

# CABLES FOR A MOVING WORLD

A blue-tinted, blurred background image of a busy transit station with many people walking. In the foreground, two cables are shown: one with a red jacket and another with a black jacket. The red cable has a green and yellow braided section near the top, and the black cable has a silver braided section near the top. Both cables have several copper conductors exposed at the top.

## TRATOS FIRESAFE®

# TRATOS FIRESAFE®



*You won't realize...  
but at this moment  
you are using our cables*

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## STANDARDS AND QUALITY SYSTEM

### STANDARDS

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#### Cables manufactured based on:

- BS7211** . . . . . Electric cables. Thermosetting insulated and thermoplastic sheathed cables for voltages up to and including 450/750 V for electric power and lighting and having low emission of smoke and corrosive gases when affected by fire.
- BS 7629** . . . . . Electric cables. Specification for 300/500 V fire resistant screened cables having low emission of smoke and corrosive gases when affected by fire Multicore and multipair cables.
- BS 7846** . . . . . Electric cables. Thermosetting insulated, armoured, fire-resistant cables of rated voltage 600/1000 V, having low emission of smoke and corrosive gases when affected by fire.

#### Fire Performance based on:

- BS EN 50200** . . . . . Method of test for resistance to fire of unprotected small cables for use in emergency circuits.
- BS EN 50267** . . . . . Common test methods for cables under fire conditions. Tests on gases evolved during combustion of materials from cables.
- BS EN 60332-1** . . . . . Tests on electrical and optical cables under fire conditions. Test for a vertical flame propagation for a single insulated wire or cable.
- BS EN 60332-3** . . . . . Tests on electric and optical fibre cables under fire conditions. Test for vertical flame spread of vertically-mounted bunched wires or cables.
- BS EN 61034** . . . . . Measurement of smoke density of cables burning under defined conditions.
- BS 6387** . . . . . Test method for resistance to fire of cables required to maintain circuit integrity under fire conditions.
- BS 8434-2** . . . . . Methods of test for assessment of the fire integrity of electric cables. Test for unprotected small cables for use in emergency circuits. (BS EN 50200 with a 930° flame and with water spray).
- BS 8491** . . . . . Method for assessment of fire integrity of large diameter power cables for use as components for smoke and heat control systems and certain other active fire safety systems.

#### Applicable Codes of Practice:

- BS 5266-1** . . . . . Emergency lighting Code of practice for the emergency escape lighting of premises.
- BS 5839-1** . . . . . Fire detection and fire alarm systems for buildings Code of practice for design, installation, commissioning and maintenance of systems in non-domestic premises.
- BS 7346-7** . . . . . Components for smoke and heat control systems Code of practice on functional recommendations and calculation methods for smoke and heat control systems for covered car parks.
- BS 8519:2010** . . . . . Code of practice Selection and installation of fire-resistant power and control cable systems for life safety and fire-fighting applications.
- BS 9999:2008** . . . . . Fire safety code of practice for the design, management and use of buildings.

## TECHNICAL INFORMATION

### CURRENT AND VOLTAGE CHARACTERISTICS

Nominal Cross Section mm <sup>2</sup>	Enclosed Trunking				Clipped Direct			
	2 Core Cable Single Phase AC or DC		1 x 3 or 4 Core Cable Three Phase		2 Core Cable Single Phase AC or DC		1 x 3 or 4 Core Cable Three Phase	
	AMPS	MV	AMPS	MV	AMPS	MV	AMPS	MV
1	19	44	17	38	17	44	15	38
1,5	24	29	22	25	22	29	19	25
2,5	33	18	30	15	30	18	26	15
4	45	11	40	9,5	40	11	35	9,5

### CAPACITANCE/RESISTANCE

Nominal Cross Section mm <sup>2</sup>	Insulation Resistance at 20 °C MΩ/km	Conductor resistance at 20 °C Ohms/km	Capacitance Core/Core pf/mtr	Capacitance Core/Screen pf/mtr
1	300	18,1	95	170
1,5	280	12,1	100	180
2,5	230	7,4	110	215
4	200	4,6	140	260

### ACCESSORIES

Cable Size	Gland (pack of 10)  Part Number	P Clip (pack of 50)  Part Number	2 Way Saddle (pack of 50)  Part Number
			
