	439	376	351	278	222	-	392	311	349
185	510	437	407	324	259	-	442	358	402
240	610	521	486	377	302	-	512	415	464
300	707	603	561	442	355	-	576	477	537
400	828	701	653	504	402	-	652	541	608
500	964	809	754	596	477	-	735	628	705
630	1129	931	866	670	537	-	823	703	795

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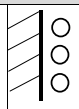
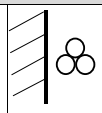
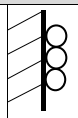
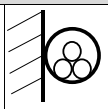
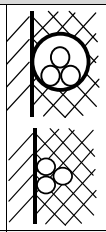
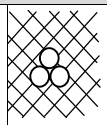
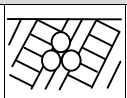
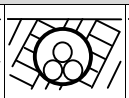
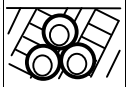
The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C	Soil Thermal Resistivity	1.2 K.m/W
Soil Temperature	15°C	Depth of Burial	0.5 m

CURRENT RATINGS

Aluminium conductor
PVC insulation
Unarmoured
Sheathed or unsheathed

Table 3.16 Single Conductor Al PVC Cables – Three Phase Ratings (A)

Conductor Size (mm^2)									
16	79	67	64	55	44	32	89	66	77
25	106	91	86	72	57	43	114	86	100
35	131	112	105	89	71	52	136	103	119
50	161	138	129	105	84	-	162	123	144
70	204	174	163	135	107	-	199	154	175
95	253	218	203	162	130	-	238	185	213
120	296	254	237	193	154	-	272	216	242
150	340	292	272	217	173	-	304	242	271
185	396	341	317	253	202	-	344	278	312
240	475	408	381	307	236	-	400	325	362
300	551	473	441	348	278	-	453	375	418
400	650	556	519	400	320	-	518	430	477
500	763	651	606	480	384	-	591	505	558
630	899	762	709	548	439	-	673	575	636

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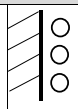
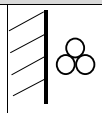
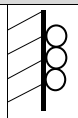
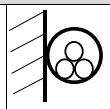
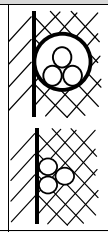
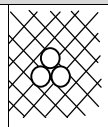
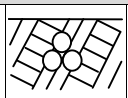
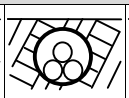
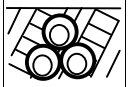
Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Copper conductor
XLPE insulation
Unarmoured
Sheathed or unsheathed

Table 3.17 Single Conductor Cu XLPE Cables – Three Phase Ratings (A)

Conductor Size (mm^2)									
1	21	18	18	17	13	9	19	19	24
1.5	28	23	22	20	17	11	24	24	29
2.5	39	33	31	28	22	15	33	33	41
4	51	44	41	36	29	21	43	43	52
6	65	55	52	46	37	26	54	54	64
10	89	76	72	62	50	35	72	72	85
16	119	101	95	79	64	47	125	92	108
25	161	138	129	107	85	64	162	121	141
35	198	169	158	132	106	79	193	147	169
50	243	207	194	157	125	-	229	174	203
70	310	264	246	201	161	-	280	217	248
95	385	328	306	242	194	-	335	261	295
120	451	384	358	287	230	-	381	304	342
150	519	443	413	325	260	-	428	342	383
185	616	515	479	369	295	-	484	388	442
240	726	616	573	439	352	-	560	456	510
300	843	713	662	516	413	-	630	525	591
400	989	832	772	587	470	-	715	596	670
500	1156	961	893	696	557	-	805	693	756
630	1353	1111	1032	785	628	-	902	778	877

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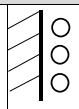
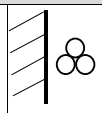
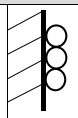
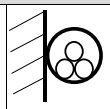
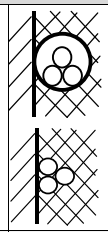
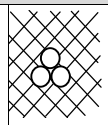
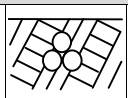
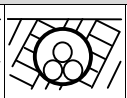
Ambient Air Temperature	30°C	Soil Thermal Resistivity	1.2 K.m/W
Soil Temperature	15°C	Depth of Burial	0.5 m

CURRENT RATINGS

Aluminium conductor
XLPE insulation
Unarmoured
Sheathed or unsheathed

Table 3.18 Single Conductor Al XLPE Cables –Three Phase Ratings (A)

Conductor Size (mm^2)									
16	92	78	74	62	50	36	97	71	85
25	124	107	100	83	66	50	125	93	110
35	154	131	122	102	83	62	150	113	131
50	188	161	150	122	98	-	178	135	157
70	241	205	191	156	125	-	217	169	193
95	298	255	238	188	151	-	260	203	229
120	350	298	278	223	178	-	296	236	265
150	403	344	320	252	201	-	332	266	296
185	470	402	373	287	230	-	377	303	343
240	564	482	448	343	275	-	438	356	397
300	656	559	519	405	323	-	495	412	460
400	776	659	613	466	373	-	567	473	525
500	912	773	717	560	448	-	646	556	598
630	1076	906	842	641	513	-	736	635	700

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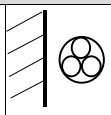
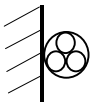
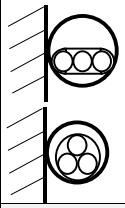
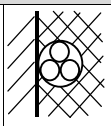
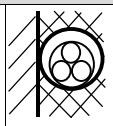
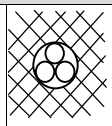
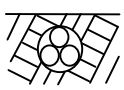
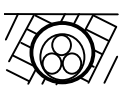
Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Copper conductors
PVC insulation
Armoured or unarmoured - (including Neutral Screened cables)

Table 3.19 Three & Four Conductor Cu PVC Cables

– Three Phase Ratings (A)

Conductor Size (mm^2)								
1	15	14	13	10	10	7	15	15
1.5	18	17	16	14	13	9	20	20
2.5	26	25	23	19	18	13	28	28
4	35	33	29	26	23	17	36	36
6	46	42	38	34	30	22	46	46
10	62	58	50	47	40	29	61	61
16	82	78	66	62	54	39	106	80
25	111	104	87	83	68	52	138	103
35	137	128	107	103	86	64	165	125
50	166	156	128	124	101	-	196	150
70	211	196	162	157	130	-	241	187
95	260	243	202	194	162	-	289	229
120	302	282	230	226	185	-	330	261
150	345	321	260	258	207	-	370	293
185	397	369	300	295	241	-	417	334
240	470	437	360	350	288	-	482	395
300	538	499	-	-	-	-	542	444
400	620	575	-	-	-	-	613	515

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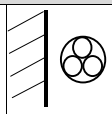
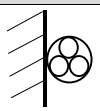
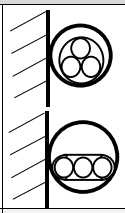
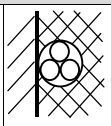
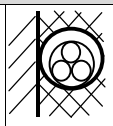
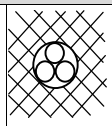
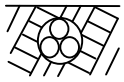
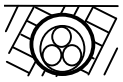
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Aluminium conductors
PVC insulation
Armoured or unarmoured - (including Neutral Screened cables)

Table 3.20 Three & Four Conductor Al PVC Cables

– Three Phase Ratings (A)

Conductor Size (mm^2)								
16	64	60	51	48	41	30	83	62
25	86	81	67	65	54	40	107	80
35	106	99	83	79	66	49	129	98
50	129	121	99	97	79	-	152	116
70	163	153	127	122	100	-	187	145
95	202	188	156	150	125	-	224	177
120	235	219	179	176	144	-	256	202
150	268	250	202	200	162	-	287	228
185	310	288	235	231	188	-	326	261
240	368	343	283	274	226	-	378	309
300	424	393	-	-	-	-	427	350
400	495	458	-	-	-	-	488	411

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The values in this table are for typical New Zealand installation conditions of:-

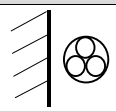
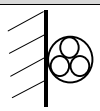
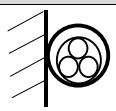
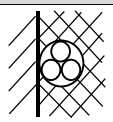
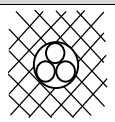
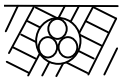
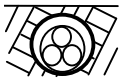
Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Copper conductors
XLPE insulation
Armoured or unarmoured - (including Neutral Screened cables)

Table 3.21 Three & Four Conductor Cu XLPE Cables

– Three Phase Ratings (A)

Conductor Size (mm^2)							
1	18	15	14	13	8	17	17
1.5	22	21	18	17	10	21	21
2.5	31	29	26	23	14	31	31
4	42	39	33	31	20	40	40
6	53	50	42	40	24	49	49
10	73	68	58	54	34	67	67
16	97	91	75	73	45	118	87
25	131	122	100	98	62	153	114
35	162	151	125	121	76	184	139
50	198	185	150	147	-	218	166
70	252	234	190	187	-	269	207
95	311	289	230	231	-	323	249
120	363	337	271	270	-	368	289
150	415	385	305	308	-	412	325
185	480	444	354	355	-	465	372
240	569	527	425	421	-	539	440
300	653	604	-	-	-	607	495
400	754	695	-	-	-	685	561

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The values in this table are for typical New Zealand installation conditions of:-

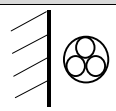
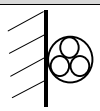
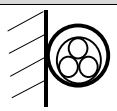
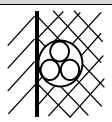
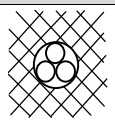
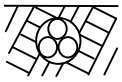
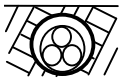
Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

CURRENT RATINGS

Aluminium conductors
XLPE insulation
Armoured or unarmoured - (including Neutral Screened cables)

Table 3.22 Three & Four Conductor Al XLPE Cables

– Three Phase Ratings (A)

Conductor Size (mm^2)							
16	75	70	58	56	35	91	67
25	102	95	78	76	47	119	89
35	125	117	97	94	58	142	108
50	154	143	116	114	-	170	128
70	196	182	147	145	-	209	161
95	242	224	178	179	-	250	194
120	282	262	211	209	-	286	225
150	322	299	238	240	-	320	253
185	374	347	276	277	-	364	291
240	446	413	333	330	-	423	345
300	514	475	-	-	-	477	391
400	601	554	-	-	-	546	446

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The values in this table are for typical New Zealand installation conditions of:-

Ambient Air Temperature	30°C
Soil Temperature	15°C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	0.5 m

VOLTAGE DROPS

Table 3.23 Single Conductor Cables - Voltage Drops (mV/A.m)						
Conductor Size	Conductor Temperature					
	Single Phase Touching		Three Phase Trefoil		Three Phase Flat Touching	
(mm^2)	75°C	90°C	75°C	90°C	75°C	90°C
Copper Conductors						
1	51.6	54.1	44.7	46.8	44.7	46.8
1.5	33.0	34.7	28.6	30.0	28.6	30.0
2.5	18.0	18.9	15.6	16.4	15.6	16.4
4	11.2	11.8	9.71	10.2	9.71	10.2
6	7.50	7.87	6.49	6.81	6.49	6.81
10	4.46	4.68	3.86	4.05	3.86	4.05
16	2.81	2.95	2.43	2.55	2.43	2.55
25	1.78	1.87	1.54	1.62	1.55	1.62
35	1.29	1.35	1.12	1.17	1.12	1.18
50	0.963	1.01	0.834	0.872	0.840	0.878
70	0.680	0.710	0.589	0.615	0.597	0.623
95	0.507	0.528	0.439	0.457	0.449	0.467
120	0.415	0.431	0.359	0.373	0.371	0.385
150	0.352	0.365	0.305	0.316	0.319	0.330
185	0.302	0.311	0.261	0.269	0.277	0.285
240	0.255	0.262	0.221	0.227	0.240	0.245
300	0.229	0.233	0.198	0.202	0.219	0.222
400	0.209	0.211	0.181	0.183	0.202	0.205
500	0.194	0.196	0.168	0.170	0.191	0.193
630	0.181	0.184	0.157	0.159	0.181	0.182
Aluminium Conductors						
16	4.68	4.91	4.05	4.25	4.05	4.25
25	2.95	3.08	2.55	2.67	2.55	2.67
35	2.14	2.24	1.85	1.94	1.85	1.94
50	1.58	1.65	1.37	1.43	1.37	1.44
70	1.10	1.15	0.952	0.997	0.956	1.00
95	0.804	0.840	0.696	0.727	0.702	0.733
120	0.644	0.672	0.558	0.582	0.565	0.589
150	0.535	0.557	0.463	0.482	0.472	0.491
185	0.439	0.455	0.380	0.394	0.391	0.404
240	0.352	0.363	0.305	0.314	0.319	0.327
300	0.300	0.307	0.260	0.266	0.276	0.281
400	0.256	0.261	0.222	0.226	0.240	0.243
500	0.226	0.228	0.196	0.197	0.216	0.216
630	0.202	0.204	0.175	0.177	0.197	0.198

Notes:

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2. PVC (V-75, V90) maximum temperature is 75°C and XLPE (X-90) maximum temperature is 90°C.

VOLTAGE DROPS

Table 3.24 Multi Conductor Cables - Voltage Drops (mV/A.m)				
Conductor Size	Conductor Temperature			
	Single Phase		Three Phase	
(mm^2)	75°C	90°C	75°C	90°C
Copper Conductors				
1	51.6	54.1	44.7	46.8
1.5	33.0	34.7	28.6	30.0
2.5	18.0	18.9	15.6	16.4
4	11.2	11.8	9.71	10.2
6	7.50	7.85	6.49	6.80
10	4.46	4.68	3.86	4.05
16	2.81	2.95	2.43	2.55
25	1.78	1.86	1.54	1.61
35	1.28	1.35	1.11	1.17
50	0.958	1.00	0.829	0.868
70	0.673	0.703	0.583	0.609
95	0.498	0.520	0.431	0.450
120	0.405	0.423	0.351	0.366
150	0.342	0.355	0.296	0.307
185	0.290	0.299	0.251	0.259
240	0.243	0.249	0.210	0.216
300	0.215	0.219	0.186	0.190
400	0.194	0.198	0.168	0.171
Aluminium Conductors				
16	4.67	4.90	4.04	4.24
25	2.93	3.08	2.54	2.67
35	2.13	2.23	1.84	1.93
50	1.57	1.65	1.36	1.43
70	1.09	1.15	0.948	0.993
95	0.798	0.835	0.691	0.723
120	0.638	0.666	0.552	0.577
150	0.528	0.550	0.457	0.476
185	0.431	0.448	0.373	0.388
240	0.343	0.355	0.297	0.307
300	0.290	0.298	0.251	0.258
400	0.245	0.249	0.212	0.216

Notes:

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2. PVC (V-75, V90) maximum temperature is 75°C and XLPE (X-90) maximum temperature is 90°C.

AC RESISTANCES

Table 3.25 Single Conductor Cables - AC Resistances (mΩ/m)				
Conductor Size (mm^2)	Conductor Temperature			
	45°C	60°C	75°C	90°C
Copper Conductors				
1	23.3	24.5	25.8	27.0
1.5	14.9	15.7	16.5	17.3
2.5	8.14	8.57	9.01	9.45
4	5.06	5.33	5.61	5.88
6	3.38	3.56	3.75	3.93
10	2.01	2.12	2.23	2.33
16	1.26	1.33	1.40	1.47
25	0.799	0.842	0.884	0.927
35	0.576	0.607	0.638	0.668
50	0.426	0.448	0.471	0.494
70	0.295	0.311	0.327	0.342
95	0.213	0.225	0.236	0.247
120	0.170	0.179	0.188	0.197
150	0.138	0.145	0.153	0.160
185	0.111	0.117	0.123	0.129
240	0.0862	0.0905	0.0948	0.0991
300	0.0703	0.0736	0.0770	0.0803
400	0.0569	0.0595	0.0620	0.0646
500	0.0467	0.0487	0.0506	0.0525
630	0.0389	0.0404	0.0418	0.0432
Aluminium Conductors				
16	2.10	2.22	2.33	2.45
25	1.32	1.39	1.47	1.54
35	0.956	1.01	1.06	1.11
50	0.706	0.745	0.783	0.822
70	0.488	0.515	0.542	0.568
95	0.353	0.372	0.392	0.411
120	0.279	0.295	0.310	0.325
150	0.228	0.240	0.253	0.265
185	0.182	0.192	0.202	0.212
240	0.140	0.147	0.155	0.162
300	0.113	0.119	0.125	0.130
400	0.0890	0.0936	0.0981	0.103
500	0.0709	0.0744	0.0779	0.0813
630	0.0571	0.0597	0.0623	0.0649

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AC RESISTANCES

Table 3.26 Multi Conductor Cables - AC Resistances (mΩ/m)

Conductor Size	Conductor Temperature							
	Circular Conductors				Shaped Conductors			
(mm^2)	45°C	60°C	75°C	90°C	45°C	60°C	75°C	90°C
Copper Conductors								
1	23.3	24.5	25.8	27.0	-	-	-	-
1.5	14.9	15.7	16.5	17.3	-	-	-	-
2.5	8.14	8.57	9.01	9.45	-	-	-	-
4	5.06	5.33	5.61	5.88	-	-	-	-
6	3.38	3.56	3.75	3.93	-	-	-	-
10	2.01	2.12	2.23	2.33	-	-	-	-
16	1.26	1.33	1.40	1.47	-	-	-	-
25	0.799	0.842	0.884	0.927	0.799	0.842	0.884	0.927
35	0.576	0.607	0.638	0.669	0.576	0.607	0.638	0.669
50	0.426	0.449	0.471	0.494	0.426	0.448	0.471	0.494
70	0.295	0.311	0.327	0.343	0.295	0.311	0.327	0.342
95	0.214	0.225	0.236	0.248	0.213	0.224	0.236	0.247
120	0.170	0.179	0.188	0.197	0.170	0.179	0.187	0.196
150	0.139	0.146	0.153	0.160	0.138	0.145	0.153	0.160
185	0.112	0.118	0.123	0.129	0.111	0.117	0.123	0.128
240	0.0870	0.0912	0.0955	0.0998	0.0859	0.0902	0.0945	0.0988
300	0.0712	0.0745	0.0778	0.0812	0.0698	0.0732	0.0766	0.0800
400	0.0580	0.0605	0.0630	0.0656	0.0563	0.0589	0.0615	0.0641
Aluminium Conductors								
16	2.10	2.22	2.33	2.45	2.10	2.22	2.33	2.45
25	1.32	1.39	1.47	1.54	1.32	1.39	1.47	1.54
35	0.956	1.01	1.06	1.11	0.956	1.01	1.06	1.11
50	0.706	0.745	0.784	0.822	0.706	0.745	0.783	0.822
70	0.488	0.515	0.542	0.569	0.488	0.515	0.542	0.568
95	0.353	0.373	0.392	0.411	0.353	0.372	0.392	0.411
120	0.280	0.295	0.310	0.325	0.279	0.295	0.310	0.325
150	0.228	0.241	0.253	0.265	0.228	0.240	0.253	0.265
185	0.182	0.192	0.202	0.212	0.182	0.192	0.202	0.211
240	0.140	0.148	0.155	0.162	0.139	0.147	0.154	0.162
300	0.113	0.119	0.125	0.131	0.112	0.118	0.124	0.130
400	0.0897	0.0943	0.0988	0.103	0.0886	0.0932	0.0978	0.102

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REACTANCES

Table 3.27 Reactances at 50 Hz of Single Core Cables (mΩ/m)				
Conductor Size	Insulation Material			
	Single Phase, or Three Phase Trefoil		Three Phase Flat Touching	
(mm^2)	PVC	XLPE	PVC	XLPE
1	0.168	0.166	0.184	0.181
1.5	0.157	0.155	0.172	0.170
2.5	0.143	0.141	0.159	0.156
4	0.137	0.131	0.152	0.146
6	0.128	0.123	0.143	0.138
10	0.118	0.114	0.134	0.129
16	0.111	0.106	0.126	0.122
25	0.106	0.102	0.121	0.118
35	0.101	0.0982	0.117	0.113
50	0.0962	0.0924	0.111	0.108
70	0.0917	0.0893	0.107	0.104
95	0.0904	0.0868	0.106	0.102
120	0.0870	0.0844	0.102	0.0996
150	0.0868	0.0844	0.102	0.0996
185	0.0862	0.0835	0.101	0.0988
240	0.0847	0.0818	0.0999	0.0970
300	0.0839	0.0809	0.0991	0.0961
400	0.0829	0.0802	0.0982	0.0955
500	0.0820	0.0796	0.0973	0.0948
630	0.0800	0.0787	0.0952	0.0940

Note:

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REACTANCES

Table 3.28 Reactances at 50 Hz of Multicore Cables (mΩ/m)				
Conductor Size	Insulation Material			
	Circular Conductors		Shaped Conductors	
(mm^2)	PVC	XLPE	PVC	XLPE
1	0.119	0.114	-	-
1.5	0.111	0.107	-	-
2.5	0.102	0.0988	-	-
4	0.102	0.0930	-	-
6	0.0967	0.0887	-	-
10	0.0906	0.0840	-	-
16	0.0861	0.0805	-	-
25	0.0853	0.0808	0.0786	0.0744
35	0.0826	0.0786	0.0761	0.0725
50	0.0797	0.0751	0.0734	0.0692
70	0.0770	0.0741	0.0710	0.0683
95	0.0766	0.0725	0.0706	0.0668
120	0.0743	0.0713	0.0685	0.0657
150	0.0745	0.0718	0.0687	0.0662
185	0.0744	0.0720	0.0686	0.0663
240	0.0735	0.0709	0.0678	0.0653
300	0.0732	0.0704	0.0675	0.0649
400	0.0728	0.0702	0.0671	0.0647

Note:

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VOLTAGE DROP GRAPHS

This information seeks to provide a quick means of selecting the size of cable to comply with voltage drop requirements.

The range of graphs is intended to cover normal stock cables available from Nexans Olex.

Basis of Graphs

© Copyright Standards New Zealand 2012. Content in the graphs and current rating values are derived from AS/NZS 3008.1.2:2010 and has been reproduced or adapted with permission from Standards New Zealand under Copyright Licence 000926. Please refer to the complete Standard for full details available for purchase from Standards New Zealand at www.standards.co.nz.

New Zealand regulations allow a maximum voltage drop of 5% from the point of supply to anywhere in the installation.

The graphs have been drawn for a voltage drop of 2.5% with the standard New Zealand supply voltages. i.e. 5.75 volts for single phase 230 volt systems, or 10 volts for three phase 400 volt systems.

For installations involving mains, sub-mains and circuits, larger cable sizes may be necessary than these graphs show, to keep the voltage drop in the complete installation under the maximum allowed by the regulations.

The graphs are drawn to allow for the highest current with the cable installed under any of the standard installation conditions as per this section or the Nexans Olex New Zealand Handbook

It is important to check that the cable will carry the required maximum load under the particular conditions of the actual installation proposed.

In cases where the load current is significantly less than the maximum for the cable, the temperature of the conductor will be less than the maximum allowed. Hence the actual voltage drop will be lower than that shown by the graphs.

Use of the Graphs

Assuming that the load current and length of run are known.

