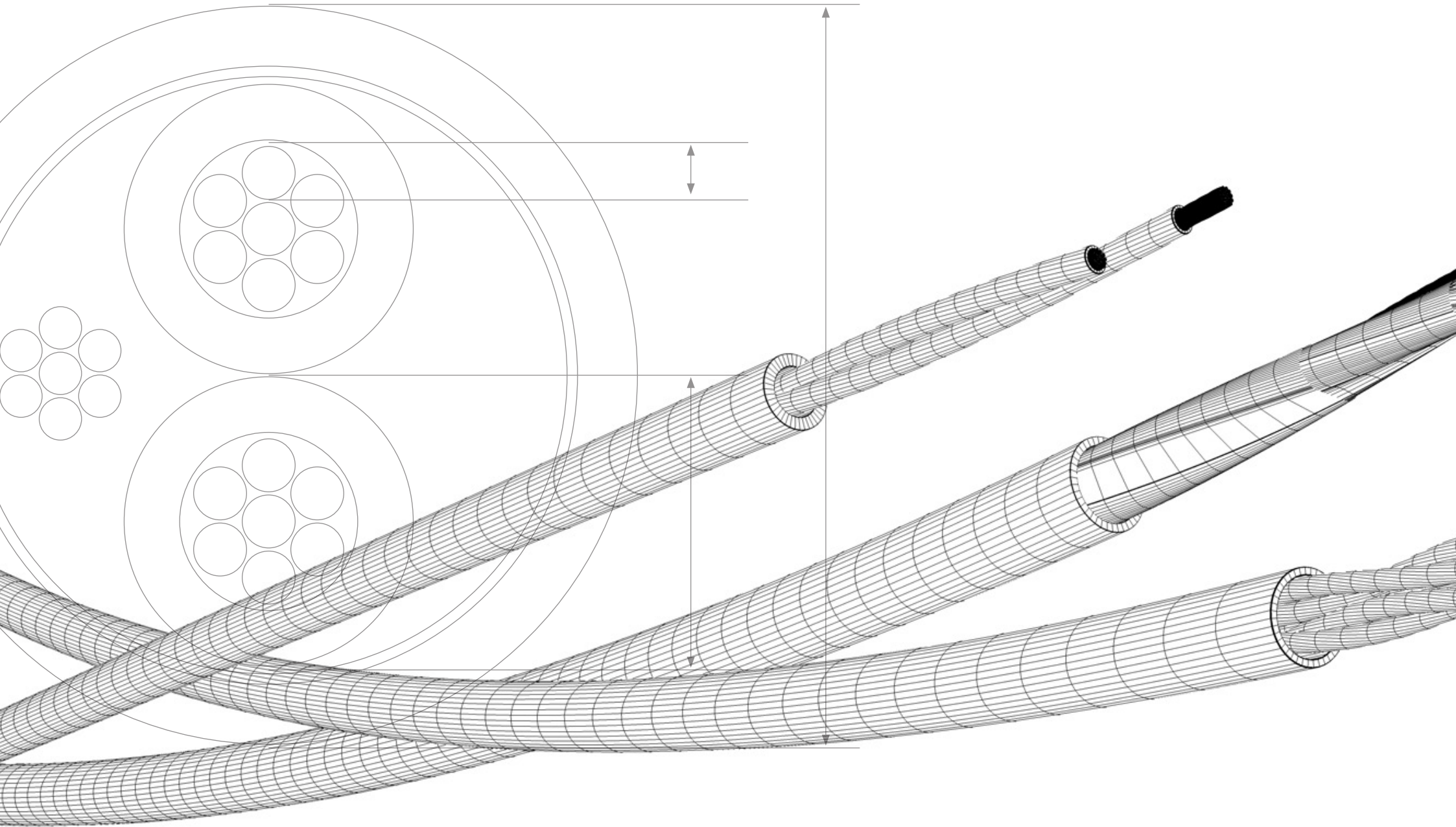
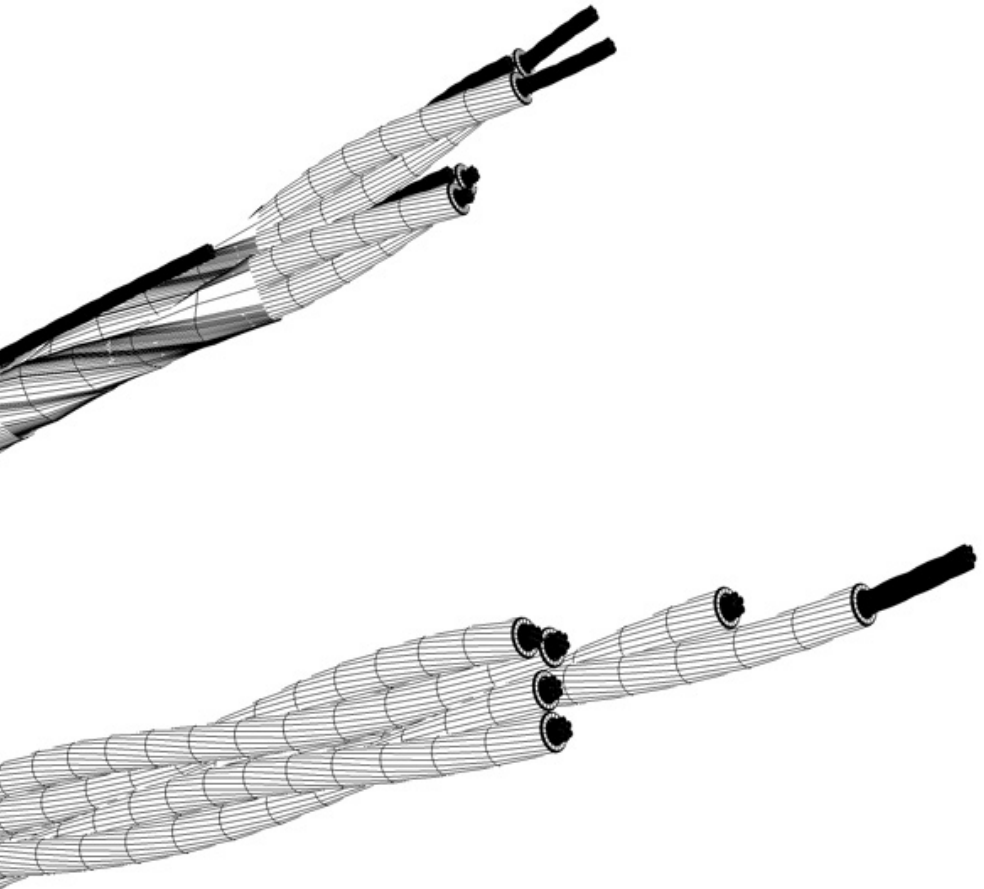


FireFighter™ Data Cables  
for Low Smoke Zero Halogen Applications







## Cable excellence engineered through quality

There are two main areas of expertise that allow FireFighter to deliver solid performance cables with confidence. The first is understanding exactly what our customers expect our cables to deliver in terms of electrical performance and environmental endurance. The second is interpreting this expectation through materials technology and cable manufacturing techniques and controls into the finished cable.

These two sweeping statements simplify the cumulative years of dedication and commitment to our cables and the thousands of hours of proving, testing and verifying performance characteristics.

FireFighter low smoke zero halogen cables are developed to meet the stringent safety requirements of public buildings and the continuing endeavour to improve survival chances in the event of disaster.



0013



## FireFighter™ Fire Performance Cables

The following pages detail the range of stocked cables for Data Telecommunications, BUS, Alarm, Def-Stan and Control applications with FireFighter™ performance. If the cable you are looking for is not here call or e-mail us with your application requirements and we will match or develop a cable to suit with FireFighter™ performance characteristics:

- no self-propagation of fire along the cable
- relatively low toxicity of gases admitted in a fire
- no production of corrosive gases
- no dioxins in the remains of the fire
- minimum smoke production

01279 871150

[sales@belcom.co.uk](mailto:sales@belcom.co.uk)