2 core & earth 1.0mm <sup>2</sup>	TW 251	TW 26L	TW 272L
2 core & earth 1.5mm <sup>2</sup>	TW 251	TW 28L	TW 302L
2 core & earth 2.5mm <sup>2</sup>	TW 251	TW 32L	TW 342L
2 core & earth 4.0mm <sup>2</sup>	TW 252	TW 37L	TW 462L
3 core & earth 1.0mm <sup>2</sup>	TW 251	TW 28L	TW 302L
3 core & earth 1.5mm <sup>2</sup>	TW 251	TW 30L	TW 342L
3 core & earth 2.5mm <sup>2</sup>	TW 252	TW 34L	TW 322L
3 core & earth 4.0mm <sup>2</sup>	TW 252	TW 43L	TW 462L
4 core & earth 1.0mm <sup>2</sup>	TW 251	TW 30L	TW 342L
4 core & earth 1.5mm <sup>2</sup>	TW 251	TW 34L	TW 342L
4 core & earth 2.5mm <sup>2</sup>	TW 252	TW 37L	TW 422L
4 core & earth 4.0mm <sup>2</sup>	TW 254	TW 51L	TW 542L
7 core & earth 1.0mm <sup>2</sup>	TW 251	TW 37L	TW 382L
7 core & earth 1.5mm <sup>2</sup>	TW 252	TW 40L	TW 422L
7 core & earth 2.5mm <sup>2</sup>	TW 254	TW 43L	TW 462L
12 core & earth 1.5mm <sup>2</sup>	TW 254	TW 67L	TW 592L
12 core & earth 2.5mm <sup>2</sup>	TW 255A	TW 75L	TW 752L
19 core & earth 1.5mm <sup>2</sup>	TW 255A	TW 67L	TW 752L
19 core & earth 2.5mm <sup>2</sup>	TW 255	TW 79L	TW 932L

## STANDARDS AND QUALITY SYSTEM

### QUALITY SYSTEM

Tratos aim to work closely with customers to find better, more environmentally friendly solutions to their challenges.

We are committed to our vision and strategy to serve all our internal and external customers by providing high quality services and products. Tratos is an established industry leader in the design, manufacture and supply of cables and products and to maintain this leading position we are committed at every level to providing our customers with quality services and products at a competitive price. As a commercial enterprise we are aware of the importance of satisfying our customers and of the financial impact of which nonconformities may have on our profitability. For these reasons we are committed to complying with all customer requirements and specifications both legal and statutory requirements. Our Quality Management System has been audited and approved by two independent, Internationally recognized and accepted authorities: BSI and AENOR-IQNET (E), in accordance to BS EN ISO 9001:2015 covering the production, purchasing of raw materials design and final test including various document types. The Tratos Quality Management system is under frequent regular surveillance by inspectors working for the Certification Authorities.



As a commercial enterprise we are aware of the importance of satisfying our customers and of the financial impact of which nonconformities may have on our profitability. For these reasons we are committed to complying with all customer requirements and specifications both legal and statutory requirements. Our Quality Management System has been audited and approved by two independent, Internationally recognized and accepted authorities: BSI and AENOR-IQNET (E), in accordance to BS EN ISO 9001:2015 covering the production, purchasing of raw materials design and final test including various document types. The Tratos Quality Management system is under frequent regular surveillance by inspectors working for the Certification Authorities.

### ENVIRONMENTAL SYSTEM

Our Environmental Management System has been audited and approved by two independent, Internationally recognized and accepted authorities:

BSI and AENOR-IQNET (E), in accordance to BS EN ISO 14001:2015 covering the production, purchasing of raw materials design and final test including various document types. The Tratos Quality Management system is under frequent regular surveillance by inspectors working for the Certification Authorities.



### ENERGY MANAGEMENT SYSTEMS

By complying with the BS EN ISO 50001:2018 Tratos follows a systematic approach in achieving continual improvement of energy performance and the Energy Management Systems (EnMS).

The BS EN ISO 50001:2018 is a standard issued by the International Standard Organization (ISO) which outlines the requirements for establishing, implementing, maintaining and improving an energy management system (EnMS).



### CIRCULAR ECONOMY

The EU Eco-Management and Audit Scheme (EMAS) is a premium management instrument developed by the European Commission for companies and other organisations to evaluate, report, and improve their environmental performance. EMAS is open to every type of organisation eager to improve its environmental performance. It spans all economic and service sectors and is applicable worldwide.



### AWARDS

Tratos cables are made with award winning Tratos-JBA® compound. Tratos UK Ltd has won a **Queen's Award for Enterprise - Innovation** for its technologically advanced Tratos-JBA® compound.



## STANDARDS AND QUALITY SYSTEM

### HEALTHY & SAFETY SYSTEM

Once its decision to create a board post dedicated to furthering best practice for Health and Safety, international cable manufacturer Tratos is celebrating receipt of ISO 45001.

ISO 45001 sets out the minimum requirements for occupational health and safety management best practice and helps companies achieve the maximum return for employees, operations and customers.



### REACH, WEEE & ROHS

**REACH**  
COMPLIANT

Tratos is fully compliant with the **REACH**. This is a European Union regulation concerning the **Registration, Evaluation, Authorisation and restriction of Chemicals**. It came into force on 1st June 2007 and replaced a number of European Directives and Regulations with a single system. REACH applies to substances manufactured or imported into the EU in quantities of 1 tonne or more per year. Generally, it applies to all individual chemical substances on their own, in preparations or in articles. To summarise, REACH makes the cable industry directly responsible for assessing and managing the risks posed by chemicals and providing safety information to their users.