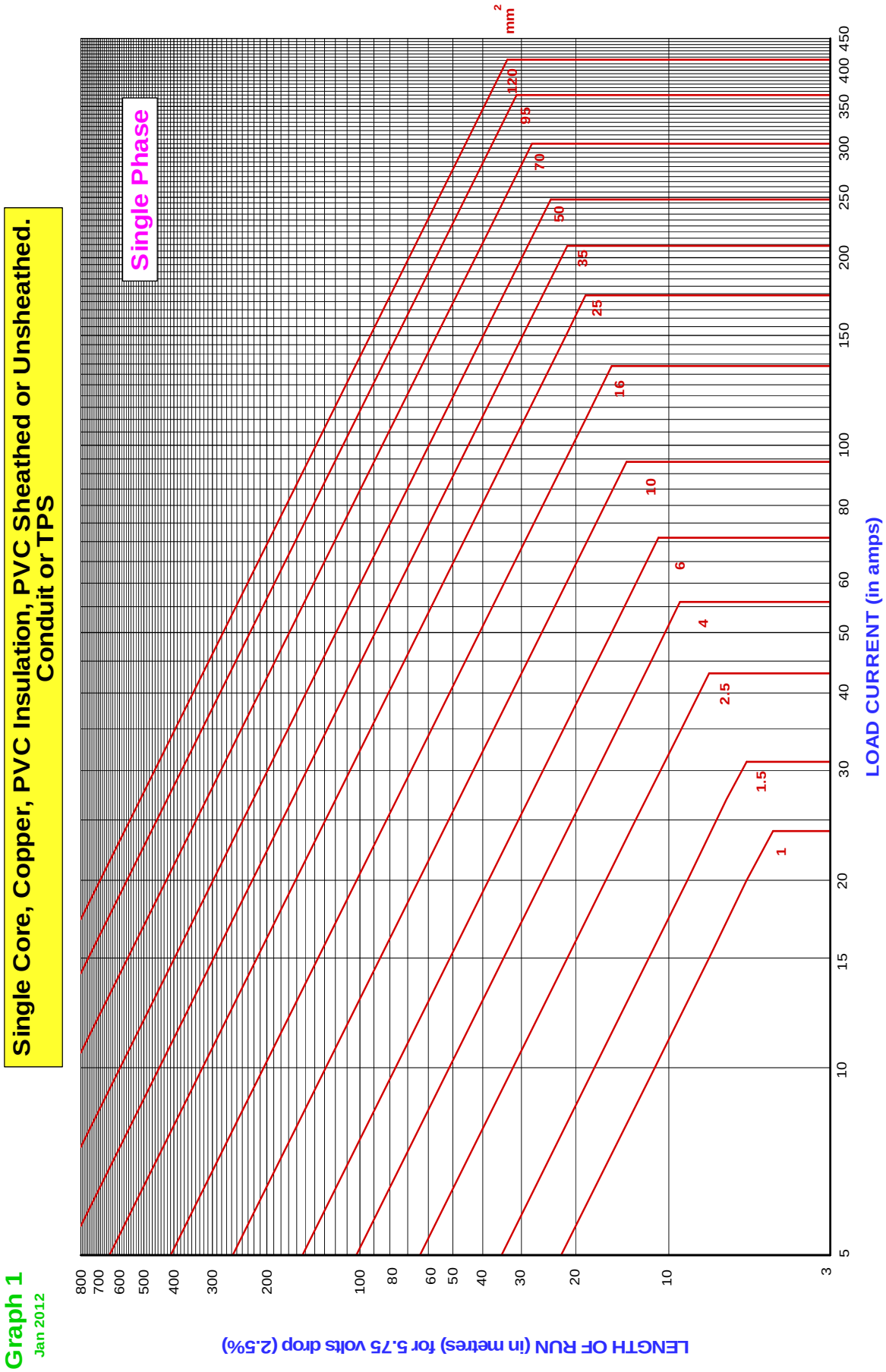
1. Select the graph appropriate for the cable under consideration, whether single phase or three phase, and for single core cables whether laid in trefoil or flat configuration.
2. Locate the intersecting point on the graph for the required values of load current and length of run.
3. For this point read the conductor size indicated for the graph line either on or above the point.
4. Check that the required load current is within the maximum for the cable size under the intended installation conditions, using either this section, the Nexans Olex New Zealand Handbook or AS/NZS 3008.1.2.

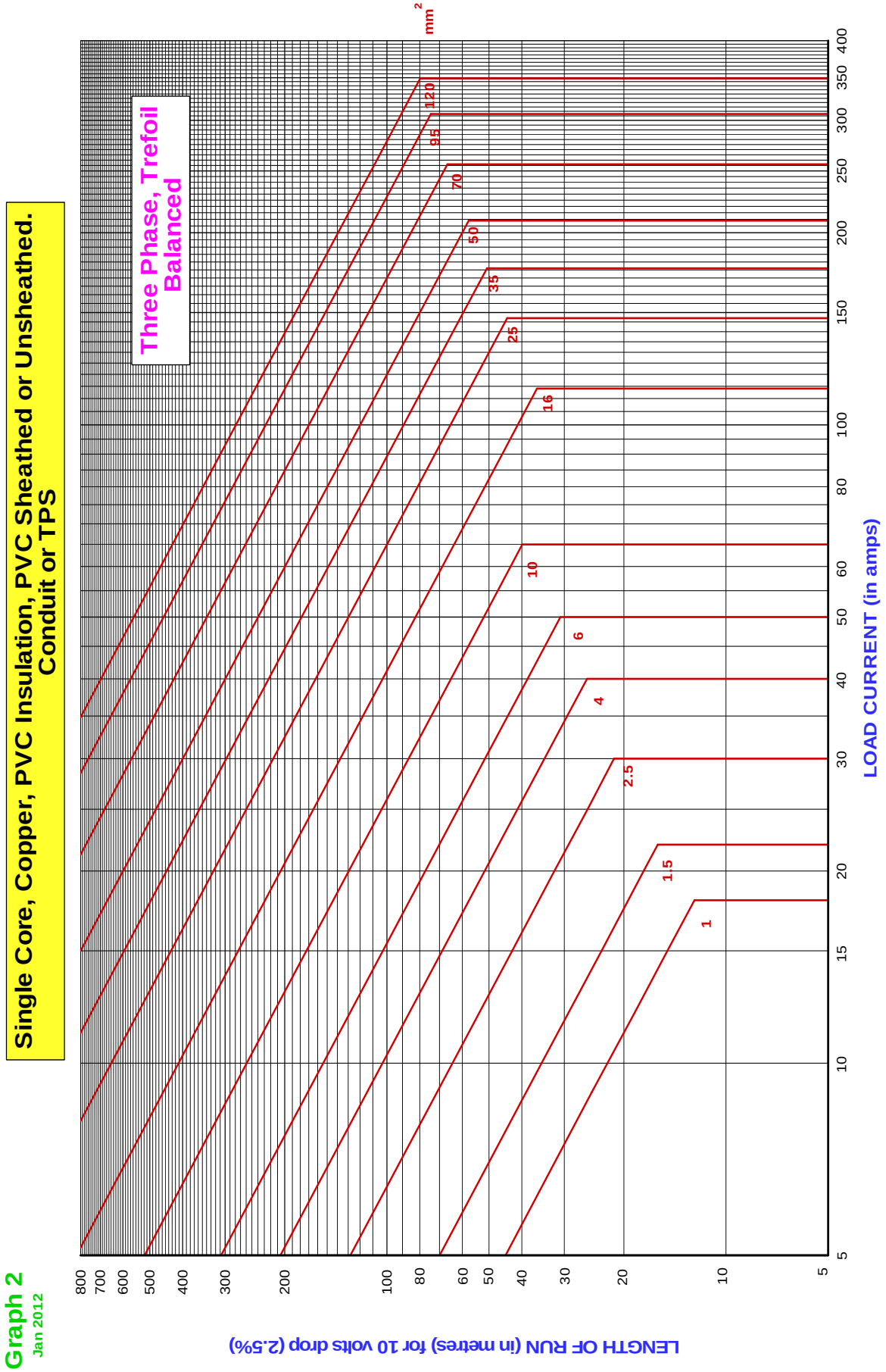
Disclaimer

Nexans Olex New Zealand Limited has taken every precaution to ensure that the information contained in these graphs is in line with the requirements of the appropriate New Zealand Standards and correct electrical practice. However, we accept no liability of any kind with respect to the information presented here.

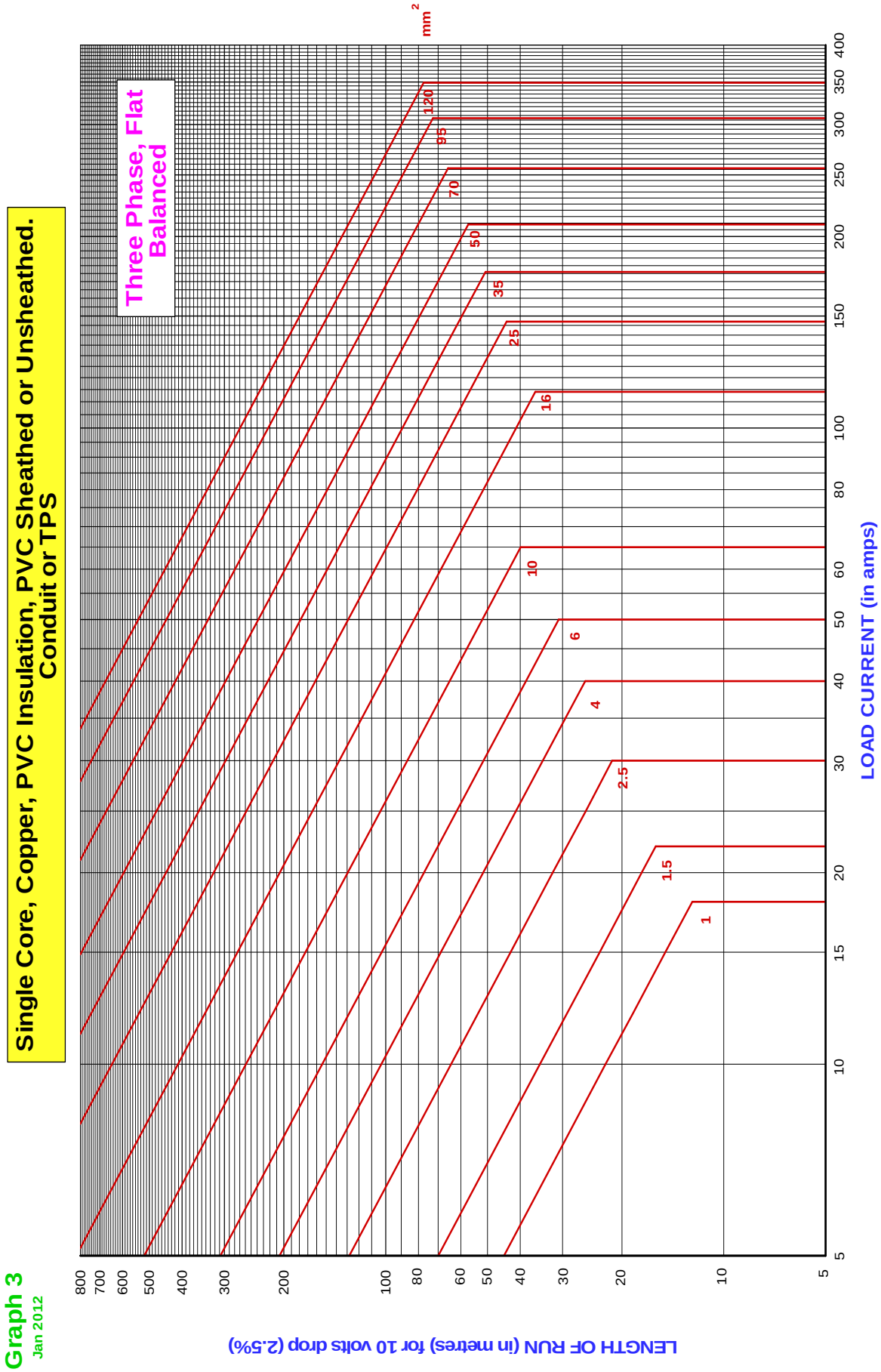
It is the responsibility of the Electrician signing the Certificate of Compliance to ensure that all the requirements of the Wiring Regulations are met.

List of Graphs

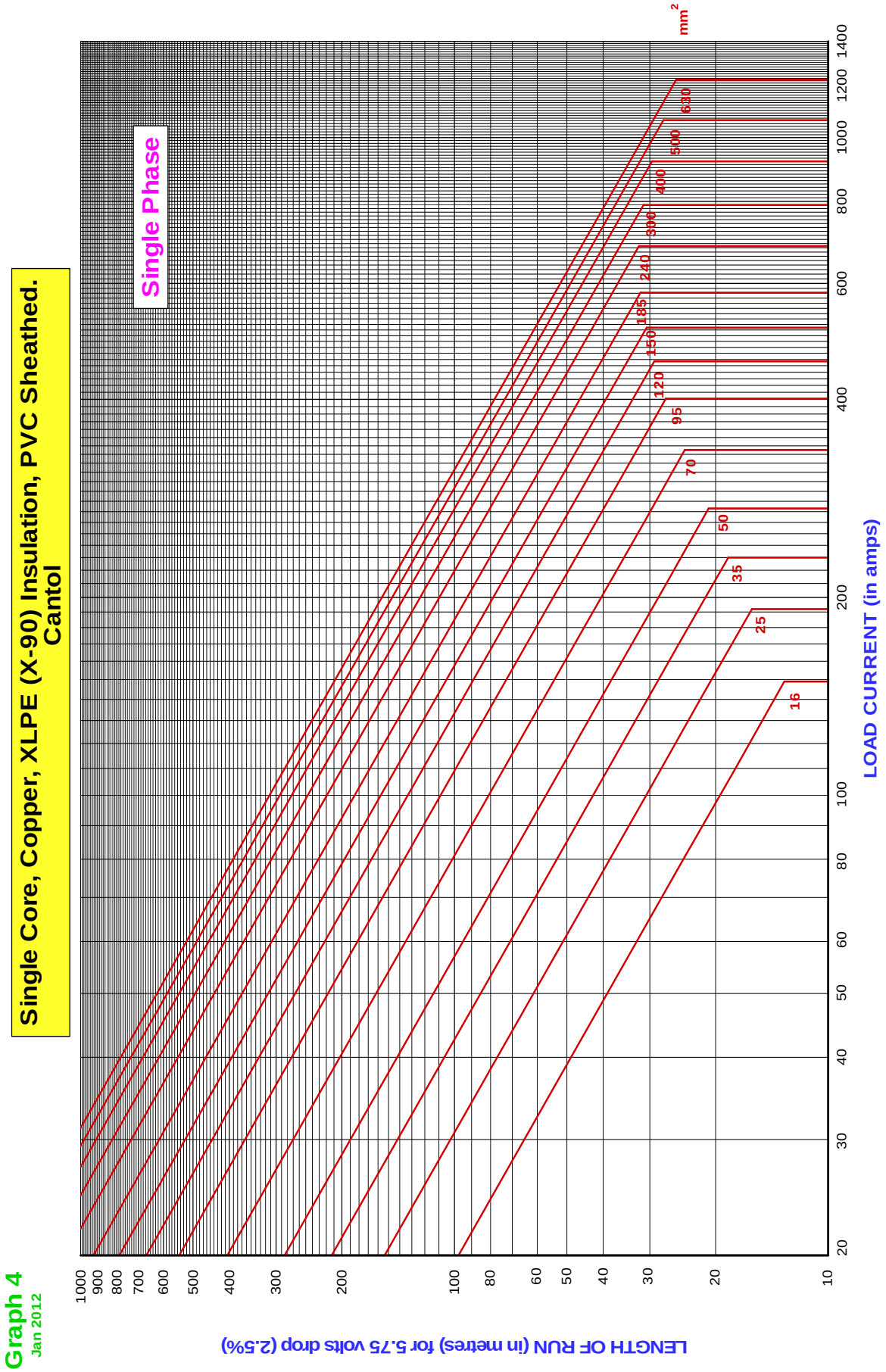

Single Core, Copper, PVC Insulation, PVC Sheathed or Unsheathed.
Conduit or TPS
Single Phase
mm²
1
1.5
2.5
4
6
10
16
25
35
50
70
95
120
LOAD CURRENT (in amps)
LENGTH OF RUN (in metres) for 5.75 volts drop (2.5%)
3
5
10
15
20
30
40
50
60
80
100
150
200
250
300
350
400
450
10
20
30
40
50
60
80
100
200
300
400
500
600
700
800
Graph 1
Jan 2012