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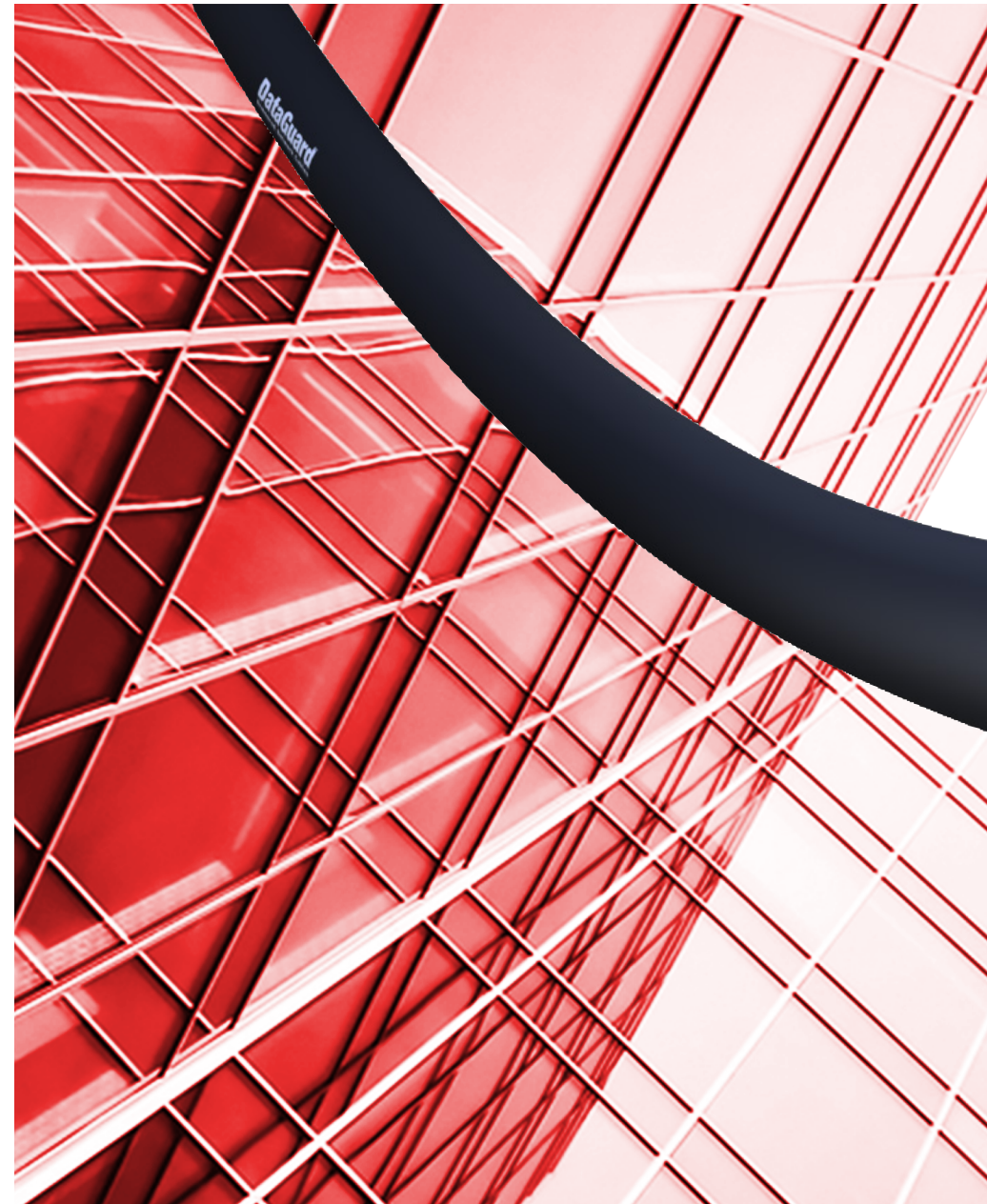
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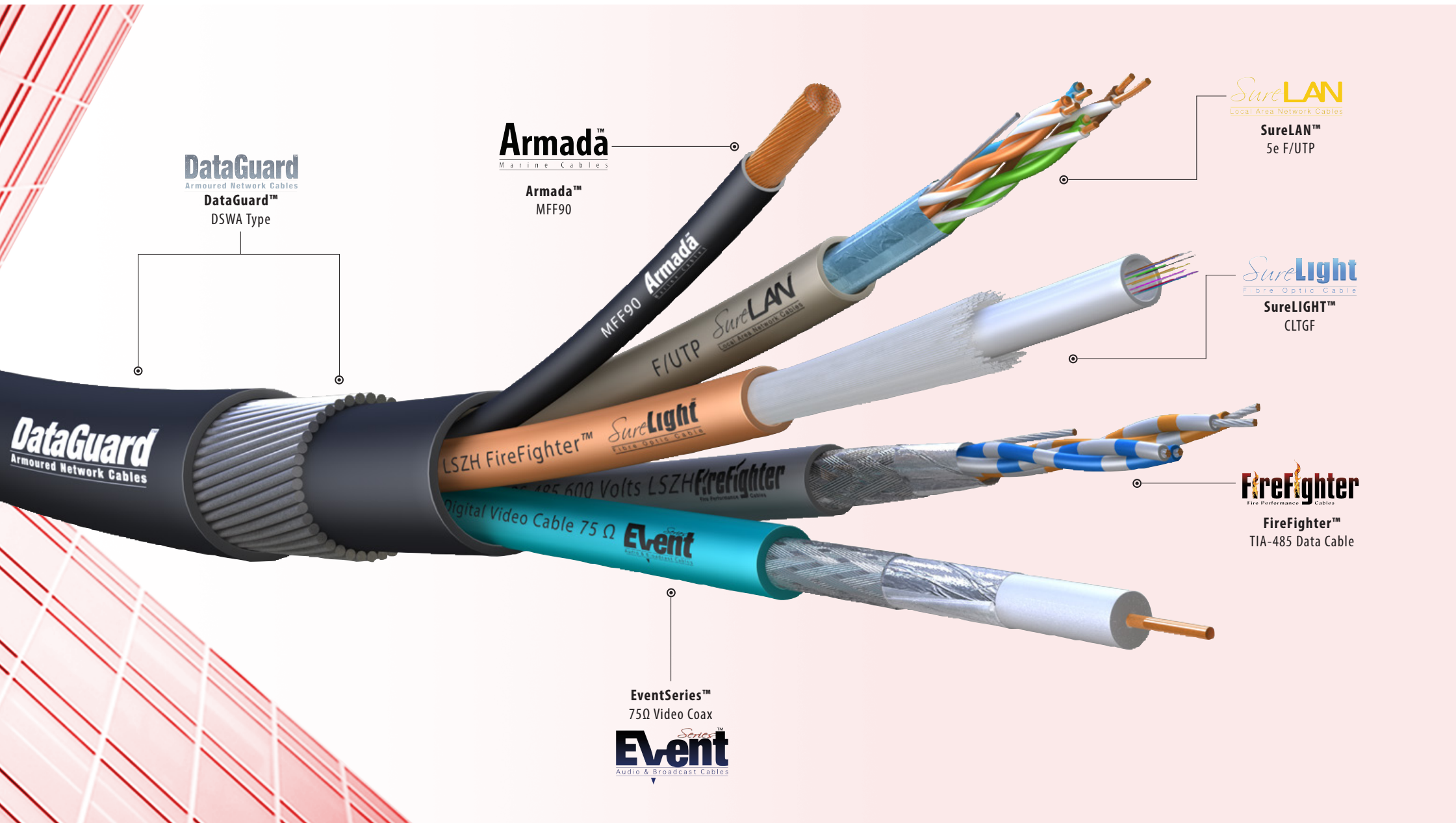
## The importance of **FireFighter** Fire Performance Cables

FireFighter cables are produced to exacting IEC standards for fire performance covering 60332-1 flame resistance for single cables and section 3 for bunched cables as well as low smoke generation (61034) and negligible halogen gas emission (60754-1). In addition to these, all FireFighter™ cables are sheathed according to IEC60092-359 for electrical installation in ships as well as being 600 V rated for Tray Cable applications.

In order to meet demanding and diverse customer applications, FireFighter™ performance materials are used in conjunction with other brands including DataGuard™ (Armoured Cables), Armada™ (MOG Cables), SureLAN™ (Local area network cables), SureLIGHT™ (Fibre Optic) and EventSeries™ (Audio & Broadcast).

Whatever the application or installation, where public safety and reliability are concerned, FireFighter™ Low smoke zero halogen properties have been proven to perform. It's not just LSZH sheath, It's a FireFighter™ Cable.