**REACH**  
COMPLIANT

Tratos fully subscribes to The **Waste Electrical and Electronic Equipment Directive (WEEE Directive)**, introduced into UK law in January 2007 by the Waste Electrical and Electrical Equipment Regulations 2006. The WEEE Directive aims to reduce the amount of electrical and electronic equipment being produced and to encourage everyone to reuse, recycle and recover it. The WEEE Directive also aims to improve the environmental performance of businesses that manufacture, supply, use, recycle and recover electrical and electronic equipment. TRATOS has enlisted the services of the UK's leading producer compliance scheme, Valpak, whom manage our recycling obligations and also ensure our compliance to the WEEE Regulations and the Waste Batteries and Accumulators Regulations.

**REACH**  
COMPLIANT

Tratos is fully compliant with the **Restriction of Hazardous Substances (RoHS) Regulations**. These Regulations implement EU Directive 2011/65/EU which bans the placing on the EU market of new electrical and electronic equipment containing more than agreed levels of lead, cadmium, mercury, hexavalent chromium, polybrominated biphenyl (PBB) and polybrominated diphenyl ether (PBDE) flame retardants. Tratos fully understands the requirements of the RoHS Directive and ensures that our products, and their components, comply.

### CORPORATE SOCIAL RESPONSABILITY

Tratos adopts a Code of Ethics which adheres to the United Nations Global Compact on human rights, labour standards, protection of the environment and anti corruption measures.

Under this self regulatory code, Tratos will carry out initiatives in the environmental and social fields with special reference to environmental policies and social policies regarding child labour, compulsory labour, health and security, freedom of association and the right to collective bargaining, discrimination, disciplinary procedures, working hours and wages.

### APPROVALS

Firesafe cables made by Tratos have been tested and certified by the following Approval Organisations:



**London  
Underground  
Registration**  
No. 1738  
Authorised For Use

# TRATOS FIRESAFE®

LOW SMOKE ZERO HALOGEN (LSZH) CABLES HAVING ENHANCED CIRCUIT INTEGRITY WHEN EXPOSED TO FIRE - BASED ON BS7211

## TRATOS FIRESAFE-TW100® - 450/750V

Firesafe TW100 is designed for installations where a fire situation may pose a hazard and the maintenance of circuit integrity is a requirement. Firesafe TW100 is suitable for installations in onerous conditions where the cable is mechanically protected in metal conduit or trunking. Applications include public buildings, schools, hospitals, department stores, cinemas, hotels, theatres, computer centres and similar applications where "standard" grade cable is specified for use in the applicable Code of Practice.

### FEATURES AND PERFORMANCES



#### CONSTRUCTION

- **Conductor:** stranded plain annealed copper class 1 or class 2 conductor
- **Insulation:** mica-glass fire resistant tape covered by an extruded layer of cross-linked, LSZH insulating compound
- **Standard Colours:** red, black, blue, yellow, brown, green/yellow (other colours on request)
- **Identification of Core:** by colour
- **Marking:** TW100 +TRATOS+ BSI BS7629-1 BS6387 CWZ BS5839 cross section LOT/YEAR -METRE MARKING - "CE"

#### STANDARDS

- BS 7211 Manufacturing standard with an additional mica-glass fire resistant tape.
- BS 6387; Categories C, W & Z (when applied to a single cable)
- IEC 60331; with the flame temperature increased to 950 oC
- BS EN 50200: when installed in screwed steel conduit
- BS EN 50200 Annex E: when installed in screwed steel conduit
- BS EN 60332-1 and BS EN 60332-3; Flame propagation
- BS EN 50267; Acid gas emission
- BS EN 61034; Smoke emission

#### CODES OF PRACTICE

- BS 5266 Emergency lighting cables, standard and enhanced, when enclosed in screwed steel conduit

#### PRODUCT APPROVAL





**TRATOS FIRESAFE TW100 - 450/750V**

Nominal Cross Section	Part Number	Insulation Thickness	Conductor DC Resistance at 20 °C Max	Maximum Temperature of the Conductor During Operation	Nominal Diameter	Nominal Cable Weight
mm <sup>2</sup>		mm	Ω/Km	°C	mm	Kg/km
1,5	981356	1,0	12,10	90 °C	3,9	32
2,5	981355	1,0	7,41		4,6	43
4	981354	1,0	4,61		5,1	55
6	981353	1,0	3,08		5,6	85
10	972065	1,0	1,83		6,8	146
16	981352	1,0	1,15		7,8	198
25	972066	1,2	0,727		9,2	320
35	981351	1,2	0,524		10,2	410
50	981350	1,4	0,387		12,0	549
70	981349	1,4	0,268		14,2	770
95	981348	1,6	0,193		15,6	1140
120	981347	1,6	0,153		17,5	1425
150	981346	1,8	0,124		19,4	1720
185	983699	2,0	0,091		22,5	2155
240	983700	2,2	0,074		24,2	2900
300	983701	2,4	0,061		28,0	3540
400	983702	2,6	0,047		31,0	4410
500	983703	2,8	0,036		34,8	5660
630	TBA	2,8	0,028		37,8	7140

