



# Cable Guide for the Mining Industry

August 2016



A brand of the

**Prysmian**  
Group

**DISCLAIMER**

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

Prysmian Australia Pty Ltd proudly manufactures in Australia and operates certified management systems compliant with the requirements of;

**ISO 9001:2008**

Quality Management Systems

**AS/NZS 4801:2001**

Occupational Health & Safety Management Systems

**OHSAS 18001:2007**

Assessment Specification for Occupational Health & Safety Management Systems

**ISO 14001:2004**

Environmental Management Systems



# Why do business with Prysmian?

Because it pays off.

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

First of all we're Australians. We've been producing tailor-made cables here since 1944. We know what it takes to deal with the many different challenges that tough Australian conditions require.

Second of all we combine this local knowledge with the strength of being a global market leader. Being the world's largest producer of power and telecommunication cables means we have the muscles to innovate and customise our solutions to perfectly match your needs. At our disposal we have 97 manufacturing plants, 17 research and development centres and around 22 000 employees.

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

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

That's why doing business with us pays off.

Please accept this Cable Guide with our compliments.



# Contents

<b>CABLE COMPONENTS</b>	<b>5</b>
-------------------------	----------

<b>QUICK REFERENCE GUIDE</b>	<b>7</b>
------------------------------	----------

<b>UNDERGROUND MINE CABLES</b>	<b>9</b>
--------------------------------	----------

Type 209 1.1-11 kV	10
Type 210 1.1 kV	12
Type 240 1.1-11 kV	14
Type 241 1.1-11 kV	16
Type 241SF 1.1-11 kV	18
Type 245SF 1.1-3.3 kV	20
Type 275 1.1 kV	22

<b>OPEN CUT MINE CABLES</b>	<b>25</b>
-----------------------------	-----------

Type 409 1.1-22 kV	26
Type 440 1.1-22 kV	28
Type 441 1.1 kV	30
Type 441 3.3-22 kV	32
Type 450 3.3-33 kV	34
Type 451 3.3-33 kV	36
Type 455 3.3-11 kV	38

<b>MINE FEEDER CABLES</b>	<b>41</b>
---------------------------	-----------

11/11 kV Paper Insulated	42
6.35/11 kV Copper	44
12.7/22 kV Copper	46
Single Point Suspension Cable 11-22 kV	48
Type 1 1.1 kV	50
Type 2S, Type 2S.3	52
Type A and Type B 1.1 kV	54

<b>TECHNICAL/GENERAL INFORMATION</b>	<b>57</b>
--------------------------------------	-----------

Mechanical information	58
Electrical information	59
Ratings information	60
Transport, handling and storage guidelines	62
Unloading - safety exclusion zones	64
Storage recommendations	65





## Cable Components

*Development of elastomeric power cables for safe and reliable mining and industrial applications has paralleled the development of the electric motor and power generation since the 19th century.*

Elastomeric cables are the natural choice for applications where durability, flexibility, and safe operation under extreme environmental conditions are important. The Prysmian Group's elastomeric cables have been "field proven" in thousands of operations, and with continuous development, utilise the best features of cables offered around the world.

In Australia, as elsewhere, there are many established guidelines governing manufacture of mining and industrial cables. Innovation in work practices, with more equipment operating at higher voltages, has required the continued development of new elastomeric cable designs. Ongoing development programs have also been required to continually improve the reliability and safety of current designs. The major design responsibility for the Prysmian Group is to ensure that cables supplied will operate reliably and safely under a wide range of conditions. Personnel often work close to energised cables, especially in underground mines. The cable construction and materials must be selected to provide maximum safety during both normal operation and in the case of cable failure.

### Conductors

The important flexibility, strength and electrical properties of mining and industrial cables are mainly derived from the particular conductor design used, and any armouring or reinforcement. Conductors used in these cables are to Australian and International Standards, and usually employ tinned annealed copper wires stranded to provide optimum flexibility. Flexibility is influenced by the number of individual wires for a given size, the lay length of bunches and strands, and the geometric arrangement of the strands.

A simple examination of wires and their size is not a reliable guide to their flexibility or endurance, since special designs are often developed to suit particular applications. These would include cables for heavy-duty reeling or flexing such as ship-loader or longwall shearer applications. The use of specially designed power, earth or pilot conductors, and their locations in the cable provide a good example of this.

### Core assembly lay length

This is a vital factor affecting cable life when the cable is subjected to repeated reeling, especially under tension. A ratio of cable lay length (pitch) to pitch circle diameter (the diameter of a circle passing through the mid points of the cores) is commonly used to specify lay lengths suited to various applications. For moderate duty reeling cables, this value should be less than 12.5, and for trailing cables it should be less than 17.

### Insulation

In the past fifty years, natural rubber insulation has been replaced by synthetic polymeric compounds with inherently superior properties. Ethylene-propylene copolymer (EPR) and terpolymer (EPDM) are most common on flexible cables, offering excellent thermal durability, corona resistance, and electrical characteristics. Cross linked polyethylene (XLPE) insulation has found limited use in fixed applications.

Insulation materials are chosen for optimum dielectric characteristics, and resistance to deterioration through heat, oxidation, salts and copper compounds. Inert fillers are used for maximum electrical stability and low moisture absorption.

### Pilot

The resistance between mining equipment and earth is usually high, and dangerous voltages can be present. To prevent hazards from shock, ground fault currents are controlled by various systems, including neutral resistance grounding. To ensure the integrity of this safety circuit, a small independent current may be passed through a pilot conductor to the load centre and return through the earth conductor. If this current is interrupted through breakage, then the circuit breaker will automatically trip and remove power from the cable. Australian mining regulatory authorities require the inclusion of an extensible central pilot conductor (for monitoring circuit integrity). This is specially designed and manufactured to restrict extensibility in service. The cores of each underground coal mining cable must also be electrically symmetrical for added safety.

### Screens

Bending of conductors under tension accelerates the breakage of individual wires. Partial failure of conductors can lead to wire ends that penetrate through the insulation. Metallic screens over the power cores, or earthing cores associated with semiconductive rubber components are provided to ground such faults through an earth. Besides being part of the earth fault detection circuit, screens relieve non-uniform electrical stresses and provide a uniform capacitance to ground.

Screening is achieved by either a helically applied layer of wires, a composite textile and tinned copper wire braid, semiconductive elastomer, or a combination of the latter. Medium voltage reeling and trailing cables usually have either individually core composite textile / copper braid or semiconductive rubber screens for minimal fatigue failure. Collective screens of either semiconductive rubber, braids, or pliable steel wire armour with copper wires to achieve the desired conductivity may also be used. The latter types are used in cable constructions for fixed or feeder cable applications.

Semiconductive rubber screens are used in cables connected to systems which are able to limit earth faults to around 500 mA (r.m.s.) within about 10ms. Australian cables have fire propagation resistant semiconductive screens.



### Armour & Reinforcement

Prysmian Group trailing cables manufactured to AS/NZS 1802 and AS/NZS 2802 and subjected to harsh wear, employ nylon textile or woven polyester tape, or an open braid of Kevlar® fibre as reinforcement. This enhances the sheath's mechanical strength, and improves the resistance against damage from crushing, stretching, and tear propagation. Where a very high degree of impact and cut resistance is required, designs will usually have a pliable wire armour. This makes the cable much heavier and more difficult to handle and use. Heavy duty textile reinforcement is preferred from an operational point of view.

### Sheath

The primary role of the cable sheath is to protect the underlying core assembly from mechanical, chemical, or other environmental damage. Polychloroprene (PCP), chlorosulphonated polyethylene (CSP), and chlorinated polyethylene (CPE) are the most commonly used synthetic polymers used in sheaths today. They are commonly filled with other materials to enhance sheath performance. A properly formulated sheathing compound is essential for a high performance reeling or trailing cable. The higher the tensile strength, the stronger the material is when stretched. As the material gets hotter, tensile strength reduces with a consequent reduction in tear resistance. As cables age, elongation may be reduced (the material becomes brittle).



# Quick Reference Guide

Standard code	210.1	209.1	209.3	240.1	240.3	240.11	241.1	241.3	241.11	245.1	245.3	275.1	Type 1	Type 2S	Type A	Type B	409	440	441	450	451	455
HV Feeder		●	●			●			○													
Section Power		●		○			●									●	●					
Lighting	●						○								●							
Power Tools	●														●							
Cutter Motor	●	●	●	●	●		○	○		○	●	○	○	●								
Conveyor Drive		●					○															
Longwall Power			●		●			●			○											
Longwall Shearer											●											
Roof Bolter		●					○					○										
Mule		●					○					○										
Shuttle Car								●				●										
Continuous Miner		●					●															
Road Header		●					○															
Loader		●					○					○										
Continuous Haulage		●					○			●												
Ventilation Fan		●					○			○		○										
Drill Rig																	●	○	○	○	●	
Face Shovel																	●	○	○	○	●	
Bucket Wheel																	○	○	●	●	●	
Dragline																	●	○	○	●	●	
Pump																	○	●	○	○	○	○
Dredge																						
Stacker - Reclaimer																			○		○	○
Ship Loader																			○		○	○
Container Crane																			○		○	○

LEGEND:

- Recommended
  - Suitable
  - Specially Designed
- Special design constructions including fibre optic cable component may apply. Consultation with Prysmian specialists recommended.



# State of the Art Cables.

We know what it takes.



At Prysmian, we always work towards four goals – quality, choice, performance and safety. We understand the risks involved in mining and the tremendous importance of electrical cables. Every product you find in our inventory complies with Australian Standards. They have been tested for durability and have been found to perform well under the extreme conditions of underground and open cut Australian mines. Rest assured, we have been powering mining equipment in Australia for decades and know what it takes.

Australian made? Yes, of course.

A brand of the

**Prysmian**  
Group

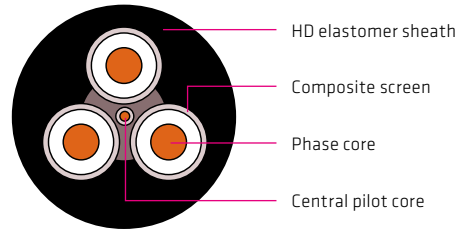




# UNDERGROUND MINE CABLES

## UNDERGROUND MINE CABLES

### Type 209 1.1-11 kV



#### Cable description

Composite screened cable for general use to AS/NZS 1802.

#### Application

1.1/1.1 kV to 11/11 kV general cable used extensively for feeder connection between transformer and gate-end box or similar, or feeder cables to pumps, fans, crushers, etc or as a substitute to Type A or B feeder cables.

This cable can also be used above ground for power supply to mobile equipment.

#### Approvals

AS/NZS 1802  
AS/NZS 1972  
AS/NZS 5000.1

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

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

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent  
Mechanical impact: Heavy  
Water exposure: Immersion/Temporary coverage  
Solar radiation and weather exposure: Suitable for direct exposure

#### Cable design

Composite screened cores with a single extensible pilot.

Core: Metal: tinned copper, three core plus central pilot.

Conductor separator tape:  
1.1/1.1 kV – polyester.  
3.3 kV and above – semiconductive screen.

Insulation: EPR (R-EP-90).

Insulation tape:  
1.1/1.1 kV – proofed textile.  
3.3 kV and above – semiconductive screen.

Screen: Composite screen (earth) of tinned annealed copper wire and polyester yarn.  
Core colours: red, white, blue braid tracers.

Pilot: Single, in centre of cable.  
Maximum DC resistance;  
5.5 Ω/100 m for power cores to 35 mm<sup>2</sup>.  
3 Ω/100 m for power conductors above 35 mm<sup>2</sup>.

Sheath: Heavy duty HD-85-PCP  
Sheath reinforcement is available upon request.

#### Installation conditions

In free air  
In duct  
Mobile equipment  
Machines

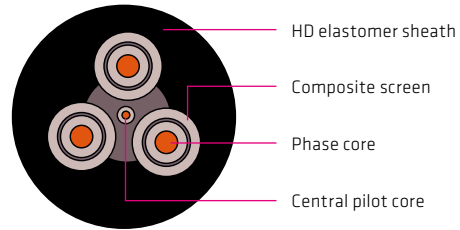
## UNDERGROUND MINE CABLES

### Physical & electrical characteristics

Type 209 1.1-11 kV											
Voltage rating & part number	Power conductor							Screen	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km	Approx area mm <sup>2</sup> /phase	Sheath thickness mm	Nominal diameter mm	Approx mass kg/100m
<b>Type 209.1</b>											
10-209-1	10	4.6	1.5	2.58	0.130	4.47	0.314	8.2	3.8	33.3	175
16-209-1	16	6.2	1.6	1.58	0.118	2.74	0.379	10	4.0	37.3	225
25-209-1	25	7.2	1.6	0.951	0.112	1.66	0.432	12	4.3	40.3	285
35-209-1	35	8.4	1.6	0.698	0.107	1.22	0.493	14	4.6	43.6	335
50-209-1	50	9.7	1.7	0.523	0.104	0.924	0.526	14	5.0	47.7	410
70-209-1	70	12.0	1.8	0.346	0.0981	0.623	0.599	16	5.4	54.0	540
95-209-1	95	13.3	2.0	0.271	0.0955	0.498	0.591	18	6.0	58.9	645
120-209-1	120	15.3	2.1	0.210	0.0925	0.397	0.640	21	6.4	64.6	790
150-209-1	150	17.2	2.3	0.166	0.0907	0.328	0.652	23	6.9	70.4	955
185-209-1	185	18.8	2.5	0.137	0.0902	0.284	0.657	30	7.4	76.5	1155
240-209-1	240	21.7	2.8	0.107	0.0883	0.240	0.672	34	8.2	85.5	1445
300-209-1	300	24.3	3.0	0.0850	0.0873	0.211	0.719	49	8.8	94.3	1790
<b>Type 209.3</b>											
16-209-3	16	6.2	3.0	1.58	0.131	2.75	0.255	14	5.3	47.3	335
25-209-3	25	7.2	3.0	0.951	0.125	1.66	0.280	15	5.6	50.4	400
35-209-3	35	8.4	3.0	0.698	0.119	1.23	0.311	16	5.9	53.5	460
50-209-3	50	9.7	3.0	0.523	0.114	0.927	0.347	17	6.3	57.2	540
70-209-3	70	12.0	3.0	0.346	0.106	0.627	0.408	19	6.6	62.6	665
95-209-3	95	13.3	3.0	0.271	0.102	0.502	0.439	21	7.1	66.4	765
120-209-3	120	15.3	3.0	0.210	0.0985	0.402	0.492	27	7.4	72.0	930
150-209-3	150	17.2	3.0	0.166	0.0954	0.332	0.541	32	7.8	76.7	1095
185-209-3	185	18.8	3.0	0.137	0.0942	0.288	0.584	42	8.2	82.3	1285
240-209-3	240	21.7	3.0	0.106	0.0906	0.242	0.659	48	8.8	89.6	1555
300-209-3	300	24.3	3.0	0.0849	0.0890	0.213	0.727	63	9.4	97.7	1900
<b>Type 209.6</b>											
16-209-6	16	6.2	5.0	1.58	0.143	2.75	0.181	17	6.4	58.2	475
25-209-6	25	7.2	5.0	0.951	0.137	1.66	0.193	19	6.7	61.7	560
35-209-6	35	8.4	5.0	0.698	0.130	1.23	0.212	21	7.0	64.8	630
50-209-6	50	9.7	5.0	0.523	0.124	0.931	0.234	22	7.3	68.2	715
70-209-6	70	12.0	5.0	0.346	0.116	0.632	0.271	23	7.7	73.8	860
95-209-6	95	13.3	5.0	0.271	0.113	0.509	0.292	30	8.1	78.0	995
120-209-6	120	15.3	5.0	0.210	0.108	0.409	0.325	32	8.5	83.2	1155
150-209-6	150	17.2	5.0	0.166	0.105	0.340	0.354	46	8.9	89.2	1370
185-209-6	185	18.8	5.0	0.136	0.102	0.294	0.381	48	9.3	93.3	1540
240-209-6	240	21.7	5.0	0.106	0.0981	0.250	0.426	53	9.9	101	1825
300-209-6	300	24.3	5.0	0.0845	0.0959	0.221	0.467	71	10.4	109	2195
<b>Type 209.11</b>											
25-209-11	25	7.2	7.6	0.951	0.150	1.67	0.150	24	8.1	75.9	805
35-209-11	35	8.4	7.6	0.698	0.143	1.23	0.163	30	8.4	79.6	915
50-209-11	50	9.7	7.6	0.523	0.136	0.936	0.178	32	8.7	83.0	1010
70-209-11	70	12.0	7.6	0.346	0.127	0.638	0.204	35	9.1	88.7	1185
95-209-11	95	13.3	7.6	0.271	0.124	0.516	0.219	48	9.6	93.8	1360
120-209-11	120	15.3	7.6	0.210	0.119	0.418	0.241	53	9.9	98.7	1540
150-209-11	150	17.2	7.6	0.165	0.114	0.347	0.261	56	10.3	103	1725
185-209-11	185	18.8	7.6	0.136	0.111	0.304	0.279	56	10.7	108	1900
240-209-11	240	21.7	7.6	0.106	0.107	0.261	0.309	77	11.3	116	2280

## UNDERGROUND MINE CABLES

### Type 210 1.1 kV



#### Cable description

Composite screened cable for hand-held equipment to AS/NZS 1802.

#### Application

1.1/1.1 kV cable used primarily for hand-held boring machines, and as a flexible lead to other equipment where heavy duty service is required. Note, certain regulatory authorities limit the use of this cable to 250/250V.

#### Approvals

AS/NZS 1802  
AS/NZS 1972  
AS/NZS 5000.1

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

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

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent  
Mechanical impact: Heavy  
Water exposure: Immersion/Temporary coverage  
Solar radiation and weather exposure: Suitable for direct exposure

#### Cable design

Composite screened power cores with a single extensible pilot.

Core: Metal: tinned copper, three core plus central pilot.

Insulation: EPR (R-EP-90).