**DataGuard**  
Armoured Network Cables  
**DataGuard™**  
DSWA Type

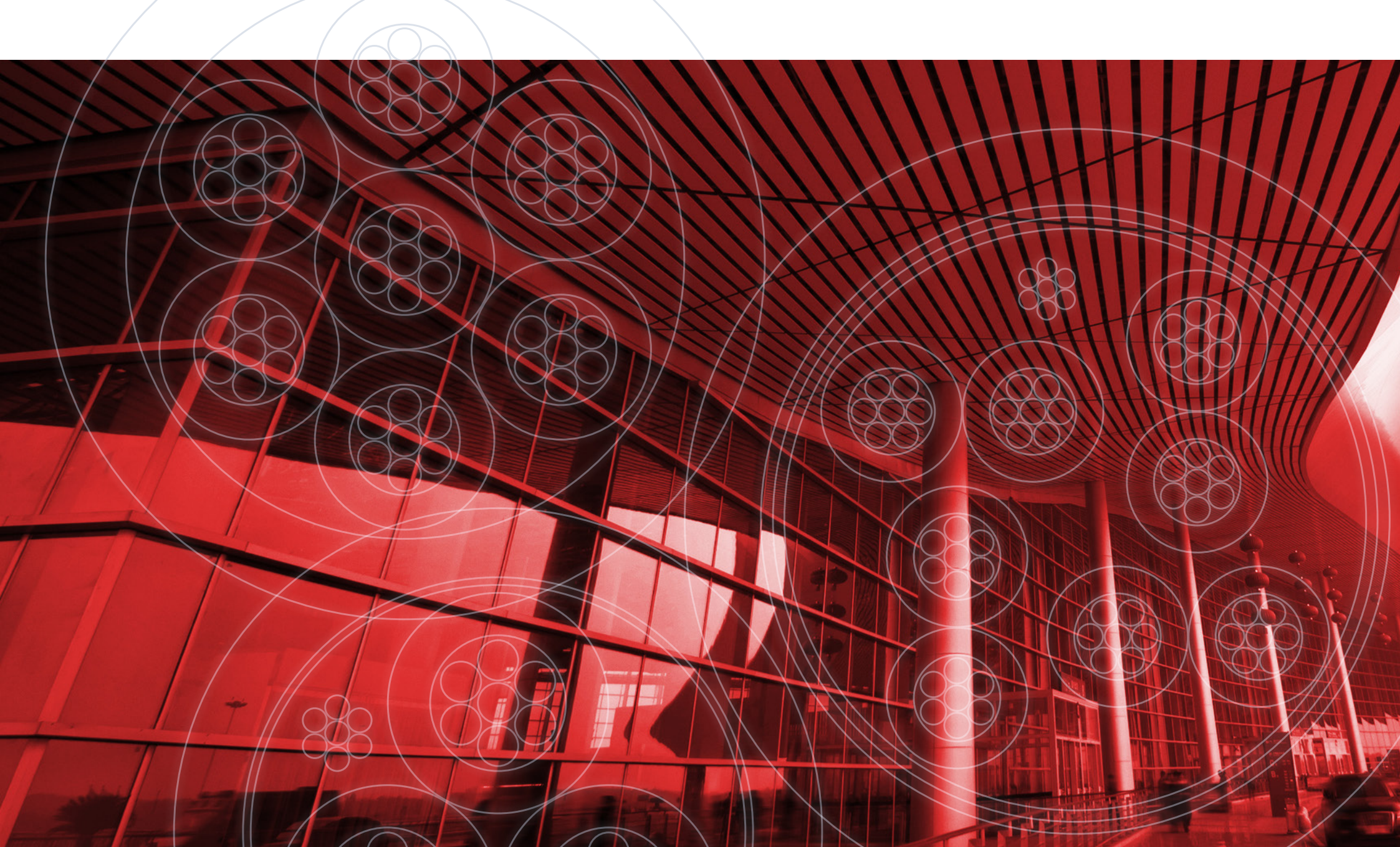
**Armada™**  
Marine Cables  
**Armada™**  
MFF90

**SureLAN**  
Local Area Network Cables  
**SureLAN™**  
5e F/UTP

**SureLight**  
Fibre Optic Cable  
**SureLIGHT™**  
CLTGF

**FireFighter**  
Fire Performance Cables  
**FireFighter™**  
TIA-485 Data Cable

**EventSeries™**  
75Ω Video Coax  
**Event**  
Series™  
Audio & Broadcast Cables







## Sectors

FireFighter™ Cables have been tried, tested and trusted in many areas where the need for a low smoke zero halogen cable is to be installed. The following is a generic list that FireFighter™ cables continue to be involved in -

- Industrial Networks
- Network & Data
- Marine, oil & gas
- Entertainment and broadcast
- Retail & Leisure
- Commercial Building
- Security
- Transport Infrastructure



**FFxT** cables have FireFighter™ Low Smoke Halogen Free performance characteristics coupled with extreme temperature survivability boasting superior ageing properties in Marine/Offshore, Aviation and Rolling stock applications in arduous arctic conditions as well as being able to withstand Oil & Drilling Fluid exposure according to NEK606 with high resistance to ozone, abrasion & corona.



**FFCi** cables have FireFighter™ performance characteristics with the addition of IEC 60331 test procedures for applications where circuit integrity is required. These include circuit integrity FE 180 and insulation integrity E30/E90. For peace of mind look for the FFCi mark for your assurance where circuit integrity is needed.

**We took care of the details so you dont  
need to deal with the devil.**

From the idiom “the devil is in the detail”, FireFighter™ endeavour to do things thoroughly, paying attention to small details which, otherwise overlooked, could prove costly later on.



**FireFighter**  
Fire Performance Cables



**FireFighter**  
Fire Performance Cables

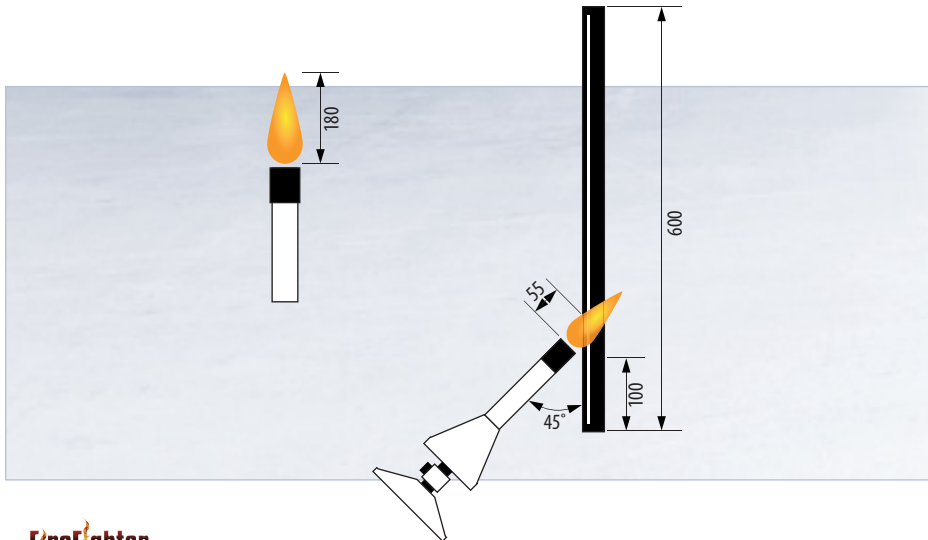


**FireFighter**  
Fire Performance Cables

## IEC Single Scale Flame Test

IEC 60332-1-2 / EN 60332-1-2 / VG 95218-2 Method 1 / BS 4066 Part 1

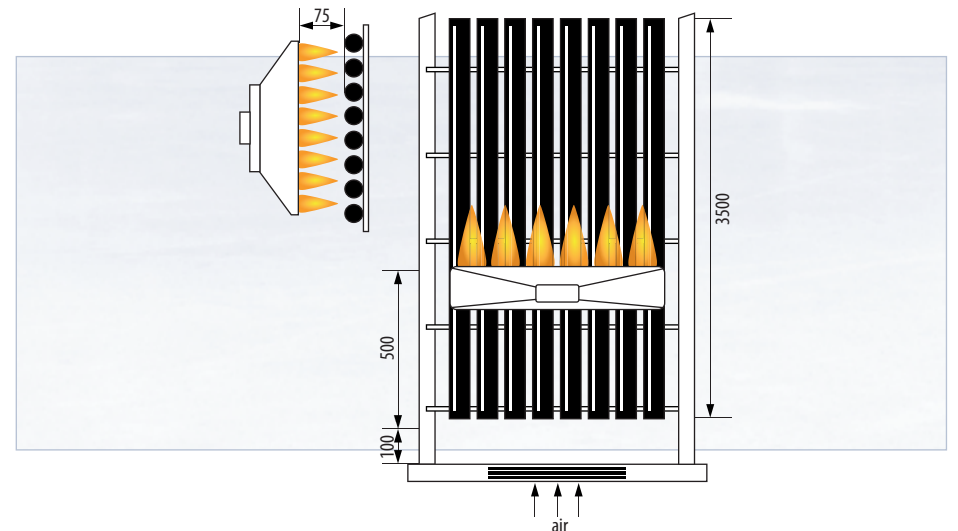
<b>Test set-up :</b>	The single cable to be tested is fixed vertically and exposed to a Bunsen burner flame at a 45° angle to the vertical. Test apparatus according to IEC/EN 60332-1-1
<b>Flame temperature :</b>	Determined by the specified setting of the Bunsen burner flame.
<b>Test duration :</b>	Cable with a diameter of $\leq 25$ mm: 60 sec Cable with a diameter of $25 < D \leq 50$ mm: 120sec
<b>Compliance criteria :</b>	The fire damage must end at least 50 mm below the upper fixing clamp. The cable must be self-extinguishing.