# TRATOS FIRESAFE®

LOW SMOKE ZERO HALOGEN (LSZH) CABLES HAVING STANDARD CIRCUIT INTEGRITY WHEN EXPOSED TO FIRE - BASED ON BS7629

## TRATOS FIRESAFE-TW950s® - 300/500 V

Firesafe TW950s is designed for installations where a fire situation may pose a hazard and the maintenance of circuit integrity is a requirement. Applications include public buildings, schools, hospitals, department stores, cinemas, hotels, theatres, computer centres and similar applications where "standard" grade cable is specified for use in the applicable Code of Practice.

### FEATURES AND PERFORMANCES



#### CONSTRUCTION

- **Conductor:** solid or stranded plain annealed copper class 1 or class 2 conductor
- **Insulation:** extruded silicone rubber
- **Electrostatic Screen:** laminated aluminium foil in direct contact with a tinned annealed copper drain wire
- **Sheath:** thermoplastic LSZH sheathing compound
- **Standard Colours:** red or white
- **Identification of Core**
  - 2 core + bare earth: Brown, Blue
  - 3 core + bare earth: Brown, Black, Grey
  - 4 core + bare earth: Brown, Blue, Black, Grey
- **Marking:** TW950 +TRATOS+ BSI BS7629-1 BS6387 CWZ LPCB222a/01 BS5839-1 PH30 2X1,5+E LOT/YEAR -METRE MARKING - "CE"

#### STANDARDS

- BS 7629; Manufacturing standard
- BS 6387; Categories C, W & Z
- BS EN 50200; PH30 (30 minutes annex E)
- BS EN 60332-1 and BS EN 60332-3; Flame propagation
- BS EN 50267; Acid gas emission
- BS EN 61034; Smoke emission

#### CODES OF PRACTICE

- BS 5266 Emergency lighting cables - standard.
- BS 5839 Clause 26.2d Standard grade
- BS 8519 Category 1 and 2\*

\* When tested in Tratos laboratories; pending third party approval

**TRATOS FIRESAFE TW950s - 300/500 V**

N° of Cores × c.s.a  mm <sup>2</sup>	Part Number (for red)	Insulation Thickness  mm	Conductor DC Resistance at 20 °C Max  Ω/Km	Maximum Temperature of the Conductor During Operation  °C	Nominal Diameter  mm	Nominal Cable Weight  Kg/km
2x1	041991	0,6	18.1	90 °C	7,5	74
2x1,5	041565	0,7	12.1		8,4	94
2x2,5	041572	0,8	7.41		10,3	143
2x4	043818	0,8	4.61		11,6	206
3x1	043819	0,6	18.1		7,9	88
3x1,5	042898	0,7	12.1		9	123
3x2,5	041573	0,8	7.41		11,1	191
3x4	042900	0,8	4.61		12,5	263
4x1	041626	0,6	18.1		8,7	109
4x1,5	041569	0,7	12.1		9,8	146
4x2,5	042911	0,8	7.41		12	233
4x4	041579	0,8	4.61		14	320
7x1,5	050686	0,7	12.1		12,1	230
7x2,5	050991	0,8	7.41		14,5	462
12x1,5	050688	0,7	12.1		15,9	365
12x2,5	050993	0,8	7.41		19,1	680
19x1,5	050690	0,7	12.1		18,3	540
19x2,5	050996	0,8	7.41		23	1.095
27x1,5	050692	0,7	12.1		20,3	878
27x2,5	044198	0,8	7.41		26,9	1.412

# TRATOS FIRESAFE®

LOW SMOKE ZERO HALOGEN (LSZH) CABLES HAVING ENHANCED CIRCUIT INTEGRITY WHEN EXPOSED TO FIRE - BASED ON BS7629

## TRATOS FIRESAFE-TW950e® - 300/500 V

Firesafe TW950e is designed for installations where a fire situation may pose a hazard and the maintenance of circuit integrity is a requirement. Applications include public buildings, schools, hospitals, department stores, cinemas, hotels, theatres, computer centres and similar applications where "enhanced" grade cable is specified for use in the applicable Code of Practice.

