


# Cables for the Extreme



## About Us

OBA (formerly O'Brien-AIM) is the largest supplier of electrical and thermal insulating materials in Australia and New Zealand.

This was not always the case. In fact for most of the 20th century O.H.O'Brien and Australian Isola Materials were strong competitors, operating in close proximity and servicing many of the same clients.

All of that changed in 2005 when Transmission Australia purchased both companies and merged them as O'Brien-AIM. With a strong, focused management, an injection of capital, and a powerful marketing strategy, the new company has emerged as an industry leader.

Today, OBA is setting the agenda and we are pleased to provide you with our story: literally a work in progress.

## Where can you find us?

OBA has offices in every state and we are literally a phone call or a keyboard click away. We continue to improve our services by ensuring that the products you want are readily available and that you receive them when you need them.

## Judge us by the company we keep

Many of the world's leading manufacturers of electrical and thermal insulating materials have made their home with OBA. We have sole agencies with some of the great companies, Omerin, Dow Corning, JSI ( Jones Stroud Insulations ) & Altana, as well as distributing products for Krempel, DuPont and Schenectady's Isonel range.

We continue to build relationships with the best companies and the best minds so that we deliver solutions that work for our customers. Our challenge is to meet our customers' needs by listening and responding. This is the reason why OBA is the market leader.

## Our range

If we don't have it, who does? Products range from Magnet Winding wire, Rigid laminates, Mica Products, Varnishes & Resin, Cables & Lead wire, Capacitors, Flexible Insulation, Ropes & Braids, Silicone Sealants, Encapsulants & Compounds, Sleeveings & Motor Accessories...the list goes on!

Complimenting our range of products, OBA also has full manufacturing, fabrication & assembly facilities which provide quality finished products from either drawings or product samples.

## Omerin - a world leader

Omerin is Europe's number one manufacturer of silicone-insulated wires and cables, and one of the world leaders. For 40 years, Omerin has been focused on manufacturing electrical wires and cables for hazardous conditions from - 190°C to + 1400°C, offering a complete range of electrical wires and cables for hot and hazardous environments.

All products are manufactured using sophisticated materials like silicone, fibreglass, mineral fibre, fluorinated insulators, polyimids, mica, aramids, polyester, polyolefines and other special elastometric and thermoplastic insulators.

The large range of high-performance products covers many applications, particularly eletrothermal and electro-mechanical installations and in industries such as metallurgy, chemicals, nuclear, aeronautics, railways, shipbuilding.

The product range extends to include braided, varnished, coated, impregnated or treated insulating sleeveings, thermocouple, extension and compensation cables, heating wires, and diverse industrial braids.

## You can help us

OBA will continue to build its relationship with you by being customer-focused. That means listening to what you want and responding to the best of our ability. If it works, tell others. If it doesn't....let's just say we won't let you down.



**“we deliver solutions that work for you”**

## Quick Reference Chart

Product Name	Temp Range (min)	Temp Range (max)	Peak Temp	Conductor	No. of Cores	Core Insulation	Sheath Insulation	Working Voltage	Test Voltage	Applications
<b>Silicone Insulated Cables</b>										
RECS (SIE)	-60°C	+180°C	+230°C	Solid Tinned Copper	1	Silicone	°	600/1000V	2000V	Wiring of domestic electrical heating appliances. Class H Rotating Machines Lighting. Industrial wiring for hot environments. All wiring in hot environments up to 150°C. Wiring in metal and glassworks industry. Wiring in furnaces, ovens, thermoplastics. Lighting, floodlights etc.
ECS (SIF)	-60°C	+180°C	+230°C	Tinned Copper	1	Silicone	°	600/1000V	2000V	
MC-ECS	-60°C	+150°C	+230°C	Tinned Copper	2-7	Silicone	Silicone	600/1000V	2500V	
ECSP	-60°C	+180°C	+230°C	Tinned Copper	1	Silicone	Coated Synthetic Reinforcing Braid	Core Size under 10 mm <sup>2</sup> : 450/750V 2500V Core Size over 10 mm <sup>2</sup> : 600/1000V 3500V		Wiring of rotating machines: motors, alternators, generators. Wiring of static machines: transformers, inductors, inverters, choppers. Shipbuilding and railway construction, power supply.
<b>Silicone Insulated with Reinforcing Braid Cables</b>										
Silicoul 1.1kV	-60°C	+180°C	+230°C	Tinned Copper	1	Silicone / Reinforcing Braid	°	1.1kV	3.5kV	Wiring of rotating machines: motors, alternators, generators. Wiring of static machines: transformers, inductors, inverters, choppers. Shipbuilding and railway construction, power supply.
Silicoul 3.7kV	-60°C	+180°C	+230°C	Tinned Copper	1	Silicone / Reinforcing Braid	°	4.2kV	10kV	
Silicoul 6.6kV	-60°C	+180°C	+230°C	Tinned Copper	1	Silicone / Reinforcing Braid	°	7.2kV	15kV	
Silicoul 13.8kV	-60°C	+180°C	+230°C	Tinned Copper	1	Silicone / Reinforcing Braid	°	15kV	30kV	
<b>Halogen Free Polyolefin Elastomer Insulated Cables</b>										
Varpren F	-50°C	+155°C	+170°C	Tinned Copper	1	Polyolefin Elastomer <sup>1</sup>	°	600/1000V	2500V	Electrical motor applications. Rotating and static machines. Lighting. Power supplies, electrotechnical equipment. Shipbuilding and railways construction.
Varpren MVA	-50°C	+150°C	+170°C	Tinned Copper	2-5	Polyolefin Elastomer <sup>1</sup>	Polyolefin Elastomer <sup>1</sup>	600/1000V	2500V	
<b>Composite Insulated Cables</b>										
NVS	-60°C	+350°C	+400°C	Pure Nickel	1	Glass	°	600/1000V	2000V	Wiring of heating elements, cartridges, bands and hot plates. Domestic electrical heating appliances, professional kitchens and ovens. Machines for thermoplastics and rubber. Furnaces and industrial ovens. Heavy industry: foundaries, steelworks, glassworks etc.
BM-NVS	-60°C	+350°C	+400°C	Pure Nickel	3-5	Silicone Impreg. Glass / Silicone Coated Fibreglass	Galvanised Steel	600/1000V	2000V	
NVAS	-60°C	+450°C	+550°C	Pure Nickel	1	Silicone Impreg. Glass / Silicone Coated Mineral Fibre Braid	°	600/1000V	2000V	
TPT	°	+125°C	°	Plain Copper	1	PET Polyester / Polyester Film	°	600V	2500V	Internal wiring of sealed motor units. Refrigeration units.
<b>Ignition Wires</b>										
HT	-60°C	+180°C	+230°C	Tinned Copper	1	Silicone	°	Pulse voltage from 5 - 20kV	°	Ignition units, creation of electric arc. Piezo-electrics of domestic electrical appliances. Gas or fuel burners in boilers and professional appliances.
<b>Extruded Fluorinated Insulation</b>										
EETFE	-90°C	+155°C	+180°C	Tinned Copper	1	ETFE fluorinated polymer	°	600/1000V	2000V	Wiring of Class F rotating machines. Wiring in household appliances, electronics. Wiring in hot or cold environments (cryogenics). Wiring in aggressive atmospheres (humid, chemical etc.). Wiring that requires compact fitting and excellent mechanical strength.
EPFA	-90°C	+260°C	+280°C	Tinned Copper	1	ETFE fluorinated polymer	°	600/1000V	2500V	
<b>Measurement &amp; Pyrometry Cables</b>										
(Couplix) - See Page 21										
(SONDIX) - See Page 22										

<sup>1</sup>Halogen Free

## Silicone Insulated Cables

### RECS (SIE VDE)

Rigid single core silicone insulated cable with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: - 60°C to + 180°C, Peaks at + 230°C
- Good resistance to thermal shock and UV
- Excellent ageing resistance
- Halogen free cable
- Working voltage:
  - cross-section <10 mm<sup>2</sup> 450/750 V
  - cross-section >10 mm<sup>2</sup> 600/1000 V
- Test voltage: 2000 V

#### COLOUR

- 0.25 to 6 mm<sup>2</sup>: all colours, including two-colour
- 10 to 95 mm<sup>2</sup>: white, black, other colours on request

#### PACKAGING

- 100m Rolls, spools, drums or SILIBOX®

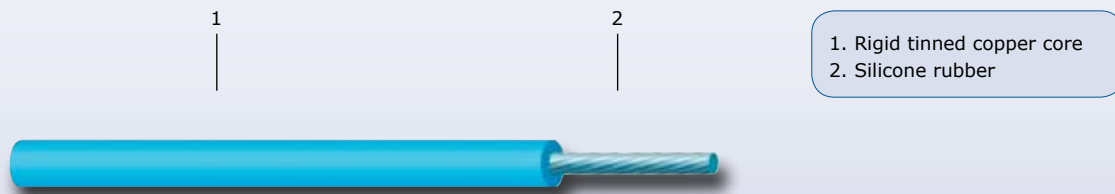
#### OPTIONS

Please consult OBA about these options.