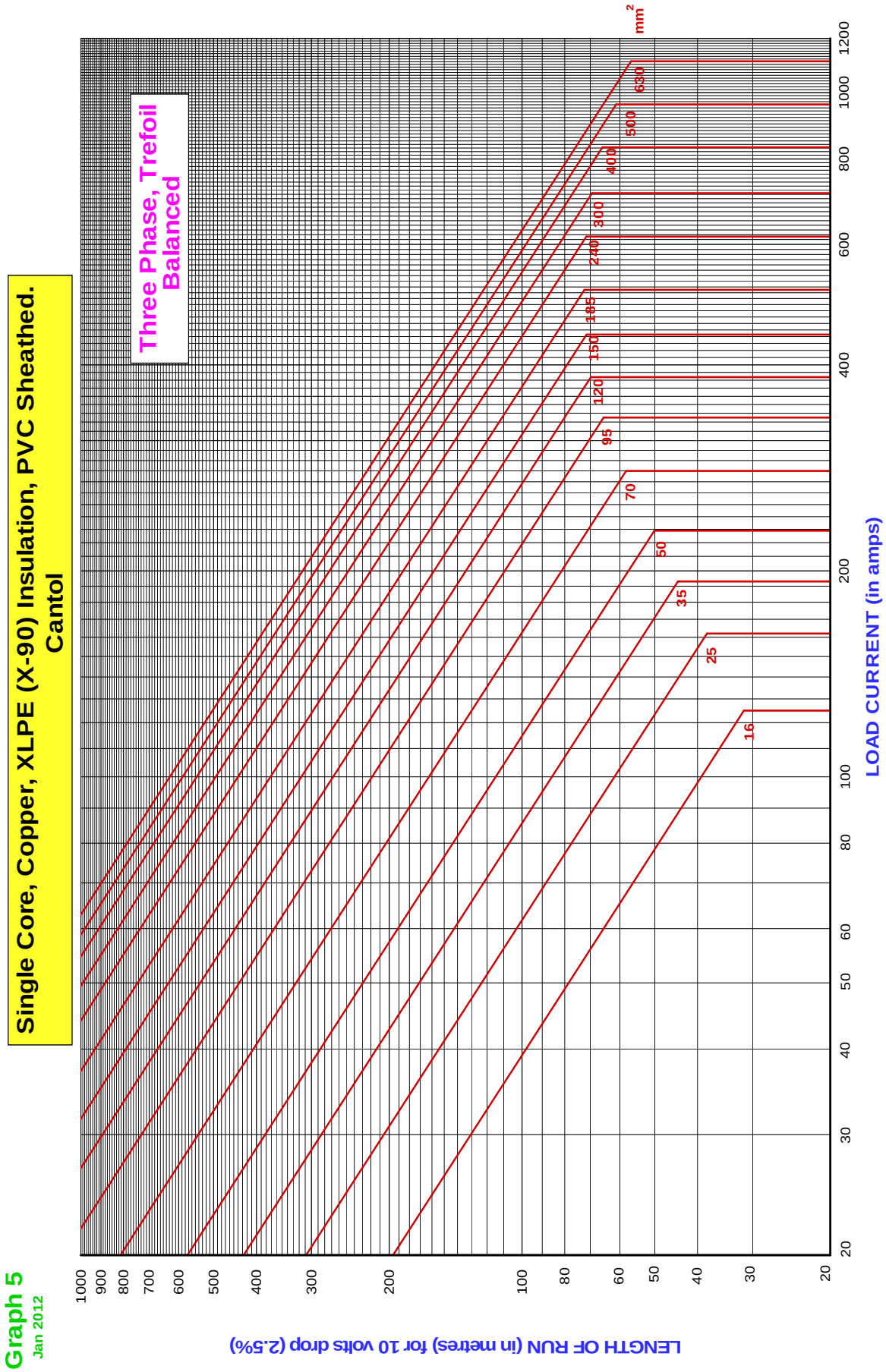
Graph 2
Jan 2012



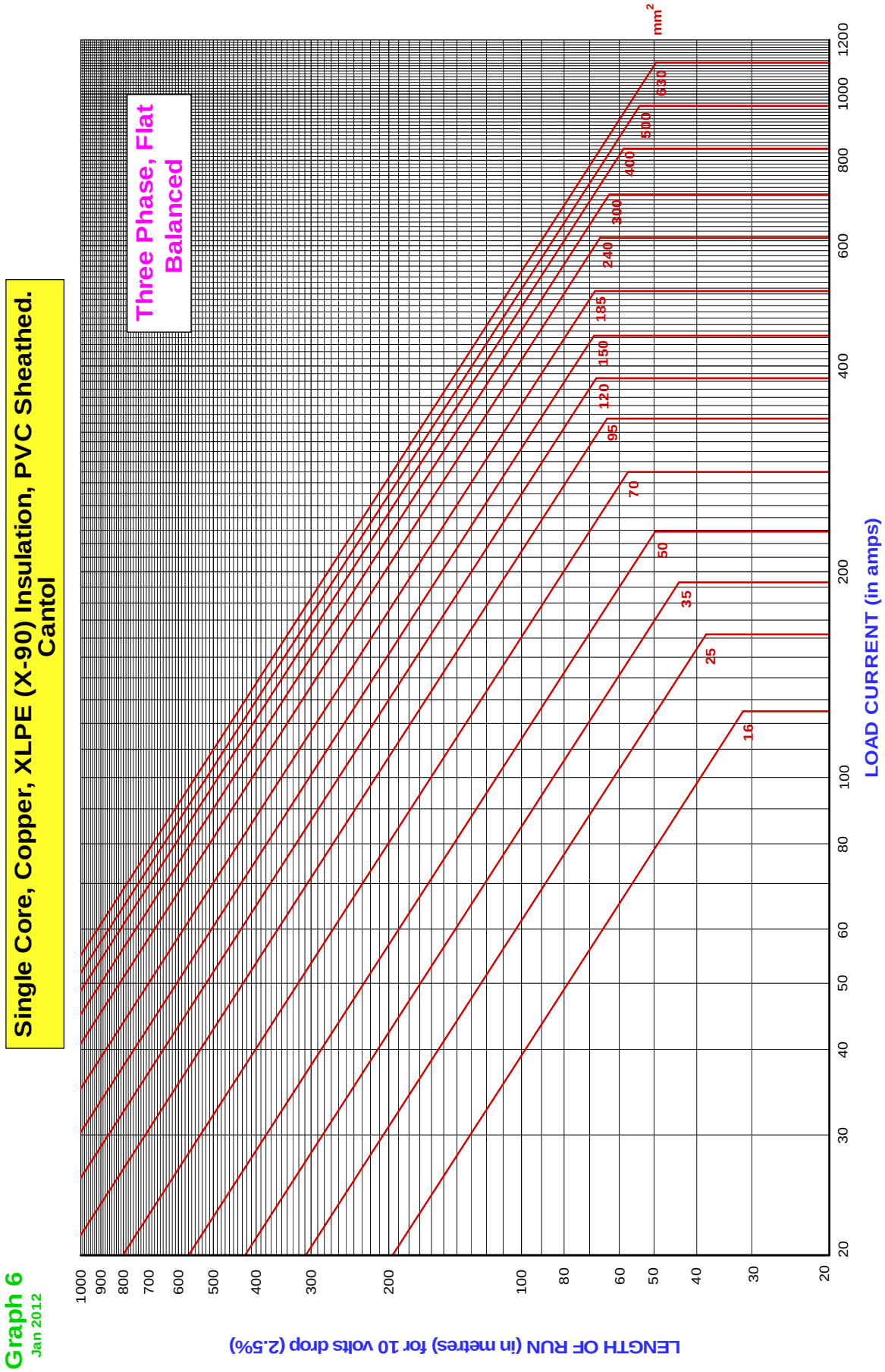
Graph 3
Jan 2012



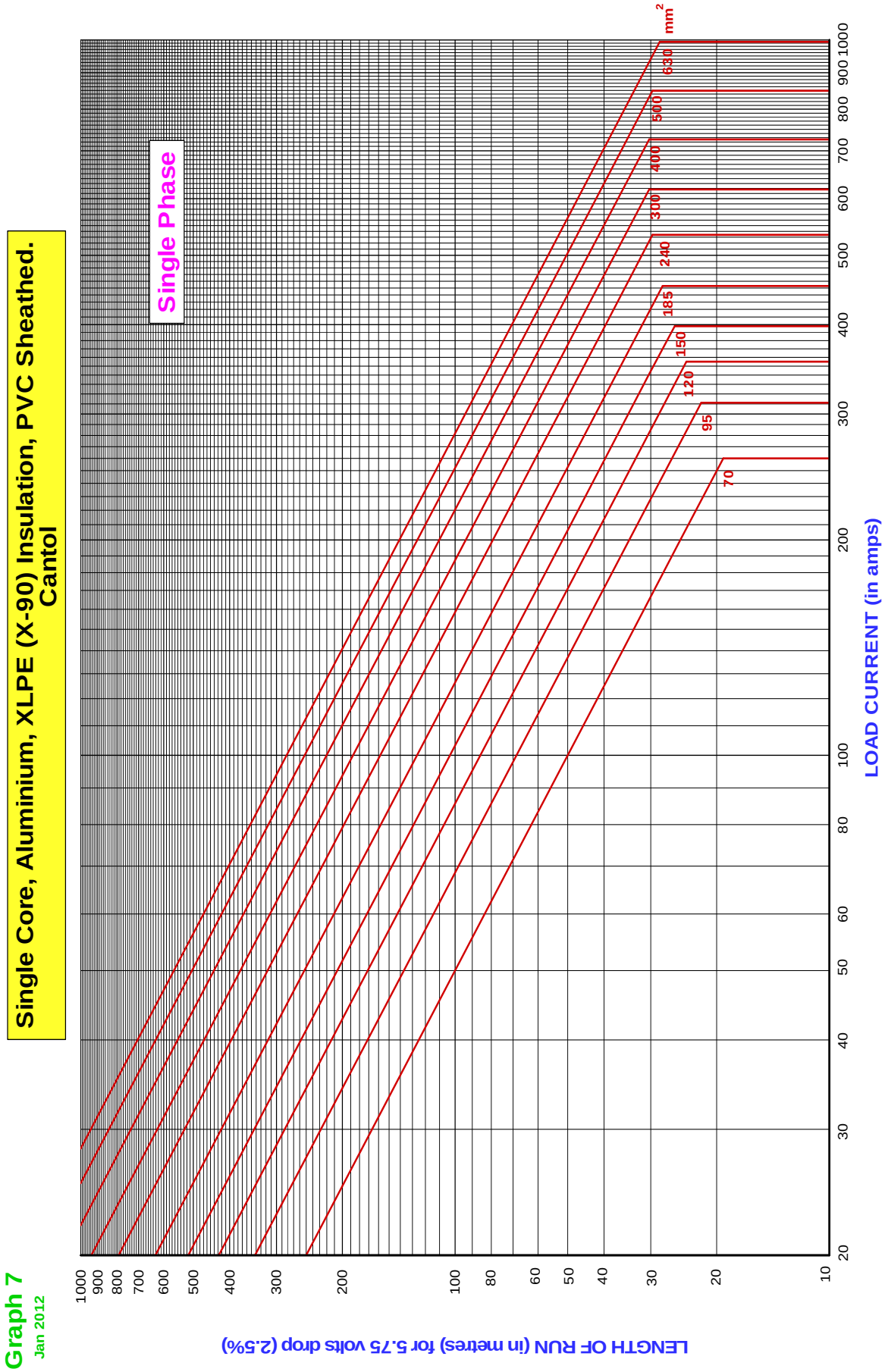
Graph 4
Jan 2012



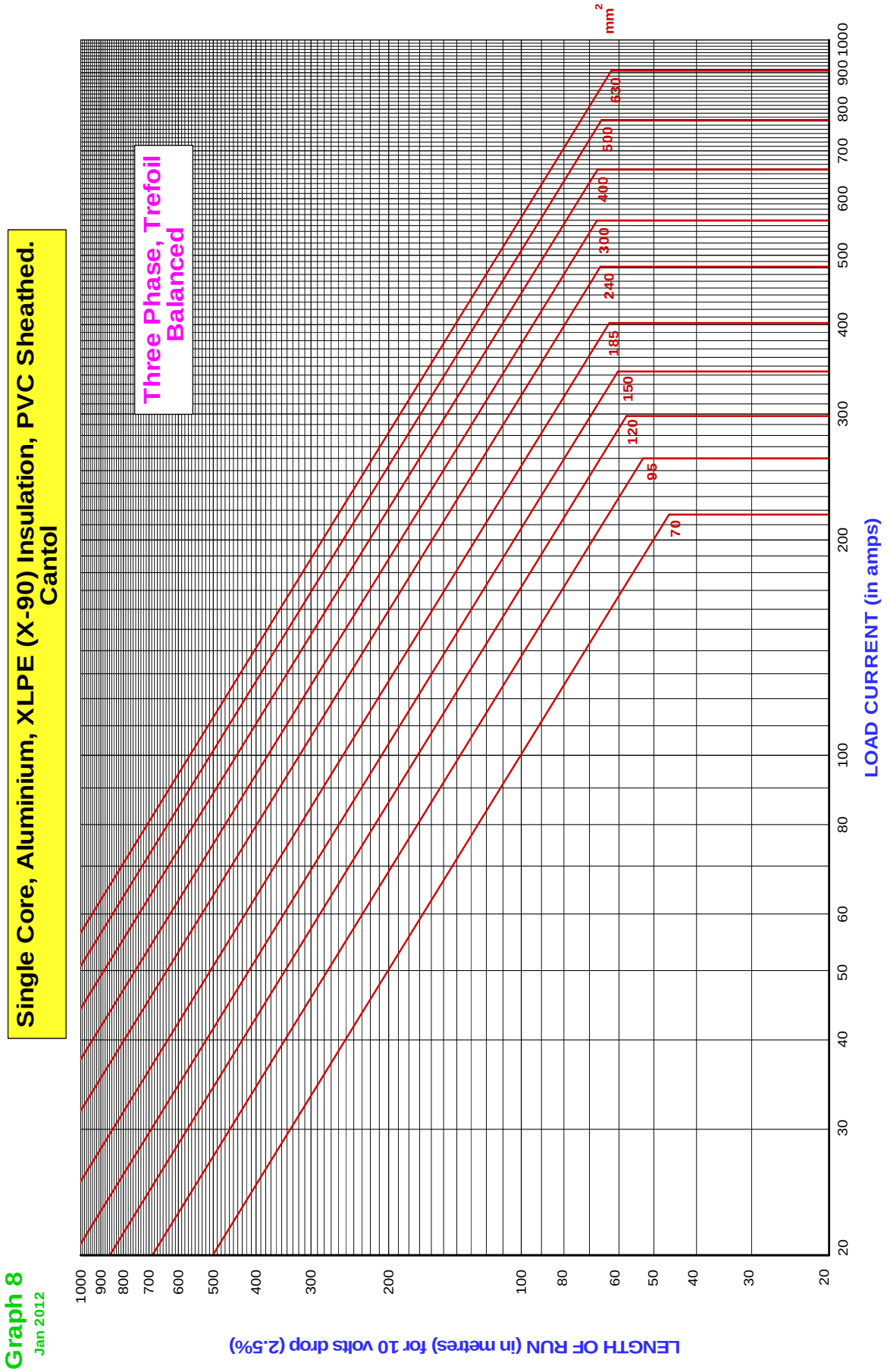
Graph 5
Jan 2012



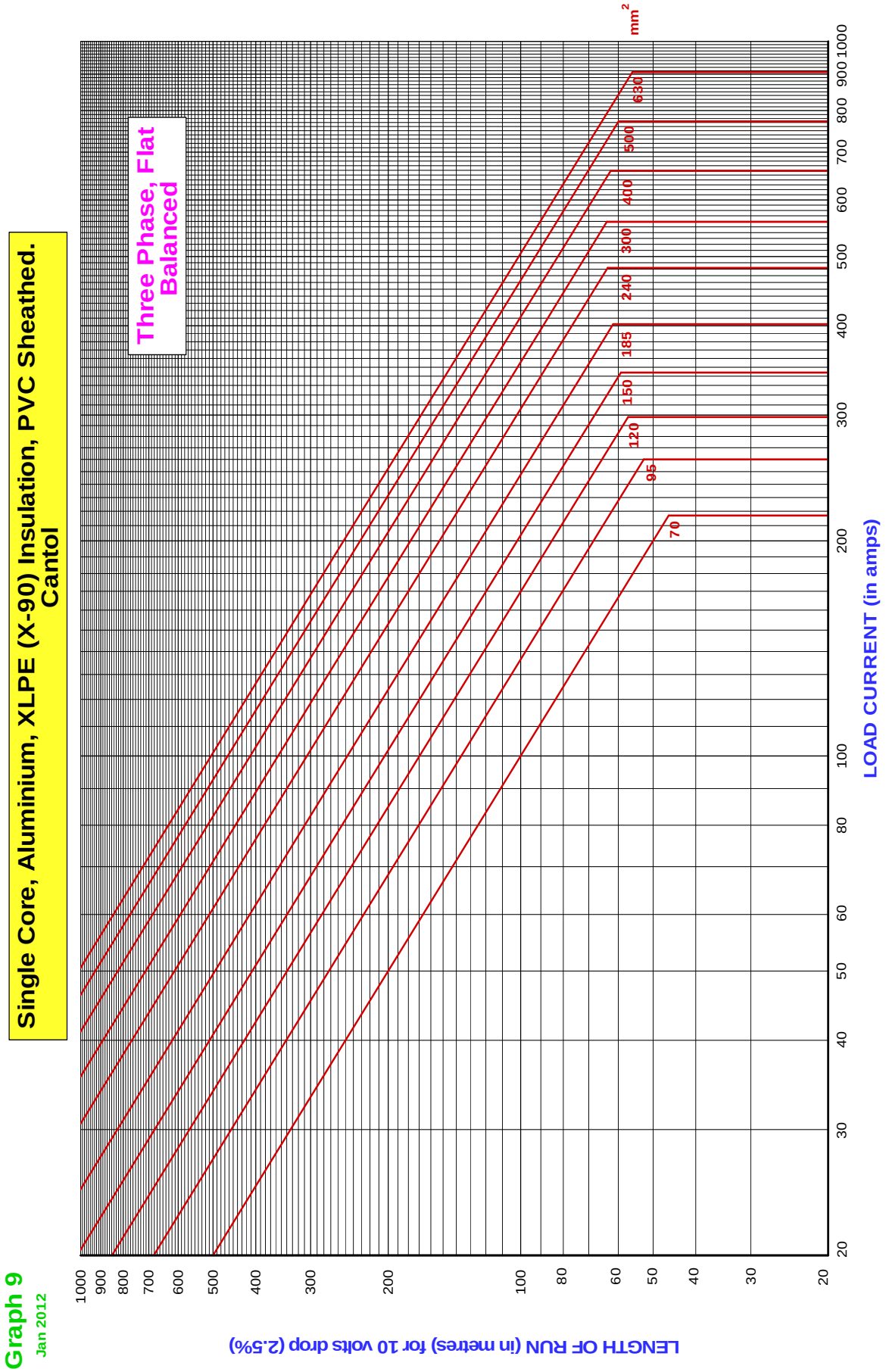
Graph 6
Jan 2012



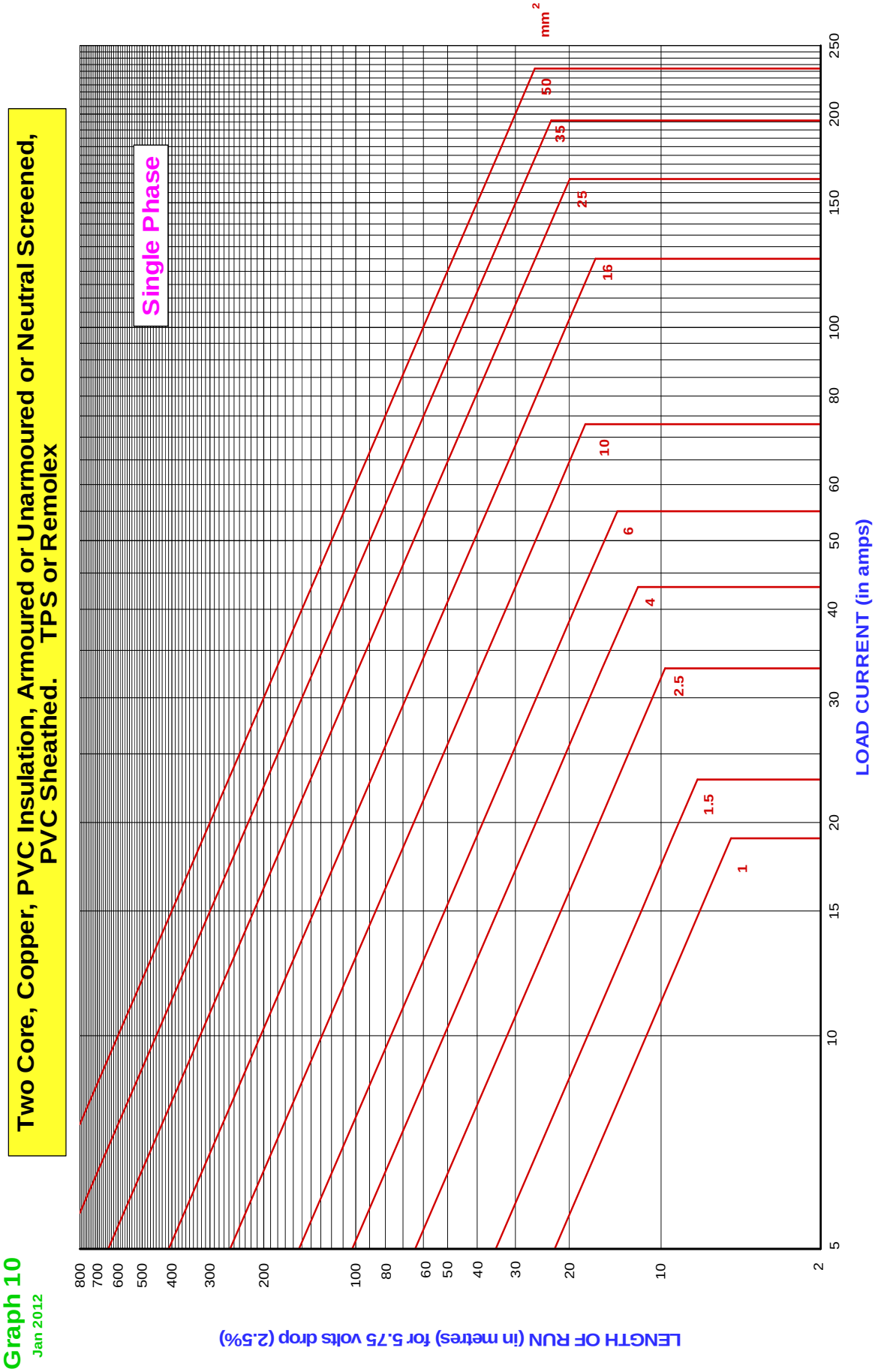
Graph 7
Jan 2012

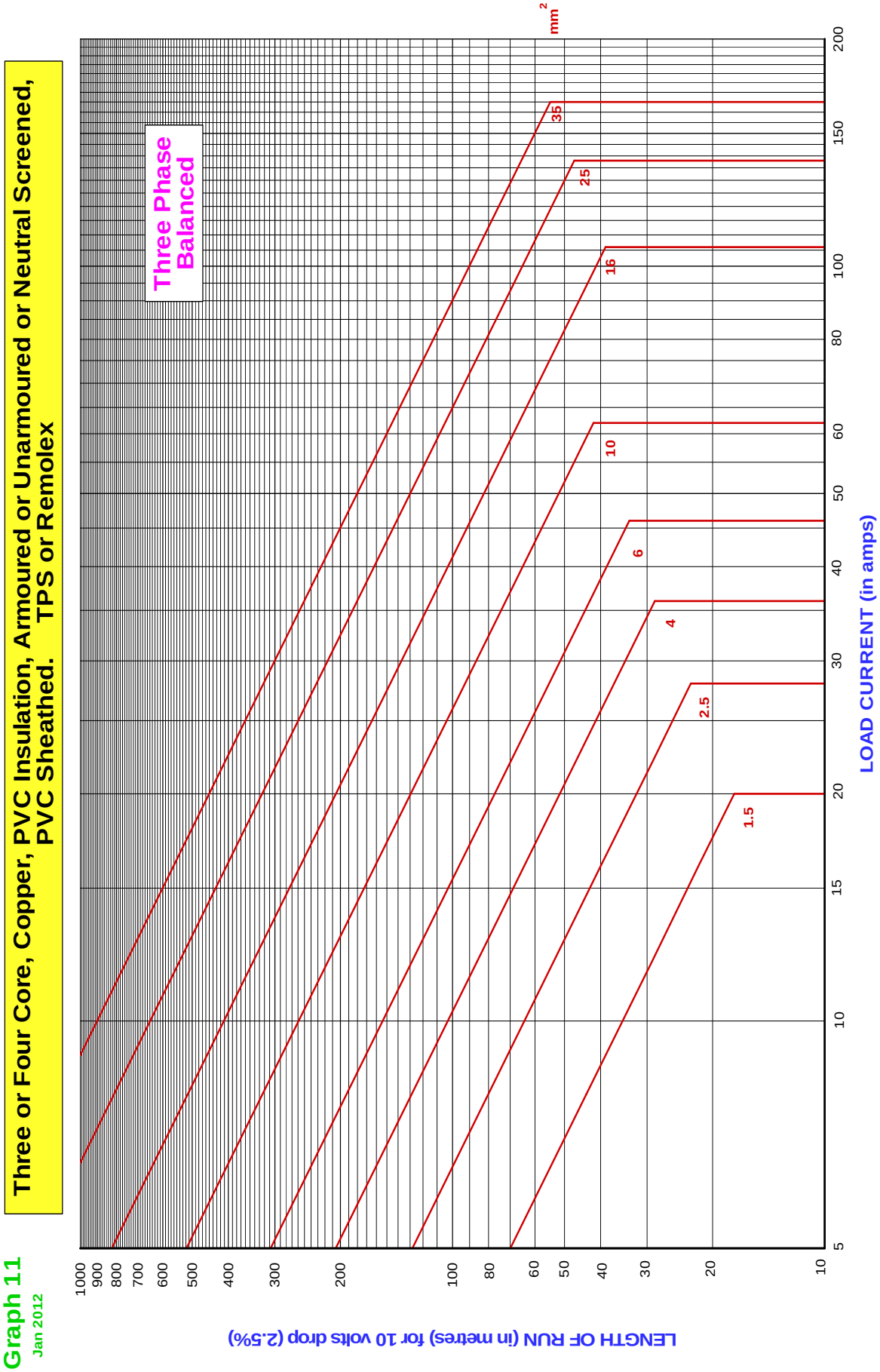


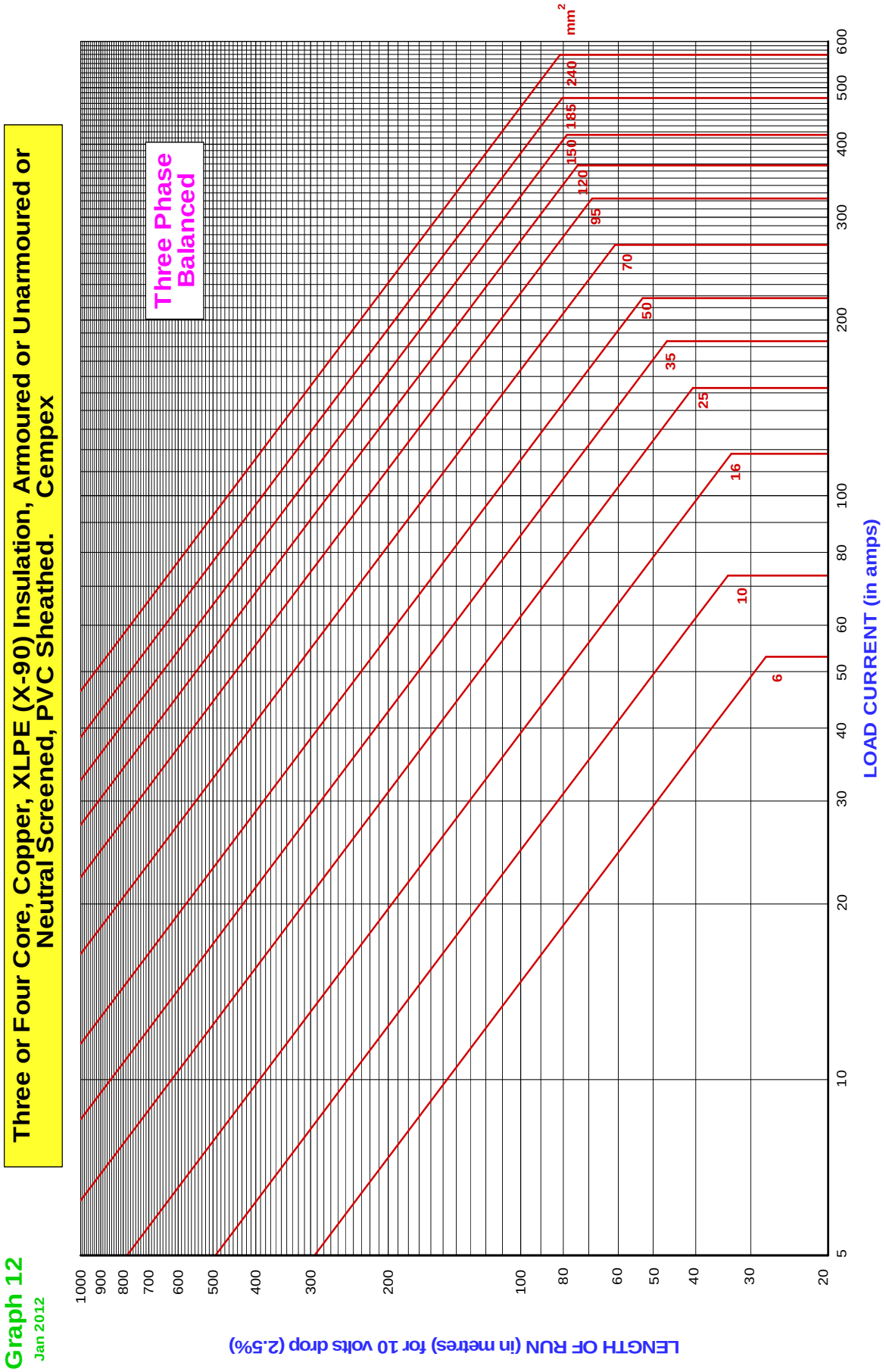
Graph 8
Jan 2012



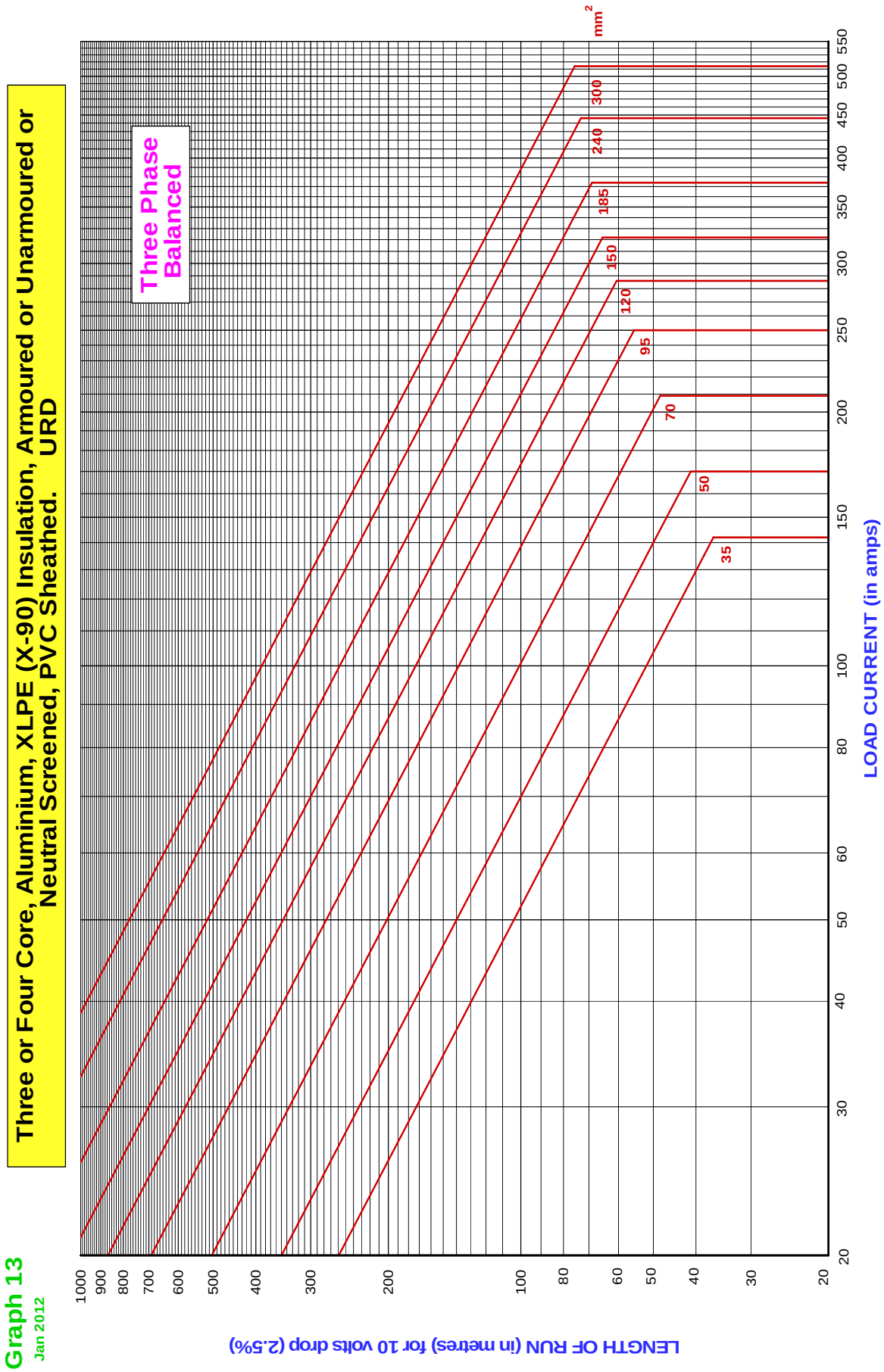
Graph 9
Jan 2012


Graph 10
Jan 2012
Two Core, Copper, PVC Insulation, Armoured or Unarmoured or Neutral Screened, PVC Sheathed. TPS or Remolex
Single Phase
mm 2
50
35
25
16
10
6
4
2.5
1.5
1
LOAD CURRENT (in amps)
LENGTH OF RUN (in metres) for 5.75 volts drop (2.5%)
800
700
600
500
400
300
200
100
80
60
50
40
30
20
10
2
5
10
15
20
30
40
50
60
80
100
150
200
250


Graph 11
Jan 2012
Three or Four Core, Copper, PVC Insulation, Armoured or Unarmoured or Neutral Screened, PVC Sheathed. TPS or Remolex
Three Phase Balanced
mm 2
35
25
16
10
6
4
2.5
1.5
LOAD CURRENT (in amps)
LENGTH OF RUN (in metres) for 10 volts drop (2.5%)
5
10
15
20
30
40
50
60
80
100
150
200
10
20
30
40
50
60
80
100
200
300
400
500
600
700
800
900
1000



Graph 12
Jan 2012



Graph 13
Jan 2012

MEDIUM VOLTAGE
TR-XLPE CABLES

SECTION FOUR – MEDIUM VOLTAGE TR-XLPE CABLES

CONSTRUCTION

Nexans Olex Medium Voltage TR-XLPE cables are designed in accordance with AS/NZS 1429.1:2000 and specific customer requirements where applicable to provide optimum performance for the end application.
The AS/NZS 1429.1:2000 is compatible with, and in some instances exceeds, the requirements of the international standard IEC 60502.2. AS/NZS 1429.1 is also compatible with (UK) BS 6622 and (US) AEIC CS8 and ICEA S-93-639/NEMA WC74.

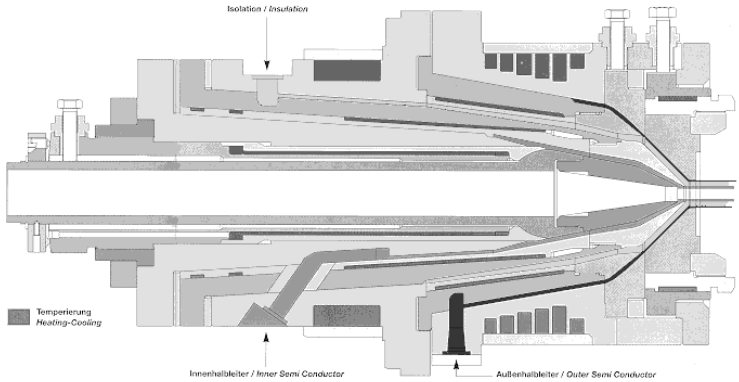
Component Detail

Conductor

Conductors are made of either copper or aluminium to AS/NZS 1125. To assist in producing a smooth circular profile at the interface between the conductor screen and the insulation, compacted stranded conductors are used.

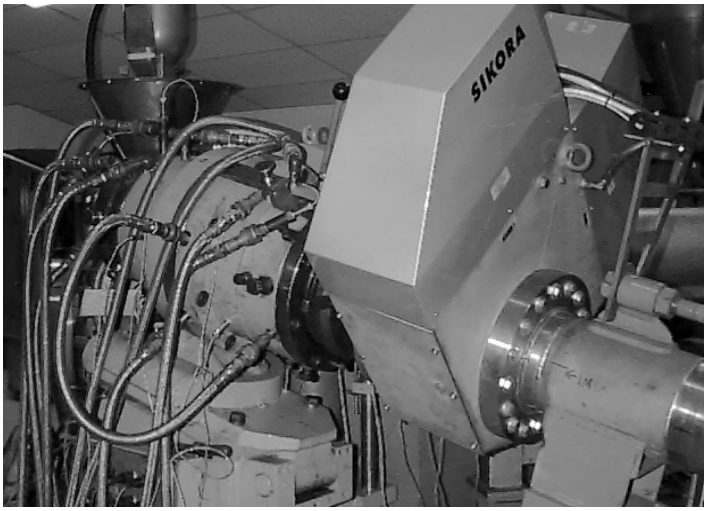
Insulation and Semiconductive Screens

All Nexans Olex Medium Voltage TR-XLPE insulated cables are produced under clean room conditions, using the triple extrusion process in which the conductor screen, insulation and insulation screen are extruded simultaneously through a single extrusion head. The surface of the insulation is never exposed to the atmosphere or to any material other than the adjacent semiconductive screens, ensuring that the interfaces between the materials are completely free of voids and contamination.



Cross sectional view of a Triple Extrusion Head

A sophisticated dimension control device uses X-Rays which are fired through the three layers of polymer to accurately measure the individual layer thicknesses; this ensures that the dimensions of all layers are constant and concentric through the entire length of the cable.



EX-RAY-800 Dimensional Controller

The cross-linking process is carried out in a totally water-free environment, using inert gas rather than steam as the curing medium. This dry-cure process ensures a high integrity insulation and leads to excellent electrical performance.

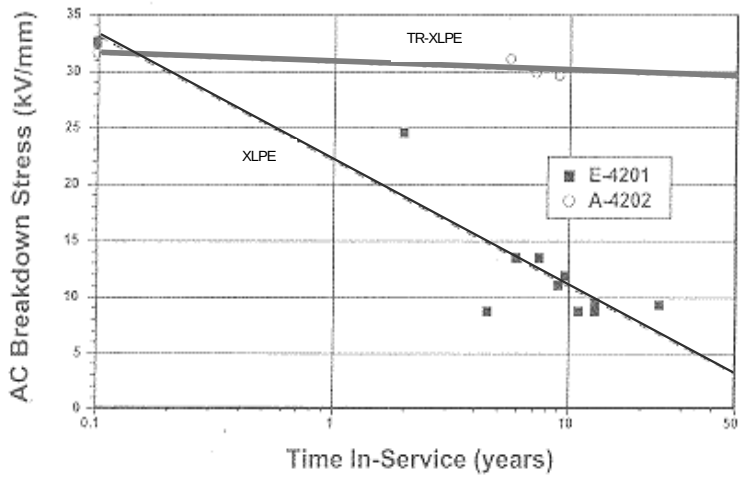
CONSTRUCTION (CONT.)

Insulation and Semiconductive Screens (cont.)

The functional components of this triple layer are:

1. Conductor screen, a semiconductive cross-linked polymeric material applied over the conductor and bonded to the insulation. This provides a smooth, circular interface between the conductor and insulation and eliminates stress concentrations.

2. Insulation , a clean, low density, high molecular weight cross-linked polyethylene. A tree-retardant grade, which has shown improved performance in accelerated ageing tests, is used. This leads to superior long term reliability.



Projected useful life of TR-XLPE cables – more than 40 years

3. Insulation screen, a layer of semiconductive cross-linked polymeric material which adheres firmly to the insulation, yet remains readily strippable by hand for jointing and terminating.

Metal Screen

A screen of plain annealed copper wires is helically applied over the semiconductive insulation screen, ie, over the core of a single core cable or each core of a three core cable.

This screen acts as a return path for capacitive charging current and induced circulating currents under normal operating conditions. The screen will also carry short circuit current in the event of an electrical fault in the circuit.

Core Assembly (Three Core Cable)

The cores are laid up and the interstices filled with a non-hygroscopic material to achieve a circular cable cross section. The laid up core assembly is bound with helically applied non-hygroscopic tapes.

Separation Sheath and Armour (Three Core Cable)

In three core armoured cables, a separation sheath of PVC is extruded over the core assembly followed by a layer of helically applied galvanised mild steel wires.

Outer Sheath

A sheath of PVC, or a dual sheath of PVC/HDPE, is extruded over the metal screen of a single core cable, or over the core assembly or steel wire armour of three core cables.

Alternative protective coverings may be applied depending on the environment in which the cable is installed, eg, LLDPE, MDPE, HDPE, Megolon.

SCREEN DESIGNS

The standard range of Nexans Olex Medium Voltage TR-XLPE cables rated up to and including 33 kV incorporates copper wire screens based on fault levels of either 3 kA or 10 kA for 1 second. If either of the standard screen designs does not suit a particular installation, the screen constructions can be tailored in size to meet the specific fault requirements of any operating system.

Wire Screen Cross Sectional Areas

In the case of three core cables which have screens around each individual core, the total screen cross sectional area is spread evenly over the three cores.

There are several other factors which can override the above criteria. Firstly, the screens are designed so that the average gap between the wires does not exceed 4 mm. This results in the screen area being increased above that required for the required fault level in certain cases. Secondly, the screen area is limited to a value so that its fault rating does not exceed that of the conductor. In some cases, the smaller cables in a range have fault levels of less than either 3 kA or 10 kA for 1 second respectively.

Screen Short Circuit Ratings

The screen short circuit ratings are calculated in accordance with formulae given in IEC 60949. Based on AS/NZS 1429.1 a starting temperature of 80°C and a final temperature of 250°C are used. The formulae are based on adiabatic conditions ie, no dissipation of heat during the short circuit.

The fault rating Isc of a copper wire screen of a given cross sectional area can be calculated for any duration from the formula :

$$Isc = \frac{148.6 * S}{\sqrt{t}} \quad (A)$$

where S = Screen Area (mm^2) and t = Fault Duration (s).

Conversely, the screen area required for a given fault rating can be calculated as follows:

$$S = \frac{Isc * \sqrt{t}}{148.6} \quad (mm^2)$$

For convenience, fault ratings for durations of 1 second are often quoted and this simplifies calculations since $\sqrt{t} = 1$ and this term disappears from the formulae.

TESTING

Testing of Nexans Olex Medium Voltage TR-XLPE cables is carried out in accordance with AS/NZS 1429.1:2000. The tests performed are :

Routine tests* - "tests made by the manufacturer on all completed cable to demonstrate the integrity of the cable."

Sample tests* - "tests made by the manufacturer on samples of completed cable, or components taken from a completed cable, at a specified frequency so as to verify that the finished product meets the design specification."

Type tests# - "tests made by a manufacturer before supplying commercially a type of cable in order to demonstrate satisfactory performance characteristics to meet the intended application. These tests are of such a nature that, after they have been made, they need not be repeated unless changes are made in the cable materials, design, or method of manufacture, which might change the performance characteristics."

* All routine and sample tests are performed in the factory.

Type tests are carried out in Nexans Olex's plant in Tottenham, Melbourne, which includes a separate laboratory dedicated to EHV cable testing. The extensive facilities include high voltage test equipment which can perform partial discharge measurements at voltages up to 300 kV, high voltage break-down tests to 600 kV, cyclic ageing tests and impulse withstand tests. The impulse test generator has been specifically built for cable and accessory testing and is the largest in the southern hemisphere, capable of impulses up to 1.2 MV. This allows all type tests to AS/NZS and other national standards to be performed.

Tests Performed on Cables		
Routine Tests	Sample Tests	Type Tests
Spark test on sheath.	Thicknesses of extruded components.	Insulation resistance at 20°C and 90°C.
Conductor examination and resistance.	Screen and armour wire diameters, and screen area.	Elongation at rupture of conductor screen.
Partial discharge tes.t	Heat shock test (PVC sheaths only).	Pressure test (PVC sheaths only.)
High voltage a.c. test for 5 min.	Insulation shrinkage.	Loss of mass (PVC sheaths only).