### FEATURES AND PERFORMANCES



#### CONSTRUCTION

- **Conductor:** stranded plain annealed copper class 1 or class 2 conductor
- **Insulation:** extruded silicone rubber
- **Tape:** Open weave glass fire barrier tape
- **Electrostatic Screen:** laminated aluminium foil in direct contact with a tinned annealed copper drain wire
- **Sheath:** thermoplastic LSZH sheathing compound
- **Standard Colours:** red or white
- **Identification of Core**
  - 2 core + bare earth: Brown, Blue
  - 3 core + bare earth: Brown, Black, Grey
  - 4 core + bare earth: Brown, Blue, Black, Grey
- **Marking:** TW950E +TRATOS+ BSI BS 7629-1 BS 6387 CWZ LPCB222b/01 BS 5839-1 PH120 2X2,5+E LOT/YEAR -METRE MARKING - "CE"

#### STANDARDS

- BS 7629; Manufacturing standard
- BS 6387; Categories C, W & Z
- BS 8434-2 enhanced
- BS EN 50200; PH30, PH60, PH120
- BS EN 60332-1 and BS EN 60332-3; Flame propagation
- BS EN 50267; Acid gas emission
- BS EN 61034; Smoke emission

#### CODES OF PRACTICE

- BS 5266 Emergency lighting cables - enhanced
- BS 5839 Clause 26.2e Enhanced grade
- BS 8519 Category 1, 2 and 3\*

#### PRODUCT APPROVAL

**London  
Underground  
Registration**

No. 1738

Authorised For Use

\* When tested in Tratos laboratories; pending third party approval

**TRATOS FIRESAFE TW950e - 300/500 V**

N° of Cores × c.s.a  mm <sup>2</sup>	Part Number (for white)	Insulation Thickness  mm	Conductor DC Resistance at 20 °C Max  Ω/Km	Maximum Temperature of the Conductor During Operation  °C	Nominal Diameter  mm	Nominal Cable Weight  Kg/km
2x1	044280	0,6	18.1	90 °C	7,5	74
2x1,5	981730	0,7	12.1		8,4	94
2x2,5	981757	0,8	7.41		10,3	143
2x4	983225	0,8	4.61		11,6	206
3x1	005909	0,6	18.1		7,9	88
3x1,5	981734	0,7	12.1		9	123
3x2,5	981736	0,8	7.41		11,1	191
3x4	005908	0,8	4.61		12,5	263
4x1	981742	0,6	18.1		8,7	109
4x1,5	981744	0,7	12.1		9,8	146
4x2,5	005907	0,8	7.41		12	233
4x4	044281	0,8	4.61		14	320
7x1,5	983819	0,7	12.1		12,1	230
7x2,5	032393	0,8	7.41		14,5	462
12x1,5	004857	0,7	12.1		15,9	365
12x2,5	044196	0,8	7.41		19,1	680
19x1,5	981729	0,7	12.1		18,3	540
19x2,5	044197	0,8	7.41		23	1.095
27x1,5	044177	0,7	12.1		20,3	878
27x2,5	0044199	0,8	7.41		26,9	1.412

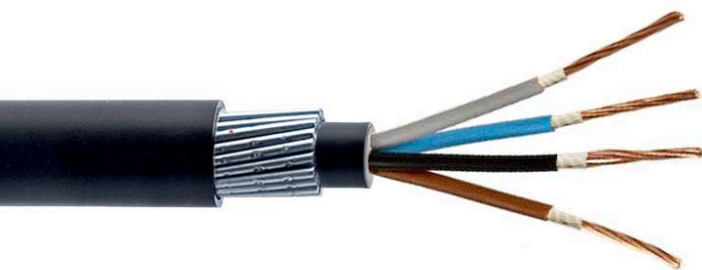
# TRATOS FIRESAFE®

LOW SMOKE ZERO HALOGEN (LSZH) CABLES HAVING ENHANCED CIRCUIT INTEGRITY WHEN EXPOSED TO FIRE - BASED ON BS7846

## TRATOS FIRESAFE-SWA/M1® - 600/1000 V Armoured

Firesafe SWA/M1 is designed for installations where a fire situation may pose a hazard and the maintenance of circuit integrity is a requirement. Applications include internal and external use in public buildings, schools, hospitals, department stores, cinemas, hotels, theatres, computer centres and similar applications where an armoured "enhanced" grade cable is specified for use in the applicable Code of Practice.