- Mechanical outer shielding:
  - in galvanized steel
  - in stainless steel

#### APPLICATIONS

- Wiring of domestic electrical heating appliances
- Rotating machines (class H)
- Lighting
- Industrial wiring for hot environments



CORE			INSULATED WIRE OR CABLE		
Nominal cross-section	Nominal stranding	Max. linear resistance at 20 °C (red copper wire)	Nominal thickness of Insulating sheath	Nominal outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[mm]	[kg/km]
0.25	1 x 0.56	74.5	0.6	1.7	5.30
0.50	1 x 0.80	36.0	0.6	2.0	7.70
0.75	1 x 0.98	24.5	0.6	2.2	10.7
1.0	1 x 1.13	18.1	0.6	2.4	12.8
1.5	1 x 1.38	12.1	0.6	2.6	18.0
2.5	1 x 1.78	7.41	0.7	3.2	28.9
4	1 x 2.26	4.61	0.8	3.9	45.4
6	1 x 2.76	3.08	0.8	4.4	64.5
10	7 x 1.38	1.83	1.1	6.4	121
16	7 x 1.70	1.15	1.2	7.5	183
25	7 x 2.14	0.727	1.6	9.6	285
35	7 x 2.52	0.524	1.8	11.2	390
50	19 x 1.78	0.387	2.2	13.3	550
70	19 x 2.14	0.268	2.4	15.5	740
95	19 x 2.52	0.193	2.6	17.8	1000

## Silicone Insulated Cables

### ECS (SIF - VDE)

Flexible single core silicone insulated cable with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: - 60°C to + 180°C, Peaks at + 230°C
- Good resistance to thermal shock and UV
- Excellent ageing resistance
- Halogen free cable
- Working voltage:
  - cross-section <10 mm<sup>2</sup> 450/750 V
  - cross-section >10 mm<sup>2</sup> 600/1000 V
- Test voltage: 2000 V

#### COLOUR

- 0.25 to 6 mm<sup>2</sup>: all colours, including two-colour
- 10 to 400 mm<sup>2</sup>: white, black, other colours on request

#### PACKAGING

- Rolls, spools, drums or SILIBOX®

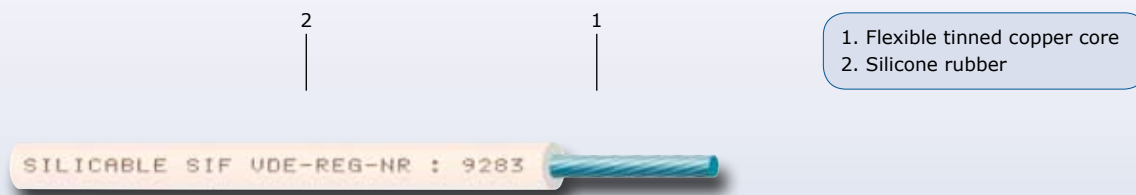
#### OPTIONS

Please consult OBA about these options.

- Nickel-plated copper core
- Pure nickel core
- Mechanical outer shielding:
  - in galvanized steel
  - in stainless steel

#### APPLICATIONS

- Wiring of domestic electrical heating appliances
- Rotating machines (class H)
- Urban lighting
- Industrial wiring in hot environments



CORE			INSULATED WIRE OR CABLE		
Nominal cross-section	Nominal stranding	Max. linear resistance at 20°C (red copper core)	Nominal thickness of insulating sheath	Nominal outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[mm]	[kg/km]
0.25	14 x 0.15 or 8 x 0.20	78.6	0.6	1.9	5.8
0.4	12 x 0.20	52.4	0.6	2	7.5
0.5	16 x 0.20	39	0.6	2.1	8.5
0.6	19 x 0.20	32.8	0.6	2.2	9.6
0.75	24 x 0.20	26	0.6	2.4	11.5
1	32 x 0.20	19.5	0.6	2.5	14.2
1.5	30 x 0.25	13.3	0.6	2.8	19.8
2.5	50 x 0.25	7.98	0.7	3.4	30.7
4	56 x 0.30	4.95	0.8	4.2	48
6	84 x 0.30	3.3	0.8	4.8	72.8
10	80 x 0.40	1.91	1.0	6.4	123
16	126 x 0.40	1.21	1.2	7.8	187
25	196 x 0.40	0.78	1.4	9.6	290
35	276 x 0.40	0.554	1.4	11	395
50	396 x 0.40	0.386	1.6	13.2	553
70	360 x 0.50	0.272	1.6	14.8	746
95	485 x 0.50	0.206	1.8	17.4	1006
120	608 x 0.50	0.161	1.8	19.4	1253
150	756 x 0.50	0.129	2.0	21.4	1563
185	944 x 0.50	0.106	2.2	23.9	1920
240	1221 x 0.50	0.080	2.2	26.4	2535
300	1525 x 0.50	0.064	2.4	29.9	3072
400	2037 x 0.50	0.049	2.6	34.2	4100

## Silicone Insulated Cables

### MC-ECS

Multi core silicone insulated cable with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: - 60°C to + 150°C, Peaks at + 230°C
- Good resistance to thermal shock
- Excellent ageing resistance
- Good resistance to the usual chemical atmospheres
- Halogen free cable
- Working voltage: up to 600/1000 V
- Test voltage: 2500 V

#### COLOUR

- Colour of insulated conductors: refer to table below
- Outer sheath: brick red, black, white
- Other colours: consult us

#### PACKAGING

- 100m Rolls, spools or drums

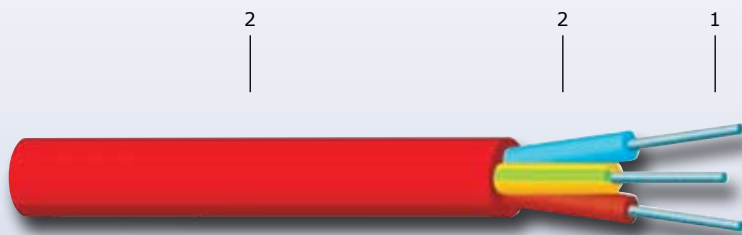
#### OPTIONS

Please consult OBA about these options.

- Red copper core
- Nickel-plated copper core
- Galvanized steel outer shielding
- Silicone-coated fibreglass outer braid
- Fibreglass braid and galvanized steel shielding

#### APPLICATIONS

- All wiring in hot environments up to 150°C
- Wiring in metal industry, glassworks, etc
- Wiring in furnaces, ovens, thermoplastics and rubber machines, welding sets, etc
- Lighting, floodlights, etc



1. Flexible tinned copper core
2. Silicone rubber

#### CONDUCTOR COLOUR CODING - IEC 446

Number	With earthing wire	Without earthing wire
2	-	brown - blue
3	green/yellow - brown - blue	black - brown - blue
4	green/yellow - black - brown - blue	black - brown - blue - grey or black
5	green/yellow - black - brown - blue - grey or black	black - brown - blue - 2 grey or black numbered
6	green/yellow - black - brown - blue - 2 grey or black numbered	black - brown - blue - 3 grey or black numbered
7	green/yellow - black - brown - blue - 3 grey or black numbered	black - brown - blue - 4 grey or black numbered
n	green/yellow - black - brown - blue - n-4 grey or black numbered	black - brown - blue - n-3 grey or black numbered

## Silicone Insulated with Reinforcing Braid Cables

### ECSP

Single core silicone insulated reinforcing Braid with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: - 60°C to + 180°C, Peaks at + 230°C
- Good resistance to thermal shock and UV
- Excellent ageing resistance.
- Good resistance to ozone and the corona effect
- Excellent mechanical strength
- Halogen free cable
- Bending radius  $\approx 5 \times$  Diameter
- Compatible with most impregnation varnishes.
- Working voltage:
  - cross-section  $<10 \text{ mm}^2$  450/750 V
  - cross-section  $<10 \text{ mm}^2$  600/1000 V
- Test voltage:
  - cross-section  $<10 \text{ mm}^2$  2500 V
  - cross-section  $<10 \text{ mm}^2$  3500 V

#### COLOUR

- 0.5 to 6  $\text{mm}^2$ : all colours
- 10 to 400  $\text{mm}^2$ : black other colours on request

#### PACKAGING

- 100m Rolls, spools or drums

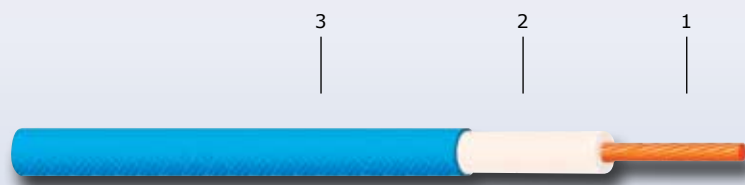
#### OPTIONS

Please consult OBA about these options.

- Extra-flexible cores
- Other cross-sections and flexibility classes: consult OBA

#### APPLICATIONS

- Wiring of rotating machines: motors, alternators, generators
- Wiring of static machines: transformers, inductors, inverters, choppers
- Shipbuilding and railway construction
- Power supply



1. Flexible tinned copper core
2. Silicone rubber
3. Coated synthetic reinforcing braid

#### CORE

#### INSULATED WIRE OR CABLE

Nominal cross-section [ $\text{mm}^2$ ]	Nominal stranding [Strands x $\varnothing$ mm]	Max. linear resistance at 20°C (red copper core) [ $\Omega/\text{km}$ ]	Nominal outer diameter [mm]	Approx. linear weight [kg/km]
0.25	8 x 0.20	78.6	1.8	5.30
0.5	16 x 0.20	39.0	2.0	8.00
0.75	24 x 0.20	26.0	2.2	10.9
1.0	32 x 0.20	19.5	2.3	13.4
1.5	30 x 0.25	13.3	2.7	19.8
2.5	50 x 0.25	7.98	3.4	30.7
4	56 x 0.30	4.95	4.2	48.0
6	84 x 0.30	3.30	5.2	73.0
10	80 x 0.40	1.91	7.0	129
16	126 x 0.40	1.21	8.6	198
25	196 x 0.40	0.78	10.4	295
35	276 x 0.40	0.554	11.9	399
50	396 x 0.40	0.386	14.1	562
70	360 x 0.50	0.272	15.9	759
95	485 x 0.50	0.206	18.2	1024
120	608 x 0.50	0.161	20.3	1275
150	756 x 0.50	0.129	22.8	1587
185	944 x 0.50	0.106	24.8	1952
240	1221 x 0.50	0.0801	28.8	2560
300	1525 x 0.50	0.0641	31.5	3095
400	2037 x 0.50	0.0486	35.4	5130

## Silicone Insulated with Reinforcing Braid Cables

### Silicoul 1.1 kV

Single core silicone insulated reinforcing braid with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: - 60°C to + 180°C, Peaks at + 230°C
- Good resistance to thermal shock and UV
- Excellent ageing resistance
- Good resistance to ozone and the corona effect
- Excellent mechanical strength
- Bending radius  $\approx 5 \times$  Diameter
- Lloyds approved
- Compatible with most impregnation varnishes
- Working voltage: 1.1 kV. Test voltage: 3.5 kV. Max permissible current: consult our technical departments

#### COLOUR

- All cross-sections: yellow

#### PACKAGING

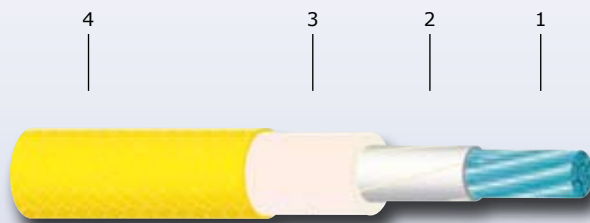
- 100m Rolls, spools or drums

#### OPTIONS

- UL/CSA approval: 1.1kV, style 3661
- Without reinforcing braid
- Other cross-sections: consult OBA