High voltage a.c. test for 1 min on separation sheath (three core armoured cable only).	Insulation concentricity.	Volume resistivity of conductor and insulation screen.s
	Conductor screen projections/irregularities.	Mechanical tests (before and after ageing) of insulation and sheaths.
	Determination of voids and contaminants.	Partial discharge test after bending.
	Hot set test.	Impulse withstand test followed by high voltage a.c. test for 15 min.
	Insulation screen strippability and adhesion.	Partial discharge test after heat cycling.
		DDF (tan δ) as a function of temperature.
		High voltage a.c. test for 4 h.
		Compatabilitry test for separation sheath (if any) and oversheath.

TEST VOLTAGE LEVELS

Voltage Withstand Tests

Rated Voltage	Impulse	Type Tests		Routine Test
		High Voltage 15 min 50 Hz (after impulse test)	High Voltage 4 h 50 Hz	High Voltage 5 min 50 Hz
(kV)	(kV)	(kV)	(kV)	(kV)
3.8/6.6	60	12.5	15	12.5
6.35/11	95	21	25	21
12.7/22	150	42	50	42
19/33	200	63	75	63

Partial Discharge Voltage Levels

Rated Voltage	Permitted Maximum Discharge	
	20 pC at 200 percent Uo	5 pC at 150 percent Uo
(kV)	(kV)	(kV)
3.8/6.6	7.6	5.7
6.35/11	13	10
12.7/22	25	19
19/33	38	29

INSTALLATION TESTS

General

After the cable has been installed and prior to commencing terminating or jointing, it is desirable to carry out checks to establish that the cable has not been damaged during the installation process, namely a Sheath Integrity Test and an Insulation Resistance Test of Primary Insulation

After completion of the tests, if the terminating or jointing is not being commenced straight away, the cable ends should be resealed with heat shrinkable end caps or similar to prevent the ingress of moisture.

Nexans Olex New Zealand Recommendations for Tests After Complete Installation of TR-XLPE Medium Voltage Cables

Advice Concerning Tests After Installation

If a test is carried out after installation, please note that the test is to detect defects caused during installation. After installation, the test is applied to the cable and accessories.

High Voltage D.C. Test After Installation

The D.C. testing of the primary insulation is not recommended. There are two important reasons for not using a High Voltage DC Test.

1. The DC field in the cable and accessories applies different electric stresses (both in magnitude and in physical location) to an AC field, so much so, that it is considered to be a poor process to find faults.
2. The application of High Voltage DC leads to premature failure of aged and "wet" primary insulation. This has been proven in the Laboratory and has been proven repeatedly in the field.

Safety Requirements

As the voltages used in these tests are potentially lethal, appropriate safety measures must be employed to ensure that the safety of all people involved in the testing process is not compromised.

Cable ends to be isolated shall be disconnected from the supply and protected from contact to supply, or ground, or accidental contact. Safety measures shall include, and shall not necessarily be limited to, earthing of cable under test prior to and after test voltages are applied, erection of safety barriers with warning signs, and an open communication channel between testing personnel.

The testing guidelines outlined in this document are Nexans Olex's recommendations only, and Nexans Olex cannot be held responsible for ensuring the safe implementation of these recommendations.

Sheath Integrity Test

A sheath integrity test (eg, 1000 V minimum insulation resistance tester) applied between the outer-most metallic layer and earth can identify after-installation damage to the non-metallic outer sheath.

The measured value should be read after application of the voltage for 1 minute. Ideally the measured value should be corrected for temperature to a standard value at 20°C if correction factors are available. A rough guide is that the insulation resistance decreases to one half of the value for a 10°C rise in temperature. The cable temperature should be recorded along with the measured values.

Measured values of Insulation Resistance for the sheath should be greater than calculated values. Calculated values for new cable range from 1.5 MΩ/km to 4.0 MΩ/km @ 20°C for PVC sheaths and from 120 MΩ/km to 300 MΩ/km @ 20°C for PE sheaths. Values are highest for small cables and thick sheaths and lowest for large cables and thin sheaths (factory tests show that measured values are up to an order of magnitude greater than the calculated values).

Earth the screens after an Insulation Resistance Test on a sheath for at least 5 minutes before handling or performing other tests.

INSTALLATION TESTS (CONT.)

Insulation Resistance Test of Primary Insulation

DC voltages up to 5 kV, used when performing Insulation Resistance Tests on Primary Insulation, are not considered to be a "High voltage DC test".

An Insulation Resistance Test of the Primary Insulation should be carried out with an insulation resistance tester, with a minimum DC voltage of 2.5 kV for 1.9/3.3 kV cables or 5 kV for cables above 1.9/3.3 kV and up to 19/33 kV. The insulation test should be carried out in the "Guarded Mode" and the instrument should have a minimum full-scale range of 500 Gohms. Guarding should be applied at both ends and a spare core used for the connection lead to the guard at the far end. Any conductor or cable core used as a guard lead must have a resistance to ground of greater than 10 kohms. The measured value should be read after application of the voltage for 1 minute. Ideally the measured value should be corrected for temperature to a standard value at 20°C if correction factors are available. A rough guide is that the insulation resistance decreases to one half of the value for a 10°C rise in temperature. The cable temperature should be recorded along with the measured values.

Measured values of insulation resistance for the primary insulation should be greater than calculated values. Calculated values for new cable range from 2,400 MΩ/km to 18,000 MΩ/km at 20°C. Values are highest for small conductors and higher voltages and lowest for large conductors and lower voltages (factory tests show that measured values are up to an order of magnitude greater than the calculated values).

This test should be performed prior to any high voltage tests. Short the conductors to the screens after an Insulation Resistance Test on Primary Insulation for at least 10 minutes before handling or performing other tests.

If the instrument used for the above insulation resistance testing is a "Megger," Type BM 25, or equivalent, then the two following tests should be considered.

1. A 10 minute Polarisation Index Test - this test is commonly used as a replacement for the standard insulation resistance test.

2. A 5 Minute Step Voltage Test - the test should use five equal steps up to the maximum test voltage of 2.5 kV for 1.9/3.3 kV cables or 5 kV for cables greater than 1.9/3.3 kV up to 19/33 kV. This test is becoming increasingly used on cables of 6.35/11 kV and greater.

Both the above tests can be carried out automatically with the Megger, BM 25 unit and guarding should be applied at both ends as above.

High Voltage A.C. Test After Installation

An A.C. voltage test at power frequency should be applied for 24 hours with the normal operating voltage of the system to the primary insulation.

Some customers have objected to a 24 hour test at only the operating voltage of the cable and would prefer a test using a higher voltage for a shorter time. This can be achieved by a Very Low Frequency (VLF) HV AC Test, and the equipment now exists for hire in New Zealand to perform this. The VLF HV AC Test is becoming recognised throughout the world as a replacement test for the old HV DC Test or the 24 hour AC test at normal operating voltage, although not many standards have details in them at this point in time. VLF Tests are carried out at a frequency in the band of 0.1 to 0.02 Hz. The VLF Test Set must be of adequate power to test the measured cable capacitance at the frequency chosen. The suggested maximum VLF test voltage for new cable is between 2.7 and 3.0 times the cable operating voltage (Uo), for a minimum of 15 minutes. Where possible, a 30 minute testing time is now recommended as international research has shown this to give a higher confidence. Refer to the test procedure of IEEE-400-2.

For existing or aged cables being recommissioned after repair or alterations, the VLF Test Voltage should be a maximum of 2.3 times the cable operating voltage (Uo), for 15 minutes.

Documentation

The values obtained in the above tests should be recorded in a cable log so that they are available for comparison purposes in the future.

CURRENT RATINGS

The continuous current ratings given in this publication have been calculated in accordance with the International Electrotechnical Commission Publication No. IEC 60287 - "Calculation of the Continuous Current Rating of Cables (100% Load factor)", based on the following environmental conditions: Ambient Air Temperature, 30°C; Ambient Soil Temperature, 15°C; Soil Thermal Resistivity, 1.2 K.m/W; Depth of burial, 1.0 m; and Screens bonded both ends.
In all cases, the ratings given are the single circuit ratings corresponding to continuous loading at the maximum conductor temperature of 90°C. Where the conditions vary from those on which the ratings are based, rating factors from Tables 4.1 to 4.4 (Section 4 Medium Voltage TR-XLPE Cables) need to be applied.