### FEATURES AND PERFORMANCES



#### CONSTRUCTION

**Conductor:** stranded plain annealed copper class 1 or class 2 conductor

**Tape:** mica/glass fire barrier tape

**Insulation:** extruded cross-linked polymer

**Bedding:** thermoplastic LSZH compound

**Armour:** single layer of galvanised steel wires

**Sheath:** thermoplastic LSZH sheathing compound

**Standard Colours:** black

#### Identification of Core

2 core: Brown, Blue

3 core: Brown, Black, Grey

4 core: Brown, Blue, Black, Grey

Multicore: Black core with white printed numbering

#### STANDARDS

- BS 7846 F2; Manufacturing and test standard
- BS 6387; Categories C, W & Z
- BS 8434-2 enhanced
- BS EN 50200; PH30, PH60, PH120
- BS 8491; PH30, PH60, PH120\*
- BS EN 60332-1 and BS EN 60332-3; Flame propagation
- BS EN 50267; Acid gas emission
- BS EN 61034; Smoke emission

#### CODES OF PRACTICE

- BS 5266 Emergency lighting cables - enhanced
- BS 5839 Clause 26.2e Enhanced grade
- BS 8519 Category 1, 2 and 3\*

#### PRODUCT APPROVAL



\* When tested in Tratos laboratories; pending third party approval

**TRATOS FIRESAFE SWA/M1 - 0.6/1 kV**

N° of Cores × c.s.a mm <sup>2</sup>	Part Number	Insulation Thickness mm	Thickness of Extruded Bedding mm	Nominal Diam. under the Armouring mm	Nominal Steel Armour Wire Diameter mm	Thickness of Oversheath Kg/km	Overall Diameter (approx.) mm	Weight (approx.) kg/km	Max. DC Conductor Resistance at 20°C Ω/km	Current Rating (A) 30° C in air	Min. bending radius mm
2x1,5	041926	0,6	0,8	8	0,9	1,3	12,8	309	12,1	22	77
2x2,5	972641	0,7	0,8	9,2	0,9	1,4	14,2	381	7,41	30	85
2x4	972644	0,7	0,8	10,3	0,9	1,4	15,3	463	4,61	40	92
2x6	972646	0,7	0,8	11,4	0,9	1,4	16,5	545	3,08	51	99
2x10	113656	0,7	0,8	12,8	0,9	1,5	18,1	688	1,83	69	109
2x16	972650	0,7	0,8	13,8	1,25	1,5	19,9	946	1,15	93	119
2x25	972652	0,9	0,8	18,3	1,25	1,6	24,7	1370	0,727	122	148
2x35	980022	0,9	1,0	20,8	1,6	1,7	28,2	1900	0,524	151	226
2x50	972438	1,0	1,0	18,3	1,6	1,8	25,9	18871	0,387	188	207
2x70	113677	1,1	1,0	20,8	1,6	1,9	28,6	2411	0,268	232	229
2x95	134006	1,1	1,2	23,4	2,0	2,0	32,3	3163	0,193	283	258
2x120	094591	1,2	1,2	26,0	2,0	2,1	35,2	3875	0,153	327	282
2x150	023359	1,4	1,2	28,9	2,0	2,2	38,4	4621	0,124	375	307
2x185	134011	1,6	1,4	32,2	2,5	2,4	43,3	5796	0,0991	428	346
2x240	TBA	1,7	1,4	35,6	2,5	2,5	46,8	7165	0,0754	500	374
2x300	TBA	1,8	1,6	39,6	2,5	2,6	51,3	8682	0,0601	570	410
2x400	TBA	2,0	1,6	44,9	2,5	2,8	57,2	10977	0,0470	671	458
3x1,5	972639	0,6	0,8	8,5	0,9	1,3	13,3	341	12,1	22	80
3x2,5	972642	0,7	0,8	9,7	0,9	1,4	14,7	437	7,41	30	88
3x4	972643	0,7	0,8	11,0	0,9	1,4	16,1	526	4,61	40	97
3x6	972645	0,7	0,8	12,1	0,9	1,4	17,2	651	3,08	51	103
3x10	041927	0,7	0,8	13,6	1,25	1,5	19,7	914	1,83	70	118
3x16	972649	0,7	0,8	14,7	1,25	1,6	21,0	1142	1,15	93	126
3x25	094529	0,9	1,0	19,8	1,6	1,7	27,2	1870	0,727	123	163
3x35	972655	0,9	1,0	20,0	1,6	1,8	28,6	2039	0,524	151	229
3x50	972656	1,0	1,0	22,5	1,6	1,8	30,2	2583	0,387	188	242
3x70	972659	1,1	1,0	25,6	1,6	1,9	33,6	3274	0,268	232	269
3x95	972660	1,1	1,2	29,9	2,0	2,1	39,2	4521	0,193	283	314
3x120	972661	1,2	1,2	32,4	2,0	2,2	42,0	5368	0,153	327	336
3x150	972662	1,4	1,4	36,0	2,5	2,3	47,0	6859	0,124	377	376
3x185	972663	1,6	1,4	40,1	2,5	2,4	51,4	8232	0,0991	428	411
3x240	972664	1,7	1,4	44,8	2,5	2,6	56,7	10213	0,0754	500	454
3x300	972665	1,8	1,6	50,4	2,5	2,7	62,6	12243	0,0601	570	501
3x400	972440	2,0	1,6	54,2	2,5	2,9	67,0	15412	0,0470	671	536