#### APPLICATIONS

- Wiring of rotating machines: motors, alternators, generators
- Wiring of static machines: transformers, inductors, inverters, choppers
- Shipbuilding and railway construction
- Power supply



1. Flexible tinned copper core
2. Separating tape
3. Silicone rubber
4. Coated synthetic reinforcing braid

CORE			INSULATED WIRE OR CABLE	
Nominal cross-section	Nominal stranding	Max. linear resistance at 20°C (red copper core)	Nominal outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[kg/km]
1.5	30 x 0.25	13.7	3.8	29.0
2.5	50 x 0.25	8.21	4.3	37.8
4	56 x 0.30	5.09	4.9	58.5
6	84 x 0.30	3.39	6.0	76.6
10	80 x 0.40	1.95	7.0	121
16	126 x 0.40	1.24	8.6	178
25	196 x 0.40	0.795	10.4	273
35	276 x 0.40	0.565	11.9	376
50	396 x 0.40	0.393	14.1	534
70	360 x 0.50	0.277	15.9	738
95	485 x 0.50	0.210	18.2	970
120	608 x 0.50	0.164	20.3	1220
150	756 x 0.50	0.132	22.8	1520
185	944 x 0.50	0.108	24.8	1850
240	1221 x 0.50	0.082	28.8	2420
300	1525 x 0.50	0.065	31.5	3095
400	2037 x 0.50	0.050	34.6	4130

## Silicone Insulated with Reinforcing Braid Cables

### Silicoul 3.7 kV

Single core silicone insulated reinforcing braid with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: -60°C to +180°C, Peaks at +230°C
- Good resistance to thermal shock and UV
- Excellent ageing resistance
- Good resistance to ozone and the corona effect
- Excellent mechanical strength
- Bending radius  $\approx 5 \times$  Diameter
- Lloyds approved
- Compatible with most impregnation varnishes
- Working voltage: 4.2 kV

#### COLOUR

- All cross-sections: brown

#### PACKAGING

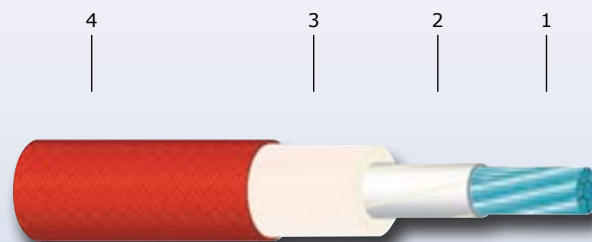
- 100m Rolls, spools or drums

#### OPTIONS

- UL/CSA approval: 4.2 kV, style 3662
- Without reinforcing braid
- Other cross-sections: consult OBA

#### APPLICATIONS

- Wiring of rotating machines: motors, alternators, generators
- Wiring of static machines: transformers, inductors, inverters, choppers
- Shipbuilding and railroad construction
- Power supply



1. Flexible tinned copper core
2. Separating tape
3. Silicone rubber
4. Coated synthetic reinforcing braid

CORE			INSULATED WIRE OR CABLE	
Nominal cross-section	Nominal stranding	Max. linear resistance at 20°C	Nominal outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[kg/km]
2.5	50 x 0.25	8.21	6.2	57
4	56 x 0.30	5.09	6.8	75
6	84 x 0.30	3.39	7.8	102
10	80 x 0.40	1.95	9.0	150
16	126 x 0.40	1.24	10.2	212
25	196 x 0.40	0.795	11.8	305
35	276 x 0.40	0.565	13.2	413
50	396 x 0.40	0.393	15.4	575
70	360 x 0.50	0.277	17.0	782
95	485 x 0.50	0.210	19.8	1030
120	608 x 0.50	0.164	21.8	1290
150	756 x 0.50	0.132	24.0	1580
185	944 x 0.50	0.108	25.4	1890
240	1221 x 0.50	0.082	29.2	2451
300	1525 x 0.50	0.065	31.8	3120
400	2037 x 0.50	0.050	35.8	4160

## Silicone Insulated with Reinforcing Braid Cables

### Silicoul 6.6 kV

Single core silicone insulated reinforcing Braid with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: -60°C to +180°C, Peaks at +230°C
- Good resistance to thermal shock and UV
- Excellent ageing resistance
- Good resistance to ozone and the corona effect
- Excellent mechanical strength
- Bending radius  $\approx 5 \times$  Diameter
- Lloyds approved
- Compatible with most impregnation varnishes
- Working voltage: 7.2 kV
- Test voltage: 15 kV
- Max. permissible current: consult OBA

#### COLOUR

- All cross-sections: grey

#### PACKAGING

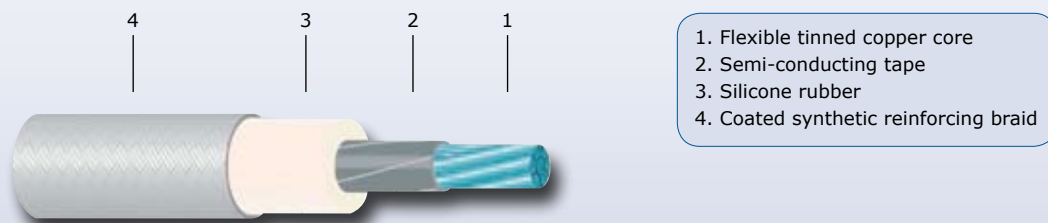
- 100m Rolls, spools or drums

#### OPTIONS

- UL/CSA approval: 7.2 kV, style 3663
- Without reinforcing braid
- Other cross-sections: consult OBA

#### APPLICATIONS

- Wiring of rotating machines: motors, alternators, generators
- Wiring of static motors: transformers, inductors, inverters, choppers
- Shipbuilding and railway construction
- Power supply



1. Flexible tinned copper core
2. Semi-conducting tape
3. Silicone rubber
4. Coated synthetic reinforcing braid

CORE			INSULATED WIRE OR CABLE	
Nominal cross-section	Nominal stranding	Max. linear resistance at 20°C (red copper core)	Nominal outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[kg/km]
4	56 x 0.30	5.09	8.2	95
6	84 x 0.30	3.39	9.1	120
10	80 x 0.40	1.95	10.3	172
16	126 x 0.40	1.24	11.5	238
25	196 x 0.40	0.795	13.0	330
35	276 x 0.40	0.565	14.6	440
50	396 x 0.40	0.393	16.7	612
70	360 x 0.50	0.277	18.3	825
95	485 x 0.50	0.210	20.5	1060
120	608 x 0.50	0.164	22.6	1315
150	756 x 0.50	0.132	24.9	1630
185	944 x 0.50	0.108	26.4	1935
240	1221 x 0.50	0.082	30.2	2510
300	1525 x 0.50	0.065	32.9	3180
400	2037 x 0.50	0.050	37.0	4210

## Silicone Insulated with Reinforcing Braid Cables

### Silicoul 13.8 kV

Single core silicone insulated reinforcing braid with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: - 60°C to + 180°C, Peaks at + 230°C
- Good resistance to thermal shock and UV
- Excellent ageing resistance
- Good resistance to ozone and the corona effect
- Excellent mechanical strength
- Bending radius  $\approx 5 \times$  Diameter
- Lloyds approved
- Compatible with most impregnation varnishes
- Working voltage: 15 kV
- Test voltage: 30 kV
- Max. permissible current: consult OBA

#### COLOUR

- All cross-sections: black

#### PACKAGING

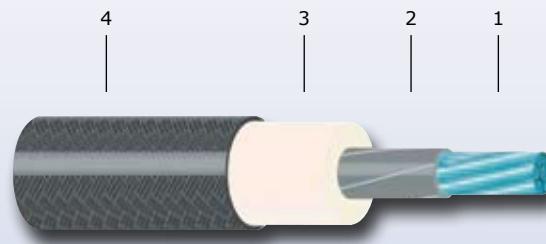
- 100m Rolls, spools or drums

#### OPTIONS

- UL/CSA approval: 15 kV, style 3664
- Without reinforcing braid
- Other cross-sections: consult OBA

#### APPLICATIONS

- Wiring of rotating machines: motors, alternators, generators
- Wiring of static machines: transformers, inductors, inverters, choppers
- Shipbuilding and railway construction
- Power supply



1. Flexible tinned copper core
2. Semi-conducting tape
3. Silicone rubber
4. Coated synthetic reinforcing braid

#### CORE

Nominal cross-section	Nominal stranding	Max. linear resistance at 20°C (red copper core)	Nominal outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[kg/km]
6	84 x 0.30	3.39	11.8	175
10	80 x 0.40	1.95	13.0	232
16	126 x 0.40	1.24	14.2	303
25	196 x 0.40	0.795	15.7	407
35	276 x 0.40	0.565	17.2	522
50	396 x 0.40	0.393	18.9	690
70	360 x 0.50	0.277	20.7	907
95	485 x 0.50	0.210	22.7	1160
120	608 x 0.50	0.164	24.7	1415
150	756 x 0.50	0.132	27.4	1758
185	944 x 0.50	0.108	28.9	2050
240	1221 x 0.50	0.082	32.7	2660
300	1525 x 0.50	0.065	35.3	3330
400	2037 x 0.50	0.050	39.6	4360

#### INSULATED WIRE OR CABLE

## Halogen Free Polyolefin Elastomer Insulated Cables

### Varpren F

Single core halogen free polyolefin elastomer insulated cable with a tinned copper conductor.