Methods of Installation

The methods of installation for which the ratings are applicable are shown graphically in Figure 2.1 (Section 2 General Technical Information).

Groups of Circuits

For groups of circuits unenclosed in air, the spacings and arrangements which need to be maintained to prevent derating are given in Figure 2.2 (Section 2 General Technical Information).
Where a number of circuits are installed in close proximity in such a way that they are not thermally independent, the appropriate rating factors from Tables 4.5, 4.6, (Section 4 Medium Voltage TR-XLPE Cables) and 2.1, 2.2 (Section 2 General Technical Information) need to be applied.

Cables in Parallel

For cables operated in parallel, each parallel leg is regarded as a separate circuit for current rating purposes and the appropriate rating factors for grouping are applicable. Refer also to Figure 2.3 (Section 2 General Technical Information) for the arrangements of single core cables so as to ensure equal current sharing between parallel legs of the same phase.

Bonding of Screens

The current ratings given for single core cables assume that the copper wire screens are solidly bonded to earth at both ends. Solid bonding can result in a reduction in current ratings on larger cables due to the heating effect of circulating currents induced in the screen. This loss can be minimised, either in short runs of cable, by earthing at one end only (single point bonding) which results in a standing voltage proportional to the conductor current and the length of run being induced on the screen and in long runs of cable, by dividing the route into tri-sections and transposing or "crossbonding" the screens at every joint position in a tri-section so that the e.m.f.'s induced by the three phases cancel one another.
When these methods of bonding are employed, higher current ratings may be used, however attention must be paid to the safety aspects with respect to the induced standing voltages. This places a limitation on the length of circuit for which single point bonding can be used.
Generally it is only considered practical to use special cross-bonding arrangements on transmission class cables (66 kV and above) as the benefits of the higher current ratings are outweighed by the costs of the extra equipment required.

Emergency Ratings

TR-XLPE insulated cables can operate under emergency conditions with a conductor temperature of 130°C for periods of up to 36 hours, not more than three times per year. In practice, however, due to the difficulty in ensuring compatibility with terminations and the high volume expansion of TR-XLPE above 100°C, a limit of 105°C for emergency rating is specified in AS/NZS 1429.1. The 105°C emergency limit represents the following approximate percentage increase over the normal continuous ratings:
Cables in air: +12%
Cables in ground (laid direct or in ducts): +9%.

MEDIUM VOLTAGE RATING FACTORS

Table 4.1 Air Temperature Variation

	Air Temperature (°C)									
	15	20	25	30	35	40	45	50	55	60
Rating Factor	1.12	1.08	1.04	1.00	0.96	0.91	0.87	0.82	0.76	0.71

Table 4.2 Soil Temperature Variation

	Soil Temperature (°C)									
	0	5	10	15	20	25	30	35	40	45
Rating Factor	1.10	1.06	1.03	1.00	0.97	0.93	0.89	0.86	0.82	0.77

Table 4.3 Depth of Burial Variation

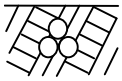
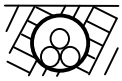
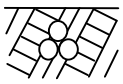
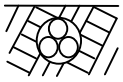
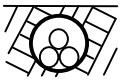
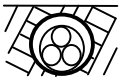
Depth of Burial (m)				
	Up to 300 mm²	Over 300 mm²		
0.8	1.02	1.03	1.01	1.01
1.0	1.00	1.0	1.00	1.00
1.25	0.98	0.98	0.98	0.98
1.5	0.97	0.96	0.96	0.97
1.75	0.96	0.94	0.95	0.97
2.0	0.94	0.92	0.94	0.96
2.5	0.93	0.91	0.92	0.95
3.0 (or more)	0.92	0.89	0.90	0.94

Table 4.4 Soil Thermal Resistivity Variation

Soil Thermal Resistivity (K.m/W)				
0.8	1.16	1.12	1.09	1.07
0.9	1.11	1.09	1.06	1.05
1.0	1.07	1.06	1.04	1.03
1.2	1.00	1.00	1.00	1.00
1.5	0.90	0.92	0.93	0.95
2.0	0.79	0.82	0.85	0.87
2.5	0.71	0.75	0.78	0.82
3.0	0.65	0.69	0.73	0.77

MEDIUM VOLTAGE RATING FACTORS (CONT.)

Table 4.5 Groups of Circuits Laid Direct

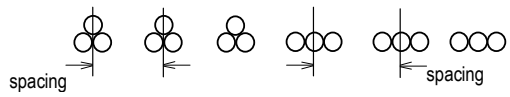
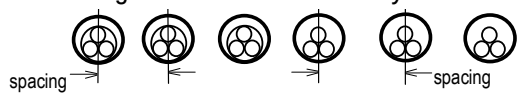
No. of Circuits	Single Core Cables 						Multicore Cables 				
	Touching		Spacing (m)				Touching	Spacing (m)			
	Trefoil	Flat	0.15	0.30	0.45	0.60		0.15	0.30	0.45	0.60
2	0.78	0.80	0.82	0.86	0.89	0.91	0.80	0.85	0.89	0.91	0.93
3	0.66	0.68	0.71	0.77	0.80	0.83	0.68	0.76	0.81	0.84	0.87
4	0.59	0.62	0.65	0.72	0.77	0.80	0.62	0.71	0.77	0.81	0.84
5	0.55	0.58	0.61	0.68	0.74	0.78	0.57	0.66	0.73	0.78	0.82
6	0.52	0.55	0.58	0.66	0.72	0.76	0.54	0.64	0.71	0.77	0.81
7	0.49	0.52	0.56	0.64	0.70	0.75	0.51	0.61	0.69	0.75	0.79
8	0.47	0.50	0.54	0.63	0.69	0.74	0.49	0.59	0.68	0.74	0.79
9	0.45	0.48	0.52	0.61	0.68	0.74	0.47	0.58	0.67	0.73	0.78
10	0.44	0.47	0.51	0.61	0.68	0.73	0.45	0.57	0.66	0.73	0.78
11	0.43	0.46	0.50	0.60	0.67	0.73	0.44	0.55	0.65	0.72	0.77
12	0.41	0.45	0.49	0.59	0.67	0.72	0.43	0.54	0.64	0.72	0.77

Table 4.6 Groups of Circuits In Underground Ducts

No. of Circuits	Multicore Cables in Single-way Ducts or Single Core Cables in Multiway Ducts 				Single Core Cables in Single-way Ducts 		
	Touching	Spacing (m)			Touching	Spacing (m)	
		0.30	0.45	0.60		0.45	0.60
2	0.88	0.91	0.93	0.94	0.85	0.88	0.90
3	0.80	0.85	0.88	0.90	0.75	0.80	0.83
4	0.76	0.81	0.85	0.88	0.70	0.77	0.80
5	0.72	0.78	0.83	0.86	0.67	0.74	0.78
6	0.69	0.76	0.81	0.85	0.64	0.72	0.76
7	0.67	0.75	0.80	0.84	0.62	0.70	0.75
8	0.65	0.74	0.79	0.83	0.61	0.69	0.74
9	0.63	0.72	0.78	0.83	0.59	0.68	0.73
10	0.62	0.72	0.78	0.82	0.58	0.67	0.73
11	0.61	0.71	0.77	0.82	0.57	0.67	0.72
12	0.60	0.70	0.77	0.81	0.57	0.66	0.72

SINGLE CORE CU 11 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen
} Triple extruded, Dry-cure
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 231-13 A

Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
16 *	12.5	14.1	16	28 x 0.85	1.0 / 1.0	20.3	0.58
25	13.7	15.3	20	36 x 0.85	1.0 / 1.0	21.5	0.73
35	14.7	16.3	20	36 x 0.85	1.0 / 1.0	22.5	0.84
50	16.0	17.6	20	36 x 0.85	1.0 / 1.0	23.8	0.98
70	17.4	19.0	20	36 x 0.85	1.0 / 1.0	25.2	1.21
95	19.1	20.7	20	36 x 0.85	1.0 / 1.0	26.9	1.48
120	20.5	22.1	20	36 x 0.85	1.0 / 1.0	28.3	1.74
150	21.9	23.5	20	36 x 0.85	1.0 / 1.0	29.7	2.02
185	23.7	25.3	20	36 x 0.85	1.0 / 1.0	31.5	2.40
240	26.0	27.6	20	36 x 0.85	1.0 / 1.0	33.8	2.98
300	28.2	29.8	20	36 x 0.85	1.0 / 1.1	36.2	3.60
400	31.6	33.2	20	36 x 0.85	1.1 / 1.1	39.8	4.49
500	34.9	36.5	20	36 x 0.85	1.1 / 1.2	43.3	5.50
630	38.5	40.1	20	36 x 0.85	1.2 / 1.2	47.1	6.90

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 3 kA for 1 s

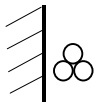
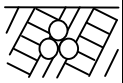
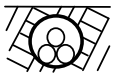
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE CU 11 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 231-13 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
16 *	1.47	0.154	0.18	65	125	120	101
25	0.927	0.144	0.21	65	163	154	129
35	0.668	0.137	0.23	65	197	183	153
50	0.494	0.130	0.26	65	237	216	181
70	0.342	0.121	0.29	80 (NZ)	294	263	221
95	0.247	0.115	0.33	80 (NZ)	359	313	264
120	0.196	0.111	0.36	100 (NZ)	413	355	305
150	0.159	0.107	0.39	100 (NZ)	470	397	341
185	0.128	0.103	0.43	100 (NZ)	539	447	384
240	0.0981	0.099	0.47	100 (NZ)	637	516	443
300	0.0791	0.096	0.52	150	730	579	509
400	0.0632	0.093	0.59	150	848	655	575
500	0.0510	0.090	0.66	150	978	737	647
630	0.0416	0.087	0.74	150	1122	823	722

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 3 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

Screens bonded both ends

SINGLE CORE CU 11 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen
} Triple extruded, Dry-cure
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 231-14 A

Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
25 *	13.7	15.3	24	29 x 1.03	1.0 / 1.0	21.9	0.77
35 *	14.7	16.3	34	24 x 1.35	1.0 / 1.0	23.5	0.98
50 *	16.0	17.6	49	22 x 1.69	1.0 / 1.0	25.5	1.26
70	17.4	19.0	70	31 x 1.69	1.0 / 1.0	26.9	1.68
95	19.1	20.7	70	31 x 1.69	1.0 / 1.0	28.6	1.95
120	20.5	22.1	69	48 x 1.35	1.0 / 1.0	29.3	2.20
150	21.9	23.5	69	48 x 1.35	1.0 / 1.0	30.7	2.48
185	23.7	25.3	69	48 x 1.35	1.0 / 1.0	32.5	2.86
240	26.0	27.6	69	48 x 1.35	1.0 / 1.0	34.8	3.44
300	28.2	29.8	69	48 x 1.35	1.0 / 1.1	37.2	4.06
400	31.6	33.2	69	48 x 1.35	1.1 / 1.1	40.8	4.95
500	34.9	36.5	69	48 x 1.35	1.1 / 1.2	44.3	5.95
630	38.5	40.1	69	48 x 1.35	1.2 / 1.2	48.1	7.35

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

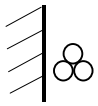
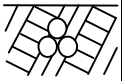
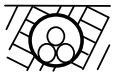
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE CU 11 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen
} Triple extruded, Dry-cure
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 231-14 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
25 *	0.927	0.145	0.21	65	164	154	129
35 *	0.668	0.140	0.23	65	200	184	154
50 *	0.494	0.134	0.26	80 (NZ)	242	217	183
70	0.342	0.125	0.29	80 (NZ)	298	262	221
95	0.247	0.119	0.33	100 (NZ)	362	311	267
120	0.196	0.113	0.36	100 (NZ)	413	351	301
150	0.159	0.109	0.39	100 (NZ)	467	391	336
185	0.128	0.105	0.43	100 (NZ)	535	439	377
240	0.0980	0.100	0.47	100 (NZ)	627	503	432
300	0.0791	0.098	0.52	150	715	561	493
400	0.0631	0.094	0.59	150	824	630	553
500	0.0509	0.091	0.66	150	943	702	616
630	0.0415	0.088	0.74	150	1072	777	681

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

Screens bonded both ends

SINGLE CORE AL 11 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen } Triple extruded, Dry-cure
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 231-23 A							
Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
25 *	13.7	15.3	16	28 x 0.85	1.0 / 1.0	21.5	0.53
35 ^	14.7	16.3	20	36 x 0.85	1.0 / 1.0	22.5	0.62
50	15.9	17.5	20	36 x 0.85	1.0 / 1.0	23.7	0.68
70	17.4	19.0	20	36 x 0.85	1.0 / 1.0	25.2	0.78
95 ^	19.1	20.7	20	36 x 0.85	1.0 / 1.0	26.9	0.89
120	20.5	22.1	20	36 x 0.85	1.0 / 1.0	28.3	0.99
150	21.9	23.5	20	36 x 0.85	1.0 / 1.0	29.7	1.09
185 ^	23.6	25.2	20	36 x 0.85	1.0 / 1.0	31.4	1.23
240 ^	26.0	27.6	20	36 x 0.85	1.0 / 1.0	33.8	1.45
300 ^	28.0	29.6	20	36 x 0.85	1.0 / 1.1	36.0	1.68
400	31.1	32.7	20	36 x 0.85	1.1 / 1.1	39.3	2.02
500	34.2	35.8	20	36 x 0.85	1.1 / 1.2	42.6	2.39
630	37.8	39.4	20	36 x 0.85	1.2 / 1.2	46.4	2.89
800	42.4	44.0	20	36 x 0.85	1.2 / 1.3	51.3	3.51
1000	46.5	48.1	20	36 x 0.85	1.2 / 1.3	55.4	4.20
Issue: January 2012 6.35/11 (12) kV. Made to AS/NZS 1429.1							

* Short circuit rating less than 3 kA for 1 s
^ Also complies with AS/NZS 4026

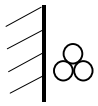
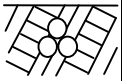
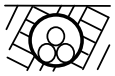
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE AL 11 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen } Triple extruded, Dry-cure
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 231-23 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
25 *	1.54	0.144	0.21	65	127	119	100
35 ^	1.113	0.137	0.23	65	153	142	119
50	0.822	0.130	0.26	65	184	167	140
70	0.568	0.121	0.29	80 (NZ)	229	204	172
95 ^	0.411	0.115	0.33	80 (NZ)	279	243	205
120	0.325	0.111	0.36	100 (NZ)	322	276	237
150	0.265	0.107	0.39	100 (NZ)	365	309	265
185 ^	0.211	0.103	0.42	100 (NZ)	421	349	300
240 ^	0.161	0.099	0.47	100 (NZ)	499	404	347
300 ^	0.130	0.096	0.52	150	572	455	399
400	0.102	0.093	0.58	150	669	519	456
500	0.0803	0.090	0.65	150	779	590	518
630	0.0638	0.088	0.72	150	907	669	587
800	0.0518	0.085	0.82	200	1050	752	687
1000	0.0432	0.083	0.91	200	1189	831	759

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 3 kA for 1 s
^ Also complies with AS/NZS 4026

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m
Screens bonded both ends	

SINGLE CORE AL 11 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen } Triple extruded, Dry-cure
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 231-24 A

Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35 *	14.7	16.3	23	40 x 0.85	1.0 / 1.0	22.5	0.64
50 *	15.9	17.5	33	39 x 1.03	1.0 / 1.0	24.1	0.80
70 *	17.4	19.0	45	54 x 1.03	1.0 / 1.0	25.6	1.00
95 *	19.1	20.7	62	43 x 1.35	1.0 / 1.0	27.9	1.28
120	20.5	22.1	69	48 x 1.35	1.0 / 1.0	29.3	1.45
150	21.9	23.5	69	48 x 1.35	1.0 / 1.0	30.7	1.55
185 ^	23.6	25.2	69	48 x 1.35	1.0 / 1.0	32.4	1.69
240 ^	26.0	27.6	69	48 x 1.35	1.0 / 1.0	34.8	1.91
300 ^	28.0	29.6	69	48 x 1.35	1.0 / 1.1	37.0	2.14
400	31.1	32.7	69	48 x 1.35	1.1 / 1.1	40.3	2.48
500	34.2	35.8	69	48 x 1.35	1.1 / 1.2	43.6	2.85
630	37.8	39.4	69	48 x 1.35	1.2 / 1.2	47.4	3.35
800	42.4	44.0	69	48 x 1.35	1.2 / 1.3	52.3	3.97
1000	46.5	48.1	69	48 x 1.35	1.2 / 1.3	56.4	4.66

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s
^ Also complies with AS/NZS 4026

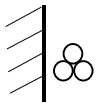
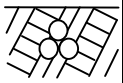
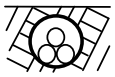
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE AL 11 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 231-24 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
35 *	1.113	0.137	0.23	65	153	142	119
50 *	0.822	0.131	0.26	80 (NZ)	185	168	141
70 *	0.568	0.122	0.29	80 (NZ)	229	204	172
95 *	0.411	0.117	0.33	80 (NZ)	281	243	205
120	0.325	0.113	0.36	100 (NZ)	323	275	236
150	0.265	0.109	0.39	100 (NZ)	366	307	263
185 ^	0.211	0.105	0.42	100 (NZ)	420	346	297
240 ^	0.161	0.100	0.47	100 (NZ)	496	399	342
300 ^	0.130	0.098	0.52	150	567	447	392
400	0.102	0.095	0.58	150	659	507	445
500	0.0802	0.092	0.65	150	763	572	502
630	0.0637	0.089	0.72	150	881	644	565
800	0.0517	0.086	0.82	200	1013	718	656
1000	0.0431	0.084	0.91	200	1139	788	719

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s
^ Also complies with AS/NZS 4026

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

Screens bonded both ends

THREE CORE CU 11 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 233-13 A

Conductor Size	Nominal Diameters		Wire Screen (Per Core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
16 *	12.5	14.1	5.7	10 x 0.85	1.1 / 1.1	39.0	1.46
25	13.7	15.3	6.8	12 x 0.85	1.1 / 1.2	41.8	1.86
35	14.7	16.3	6.8	12 x 0.85	1.1 / 1.2	43.9	2.20
50	16.0	17.6	6.8	12 x 0.85	1.2 / 1.2	46.9	2.67
70	17.4	19.0	7.4	13 x 0.85	1.3 / 1.3	50.4	3.42
95	19.1	20.7	7.9	14 x 0.85	1.3 / 1.4	54.2	4.32
120	20.5	22.1	8.5	15 x 0.85	1.4 / 1.4	57.8	5.20
150	21.9	23.5	8.5	15 x 0.85	1.4 / 1.5	61.0	6.10
185	23.7	25.3	9.6	17 x 0.85	1.5 / 1.5	65.1	7.35
240	26.0	27.6	10.2	18 x 0.85	1.6 / 1.6	70.5	9.20
300	28.2	29.8	11.3	20 x 0.85	1.6 / 1.7	75.4	11.20
400	31.6	33.2	11.9	21 x 0.85	1.8 / 1.8	83.4	14.05

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 3 kA for 1 s

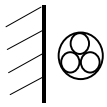
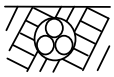
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE CU 11 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 233-13 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A)		
							
16 *	1.47	0.141	0.18	65	111	112	93
25	0.927	0.132	0.21	65	145	143	119
35	0.668	0.126	0.23	65	175	171	143
50	0.494	0.119	0.26	65	210	202	168
70	0.342	0.111	0.29	80 (NZ)	259	246	206
95	0.247	0.105	0.33	80 (NZ)	315	294	246
120	0.196	0.102	0.36	100 (NZ)	360	333	284
150	0.159	0.099	0.39	100 (NZ)	408	373	318
185	0.128	0.095	0.43	100 (NZ)	466	421	358
240	0.0984	0.091	0.47	100 (NZ)	546	486	414
300	0.0796	0.089	0.52	150	622	547	474
400	0.0638	0.086	0.59	150	714	618	536

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 3 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

THREE CORE CU 11 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 233-14 A

Conductor Size	Nominal Diameters		Wire Screens (per core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35 *	14.7	16.3	11.3	20 x 0.85	1.2 / 1.2	44.1	2.35
50 *	16.0	17.6	16.5	29 x 0.85	1.2 / 1.3	47.1	2.95
70	17.4	19.0	22.7	40 x 0.85	1.3 / 1.3	50.4	3.85
95	19.1	20.7	22.7	40 x 0.85	1.3 / 1.4	54.2	4.74
120	20.5	22.1	22.7	40 x 0.85	1.4 / 1.4	57.8	5.60
150	21.9	23.5	22.7	40 x 0.85	1.4 / 1.5	61.0	6.50
185	23.7	25.3	22.7	40 x 0.85	1.5 / 1.5	65.1	7.70
240	26.0	27.6	22.7	40 x 0.85	1.6 / 1.6	70.5	9.55
300	28.2	29.8	22.7	40 x 0.85	1.6 / 1.7	75.4	11.50
400	31.6	33.2	22.7	40 x 0.85	1.8 / 1.8	83.4	14.35

Issue: January 2012

6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

Note:

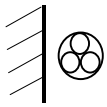
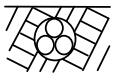
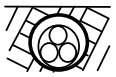
1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE CU 11 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 233-14 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A)		
							
35 *	0.668	0.126	0.23	65	175	171	143
50 *	0.494	0.119	0.26	80 (NZ)	210	202	169
70	0.342	0.111	0.29	80 (NZ)	259	246	206
95	0.247	0.105	0.33	80 (NZ)	315	294	246
120	0.196	0.102	0.36	100 (NZ)	360	333	284
150	0.159	0.099	0.39	100 (NZ)	408	373	318
185	0.128	0.095	0.43	100 (NZ)	466	421	358
240	0.0984	0.091	0.47	100 (NZ)	546	486	414
300	0.0796	0.089	0.52	150	622	547	474
400	0.0638	0.086	0.59	150	714	618	536

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

THREE CORE AL 11 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen
} Triple extruded, Dry-cure
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 233-23 A							
Conductor Size	Nominal Diameters		Wire Screens (per core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
25 *	13.7	15.3	5.7	10 x 0.85	1.1 / 1.1	41.6	1.33
35 ^	14.7	16.3	6.8	12 x 0.85	1.1 / 1.2	43.9	1.53
50	15.9	17.5	6.8	12 x 0.85	1.2 / 1.2	46.7	1.75
70	17.4	19.0	7.4	13 x 0.85	1.3 / 1.3	50.4	2.11
95 ^	19.1	20.7	7.9	14 x 0.85	1.3 / 1.4	54.2	2.51
120	20.5	22.1	8.5	15 x 0.85	1.4 / 1.4	57.5	2.89
150	21.9	23.5	8.5	15 x 0.85	1.4 / 1.5	60.7	3.26
185 ^	23.6	25.2	9.6	17 x 0.85	1.5 / 1.5	64.6	3.79
240 ^	26.0	27.6	10.2	18 x 0.85	1.6 / 1.6	70.2	4.59
300 ^	28.0	29.6	10.8	19 x 0.85	1.6 / 1.7	74.7	5.35
400	31.1	32.7	11.9	21 x 0.85	1.8 / 1.8	82.3	6.55
Issue: January 2012 6.35/11 (12) kV. Made to AS/NZS 1429.1							

* Short circuit rating less than 3 kA for 1 s

^ Also complies with AS/NZS 4026

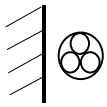
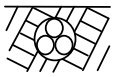
Note:

1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE AL 11 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 233-23 B							
Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A) 		
25 *	1.54	0.132	0.21	65	112	111	93
35 ^	1.11	0.125	0.23	65	136	133	111
50	0.822	0.120	0.26	65	162	157	130
70	0.568	0.111	0.29	80 (NZ)	201	191	160
95 ^	0.411	0.105	0.33	80 (NZ)	244	228	191
120	0.325	0.102	0.36	100 (NZ)	280	259	220
150	0.265	0.099	0.39	100 (NZ)	317	290	246
185 ^	0.211	0.095	0.42	100 (NZ)	363	328	279
240 ^	0.162	0.091	0.47	100 (NZ)	426	379	323
300 ^	0.130	0.089	0.52	150	486	428	371
400	0.102	0.087	0.58	150	562	487	423
Issue: January 2012 6.35/11 (12) kV. Made to AS/NZS 1429.1							

* Short circuit rating less than 3 kA for 1 s

^ Also complies with AS/NZS 4026

Note:

1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

THREE CORE AL 11 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 233-24 A							
Conductor Size	Nominal Diameters		Wire Screens (per core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
25 *	13.7	15.3	5.7	10 x 0.85	1.1 / 1.1	41.6	1.33
35 *	14.7	16.3	7.9	14 x 0.85	1.1 / 1.2	43.9	1.56
50 *	15.9	17.5	10.8	19 x 0.85	1.2 / 1.3	46.9	1.88
70 *	17.4	19.0	15.3	27 x 0.85	1.3 / 1.3	50.4	2.34
95 *	19.1	20.7	20.4	36 x 0.85	1.3 / 1.4	54.2	2.86
120	20.5	22.1	22.7	40 x 0.85	1.4 / 1.4	57.5	3.29
150	21.9	23.5	22.7	40 x 0.85	1.4 / 1.5	60.7	3.66
185 ^	23.6	25.2	22.7	40 x 0.85	1.5 / 1.5	64.6	4.15
240 ^	26.0	27.6	22.7	40 x 0.85	1.6 / 1.6	70.2	4.94
300 ^	28.0	29.6	22.7	40 x 0.85	1.6 / 1.7	75.0	5.65
400	31.1	32.7	22.7	40 x 0.85	1.8 / 1.8	82.3	6.85
Issue: January 2012 6.35/11 (12) kV. Made to AS/NZS 1429.1							

* Short circuit rating less than 10 kA for 1 s

^ Also complies with AS/NZS 4026

Note:

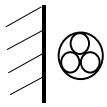
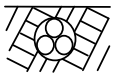
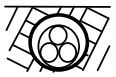
1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE AL 11 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 233-24 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A)		
							
25 *	1.54	0.132	0.21	65	112	111	93
35 *	1.11	0.125	0.23	65	136	133	111
50 *	0.822	0.120	0.26	65	162	157	130
70 *	0.568	0.111	0.29	80 (NZ)	201	191	160
95 *	0.411	0.105	0.33	80 (NZ)	244	228	191
120	0.325	0.102	0.36	100 (NZ)	280	259	220
150	0.265	0.099	0.39	100 (NZ)	317	290	246
185 ^	0.211	0.095	0.42	100 (NZ)	363	328	279
240 ^	0.162	0.091	0.47	100 (NZ)	426	379	323
300 ^	0.130	0.089	0.52	150	486	427	370
400	0.102	0.087	0.58	150	562	487	423

Issue: January 2012
6.35/11 (12) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

^ Also complies with AS/NZS 4026

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

SINGLE CORE CU 22 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen
} Triple extruded, Dry-cure
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 241-13 A

Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35	18.5	20.1	20	36 x 0.85	1.0 / 1.0	26.3	0.98
50	19.8	21.4	20	36 x 0.85	1.0 / 1.0	27.6	1.12
70	21.2	22.8	20	36 x 0.85	1.0 / 1.0	29.0	1.35
95	22.9	24.5	20	36 x 0.85	1.0 / 1.0	30.7	1.64
120	24.3	25.9	20	36 x 0.85	1.0 / 1.0	32.1	1.91
150	25.7	27.3	20	36 x 0.85	1.0 / 1.0	33.5	2.20
185	27.5	29.1	20	36 x 0.85	1.0 / 1.1	35.5	2.60
240	29.8	31.4	20	36 x 0.85	1.0 / 1.1	37.8	3.19
300	32.0	33.6	20	36 x 0.85	1.1 / 1.1	40.2	3.83
400	35.4	37.0	20	36 x 0.85	1.1 / 1.2	43.8	4.73
500	38.7	40.3	20	36 x 0.85	1.2 / 1.2	47.3	5.75
630	42.3	43.9	20	36 x 0.85	1.2 / 1.3	51.2	7.20

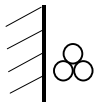
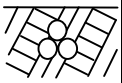
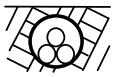
Issue: January 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE CU 22 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 241-13 B							
Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A) 		
35	0.668	0.147	0.17	80 (NZ)	202	183	156
50	0.494	0.139	0.19	80 (NZ)	242	216	183
70	0.342	0.130	0.21	100 (NZ)	299	263	227
95	0.247	0.123	0.23	100 (NZ)	365	314	271
120	0.196	0.119	0.25	100 (NZ)	419	355	307
150	0.159	0.115	0.27	100 (NZ)	476	398	343
185	0.128	0.110	0.29	100 (NZ)	546	448	386
240	0.0979	0.106	0.32	150	644	517	455
300	0.0789	0.103	0.35	150	737	581	511
400	0.0629	0.099	0.40	150	855	658	579
500	0.0505	0.095	0.44	150	986	740	651
630	0.0411	0.092	0.49	200	1132	829	758
Issue: January 2012 12.7/22 (24) kV. Made to AS/NZS 1429.1							

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

Screens bonded both ends

SINGLE CORE CU 22 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen } Triple extruded, Dry-cure
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 241-14 A

Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35 *	18.5	20.1	34	41 x 1.03	1.0 / 1.0	26.7	1.10
50 *	19.8	21.4	49	34 x 1.35	1.0 / 1.0	28.6	1.39
70	21.2	22.8	69	48 x 1.35	1.0 / 1.0	30.0	1.81
95	22.9	24.5	69	48 x 1.35	1.0 / 1.0	31.7	2.10
120	24.3	25.9	69	48 x 1.35	1.0 / 1.0	33.1	2.37
150	25.7	27.3	69	48 x 1.35	1.0 / 1.0	34.5	2.65
185	27.5	29.1	69	48 x 1.35	1.0 / 1.1	36.5	3.06
240	29.8	31.4	69	48 x 1.35	1.1 / 1.1	39.0	3.66
300	32.0	33.6	69	48 x 1.35	1.1 / 1.1	41.2	4.29
400	35.4	37.0	69	48 x 1.35	1.2 / 1.2	45.0	5.20
500	38.7	40.3	69	48 x 1.35	1.2 / 1.2	48.3	6.25
630	42.3	43.9	69	48 x 1.35	1.3 / 1.3	52.4	7.70

Issue: January 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

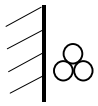
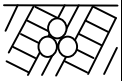
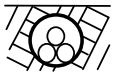
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE CU 22 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 241-14 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
35 *	0.668	0.148	0.17	80 (NZ)	202	183	156
50 *	0.494	0.141	0.19	100 (NZ)	244	216	187
70	0.342	0.132	0.21	100 (NZ)	301	262	226
95	0.247	0.125	0.23	100 (NZ)	365	311	269
120	0.196	0.121	0.25	100 (NZ)	419	351	303
150	0.159	0.117	0.27	100 (NZ)	474	392	338
185	0.128	0.112	0.29	150	541	440	387
240	0.0978	0.108	0.32	150	635	504	444
300	0.0788	0.104	0.35	150	722	563	496
400	0.0628	0.101	0.40	150	832	633	556
500	0.0505	0.097	0.44	150	953	707	621
630	0.0409	0.094	0.49	200	1083	783	716

Issue: January 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

Screens bonded both ends

SINGLE CORE AL 22 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen } Triple extruded, Dry-cure
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 241-23 A

Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35 ^	18.5	20.1	20	36 x 0.85	1.0 / 1.0	26.3	0.75
50	19.7	21.3	20	36 x 0.85	1.0 / 1.0	27.5	0.82
70	21.2	22.8	20	36 x 0.85	1.0 / 1.0	29.0	0.92
95 ^	22.9	24.5	20	36 x 0.85	1.0 / 1.0	30.7	1.04
120	24.3	25.9	20	36 x 0.85	1.0 / 1.0	32.1	1.15
150	25.7	27.3	20	36 x 0.85	1.0 / 1.0	33.5	1.27
185 ^	27.4	29.0	20	36 x 0.85	1.0 / 1.1	35.4	1.43
240 ^	29.8	31.4	20	36 x 0.85	1.0 / 1.1	37.8	1.66
300 ^	31.8	33.4	20	36 x 0.85	1.1 / 1.1	40.0	1.90
400	34.9	36.5	20	36 x 0.85	1.1 / 1.2	43.3	2.26
500	38.0	39.6	20	36 x 0.85	1.2 / 1.2	46.6	2.65
630	41.6	43.2	20	36 x 0.85	1.2 / 1.3	50.5	3.17
800	46.2	47.8	20	36 x 0.85	1.3 / 1.3	55.3	3.83
1000	50.3	51.9	20	36 x 0.85	1.3 / 1.3	59.4	4.54

Issue: January 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

^ Also complies with AS/NZS 4026

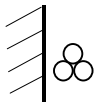
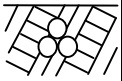
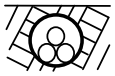
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE AL 22 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 241-23 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
35 ^	1.113	0.146	0.17	80 (NZ)	157	142	121
50	0.822	0.140	0.19	80 (NZ)	187	167	142
70	0.568	0.130	0.21	100 (NZ)	233	204	176
95 ^	0.411	0.123	0.23	100 (NZ)	283	244	210
120	0.325	0.119	0.25	100 (NZ)	326	277	239
150	0.265	0.115	0.27	100 (NZ)	370	309	267
185 ^	0.211	0.110	0.29	100 (NZ)	426	350	301
240 ^	0.161	0.106	0.32	150	504	405	356
300 ^	0.130	0.103	0.35	150	577	455	401
400	0.102	0.099	0.39	150	673	520	458
500	0.0800	0.096	0.43	150	783	592	520
630	0.0634	0.093	0.48	200	912	672	615
800	0.0513	0.090	0.54	200	1054	756	691
1000	0.0427	0.087	0.60	200	1194	836	764

Issue: January 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

^ Also complies with AS/NZS 4026

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m
Screens bonded both ends	

SINGLE CORE AL 22 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 241-24 A

Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35 *	18.5	20.1	23	40 x 0.85	1.0 / 1.0	26.3	0.78
50 *	19.7	21.3	33	39 x 1.03	1.0 / 1.0	27.9	0.94
70 *	21.2	22.8	46	32 x 1.35	1.0 / 1.0	30.0	1.17
95 *	22.9	24.5	61	27 x 1.69	1.0 / 1.0	32.4	1.43
120	24.3	25.9	69	48 x 1.35	1.0 / 1.0	33.1	1.61
150	25.7	27.3	69	48 x 1.35	1.0 / 1.0	34.5	1.72
185 ^	27.4	29.0	69	48 x 1.35	1.0 / 1.1	36.4	1.89
240 ^	29.8	31.4	69	48 x 1.35	1.1 / 1.1	39.0	2.13
300	31.8	33.4	69	48 x 1.35	1.1 / 1.1	41.0	2.36
400	34.9	36.5	69	48 x 1.35	1.2 / 1.2	44.5	2.74
500	38.0	39.6	69	48 x 1.35	1.2 / 1.2	47.6	3.11
630	41.6	43.2	69	48 x 1.35	1.3 / 1.3	51.7	3.66
800	46.2	47.8	69	48 x 1.35	1.3 / 1.4	56.5	4.31
1000	50.3	51.9	69	48 x 1.35	1.3 / 1.4	60.6	5.00

Issue: January 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s
^ Also complies with AS/NZS 4026

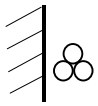
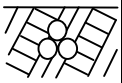
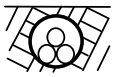
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE AL 22 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screen
PVC/HDPE sheath

Product Sheet No. 241-24 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
35 *	1.113	0.146	0.17	80 (NZ)	157	142	121
50 *	0.822	0.141	0.19	80 (NZ)	188	168	142
70 *	0.568	0.132	0.21	100 (NZ)	235	204	177
95 *	0.411	0.127	0.23	100 (NZ)	286	243	210
120	0.325	0.121	0.25	100 (NZ)	327	275	237
150	0.265	0.117	0.27	100 (NZ)	370	307	265
185 ^	0.211	0.112	0.29	150	425	346	305
240 ^	0.161	0.108	0.32	150	501	399	351
300	0.130	0.104	0.35	150	571	447	394
400	0.102	0.101	0.39	150	663	508	447
500	0.0800	0.097	0.43	150	768	574	505
630	0.0633	0.095	0.48	200	886	647	592
800	0.0512	0.091	0.54	200	1019	722	660
1000	0.0426	0.088	0.60	200	1146	793	724

Issue: January 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s
^ Also complies with AS/NZS 4026

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

Screens bonded both ends

THREE CORE CU 22 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 243-13 A							
Conductor Size	Nominal Diameters		Wire Screens (per core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35	18.5	20.1	7.4	13 x 0.85	1.3 / 1.4	52.9	2.76
50	19.8	21.4	7.9	14 x 0.85	1.4 / 1.4	56.0	3.28
70	21.2	22.8	8.5	15 x 0.85	1.4 / 1.5	59.2	4.04
95	22.9	24.5	9.1	16 x 0.85	1.5 / 1.5	63.1	4.99
120	24.3	25.9	9.6	17 x 0.85	1.5 / 1.6	66.6	5.90
150	25.7	27.3	10.2	18 x 0.85	1.6 / 1.6	69.8	6.85
185	27.5	29.1	10.8	19 x 0.85	1.6 / 1.7	73.9	8.10
240	29.8	31.4	11.3	20 x 0.85	1.7 / 1.8	79.3	10.05
300	32.0	33.6	12.5	22 x 0.85	1.8 / 1.9	84.4	12.10
400	35.4	37.0	13.6	24 x 0.85	1.9 / 2.0	92.2	14.70
Issue: September 2012 12.7/22 (24) kV. Made to AS/NZS 1429.1							

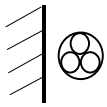
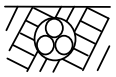
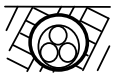
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE CU 22 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 243-13 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A)		
							
35	0.668	0.138	0.17	80 (NZ)	177	170	144
50	0.494	0.131	0.19	100 (NZ)	212	201	173
70	0.342	0.122	0.21	100 (NZ)	261	245	210
95	0.247	0.116	0.23	100 (NZ)	317	293	251
120	0.196	0.111	0.25	100 (NZ)	363	333	285
150	0.159	0.108	0.27	100 (NZ)	411	373	319
185	0.128	0.103	0.29	150	469	421	366
240	0.0981	0.099	0.32	150	549	486	423
300	0.0792	0.096	0.35	150	625	547	476
400	0.0633	0.093	0.40	150	718	620	539

Issue: September 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

THREE CORE CU 22 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen
} Triple extruded, Dry-cure
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 243-14 A

Conductor Size	Nominal Diameters		Wire Screens (per core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35 *	18.5	20.1	11.3	20 x 0.85	1.3 / 1.4	52.9	2.87
50 *	19.8	21.4	16.5	29 x 0.85	1.4 / 1.4	56.0	3.51
70	21.2	22.8	22.7	40 x 0.85	1.4 / 1.5	59.2	4.44
95	22.9	24.5	22.7	40 x 0.85	1.5 / 1.5	63.4	5.40
120	24.3	25.9	22.7	40 x 0.85	1.5 / 1.6	66.6	6.25
150	25.7	27.3	22.7	40 x 0.85	1.6 / 1.6	69.8	7.20
185	27.5	29.1	22.7	40 x 0.85	1.6 / 1.7	73.9	8.45
240	29.8	31.4	22.7	40 x 0.85	1.7 / 1.8	79.3	10.35
300	32.0	33.6	22.7	40 x 0.85	1.8 / 1.9	84.4	12.40
400	35.4	37.0	22.7	40 x 0.85	1.9 / 2.0	92.2	15.30

Issue: September 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

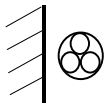
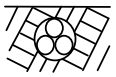
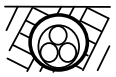
* Short circuit rating less than 10 kA for 1 s

Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE CU 22 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 243-14 B							
Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A) 		
35 *	0.668	0.138	0.17	80 (NZ)	177	170	144
50 *	0.494	0.131	0.19	100 (NZ)	212	201	173
70	0.342	0.122	0.21	100 (NZ)	261	245	210
95	0.247	0.116	0.23	100 (NZ)	317	293	251
120	0.196	0.111	0.25	100 (NZ)	363	333	285
150	0.159	0.108	0.27	100 (NZ)	411	373	319
185	0.128	0.103	0.29	150	469	421	366
240	0.0981	0.099	0.32	150	549	486	423
300	0.0792	0.096	0.35	150	625	547	476
400	0.0633	0.093	0.40	150	718	620	539
Issue: September 2012 12.7/22 (24) kV. Made to AS/NZS 1429.1							

* Short circuit rating less than 10 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

THREE CORE AL 22 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 243-23 A							
Conductor Size	Nominal Diameters		Wire Screens (per core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35 ^	18.5	20.1	7.4	13 x 0.85	1.3 / 1.4	52.9	2.08
50	19.7	21.3	7.9	14 x 0.85	1.4 / 1.4	55.7	2.36
70	21.2	22.8	8.5	15 x 0.85	1.4 / 1.5	59.2	2.73
95 ^	22.9	24.5	9.1	16 x 0.85	1.5 / 1.5	63.1	3.18
120	24.3	25.9	9.6	17 x 0.85	1.5 / 1.6	66.3	3.58
150	25.7	27.3	10.2	18 x 0.85	1.6 / 1.6	69.5	4.02
185 ^	27.4	29.0	10.8	19 x 0.85	1.6 / 1.7	73.4	4.56
240 ^	29.8	31.4	11.3	20 x 0.85	1.7 / 1.8	79.0	5.40
300	31.8	33.4	12.5	22 x 0.85	1.8 / 1.9	84.0	6.30
400	34.9	36.5	13.6	24 x 0.85	1.9 / 2.0	91.1	7.55
Issue: September 2012 12.7/22 (24) kV. Made to AS/NZS 1429.1							

^ Also complies with AS/NZS 4026

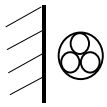
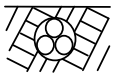
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE AL 22 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 243-23 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A)		
							
35 ^	1.11	0.137	0.17	80 (NZ)	137	132	112
50	0.822	0.131	0.19	100 (NZ)	164	156	134
70	0.568	0.122	0.21	100 (NZ)	203	190	163
95 ^	0.411	0.116	0.23	100 (NZ)	246	227	195
120	0.325	0.111	0.25	100 (NZ)	282	259	221
150	0.265	0.108	0.27	100 (NZ)	319	289	247
185 ^	0.211	0.103	0.29	150	365	328	285
240 ^	0.161	0.099	0.32	150	428	379	330
300	0.130	0.096	0.35	150	487	427	371
400	0.102	0.093	0.39	150	564	488	424

Issue: September 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

^ Also complies with AS/NZS 4026

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

THREE CORE AL 22 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen
} Triple extruded, Dry-cure
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 243-24 A

Conductor Size	Nominal Diameters		Wire Screens (per core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
35 *	18.5	20.1	7.9	14 x 0.85	1.3 / 1.4	52.9	2.10
50 *	19.7	21.3	10.8	19 x 0.85	1.4 / 1.4	55.7	2.44
70 *	21.2	22.8	15.3	27 x 0.85	1.4 / 1.5	59.2	2.92
95 *	22.9	24.5	20.4	36 x 0.85	1.5 / 1.5	63.1	3.50
120	24.3	25.9	22.7	40 x 0.85	1.5 / 1.6	66.3	3.95
150	25.7	27.3	22.7	40 x 0.85	1.6 / 1.6	69.5	4.37
185 ^	27.4	29.0	22.7	40 x 0.85	1.6 / 1.7	73.4	4.89
240 ^	29.8	31.4	22.7	40 x 0.85	1.7 / 1.8	79.3	5.75
300	31.8	33.4	22.7	40 x 0.85	1.8 / 1.9	84.0	6.55
400	34.9	36.5	22.7	40 x 0.85	1.9 / 2.0	91.1	7.80

Issue: September 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s
^ Also complies with AS/NZS 4026

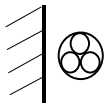
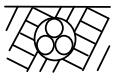
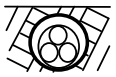
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE AL 22 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 243-24 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A)		
							
35 *	1.11	0.137	0.17	80 (NZ)	137	132	112
50 *	0.822	0.131	0.19	100 (NZ)	164	156	134
70 *	0.568	0.122	0.21	100 (NZ)	203	190	163
95 *	0.411	0.116	0.23	100 (NZ)	246	227	195
120	0.325	0.111	0.25	100 (NZ)	282	259	221
150	0.265	0.108	0.27	100 (NZ)	319	289	247
185 ^	0.211	0.103	0.29	150	365	328	285
240 ^	0.161	0.099	0.32	150	428	379	330
300	0.130	0.096	0.35	150	487	427	371
400	0.102	0.093	0.39	150	564	488	424

Issue: September 2012
12.7/22 (24) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s
^ Also complies with AS/NZS 4026

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

SINGLE CORE CU 33 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen
} Triple extruded, Dry-cure
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 251-13 A

Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
50	24.6	26.2	20	36 x 0.85	1.0 / 1.0	32.4	1.33
70	26.0	27.6	20	36 x 0.85	1.0 / 1.0	33.8	1.57
95	27.7	29.3	20	36 x 0.85	1.0 / 1.1	35.7	1.88
120	29.1	30.7	20	36 x 0.85	1.0 / 1.1	37.1	2.16
150	30.5	32.1	20	36 x 0.85	1.1 / 1.1	38.7	2.47
185	32.3	33.9	20	36 x 0.85	1.1 / 1.1	40.5	2.88
240	34.6	36.2	20	36 x 0.85	1.1 / 1.2	43.0	3.50
300	36.8	38.4	20	36 x 0.85	1.2 / 1.2	45.4	4.16
400	40.2	41.8	20	36 x 0.85	1.2 / 1.3	49.1	5.10
500	43.5	45.1	20	36 x 0.85	1.3 / 1.3	52.6	6.15
630	47.1	48.7	20	36 x 0.85	1.3 / 1.4	56.4	7.60

Issue: January 2012
19/33 (36) kV. Made to AS/NZS 1429.1

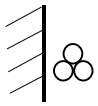
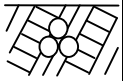
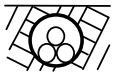
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE CU 33 KV CABLES

3 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 251-13 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
50	0.494	0.149	0.14	100 (NZ)	246	216	188
70	0.342	0.139	0.16	100 (NZ)	304	263	228
95	0.247	0.133	0.17	100 (NZ)	370	314	272
120	0.196	0.128	0.19	150	425	356	315
150	0.159	0.124	0.20	150	482	398	352
185	0.127	0.119	0.22	150	552	448	396
240	0.0977	0.114	0.24	150	650	518	458
300	0.0786	0.110	0.26	150	743	582	514
400	0.0625	0.106	0.29	150	861	660	582
500	0.0501	0.102	0.32	200	993	744	682
630	0.0406	0.098	0.36	200	1139	835	764