Screen: Composite screen (earth) of tinned annealed copper wire and polyester yarn.

Core colours: red, white, blue braid tracers

Pilot: Single, in centre of cable.  
Pilot resistance is  $\leq 5.5 \Omega/100 \text{ m}$ .

Sheath: Heavy duty HD-85-PCP.

#### Installation conditions

In free air  
In duct  
Machines



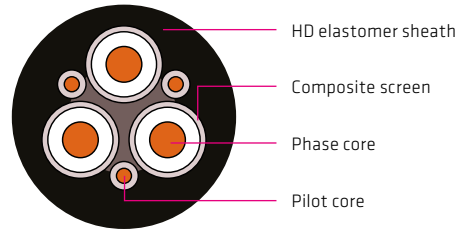
## UNDERGROUND MINE CABLES

### Physical & electrical characteristics

Type 210 1.1 kV											
Voltage rating & part number	Power conductor							Screen	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km	Approx area mm <sup>2</sup> /phase	Sheath thickness mm	Nominal diameter mm	Approx mass kg/100m
Type 210.1											
1.5-210-1	1.5	1.6	1.4	17.5	0.187	30.3	0.165	6.2	3.0	25.6	100
2.5-210-1	2.5	2.1	1.5	10.5	0.174	18.2	0.184	6.9	3.0	26.8	110

## UNDERGROUND MINE CABLES

### Type 240 1.1-11 kV



#### Cable description

Composite screened cable for general use to AS/NZS 1802.

#### Application

1.1/1.1 kV to 11/11 kV cable used extensively for feeder connection between transformer and gate-end box or similar, continuous miner cable or feeder cables to pumps. Having three pilots, the cable can be used in long runs, without compromising pilot control protection system resistance limitations.

For applications requiring high degrees of flexibility, Type 241 cables would be more appropriate.

#### Approvals

AS/NZS 1802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Composite screened power cores and three separate pilot conductors.

Core: Metal: tinned copper, three core plus central pilot.

Conductor separator tape:

1.1/1.1 kV – polyester.

3.3 kV and above – semiconductive screen.

Insulation: EPR (R-EP-90).

Insulation tape:

1.1/1.1 kV – proofed textile.

3.3 kV and above – semiconductive screen.

Screen: Composite screen (earth) of tinned annealed copper wire and polyester yarn.

Core colours: red, white, blue braid tracers

Pilot: Three in the interstitial cavities elastomer covered and proofed taped.

Sheath: Heavy duty HD-85-PCP.

Sheath reinforcement is available upon request.

#### Installation conditions

In free air

In duct

Mobile equipment

Machines

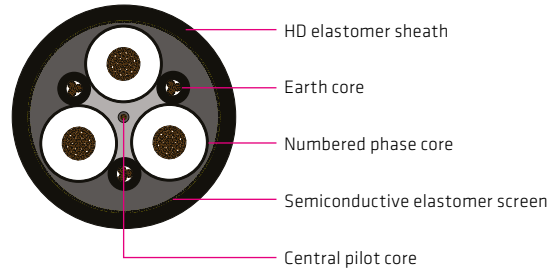
**UNDERGROUND MINE CABLES**

**Physical & electrical characteristics**

Type 240 1.1-11 kV												
Voltage rating & part number	Power conductor							Screen	Pilot	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km			Approx area mm <sup>2</sup> /phase	Approx area (each) mm <sup>2</sup>	Sheath thickness mm
Type 240.1												
6-240-1	6	3.5	1.5	4.32	0.141	7.49	0.259	8.2	1	3.8	31.0	150
10-240-1	10	4.6	1.5	2.58	0.130	4.47	0.314	8.2	1.5	3.8	33.3	175
16-240-1	16	6.2	1.6	1.58	0.118	2.74	0.379	10	3	4.0	37.3	230
25-240-1	25	7.2	1.6	0.951	0.112	1.66	0.432	12	4.5	4.3	40.3	295
35-240-1	35	8.4	1.6	0.698	0.107	1.22	0.493	14	6	4.6	43.6	350
50-240-1	50	9.7	1.7	0.523	0.104	0.924	0.526	14	8	5.0	47.7	425
70-240-1	70	12.0	1.8	0.346	0.0981	0.623	0.599	16	12.5	5.4	54.0	565
95-240-1	95	13.3	2.0	0.271	0.0955	0.498	0.591	18	12.5	6.0	58.9	670
120-240-1	120	15.3	2.1	0.210	0.0925	0.397	0.640	21	13.75	6.4	64.6	815
150-240-1	150	17.2	2.3	0.166	0.0907	0.328	0.652	23	17	6.9	70.4	990
185-240-1	185	18.8	2.5	0.137	0.0902	0.284	0.657	30	22	7.4	76.5	1195
240-240-1	240	21.7	2.8	0.107	0.0883	0.240	0.672	34	27	8.2	85.5	1505
300-240-1	300	24.3	3.0	0.0850	0.0873	0.211	0.719	49	35.7	8.8	94.3	1870
Type 240.3												
16-240-3	16	6.2	3.0	1.58	0.131	2.75	0.255	14	3	5.3	47.3	340
25-240-3	25	7.2	3.0	0.951	0.125	1.66	0.280	15	4.5	5.6	50.4	410
35-240-3	35	8.4	3.0	0.698	0.119	1.23	0.311	16	6	5.9	53.5	475
50-240-3	50	9.7	3.0	0.523	0.114	0.927	0.347	17	8	6.3	57.2	555
70-240-3	70	12.0	3.0	0.346	0.106	0.627	0.408	19	12.5	6.6	62.6	690
95-240-3	95	13.3	3.0	0.271	0.102	0.502	0.439	21	12.5	7.1	66.4	785
120-240-3	120	15.3	3.0	0.210	0.0985	0.402	0.492	27	13.75	7.4	72.0	955
150-240-3	150	17.2	3.0	0.166	0.0954	0.332	0.541	32	17	7.8	76.7	1130
185-240-3	185	18.8	3.0	0.137	0.0942	0.288	0.584	42	22	8.2	82.3	1330
240-240-3	240	21.7	3.0	0.106	0.0906	0.242	0.659	48	27	8.8	89.6	1615
300-240-3	300	24.3	3.0	0.0849	0.0890	0.213	0.727	63	35.7	9.4	97.7	1980
Type 240.6												
16-240-6	16	6.2	5.0	1.58	0.143	2.75	0.181	17	3	6.4	58.2	480
25-240-6	25	7.2	5.0	0.951	0.137	1.66	0.193	19	4.5	6.7	61.7	570
35-240-6	35	8.4	5.0	0.698	0.130	1.23	0.212	21	6	7.0	64.8	645
50-240-6	50	9.7	5.0	0.523	0.124	0.931	0.234	22	8	7.3	68.2	730
70-240-6	70	12.0	5.0	0.346	0.116	0.632	0.271	23	12.5	7.7	73.8	880
95-240-6	95	13.3	5.0	0.271	0.113	0.509	0.292	30	12.5	8.1	78.0	1020
120-240-6	120	15.3	5.0	0.210	0.108	0.409	0.325	32	13.75	8.5	83.2	1180
150-240-6	150	17.2	5.0	0.166	0.105	0.340	0.354	46	17	8.9	89.2	1410
185-240-6	185	18.8	5.0	0.136	0.102	0.294	0.381	48	22	9.3	93.6	1585
240-240-6	240	21.7	5.0	0.106	0.0981	0.250	0.426	53	27	9.9	101	1885
300-240-6	300	24.3	5.0	0.0845	0.0959	0.221	0.467	71	35.7	10.4	109	2275
Type 240.11												
25-240-11	25	7.2	7.6	0.951	0.150	1.67	0.150	24	4.5	8.1	75.9	815
35-240-11	35	8.4	7.6	0.698	0.143	1.23	0.163	30	6	8.4	79.6	930
50-240-11	50	9.7	7.6	0.523	0.136	0.936	0.178	32	8	8.7	83.0	1025
70-240-11	70	12.0	7.6	0.346	0.127	0.638	0.204	35	12.5	9.1	88.7	1210
95-240-11	95	13.3	7.6	0.271	0.124	0.516	0.219	48	12.5	9.6	93.8	1385
120-240-11	120	15.3	7.6	0.210	0.119	0.418	0.241	53	13.75	9.9	98.7	1565
150-240-11	150	17.2	7.6	0.165	0.114	0.347	0.261	56	17	10.3	103	1765
185-240-11	185	18.8	7.6	0.136	0.111	0.304	0.279	56	22	10.7	108	1945
240-240-11	240	21.7	7.6	0.106	0.107	0.261	0.309	77	27	11.3	116	2340

## UNDERGROUND MINE CABLES

### Type 241 1.1-11 kV



#### Cable description

Semiconductive screened cable for general use to AS/NZS 1802.

#### Application

1.1/1.1 kV to 11/11 kV general purpose cable used for continuous miners, or feeder cables to pumps. Also commonly used for monorails supplying DCBs and longwalls. Typically, a more flexible cable for use is a semiconductive screen instead of a metal screen.

#### Approvals

AS/NZS 1802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Semiconductive elastomer screened power cores, with three earth cores and one extensible pilot.

Core: Metal: tinned copper, three core three earths plus central pilot.

Conductor separator tape:

1.1/1.1 kV – polyester where necessary.

3.3 kV and above – semiconductive screen.

Insulation: EPR (R-EP-90) core with durably printed core numbers at intervals less than 300 mm, on black semiconductive insulation screen for phase identification

Screen: Semiconductive elastomer screen.

Pilot: Single, in centre of cable.

Maximum DC resistance;

5.5  $\Omega$ /100 m for power cores to 35 mm<sup>2</sup>.

3  $\Omega$ /100 m for power conductors above 35 mm<sup>2</sup>.

Earth: Three semiconductive elastomer covered flexible earths, located in the interstices.

Sheath: Open weave reinforcement, under heavy duty HD-85-PCP.

#### Installation conditions

In free air

In duct

Mobile equipment

Machines



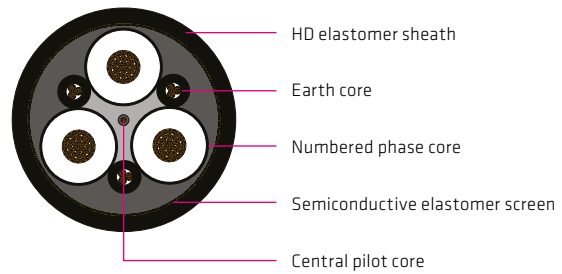
## UNDERGROUND MINE CABLES

### Physical & electrical characteristics

Type 241 1.1-11 kV											
Voltage rating & part number	Power conductor							Earth	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km		Approx area (each) mm <sup>2</sup>	Sheath thickness mm	Nominal diameter mm
Type 241.1											
6-241-1	6	3.5	1.5	4.32	0.139	7.49	0.259	1	3.8	29.9	130
10-241-1	10	4.6	1.5	2.58	0.127	4.47	0.314	1.5	3.8	32.0	155
16-241-1	16	6.2	1.6	1.58	0.116	2.74	0.379	3	3.9	35.9	200
25-241-1	25	7.2	1.6	0.951	0.110	1.66	0.432	4.5	4.2	38.9	255
35-241-1	35	8.4	1.6	0.698	0.106	1.22	0.493	6	4.4	42.0	310
50-241-1	50	9.7	1.7	0.523	0.102	0.923	0.526	8	4.9	46.3	380
70-241-1	70	12.0	1.8	0.346	0.0965	0.622	0.599	12.5	5.3	52.4	510
95-241-1	95	13.3	2.0	0.271	0.0942	0.497	0.591	12.5	5.8	57.1	605
120-241-1	120	15.3	2.1	0.210	0.0912	0.397	0.640	13.75	6.3	62.9	745
150-241-1	150	17.2	2.3	0.166	0.0896	0.327	0.652	17	6.7	68.6	910
185-241-1	185	18.8	2.5	0.137	0.0885	0.283	0.657	22	7.3	74.4	1085
240-241-1	240	21.7	2.8	0.107	0.0868	0.239	0.672	27	8.0	83.2	1370
300-241-1	300	24.3	3.0	0.0851	0.0848	0.208	0.719	35.2	8.7	90.8	1670
Type 241.3											
16-241-3	16	6.2	3.0	1.58	0.129	2.75	0.255	3	5.0	45.0	285
25-241-3	25	7.2	3.0	0.951	0.123	1.66	0.280	4.5	5.3	48.2	350
35-241-3	35	8.4	3.0	0.698	0.117	1.23	0.311	6	5.6	51.2	410
50-241-3	50	9.7	3.0	0.523	0.112	0.926	0.347	8	6.0	55.0	485
70-241-3	70	12.0	3.0	0.346	0.105	0.626	0.408	12.5	6.4	60.6	620
95-241-3	95	13.3	3.0	0.271	0.101	0.501	0.439	16	6.8	64.2	715
120-241-3	120	15.3	3.0	0.210	0.0965	0.400	0.492	20	7.2	69.3	855
150-241-3	150	17.2	3.0	0.166	0.0934	0.330	0.541	27	7.6	74.2	1030
185-241-3	185	18.8	3.0	0.137	0.0911	0.285	0.584	35.2	8.0	78.5	1190
240-241-3	240	21.7	3.0	0.107	0.0878	0.240	0.659	39.5	8.6	85.8	1450
300-241-3	300	24.3	3.0	0.0851	0.0854	0.209	0.727	50	9.1	92.3	1735
Type 241.6											
16-241-6	16	6.2	5.0	1.58	0.141	2.75	0.181	3	6.1	55.9	410
25-241-6	25	7.2	5.0	0.951	0.135	1.66	0.193	4.5	6.4	59.4	495
35-241-6	35	8.4	5.0	0.698	0.129	1.23	0.212	6	6.7	62.5	560
50-241-6	50	9.7	5.0	0.523	0.123	0.931	0.234	8	7.1	66.2	645
70-241-6	70	12.0	5.0	0.346	0.115	0.632	0.271	12.5	7.4	71.7	790
95-241-6	95	13.3	5.0	0.271	0.111	0.507	0.292	16	7.9	75.5	905
120-241-6	120	15.3	5.0	0.210	0.106	0.407	0.325	20	8.3	80.6	1065
150-241-6	150	17.2	5.0	0.166	0.102	0.337	0.354	27	8.6	85.1	1235
185-241-6	185	18.8	5.0	0.137	0.0997	0.293	0.381	35.2	9.0	89.5	1410
240-241-6	240	21.7	5.0	0.106	0.0957	0.247	0.426	39.5	9.6	96.8	1685
300-241-6	300	24.3	5.0	0.0847	0.0927	0.217	0.467	50	10.2	104	1995
Type 241.11											
25-241-11	25	7.2	7.6	0.951	0.148	1.67	0.150	4.5	7.8	73.8	720
35-241-11	35	8.4	7.6	0.698	0.141	1.23	0.163	6	8.1	76.8	800
50-241-11	50	9.7	7.6	0.523	0.135	0.936	0.178	8	8.5	80.5	895
70-241-11	70	12.0	7.6	0.346	0.126	0.638	0.204	12.5	8.9	86.1	1060
95-241-11	95	13.3	7.6	0.271	0.122	0.515	0.219	16	9.3	89.7	1180
120-241-11	120	15.3	7.6	0.210	0.116	0.416	0.241	20	9.7	94.8	1350
150-241-11	150	17.2	7.6	0.165	0.112	0.345	0.261	27	10.0	99.3	1540
185-241-11	185	18.8	7.6	0.136	0.109	0.302	0.279	32	10.4	104	1720
240-241-11	240	21.7	7.6	0.106	0.104	0.257	0.309	39.5	11.0	111	2035

## UNDERGROUND MINE CABLES

### Type 241SF 1.1-11 kV



#### Cable description

Semiconductive screened cable for general use to AS/NZS 1802.

#### Application

1.1/1.1 kV to 11/11 kV general purpose cable used for continuous miners, or feeder cables to pumps. Also commonly used for monorails supplying DCBs and longwalls. Cable stranding and lay-up have been modified to provide for maximum flexibility in arduous conditions.

Type 241SF cable designed for applications requiring maximum flexibility.

#### Approvals

AS/NZS 1802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Very flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Semiconductive elastomer screened power cores, with three earth cores and one extensible pilot.

Core: Metal: tinned copper, three core three earths plus central pilot.

Conductor separator tape:

1.1/1.1 kV – polyester where necessary.

3.3 kV and above – semiconductive screen.

Insulation: EPR (R-EP-90) core with durably printed core numbers at intervals less than 300 mm, on black semiconductive insulation screen for phase identification.

Screen: Semiconductive elastomer screen.

Pilot: Single, in centre of cable.

Maximum DC resistance;

5.5  $\Omega$ /100 m for power cores to 35 mm<sup>2</sup>.

3  $\Omega$ /100 m for power conductors above 35 mm<sup>2</sup>.

Earth: Three semiconductive elastomer covered flexible earths, located in the interstices.

Sheath: Open weave reinforcement, under heavy duty HD-85-PCP.