## IEC Large Scale Flame Test

IEC 60332-3/EN 50266-2

<b>Test set-up :</b>	The cables are fixed to a ladder, close together or at a distance depending on the type of fire. The cables may be fixed in several layers.
<b>Flame temperature :</b>	Determined by the specified volume of propane and air.
<b>Test duration :</b>	Part 21: Category A F/R only for special applications Part 22: Category A (7 l flammable material/m): 40 min Part 23: Category B (3.5 l flammable material/m): 40 min Part 24: Category C (1.5 l flammable material/m): 20 min Part 25: Category D (0.5 l flammable material/m): 20 min
<b>Compliance criteria :</b>	Fire damage to the cable may be visible for a maximum of 2.5 m from the bottom of the burner to the top.



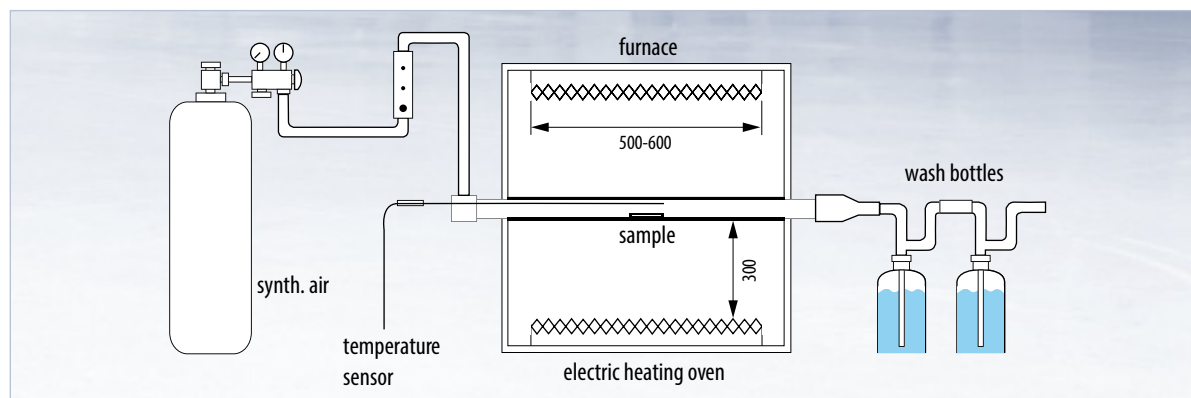
## IEC Determination of Halogen Acid gas and acidity of gases

IEC 60754-1 / EN 50267-2-1 / VDE 0482-261-2-1 / NF C32-074-21

<b>Test set-up :</b>	A sample of between 0.5g and 1.0g is heated in a tube. The resulting gases are dissolved and tested for their halogen content. Test apparatus acc. to EN 50267-1
<b>Flame temperature :</b>	800 ± 80 °C
<b>Test duration :</b>	40 ± 5 minutes in total, with at least 20 minutes at the maximum temperature
<b>Compliance criteria :</b>	The amount of halogen acid is expressed as mg of hydrochloric acid per gram mass sample
<b>Scope :</b>	For compounds or materials described as 'zero-halogen' and all materials containing less than 5mg/g halogen acid equivalent, it is recommended to use the method specified in IEC 60794-2 / EN 50267-2-2.

IEC 60754-2 / EN 50267-2-2 / VDE 0482-261-2-2 / NF C32-074-22

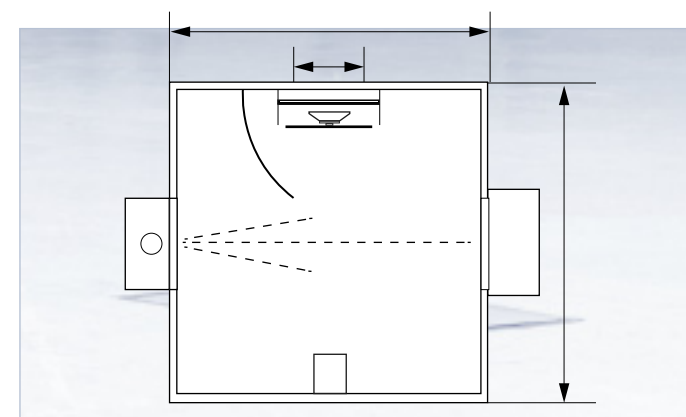
<b>Test set-up :</b>	A sample of 1g of all non-metallic cable components is burnt in a furnace. The pH value and the conductivity of the combustion gases dissolved in water are measured. Test apparatus acc. to EN 50267-1
<b>Flame temperature :</b>	At least 935°C
<b>Test duration :</b>	30 minutes
<b>Compliance criteria :</b>	The pH value and the conductivity must be measured. Recommendation : The pH value of the washing water must be at least 4.3, the conductivity of the washing water must be at most 10µs/mm. The criteria are valid for one non-metallic component of a cable



## IEC Measurement of smoke density under defined conditions

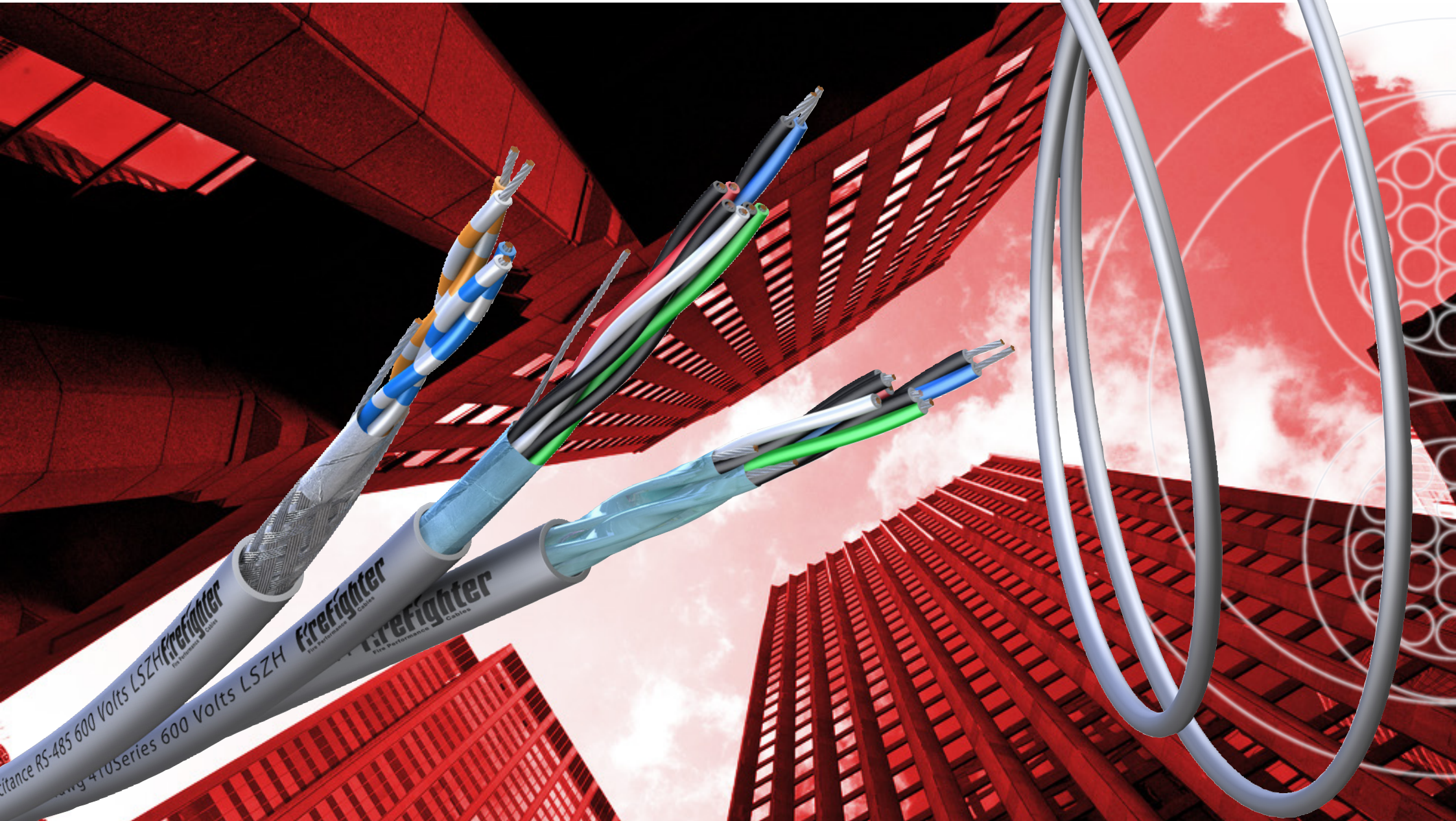
IEC 61034-2 / EN 61034-2 / VDE 0482-1034-2 / NF C32-073-2

<b>Test set-up :</b>	A cable specimen is burnt in a closed chamber using flammable liquid. The light transmittance of the resulting smoke is measured optically. Test apparatus acc. to IEC / EN 61034-1
<b>Flame temperature :</b>	Determined by the quantity and composition of the fuel.
<b>Test duration :</b>	40 minutes
<b>Compliance criteria :</b>	The smoke must transmit the light at the end of the test's duration, as stated in the individual specifications. The recommendation of light transmission is 60% minimum.