Issue: January 2012
19/33 (36) kV. Made to AS/NZS 1429.1

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

Screens bonded both ends

SINGLE CORE CU 33 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 251-14 A

Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
50 *	24.6	26.2	49	34 x 1.35	1.0 / 1.0	33.4	1.60
70	26.0	27.6	69	48 x 1.35	1.0 / 1.1	35.0	2.04
95	27.7	29.3	69	48 x 1.35	1.0 / 1.1	36.7	2.34
120	29.1	30.7	69	48 x 1.35	1.1 / 1.1	38.3	2.63
150	30.5	32.1	69	48 x 1.35	1.1 / 1.1	39.7	2.93
185	32.3	33.9	69	48 x 1.35	1.1 / 1.2	41.7	3.35
240	34.6	36.2	69	48 x 1.35	1.1 / 1.2	44.0	3.96
300	36.8	38.4	69	48 x 1.35	1.2 / 1.2	46.4	4.62
400	40.2	41.8	69	48 x 1.35	1.2 / 1.3	50.1	5.55
500	43.5	45.1	69	48 x 1.35	1.3 / 1.3	53.6	6.60
630	47.1	48.7	69	48 x 1.35	1.3 / 1.4	57.4	8.05

Issue: January 2012
19/33 (36) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

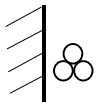
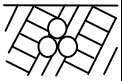
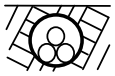
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE CU 33 KV CABLES

10 kA for 1 s Wire Screens

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 251-14 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
50 *	0.494	0.151	0.14	100 (NZ)	248	216	188
70	0.342	0.142	0.16	100 (NZ)	305	262	227
95	0.247	0.134	0.17	150	370	311	276
120	0.196	0.130	0.19	150	424	352	311
150	0.159	0.125	0.20	150	479	392	347
185	0.127	0.120	0.22	150	547	441	389
240	0.0976	0.115	0.24	150	641	506	447
300	0.0786	0.112	0.26	150	729	565	499
400	0.0625	0.107	0.29	200	840	636	583
500	0.0501	0.103	0.32	200	961	711	651
630	0.0405	0.100	0.36	200	1094	790	723

Issue: January 2012
19/33 (36) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

Screens bonded both ends

SINGLE CORE AL 33 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen } Triple extruded, Dry-cure
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 251-23 A							
Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
50	24.5	26.1	20	36 x 0.85	1.0 / 1.0	32.3	1.03
70	26.0	27.6	20	36 x 0.85	1.0 / 1.0	33.8	1.14
95	27.7	29.3	20	36 x 0.85	1.0 / 1.1	35.7	1.28
120	29.1	30.7	20	36 x 0.85	1.0 / 1.1	37.1	1.40
150	30.5	32.1	20	36 x 0.85	1.1 / 1.1	38.7	1.54
185	32.2	33.8	20	36 x 0.85	1.1 / 1.1	40.4	1.71
240	34.6	36.2	20	36 x 0.85	1.1 / 1.2	43.0	1.97
300	36.6	38.2	20	36 x 0.85	1.2 / 1.2	45.2	2.23
400	39.7	41.3	20	36 x 0.85	1.2 / 1.3	48.6	2.61
500	42.8	44.4	20	36 x 0.85	1.3 / 1.3	51.9	3.04
630	46.4	48.0	20	36 x 0.85	1.3 / 1.4	55.7	3.58
800	51.0	52.6	20	36 x 0.85	1.4 / 1.4	60.5	4.28
1000	55.1	56.7	21	37 x 0.85	1.4 / 1.4	64.6	5.05

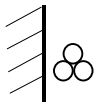
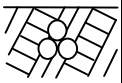
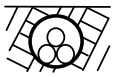
Issue: January 2012
19/33 (36) V. Made to AS/NZS 1429.1

Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE AL 33 KV CABLES

3 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 251-23 B							
Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A) 		
50	0.822	0.150	0.14	100 (NZ)	190	167	146
70	0.568	0.139	0.16	100 (NZ)	236	204	177
95	0.411	0.133	0.17	100 (NZ)	287	244	211
120	0.325	0.128	0.19	150	330	277	245
150	0.265	0.124	0.20	150	374	309	274
185	0.211	0.118	0.22	150	430	350	309
240	0.161	0.114	0.24	150	508	405	358
300	0.129	0.110	0.26	150	581	456	402
400	0.101	0.107	0.29	150	677	521	459
500	0.0797	0.103	0.32	200	787	593	544
630	0.0630	0.099	0.35	200	914	674	617
800	0.0509	0.095	0.39	200	1057	759	694
1000	0.0422	0.092	0.43	200	1197	841	768

Issue: January 2012
19/33 (36) kV. Made to AS/NZS 1429.1

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m
Screens bonded both ends	

SINGLE CORE AL 33 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen } Triple extruded, Dry-cure
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 251-24 A							
Conductor Size	Nominal Diameters		Wire Screen		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
50 *	24.5	26.1	33	39 x 1.03	1.0 / 1.0	32.7	1.14
70 *	26.0	27.6	46	32 x 1.35	1.0 / 1.1	35.0	1.39
95 *	27.7	29.3	62	43 x 1.35	1.0 / 1.1	36.7	1.68
120	29.1	30.7	69	48 x 1.35	1.1 / 1.1	38.3	1.88
150	30.5	32.1	69	48 x 1.35	1.1 / 1.1	39.7	2.00
185	32.2	33.8	69	48 x 1.35	1.1 / 1.2	41.6	2.18
240	34.6	36.2	69	48 x 1.35	1.1 / 1.2	44.0	2.43
300	36.6	38.2	69	48 x 1.35	1.2 / 1.2	46.2	2.69
400	39.7	41.3	69	48 x 1.35	1.2 / 1.3	49.6	3.07
500	42.8	44.4	69	48 x 1.35	1.3 / 1.3	52.9	3.50
630	46.4	48.0	69	48 x 1.35	1.3 / 1.4	56.7	4.05
800	51.0	52.6	69	48 x 1.35	1.4 / 1.5	61.7	4.76
1000	55.1	56.7	69	48 x 1.35	1.4 / 1.5	65.8	5.50
Issue: January 2012 19/33 (36) kV. Made to AS/NZS 1429.1							

* Short circuit rating less than 10 kA for 1 s

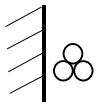
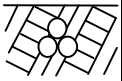
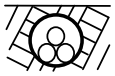
Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

SINGLE CORE AL 33 KV CABLES

10 kA for 1 s Wire Screens

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 251-24 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Multi Way) (mm)	Current Ratings (A)		
							
50 *	0.822	0.151	0.14	100 (NZ)	191	168	146
70 *	0.568	0.142	0.16	100 (NZ)	238	204	178
95 *	0.411	0.134	0.17	150	288	243	215
120	0.325	0.130	0.19	150	331	275	244
150	0.265	0.125	0.20	150	374	307	272
185	0.211	0.120	0.22	150	429	346	306
240	0.161	0.115	0.24	150	505	400	353
300	0.129	0.112	0.26	150	575	448	395
400	0.101	0.108	0.29	150	668	509	449
500	0.0797	0.104	0.32	200	772	576	528
630	0.0630	0.100	0.35	200	891	650	595
800	0.0508	0.097	0.39	200	1023	726	663
1000	0.0421	0.094	0.43	200	1152	799	728

Issue: January 2012
19/33 (36) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

Screens bonded both ends

THREE CORE CU 33 KV CABLES

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 253-11 A

Conductor Size	Nominal Diameters		Wire Screens (per core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
3 kA for 1 s Wire Screens							
50	24.6	26.2	9.6	17 x 0.85	1.5 / 1.6	66.9	4.15
70	26.0	27.6	10.2	18 x 0.85	1.6 / 1.7	70.4	4.99
95	27.7	29.3	10.8	19 x 0.85	1.7 / 1.7	74.5	6.00
120	29.1	30.7	11.3	20 x 0.85	1.7 / 1.8	77.8	6.90
150	30.5	32.1	11.9	21 x 0.85	1.8 / 1.8	81.0	7.95
185	32.3	33.9	12.5	22 x 0.85	1.8 / 1.9	85.1	9.25
240	34.6	36.2	13.1	23 x 0.85	1.9 / 2.0	90.5	11.25
300	36.8	38.4	14.2	25 x 0.85	2.0 / 2.0	95.4	13.40
10 kA for 1 s Wire Screens							
50 *	24.6	26.2	16.5	29 x 0.85	1.6 / 1.6	67.1	4.37
70	26.0	27.6	22.7	40 x 0.85	1.6 / 1.7	70.4	5.35
95	27.7	29.3	22.7	40 x 0.85	1.7 / 1.7	74.5	6.35
120	29.1	30.7	22.7	40 x 0.85	1.7 / 1.8	77.8	7.25
150	30.5	32.1	22.7	40 x 0.85	1.8 / 1.8	81.0	8.25
185	32.3	33.9	22.7	40 x 0.85	1.8 / 1.9	85.1	9.55
240	34.6	36.2	22.7	40 x 0.85	1.9 / 2.0	90.5	11.55
300	36.8	38.4	22.7	40 x 0.85	2.0 / 2.0	95.4	13.60

Issue: September 2012
19/33 kV. (36) Made to AS/NZS 1429.1

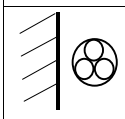
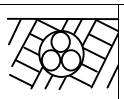
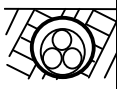
* Short circuit rating less than 10 kA for 1 s

Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE CU 33 KV CABLES

Copper conductor
SCXLPE conductor screen
TR-XLPE insulation
SCXLPE insulation screen } Triple extruded, Dry-cure
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 253-11 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A) 		
3 kA for 1 s Wire Screens							
50	0.494	0.143	0.14	100 (NZ)	212	200	173
70	0.342	0.133	0.16	100 (NZ)	262	244	211
95	0.247	0.126	0.17	150	317	292	256
120	0.196	0.122	0.19	150	364	331	290
150	0.159	0.118	0.20	150	411	372	325
185	0.128	0.113	0.22	150	470	420	367
240	0.0978	0.108	0.24	150	550	486	425
300	0.0789	0.104	0.26	150	626	547	478
10 kA for 1 s Wire Screens							
50 *	0.494	0.143	0.14	100 (NZ)	212	200	173
70	0.342	0.133	0.16	100 (NZ)	262	244	211
95	0.247	0.126	0.17	150	317	292	256
120	0.196	0.122	0.19	150	364	331	290
150	0.159	0.118	0.20	150	411	372	325
185	0.128	0.113	0.22	150	470	420	367
240	0.0978	0.108	0.24	150	550	486	425
300	0.0789	0.104	0.26	150	626	547	478

Issue: September 2012
19/33 (36) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

THREE CORE AL 33 KV CABLES

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 253-21 A

Conductor Size	Nominal Diameters		Wire Screens (per core)		Thickness of Sheath PVC/HDPE	Nominal Overall Diameter	Linear Mass
	Insulation	Insulation Screen	Area	No. & Size			
(mm^2)	(mm)	(mm)	(mm^2)	(No. x mm)	(mm)	(mm)	(kg/m)
3 kA for 1 s Wire Screens							
50	24.5	26.1	9.6	17 x 0.85	1.5 / 1.6	66.7	3.22
70	26.0	27.6	10.2	18 x 0.85	1.6 / 1.7	70.4	3.67
95	27.7	29.3	10.8	19 x 0.85	1.7 / 1.7	74.2	4.18
120	29.1	30.7	11.3	20 x 0.85	1.7 / 1.8	77.5	4.63
150	30.5	32.1	11.9	21 x 0.85	1.8 / 1.8	80.7	5.10
185	32.2	33.8	12.5	22 x 0.85	1.8 / 1.9	84.9	5.70
240	34.6	36.2	13.1	23 x 0.85	1.9 / 2.0	90.5	6.65
300	36.6	38.2	14.2	25 x 0.85	2.0 / 2.0	95.0	7.55
10 kA for 1 s Wire Screens							
50 *	24.5	26.1	10.8	19 x 0.85	1.6 / 1.6	66.9	3.28
70 *	26.0	27.6	15.3	27 x 0.85	1.6 / 1.7	70.4	3.82
95 *	27.7	29.3	20.4	36 x 0.85	1.7 / 1.7	74.2	4.45
120	29.1	30.7	22.7	40 x 0.85	1.7 / 1.8	77.5	4.94
150	30.5	32.1	22.7	40 x 0.85	1.8 / 1.8	80.7	5.40
185	32.2	33.8	22.7	40 x 0.85	1.8 / 1.9	84.9	6.00
240	34.6	36.2	22.7	40 x 0.85	1.9 / 2.0	90.5	6.90
300	36.6	38.2	22.7	40 x 0.85	2.0 / 2.0	95.0	7.75

Issue: September 2012
19/33 (36) kV. Made to AS/NZS 1429.1

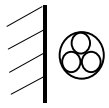
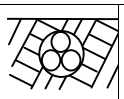
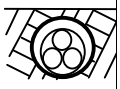
* Short circuit rating less than 10 kA for 1 s

Note:
1. Subject to confirmation, similar cables can be manufactured to other specifications.

THREE CORE AL 33 KV CABLES

Aluminium conductor
SCXLPE conductor screen
TR-XLPE insulation } Triple extruded, Dry-cure
SCXLPE insulation screen
Copper wire screens
PVC/HDPE sheath

Product Sheet No. 253-21 B

Conductor Size (mm^2)	Conductor AC Resistance at 50 Hz and 90°C (Ohm/km)	Inductive Reactance at 50 Hz (Ohm/km)	Conductor to Screen Capacitance (μF/km)	Nominal PVC Duct Size (Single Way) (mm)	Current Ratings (A)		
							
3 kA for 1 s Wire Screens							
50	0.822	0.143	0.14	100 (NZ)	164	155	134
70	0.568	0.133	0.16	100 (NZ)	203	189	163
95	0.411	0.126	0.17	150	246	226	198
120	0.325	0.122	0.19	150	283	257	226
150	0.265	0.118	0.20	150	319	288	252
185							
240							
300							
10 kA for 1 s Wire Screens							
50 *	0.822	0.143	0.14	100 (NZ)	164	155	134
70 *	0.568	0.133	0.16	100 (NZ)	203	189	163
95 *	0.411	0.126	0.17	150	246	226	198
120	0.325	0.122	0.19	150	283	257	226
150	0.265	0.118	0.20	150	319	288	252
185							
240							
300							

Issue: January 2012
19/33 (36) kV. Made to AS/NZS 1429.1

* Short circuit rating less than 10 kA for 1 s

Note:
1. The values in this table are for installation conditions of:

Ambient Air Temperature	30 °C
Soil Temperature	15 °C
Soil Thermal Resistivity	1.2 K.m/W
Depth of Burial	1.0 m

NOTES

SECTION FIVE – AERIALS

THERMAL CHARACTERISTICS

Continuous Current Carrying Capacity

The continuous current carrying capacity of a conductor depends on the permissible conductor temperature rise above ambient air temperature. For the calculation of current ratings of bare overhead conductors, ambient air temperatures between 20ºC and 40ºC are usually considered.

The maximum permissible continuous operating temperature of an overhead conductor is limited by the permanent effects of high temperatures on the strength of the conductor material. Aluminium wire may be operated indefinitely at temperatures of up to 75°C without significant annealing occurring. Therefore, this temperature is taken as the continuous operating temperature for bare aluminium and aluminium alloy conductors.

For aluminium and aluminium alloy conductors, a maximum operating temperature limit of 100°C is recommended, resulting in approximately 3% loss of strength after 1000 hours of operation. Under emergency operating conditions with higher temperatures, the effect of annealing should be considered. The loss of strength for an AAC or AAAC/1120 conductor operated at 150°C for 10 hours is equivalent to the loss of strength for the same conductor operated at 100°C for 7000 hours. The effect is less significant with steel-reinforced conductors, where the steel provides most of the strength of the conductor and is essentially unaffected by temperature. However, to allow for the effects on grease and fittings, a maximum operating temperature limit of 120°C is recommended in this case.

The maximum load capacity of a long line is usually dictated by consideration of system stability, permissible voltage regulation, or the cost of energy losses. However, the maximum load capacity of a short line may be determined by the maximum permissible operating temperature of the conductor. The maximum permissible operating temperature is that which results in the greatest permissible sag (allowing for creep) or that which results in the maximum allowable permanent loss of tensile strength due to annealing.

The conductor temperature depends on the current load, the electrical characteristics of the conductor, and the atmospheric parameters such as wind and sun. Assuming these factors to be fairly constant, the conductor temperature does not change significantly. In this situation, the heat supplied to the conductor is balanced by the heat dissipated and the thermal condition of the conductor is then defined as “steady state”. At such a steady state, with the conductor at maximum permissible temperature, a heat balance equation can be used to calculate the continuous current carrying capacity of a conductor.

The formulae used for the calculations are generally in accordance with those published by V. T. Morgan.

THERMAL CHARACTERISTICS (CONT.)

Ambient Temperature

For dry conductors the choice of ambient temperature has little influence on the increase of the calculated current carrying capacity for a given temperature rise. For example, for temperature rises higher than 30°C, the increase in the current carrying capacity for a given temperature rise above an ambient of 20°C is within 2% of the value obtained with the same temperature rise above an ambient of 35°C. Rain has a major effect on the current carrying capacity of a conductor, and the rating of a wet conductor is higher than that of a dry one. For conductors with a wet surface, the choice of ambient temperature significantly influences the current carrying capacity.

Solar Radiation

Many factors can influence the effect of solar radiation. The altitude of the sun, the clearness ratio of the sky, the incidence of the solar beam and the reflectance of the sun from the ground, affect the magnitude of the solar heat input into the conductor. However, small changes in solar radiation intensity have little effect on the current carrying capacity. An increase in solar radiation intensity from 1000 W/m^2 to 1200 W/m^2 decreases the rating of a conductor by about 2%. A value of 1000 W/m^2 for direct solar radiation and 100W/m^2 for diffuse solar radiation for summer noon conditions has been chosen as appropriate to general conditions throughout Australia and New Zealand.

Emissivity and Solar Absorption Coefficients

Emissivity is the value between zero and unity which defines the fraction of the black-body radiation that the surface emits. Similarly, absorptivity is the value between zero and unity that defines the fraction of the incident irradiation that is absorbed by the surface. The surface condition of a conductor affects both these parameters, and for convenience they are assumed to be equal.

The Rural Weathered condition is considered to exist on old lines in clean atmospheres and may also exist as sections of new conductor in an old line arising from augmentation or alteration works.

Air Movement

This is the most significant of all the parameters. The rate of increase of the current carrying capacity of a conductor with increasing wind velocity is greatest at low wind velocities. This is partly due to the effect of wind velocity on the radial temperature gradient in the conductor.

Wind direction also affects the current carrying capacity of a conductor. However, it would be difficult to take the variability of the wind into account because of its dependence on many factors, including local topography and climate.

In view of this and of the lack of comprehensive meteorological data across the country, current carrying capacities have been calculated for the theoretical extreme condition of still air and for 1.0 metre/second.

ELECTRICAL CHARACTERISTICS

AC Resistance

The electrical resistance of a conductor with alternating current is greater than its resistance with direct current.

For all-aluminium conductors, the increased resistance is due mainly to skin effect, which causes the current to concentrate in the outer portion of the conductor. Non-uniformity of current distribution is also caused by a proximity effect, which results from electromagnetic fields from nearby conductors. However, for normal spacing of overhead lines this effect is small and can be ignored.

For steel-reinforced conductors the current that follows the spiral of the helically applied aluminium wires around the steel core produces a longitudinal magnetic flux in the steel core. This alternating flux causes both hysteresis and eddy current losses, increasing the effective resistance of the conductor to alternating current. The magnetic flux in the steel varies with current, and is most significant when the number of aluminium layers is odd, because there is incomplete cancellation of the magnetic flux in the steel core.

Skin effect and, in the case of steel-reinforced conductors with single and three layers of aluminium, hysteresis and eddy current effects, were taken into consideration in determining the AC resistance.

Inductive Reactance

The inductive reactance of stranded conductors in an overhead line is calculated by considering the flux linkages caused by current flowing in the conductors. To simplify the calculation, it is usually considered to consist of two components: the conductor component of reactance resulting from the magnetic flux, and the spacing component of reactance resulting from the magnetic flux to the equivalent return conductor.

The conductor component depends on the number of strands and the geometry of the conductor. The spacing component takes into consideration the spacing between conductors and the geometry of the circuit. The reactance of an overhead line is found by adding the two components.

For steel-reinforced conductors, the magnetic flux in the steel core depends on the amount of current flowing in the conductors and is most significant when the number of aluminium layers is odd. However, the magnetic properties of the steel core are highly non-linear, and the conductor component of reactance can be accurately determined only from tests. The values shown in the tables of electrical performance data in the following sections are sufficiently accurate for most practical installations.

Values for inductive reactance to 300 mm horizontal spacing are shown in the following Product Sheets.

PHYSICAL & MECHANICAL CHARACTERISTICS

Sag and Tension

The general theory of sag-tension calculations is based on the fact that a conductor suspended between two points assumes the shape of a catenary. The basic relationship between sag and tension can be established from knowledge of the stress-strain characteristics of a conductor. Factors which will subsequently affect the sag and tension are thermal elongation of the conductor due to changes in temperature, creep with time under load, and increased loadings due to wind and ice. These factors affect the length of the conductor and consequently the sag and tension characteristics.

The physical and mechanical performance characteristics required for sag-tension calculations are shown in the product sheets which follow, and the factors which affect the length of a stranded conductor are briefly explained in the following sections.

Suitable formulae for selecting the appropriate tension are published in AS/NZS 7000:2010, Overhead Line Design - Detailed Procedures.

Stress-Strain Characteristics

The stress-strain behaviour of a stranded conductor depends on the properties of the component wires and the construction of the conductor, including the number of layers and the lay length of the wires.

Stress-strain tests are used to establish the behaviour of a stranded conductor during the initial loading period, and a relationship for its elastic behaviour in its final state. The test procedure used to obtain the stress-strain characteristics is to load and hold the conductor at 30%, 50% and 70% of its calculated breaking load with load-holding periods of 30 minutes, 1 hour and 1 hour respectively and the conductor is unloaded at the end of each holding period.

From the initial loading curve where the conductor is loaded to 30% of its breaking load and held for 30 minutes, the amount of geometric settlement of the component wires, the initial creep and the initial modulus of elasticity can be determined.

Subsequent loading and unloading of the conductor at 50% and 70% of its breaking load with load holding periods of 1 hour, ensures that the component wires are settled and that most of the initial creep has been removed. This leaves the conductor in its final state and the final unloading of the conductor is used to determine the final modulus of elasticity.

The final modulus of elasticity is used for sag-tension calculations to determine the behaviour of a conductor which has been in service for some time and has been subjected to high tensions due to low temperatures, wind and in some cases ice loading.

At some high temperature, all of the load is transferred to the steel and the thermal elongation of the composite conductor is identical to the thermal elongation of the steel core alone. In practice, for normal operating conditions, it is sufficiently accurate to assume a direct relationship between thermal elongation and the coefficient of linear expansion of the composite conductor. The coefficient of linear expansion for the composite conductor may be calculated, taking into account the material properties and the areas of each component making up the conductor.

PHYSICAL & MECHANICAL CHARACTERISTICS (CONT.)