#### Installation conditions

In free air

In duct

Mobile equipment

Machines

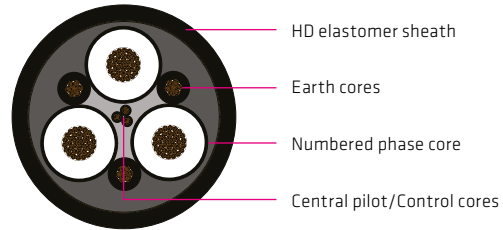
## UNDERGROUND MINE CABLES

### Physical & electrical characteristics

Type 241SF 1.1-11 kV											
Voltage rating & part number	Power conductor							Earth	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km		Approx area (each) mm <sup>2</sup>	Sheath thickness mm	Nominal diameter mm
<b>Type 241.1 SF</b>											
70-241-1 SF	70	12.1	1.8	0.346	0.0985	0.623	0.619	12.5	5.3	52.7	525
95-241-1 SF	95	13.6	2.0	0.271	0.0968	0.498	0.622	12.5	5.8	57.6	635
120-241-1 SF	120	15.6	2.1	0.210	0.0938	0.398	0.673	13.75	6.3	63.6	785
150-241-1 SF	150	17.5	2.3	0.166	0.0922	0.329	0.685	17	6.7	69.2	955
185-241-1 SF	185	19.0	2.5	0.137	0.0898	0.284	0.674	22	7.3	74.8	1115
240-241-1 SF	240	21.9	2.8	0.107	0.0881	0.240	0.689	27	8.0	83.7	1405
300-241-1 SF	300	24.4	3.0	0.0851	0.0862	0.210	0.736	35.7	8.7	91.2	1715
<b>Type 241.3 SF</b>											
70-241-3 SF	70	12.1	3.0	0.346	0.107	0.627	0.422	12.5	6.4	60.9	635
95-241-3 SF	95	13.6	3.0	0.271	0.103	0.502	0.461	16	6.8	64.8	750
120-241-3 SF	120	15.6	3.0	0.210	0.0991	0.402	0.517	20	7.2	70.0	900
150-241-3 SF	150	17.5	3.0	0.166	0.0961	0.332	0.568	27	7.6	74.8	1075
185-241-3 SF	185	19.0	3.0	0.137	0.0924	0.286	0.600	35.2	8.0	78.9	1225
240-241-3 SF	240	21.9	3.0	0.107	0.0891	0.241	0.675	39.5	8.6	86.2	1485
300-241-3 SF	300	24.4	3.0	0.0851	0.0867	0.210	0.744	50	9.1	92.7	1775
<b>Type 241.6 SF</b>											
70-241-6 SF	70	12.1	5.0	0.346	0.118	0.633	0.283	12.5	7.4	72.0	820
95-241-6 SF	95	13.6	5.0	0.271	0.114	0.509	0.307	16	7.9	76.1	945
120-241-6 SF	120	15.6	5.0	0.210	0.109	0.410	0.341	20	8.3	81.3	1110
150-241-6 SF	150	17.5	5.0	0.166	0.105	0.340	0.371	27	8.6	85.8	1290
185-241-6 SF	185	19.0	5.0	0.137	0.101	0.295	0.390	35.2	9.0	89.9	1445
240-241-6 SF	240	21.9	5.0	0.106	0.0971	0.249	0.436	39.5	9.6	97.2	1725
300-241-6 SF	300	24.4	5.0	0.0847	0.0941	0.219	0.478	50	10.2	104	2040
<b>Type 241.11 SF</b>											
70-241-11 SF	70	12.1	7.6	0.346	0.129	0.640	0.212	12.5	8.9	86.4	1090
95-241-11 SF	95	13.6	7.6	0.271	0.125	0.517	0.229	16	9.3	90.3	1225
120-241-11 SF	120	15.6	7.6	0.210	0.119	0.418	0.252	20	9.7	95.5	1405
150-241-11 SF	150	17.5	7.6	0.165	0.115	0.348	0.273	27	10.0	100.0	1600
185-241-11 SF	185	19.0	7.6	0.136	0.110	0.303	0.286	35.2	10.4	104	1765
240-241-11 SF	240	21.9	7.6	0.106	0.106	0.260	0.317	39.5	11.0	111	2080

## UNDERGROUND MINE CABLES

### Type 245SF 1.1-3.3 kV



#### Cable description

Ultra flexible cable for general use to AS/NZS 1802.

#### Application

These cables have been designed to operate within the tight bending radii experienced with cable chains used on longwall shearers, and provide additional pilot conductors for modern machine monitoring.

For general purpose and especially for trailing applications in cable chains on Longwall Shearer equipment, and in environments calling for maximum flexibility.

#### Approvals

AS/NZS 1802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Very flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Semiconductive screened power cores, with three earth cores and three extensible pilots.

Core: Metal: tinned copper, three core three earths plus three central pilots.

Conductor separator tape:

1.1/1.1 kV – polyester where necessary.

3.3 kV and above – semiconductive screen.

Insulation: EPR (R-EP-90) core with durably printed core numbers at intervals less than 300 mm, on black semiconductive insulation screen for phase identification.

Screen: Semiconductive elastomer screen.

Pilot: Three pilots, in the centre of the cable.

Maximum DC resistance;  
3 Ω/100 m for all cables.

Earth: Three semiconductive elastomer covered flexible earths, located in the interstices.

Sheath: Open weave reinforcement, under heavy duty HD-85-PCP.

#### Installation conditions

In free air

In duct

Mobile equipment

Machines



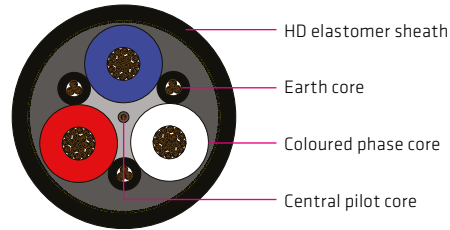
## UNDERGROUND MINE CABLES

### Physical & electrical characteristics

Type 245SF 1.1-3.3 kV											
Voltage rating & part number	Power conductor							Earth	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km		Approx area (each) mm <sup>2</sup>	Sheath thickness mm	Nominal diameter mm
Type 245.1 SF											
50-245-1 SF	50	9.8	1.7	0.523	0.114	0.927	0.544	8	4.8	49.7	425
70-245-1 SF	70	12.0	1.8	0.346	0.107	0.627	0.614	12.5	5.1	54.9	555
95-245-1 SF	95	13.8	2.0	0.271	0.103	0.502	0.630	12.5	5.6	60.3	675
120-245-1 SF	120	15.9	2.1	0.210	0.0988	0.402	0.684	13.75	6.0	65.7	845
150-245-1 SF	150	17.9	2.3	0.166	0.0956	0.332	0.698	17	6.3	70.8	1010
Type 245.3 SF											
50-245-3 SF	50	9.8	3.0	0.523	0.121	0.930	0.359	8	5.7	57.4	525
70-245-3 SF	70	12.0	3.0	0.346	0.271	0.630	0.418	12.5	6.0	62.3	660
95-245-3 SF	95	13.8	3.0	0.271	0.212	0.505	0.46	17.5	6.4	69.0	790
120-245-3 SF	120	15.9	3.0	0.210	0.164	0.405	0.525	21.1	6.7	75.7	989
150-245-3 SF	150	17.9	3.0	0.166	0.0986	0.334	0.578	27	7.0	77.4	1098

## UNDERGROUND MINE CABLES

### Type 275 1.1 kV



#### Cable description

Shuttle car cable to AS/NZS 1802.

#### Application

These cables are used with high-speed reeling equipment employed on shuttle cars, and are subject to the greatest exertion underground. Cable constructions are designed to resist "corkscrewing" in these arduous conditions.

#### Approvals

AS/NZS 1802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Non-individually screened power cores, three earth cores and one extensible pilot, laid-up in a semiconductive cradle and fill to 1.1/1.1 kV application.

Core: Metal: tinned copper, three core three earths plus pilot.

Insulation: EPR (R-EP-90)  
Core colours: red, white, blue

Pilot: One pilot, in the centre of the cable.  
Maximum DC resistance;  
5.5  $\Omega$ /100 m for power conductors up to 35 mm<sup>2</sup>.  
3  $\Omega$ /100 m for all larger cables.

Earth: Three semiconductive elastomer covered flexible earths, located in the interstices.

Sheath: Semiconductive elastomer filled, with an open weave reinforcement, under a heavy duty HD-85-PCP

#### Installation conditions

In free air

Mobile equipment

## UNDERGROUND MINE CABLES

### Physical & electrical characteristics

Type 275 1.1 kV											
Voltage rating & part number	Power conductor							Earth	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km		Approx area (each) mm <sup>2</sup>	Sheath thickness mm	Nominal diameter mm
Type 275.1											
16-275-1	16	6.0	1.6	1.58	0.109	2.74	0.377	4.5	3.8	31.8	170
25-275-1	25	7.3	1.6	0.951	0.102	1.66	0.443	6.6	4.0	35.0	225
35-275-1	35	8.9	1.6	0.698	0.0963	1.22	0.521	9	4.3	39.0	285
50-275-1	50	10.2	1.7	0.523	0.0943	0.920	0.551	13.2	4.7	43.3	370

# Do you always get what you see?

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



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

Australian made? Yes, of course.

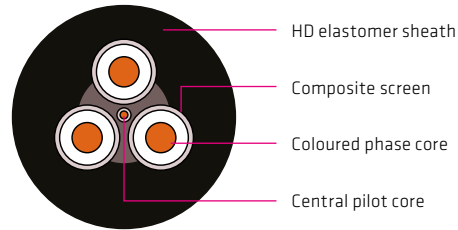
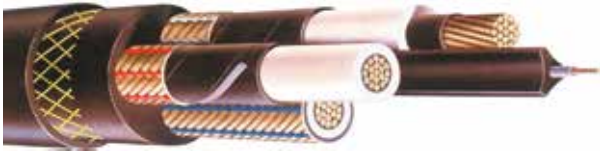




# OPEN CUT MINE CABLES

## OPEN-CUT MINE CABLES

### Type 409 1.1-22 kV



#### Cable description

Class 2 composite screened cable with central pilot.

#### Application

Heavy duty trailing cable with good flexibility and high resistance to abrasion and weathering. Suitable for pumps, shovels, draglines, blasthole drill, etc. For improved performance, all cables (except 409.1 below 50 mm) incorporate a polyaramid yarn Kevlar® braid sheath reinforcement for exceptional tear and cut-through resistance. Cable designed for trailing and most reeling applications.

#### Approvals

AS/NZS 2802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Very good/Frequent

#### Cable design

Composite screened power cores with a single extensible pilot.

Core: Metal: tinned copper, three core plus central pilot.

Conductor tape:

1.1/1.1 kV – polyester.

3.3 kV and above – semiconductive screen.

Insulation: Class 2 EPR (R-EP-90).

Insulation tape:

1.1/1.1 kV – proofed textile

3.3 kV and above – semiconductive screen

Screen: Composite screen (earth) of tinned annealed copper wire and polyester yarn.

Core colours: red, white, blue.

Pilot: Single, in centre of cable.

Maximum DC resistance;

3 Ω/100 m for power cores to 35 mm<sup>2</sup>.

2 Ω/100 m for power conductors above 35 mm<sup>2</sup>.

Sheath: Heavy duty HD-85-PCP, incorporating a polyaramid yarn Kevlar® braid reinforcement (optional).

#### Installation conditions

In free air

Mobile equipment

Class 2 cables use standard insulation and sheath materials. For higher performance applications, particularly reeling operations.

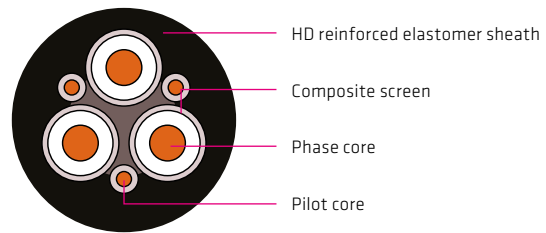
**OPEN-CUT MINE CABLES**

**Physical & electrical characteristics**

Type 409 1.1-22 kV											
Voltage rating & part number	Power conductor							Earth	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km		Approx area (each) mm <sup>2</sup>	Sheath thickness mm	Nominal diameter mm
Type 409.1											
6-409-1	6	3.5	1.5	4.32	0.145	7.49	0.259	8.2	3.8	32.2	160
10-409-1	10	4.6	1.5	2.58	0.133	4.47	0.314	8.2	3.8	34.3	185
16-409-1	16	6.2	1.6	1.58	0.120	2.74	0.379	10	4.0	38.1	235
25-409-1	25	7.2	1.6	0.951	0.113	1.66	0.432	12	4.3	40.9	290
35-409-1	35	8.4	1.6	0.698	0.108	1.22	0.493	14	4.6	44.0	345
50-409-1	50	9.7	1.7	0.523	0.107	0.925	0.526	14	5.0	49.1	430
70-409-1	70	12.0	1.8	0.346	0.0997	0.624	0.599	16	5.4	54.8	550
95-409-1	95	13.3	2.0	0.271	0.0971	0.499	0.591	22	6.0	60.0	675
120-409-1	120	15.3	2.1	0.210	0.0932	0.398	0.640	25	6.4	65.2	815
150-409-1	150	17.2	2.3	0.166	0.0928	0.329	0.652	37	6.9	72.3	1025
185-409-1	185	18.8	2.5	0.137	0.0915	0.285	0.657	40	7.4	77.8	1200
240-409-1	240	21.7	2.8	0.106	0.0905	0.241	0.672	58	8.2	88.3	1555
300-409-1	300	24.3	3.0	0.0849	0.0883	0.212	0.719	63	8.8	95.7	1860
Type 409.3											
16-409-3	16	6.2	3.0	1.58	0.131	2.75	0.255	14	5.3	47.4	335
25-409-3	25	7.2	3.0	0.951	0.125	1.66	0.280	15	5.6	50.5	400
35-409-3	35	8.4	3.0	0.698	0.119	1.23	0.311	16	5.9	53.6	460
50-409-3	50	9.7	3.0	0.523	0.115	0.928	0.347	17	6.3	57.8	545
70-409-3	70	12.0	3.0	0.346	0.107	0.627	0.408	19	6.6	62.8	665
95-409-3	95	13.3	3.0	0.271	0.102	0.502	0.439	21	7.1	66.5	765
120-409-3	120	15.3	3.0	0.210	0.0985	0.402	0.492	28	7.4	72.0	935
150-409-3	150	17.2	3.0	0.166	0.0954	0.332	0.541	32	7.8	76.7	1095
185-409-3	185	18.8	3.0	0.137	0.0942	0.288	0.584	42	8.2	82.5	1290
240-409-3	240	21.7	3.0	0.106	0.0906	0.242	0.659	48	8.8	89.8	1560
300-409-3	300	24.3	3.0	0.0849	0.0890	0.213	0.727	63	9.4	97.8	1900
Type 409.6											
16-409-6	16	6.2	5.0	1.58	0.143	2.75	0.181	17	6.4	58.2	475
25-409-6	25	7.2	5.0	0.951	0.137	1.66	0.193	19	6.7	61.7	560
35-409-6	35	8.4	5.0	0.698	0.130	1.23	0.212	21	7.0	64.7	625
50-409-6	50	9.7	5.0	0.523	0.124	0.931	0.234	22	7.3	68.3	715
70-409-6	70	12.0	5.0	0.346	0.116	0.632	0.271	23	7.7	73.9	860
95-409-6	95	13.3	5.0	0.271	0.113	0.509	0.292	30	8.1	78.2	1005
120-409-6	120	15.3	5.0	0.210	0.108	0.409	0.325	32	8.5	83.4	1160
150-409-6	150	17.2	5.0	0.166	0.105	0.340	0.354	46	8.9	89.4	1380
185-409-6	185	18.8	5.0	0.136	0.102	0.294	0.381	49	9.3	93.7	1545
240-409-6	240	21.7	5.0	0.106	0.0981	0.250	0.426	53	9.9	101	1830
300-409-6	300	24.3	5.0	0.0845	0.0959	0.221	0.467	71	10.4	109	2195
Type 409.11											
25-409-11	25	7.2	7.6	0.951	0.150	1.67	0.150	24	8.1	76.1	810
35-409-11	35	8.4	7.6	0.698	0.143	1.23	0.163	30	8.4	79.8	920
50-409-11	50	9.7	7.6	0.523	0.136	0.936	0.178	32	8.7	83.2	1020
70-409-11	70	12.0	7.6	0.346	0.127	0.638	0.204	35	9.1	88.8	1185
95-409-11	95	13.3	7.6	0.271	0.124	0.516	0.219	48	9.6	93.9	1365
120-409-11	120	15.3	7.6	0.210	0.119	0.418	0.241	53	9.9	98.8	1540
150-409-11	150	17.2	7.6	0.165	0.114	0.347	0.261	56	10.3	104	1730
185-409-11	185	18.8	7.6	0.136	0.111	0.304	0.279	56	10.7	108	1900
240-409-11	240	21.7	7.6	0.106	0.107	0.261	0.309	77	11.3	116	2280
Type 409.22											
35-409-22	35	8.4	10.5	0.698	0.160	1.24	0.147	53	10.0	102	1420
50-409-22	50	9.7	10.5	0.523	0.153	0.944	0.159	56	10.3	106	1540
70-409-22	70	12.0	10.5	0.346	0.143	0.648	0.178	60	10.7	111	1735
95-409-22	95	13.3	10.5	0.271	0.138	0.527	0.189	62	11.1	115	1870

## OPEN-CUT MINE CABLES

### Type 440 1.1-22 kV



#### Cable description

Class 2 composite screened cable for general use.

#### Application

Trailing cable with good flexibility, and high resistance to abrasion and weathering. Suitable for long lengths of cable runs, in cases where the use of Type 409 or 441 could result in pilot resistances not meeting requirements. Cable suitable for trailing and most reeling applications.

#### Approvals

AS/NZS 2802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Composite screened power cores with three pilot cores.

Core: Metal: tinned copper, three core plus three pilots.

Conductor tape:

1.1/1.1 kV – polyester.

3.3 kV and above – semiconductive screen.

Insulation: EPR (R-EP-90) white

Insulation tape:

1.1/1.1 kV – proofed textile

3.3 kV and above – semiconductive screen

Screen: Composite screen (earth) of tinned annealed copper wire and polyester yarn.

Core colours: red, white, blue, braid tracers

Pilot: Three elastomer covered and proofed tape pilots disposed in the cable interstices.

Sheath: Heavy duty HD-85-PCP, incorporating a polyaramid yarn Kevlar® braid reinforcement (optional).