#### GENERAL INFORMATION

- Working temperature: -50°C to +155°C, Peak temperature: +170°C
- Good compatibility with class F varnishes
- Good resistance to atmospheric agents: UV, Ozone, Oxygen
- Excellent tearing resistance
- Halogen free polyolefin elastomer
- Bending radius  $\approx 5 \times$  Diameter
- Nominal voltage: 600/1000 V
- Test voltage: 2500 V

#### PACKAGING

- 100m Rolls, spools or drums

#### APPLICATIONS

- Electrical motor applications
- Rotating and static machines
- Lighting
- Power supplies, electrotechnical equipment
- Shipbuilding and railways construction



1. Tinned copper core
2. Halogen free polyolefin elastomer. Good compatibility with class F varnishes.

CORE			ISOLATION / INSULATION		
Nominal Cross-section	Nominal Stranding	Core resistance (20 °C)	Wall thickness	Nominal Outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[Ø mm]	[kg/km]
0.25	8 x 0.20	80.2	0.6	1.95	4
0.50	16 x 0.20	40.1	0.6	2.2	9
0.75	24 x 0.20	26.7	0.6	2.4	12
1.0	32 x 0.20	20.0	0.6	2.5	14
1.5	30 x 0.25	13.7	0.6	3.0	21
2.5	50 x 0.25	8.21	0.7	3.6	31
4	56 x 0.30	5.09	0.8	4.3	47
6	84 x 0.30	3.39	0.8	4.9	73
10	80 x 0.40	1.95	1.0	6.6	125
16	126 x 0.40	1.24	1.0	7.7	185
25	196 x 0.40	0.795	1.2	9.6	280
35	276 x 0.40	0.565	1.2	10.7	370
50	396 x 0.40	0.393	1.4	12.6	540
70	360 x 0.50	0.277	1.4	14.9	730
95	485 x 0.50	0.210	1.6	17.2	990
120	608 x 0.50	0.164	1.6	-	1250
150	756 x 0.50	0.132	1.8	-	1650
185	944 x 0.50	0.108	2.0	-	1750

## Halogen Free Polyolefin Elastomer Insulated Cables

### Varpren MVA

Multi core halogen free polyolefin elastomer insulated cable with a tinned copper conductor.

#### GENERAL INFORMATION

- Working temperature: -50°C to +150°C  
Peak temperature: +170°C
- Adequate resistance to thermal shocks
- Good ageing in hot environments
- Good resistance to atmospheric agents: UV, Ozone, Oxygen
- Excellent tearing resistance
- Halogen free cable
- Fire retardant
- Bending radius  $\approx 10 \times$  Diameter
- Nominal voltage: 600/1000 V
- Test voltage: 2500 V

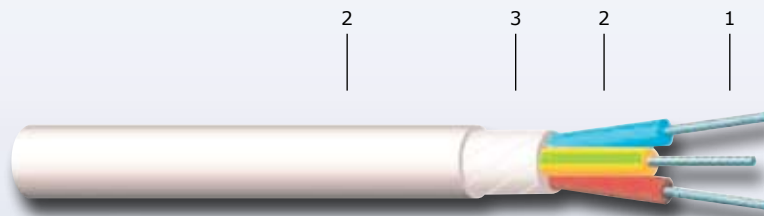
#### PACKAGING

- 100m Rolls, spools or drums

#### APPLICATIONS

- Electrical motor applications
- Rotating and static machines
- Lighting
- Power supplies, electrotechnical equipment
- Shipbuilding and railways construction

NB: MVA cables can be made to order in 2 to 5 cores in sizes up to 2.5 mm<sup>2</sup>



1. Flexible tinned copper core
2. Halogen free polyolefin elastomer
3. Separating tape

#### CORE

#### INSULATION

Nominal Cross-section [mm <sup>2</sup> ]	Nominal Stranding [Strands x Ømm]	Core resistance (20 °C) [Ω/km]	Wall thickness [mm]	Nominal Outer diameter [Ø mm]
2 x 0.5	16 x 0.20	40.1	0.7	6.7
3 x 0.5	16 x 0.20	40.1	0.7	7.1
4 x 0.5	16 x 0.20	40.1	0.8	7.8
5 x 0.5	16 x 0.20	40.1	0.8	8.4
2 x 0.75	24 x 0.20	26.7	0.8	7.2
3 x 0.75	24 x 0.20	40.1	0.8	7.7
4 x 0.75	24 x 0.20	40.1	0.9	8.5
5 x 0.75	24 x 0.20	40.1	1.0	9.3
2 x 1.0	32 x 0.20	20.0	0.8	7.5
3 x 1.0	32 x 0.20	20.0	0.9	8.1
4 x 1.0	32 x 0.20	20.0	0.9	8.7
5 x 1.0	32 x 0.20	20.0	1.0	9.7
2 x 1.5	30 x 0.25	13.7	1.0	8.9
3 x 1.5	30 x 0.25	13.7	1.0	9.3
4 x 1.5	30 x 0.25	13.7	1.0	10.1
5 x 1.5	30 x 0.25	13.7	1.0	11.0
2 x 2.5	50 x 0.25	8.21	1.0	9.9
3 x 2.5	50 x 0.25	8.21	1.0	10.5
4 x 2.5	50 x 0.25	8.21	1.0	11.6
5 x 2.5	50 x 0.25	8.21	1.0	12.8

## Composite Insulated Cables

### NVS and NVSL

Single core glass covered insulated cable with pure nickel conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: -60°C to + 350°C, Peaks at + 400°C
- Good resistance to thermal shock
- Excellent ageing resistance
- Good resistance to the usual chemical atmospheres
- Working voltage: 300/500 V
- Test voltage: 2000 V

#### COLOUR

- Standard colour: brown.
- All plain colours or with coloured spiral tracers on request, including green/yellow

#### PACKAGING

- 100m Rolls, spools or drums

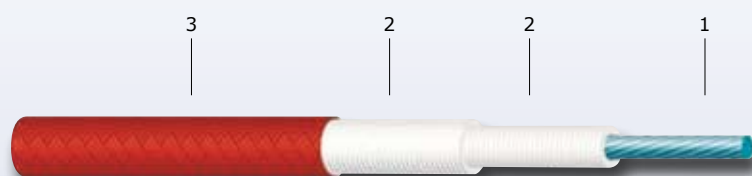
#### OPTIONS

Please consult OBA about these options.

- Teflon-coated (Teflon® PTFE varnish) fibreglass
- braid
- Multi-conductor assemblies
  - under silicone-coated fibreglass braid
  - under galvanized steel shielding braid
- Other cross-sections and flexibility classes: consult OBA

#### APPLICATIONS

- Wiring of heating elements, cartridges, bands and hot plates
- Domestic electrical heating appliances, professional kitchens and ovens
- Machines for thermoplastics and rubber, etc
- Furnaces and industrial ovens



1. Flexible nickel core
2. Silicone-impregnated glass lappings
3. Silicone-coated fibreglass braid

CORE			INSULATED WIRE OR CABLE	
Nominal cross-section	Nominal stranding	Max. linear resistance at 20°C (red copper core)	Nominal outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[kg/km]
<b>SILICABLE® NVS</b>				
0.25	4 x 0.30	351	1.9	6.5
0.50	7 x 0.30	178	2.1	8.7
0.75	11 x 0.30	114	2.4	12
1.0	14 x 0.30	91.0	2.5	15
1.5	21 x 0.30	61.0	2.8	21
2.5	35 x 0.30	36.5	3.2	32
4	56 x 0.30	23.8	4.3	50
6	84 x 0.30	15.1	4.8	72
10	140 x 0.30	8.7	6.8	131
16	228 x 0.30	5.8	8.2	206
25	354 x 0.30	3.6	10.1	323
35	495 x 0.30	2.6	12.0	423
50	707 x 0.30	1.9	13.2	591
<b>SILICABLE® NVSL (reduced outer diameters)</b>				
0.22	7 x 0.20	395	1.2 ± 0.15	5.4
0.25	8 x 0.20	351	1.3 ± 0.15	6.0
0.34	11 x 0.20	257	1.4 ± 0.15	7.7
0.5	7 x 0.30 or 16 x 0.20	178	1.6 ± 0.15	8.5
0.6	9 x 0.30 or 19 x 0.20	140	1.7 ± 0.15	9.5
0.75	11 x 0.30 or 24 x 0.20	115	1.8 ± 0.20	12
1.0	14 x 0.30 or 32 x 0.20	91	2.1 ± 0.20	14
1.5	21 x 0.30	61	2.5 ± 0.20	20
2.0	28 x 0.30	46	2.9 ± 0.20	26
2.5	35 x 0.30	36.5	3.1 ± 0.25	32
4.0	56 x 0.30	23.8	3.6 ± 0.30	49

## Composite Insulated Cables

### BM-NVS

Multicore glass covered insulated cable with pure nickel conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: - 60°C to + 350°C, Peaks at + 400°C
- Good resistance to thermal shock
- Excellent ageing resistance
- Working voltage: 300/500 V
- Test voltage: 2000 V

#### COLOUR

- Colour-coding of insulated conductors (main products):
  - 3: Brown - Blue - Green/Yellow (earthing wire)
  - 4: Black - Brown - Blue - Green/Yellow (earthing wire)
  - 5: Black - Black - Brown - Blue - Green/Yellow (earthing wire)
- Outer braid with or without coloured spiral tracers

#### PACKAGING

- 100m Rolls

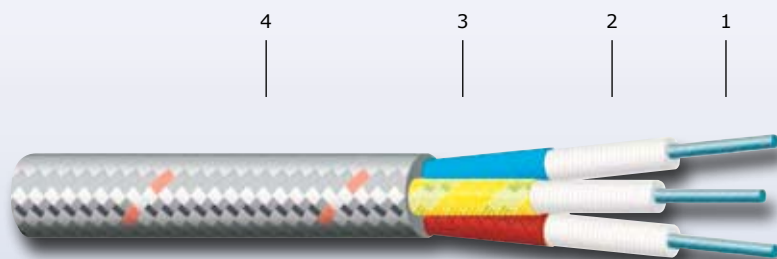
#### OPTIONS

Please consult OBA about these options.