**Note:**

Two-Core conductors: up to 35mm<sup>2</sup> class 2 Circular or compacted circular stranded conductors — above 35mm<sup>2</sup> class 2 Shaped stranded conductors

Three & Four-Core conductors: up to 25mm<sup>2</sup> class 2 Circular or compacted circular stranded conductors — above 25mm<sup>2</sup> class 2 Shaped stranded conductors

## TRATOS FIRESAFE SWA/M1 - 0.6/1 kV

N° of Cores × c.s.a mm <sup>2</sup>	Part Number	Insulation Thickness mm	Thickness of Extruded Bedding mm	Nominal Diam. under the Armouring mm	Nominal Steel Armour Wire Diameter mm	Thickness of Oversheath Kg/km	Overall Diameter (approx.) mm	Weight (approx.) kg/km	Max. DC Conductor Resistance at 20°C Ω/km	Current Rating (A) 30° C in air	Min. bending radius mm
4x1,5	971261	0,6	0,8	9,3	0,9	1,3	14,1	372	12,1	22	85
4x2,5	971265	0,7	0,8	10,7	0,9	1,4	15,8	493	7,41	30	95
4x4	971267	0,7	0,8	12,1	0,9	1,4	17,2	606	4,61	40	103
4x6	971278	0,7	0,8	13,4	1,25	1,5	19,5	781	3,08	51	117
4x10	971269	0,7	0,8	15,1	1,25	1,5	21,2	1129	1,83	70	127
4x16	971271	0,7	0,8	15,3	1,25	1,6	22,7	1348	1,15	93	136
4x25	971273	0,9	1,0	20,6	1,6	1,7	28,0	2065	0,727	123	168
4x35	972599	0,9	1,0	22,2	1,6	1,8	29,9	2472	0,524	151	239
4x50	972601	1,0	1,0	25,7	1,6	1,9	33,7	3463	0,387	188	270
4x70	972603	1,1	1,2	29,6	2,0	2,1	38,9	4488	0,268	234	311
4x95	972605	1,1	1,2	33,6	2,0	2,2	43,3	5672	0,193	283	346
4x120	972607	1,2	1,4	37,3	2,5	2,3	48,3	7234	0,153	329	386
4x150	972609	1,4	1,4	41,2	2,5	2,4	52,5	8727	0,124	377	420
4x185	972611	1,6	1,4	45,6	2,5	2,6	57,5	10501	0,0991	428	460
4x240	972613	1,7	1,6	51,6	2,5	2,7	63,9	12977	0,0754	500	511
4x300	972615	1,8	1,6	57,6	2,5	2,9	70,5	15899	0,0601	570	564
4x400	972617	2,0	1,8	64,8	3,15	3,2	79,8	20847	0,0470	671	638
5x1,5	013615	0,6	0,8	10,2	0,9	1,4	15,2	415	12,1	22	122
5x2,5	013616	0,7	0,8	11,9	0,9	1,4	17,0	541	7,41	30	136
5x4	013617	0,7	0,8	13,4	0,9	1,5	18,7	719	4,61	40	150
5x6	013630	0,7	0,8	14,8	1,25	1,5	20,9	963	3,08	51	167
5x10	980623	0,7	0,8	16,8	1,25	1,6	23,2	1261	1,83	70	186
5x16	013631	0,7	1,0	18,5	1,6	1,7	25,9	1810	1,15	93	207
5x25	980624	0,9	1,0	24,4	1,6	1,8	32,1	2644	0,727	123	257
5x35	013632	0,9	1,0	26,8	1,6	1,9	34,8	3251	0,524	151	278
5x50	013633	1,0	1,2	31,6	2	2,0	40,8	4716	0,387	190	326
5x70	013634	1,1	1,2	36,2	2,0	2,2	45,9	5983	0,268	234	367

Note:

Two-Core conductors: up to 35mm<sup>2</sup> class 2 Circular or compacted circular stranded conductors — above 35mm<sup>2</sup> class 2 Shaped stranded conductors

Three & Four-Core conductors: up to 25mm<sup>2</sup> class 2 Circular or compacted circular stranded conductors — above 25mm<sup>2</sup> class 2 Shaped stranded conductors