#### Installation conditions

In free air

Mobile equipment

**OPEN-CUT MINE CABLES**

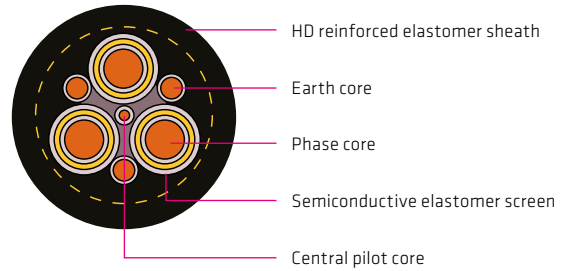
**Physical & electrical characteristics**

Type 440 1.1-22 kV												
Voltage rating & part number	Power conductor							Screen	Pilot	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km			Approx area mm <sup>2</sup> /phase	Approx area (each) mm <sup>2</sup>	Sheath thickness mm
<b>Type 440.1</b>												
6-440-1	6	3.5	1.5	4.32	0.141	7.49	0.259	8.2	1	3.8	31.0	150
10-440-1	10	4.6	1.5	2.58	0.130	4.47	0.314	8.2	1.5	3.8	33.3	175
16-440-1	16	6.2	1.6	1.58	0.118	2.74	0.379	10	3	4.0	37.3	230
25-440-1	25	7.2	1.6	0.951	0.112	1.66	0.432	12	4.5	4.3	40.3	295
35-440-1	35	8.4	1.6	0.698	0.107	1.22	0.493	14	6	4.6	43.6	350
50-440-1	50	9.7	1.7	0.523	0.104	0.924	0.526	14	8	5.0	47.7	425
70-440-1	70	12.0	1.8	0.346	0.0981	0.623	0.599	16	12.5	5.4	54.0	565
95-440-1	95	13.3	2.0	0.271	0.0964	0.498	0.591	22	12.5	6.0	59.5	695
120-440-1	120	15.3	2.1	0.210	0.0932	0.398	0.640	25	13.75	6.4	65.2	845
150-440-1	150	17.2	2.3	0.166	0.0928	0.329	0.652	37	17	6.9	72.3	1065
185-440-1	185	18.8	2.5	0.137	0.0915	0.285	0.657	40	22	7.4	77.8	1245
240-440-1	240	21.7	2.8	0.106	0.0905	0.241	0.672	58	27	8.2	88.1	1610
300-440-1	300	24.3	3.0	0.0849	0.0883	0.212	0.719	63	35.7	8.8	95.5	1930
<b>Type 440.3</b>												
16-440-3	16	6.2	3.0	1.58	0.131	2.75	0.255	14	3	5.3	47.3	340
25-440-3	25	7.2	3.0	0.951	0.125	1.66	0.280	15	4.5	5.6	50.4	410
35-440-3	35	8.4	3.0	0.698	0.119	1.23	0.311	16	6	5.9	53.5	475
50-440-3	50	9.7	3.0	0.523	0.114	0.927	0.347	17	8	6.3	57.2	555
70-440-3	70	12.0	3.0	0.346	0.106	0.627	0.408	19	12.5	6.6	62.6	690
95-440-3	95	13.3	3.0	0.271	0.102	0.502	0.439	21	12.5	7.1	66.4	785
120-440-3	120	15.3	3.0	0.210	0.0985	0.402	0.492	28	13.75	7.4	72.0	960
150-440-3	150	17.2	3.0	0.166	0.0954	0.332	0.541	32	17	7.8	76.7	1130
185-440-3	185	18.8	3.0	0.137	0.0942	0.288	0.584	42	22	8.2	82.3	1330
240-440-3	240	21.7	3.0	0.106	0.0906	0.242	0.659	48	27	8.8	89.6	1615
300-440-3	300	24.3	3.0	0.0849	0.0890	0.213	0.727	63	35.7	9.4	97.7	1980
<b>Type 440.6</b>												
16-440-6	16	6.2	5.0	1.58	0.143	2.75	0.181	17	3	6.4	58.2	480
25-440-6	25	7.2	5.0	0.951	0.137	1.66	0.193	19	4.5	6.7	61.7	570
35-440-6	35	8.4	5.0	0.698	0.130	1.23	0.212	21	6	7.0	64.8	645
50-440-6	50	9.7	5.0	0.523	0.124	0.931	0.234	22	8	7.3	68.2	730
70-440-6	70	12.0	5.0	0.346	0.116	0.632	0.271	23	12.5	7.7	73.8	880
95-440-6	95	13.3	5.0	0.271	0.113	0.509	0.292	30	12.5	8.1	78.0	1020
120-440-6	120	15.3	5.0	0.210	0.108	0.409	0.325	32	13.75	8.5	83.2	1180
150-440-6	150	17.2	5.0	0.166	0.105	0.340	0.354	46	17	8.9	89.2	1410
185-440-6	185	18.8	5.0	0.136	0.102	0.294	0.381	49	22	9.3	93.6	1590
240-440-6	240	21.7	5.0	0.106	0.0981	0.250	0.426	53	27	9.9	101	1885
300-440-6	300	24.3	5.0	0.0845	0.0959	0.221	0.467	71	35.7	10.4	109	2275
<b>Type 440.11</b>												
25-440-11	25	7.2	7.6	0.951	0.150	1.67	0.150	24	4.5	8.1	75.9	815
35-440-11	35	8.4	7.6	0.698	0.143	1.23	0.163	30	6	8.4	79.6	930
50-440-11	50	9.7	7.6	0.523	0.136	0.936	0.178	32	8	8.7	83.0	1025
70-440-11	70	12.0	7.6	0.346	0.127	0.638	0.204	35	12.5	9.1	88.7	1210
95-440-11	95	13.3	7.6	0.271	0.124	0.516	0.219	48	12.5	9.6	93.8	1385
120-440-11	120	15.3	7.6	0.210	0.119	0.418	0.241	53	13.75	9.9	98.7	1565
150-440-11	150	17.2	7.6	0.165	0.114	0.347	0.261	56	17	10.3	103	1765
185-440-11	185	18.8	7.6	0.136	0.111	0.304	0.279	56	22	10.7	108	1945
<b>Type 440.22</b>												
35-440-22	35	8.4	10.5	0.698	0.160	1.24	0.147	53	6	10.0	102	1430
50-440-22	50	9.7	10.5	0.523	0.153	0.944	0.159	56	8	10.3	106	1550
70-440-22	70	12.0	10.5	0.346	0.143	0.648	0.178	60	12.5	10.7	111	1755
95-440-22	95	13.3	10.5	0.271	0.138	0.527	0.189	62	12.5	11.1	115	1890



## OPEN-CUT MINE CABLES

### Type 441 1.1 kV



#### Cable description

Class 2 semiconductive screened cable for general use.

#### Application

Suitable for trailing and most reeling applications and is used for general purpose supply.

#### Approvals

AS/NZS 2802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Semiconductive elastomer screened power cores with three earth cores and one pilot core.

Core: Metal: tinned copper, three core plus three earths.

Insulation: EPR (R-EP-90) core, identification by printed numbers on black semiconductive elastomer insulation screen.

Earth: Three, semiconductive elastomer covered, disposed in the cable interstices.

Pilot: One EPR cover tinned annealed copper central extensible conductor.

Sheath: Heavy duty HD-85-PCP, incorporating a polyaramid yarn Kevlar® braid reinforcement (optional).

#### Installation conditions

In free air

Mobile equipment

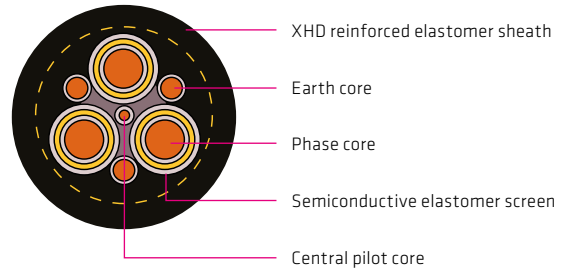
## OPEN-CUT MINE CABLES

### Physical & electrical characteristics

Type 441 1.1 kV											
Voltage rating & part number	Power conductor							Earth	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km		Approx area (each) mm <sup>2</sup>	Sheath thickness mm	Nominal diameter mm
Type 441.1											
6-441-1	6	3.5	1.5	4.32	0.143	7.49	0.259	2.1	3.8	30.7	140
10-441-1	10	4.6	1.5	2.58	0.130	4.47	0.314	3.4	3.8	32.8	165
16-441-1	16	6.2	1.6	1.58	0.118	2.74	0.379	5.3	3.9	36.5	210
25-441-1	25	7.2	1.6	0.951	0.111	1.66	0.432	5.3	4.2	39.3	260
35-441-1	35	8.4	1.6	0.698	0.106	1.22	0.493	5.3	4.4	42.2	305
50-441-1	50	9.7	1.7	0.523	0.105	0.924	0.526	8	4.9	47.5	395
70-441-1	70	12.0	1.8	0.346	0.0984	0.623	0.599	12.5	5.3	53.2	520
95-441-1	95	13.3	2.0	0.271	0.0953	0.498	0.591	16	5.8	57.6	620
120-441-1	120	15.3	2.1	0.210	0.0914	0.397	0.640	20	6.3	63.1	765
150-441-1	150	17.2	2.3	0.166	0.0896	0.327	0.652	27	6.7	68.6	935
185-441-1	185	18.8	2.5	0.137	0.0885	0.283	0.657	32	7.3	74.4	1115
240-441-1	240	21.7	2.8	0.107	0.0848	0.236	0.672	39.5	8.0	82.2	1385
300-441-1	300	24.3	3.0	0.0853	0.0823	0.205	0.719	50	8.7	89.4	1680

## OPEN-CUT MINE CABLES

### Type 441 3.3-22 kV



#### Cable description

Class 1 semiconductive screened cable for general use.

#### Application

Being a class 1 cable, this cable has lower insulation and sheath radials than class 2, and is suitable for use with materials handling equipment, and applications that call for a smaller overall diameter and mass for reeling and trailing applications. The cables are finished with a polyaramid yarn Kevlar® braid sheath reinforcement for exceptional tear and cut-through resistance. This cable is suitable for slow reeling and trailing applications.

#### Approvals

AS/NZS 2802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Semiconductive elastomer screened power cores with three earth cores and one pilot core.

Core: Metal: tinned copper, three core plus three earths.

Insulation: XR-EP-90 core identification by printed numbers on black semiconductive elastomer insulation screen.

Earth: Three semiconductive elastomer covered tinned annealed copper cores disposed in the cable interstices.

Pilot: One EPR covered central extensible core.  
Maximum DC resistance;

3 Ω/100 m for power conductor up to 35 mm<sup>2</sup>.

2 Ω/100 m for power conductors above 35 mm<sup>2</sup>.

Sheath: Extra heavy duty HD-85-PCP, incorporating a polyaramid yarn Kevlar® braid reinforcement.

#### Installation conditions

In free air

Mobile equipment

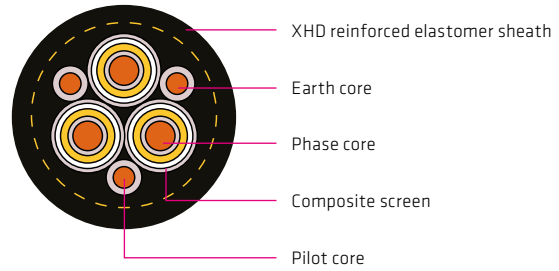
## OPEN-CUT MINE CABLES

### Physical & electrical characteristics

Type 441 3.3-22 kV											
Voltage rating & part number	Power conductor							Earth	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km		Approx area (each) mm <sup>2</sup>	Sheath thickness mm	Nominal diameter mm
<b>Type 441.3</b>											
25-441-3	25	7.2	2.2	0.951	0.120	1.66	0.395	5.3	4.9	45.9	320
35-441-3	35	8.4	2.2	0.698	0.115	1.23	0.437	5.3	5.2	48.8	370
50-441-3	50	9.7	2.4	0.523	0.113	0.927	0.450	8	5.7	54.4	470
70-441-3	70	12.0	2.4	0.346	0.105	0.626	0.525	12.5	6.0	59.5	595
95-441-3	95	13.3	2.4	0.271	0.100	0.500	0.563	16	6.3	62.7	685
120-441-3	120	15.3	2.4	0.210	0.0959	0.400	0.628	20	6.5	67.2	815
150-441-3	150	17.2	2.4	0.166	0.0929	0.329	0.687	27	6.6	71.3	965
185-441-3	185	18.8	2.4	0.137	0.0906	0.284	0.741	32	6.7	75.1	1105
240-441-3	240	21.7	2.4	0.107	0.0874	0.239	0.833	39.5	6.9	81.6	1350
300-441-3	300	24.3	2.4	0.0851	0.0850	0.208	0.917	50	7.0	87.4	1620
<b>Type 441.6</b>											
25-441-6	25	7.2	3.0	0.951	0.126	1.66	0.309	5.3	5.3	50.2	370
35-441-6	35	8.4	3.0	0.698	0.121	1.23	0.340	5.3	5.6	53.3	425
50-441-6	50	9.7	3.0	0.523	0.116	0.928	0.375	8	6.0	57.6	515
70-441-6	70	12.0	3.0	0.346	0.108	0.628	0.435	12.5	6.3	62.6	640
95-441-6	95	13.3	3.0	0.271	0.103	0.502	0.465	16	6.4	65.5	725
120-441-6	120	15.3	3.0	0.210	0.0990	0.402	0.518	20	6.6	70.1	860
150-441-6	150	17.2	3.0	0.166	0.0958	0.332	0.566	27	6.7	74.2	1015
185-441-6	185	18.8	3.0	0.137	0.0934	0.287	0.608	32	6.8	78.0	1155
240-441-6	240	21.7	3.0	0.106	0.0899	0.241	0.682	39.5	7.0	84.6	1410
300-441-6	300	24.3	3.0	0.0849	0.0877	0.211	0.754	50	7.1	90.4	1680
<b>Type 441.11</b>											
25-441-11	25	7.2	5.0	0.951	0.137	1.66	0.217	5.3	6.3	60.9	500
35-441-11	35	8.4	5.0	0.698	0.131	1.23	0.236	5.3	6.4	63.6	555
50-441-11	50	9.7	5.0	0.523	0.124	0.931	0.258	8	6.5	66.7	635
70-441-11	70	12.0	5.0	0.346	0.116	0.632	0.296	12.5	6.6	71.6	765
95-441-11	95	13.3	5.0	0.271	0.112	0.508	0.317	16	6.8	74.8	870
120-441-11	120	15.3	5.0	0.210	0.108	0.409	0.350	20	6.9	79.3	1010
150-441-11	150	17.2	5.0	0.166	0.104	0.339	0.381	27	7.0	83.6	1180
185-441-11	185	18.8	5.0	0.137	0.101	0.295	0.407	32	7.1	87.2	1320
240-441-11	240	21.7	5.0	0.106	0.0970	0.249	0.453	39.5	7.3	93.8	1585
300-441-11	300	24.3	5.0	0.0846	0.0942	0.219	0.499	50	7.5	100.0	1880
<b>Type 441.22</b>											
35-441-22	35	8.4	7.6	0.698	0.143	1.23	0.178	5.3	6.9	76.0	750
50-441-22	50	9.7	7.6	0.523	0.136	0.936	0.194	8	7.0	79.2	840
70-441-22	70	12.0	7.6	0.346	0.127	0.638	0.219	12.5	7.1	84.1	980
95-441-22	95	13.3	7.6	0.271	0.123	0.515	0.234	16	7.2	87.0	1085
120-441-22	120	15.3	7.6	0.210	0.118	0.417	0.256	20	7.3	91.7	1245
150-441-22	150	17.2	7.6	0.165	0.113	0.346	0.276	27	7.4	95.8	1415
185-441-22	185	18.8	7.6	0.136	0.110	0.303	0.294	32	7.6	99.8	1580
240-441-22	240	21.7	7.6	0.106	0.105	0.258	0.325	39.5	7.7	106	1850

## OPEN-CUT MINE CABLES

### Type 450 3.3-33 kV



#### Cable description

Class 1 composite screened cable for general use.

#### Application

3.3/3.3 kV to 33/33 kV reeling cables for use with drag-lines, shovels, excavators, wharf cranes, and materials handling equipment. This cable is suitable for slow reeling and trailing applications.

#### Approvals

AS/NZS 2802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C **Flexibility**

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Composite screened power cores with two earth and one pilot core.

Core: Metal: tinned copper, three core plus two earths and one pilot.  
Semiconductive barrier taped and elastomer screened.

Insulation: EPR (XR-EP-90) semiconductive elastomer screened.

Screen: Composite tinned annealed copper wire and polyester yarn screen, under a semiconductive tape.

Core colours: red, white, blue, braid tracers.

Earth: Two semiconductive elastomer covered tinned annealed copper wire earths disposed in the cable interstices.

Pilot: One, elastomer covered tinned annealed copper wire pilot disposed in the cable interstices.

Sheath: Extra heavy duty XHD-85-PCP, incorporating a polyaramid braid reinforcement.