- Earthing wire in nickel-plated copper
- All conductors in nickel-plated copper
- Outer braid in stainless steel
- Other cross-sections and conductor number: consult OBA

#### APPLICATIONS

- Wiring of resistance, cartridges, hot-plates and heater bands



1. Flexible nickel core
2. Silicone-impregnated glass lappings
3. Braid in silicone-coated fibreglass
4. Braid in galvanised steel

#### INSULATED CONDUCTORS

#### CABLE

Nominal cross-section [mm <sup>2</sup> ]	Nominal stranding [Strands x Ømm]	Approx. outer diameter [mm]	Approx. outer diameter [mm]	Approx. linear weight [kg/km]
3 x 0.75	11 x 0.30	2.4	6.4	81.0
4 x 0.75	11 x 0.30	2.4	7.0	98.0
5 x 0.75	11 x 0.30	2.4	7.4	116
3 x 1.0	14 x 0.30	2.5	6.7	96.0
4 x 1.0	14 x 0.30	2.5	7.3	114
5 x 1.0	14 x 0.30	2.5	7.8	132
3 x 1.5	21 x 0.30	2.8	7.2	117
4 x 1.5	21 x 0.30	2.8	7.6	140
5 x 1.5	21 x 0.30	2.8	9.0	169
3 x 2.5	35 x 0.30	3.2	8.2	157
4 x 2.5	35 x 0.30	3.2	9.6	199
5 x 2.5	35 x 0.30	3.2	10.8	239
3 x 4	56 x 0.30	4.3	10.6	228
4 x 4	56 x 0.30	4.3	11.6	286
5 x 4	56 x 0.30	4.3	13.2	346
3 x 6	84 x 0.30	4.8	11.7	303
4 x 6	84 x 0.30	4.8	12.7	380
5 x 6	84 x 0.30	4.8	13.8	462
3 x 10	140 x 0.30	6.6	17.0	517
4 x 10	140 x 0.30	6.6	19.2	664
5 x 10	140 x 0.30	6.6	23.0	824

## Composite Insulated Cables

### NVAS

#### Single core mineral fibre insulated cable with pure nickel conductor

#### GENERAL INFORMATION

- Continuous working temperatures: - 60°C to + 450°C, Peaks at + 550°C
- Excellent resistance to thermal shock
- Excellent ageing resistance
- Good resistance to the usual chemical atmospheres
- Lloyds approved
- Working voltage: 300/500 V
- Test voltage: 2000 V

#### COLOUR

- Standard colour: grey
- Any colour on request, including green/yellow

#### PACKAGING

- 100m Rolls, spools or drums

#### OPTIONS

Please consult OBA about these options.

- Multiconductor assemblies
  - under a braided mineral fibre sheath
  - under a stainless steel shielding braid
- Other cross-sections and flexibility classes: consult us
- Very high temperature fibreglass insulating sheath: (outer diameters identical to type NVS)

#### APPLICATIONS

- Wiring of heating elements, cartridges, bands and hot plates
- Wiring of domestic electrical heating appliances, professional kitchens and ovens
- Machines for thermoplastics and rubber, etc
- Furnaces and industrial ovens
- Heavy industry: foundries, steelworks, glassworks, etc



1. Flexible nickel core
2. Several silicone-impregnated glass lappings
3. Silicone-coated mineral fibre braid

CORE			INSULATED WIRE OR CABLE	
Nominal cross-section	Nominal stranding	Max. linear resistance at 20°C (nickel core)	Nominal outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[kg/km]
0.25	4 x 0.30	351	2.2	6.5
0.50	7 x 0.30	178	2.5	8.7
0.75	11 x 0.30	114	2.7	12
1.0	14 x 0.30	91	3.2	15
1.5	21 x 0.30	61	3.4	21
2.5	35 x 0.30	36.5	4.0	32
4	56 x 0.30	23.8	4.5	50
6	84 x 0.30	15.1	5.3	72
10	140 x 0.30	8.7	8.0	130
16	228 x 0.30	5.8	9.0	206
25	354 x 0.30	3.6	10.6	323
35	495 x 0.30	2.6	13.4	423
50	707 x 0.30	1.9	14.0	590

## Composite Insulated Cables

### TPT

Freon-resistant Single core glass covered cable with copper conductor

#### GENERAL INFORMATION

- Continuous working temperatures: + 125°C (Class B)
- Excellent resistance to freon R12, R22, R134a, R502 and refrigerating fluids
- Excellent resistance to alcohols and solvents
- Working voltage: 600 V. Test voltage: 2500 V

#### COLOUR

- Plain white or white with coloured spiral tracers

#### PACKAGING

- 100m Rolls, spools or drums

#### OPTIONS

- Other cross-sections or flexibility classes: consult us

#### APPLICATIONS

- Internal wiring of sealed motor units



1. Flexible red copper core
2. Uncoated braid in high tenacity, thermally stabilised PET polyester
3. Polyester film

#### CORE

Nominal cross-section	Nominal stranding	Max. linear resistance at 20°C (red copper core)	Nominal outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[Ω/km]	[mm]	[kg/km]
0.75	42 x 0.15	26.0	1.8	8.8
1.0	32 x 0.20	19.5	1.9	11
1.5	30 x 0.25	13.3	2.3	17
2.5	50 x 0.25	7.98	2.8	29
4	56 x 0.30	4.95	3.2	44
6	84 x 0.30	3.30	3.8	65
10	80 x 0.40	1.91	6.5	116
16	126 x 0.40	1.21	7.5	181
25	196 x 0.40	0.78	8.8	280
35	276 x 0.40	0.55	10.1	385
50	396 x 0.40	0.39	11.6	550

#### INSULATED WIRE OR CABLE

## Ignition wires

### HT

Single core silicone insulated cable with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: - 60°C to + 180°C, Peaks at + 230°C
- Good resistance to thermal shock, excellent resistance to ageing
- Good resistance to humidity
- Excellent resistance to ozone and the corona effect
- Does not spread flame or fire
- Pulsed voltage: from 5 to 50 kV
- ECS-HT-VDE: working voltage 1.8/3 kV

#### COLOUR

- Main products: refer to table
- Colour of silicone insulator: brick red, white, black or translucent. Other colours: consult us

#### OPTIONS

- Teflon insulated cables
- Longitudinal marking on silicone insulator: consult OBA

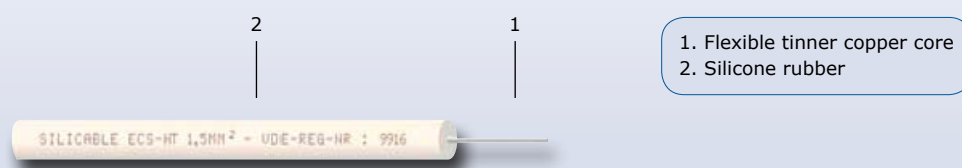
- Pure nickel or nickel-plated copper conductor: consult OBA
- Other cross-sections and flexibility classes: consult OBA
- Applications requiring design of a specific cable: consult OBA

#### PACKAGING

- 100m Rolls, spools, drums or SILIBOX®

#### APPLICATIONS

- Ignition circuits, creation of electric arc
- Piezo-electrics of domestic electrical appliances
- Gas or fuel burners in boilers, and professional appliances
- Neon electric signs
- Burners in corrosive environments, near flames, molten glass or metal



CORE			INSULATED WIRE		
Application Code	Nominal cross-section [mm <sup>2</sup> ]	Nominal stranding [Strands x Ømm]	Max. linear resistance at 20°C (tinned copper core) [Ω/km]	Thickness of silicone insulating sheath [mm]	Nominal outer diameter [mm]
(E)CS-HT	0.25	8 x 0.20	80.9	1.15	3.0
	0.34	7 x 0.25	59.2	1.10	3.0
	0.5	16 x 0.20	40.1	1.00	3.0
	1.0	32 x 0.20	20.0	2.45	6.2
	1.5	30 x 0.25	13.7	3.20	8.0
	2.5	50 x 0.25	8.21	3.45	9.0
	4	56 x 0.30	5.09	3.70	10
ECS-HT-VDE	1.0	32 x 0.20	20.0	1.30	3.9
	1.5	30 x 0.25	13.7	1.30	4.2
(E)CSV-HT or (E)CSVRI-HT	0.34	7 x 0.25	59.2	0.90	3.0
	0.5	16 x 0.20	40.1	0.90	3.1
(E)CSVCS-HT	1.34	19 x 0.30	15.0	2.75	7.0
	1.5	30 x 0.25	13.7	2.85	7.3
CSABI-HT	1.5	30 x 0.25	13.7	3.20	10
	2.5	50 x 0.25	8.21	3.50	11
	4	56 x 0.30	5.09	3.70	12

## Extruded Fluorinated Insulation

### EETFE

Single core fluoro polymer insulated cable with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: -90°C to +155°C, Peaks at +180°C
- Excellent resistance to aggressive chemical atmospheres
- Excellent resistance to humidity and UV
- Excellent mechanical strength
- Working voltage: 450/750 V
- Test voltage: 2500 V

#### COLOUR

- All colours, including translucent

#### PACKAGING

- 100m Rolls, spools, drums or SILIBOX®

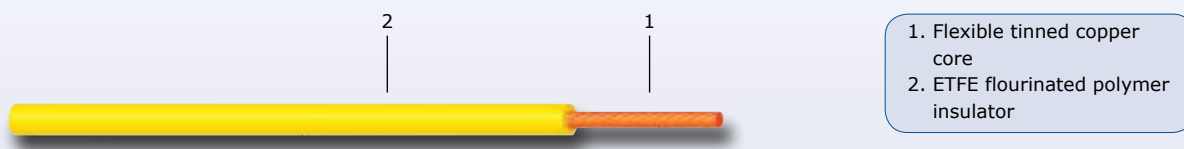
#### OPTIONS

Please consult OBA about these options.

- Nickel-plated copper core
- Silver-plated copper core
- Pure nickel core
- Cross-sections up to 240 mm<sup>2</sup>: consult OBA
- Other flexibility classes: consult OBA

#### APPLICATIONS

- Wiring of rotating machines, class F
- Wiring in household appliances, electronics
- Wiring in hot or cold environments (cryogenics)
- Wiring in aggressive atmospheres (humid, chemical, etc.)
- Wiring that requires compact fitting and excellent mechanical strength



#### CORE

#### INSULATED WIRE OR CABLE

Nominal cross-section	Nominal stranding	Nominal diameter	Max. linear resistance at 20 °C (red copper wire)	Nominal insulation thickness	Outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[mm]	[Ω/km]	[mm]	[mm]	[kg/km]
0.05	7 x 0.10	0.30	373	0.17	0.65	0.90
0.12	7 x 0.15	0.45	161	0.17	0.80	1.70
0.15	19 x 0.10	0.50	136	0.20	0.90	2.1
0.22	7 x 0.20	0.60	89.9	0.20	1.00	2.8
0.25	19 x 0.13	0.65	79.9	0.20	1.05	3.2
0.34	7 x 0.25	0.75	58.9	0.20	1.15	4.1
0.34	19 x 0.15	0.75	58.9	0.20	1.15	4.1
0.50	7 x 0.30	0.90	39.6	0.20	1.30	5.7
0.50	16 x 0.20	0.90	39.0	0.20	1.30	5.7
0.60	19 x 0.20	1.00	32.8	0.20	1.40	6.7
0.75	24 x 0.20	1.05	26.0	0.20	1.45	7.8
0.93	19 x 0.25	1.25	21.0	0.25	1.70	10
1.00	32 x 0.20	1.20	19.5	0.25	1.70	11
1.34	19 x 0.30	1.40	14.6	0.25	1.90	14
1.50	30 x 0.25	1.45	13.3	0.30	1.95	15
2.5	50 x 0.25	1.90	7.98	0.30	2.50	26
4.0	56 x 0.30	2.55	4.95	0.30	3.30	41
6.0	84 x 0.30	3.10	3.30	0.35	3.90	62
10	80 x 0.40	4.40	1.91	0.40	5.20	100
16	126 x 0.40	5.40	1.21	0.40	6.20	157

## Extruded Fluorinated Insulation

### EPFA

Single core fluoro polymer insulated cable with tinned copper conductor.