## Characteristics of RS232, RS422, RS423 and TIA(RS)-485

	RS232	RS423	RS422	TIA(RS)-485
<b>Differential</b>	no	no	yes	yes
<b>Max number of drivers</b>	1	1	1	32
<b>Max number of receivers</b>	1	10	10	32
<b>Modes of operation</b>	half duplex full duplex	half duplex	half duplex	half duplex
<b>Network topology</b>	point to point	multidrop	multidrop	multipoint
<b>Max distance (acc. standard)</b>	15 m	1200 m	1200 m	1200 m
<b>Max speed at 12m</b>	20 kbs	100 kbs	10 mbs	35 mbs
<b>Max speed at 1200 m</b>	(1 kbs)	1 kbs	100 kbs	100 kbs
<b>Max slew rate</b>	30 V/ $\mu$ s	adjustable	n/a	n/a
<b>Receiver input resistance</b>	3..7 k $\Omega$	$\geq$ 4 k $\Omega$	$\geq$ 4 k $\Omega$	$\geq$ 12 k $\Omega$
<b>Driver load impedance</b>	3..7 k $\Omega$	$\geq$ 450 k $\Omega$	100 $\Omega$	54 $\Omega$
<b>Receiver input sensitivity</b>	$\pm$ 3 V	$\pm$ 200 mV	$\pm$ 200 mV	$\pm$ 200 mV
<b>Receiver input range</b>	$\pm$ 15 V	$\pm$ 12 V	$\pm$ 10 V	-7..12 V
<b>Max driver output voltage</b>	$\pm$ 25 V	$\pm$ 6 V	$\pm$ 6 V	-7..12 V
<b>Min driver output voltage (with load)</b>	$\pm$ 5 V	$\pm$ 3.6 V	$\pm$ 2.0 V	$\pm$ 1.5 V



...tance RS-485 600 Volts LSZH FireFighter  
...ng 410 Series 600 Volts LSZH FireFighter  
Fire Performance Cables  
Fire Performance Cables

**400Series** Single-Pair  
600 Volts LSZH FireFighter™

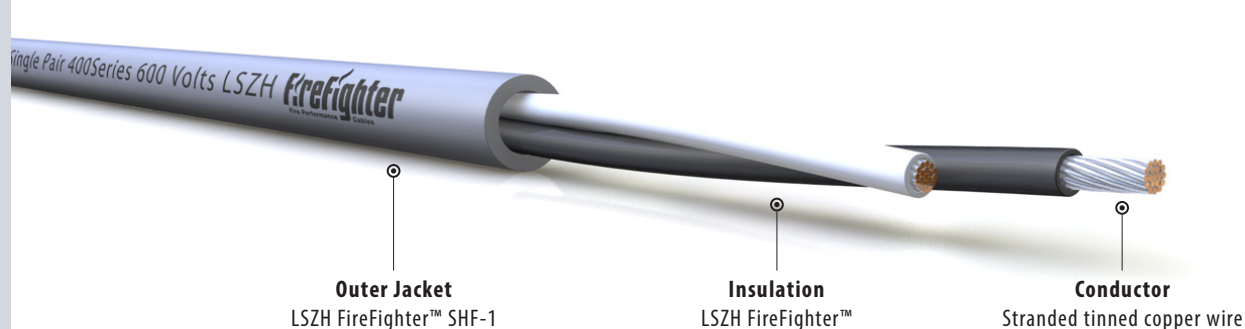
*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Images used are an example from the range  
and indicative only.*



Part Number	Formation <i>(No. of pairs x awg)</i>	Colour code	Nom. Ø (mm) <i>mm</i>	Weight (kg/km) <i>kg/km</i>	Nom. Capacitance (cond./cond.) <i>pF/m</i>	Nom. Conductor DC Resistance <i>Ω/km</i>	Nom. Inductance <i>μH/m</i>
4001P2244	1 x 2 x 22 awg	black / red	4.32	18	98	51.4	0.56
4001P2044	1 x 2 x 20 awg	black / red	4.57	21	80.8	33	0.56
4001P2044-BW	1 x 2 x 20 awg	black / white	4.57	21	80.8	33	0.56
4001P1844	1 x 2 x 18 awg	black / red	5.94	39	72.6	19.4	0.56
3001P1844	1 x 2 x 18 awg	black / white	5.94	39	72.6	19.4	0.56
4001P1644	1 x 2 x 16 awg	black / white	6.96	51	108	14.7	0.56
4001P1444	1 x 2 x 14 awg	black / white	8.64	96	108	9.38	0.56
4001P1244	1 x 2 x 12 awg	black / white	9.80	142	108	14.7	0.56



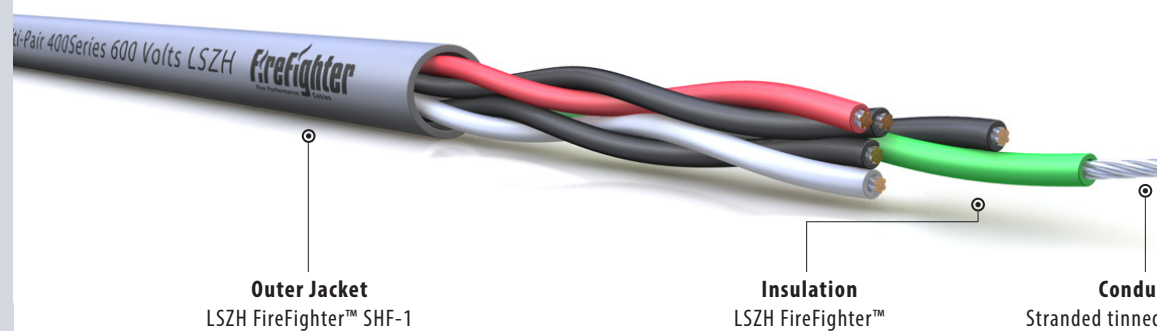
**400Series Multi-Pair**  
600 Volts LSZH FireFighter™

**Fire Performance:**  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

**Temperature range:**  
Static: -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

**Voltage Rating:**  
600 V

**Voltage Test core - core :**  
2000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Conductor DC Resistance Ω/km
4003P2044	3 x 2 x 20 awg	Chart 3	7.50	67	80.3	32.8
4002P1844	2 x 2 x 18 awg		8.45	65	83.6	19.2
4003P1844	3 x 2 x 18 awg		8.81	87	83.6	19.2

Images used are an example from the range and indicative only.

**400Series Multi-Core 22awg**  
600 Volts LSZH FireFighter™

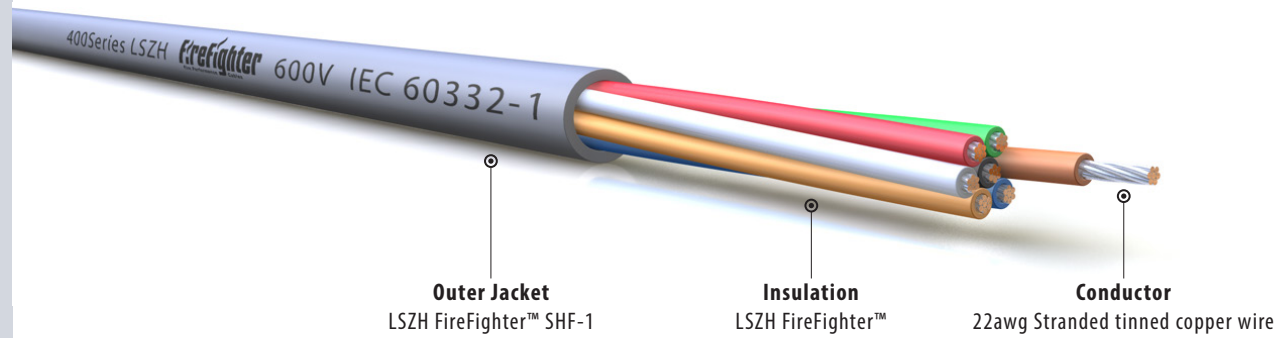
*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of cores)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Conductor DC Resistance Ω/km	Nom. Inductance μH/m
4001P2244	2 x 22 awg (1 pair)	Chart 3	3.30	18	99 pF/m	51.5 Ω/km	0.66 μH/m
4003C2244	3 x 22 awg	black/red/green	3.50	21			
4004C2244	4 x 22 awg	Chart 1	3.90	27			
4006C2244	6 x 22 awg	Chart 1	4.90	48			
4008C2244	8 x 22 awg	Chart 1	5.50	58			
4010C2244	10 x 22 awg	Chart 1	5.90	69			
4012C2244	12 x 22 awg	Chart 1	6.40	81			