#### Installation conditions

In free air

Mobile equipment

**OPEN-CUT MINE CABLES**

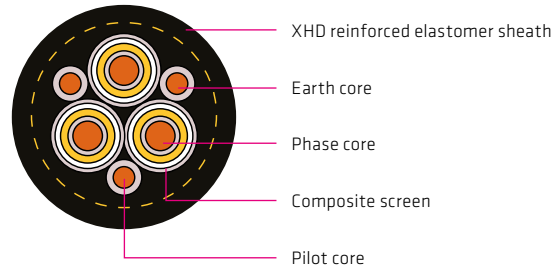
**Physical & electrical characteristics**

Type 450 3.3-33 kV												
Voltage rating & part number	Power conductor							Screen	Earth & pilot	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km			Approx area mm <sup>2</sup> /phase	Approx area (each) mm <sup>2</sup>	Sheath thickness mm
<b>Type 450.3</b>												
25-450-3	25	7.2	2.2	0.951	0.118	1.66	0.395	7.9	8	4.8	46.7	355
35-450-3	35	8.4	2.2	0.698	0.113	1.22	0.437	8.5	8	5.1	49.7	415
50-450-3	50	9.7	2.4	0.523	0.109	0.925	0.450	9.3	12	5.6	54.5	515
70-450-3	70	12.0	2.4	0.346	0.103	0.625	0.525	14	18	6.0	60.5	660
95-450-3	95	13.3	2.4	0.271	0.0986	0.500	0.563	15	25	6.3	63.9	765
120-450-3	120	15.3	2.4	0.210	0.0947	0.399	0.628	16	31	6.4	68.4	900
150-450-3	150	17.2	2.4	0.166	0.0918	0.329	0.687	17	39.5	6.6	72.8	1070
185-450-3	185	18.8	2.4	0.137	0.0896	0.284	0.741	18	50	6.7	76.5	1225
240-450-3	240	21.7	2.4	0.107	0.0867	0.239	0.833	25	60	6.9	83.3	1485
300-450-3	300	24.3	2.4	0.0851	0.0844	0.208	0.917	27	80	7.0	89.0	1800
<b>Type 450.6</b>												
25-450-6	25	7.2	3.0	0.951	0.124	1.66	0.309	8.8	8	5.2	51.1	410
35-450-6	35	8.4	3.0	0.698	0.118	1.23	0.340	9.3	8	5.5	54.2	470
50-450-6	50	9.7	3.0	0.523	0.113	0.927	0.375	10	12	5.9	57.8	560
70-450-6	70	12.0	3.0	0.346	0.106	0.627	0.435	15	18	6.3	63.9	710
95-450-6	95	13.3	3.0	0.271	0.102	0.502	0.465	16	25	6.4	66.8	810
120-450-6	120	15.3	3.0	0.210	0.0979	0.401	0.518	17	31	6.5	71.4	950
150-450-6	150	17.2	3.0	0.166	0.0948	0.331	0.566	18	39.5	6.6	75.5	1120
185-450-6	185	18.8	3.0	0.137	0.0923	0.286	0.608	20	50	6.8	79.3	1280
240-450-6	240	21.7	3.0	0.106	0.0893	0.240	0.682	27	60	7.0	86.2	1545
300-450-6	300	24.3	3.0	0.0850	0.0871	0.211	0.754	29	80	7.1	92.3	1875
<b>Type 450.11</b>												
25-450-11	25	7.2	5.0	0.951	0.136	1.66	0.217	14	8	6.3	62.3	565
35-450-11	35	8.4	5.0	0.698	0.129	1.23	0.236	15	8	6.4	65.0	625
50-450-11	50	9.7	5.0	0.523	0.123	0.931	0.258	16	12	6.5	68.1	715
70-450-11	70	12.0	5.0	0.346	0.115	0.632	0.296	17	18	6.6	73.1	855
95-450-11	95	13.3	5.0	0.271	0.111	0.507	0.317	18	25	6.7	76.1	965
120-450-11	120	15.3	5.0	0.210	0.107	0.408	0.350	20	31	6.9	80.7	1115
150-450-11	150	17.2	5.0	0.166	0.103	0.338	0.381	26	39.5	7.0	85.2	1315
185-450-11	185	18.8	5.0	0.137	0.100	0.294	0.407	27	50	7.1	89.0	1485
240-450-11	240	21.7	5.0	0.106	0.0964	0.248	0.453	30	60	7.3	95.5	1745
300-450-11	300	24.3	5.0	0.0846	0.0937	0.219	0.499	32	80	7.4	101	2080
<b>Type 450.22</b>												
35-450-22	35	8.4	7.6	0.698	0.142	1.23	0.178	19	8	6.8	77.2	835
50-450-22	50	9.7	7.6	0.523	0.135	0.936	0.194	20	12	6.9	80.2	930
70-450-22	70	12.0	7.6	0.346	0.127	0.638	0.219	27	18	7.0	85.6	1105
95-450-22	95	13.3	7.6	0.271	0.122	0.515	0.234	27	25	7.2	88.9	1230
120-450-22	120	15.3	7.6	0.210	0.117	0.416	0.256	29	31	7.3	93.4	1395
150-450-22	150	17.2	7.6	0.165	0.113	0.346	0.276	31	39.5	7.4	97.5	1580
185-450-22	185	18.8	7.6	0.136	0.110	0.303	0.294	32	50	7.5	101	1760
240-450-22	240	21.7	7.6	0.106	0.105	0.258	0.325	34	60	7.7	108	2035
<b>33 kV available on request</b>												



## OPEN-CUT MINE CABLES

### Type 451 3.3-33 kV



#### Cable description

Class 1 composite screened cable for general use.

#### Application

3.3/3.3 kV to 33/33 kV reeling cables similar to Type 450 cables but with reduced pilot size, for use with drag-lines, shovels, excavators, wharf cranes, and materials handling equipment. This cable is suitable for slow reeling and trailing applications.

#### Approvals

AS/NZS 2802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Composite screened power cores with two earth and one pilot core.

Core: Metal: tinned copper, three core plus two earths and one pilot. Semiconductive barrier taped and elastomer screened.

Insulation: EPR (XR-EP-90) semiconductive elastomer screened.

Screen: Composite tinned annealed copper wire and polyester yarn screen, under a semiconductive tape.

Core colours: red, white, blue, braid tracers.

Earth: Two semiconductive elastomer covered, disposed in the cable interstices.

Pilot: One, elastomer covered, disposed in the cable interstices.

Sheath: Extra heavy duty XHD-85-PCP, incorporating a polyaramid Kevlar® braid reinforcement.

#### Installation conditions

In free air

Mobile equipment

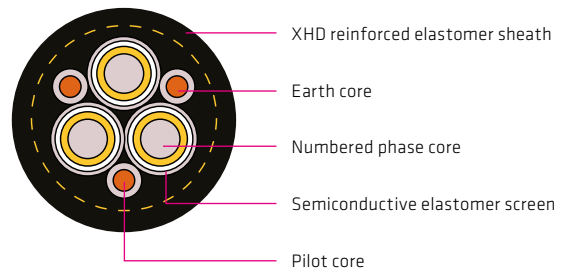
**OPEN-CUT MINE CABLES**

**Physical & electrical characteristics**

Type 451 3.3-33 kV													
Voltage rating & part number	Power conductor							Screen	Earth	Pilot	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km				Approx area mm <sup>2</sup> /phase	Approx area (each) mm <sup>2</sup>	Approx area mm <sup>2</sup>
<b>Type 451.3</b>													
25-451-3	25	7.2	2.2	0.951	0.118	1.66	0.395	7.9	8	9	4.8	46.7	360
35-451-3	35	8.4	2.2	0.698	0.113	1.22	0.437	8.5	8	9	5.1	49.7	415
50-451-3	50	9.7	2.4	0.523	0.109	0.925	0.450	9.3	12	9	5.6	54.5	510
70-451-3	70	12.0	2.4	0.346	0.103	0.625	0.525	14	18	9	6.0	60.5	655
95-451-3	95	13.3	2.4	0.271	0.0986	0.500	0.563	15	25	9	6.3	63.9	755
120-451-3	120	15.3	2.4	0.210	0.0947	0.399	0.628	16	31	13.2	6.4	68.4	890
150-451-3	150	17.2	2.4	0.166	0.0918	0.329	0.687	17	39.5	13.2	6.6	72.8	1050
<b>Type 451.6</b>													
25-451-6	25	7.2	3.0	0.951	0.124	1.66	0.309	8.8	8	9	5.2	51.1	415
35-451-6	35	8.4	3.0	0.698	0.118	1.23	0.340	9.3	8	9	5.5	54.2	470
50-451-6	50	9.7	3.0	0.523	0.113	0.927	0.375	10	12	9	5.9	57.8	555
70-451-6	70	12.0	3.0	0.346	0.106	0.627	0.435	15	18	9	6.3	63.9	705
95-451-6	95	13.3	3.0	0.271	0.102	0.502	0.465	16	25	9	6.4	66.8	800
120-451-6	120	15.3	3.0	0.210	0.0979	0.401	0.518	17	31	13.2	6.5	71.4	940
150-451-6	150	17.2	3.0	0.166	0.0948	0.331	0.566	18	39.5	13.2	6.6	75.5	1100
<b>Type 451.11</b>													
25-451-11	25	7.2	5.0	0.951	0.136	1.66	0.217	14	8	13.2	6.3	62.3	570
35-451-11	35	8.4	5.0	0.698	0.129	1.23	0.236	15	8	13.2	6.4	65.0	630
50-451-11	50	9.7	5.0	0.523	0.123	0.931	0.258	16	12	13.2	6.5	68.1	715
70-451-11	70	12.0	5.0	0.346	0.115	0.632	0.296	17	18	13.2	6.6	73.1	850
95-451-11	95	13.3	5.0	0.271	0.111	0.507	0.317	18	25	13.2	6.7	76.1	955
120-451-11	120	15.3	5.0	0.210	0.107	0.408	0.350	20	31	13.2	6.9	80.7	1105
150-451-11	150	17.2	5.0	0.166	0.103	0.338	0.381	26	39.5	13.2	7.0	85.2	1295
<b>Type 451.22</b>													
35-451-22	35	8.4	7.6	0.698	0.142	1.23	0.178	19	8	13.2	6.8	77.2	840
50-451-22	50	9.7	7.6	0.523	0.135	0.936	0.194	20	12	13.2	6.9	80.2	930
70-451-22	70	12.0	7.6	0.346	0.127	0.638	0.219	27	18	13.2	7.0	85.6	1100
95-451-22	95	13.3	7.6	0.271	0.122	0.515	0.234	27	25	13.2	7.2	88.9	1220
120-451-22	120	15.3	7.6	0.210	0.117	0.416	0.256	29	31	13.2	7.3	93.4	1380
150-451-22	150	17.2	7.6	0.165	0.113	0.346	0.276	31	39.5	13.2	7.4	97.5	1560
*33kV available on request.													

## OPEN-CUT MINE CABLES

### Type 455 3.3-11 kV



#### Cable description

Class 1 semiconductive screened cable for general use.

#### Application

3.3/3.3 kV to 11/11 kV reeling cables for use with drag-lines, shovels, excavators, wharf cranes, and materials handling equipment. The cable is similar to Type 450 cables, without a composite insulation screen. This cable is suitable for slow reeling and trailing applications.

#### Approvals

AS/NZS 2802

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Semiconductive elastomer screened power cores with two earth and one pilot core.

Core: Metal: tinned copper, three core plus two earths and one pilot.

Insulation: EPR (XR-EP-90) semiconductive elastomer screened with numbered cores.

Earth: Two semiconductive elastomer covered, disposed in the cable interstices.

Pilot: One, elastomer covered, disposed in the cable interstices.

Sheath: Extra heavy duty XHD-85-PCP, incorporating a polyaramid Kevlar® braid reinforcement.

#### Installation conditions

In free air

Mobile equipment

## OPEN-CUT MINE CABLES

### Physical & electrical characteristics

Type 455 3.3-11 kV											
Voltage rating & part number	Power conductor							Earth & pilot	Cable		
	Nominal area mm <sup>2</sup>	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Capacitance to earth μF/phase/km		Approx area (each) mm <sup>2</sup>	Sheath thickness mm	Nominal diameter mm
Type 455.3											
25-455-3	25	7.3	2.2	0.951	0.112	1.66	0.404	8	4.5	42.2	300
35-455-3	35	8.9	2.2	0.698	0.105	1.22	0.462	8	4.8	46.2	360
50-455-3	50	10.2	2.4	0.523	0.103	0.923	0.473	12	5.2	50.7	455
70-455-3	70	12.7	2.4	0.346	0.0964	0.622	0.555	18	5.7	56.9	585
95-455-3	95	13.8	2.4	0.271	0.0941	0.497	0.593	25	6.1	60.2	700
120-455-3	120	15.7	2.4	0.210	0.0915	0.397	0.633	31	6.4	65.3	850
150-455-3	150	17.6	2.4	0.166	0.0884	0.326	0.719	39.5	6.5	69.1	1010
Type 455.6											
25-455-6	25	7.3	3.0	0.951	0.119	1.66	0.316	8	5.0	46.8	345
35-455-6	35	8.9	3.0	0.698	0.112	1.22	0.359	8	5.3	50.9	415
50-455-6	50	10.2	3.0	0.523	0.107	0.925	0.394	12	5.6	54.2	500
70-455-6	70	12.7	3.0	0.346	0.100	0.624	0.459	18	6.0	60.2	635
95-455-6	95	13.8	3.0	0.271	0.0978	0.499	0.490	25	6.3	63.3	745
120-455-6	120	15.7	3.0	0.210	0.0944	0.399	0.540	31	6.5	67.7	890
150-455-6	150	17.6	3.0	0.166	0.0916	0.328	0.591	39.5	6.6	72.0	1055
Type 455.11											
25-455-11	25	7.3	5.0	0.951	0.132	1.66	0.223	8	6.1	57.6	480
35-455-11	35	8.9	5.0	0.698	0.124	1.23	0.251	8	6.3	61.5	550
50-455-11	50	10.2	5.0	0.523	0.119	0.929	0.273	12	6.4	64.4	640
70-455-11	70	12.7	5.0	0.346	0.111	0.629	0.314	18	6.5	69.8	775
95-455-11	95	13.8	5.0	0.271	0.108	0.505	0.334	25	6.7	72.7	890
120-455-11	120	15.7	5.0	0.210	0.104	0.406	0.365	31	6.8	77.0	1040
150-455-11	150	17.6	5.0	0.166	0.100	0.336	0.397	39.5	6.9	81.3	1215



# A perfect fit.

Cable solutions your way.

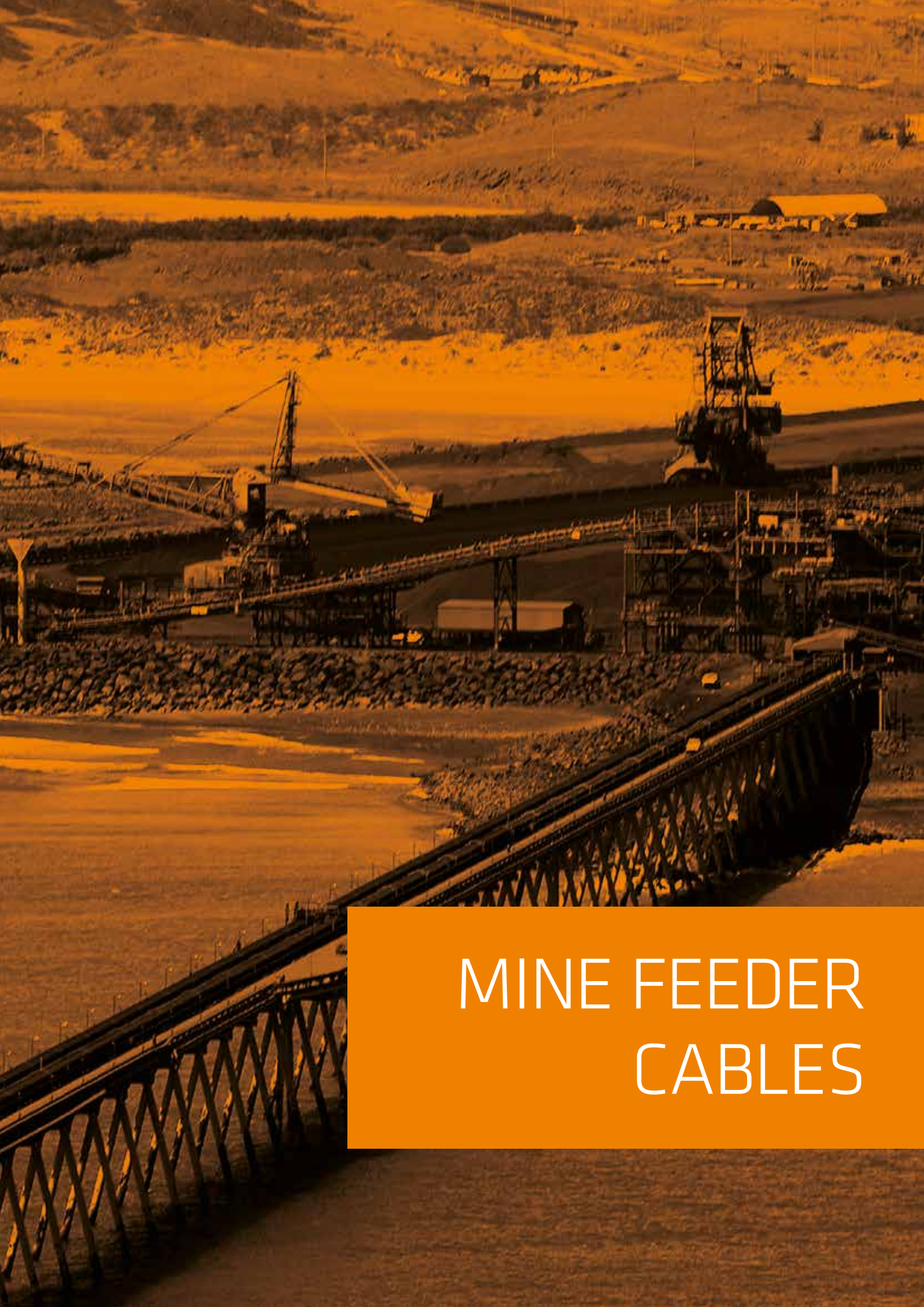


Your satisfaction is our livelihood. So it goes without saying – we tailor-make our cable solutions to fit your needs. To make sure our offer fits the bill we have both research centres and very skilled experts at your service.

Australian made? Yes, of course.

A brand of the  
**Prysmian**  
Group

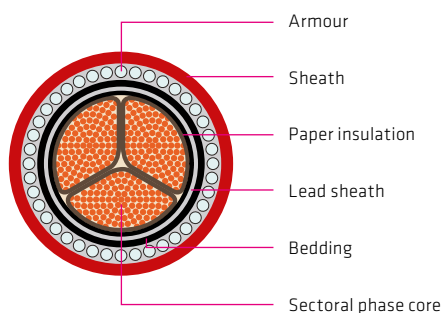




# MINE FEEDER CABLES

## MINE FEEDER CABLES

### 11/11 kV Paper Insulated



#### Cable description

Three core belted paper insulated cable to AS1026 and AS/NZS 1972.