#### GENERAL INFORMATION

- Continuous working temperatures: -90°C to +260°C, Peaks at +280°C
- Excellent resistance to aggressive chemical atmospheres
- Excellent resistance to humidity and UV
- Excellent mechanical strength
- Working voltage: 450/750 V
- Test voltage: 2500 V

#### COLOUR

- All colours, including translucent

#### PACKAGING

- 100m Rolls, spools, drums or SILIBOX®

#### OPTIONS

Please consult OBA about these options.

- Nickel-plated copper core
- Silver-plated copper core
- Pure nickel core
- MFA fluorinated polymer insulator (- 90°C to + 240°C)
- Cross-sections up to 240 mm<sup>2</sup>: consult OBA
- Other flexibility classes: consult OBA

#### APPLICATIONS

- Wiring in household appliances, electronics
- Wiring in hot and cold environments (cryogenics)
- Wiring in aggressive environments (humid, chemical, etc.)
- Wiring that requires compact fitting and excellent mechanical strength



1. Flexible tinned copper core
2. PFA fluorinated polymer insulator

CORE				INSULATED WIRE OR CABLE		
Nominal cross-section	Nominal stranding	Nominal diameter	Max. linear resistance at 20 °C (red copper wire)	Nominal insulation thickness	Outer diameter	Approx. linear weight
[mm <sup>2</sup> ]	[Strands x Ømm]	[mm]	[Ω/km]	[mm]	[mm]	[kg/km]
0.05	7 x 0.10	0.30	373	0.17	0.65	1.0
0.12	7 x 0.15	0.45	161	0.17	0.80	1.8
0.15	19 x 0.10	0.50	136	0.20	0.90	2.3
0.22	7 x 0.20	0.60	89.9	0.20	1.00	3.0
0.25	19 x 0.13	0.65	79.9	0.20	1.05	3.4
0.34	7 x 0.25	0.75	58.9	0.20	1.15	4.3
0.34	19 x 0.15	0.75	58.9	0.20	1.15	4.3
0.50	7 x 0.30	0.90	39.6	0.20	1.30	6.0
0.50	16 x 0.20	0.90	39.0	0.20	1.30	6.0
0.60	19 x 0.20	1.00	32.8	0.20	1.40	7.0
0.75	24 x 0.20	1.05	26.0	0.20	1.45	8.0
0.93	19 x 0.25	1.25	21.0	0.25	1.70	10
1.00	32 x 0.20	1.20	19.5	0.25	1.70	11
1.34	19 x 0.30	1.40	14.6	0.25	1.90	14
1.5	30 x 0.25	1.45	13.3	0.30	1.95	16
2.5	50 x 0.25	1.90	7.98	0.30	2.50	26
4	56 x 0.30	2.55	4.95	0.30	3.30	42
6	84 x 0.30	3.10	3.30	0.35	3.90	64
10	80 x 0.40	4.40	1.91	0.40	5.20	103
16	126 x 0.40	5.40	1.21	0.40	6.20	159

## Measurement & Pyrometry Cables

### Thermocouple cables (COUPLIX)

#### GENERAL INFORMATION

**Thermoelectric effect (Seebeck):** The thermoelectric effect consists of the production of an electromotive force (emf) created by the temperature difference between two different metal or alloy junctions making up the same circuit.

**Thermocouple:** A thermoelectric couple is formed by a pair of conductors of different types connected at their ends, to provide a complete circuit that can be used for measuring temperature by thermoelectric effect.

**Extension Cables:** Extension cables are manufactured with wires of the same composition as the wires of the corresponding couples. They are coded with the letter "X" placed after the thermocouple code, for example "JX".

**Compensation Cables:** Compensation cables are manufactured with wires of different stranding or material to the wires of the corresponding thermocouples. They are marked by the letter "C" placed after the thermocouple

code, for example "KC". Different alloys can be used for the same type of thermocouple.

Note: All stocked thermocouple cables are supplied in A.N.S.I. colour code.

#### OPTIONS

- Other cross-sections and stranding: consult OBA
- Other insulation: consult OBA
- Multipair cables, with or without individual screen with or without general screen: consult OBA
- Imposed maximum outer diameters: consult OBA
- Hybrid cables: consult OBA

#### APPLICATIONS

Anywhere to measure heat



Example of:  
Couplix Thermocouple Type K  
ANSI Configuration

	No. of Pairs	Nominal Cross Section [mm <sup>2</sup> ]	Insulation		Continuous working temperature of insulation	Sheath Colour
			Conductor	Sheath		
<b>Type J Single Pair</b>						
J-BIMV-VS	1	0.22	Fibreglass	Fibreglass/Stainless Steel Braid	-60°C to + 400°C	Stainless Steel
J-M5-5	1	0.22	PFA	PFA	-190°C to +260°C	Brown
J-MV-VS	1	0.22	Fibreglass	Fibreglass	-60°C to +400°C	Brown
<b>Type J Single Pair Extension</b>						
JX1-MY2-Y2	1	0.22	PVC 105C	PVC 105C	-30°C to +105°C	Black
<b>Type K Single Pair</b>						
K-BIM5-5	1	0.22	PFA	PFA/S.Steel Braid	-60°C to +260°C	Stainless Steel
K-BIMV-VS	1	0.22	Fibreglass	Fibreglass/ S.Steel Braid	-60°C to +400°C	Stainless Steel
K-M5-5	1	0.22	PFA	PFA	-190°C to +260°C	Brown
K-MV-VS	1	0.22	Fibreglass	Fibreglass	-60°C to +400°C	Brown
<b>Type K Single Pair Extension</b>						
KX1-MY2-Y2	1	0.22	PVC 105C	PVC 105C	-30°C to +105°C	Yellow
<b>Type T Single Pair</b>						
T-M5-5	1	0.22	PFA	PFA	-190°C to +260°C	Brown
<b>Type K Multi Pair Extension (Overall screened plus drain wire)</b>						
KX1-MY2BAL-M-Y2	1	0.22	PVC 105C	PVC 105C	-30C to +105C	Yellow
KX1-MY2BAL-M-Y2	4	0.22	PVC 105C	PVC 105C	-30C to +105C	Yellow
KX1-MY2BAL-M-Y2	6	0.22	PVC 105C	PVC 105C	-30C to +105C	Yellow
KX1-MY2BAL-M-Y2	8	0.22	PVC 105C	PVC 105C	-30C to +105C	Yellow
KX1-MY2BAL-M-Y2	12	0.22	PVC 105C	PVC 105C	-30C to +105C	Yellow
KX1-MY2BAL-M-Y2	24	0.22	PVC 105C	PVC 105C	-30C to +105C	Yellow

Other types and conductor configurations can be made to order

## Measurement & Pyrometry Cables

### RTD Cables (SONDIX)

#### Platinum resistance temperature detector connection cables

##### GENERAL INFORMATION

- The electrical resistance of a metal conductor increases with temperature
- This variation is reversible
- Platinum is the metal most often used

##### COLOUR

- Cables with 2, 3 or 4 conductors
- Other number of conductors on request
- Colour-coding:
  - 2 conductors: red/white
  - 3 conductors: red/red/white
  - 4 conductors: red/red/white/white
- Standard colour of silicone sheaths: grey
- Standard colour of FEP or PFA sheaths: white
- Standard colour of outer fibreglass sheaths: white
- Other colours on request
- Types of core: red, tinned, silver-plated or nickel-plated copper
- Outer diameters: consult OBA

##### OPTIONS

- Other number of conductors: consult OBA
- Other cross-sections and conductor metals: consult OBA
- High-performance insulation, for temperatures up to 850°C and above: consult OBA
- Parallel assembly, flat cables: consult OBA

##### APPLICATIONS

- Cabling for platinum resistance temperature detectors

##### PACKAGING

- Other types and conductor configurations can be made to order These cables are available in other pack sizes in multiples of 100m



Example of:  
Sondix RTD Cable

Nominal Cross Section [mm <sup>2</sup> ]	No. of Cores	Insulation Type	Insulation		Continuous working temperature of insulation	Sheath Colour	Pack Size
			Insulation Conductor	Sheath			
0.22	3	M5BAL-E5	PFA	PFA	-190°C to +260°C	White	500m
0.22	4	M5BAL-E5	PFA	PFA	-190°C to +260°C	White	500m
0.22	6	M5BAL-E5	PFA	PFA	-190°C to +260°C	White	500m

## Technical References

### Glossary

**Assembly (or twist)** An assembly of one or more insulated conductors, usually twisted together, in one or more layers. The assembly pitch defines the length, along the cable axis, of a full turn of the twist formed by one of the assembly conductors

**Bedding** A layer of material applied under the shielding.

**Core (or conductor)** The core is the part of the cable whose function is to conduct the current.

- *Core shape*: cores are generally circular, and compacted or not, but may also be sectoral.
- *Solid core (class 1 – IEC 228)*: a circular or sectoral core made up of a single wire. The term <rigid core> is also used.
- *Wired core (class 2 – IEC 228)*: a circular or sectoral core made up of a group of individual wires usually twisted together. The term <semi-rigid core> is also used.
- *Flexible core (class 5 – IEC 228)*: a circular core comprising an assembly of thin-wire strands or simple strands.
- *Extra flexible core (class 6 – IEC 228)*: a circular core comprising an assembly of very fine wires in strands or simple strands.
- *Strand*: a twisted assembly of wires, geometrically arranged, in one or more distinct layers.
- *Simple strand*: a twisted assembly of wires in which the strands have no set position.
- *Compound strand*: a geometric assembly of one or more strands, arranged in one or more layers.
- *Theoretical cross-section*: obtained by the following formula, where n is the number of wires forming the core, and the D the diameter of the wires:

$$S = n \times \frac{\pi D^2}{4}$$

- *Nominal cross-section*: the conventional value of the core cross-section.