Thermal Elongation

Variations in temperature will change the length of a conductor and this change in length is known as thermal elongation or thermal strain.

For homogeneous AAC, AAAC and hard drawn copper conductors the thermal elongation is directly related to the coefficient of linear expansion of the material.

For composite ACSR and AACSR conductors the thermal elongation is more complex to establish, due to the relationship between stresses and strains of constituent wires. The stress distribution in a composite conductor changes with temperature. Due to the lower coefficient of thermal expansion of steel compared with that of aluminium, a rise in temperature increases the proportion of the tensile load carried by the steel core.

Creep

Creep is defined as the plastic deformation or non-recoverable extension of conductors which occurs with time under load. It can be considered to consist of two components: initial creep and long term creep.

Initial creep is the result of settling in of wires when the conductor is first subjected to maximum tension. This component of creep can be offset by pre-tensioning the conductor at a load higher than the everyday tension (EDT) before final sagging. This procedure can effectively stabilise the conductor before final sagging and also provides a consistent base for determining subsequent long-term creep. If conductors are installed at a value of the tension below that used for final sagging, full allowance for both initial and long term creep should be made.

Long term creep depends on stress, operating temperature and time. It can be calculated from information on the material and design of the conductor. Typically, extensions of 400–500 micrometres per metre may occur over a 30-year life of a line. In order to avoid problems associated with the increase of sag resulting from creep, a number of solutions may be adopted.

One solution is to assume an imaginary lower temperature of installation which would (when the temperature is raised to the actual installation temperature) result in a thermal expansion equal in value to that of the predicted creep. For example, if the predicted creep is equal to the thermal expansion caused by a temperature increase of 20°C, then the installation temperature is assumed to be less than the actual by 20°C. This results in the line being tensioned at a higher EDT than normal at the time of installation. In the 30-year life span of the conductor, the tension will gradually decrease to the value of true EDT.

Alternatively, commercially available computer programs based on the more complex strain-summation method can be used to determine the stringing tension for any given future loading conditions and limiting constraints on one or more parameters. Determining the stringing tension is done by iteration, working forward in time.

Everyday Tension

Aeolian vibration can damage overhead line conductors as a result of mechanical fatigue. The standard practice for preventing fatigue damage is to limit the tension of the conductor to a value that will not subject the conductor to excessive vibration under normal operating conditions.

The tension that may be applied to a conductor is usually expressed as a percentage of the conductor breaking load. As the damage from fatigue is most pronounced in the outer layers of the conductor, the safe tension is based on the allowable stress in the outer layers. Three main factors which cause vibration fatigue on conductors are considered when determining the safe allowable outer layer stress: the type of suspension arrangement used, the terrain, and the efficiency of the vibration damping system, if used. Reference should be made to AS/NZS 7000:2010, Overhead Line Design - Detailed Procedures, for EDT figures.

BARE OVERHEAD CONDUCTORS

Materials

Nexans Olex offers a number of materials meeting the requirements of both Australian and International Standards.

Aluminium 1350: High purity electrical conductor (EC) grade aluminium (alloy 1350) has a conductivity of 61% IACS and UTS of 160–185 MPa.

Aluminium alloy 1120: Nexans Olex alloy 1120 (Ductolex) has a conductivity of 59% IACS and UTS of 240–250 MPa. It provides a conductor with comparable electrical resistance and 40–50% higher strength than a similar conductor of EC grade material. This alloy can be considered a 'high tech' version of EC grade aluminium and offers significant advantages over older type alloys, such as alloy 6201. Steel-reinforced aluminium alloy 1120 conductors have a high strength to weight ratio, resulting in small sags on long span lengths. Fittings for alloy 1120 conductors are similar to those used for EC grade aluminium conductors.

Copper: Hard drawn copper wire produced from high conductivity alloy 110A has a conductivity of 97% IACS and UTS of 405–460 MPa.

Galvanised steel: Galvanised steel wire made from fully-killed steel with a carbon content of 0.6% has a UTS of 1.31–1.39 GPa. It is galvanised by either a hot dip or electrolytic process to give a zinc coating mass of 200–260 g/m^2.

Construction

The wires in all bare conductors are stranded concentrically with successive layers having an opposite direction of lay, the outermost layer being right-handed. When required, a larger central wire (king wire) is included in a conductor. The diameter of this wire is based on conductor design considerations and is usually 5% greater than the surrounding wires. The incorporation of a king wire is often an advantage for ACSR type conductors, as it ensures that the surrounding layer of wires fits firmly on the central wire.

ACSR conductors may be subjected to corrosive conditions such as high pollution found in industrial areas or salt spray in coastal areas. The application of high melting point grease over the steel wires provides additional protection against corrosion. Aluminium alloy 1120 conductors are becoming more popular as replacements for steel-reinforced conductors in areas of high corrosion risk.

Property of Materials

Property	Unit	Aluminium	Aluminium Alloy 1120 (Ductolex)	Copper	Galvanised Steel
Density at 20ºC	kg/m^3	2700	2700	8890	7800
Conductivity at 20ºC	% IACS	61	59	97	10.1
Resistivity at 20ºC	μΩ.m	0.0283	0.0293	0.01777	0.17
Constant-Mass Temperature Coefficient of Resistance	per ºC	0.00403	0.00390	0.00381	0.0044
Ultimate Tensile Stress	MPa	160–185	230–250	405–460	1310–1390
Modulus of Elasticity	GPa	68	68	124	193
Coefficient of Linear Expansion	per ºC	23.0 x 10^{-6}	23.0 x 10^{-6}	17 x 10^{-6}	11.5 x 10^{-6}

AAC AERIAL CONDUCTORS

Aluminium conductor

Product Sheet No. 310-01 A					
Code Name	Stranding (mm)	Cross Sectional Area (mm^2)	Nominal Overall Diameter (mm)	Mass (kg/km)	Breaking Load (kN)
Namu	7/2.11	24.5	6.33	66.9	4.07
Poko	7/2.36	30.6	7.08	83.7	5.09
Ladybird	7/2.79	42.8	8.37	117	6.92
Kutu	7/3.00	49.5	9.00	135	7.98
Fly	7/3.40	63.6	10.2	174	9.98
Rango	7/3.66	73.6	11.0	201	11.2
Grasshopper	7/3.91	84.1	11.7	230	12.8
Wasp	7/4.39	106	13.2	290	16.1
Beetle	19/2.67	106	13.4	292	17.2
Weke	7/4.72	122	14.2	335	18.6
Bee	7/4.90	132	14.7	361	20.1
Cricket	7/5.36	158	16.1	432	24.0
Weta	19/3.35	167	16.8	460	26.2
Pluto	19/3.75	210	18.8	576	31.9
Mata	19/3.86	222	19.3	611	33.8
Cockroach	19/4.22	266	21.1	731	40.4
Butterfly	19/4.65	323	23.3	888	49.1
Cicada	37/4.65	628	32.6	1730	95.6
Issue: January 2012 Made to AS 1531					

Notes:

1. Coefficient of linear expansion 23.0 x 10^{-6}/°C.
2. Modulus of elasticity:
   - 65 GPa for seven (7) and nineteen (19) wire conductors.
   - 64 GPa for thirtyseven (37) wire conductors.

AAC AERIAL CONDUCTORS

Aluminium conductor

Product Sheet No. 310-01 B				
Code Name	Calculated DC Resistance at 20°C (Ohm/km)	Reactance at 50Hz with 300 mm Spacing (Ohm/km)	Current Rating Still Air (Amps)	Current Rating 1 m/s (Amps)
Namu	1.17	0.321	85	164
Poko	0.936	0.314	98	189
Ladybird	0.670	0.303	121	232
Kutu	0.579	0.299	132	253
Fly	0.451	0.291	155	295
Rango	0.389	0.286	170	323
Grasshopper	0.342	0.282	184	350
Wasp	0.271	0.275	213	403
Beetle	0.271	0.271	213	404
Weke	0.234	0.270	233	441
Bee	0.217	0.268	244	461
Cricket	0.181	0.262	275	515
Weta	0.172	0.257	286	533
Pluto	0.137	0.250	333	612
Mata	0.130	0.248	345	632
Cockroach	0.108	0.242	390	707
Butterfly	0.0895	0.236	443	792
Cicada	0.0460	0.214	689	1178
Issue: January 2012 Made to AS 1531				

Note:

1. Current ratings are based on an ambient temperature of 30°C, a maximum conductor temperature of 75°C, rural weathered, summer noon and intensity of solar radiation 1000 W/m^2.

AAAC AERIAL CONDUCTORS

1120 Aluminium alloy conductor

Product Sheet No. 310-02 A					
Code Name	Stranding (mm)	Cross Sectional Area (mm^2)	Nominal Overall Diameter (mm)	Mass (kg/km)	Breaking Load (kN)
Chlorine	7/2.50	34.4	7.50	94.3	8.18
Chromium	7/2.75	41.6	8.25	113	9.91
Fluorine	7/3.00	49.5	9.00	135	11.8
Helium	7/3.75	77.3	11.3	211	17.6
Hydrogen	7/4.50	111	13.5	304	24.3
Iodine	7/4.75	124	14.3	339	27.1
Krypton	19/3.25	158	16.3	433	37.4
Lutetium	19/3.50	183	17.5	503	41.7
Neon	19/3.75	210	18.8	576	47.8
Nitrogen	37/3.00	262	21.0	721	62.2
Sulfur	61/3.75	674	33.8	1860	145
Issue: September 2012 Made to AS 1531					

Notes:

1. Coefficient of linear expansion 23.0 x 10^{-6}/°C.
2. Modulus of elasticity:
   - 65 GPa for seven (7) and nineteen (19) wire conductors.
   - 64 GPa for thirtyseven (37) and sixtyone (61) wire conductors.

AAAC AERIAL CONDUCTORS

1120 Aluminium alloy conductor

Product Sheet No. 310-02 B				
Code Name	Calculated DC Resistance at 20°C (Ohm/km)	Reactance at 50Hz with 300 mm Spacing (Ohm/km)	Current Rating Still Air (Amps)	Current Rating 1 m/s (Amps)
Chlorine	0.864	0.310	104	200
Chromium	0.713	0.304	117	224
Fluorine	0.599	0.299	131	250
Helium	0.383	0.285	173	328
Hydrogen	0.266	0.273	217	410
Iodine	0.239	0.270	231	438
Krypton	0.189	0.259	271	507
Lutetium	0.163	0.254	299	555
Neon	0.142	0.250	328	603
Nitrogen	0.114	0.242	381	690
Sulfur	0.0444	0.212	711	1210
Issue: September 2012 Made to AS 1531				

Note:

1. Current ratings are based on an ambient temperature of 30°C, a maximum conductor temperature of 75°C, rural weathered, summer noon and intensity of solar radiation 1000 W/m^2.

ACSR AERIAL CONDUCTORS

Aluminium conductor
Galvanised steel reinforced

Product Sheet No. 310-03 A								
Code Name	Number of Strands/Wire Diameter (mm)		Equivalent Aluminium Cross Sectional Area	Nominal Overall Diameter	Mass	Breaking Load	Modulus of Elasticity	Coefficient of Linear Expansion
	Aluminium	Steel	(mm^2)	(mm)	(kg/km)	(kN)	(GPa)	(x 10^{-6}/°C)
Magpie	3/2.11	4/2.11	12.7	6.33	139	17.4	136	13.9
Squirrel	6/2.11	1/2.11	20.7	6.33	84.8	7.49	83	19.3
Gopher	6/2.36	1/2.36	26.0	7.08	106	9.37	83	19.3
Ferret	6/3.00	1/3.00	41.8	9.00	171	14.9	83	19.3
Mink	6/3.66	1/3.66	62.2	11.0	255	21.6	83	19.3
Raccoon	6/4.09	1/ 4.09	77.7	12.3	318	12.3	83	19.3
Dog	6/4.72	7/1.57	103	14.2	396	32.9	80	19.9
Dingo	18/3.35	1/3.35	155	16.8	505	35.4	71	21.4
Wolf	30/2.59	7/2.59	155	18.1	724	67.4	88	18.4
Jaguar	18/3.86	1/3.86	207	19.3	671	33.0	71	21.4
Goat	30/3.71	7/3.71	317	26.0	1490	135	88	18.4
Zebra	54/3.18	7/3.18	420	28.6	1620	131	78	19.9
Cardinal	54/3.38	7/3.38	474	30.4	1830	149	78	19.9
Moose	54/3.53	7/3.53	517	31.8	1990	159	78	19.9
Pawpaw	54/3.75	19/2.25	584	33.8	2240	178	78	20.0

Issue: January 2012

Made to AS 3607

ACSR AERIAL CONDUCTORS

Aluminium conductor
Galvanised steel reinforced

Product Sheet No. 310-03 B				
Code Name	Calculated DC Resistance at 20°C (Ohm/km)	Reactance at 50Hz with 300 mm Spacing (Ohm/km)	Current Rating Still Air (Amps)	Current Rating 1 m/s (Amps)
Magpie	2.23	0.349	59	113
Squirrel	1.37	0.322	75	145
Gopher	1.09	0.315	86	167
Ferret	0.677	0.299	117	223
Mink	0.455	0.287	152	285
Raccoon	0.364	0.280	175	326
Dog	0.274	0.271	210	387
Dingo	0.182	0.257	274	494
Wolf	0.183	0.252	280	501
Jaguar	0.137	0.248	336	616
Goat	0.0893	0.229	462	814
Zebra	0.0674	0.222	544	942
Cardinal	0.0597	0.219	590	1014
Moose	0.0547	0.216	626	1068
Pawpaw	0.0485	0.212	678	1148
Issue: January 2012 Made to AS 3607				

Note:
1. Current ratings are based on an ambient temperature of 30°C, a maximum conductor temperature of 75°C, rural weathered, summer noon and intensity of solar radiation 1000 W/m^2.

HARD DRAWN CU AERIAL CONDUCTORS

Copper conductor

Product Sheet No. 320-01 A				
Cross Sectional Area (mm^2)	Stranding (mm)	Nominal Conductor Diameter (mm)	Mass (kg/km)	Breaking Load (kN)
6	7/1.04	3.12	53.6	2.51
10	7/1.35	4.05	90.2	4.17
16	7/1.70	5.10	143	6.5
25	7/2.14	6.42	227	10.1
35	19/1.53	7.65	314	14.1
50	19/1.83	9.15	451	20.0
70	19/2.14	10.7	617	26.8
95	37/1.83	12.8	882	39.0
Issue: January 2012 Made to AS 1746				

Notes:

1. Coefficient of linear expansion 17.0 x 10^{-6}/°C.
2. Modulus of elasticity:
   - 119 GPa for seven (7) wire conductors.
   - 118 GPa for nineteen (19) wire conductors.
   - 117 GPa for thirty seven (37) wire conductors.

HARD DRAWN CU AERIAL CONDUCTORS

Copper conductor

Product Sheet No. 320-01 B				
Cross Sectional Area ($mm^{2)}$)	Calculated DC Resistance at 20°C (Ohm/km)	Reactance at 50Hz with 300 mm Spacing (Ohm/km)	Current Rating Still Air (Amps)	Current Rating 1 m/s (Amps)
6	3.03	0.365	44	87
10	1.80	0.349	61	120
16	1.13	0.334	82	160
25	0.716	0.320	110	212
35	0.516	0.306	135	260
50	0.361	0.295	169	323
70	0.264	0.285	206	392
95	0.186	0.273	256	486
Issue: January 2012 Made to AS 1746				

Note:

1. Current ratings are based on an ambient temperature of 30°C, a maximum conductor temperature of 75°C, rural weathered, summer noon and intensity of solar radiation 1000 W/m^2.

PVC INSULATED HARD DRAWN CU AERIAL CABLES

Copper conductor
PVC insulation

Product Sheet No. 330-01 A						
Cross Sectional Area ($mm^{2)}$	Stranding (mm)	Conductor Diameter (mm)	Insulation Thickness (mm)	Nominal Overall Diameter (mm)	Mass (kg/km)	Breaking Load (kN)
6	7/1.04	3.12	1.0	5.3	80	2.3
10	7/1.35	4.05	1.0	6.3	120	3.9
16	7/1.70	5.10	1.0	7.3	180	5.9
25	19/1.35	6.75	1.2	9.3	300	10.4
35	19/1.53	7.65	1.2	10.3	370	12.7
50	19/1.83	9.15	1.4	12.2	510	17.3
70	19/2.14	10.7	1.4	13.8	710	25.0
95	37/1.83	12.8	1.6	16.2	980	32.8
Issue: January 2012 Made to AS/NZS 5000.1						

Notes:

1. Coefficient of linear expansion 17.0 x 10^{-6}/°C.
2. Modulus of elasticity:
   - 112 GPa for seven (7) wire conductors.
   - 110 GPa for nineteen (19) wire conductors.
   - 108 GPa for thirty seven (37) wire conductors.

PVC INSULATED HARD DRAWN CU AERIAL CABLES

Copper conductor
PVC insulation

Product Sheet No. 330-01 B				
Cross Sectional Area (mm^2)	Calculated DC Resistance at 20°C (Ohm/km)	Inductive Reactance at 50Hz with 300 mm Spacing (Ohm/km)	Current Rating Still Air (Amps)	Current Rating 1 m/s (Amps)
6	3.17	0.365	45	81
10	1.88	0.349	63	110
16	1.18	0.334	84	147
25	0.749	0.314	115	194
35	0.540	0.306	141	235
50	0.399	0.295	172	281
70	0.276	0.285	218	353
95	0.198	0.273	266	421
Issue: January 2012 Made to AS/NZS 5000.1				

Note:
1. Current ratings are based on an ambient temperature of 30°C, a maximum conductor temperature of 75°C and intensity of solar radiation 1000 W/m^2.

PVC INSULATED AAC AERIAL CABLES

Aluminium conductor
PVC insulation

Product Sheet No. 330-02 A						
Code Name	Stranding (mm)	Cross Sectional Area (mm^2)	Insulation Thickness (mm)	Nominal Overall Diameter (mm)	Mass (kg/km)	Breaking Load (kN)
Namu	7/2.11	24.5	1.2	8.85	119	4.07
Poko	7/2.36	30.6	1.3	9.75	154	5.09
Ladybird	7/2.79	42.8	1.4	11.4	200	6.92
Kutu	7/3.00	49.5	1.4	12.0	224	7.98
Fly	7/3.40	63.6	1.4	13.2	276	9.98
Rango	7/3.66	73.6	1.4	14.0	314	11.2
Wasp	7/4.39	106	1.6	16.6	443	16.1
Beetle	19/2.67	106	1.6	16.8	437	17.2
Weke	7/4.72	122	1.8	18.0	520	18.6
Weta	19/3.35	167	1.8	20.7	650	26.2
Issue: January 2012 Generally made to AS/NZS 5000.1						

Notes:
1. Coefficient of linear expansion 23.0 x 10^{-6}/°C.
2. Modulus of elasticity 65 GPa.

PVC INSULATED AAC AERIAL CABLES

Aluminium conductor
PVC insulation

Product Sheet No. 330-02 B				
Code Name	Calculated DC Resistance at 20°C (Ohm/km)	Reactance at 50Hz with 300mm Spacing (Ohm/km)	Current Rating Still Air (Amps)	Current Rating 1 m/s (Amps)
Namu	1.17	0.321	90	152
Poko	0.936	0.314	104	174
Ladybird	0.670	0.303	130	212
Kutu	0.579	0.299	142	232
Fly	0.451	0.291	168	271
Rango	0.389	0.286	185	297
Wasp	0.271	0.275	234	368
Beetle	0.271	0.271	235	369
Weke	0.234	0.270	258	399
Weta	0.172	0.257	317	484
Issue: January 2012 Generally made to AS/NZS 5000.1				

Note:
1. Current ratings are based on an ambient temperature of 30°C, a maximum conductor temperature of 75°C, rural weathered, summer noon and intensity of solar radiation 1000 W/m^2.

AL AERIAL BUNDLED CABLES (ABC)

Aluminium conductor
XLPE insulation

Product Sheet No. 330-03 A (Two Core)

Cross Sectional Area (mm^2)	Conductor Diameter (mm)	Insulation Thickness (mm)	Nominal Overall Diameter of Bundle (mm)	Mass (kg/km)	Breaking Load (kN)
25	5.99	1.3	18.4	200	7.0
35	6.90	1.3	20.6	260	9.8
50	8.05	1.5	23.8	350	14.0
95	11.40	1.7	31.8	680	26.6

Issue: January 2012

Made to AS/NZS 3560.1

Product Sheet No. 330-04 A (Three Core)

Cross Sectional Area (mm^2)	Conductor Diameter (mm)	Insulation Thickness (mm)	Nominal Overall Diameter of Bundle (mm)	Mass (kg/km)	Breaking Load (kN)
35	6.90	1.3	22.2	390	14.7

Issue: January 2012

Made to AS/NZS 3560.1

Product Sheet No. 330-05 A (Four Core)

CrossSectional Area (mm^2)	Conductor Diameter (mm)	Insulation Thickness (mm)	Nominal Overall Diameter of Bundle (mm)	Mass (kg/km)	Breaking Load (kN)
25	5.99	1.3	22.2	400	14.0
35	6.90	1.3	24.9	520	19.6
50	8.05	1.5	28.7	700	28.0
70	9.69	1.5	32.8	960	39.2
95	11.40	1.7	38.4	1350	53.2
120	12.90	1.7	42.2	1660	67.2
150	14.35	1.7	45.6	2020	84.0

Issue: January 2012

Made to AS/NZS 3560.1

Notes:

1. Coefficient of linear expansion 23 x 10^{-6}/°C.
2. Modulus of elasticity 59 GPa up to and including 50 mm² and 56 GPa for conductors above 50 mm².

AL AERIAL BUNDLED CABLES (ABC)

Aluminium conductor
XLPE insulation

Product Sheet No. 330-03 B (Two Core)				
Cross Sectional Area (mm^2)	Calculated DC Resistance at 20°C (Ohm/km)	Maximum AC Resistance at 80°C (Ohm/km)	Positive Sequence Reactance at 50Hz (Ohm/km)	Current Rating (Amps)
25	1.20	1.49	0.102	118
35	0.868	1.08	0.0982	140
50	0.641	0.796	0.0924	168
95	0.320	0.398	0.0868	258
Issue: January 2012 Made to AS/NZS 3560.1				

Product Sheet No. 330-04 B (Three Core)				
Cross Sectional Area (mm^2)	Calculated DC Resistance at 20°C (Ohm/km)	Maximum AC Resistance at 80°C (Ohm/km)	Positive Sequence Reactance at 50Hz (Ohm/km)	Current Rating (Amps)
35	0.868	1.08	0.0982	134
Issue: January 2012 Made to AS/NZS 3560.1				

Product Sheet No. 330-05 B (Four Core)				
Cross Sectional Area (mm^2)	Calculated DC Resistance at 20°C (Ohm/km)	Maximum AC Resistance at 80°C (Ohm/km)	Positive Sequence Reactance at 50Hz (Ohm/km)	Current Rating (Amps)
25	1.20	1.49	0.102	109
35	0.868	1.08	0.0982	134
50	0.641	0.796	0.0924	157
70	0.443	0.551	0.0893	196
95	0.320	0.398	0.0868	241
120	0.253	0.315	0.0844	280
150	0.206	0.257	0.0844	314
Issue: January 2012 Made to AS/NZS 3560.1				

Note:
1. Current ratings are based on an ambient temperature of 30°C, a maximum conductor temperature of 80°C, wind speed of 1 m/s and intensity of solar radiation 1000 W/m^2.

NOTES