#### Application

High voltage feeder cables used in power reticulation throughout the mine. Suitable as primary supply for mines and industrial networks.

Note: 12.7/22 kV XPLE cable can be used as an alternative, with gains in temperature rating generally allowing a reduction in cable size, with consequent savings in cost, size and weight.

#### Approvals

AS/NZS 1972

#### Behaviour in flame and fire:

No fire performance

#### Temperature range

Maximum operating temperature: +65 °C

Minimum operating temperature: 0 °C

#### Flexibility

Rigid

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Very heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Suitable for direct exposure

#### Cable design

Paper insulated, paper belted, lead sheathed, GSW armoured, PVC sheathed cable.

Core: Metal: Compacted shaped plain annealed copper conductor. Semiconductive tape screen.

Insulation: Impregnated paper tape insulated (numbered), overall paper tape belt insulated.

Inner sheath: Lead alloy.

Bedding: Bitumen impregnated paper and textile tape.

Armour: Galvanised steel wire armour.  
The armour is designed to provide not less than 50% conductance of the power conductor.

Outer sheath: PVC (red).

#### Installation conditions

In free air

In duct

Buried direct



## MINE FEEDER CABLES

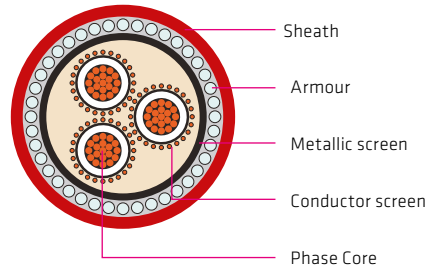
### Physical & electrical characteristics

11/11 kV Paper Insulated				
Conductor		Nominal overall diameter mm	Approx. cable mass kg/100m	Min. installed bend radius mm
mm <sup>2</sup>	Shape			
16	Circular	47.6	551	570
25	Circular	49	632	590
35	Circular	50.3	673	600
50	Sector	53	748	640
70	Sector	56.3	873	680
95	Sector	60	1021	720
120	Sector	62.1	1122	750
150	Sector	65.1	1268	780
185	Sector	69.9	1542	840
240	Sector	74.8	1793	900
300	Sector	79.8	2119	960
400	Sector	86.3	2505	1040
500	Sector	92.2	3003	1110

Core Area mm <sup>2</sup>	Current rating			Electrical characteristics					
	In air A	In ground A	In ducts A	DC ohm	AC ohm	Inductance	Capacitance	Star reactance	Volt drop
16	61	75	67	1.15	1.35	0.398	0.165	0.125	2.35
25	79	96	86	0.727	0.856	0.344	0.212	0.108	1.49
35	95	115	102	0.524	0.617	0.323	0.242	0.102	1.08
50	120	143	126	0.387	0.456	0.292	0.29	0.092	0.805
70	149	176	154	0.268	0.316	0.28	0.328	0.088	0.568
95	182	211	185	0.193	0.228	0.27	0.367	0.085	0.421
120	208	240	210	0.153	0.181	0.264	0.398	0.083	0.345
150	236	270	239	0.124	0.147	0.255	0.435	0.08	0.29
185	269	303	269	0.0991	0.118	0.25	0.474	0.078	0.246
240	318	353	313	0.0754	0.091	0.242	0.525	0.076	0.205
300	362	396	351	0.0601	0.073	0.238	0.573	0.075	0.181
400	419	450	398	0.047	0.059	0.234	0.642	0.073	0.162
500	481	509	456	0.0366	0.047	0.229	0.715	0.072	0.149

## MINE FEEDER CABLES

### 6.35/11 kV Copper



#### Cable description

Three core copper wire screened armoured to AS/NZS 1972.

#### Application

Suitable as primary supply for mines and industrial networks.

#### Approvals

AS/NZS 1972

#### Behaviour in flame and fire:

Flame retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Minimum bending radius

Installed cables: 12D

#### Flexibility

Rigid

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Very heavy

Water exposure: Water splashes

Solar radiation and

weather exposure: Very good/Frequent

#### Cable design

XLPE insulated, screened, GSW armoured, PVC sheathed cable.

Core: Metal: Plain circular compacted copper.

Conductor screen:

Extruded semiconducting compound, bonded to the insulation and applied in the same operation as the insulation.

Insulation: Cross Linked Polyethylene (XLPE) - standard.

Insulation screen:

Extruded semiconducting compound.

Metallic screen:

Plain annealed copper wire. Combined screen area is designed to provide not less than 50% conductance of one associated power conductor.

Armour: Galvanised steel wires.

Outer sheath:

Red 5V-90 polyvinyl chloride (PVC).

#### Installation conditions

In free air

In duct

In ground

In trench

**Note:** Not specifically designed for use as self supporting cables, as submarine cables or where exposure to excessive heat and/or corrosive products is involved. In case of any doubt concerning the suitability of a particular cable type for a particular application, guidance should be sought from the Prysmian Customer Service Team.

## MINE FEEDER CABLES

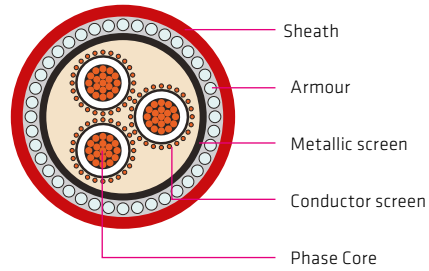
### Physical & electrical characteristics

6.35/11 kV Copper									
Product code:	25XFED3C11	35XFED3C11	50XFED3C11	70XFED3C11	95XFED3C11	120XFED3C11	150XFED3C11	185XFED3C11	240XFED3C11
Nominal conductor area mm <sup>2</sup>	25	35	50	70	95	120	150	185	240
Nominal conductor diameter mm	6.1	7.0	8.2	9.8	11.5	12.9	14.3	16.0	18.2
Nominal diameter under armour mm	40.9	42.9	45.5	49.4	53.2	56.3	59.5	66.0	71.2
Nominal wire armour diameter mm	2.5	2.5	2.5	2.5	2.5	2.5	2.5	3.15	3.15
Nominal diameter mm	51.3	53.5	56.3	60.4	64.4	67.9	71.3	79.5	85.1
Nominal mass kg/100m	425	475	539	646	778	888	1009	1286	1533
Pulling tension: Cond(s) kN	5.3	7.4	10.5	14.7	20.0	25.0	25.0	25.0	25.0
Pulling tension: Stocking kN	5.3	7.4	10.5	12.8	14.5	16.1	17.8	22.1	25
Pulling Tension: Armour wires kN	10.52	11.46	12.75	14.77	16.95	18.75	20.6	25.0	25.0
Min bending radius during install mm	920	960	1010	1090	1160	1220	1280	1430	1530
Min bending radius set in position mm	615	640	676	725	773	814	855	954	1020
Rdc @ ref temp: Phase cond Ohm/km	0.727	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754
Rac @ oper temp: Phase conductor	0.927	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.0983
Inductance mH/km	0.415	0.397	0.379	0.349	0.333	0.319	0.310	0.309	0.298
Inductance reactance Ohm/km	0.130	0.124	0.119	0.109	0.104	0.100	0.097	0.097	0.0937
Zo @ ref temp: Ro Ohm/km	4.00+j0.084	3.51+j0.018	2.51+j0.073	1.76+j0.063	1.29+j0.059	1.02+j0.054	0.82+j0.051	0.66+j0.050	0.52+j0.047
Capacitance: Phase to earth uF/km	0.211	0.230	0.254	0.289	0.324	0.353	0.382	0.418	0.465
Capacitance: Charging curr. per phase A/km	0.42	0.46	0.51	0.58	0.65	0.70	0.76	0.83	0.92
ISC: Phase cond. kA, 1 sec	3.6	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34.3
In ground, direct buried A	145	172	202	246	290	330	370	410	464
In ground, in duct A	120	145	170	205	245	280	310	350	410
In free air A; Spaced from wall	148	177	210	259	312	356	400	460	529
In free air A; Clipped to wall	138	166	197	242	291	332	373	427	490
Preferred duct nominal size	80	80	100	100	100	100	100	125	125

Note: For rating factors see technical information.

## MINE FEEDER CABLES

### 12.7/22 kV Copper



#### Cable description

Three core copper wire screened armoured to AS/NZS 1972.

#### Application

Suitable as primary supply for mines and industrial networks.

#### Approvals

AS/NZS 1972

#### Behaviour in flame and fire:

Flame retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Minimum bending radius

Installed cables: 12D

#### Flexibility

Rigid

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Very heavy

Water exposure: Water splashes

Solar radiation and

weather exposure: Very good/Frequent

#### Cable design

XLPE insulated, screened, GSW armoured, PVC sheathed cable.

Core: Metal: Plain circular compacted copper.

Conductor screen:

Extruded semiconducting compound, bonded to the insulation and applied in the same operation as the insulation.

Insulation: Cross Linked Polyethylene (XLPE) - standard.

Insulation screen:

Extruded semiconducting compound.

Metallic screen:

Plain annealed copper wire. Combined screen area is designed to provide not less than 50% conductance of one associated power conductor.

Armour: Galvanised steel wires.

Outer sheath:

Red 5V-90 polyvinyl chloride (PVC).

#### Installation conditions

In free air

In duct

In ground

In trench

**Note:** Not specifically designed for use as self supporting cables, as submarine cables or where exposure to excessive heat and/or corrosive products is involved. In case of any doubt concerning the suitability of a particular cable type for a particular application, guidance should be sought from the Prysmian Customer Service Team.

## MINE FEEDER CABLES

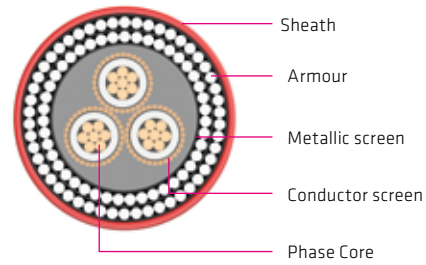
### Physical & electrical characteristics

12.7/22kV Copper								
Product code:	35XFED3C22	50XFED3C22	70XFED3C22	95XFED3C22	120XFED3C22	150XFED3C22	185XFED3C22	240XFED3C22
Nominal conductor area mm <sup>2</sup>	35	50	70	95	120	150	185	240
Nominal conductor diameter mm	7.0	8.2	9.8	11.5	12.9	14.3	16.0	18.2
Nominal diameter under armour mm	52.43	55.07	58.82	62.48	65.70	68.92	75.49	80.41
Nominal wire armour diameter mm	2.5	2.5	2.5	2.5	3.15	3.15	3.15	3.15
Nominal diameter mm	63.6	66.5	70.4	74.5	79.4	83.0	89.8	95.1
Nominal mass kg/100m	603	660	776	902	1110	1245	1449	1699
Pulling tension: Cond(s) kN	7.4	10.5	14.7	20.0	25.0	25.0	25.0	25.0
Pulling tension: Stocking kN	7.4	10.5	14.7	19.4	22.1	24.1	25.0	25.0
Pulling Tension: Armour wires kN	16.3	18.31	20.0	22.5	25.0	25.0	25.0	25.0
Min bending radius during install mm	1145	1195	1265	1340	1430	1490	1615	1710
Min bending radius set in position mm	760	795	845	890	950	995	1075	1140
Rdc @ ref temp: Phase cond Ohm/km	0.524	0.387	0.268	0.193	0.153	0.124	0.0991	0.0754
Rac @ oper temp: Phase conductor	0.668	0.494	0.342	0.247	0.196	0.159	0.128	0.098
Inductance mH/km	0.438	0.418	0.385	0.367	0.351	0.340	0.336	0.323
Inductance reactance Ohm/km	0.137	0.131	0.121	0.115	0.110	0.107	0.106	0.102
Zo @ ref temp: Ro Ohm/km	2.87+j0.092	2.57+j0.085	1.76+j0.075	1.28+j0.069	1.02+j0.065	0.82+j0.061	0.66+j0.059	0.53+j0.055
Capacitance: Phase to earth uF/km	0.164	0.179	0.200	0.223	0.241	0.259	0.282	0.311
Capacitance: Charging curr. per phase A/km	0.65	0.71	0.80	0.89	0.96	1.03	1.12	1.24
ISC: Phase cond. kA, 1 sec	5.0	7.2	10.0	13.6	17.2	21.5	26.5	34
In ground, direct buried A	174	204	247	293	330	365	410	465
In ground, in duct A	145	170	210	252	285	314	353	403
In free air A; Spaced from wall	182	216	265	319	364	407	465	535
In free air A; Clipped to wall	171	202	248	298	339	380	433	497
Preferred duct nominal size	100	100	100	125	125	125	150	150

Note: For rating factors see technical information.

## MINE FEEDER CABLES

### Single Point Suspension Cable 11-22 kV



#### Cable description

Single point suspension cables that are also known as borehole cables are used in both underground coal and metalliferous mines. The cables are designed to be self-supporting from the surface when lowered down a vertical shaft or a borehole. The construction incorporates double armour for the suspended length which is specifically engineered to resist torsion forces. These cables can include earth cores and fibre optic cables within the cable assembly where required.

#### Application

Typical use consists of low cost overhead network covering an expansive geographical area of a mine with boreholes drilled at selected points to supply power to working areas in tunnels. Common feeder voltages are 6.35/11KV and 12.7/22KV which meet Australian Standard AS/NZS1972 for underground coal mines and generic AS/NZS 1429.1 constructions for metalliferous mines.

#### Approvals

AS/NZS 1972

#### Temperature range

Maximum operating temperature: +90 °C

#### Cable design

Core: Metal: Plain circular compacted copper.

Conductor screen:

Extruded semiconducting compound, bonded to the insulation and applied in the same operation as the insulation.

Insulation: Cross Linked Polyethylene (XLPE) - standard.

Insulation screen:

Extruded semiconducting compound.

Metallic screen:

Plain annealed copper wire. Combined screen area is designed to provide not less than 50% conductance of one associated power conductor.

Armour: Galvanised steel wires.

Outer sheath:

Red 5V-90 polyvinyl chloride (PVC).

**Note:** The final cable design is installation specific. For additional information please contact our sales team on 1300 300 304 or [sales.au@prysmiangroup.com](mailto:sales.au@prysmiangroup.com)

## MINE FEEDER CABLES

### Physical & electrical characteristics

11 kV Single Point Suspension Cable					
Product code:		185X3C	240X3C	300X3C	400X3C
11 kV					
Nominal conductor area mm <sup>2</sup>		185	240	300	400
Nominal conductor diameter mm		16.05	18.24	20.6	23.45
Nominal diameter under armour mm		63	71	77	82
Nominal wire armour diameter mm		3.2	3.2	3.2	3.2
Nominal diameter mm	Suspended	90.2	98.4	104.1	109.2
	Suspension	100	108	114	119
Max Length m		600	500	450	400

Note: For rating factors see technical information.

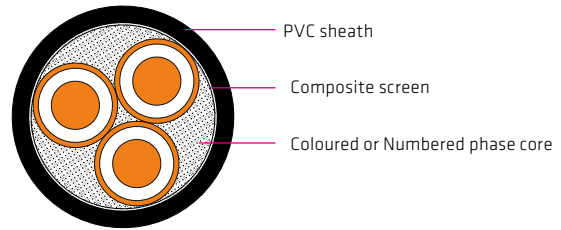
22 kV Single Point Suspension Cable				
Product code:		185X3C	240X3C	300X3C
22 kV				
Nominal conductor area mm <sup>2</sup>		185	240	300
Nominal conductor diameter mm		16.05	18.24	20.6
Nominal diameter under armour mm		75	80	86
Nominal wire armour diameter mm		3.2	3.2	3.2
Nominal diameter mm	Suspended	102.69	107.61	113.2
	Suspension	112	117	123
Max Length m		550	450	400

Note: For rating factors see technical information.



## MINE FEEDER CABLES

### Type 1 1.1 kV



#### Cable description

PVC insulated and covered, screened cable.

#### Application

Cable designed for the wiring of mobile equipment such as continuous miners, shuttle cars, road headers, personnel transports, etc. Type 1 cables require further mechanical protection when used in external (non-protected) installations. They are used for the interconnection of equipment, for example control boxes, motors, etc. Cables rated in excess of 20 amps are electrically symmetrical.

#### Approvals

AS/NZS 1972

#### Behaviour in flame and fire:

No fire performance

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: 0 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Light

Water exposure: Water splashes

Solar radiation and

weather exposure: Very good/Frequent

#### Cable design

PVC insulated, screened, PVC sheathed cable.

Core: Metal: Tinned annealed copper

Insulation: Heat resistant V-90 PVC.

Screen: Tinned copper wire and polyester yarn composite braid screened. Cables can be individually or collectively (as displayed) screened.

Cover: Heat resistant 5V-90 PVC.