**Filler** Material used to fill the gaps between components of an assembly.

**Inner sheath** A continuous tube of non-metallic, usually extruded material (elastomer or thermoplastic), which covers the screen or conductor assembly and any filler used.

**Insulated conductor** The core, sheath and any other components (screen, separator, etc.) considered together.

**Insulating sheath (or insulator)** A layer in one or more parts, which insulates the core electrically from the outside.

- *Extruded insulator*: an elastomer- or thermoplastic-based insulator, forming a continuous, consistent and homogeneous layer.
- *Composite insulator*: an insulator based on synthetic or mineral fibres or tapes which are lapped, braided, woven or taped round the core, then treated, coated, varnished or left in their natural state.

**Mechanical shielding** A layer comprising metal tapes, or circular rolled metal wires, designed to protect the cable from external mechanical effects. The shielding may be on the outside of the cable.

**Outer sheath (or covering)** A continuous, consistent tubular layer of non-metallic material (elastomer or thermoplastic), usually extruded, which is applied to the outside of the cable and provides external protection. The outer sheath must be adapted to the cable's immediate environment (humidity, water, fire, oils, solvents, miscellaneous chemicals, harsh climatic conditions, UV rays, X-rays, etc.).

**Screen** A conducting layer (metallic or non-metallic) made up of metal tapes, usually in aluminium or copper, metal braids, usually in copper, or special conducting polymers. Their function is to insulate the conductor or cable from external electromagnetic fields liable to disrupt their operation.

**Separator** A film between two components of a conductor or cable, to prevent harmful interaction between them or make them easier to separate. It can also be used to make cable manufacturing easier.

### Choosing a high temperature cable

To ensure reliable long-term performance, it is important to choose the right high temperature wire or cable. Relying on past experience is often useful but can also be dangerous, as operating constraints are often complex. It is therefore necessary to have full details of the environmental conditions of the application. The list below, although not exhaustive, outlines the main problems posed by most applications.

**Cryogenic temperatures** at low temperature, most insulators become friable and lose their flexibility. They may then crumble or break. Only fluorinated and polyimide insulators keep their mechanical properties at cryogenic temperatures.

**Exposure to hydrocarbons, solvents, acids, etc.** numerous materials can be damaged by these types of product or other chemicals in general. Other materials, such as fluorinated polymers, are naturally more resistant, and can be used as a protective layer or coating.

**Flame/Fire** an important characteristic of cables is their ability to prevent flame spread. But fire resistance is an entirely different constraint, which requires maintaining the operating integrity of the cable during a fire.

**Heat** exposure to excessive heat over too long a period can cause the cable component materials to deteriorate (cracking, combustion, flaking, etc.). The time of exposure is a factor as important as temperature in the choice of materials, which are sometimes more resistant to brief, high thermal shock than to prolonged exposure at lower temperature. In this respect, it is important to note that the cable is only as strong as its weakest component, so care should be taken to harmonise the materials used.

**Humidity** humidity is more easily absorbed by certain insulating materials, which may cause electrical defects.

**Low emission of fumes and low toxicity** safety considerations dictate limits as to the quantity of fumes emitted in case of fire, and the type of fumes. Certain materials exhibit interesting characteristics in this area (fiberglass, silicone, halogen-free polymers, etc.).

**Mechanical fatigue (bending, abrasion, crushing, etc.)**

Some materials withstand this type of attack better than others. For example, mica-based insulators do not withstand alternate bending very well. In some cases, the mechanical-strength function can be disassociated from the other constraints by using a specific layer of the cable to perform the function.

**Ozone resistance** this highly oxidizing gas can damage the most commonly used insulators. The exception is silicone rubber, which is resistant to this type of attack.

**Radiation** can cause decomposition of many polymers used for insulation. However, polyimides and silica fibres are more resistant than other materials.

**Spillage of hot materials (molten metals, etc.)** often accidental, such incidents can destroy the cable. However, some clever combinations of insulators can limit the risk of damage.

**Type of installation** in each installation scenario, there may be a particular aspect that needs to be developed (crushing resistance, service in a conducting environment, etc.).

**Voltage, current** and more generally all the electrical characteristics of the application. In particular, it is important to know that, as temperature rises, the linear resistance of the conductor increases and the insulating resistance of the insulators decreases.

## Technical References

### Insulator Characteristics

	Standardised chemical symbol or abbreviation	Electrical characteristics						
		Relative permittivity $\epsilon_r$ at 50 Hz	Relative permittivity $\epsilon_r$ at 1 MHz	Dielectric loss factor $\tan\delta$ at 1MHz	Breakdown voltage [kV/mm]	Surface resistivity [ $\Omega$ ]	Volume resistivity [ $\Omega \cdot \text{cm}$ ]	Resistance to leakage current by HV sparks [s]
<b>Thermoplastics</b>								
Polyvinyl chloride	PVC	5 to 9	3.3 to 4.5	$4 \cdot 10^{-2}$	30 to 60	$10^{10}$	$10^{16}$	60 to 80
High temperature polyvinyl chloride	PVC-HT	5 to 9	3.3 to 4.5	$4 \cdot 10^{-2}$	30 to 60	$10^{10}$	$10^{16}$	60 to 80
Polyethylene, PE low density	LDPE	2.29	2.29	$2 \cdot 10^{-4}$	20 to 30	$^{\circ}$	$10^{17}$	135 to 160
High density PE	HDPE	2.32	2.32	$2 \cdot 10^{-4}$	17 to 24	$^{\circ}$	$10^{17}$	$^{\circ}$
Reticulated PE (PRC or LX PE)	VPE (PRC)	2.4	2.32	$2 \cdot 10^{-4}$	25	$^{\circ}$	$10^{17}$	$^{\circ}$
Polyurethane	PUR	2.9 to 4.3	2.9 to 4.3	$3 \cdot 10^{-2}$	20	$^{\circ}$	$10^{15}$	$^{\circ}$
Polyamide Nylon® Rilsan®	PA	4	4	$2 \cdot 10^{-2}$	30	$10^{12}$	$10^{12}$ to $10^{16}$	70 to 135
PE terephthalate	PETP	3.4	3.5	$1 \cdot 10^{-2}$	17 to 30	$10^{12}$	$10^{13}$ to $10^{16}$	30 to 100
Polypropylene	PP	2.3	2.3	$3 \cdot 10^{-4}$	20 to 40	$10^{11}$ to $10^{15}$	$10^{16}$ to $10^{17}$	120 to 185
Polyvinylidene chloride, Kynar®, Hylar®	PVDF	8.4	6.5	$1.7 \cdot 10^{-1}$	10 to 36	$^{\circ}$	$10^{13}$	50 to 70
Tetrafluorethylene, Tefzel®, Histaflon ET®	ETFE	2.6	2.6	$2 \cdot 10^{-4}$	36	$10^{12}$	$10^{16}$	120
Ethylene chlorofluorethylene, Halar®	ECTFE	2.6	2.5	$2 \cdot 10^{-4}$	39	$10^{14}$	$10^{16}$	135
Fluorethylene Propylene, Teflon®, Hostafion TF®	FEP	2.1	2.1	$< 3 \cdot 10^{-4}$	20 to 24	$> 10^{16}$	$> 10^{18}$	$> 170$
Polyimid, Kapton®	PI	3.8	3.8	$2 \cdot 10^{-2}$	28	$^{\circ}$	$10^{14}$ to $10^{16}$	$^{\circ}$
Polytetrafluorethylene, Teflon®, Hostafion TF®	PTFE	2	2	$2 \cdot 10^{-4}$	25	$> 10^{16}$	$10^{18}$ to $10^{19}$	$> 300$
Perfluoralkoxy, Teflon®	PFA	2.1	2	$2 \cdot 10^{-4}$	25	$> 10^{17}$		$> 180$
<b>Elastomers</b>								
Natural rubbers (polyisoprene mixtures)	NR	2.3	2.7	$5 \cdot 10^{-4}$	20	$10^{14}$ to $10^{15}$	$10^{15}$ to $10^{17}$	$^{\circ}$
Chloropropylene, Polychloroprene, Neoprene®	CR (PCP)	20	12	$3 \cdot 10^{-1}$	20	$5 \cdot 10^{11}$	$5 \cdot 10^{11}$	$^{\circ}$
Polyethylene, Chlorosulfonique, Hypalon®	CSM (CSP)	6.5	6	$2 \cdot 10^{-2}$	20	$10^{12}$	$10^{12}$	$^{\circ}$
Ethylene - Propylene, copolymerized	EPM, EPDM, EPR	3.5	3.3	$8 \cdot 10^{-3}$	35	$^{\circ}$	$10^{16}$	$^{\circ}$
Vinyl ethyleneacetate, Levaprene®	EVA	5	5	$2 \cdot 10^{-2}$	15	$^{\circ}$	$10^{14}$	$^{\circ}$
Silicone rubber	SIR	3.2	3.2	$2 \cdot 10^{-3}$	25	$^{\circ}$	$10^{15}$	130 to 240
Very high temperature silicone rubber	SIR-THT*	3.2	3.2	$2 \cdot 10^{-3}$	25	$^{\circ}$	$10^{15}$	130 to 240
<b>Mineral Insulators</b>								
Glass filament E	V*	3.8	3.8	$2 \cdot 10^{-4}$	$^{\circ}$	$^{\circ}$	$10^{11}$	$^{\circ}$
Glass Filament R	V-R*	3.8	3.8	$2 \cdot 10^{-4}$	$^{\circ}$	$^{\circ}$	$10^{11}$	$^{\circ}$
Mineral fibre A	A*	3.8	3.8	$2 \cdot 10^{-4}$	$^{\circ}$	$^{\circ}$	$10^{11}$	$^{\circ}$
Silica	SI*	3.9	3.9	$2 \cdot 10^{-4}$	$^{\circ}$	$^{\circ}$	$10^{14}$ to $10^{18}$	$^{\circ}$
Ceramic fibre	CER*	5	4.5	$2 \cdot 10^{-4}$	8 to 12	$^{\circ}$	$10^{11}$ to $10^{16}$	$^{\circ}$
Borosilicoaluminate fibre, Nextel®	NX*	5	4.5	$2 \cdot 10^{-4}$	8 to 12	$^{\circ}$	$10^{11}$ to $10^{16}$	$^{\circ}$
Moscovite mica	MI*	7	7	$5 \cdot 10^{-2}$	$^{\circ}$	$^{\circ}$	$10^{15}$ to $10^{16}$	$^{\circ}$
Phlogopite mica	MI*	5.5	5.5	$5 \cdot 10^{-2}$	$^{\circ}$	$^{\circ}$	$10^{13}$ to $10^{14}$	$^{\circ}$