**410Series** Single-Pair 22awg  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

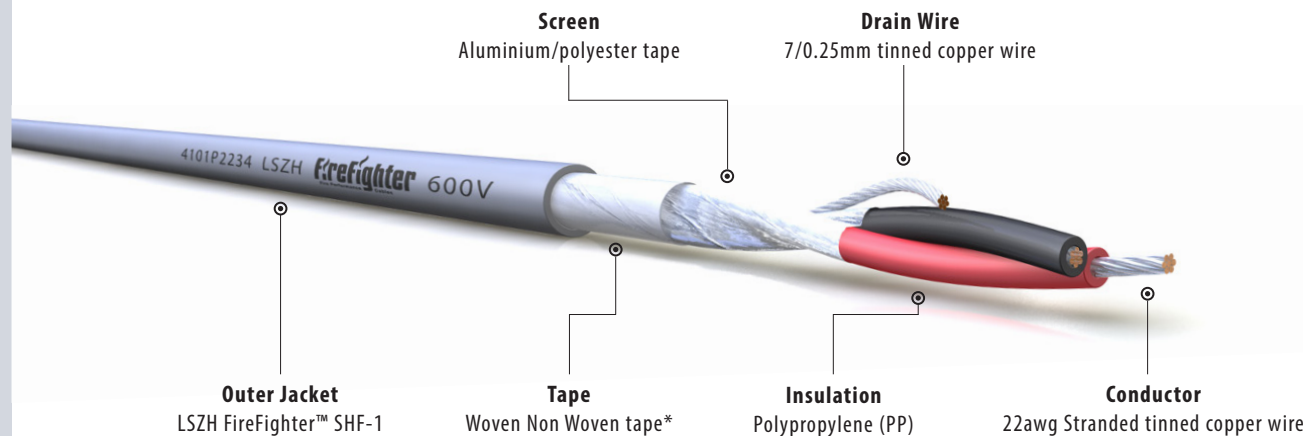
*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

**\* Woven Non Woven tape separator facilitates jacket stripping**

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance pF/m	Nom. Conductor DC Resistance Ω/km
4101P2234	1 x 2 x 22 awg	Black / Red	3.6	20	82.5	52.2

**490Series** Single Pair 22awg  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

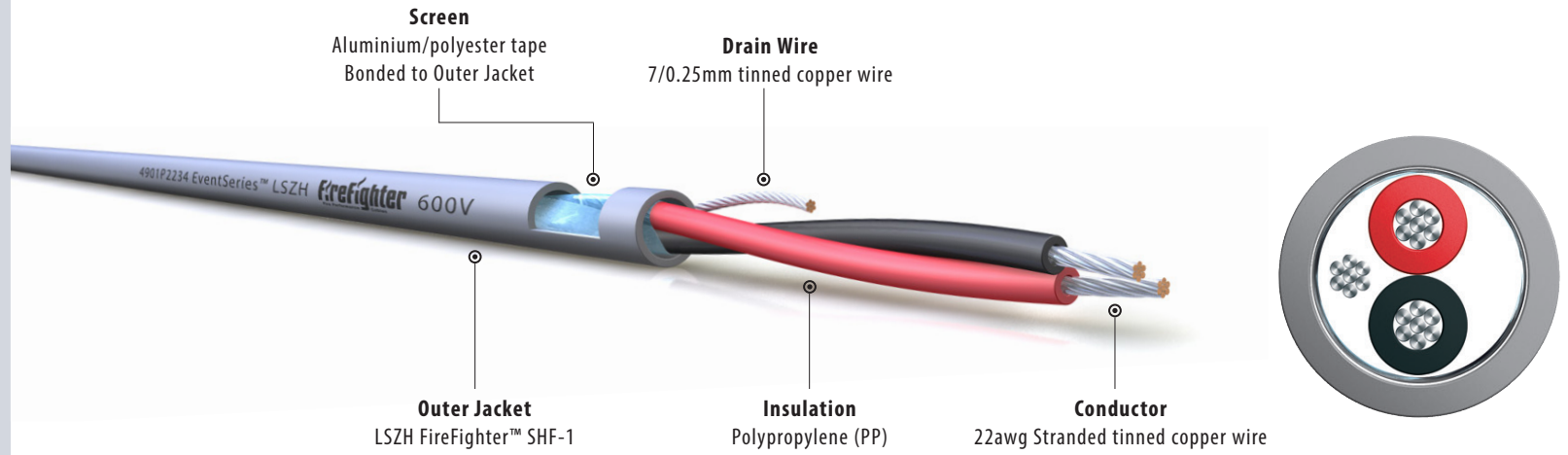
*Temperature range:*  
Static : -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range  
and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance pF/m	Nom. Conductor DC Resistance Ω/km
4901P2234	1 x 2 x 22 awg	Black / Red	3.607	20	82.5	52.2

**410Series Single Pair**  
600 Volts LSZH FireFighter™

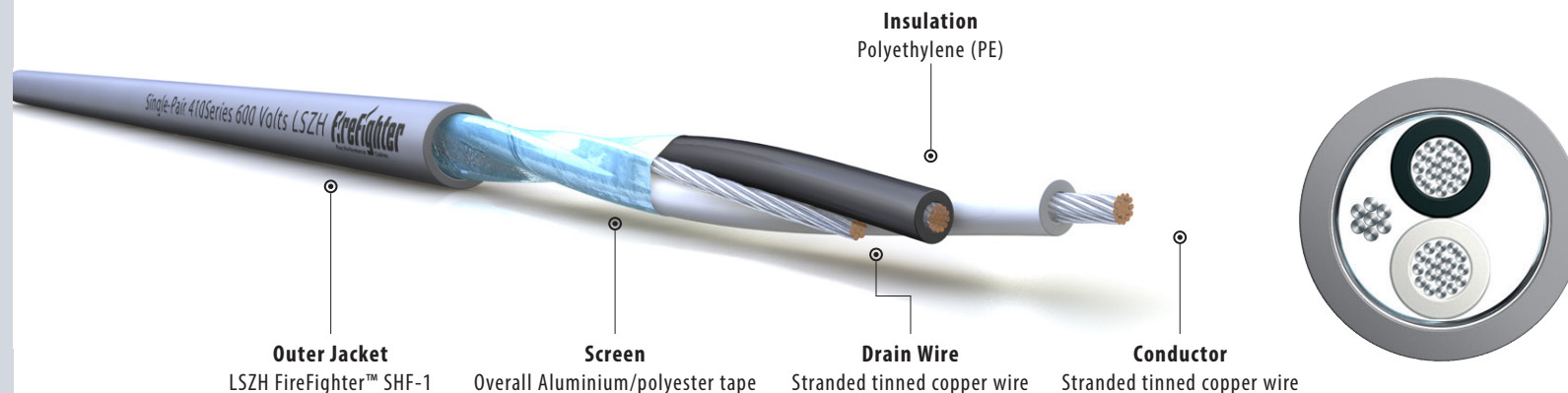
*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
*Static:* -20 °C up to +80 °C  
*Installation:* -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Conductor DC Resistance Ω/km
4101P2224	1 x 2 x 22 awg	Black / White	4.45	26	72.6	140	54
4101P2024	1 x 2 x 20 awg		5.18	33	84	155	33
4101P1824	1 x 2 x 18 awg		5.64	45	90	166	23
4101P1624	1 x 2 x 16 awg		7.95	60	75	139	14.5
4101P1424	1 x 2 x 14 awg		9.02	106	77	144	9.7
4101P1224	1 x 2 x 12 awg		10.16	142	82.5	161	5.3

*Images used are an example from the range and indicative only.*

**410Series Multi-Pair 16awg**  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

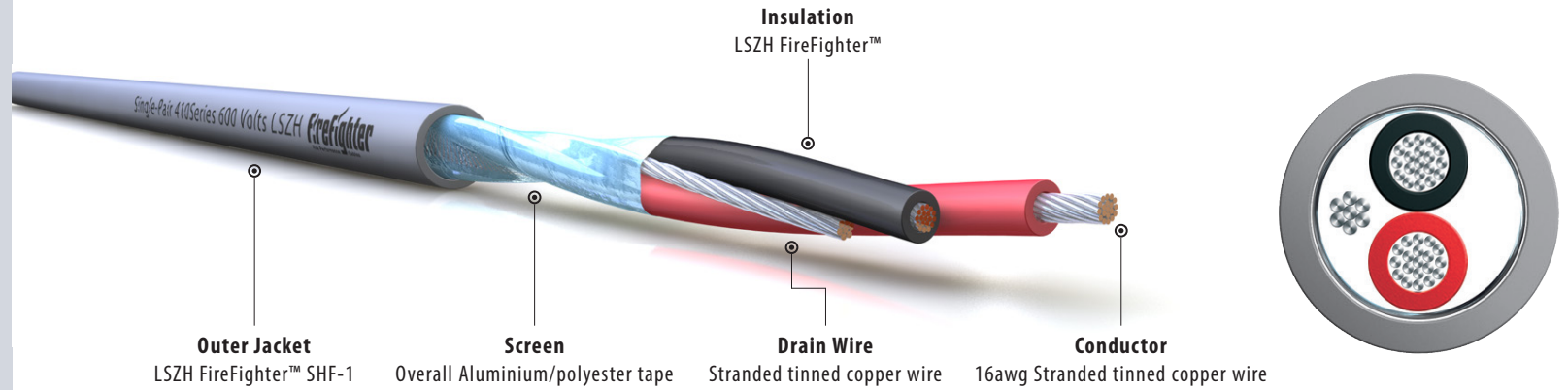
*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range  
and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/km	Nom. Capacitance (C./C./S.) pF/km	Nom. Conductor DC Resistance Ω/km	Nom. Inductance μH/m	Nom. Impedance Ω
4101P1644	1 x 2 x 16 awg	Chart 3	7.95	60	75	139	14.5	0.56	65
4102P1644	2 x 2 x 16 awg		11.5	136					