**AUXILIARY CABLES - 0.6/1kV copper conductors**

N° of Cores × c.s.a  mm <sup>2</sup>	Part Number	Insulation Thickness  mm	Thickness of Extruded Bedding  mm	Nominal Diam. under the Armouring  mm	Nominal Steel Armour Wire Diameter  mm	Thickness of Oversheath  Kg/km	Overall Diameter (approx.)  mm	Weight (approx.)  kg/km	Max. DC Conductor Resistance at 20°C  Ω/km	Current Rating (A)	Min. bending radius  mm
										30° C in air	
7x1,5	134576	0,6	0,8	11,2	0,9	1,4	16,3	488	12,1	22	130
12x1,5	990493	0,6	0,8	14,9	1,25	1,5	21,0	835	12,1	23	168
19x1,5	991190	0,6	0,8	17,6	1,25	1,6	24,0	1066	12,1	23	192
27x1,5	946951	0,6	1,0	21,7	1,6	1,7	29,1	1620	12,1	23	233
37x1,5	972442	0,6	1,0	24,4	1,6	1,7	31,9	1940	12,1	23	255
48x1,5	990826	0,6	1,0	28,0	1,6	1,8	35,8	2315	12,1	23	286
7x2,5	112208	0,7	0,8	13,0	0,9	1,4	18,1	614	7,41	30	145
12x2,5	990877	0,7	0,8	17,4	1,25	1,6	23,8	1043	7,41	31	190
19x2,5	020087	0,7	1,0	21,0	1,6	1,7	28,4	1629	7,41	31	227
27x2,5	958976	0,7	1,0	25,3	1,6	1,8	33,1	2073	7,41	31	265
37x2,5	971201	0,7	1,0	26,6	1,6	1,8	34,4	2486	7,41	31	275
48x2,5	945668	0,7	1,2	33,2	2,0	2,0	42,4	3373	7,41	31	339
7x4	TBA	0,7	0,8	14,6	1,25	1,5	20,7	916	4,61	40	166
12x4	991327	0,7	1,0	20,0	1,6	1,6	27,2	1560	4,61	41	218
19x4	TBA	0,7	1,0	23,8	1,6	1,7	31,3	2088	4,61	41	250
27x4	TBA	0,7	1,0	28,7	1,6	1,9	36,8	2693	4,61	41	294
37x4	051487	0,7	1,2	32,8	2,0	2,0	41,8	3741	4,61	41	334
48x4	TBA	0,7	1,2	37,6	2,0	2,1	47,2	4584	4,61	41	378

Note: class 2 Circular or compacted circular stranded conductor

# TRATOS FIRESAFE®

LOW SMOKE ZERO HALOGEN (LSZH) CABLES HAVING ENHANCED CIRCUIT INTEGRITY WHEN EXPOSED TO FIRE

## TRATOS FIRESAFE-OPTI® - Fibre Optics

Firesafe OPTI has been designed for use in areas where optical fibre cables are required to operate in the event of a fire. For use in railway and highways tunnels, mass transit underground systems, metro lines, ducts and public buildings.

### FEATURES AND PERFORMANCES



#### CONSTRUCTION

- **Fibre:** 62.5/125 multimode fibres
- **Tube:** jelly filled loose tube
- **Tape:** Fire Resistant Wrapping
- **Inner Sheath:** polyethylene
- **Strength Member:** aramidic
- **Tape:** corrugated steel
- **Outer Sheath:** LSZH
- **Standard Colour:** violet (more colors are available upon request)

#### STANDARDS

- CEI IEC 60331-11 Ed. 1999 equivalent CEI 20-36/1-1 Ed. 1 2003-03: Test for electric cables under re conditions Part 11 apparatus fire alone at flame temperatures of at least 750°C.
- CEI OEC 60331-25 Ed. 1999 equivalent CEI 20-36/2-5 Ed. 1 2002-03: Test for electrical cables under fire conditions – circuits integrity part 25 procedures and requirements optical bre cables.



#### VENDOR APPROVAL SYSTEM



## TRATOS FIRESAFE-OPTI - Fibre Optics

N° of Fibres mm <sup>2</sup>	Part Number	N° of Fibres/Tube	N° of Tubes	Nominal Diameter (approx.) mm	Pulling Load Static/Dynamic Max. N	Bending Radius Static/Dynamic Min. mm	Nominal Cable Weight Kg/km
8	TBA	1	8	20,5	3.000/4.000	430/350	450
16	TBA	2	8	20,5	3.000/4.000	430/350	450
48	TBA	6	8	20,5	3.000/4.000	430/350	450
72	TBA	12	6	21,5	3.000/4.000	430/350	450

## OPTICAL CHARACTERISTICS

Attenuation range dm/km		Bandwidth MHz/km		Numerical Aperture	Attenuation Increase after 90 min. dB	Flame test and 15 min. room Max. at 1300nm	Temperature (for 8 fibre) Average dB
at 850nm	at 1300nm	at 850nm	at 1300nm				
3/3,5	0,7/1,5	>160/200	>200/600	0,275+/-0,015	+0,04		+0,0075

## PHYSICAL CHARACTERISTICS

Core Diameter	Cladding Diameter	Core/Cladding Concentricity Error	Core Non Circularity	Cladding Non Circularity	Coating Diameter
Micron	Micron	%	%	%	Micron

## GENERAL CHARACTERISTICS

Proof Test %	Effective Group Index		Coating Stripability N
	at 850nm	at 1300nm	
>0,5	1,4970	1,4919	1/5