N.B.: (\* = symbol used internally by OMERIN)

## Technical References

### Insulator Characteristics

	Standardised chemical symbol or abbreviation	Thermal characteristics					Other characteristics						
		Continuous service operating temperature	Short-term operating temperature	Melting temperature	Flame behaviour	Flexibility	Abrasion resistance	Tensile strength [Mpa]	Elongation at breaking point [%]	Water absorption [%]	Steam resistance	Radiation resistance [rad]	
<b>Thermoplastics</b>													
Polyvinyl chloride	PVC	-30 to +80°C	100	120	=	+	+	15	250	1	--	8.10 7	
High temperature polyvinyl chloride	PVC-HT	-30 to +105°C	120	140	=	+	+	18	200	0.8	-	1.10 8	
Polyethylene, PE low density	LDPE	-50 to +70°C	100	100	-	=	=	10	400	0.03	-	1.10 7	
High density PE	HDPE	-50 to +100°C	120	130	-	-	+	20	500	0.03	-	7.10 6	
Reticulated PE (PRC or LX PE)	VPE (PRC)	-40 to +115°C	140	150	-	=	+	22	300	0.03	-	1.10 7	
Polyurethane	PUR	-50 to +90°C	100	140	=	+	++	30	400	5	-	5.10 7	
Polyamide Nylon® Rislant®	PA	-30 to +105°C	125	140	=	=	++	150	200	15	=	1.10 7	
PE terephthalate	PETP	-100 to +130°C	180	200	-	-	++	100	50	3	=	1.10 7	
Polypropylene	PP	-10 to +110°C	140	160	-	=	+	30	500	0.1	=	1.10 5	
Polyvinylidene chloride, Kynar®, Hylar®	PVDF	-40 to +135°C	150	170	+	--	++	45	300	0.2	+	1.10 6	
Tetrafluorethylene, Tefzel®, Histaflon ET®	ETFE	-100 to +150°C	180	270	++	=	++	45	200	0.2	+	1.10 7	
Ethylene chlorofluorethylene, Halar®	ECTFE	-100 to +140°C	170	240	++	=	++		200	0.2	+	2.10 7	
Fluorethylene Propylene, Teflon®, Hostaflon TF®	FEP	-100 to +205°C	230	270	++	=	=	20	250	0.1	++	3.10 5	
Polyimid, Kapton®	PI	-190 to +350°C	400	500	++	=	++	18	70	10	=	1.10 10	
Polytetrafluorethylene, Teflon®, Hostaflon TF®	PTFE	-190 to +260°C	300	327	++	-	+	40	350	0.05	++	3.10 5	
Perfluoralkoxy, Teflon®	PFA	-190 to +260°C	280	327	++	+	+	27.5	300	0.3	++	3.10 5	
<b>Elastomers</b>													
Natural rubbers (polyisoprene mixtures)	NR	-30 to +70°C	90	130	-	++	+	10	350	0.1	-	8.10 7	
Chloropropylene, Polychloroprene, Neoprene®	CR (PCP)	-30 to +90°C	100	150	+	+	++	15	300	10	=	2.10 7	
Polyethylene, Chlorosulfonique, Hypalon®	CSM (CSP)	-40 to +100°C	130	180	+	+	++	10-20	300	15	=	2.10 5	
Ethylene - Propylene, copolymerized	EPM, EPDM, EPR	-30 to +110°C	120	160	-	++	+	5	200	0.2	-	1.10 5	
Vinyl ethyleneacetate, Levaprene®	EVA	-50 to +125°C	150	180	-	++	°	6	300	0.1	-	1.10 7	
Silicone rubber	SIR	-60 to +180°C	250	300	+	++	=	5	200	5	=	2.10 7	
Very high temperature silicone rubber	SIR-THT*	-60 to +230°C	280	320	+	++	=	7	250	5	=	2.10 7	
<b>Mineral Insulators</b>													
Glass filament E	V*	-60 to +280°C	350	850	+	=	-	2400	4.5	1	-	+	
Glass Filament R	V-R*	-60 to +400°C	450	985	+	=	-	3600	5.2	1	-	+	
Mineral fibre A	A*	-60 to +400°C	450	880	++	=	=	2500	4.6	1	-	+	
Silica	SI*	-60 to +900°C	1000	1150	++	=	-	3600	°	1	-	++	
Ceramic fibre	CER*	-60 to +1100°C	1300	2000	++	=	-	2000	°	0.8	-	+	
Borosilicoalum inate fibre, Nextel®	NX*	-60 to +1200°C	1400	1800	++	=	-	2000	°	0.8	-	++	
Moscovite mica	MI*	-60 to +800°C	1200	1200	++	=	-	°	°	°	-	+	
Phlogopite mica	MI*	-60 to +1000°C	1200	1400	++	=	-	°	°	°	-	+	

N.B.: The a.m. information is for guidance only. Tests under the most realistic operating conditions are recommended. Our liability can in no way be engaged.

Assessment	Flame behaviour
+ + Very good	+ + Non-flammable
+ Good	+ Difficult to ignite
= Average	= Self-extinguishing
- Poor	- Flammable
-- Very poor	

## Technical References

### Characteristics of the main conducting metals

Cores are defined by their nominal cross-section, type of conducting metal, composition (stranding) and flexibility class.

Type of metal	Usual symbol	Continuous working temp [°C]	Peak temp [°C]	Melting temp [°C]	Density at 20°C [g/cm <sup>3</sup> ]	Resistivity at 20°C [μΩ.cm]	Temp coefficient [10 <sup>-3</sup> K <sup>-1</sup> ]	Thermal conductivity [w/(cm.k)]	Linear expansion coefficient [x 10 <sup>-6</sup> K <sup>-1</sup> ]	Tensile strength [MPa]
Red copper	CuA1	150	450	1083	8.89	1.724	3.93	3.93	17.0	220
Red copper deoxidised	CuC1	180	500	1083	8.89	1.724	3.93	3.93	17.0	220
Tinned copper	CuSn	180	300	1083	8.89	1.74	4.00	3.93	17.0	220
Silver-plated copper	CuAg	200	450	1083	8.89	1.724	3.89	3.93	17.0	220
Nickel-plated copper	CuNi	300	500	1083	8.89	1.8	4.2	3.93	17.0	220
27% nickel-plated copper	CuNi27	450	800	1083	8.89	3.09	4 to 5	3.07	15.6	400
Nickel	Ni	600	900	1455	8.90	6.8	5 to 7	0.92	13.3	500
Brass 70/30	CuZn 70/30	180	300	954	8.52	5.5		1.26	19.9	630
Nickel chrome 80/20	NiCr 80/20	1000	1200	1400	8.35	108	0 to 0.1	0.15	17.5	°
Aluminium	AL	100	150	660	2.70	2.826	4.03	2.22	23.0	80
Pure silver	Ag	200	300	960	10.49	1.6	3.8	4.08	19.7	160
Galvanised steel	GALVA	600	900	1550	7.00	15	5 to 6	0.75	11.7	500-700
Stainless steel, AISI 304	INOX 304	600	900	1550	7.00	15	5 to 6	0.75	11.7	500-700
Tungsten	W	2000		3380	19.30	5.3	4.5	2.01	4.3	°
Tantalum	Ta	1400		2996	16.60	12.4	3.3	0.55	6.5	93

Aluminium is not commonly used in Omerin cables

## Technical References

### Permissible Currents in Conductors for any Insulated Single-Conductor Cable with a small cross-section

Table I below indicates the maximum permissible currents for the most common cross-sections and the main metals used for the stranding of cores.

These values are expressed in amps and correspond to the maximum permissible heating of the metal, as indicated in the table. This is obviously based on the assumption that the insulator used is compatible with the temperature.

N.B.: these values are given for an ambient temperature of 40°C: for higher ambient temperatures, use the correction factors given in the table below (multiply the value at 40°C by the correction coefficient).

**Table 1 - Permissible currents (ambient temperature 40°C)**

Maximum permissible temperature	180°C	200°C	250°C	450°C	450°C
Cross-section	Red or tinned copper core NF C 31-111	Silver-plated copper core NF C 31-111	Nickel-plated copper core class 2 ASTM B 355	Nickel-plated copper core class 27 ASTM B 355	Nickel core 200 ASTM B 160
[mm <sup>2</sup> ]					
0.50	11.1	12.4	14.4	16.5	7.7
0.75	14.6	16.3	18.8	21.5	10.1
1.0	17.8	19.8	22.7	26.0	12.1
1.5	23.4	26.0	29.5	33.8	15.8
2.5	33.0	36.7	41.2	47.2	22.1
4	45.4	50.4	56.0	64.1	30.0
6	59.7	66.3	72.9	83.5	39.1

**Table 2 - Correction Factors**

Ambient temperature	°C	°F	180°C	200°C	250°C	450°C
41-50		106-122	0.96	0.97	0.98	0.99
51-60		124-140	0.91	0.94	0.95	0.99
61-70		142-158	0.87	0.90	0.93	0.96
71-80		160-176	0.81	0.87	0.90	0.95
81-90		177-194	0.77	0.83	0.87	0.93
91-100		195-212	0.65	0.72	0.85	0.92
101-120		213-248	0.62	0.71	0.79	0.89
121-140		249-284	0.50	0.61	0.71	0.86
141-160		285-320	0.35	0.50	0.65	0.84
161-180		321-356	°	0.35	0.58	0.81
181-200		357-392	°	°	0.49	0.78
201-225		393-437	°	°	0.35	0.74
226-250		439-482	°	°	°	0.69
251-275		483-527	°	°	°	0.65
276-300		528-572	°	°	°	0.60
301-325		573-617	°	°	°	0.55
326-350		618-662	°	°	°	0.49
351-375		663-707	°	°	°	0.42
376-400		708-752	°	°	°	0.34

Example: permissible current of a conductor of 0.75mm<sup>2</sup> with tinned copper core:

-at ambient temperature 40°C : 14.6 A

-at ambient temperature 100°C : 0.65 x 14.6 A = 9.49 A

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