### 410Series Triple Conductor 600 Volts LSZH FireFighter™

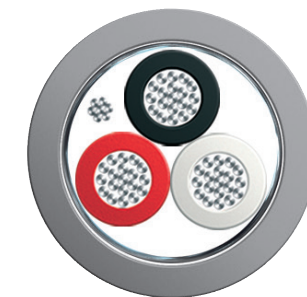
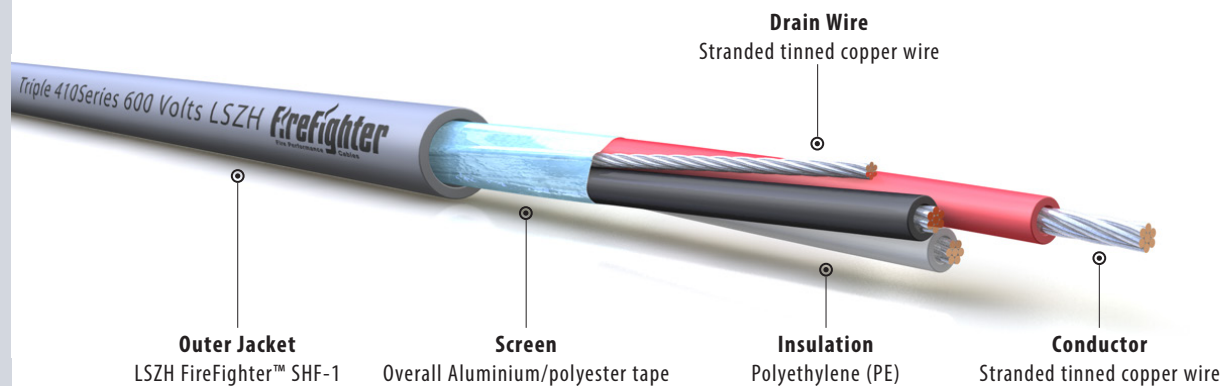
**Fire Performance:**  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

**Temperature range:**  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

**Voltage Rating:**  
600 V

**Voltage Test core - core :**  
2000 Vdc x 1 min

**Voltage Test core - screen :**  
1000 Vdc x 1 min



Part Number	Formation (No. of cores)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km
4103C2224	3 x 22 awg	Black/Red/White	5.15	33	75.9	135	49.5	38.6
4103C2024	3 x 20 awg		5.54	42	89.1	168	33	29.4
4103C1824	3 x 18 awg		6.25	59	79.2	158	21.7	28
4103C1624	3 x 16 awg		8.30	96	85.8	165	15.8	-

Images used are an example from the range and indicative only.

### 410Series Multi-Pair 24awg 600 Volts LSZH FireFighter™

**Fire Performance:**

IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

**Temperature range:**

Static: -20 °C up to +80 °C

Installation: -5 °C up to +80 °C

**Voltage Rating:**

600 V

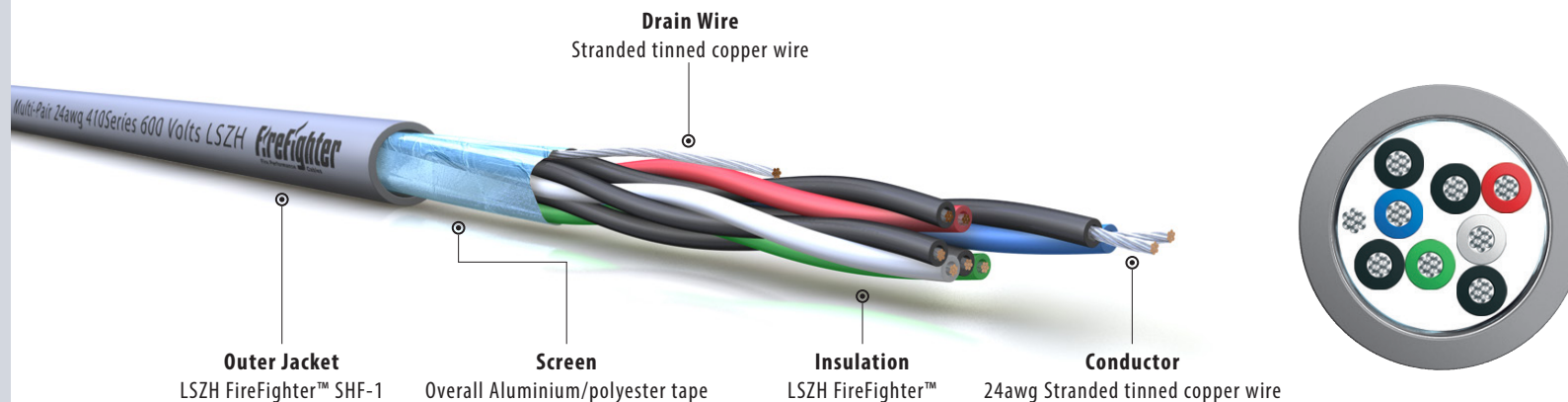
**Voltage Test core - core :**

2000 Vdc x 1 min

**Voltage Test core - screen :**

1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4101P2444	1 x 2 x 24 awg	Chart 3	3.96	18	131	243	78.7	59.1	75
4102P2444	2 x 2 x 24 awg		5.64	33	98	164	78.7	55.8	75
4103P2444	3 x 2 x 24 awg		5.89	42	98	164	78.7	55.8	75
4104P2444	4 x 2 x 24 awg		6.73	54	98	164	78.7	55.8	75
4105P2444	5 x 2 x 24 awg		7.34	60	98	164	78.7	55.8	75
4106P2444	6 x 2 x 24 awg		7.34	68	98	164	78.7	52.5	75
4107P2444	7 x 2 x 24 awg		7.47	69	98	164	78.7	54.1	75
4108P2444	8 x 2 x 24 awg		8.23	77	98	164	78.7	54.1	75
4109P2444	9 x 2 x 24 awg		8.48	99	98	164	78.7	54.1	75
4110P2444	10 x 2 x 24 awg		9.34	105	98	164	78.7	54.1	75
4115P2444	15 x 2 x 24 awg		10.60	145	98	164	78.7	54.1	75
4119P2444	19 x 2 x 24 awg		11.40	178	98	164	78.7	54.1	75
4125P2444	25 x 2 x 24 awg		12.80	220	98	164	78.7	54.1	75
4150P2444	50 x 2 x 24 awg		18.00	370	98	164	78.7	49.9	75



**410Series Multi-Pair 18awg**  
600 Volts LSZH FireFighter™

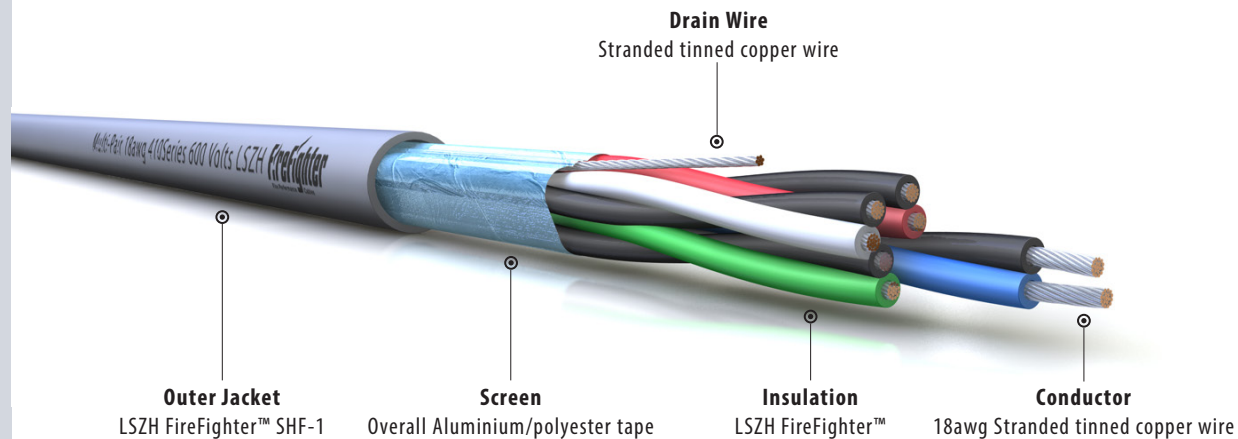
*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
*Static: -20 °C up to +80 °C*  
*Installation: -5 °C up to +80 °C*