#### Installation conditions

In duct

Machines

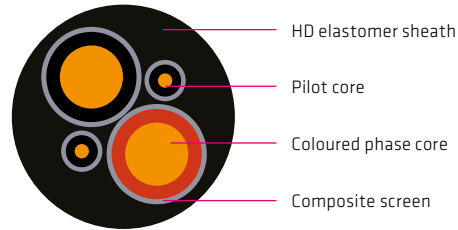
## MINE FEEDER CABLES

### Physical & electrical characteristics

Type 1 1.1 kV											
Voltage rating & part number	Power conductor							Screen Max 20°C dc resistance, combined	Cable		
	Nominal area mm <sup>2</sup>	No. of cores	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m		Covering thickness mm	Nominal diameter mm	Approx mass kg/100m
<b>1.1/1.1 kV Type 1 – Individually screened machine cables</b>											
1.5T1-IS-2C	1.5	2	1.6	0.8	17.5	0.120	30.3	13.7	0.8	10.2	15
1.5T1-IS-3C	1.5	3	1.6	0.8	17.5	0.120	30.3	13.7	0.8	10.8	20
10T1-IS-3C	10	3	4.6	1.0	2.58	0.0923	4.47	6.06	1.0	18.1	60
16T1-IS-3C	16	3	6.2	1.0	1.58	0.0854	2.74	3.72	1.3	22.0	85
1.5T1-IS-4C	1.5	4	1.6	0.8	17.5	0.128	30.3	13.7	0.8	11.9	25
10T1-IS-4C	10	4	4.6	1.0	2.58	0.0998	4.47	6.06	1.3	20.5	75
16T1-IS-4C	16	4	6.2	1.0	1.58	0.0929	2.74	3.72	1.3	24.3	110
<b>1.1/1.1 kV Type 1 – Collectively screened machine cables</b>											
1.5T1-CS-2C	1.5	2	1.6	0.8	17.5	0.106	30.3	13.7	0.8	9.38	15
1.5T1-CS-3C	1.5	3	1.6	0.8	17.5	0.106	30.3	13.7	0.8	9.88	15
1.5T1-CS-4C	1.5	4	1.6	0.8	17.5	0.114	30.3	13.7	0.8	10.7	20
1.5T1-CS-6C	1.5	6	1.6	0.8	17.5	0.123	30.3	13.7	1.0	12.8	25
1.5T1-CS-16C	1.5	16	1.6	0.8	17.5	0.152	30.3	13.7	1.3	18.8	55
1.5T1-CS-30C	1.5	30	1.6	0.8	17.5	0.169	30.3	13.7	1.5	24.7	90

## MINE FEEDER CABLES

### Type 2S, Type 2S.3



#### Cable description

Elastomer insulated and sheathed, screened cable.

#### Application

Cables designed for wiring mobile equipment such as continuous miners, shuttle cars, road headers, and personnel transporters. 0.6/1 kV Type 2S cables are sheathed and do not require further mechanical protection when used in external (non-protected) installations. They are used for the interconnection of equipment, for example control boxes, motors, etc., and may be used for longwall lighting systems.

#### Approvals

AS/NZS 1972

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Very good/Frequent

#### Cable design

EPR insulated, screened, CPE sheathed cable.

Core: Metal: Tinned annealed copper.

Insulation: EPR (R-EP-90).

Pilot (where required):

Tinned annealed copper, R-EP-90 insulated (screened when individual power cores are screened).

Screen: Tinned copper wire and polyester yarn composite braid screened. Cables can be individually (as displayed) or collectively screened.

Sheath: HD-90-CPE Black.

#### Installation conditions

In free air

Mobile equipment

Machines

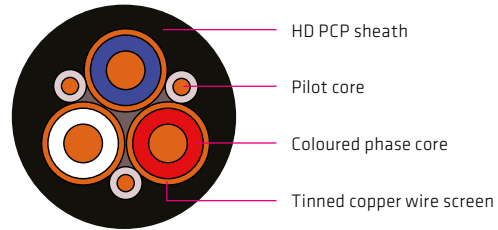
## MINE FEEDER CABLES

### Physical & electrical characteristics

Type 2S, Type 2S.3													
Voltage rating & part number	Power conductor							Pilot		Screen	Cable		
	Nominal area mm <sup>2</sup>	No. of cores	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Approx area mm <sup>2</sup>	No. of cores	Max 20°C dc resistance, combined Ω/km	Sheath thickness mm	Nominal diameter mm	Approx mass kg/100m
<b>1.1/1.1 kV Type 2S – Individually screened machine cables</b>													
10T2S-IS-2C	10	2	4.6	1.0	2.58	0.0953	4.47	-	-	6.06	1.8	18.9	60
16T2S-IS-2C	16	2	6.2	1.0	1.58	0.0879	2.74	-	-	3.72	1.8	22.1	85
10T2S-IS-3C	10	3	4.6	1.0	2.58	0.0953	4.47	-	-	6.06	1.8	20.1	75
16T2S-IS-3C	16	3	6.2	1.0	1.58	0.0879	2.74	-	-	3.72	1.8	23.5	105
10T2S-IS-4C	10	4	4.6	1.0	2.58	0.103	4.47	-	-	6.06	1.8	22.1	95
16T2S-IS-4C	16	4	6.2	1.0	1.58	0.0954	2.74	-	-	3.72	1.8	25.9	130
16T2S-IS-2C1P	16	2	6.2	1.0	1.58	0.0786	2.74	1	1	3.72	1.8	22.1	100
6T2S-IS-2C2P	6	2	3.5	1.0	4.32	0.0936	7.48	1	2	8.21	1.8	16.9	50
10T2S-IS-2C2P	10	2	4.6	1.0	2.58	0.0860	4.47	1	2	6.06	1.8	19.0	65
16T2S-IS-2C2P	16	2	6.2	1.0	1.58	0.0786	2.74	1	2	3.72	1.8	22.1	90
6T2S-IS-3C3P	6	3	3.5	1.0	4.32	0.119	7.49	1	3	8.21	1.8	19.8	70
10T2S-IS-3C3P	10	3	4.6	1.0	2.58	0.104	4.47	1	3	6.06	1.8	21.3	85
16T2S-IS-3C3P	16	3	6.2	1.0	1.58	0.0879	2.74	1	3	3.72	1.8	23.5	110
25T2S-IS-3C3P	25	3	7.2	1.2	0.951	0.0870	1.65	1	3	2.24	1.8	26.8	155
35T2S-IS-3C3P	35	3	8.4	1.2	0.698	0.0837	1.22	1	3	1.64	1.8	29.5	190
50T2S-IS-3C3P	50	3	9.7	1.4	0.523	0.0828	0.917	1	3	1.23	1.9	33.4	245
<b>3.3/3.3 kV Type 2S.3 – Individually screened machine cables</b>													
10T2S.3-IS-3C3P	10	3	4.6	3.0	2.58	0.125	4.47	1.5	3	6.06	1.8	30.5	140
16T2S.3-IS-3C3P	16	3	6.2	3.0	1.58	0.116	2.74	1.5	3	3.72	1.9	34.7	185
25T2S.3-IS-3C3P	25	3	7.2	3.0	0.951	0.110	1.66	1.5	3	2.24	2.0	37.3	235
35T2S.3-IS-3C3P	35	3	8.4	3.0	0.698	0.105	1.22	1.5	3	1.64	2.0	39.8	275
50T2S.3-IS-3C3P	50	3	9.7	3.0	0.523	0.101	0.923	1.5	3	1.23	2.1	42.8	325
70T2S.3-IS-3C3P	70	3	12.0	3.0	0.346	0.0950	0.621	1.5	3	0.813	2.3	48.3	435
95T2S.3-IS-3C3P	95	3	13.3	3.0	0.271	0.0926	0.496	1.5	3	0.636	2.4	51.4	515
120T2S.3-IS-3C3P	120	3	15.3	3.0	0.210	0.0897	0.396	1.5	3	0.492	2.5	56.4	640
<b>1.1/1.1 kV Type 2S – Collectively screened machine cables</b>													
1.5T2S-CS-2C	1.5	2	1.6	1.0	17.5	0.118	30.3	-	-	13.7	1.8	12.2	20
1.5T2S-CS-3C	1.5	3	1.6	1.0	17.5	0.119	30.3	-	-	13.7	1.8	12.7	25
1.5T2S-CS-4C	1.5	4	1.6	1.0	17.5	0.126	30.3	-	-	13.7	1.8	13.7	25
1.5T2S-CS-6C	1.5	6	1.6	1.0	17.5	0.135	30.3	-	-	13.7	1.8	16.0	35
1.5T2S-CS-16C	1.5	16	1.6	1.0	17.5	0.164	30.3	-	-	13.7	1.8	22.8	75
1.5T2S-CS-30C	1.5	30	1.6	1.0	17.5	0.181	30.3	-	-	13.7	1.8	29.1	120

## MINE FEEDER CABLES

### Type A and Type B 1.1 kV



#### Cable description

1.1/1.1 kV feeder cables to AS/NZS 1972.

#### Application

Individually screened power cores. 1.1/1.1 kV cable suitable for applications where the conductivity of the combined screens must meet the requirements of AS/NZS 1972. Type A cables have three pilot cores. Type B cables have no pilots.

For use between transportable substations and associated equipment, where the cable has to be frequently moved.

#### Approvals

AS/NZS 1972

#### Behaviour in flame and fire:

Fire retardant

#### Temperature range

Maximum operating temperature: +90 °C

Minimum operating temperature: -25 °C

#### Flexibility

Semi-flexible

#### Resistance to

Chemical exposure: Very good/Frequent

Mechanical impact: Heavy

Water exposure: Immersion/Temporary coverage

Solar radiation and

weather exposure: Excellent/Permanent.

#### Cable design

EPR insulated, screened, PCP sheathed cable.

Core: Metal: Tinned Copper, three core (plus three symmetrical pilots in Type A).

Conductor tape: Polyester textile.

Insulation: EPR (R-EP-90)  
Core colours: red, white, blue, under a semiconductive tape.

Earth: Screen (earth) of tinned annealed copper wire.

Pilot: Three elastomer covered in the cable interstices (Type A only).

Sheath: Heavy duty HD-85-PCP.

#### Installation conditions

In free air

In duct

Mobile equipment

## MINE FEEDER CABLES

### Physical & electrical characteristics

Type A and Type B 1.1 kV													
Voltage rating & part number	Power conductor							Pilot		Screen	Cable		
	Nominal area mm <sup>2</sup>	No. of cores	Nominal diameter mm	Insulation thickness mm	ac Resistance @ 90°C & 50Hz Ω/km	Reactance @ 50Hz Ω/km	3 phase voltage drop @ 90°C & 50Hz mV/A.m	Approx area mm <sup>2</sup> /phase	No. of cores	Max 20°C dc resistance, combined Ω/km	Sheath thickness mm	Nominal diameter mm	Approx mass kg/100m
<b>1.1/1.1 kV Type A feeder cables</b>													
16TYPEA	16	3	5.1	1.4	1.48	0.109	2.57	0.75	3	6.96	2.5	27.4	150
25TYPEA	25	3	6.7	1.4	0.936	0.0991	1.63	1	3	4.40	2.5	30.9	195
35TYPEA	35	3	7.7	1.5	0.675	0.0954	1.18	1.5	3	3.17	2.5	33.4	240
50TYPEA	50	3	9.0	1.7	0.499	0.0925	0.879	2.5	3	2.35	3.0	38.1	315
70TYPEA	70	3	10.6	1.8	0.345	0.0894	0.617	2.5	3	1.62	3.3	42.3	395
95TYPEA	95	3	12.6	2.0	0.250	0.0871	0.459	2.5	3	1.76	3.8	48.7	530
120TYPEA	120	3	14.2	2.2	0.198	0.0859	0.374	2.5	3	1.39	3.8	53.0	645
150TYPEA	150	3	15.7	2.3	0.162	0.0847	0.317	2.5	3	1.13	4.4	57.8	765
185TYPEA	185	3	17.9	2.5	0.130	0.0832	0.267	2.5	3	0.900	5.1	65.2	975
240TYPEA	240	3	20.3	2.7	0.0997	0.0841	0.226	2.5	3	0.686	5.7	74.5	1300
<b>1.1/1.1 kV Type B feeder cables</b>													
16TYPEB	16	3	5.1	1.4	1.48	0.106	2.57	-	-	6.96	2.5	27.1	145
25TYPEB	25	3	6.7	1.4	0.936	0.0982	1.63	-	-	4.40	2.5	30.8	190
35TYPEB	35	3	7.7	1.5	0.675	0.0954	1.18	-	-	3.17	2.5	33.4	235
50TYPEB	50	3	9.0	1.7	0.499	0.0925	0.879	-	-	2.35	3.0	38.1	305
70TYPEB	70	3	10.6	1.8	0.345	0.0894	0.617	-	-	1.62	3.3	42.3	390
95TYPEB	95	3	12.6	2.0	0.250	0.0871	0.459	-	-	1.76	3.8	48.7	525
120TYPEB	120	3	14.2	2.2	0.198	0.0859	0.374	-	-	1.39	3.8	53.0	640
150TYPEB	150	3	15.7	2.3	0.162	0.0847	0.317	-	-	1.13	4.4	57.8	760
185TYPEB	185	3	17.9	2.5	0.130	0.0832	0.267	-	-	0.900	5.1	65.2	970
240TYPEB	240	3	20.3	2.7	0.0997	0.0841	0.226	-	-	0.686	5.7	74.5	1295

# One stop shop.

We have all the cables you need.



No worries. Regardless of what cables you're looking for, we have them for sure. A full market offer ranging from construction, power and telecom cables. And if not, we'll invent them. Plus, we provide you with all the services you might need - before, during and after.

Australian made? Yes, of course.



A hand is shown in the lower-left corner, holding a dark green puzzle piece. The background is a lighter green gradient. The puzzle piece is being held in a way that it appears to be being placed into or removed from a larger assembly. The text 'TECHNICAL/GENERAL INFORMATION' is centered in the lower half of the image.

# TECHNICAL/GENERAL INFORMATION

## TECHNICAL INFORMATION

### Mechanical information

#### Bending radii

Observation of cables during service has shown problems arise from cables being reeled or passed around pulleys or sheaves of too small a bending diameter. This also occurs when moving trailing cables. If the minimum bending diameter is observed, then the effect of reeling on the lay or twist of phase conductors will be minimised. Additionally if the recommendations are followed;

- braid screens will be prevented from stretching too far and breaking up
- semi conducting tapes will not become unlapped and
- the incidence of bird-caging or kinking of conductors will be reduced by distributing mechanical stresses uniformly

#### Recommended minimum bending radii in multiples of cable overall diameter

	Cables rated 1.1/1.1 kV		Cables rated 3.3 kV and above	
	Unarmoured		Unarmoured	
For despatch drum barrel	6		8	
For fixed bend	4		6	
Free flexing applications	6		10	
Permanent repeated reeling	10		12	
Passing over sheaves	10		15	
Festoon	7		10	
Cable chain	5		10	

#### Cable tension

When cables experience tension, initially they become more compacted, as individual wires, strands and cores are pulled closer together. As tension increases, the cable will stretch, which may result in it no longer having a balanced construction. As the cable stretches, individual wires in the strand are forced into compression and shear, and now the small wires are damaged and will break more easily during bending or flexing. The stretching of the conductors may result in permanent elongation, causing the conductors to become wirey.

Tension also elongates the conductor insulation, resulting in a reduced radial thickness. The elongated insulation is then vulnerable to compression cutting (it will rupture more easily when it is crushed against the stranded conductor during runovers or when passed around bends).

All possible steps should be taken to ensure that recommended cable tensions are not exceeded. The maximum safe working force for metric flexible conductors is 20 N/mm<sup>2</sup> when trailing. T, the maximum pulling tension (Newtons) is calculated by multiplying the number of cores and area of each core, by the safe working force. Note, when calculating the safe tensile force, area of earths, pilots, and shields must not be included.

When dragging cable, the maximum length of cable that should be dragged from a suitably formed centre point, may be calculated by the following formula:

$$L = \frac{T}{f \times W \times 10}$$

L = Maximum total length of cable to be pulled (m)

f = 0.5 (coefficient of friction)

W = Mass of Cable (kg/m)

Suspended unarmoured cables should not exceed the maximum pulling tension as calculated by:

$$L = \frac{T}{W \times 9.8}$$

L = Maximum total length of cable to be suspended (m)

For high tensile loads, bending radii should be increased, to limit damage to the cable. If the cable is required to endure higher tensile loads than above, support elements should be included in the cable structure. These can be either textile or metal, depending on the required duty of the cable.

Trailing and reeling cables can also experience torsional loads. While all efforts should be made to remove this condition, cables can be manufactured to withstand a degree of abuse, during their service life. Prysmian incorporate textile braid reinforcement into many cables. In this instance, torsional stresses should be limited to  $\pm 25^\circ/\text{m}$ .

## TECHNICAL INFORMATION

### Electrical information

#### Continuous current carrying capacity

In accordance with IEC60287 for the free air condition based on a conductor temperature of 90°C, and ambient air temperature 40°C, a solar radiation absorption coefficient of 0.8 and

an intensity of 1000W/m<sup>2</sup>, where exposed to direct sunlight, the following current carrying capacities should be adopted.

Power conductor nominal area mm <sup>2</sup>	Protected from sun cable voltage rating		Exposed to sun cable voltage rating	
	1.1/1.1 kV	3.3/3.3 - 33/33 kV	1.1/1.1 kV	3.3/3.3 - 33/33 kV
1.5	23	-	18	-
2.5	30	-	23	-
6	49	-	38	-
10	66	-	51	-
16	88	89	67	66
25	120	120	90	89
35	145	145	110	105
50	170	170	125	125
70	220	220	160	155
95	250	250	185	180
120	295	295	210	220
150	340	340	245	240
185	385	385	270	265
240	455	450	315	310
300	515	510	355	350

#### Derating factors for multiple coils

Where layers of flexible cable are stored on cylindrical type drums or reels, allowances must be made to cater for reduced

heat dispersion. Current carrying capacities must be multiplied by the following derating factors;

No. of layers on drum	Derating factor
<b>Cylindrical drum</b>	
1	0.85
2	0.65
3	0.45
4	0.35
<b>Radial drum</b>	
Ventilated	0.85
Unventilated	0.75

Where cables are exposed to higher temperatures in trailing applications, or possible lower temperatures in underground

applications, the following rating factors should / can be applied for current carrying capacity.

Conductor temp °C	Rating factor ambient air temperature °C									
	15	20	25	30	35	40	45	50	55	60
75	1.35	1.28	1.21	1.14	1.07	1.0	0.91	0.82	0.72	0.60
90	1.26	1.20	1.15	1.10	1.05	1.0	0.94	0.88	0.81	0.73

## TECHNICAL INFORMATION

### Ratings information

#### Rating factors for XLPE feeder cables

Cables buried direct in the ground									
Variation in ground temperature									
Ground temperature °C	10	15	20	25	30	35	40		
Rating factor	1.11	1.07	1.03	1.00	0.97	0.93	0.89		
Variation in thermal resistivity of soil	Values of 'g' °C m/W								
Nominal area of conductor mm <sup>2</sup>	0.8	0.9	1.0	1.2	1.5	2.0	2.5	3.0	
Three core cables	Up to 16	1.09	1.06	1.04	1.00	0.95	0.87	0.79	0.74
	From 25 - 150	1.14	1.10	1.07	1.00	0.93	0.84	0.76	0.70
	From 185 - 400	1.16	1.11	1.07	1.00	0.92	0.82	0.74	0.68
Group rating factors for three core cables, in horizontal formation				Group spacing – metres					
Voltage range of cables	No. of cables in group	Touching	0.15	0.30	0.45	0.60			
From 1.9/3.3 kV to 12.7/22 kV	2	0.80	0.85	0.89	0.90	0.92			
	3	0.69	0.75	0.80	0.84	0.86			
	4	0.63	0.70	0.77	0.80	0.84			

## TECHNICAL INFORMATION

### Duct selection

Cables buried in singleway ducts	
Nominal duct size	Max cable diameter
50	29
63	38
80	55
100	72
125	88
150	100
200	143

Variation in ground temperature							
Ground temperature °C	10	15	20	25	30	35	40
Rating factor	1.11	1.07	1.03	1.00	0.97	0.93	0.89

Variation in thermal resistivity of soil		Values of 'g' °C m/W							
Nominal area of conductor mm <sup>2</sup>		0.8	0.9	1.0	1.2	1.5	2.0	2.5	3.0
Three core cables	Up to 16	1.05	1.04	1.03	1.00	0.97	0.92	0.87	0.83
	From 25 - 150	1.07	1.05	1.03	1.00	0.96	0.90	0.85	0.78
	From 185 - 400	1.09	1.06	1.04	1.00	0.95	0.87	0.82	0.76

Group rating factors for three core cables in singleway ducts			Group spacing - metres		
Voltage range of cables	No. of cables in group	Touching	0.30	0.45	0.60
From 1.9/3.3 kV to 12.7/22 kV	2	0.88	0.91	0.93	0.9
	3	0.8	0.84	0.87	0.84
	4	0.75	0.81	0.84	0.8

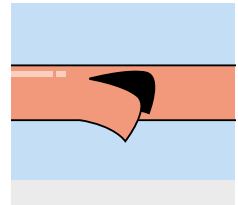
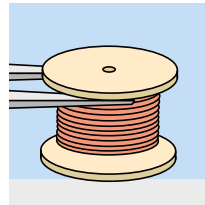
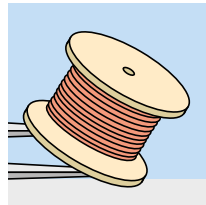
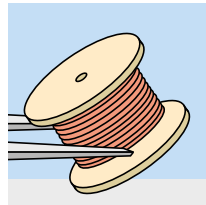
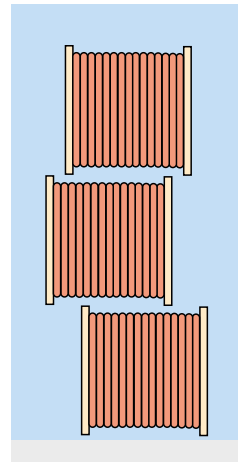
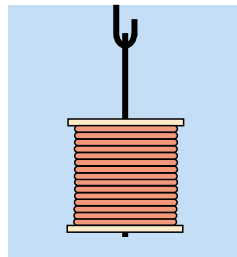
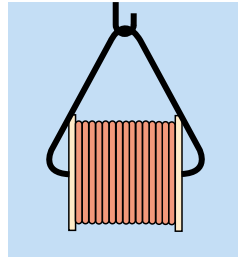
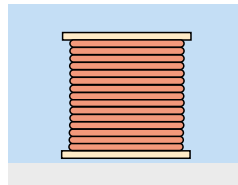
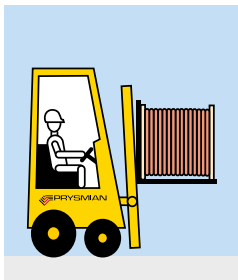
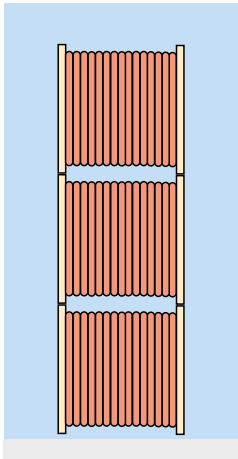
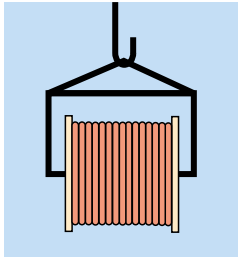
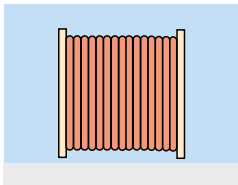
Cables installed in free air								
Variation in ambient air temperature								
Ambient air temperature °C	15	20	25	30	35	40	45	50
Rating factor	1.26	1.2	1.15	1.1	1.05	1	0.94	0.88

Grouping of cables in air
<b>Derating is not necessary if the following minimum clearance between adjacent circuits can be maintained;</b>
1. The horizontal clearance is not less than twice the diameter of an individual cable.
2. The vertical clearance is not less than four times the diameter of an individual cable.
3. Where the number of circuits is more than three, they are installed in a horizontal plane.

GENERAL INFORMATION

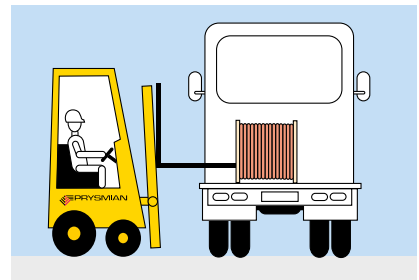
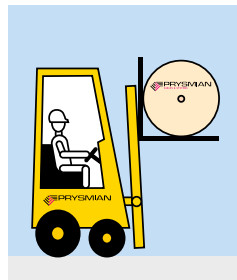
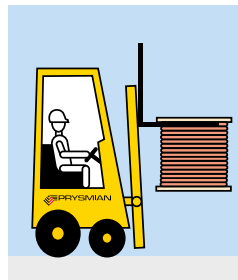
Transport, handling and storage guidelines

Always use appropriate safety.



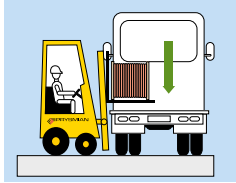
Do not attempt to lift drums of cable without inserting the fork lift tynes fully under both flanges as the tynes can damage the cable, making it un-serviceable. Do not attempt to lift drums by the flange or to lift drums into the upright (correct) position by lifting the top flanges as it may break the flange from the drum barrel. The drum will then be undeliverable. Use a length of steel pipe through the centre of the drum to provide leverage and control.

This cable has been rendered un-serviceable through fork lift tine damage and may necessitate the scrapping of the whole drum.

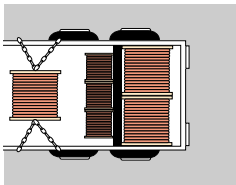


Do not use the fork lift tynes to push cable drums sideways on a truck tray or the ground as damage to the flanges can result in the drum being unacceptable to customers.

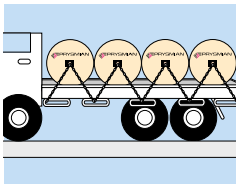
**GENERAL INFORMATION**



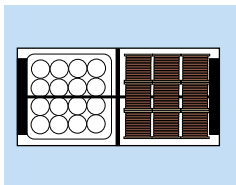
Prior to lifting any drums, ensure the site has suitably rated mechanical handling equipment to handle the drum.  
Lower drums gently onto the ground or transport.



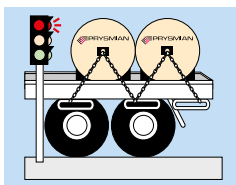
Always protect cable from rubbing or damage. Adjust load or consider using separators such as carpet, ply or corflute between products for protection.



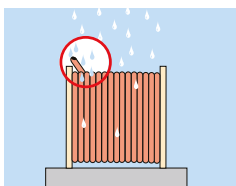
Heavy drums should be chained appropriately for transit, with protection from the chain rubbers or carpet for the spindle hole in the centre of the drum. Under no circumstances are drums to be transported on their side.



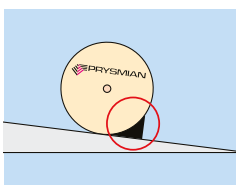
Always protect product, especially spools, against load restraint damage during tying down of load. Consider using angles or carpet under straps, chains and rope.



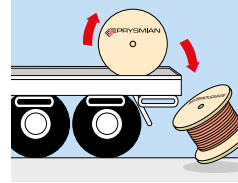
Ensure drums are restrained to restrict movement during sudden stop/starts.



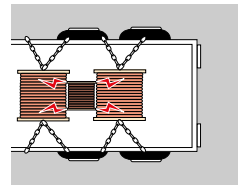
Ensure cable sealing is intact so moisture cannot seep into cable. Report damage.



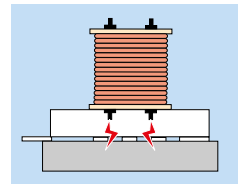
When placing drums on an uneven surface be prepared to chock drums to prevent rolling if required.



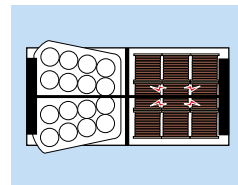
Avoid impact force loadings. Never drop drums.



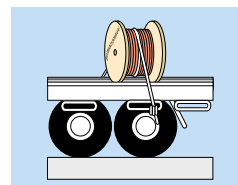
Never let drum flanges contact cable on adjacent drums.



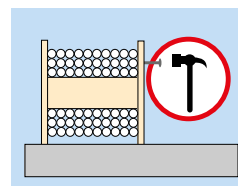
Never lay drums on their side, even on top of pallets, as protruding bolts damage spools and cable.



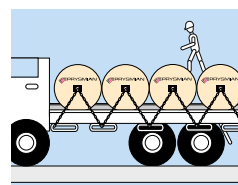
Never use rope directly over shrink-wrapped cable.



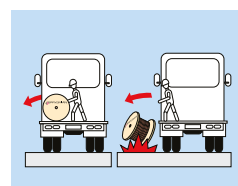
When securing drums for transit, do not place ropes or chains over cable as damage can occur to the outer insulation rendering the cable unserviceable.



Avoid use of additional nails on drums or cable. Flange thicknesses vary and some customers prohibit their use.



Never climb or walk over products loaded on the truck. If you must get onto the tray, do not go higher than the deck height.



Do not roll cable drums from the back of a delivery truck to the ground as the resulting flange damage will be unacceptable to the customer as the cable will not be able to be rolled off the drum and the drum will need to be returned.



## GENERAL INFORMATION



Before lifting or rolling any product, first confirm there isn't any mechanical aids to do the task. If there isn't, always assess its weight and size to ensure it is safe to manually handle. If you believe there is a risk of injury DO NOT attempt. Report to supervisor.

When rewinding cables, drums shall be of suitable construction and in good condition. All drums shall be held firmly in appropriate pay-off stands to prevent vibration and ensure smooth, even rotation to minimise inner end cable grow-out and tangling. Cables shall be wound evenly and uniformly, then secured.

## Unloading – safety exclusion zones

At all sites, you should determine if the area is safe to undertake the loading and unloading task, that you can establish a safety exclusion zone with cooperation of site representatives, and that appropriate lifting equipment is available.

If it isn't, contact your manager for further advice so alternative arrangements can be made.

Use this guide to set up your safety exclusion zone.



### GREEN ZONES

Safety exclusion zone when mobile equipment is operating in red zone. Ensure visual contact is maintained with mobile plant operator.



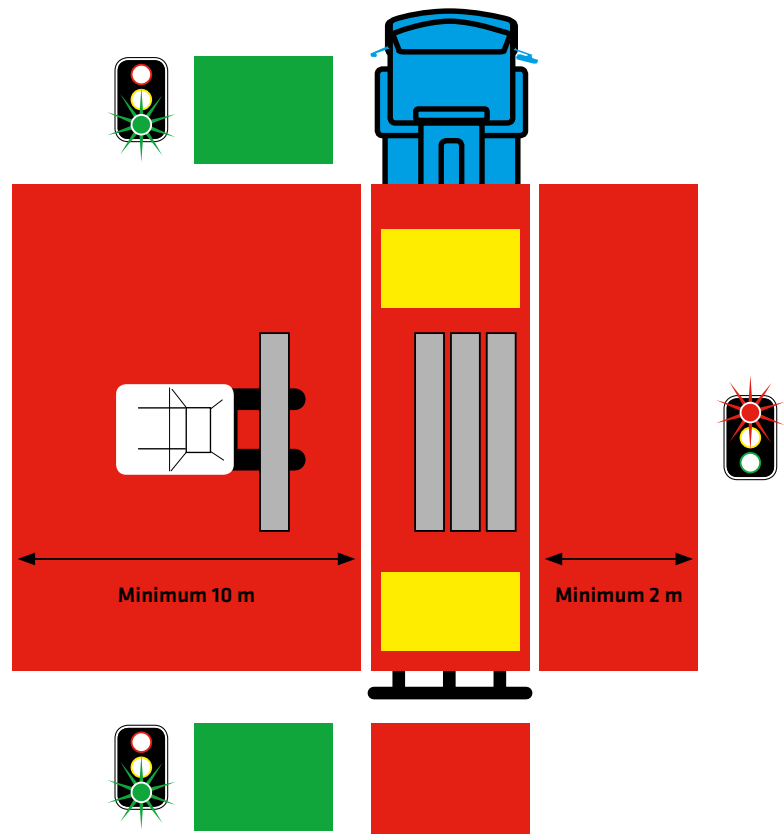
### AMBER ZONES

Management approved handling task only – you must not enter unless company records confirm you are registered as competent to perform this task.



### RED ZONES

People are not allowed in this zone whilst mobile plant is operating. Ensure its engine is off before entering.



## GENERAL INFORMATION

### Storage recommendations

When storing cable drums for long periods, please take the following guidelines into consideration:

- ✓ Select a site for storage that is level and dry, preferably indoors with a concrete surface, with no risk of falling objects, chemical spills (oil, grease, etc.) open flames and excessive heat (see fig. 1).
- ✓ If concrete hard storage is not available, select a well-drained surface that will prevent the reel flanges sinking into it (see fig. 1).
- ✓ The drums must always be stored with their flanges vertical.
- ✓ Leave enough space between stored drums for air circulation (see fig. 2).
- ✓ If drums are stored in a high traffic area (fork lifts frequent transit) suitable barriers should be erected to prevent damage from moving equipment (see fig. 2).

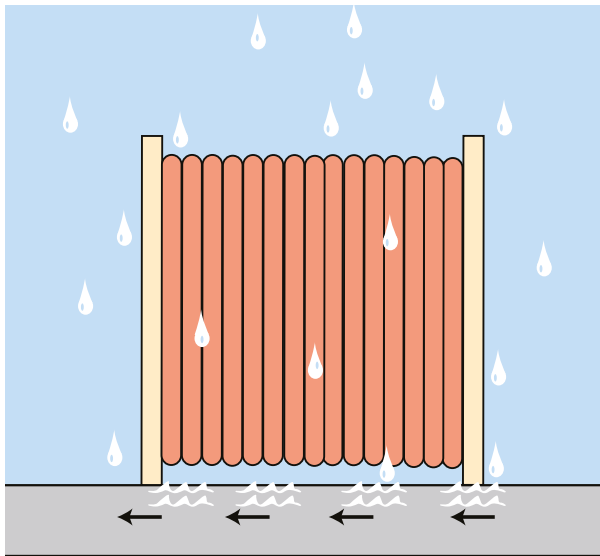


Fig. 1

- ✓ The bolts should be tightened at regular intervals.
- ✓ During storage, the drums should be rolled to an angle of 90° every three months (see fig. 3).
- ✓ When only a portion of the cable is used, the open end of the cable remaining on the drum should immediately be re-sealed to prevent the entrance of moisture. Once it has been re-sealed, the cut end should be fixed to the inside edge of the drum flange to prevent the end from extending beyond the flanges during drum movement.
- ✓ When it is required to rewind the cable on to another drum, always consider that the diameter of the new drum barrel should be at least the same size of the original drum barrel diameter (see fig. 4).

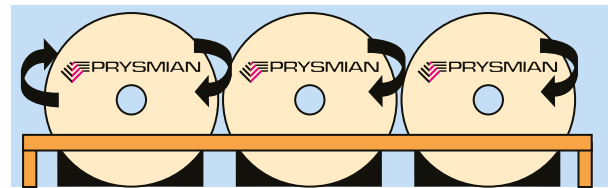


Fig. 2

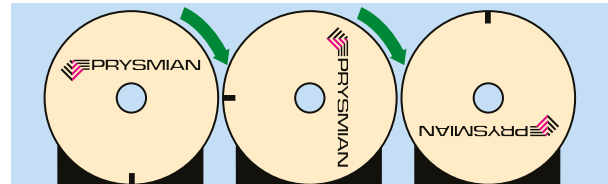


Fig. 3

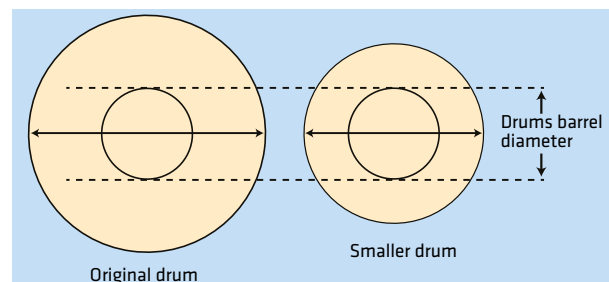


Fig. 4





Linking the future

© All rights reserved by Prysmian Group 2016-08 | Version 2

**Prysmian Australia Ltd**

1 Heathcote Road, Liverpool 2170 NSW, Australia  
Ph: 1300 300 304 Fx: 1300 300 307  
E-mail: [sales.au@prysmiangroup.com](mailto:sales.au@prysmiangroup.com)

[www.prysmiancable.com.au](http://www.prysmiancable.com.au)



A brand of the  
**Prysmian**  
Group