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/km	Nom. Capacitance (C./C./S.) pF/km	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km
4101P1844	1 x 2 x 18 awg	Chart 3	5.80	52.2	178	330	19.6	29.7
4102P1844	2 x 2 x 18 awg		9.60	90	115.5	178.2	19.6	29.7
4103P1844	3 x 2 x 18 awg		10.8	126	115.5	178.2	19.6	29.7
4104P1844	4 x 2 x 18 awg		11.7	145	115.5	178.2	19.6	29.7

*Images used are an example from the range and indicative only.*

**410Series Multi-Core 24awg**  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

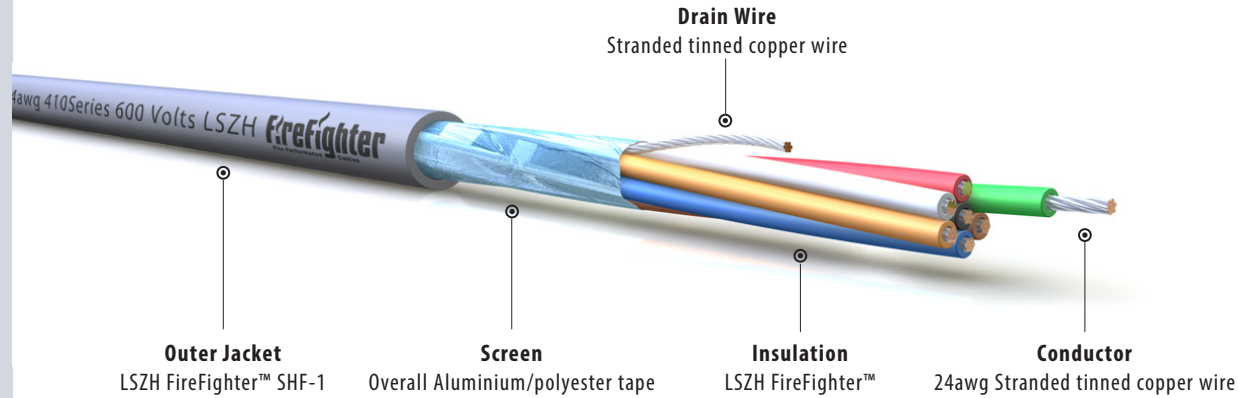
*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of cores)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km
4103C2444	3 x 24 awg	Chart 1	4.11	23	108	213	82.5	59.4
4104C2444	4 x 24 awg	Chart 1	4.67	27	108	213		
4105C2444	5 x 24 awg	Chart 1	4.80	31	108	213		
4106C2444	6 x 24 awg	Chart 1	5.31	36	108	213		
4107C2444	7 x 24 awg	Chart 1	5.31	40	108	213		
4108C2444	8 x 24 awg	Chart 1	5.69	51	108	213		
4109C2444	9 x 24 awg	Chart 1	6.20	58	98	180		
4110C2444	10 x 24 awg	Chart 1	6.19	60	98	180		
4112C2444	12 x 24 awg	Chart 13	6.90	65	98	180		
4115C2444	15 x 24 awg	Chart 2	7.21	82	98	180		
4120C2444	20 x 24 awg	Chart 2	7.98	99	98	180		
4125C2444	25 x 24 awg	Chart 2	8.61	124	98	180		

**420Series Multi-Pair 24awg**  
 Low Capacitance  
 600 Volts LSZH FireFighter™

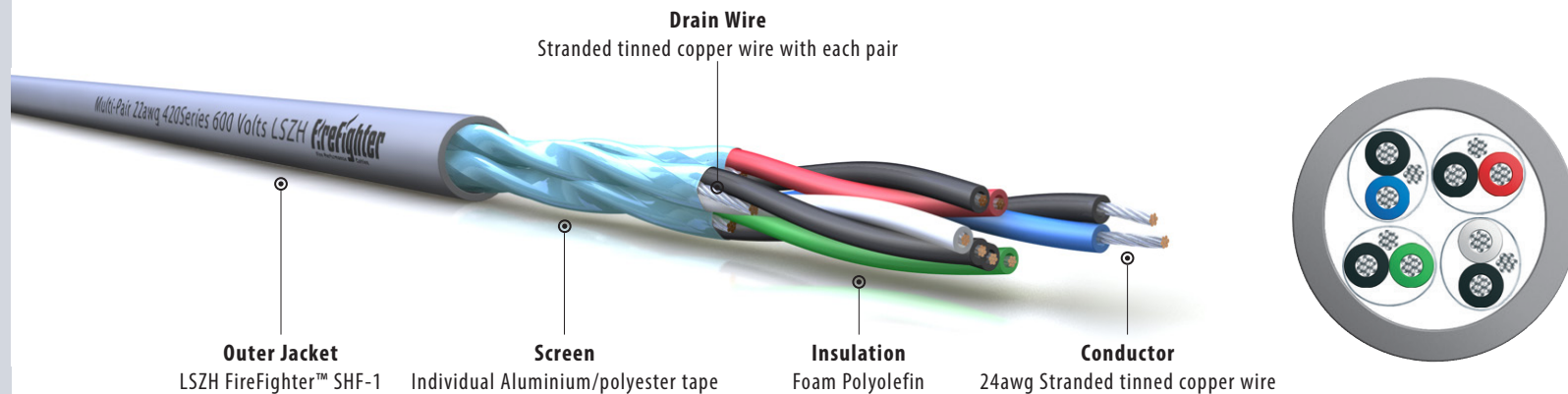
*Fire Performance:*  
 IEC60332-1,  
 IEC60332-3,  
 IEC61034,  
 IEC60754-1,  
 IEC60092.

*Temperature range:*  
 Static: -20 °C up to +80 °C  
 Installation: -5 °C up to +80 °C

*Voltage Rating:*  
 600 V

*Voltage Test core - core :*  
 2000 Vdc x 1 min

*Voltage Test core - screen :*  
 1000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4202P2454	2 x 2 x 24 awg	Chart 3	8.05	40	41	76.1	78.7	59.1	100
4203P2454	3 x 2 x 24 awg		8.48	50					
4204P2454	4 x 2 x 24 awg		9.22	63					
4206P2454	6 x 2 x 24 awg		10.69	85					
4208P2454	8 x 2 x 24 awg		11.9	123					
4212P2454	12 x 2 x 24 awg		13.2	170					

*Images used are an example from the range and indicative only.*

**420Series Multi-Pair 22awg**  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static : -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

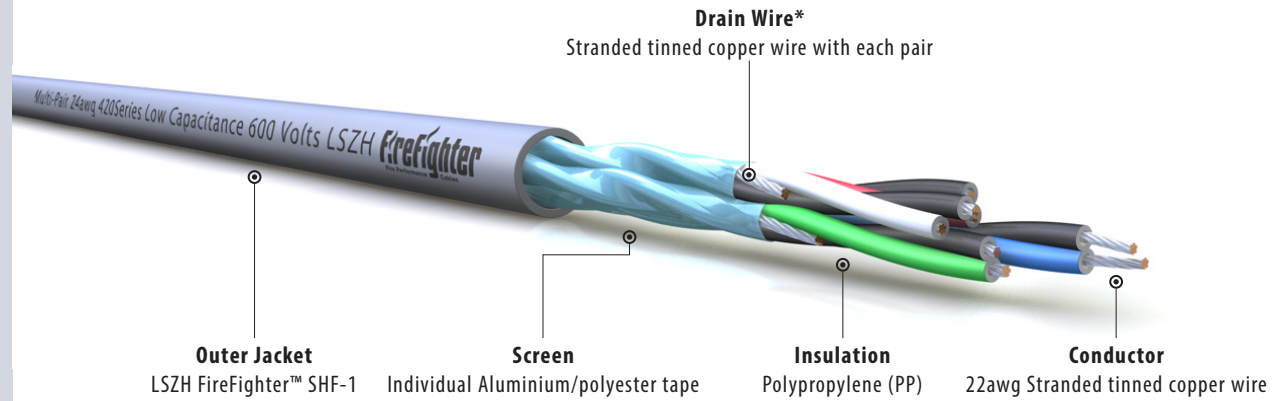
*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

**\* 4202P2234 has one common drain wire (Alu. Outside)**

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4202P2234	2 x 2 x 22 awg	Chart 9	4.60	30	115	203	49.2	54.5	45
4203P2234	3 x 2 x 22 awg	Chart 3	6.93	60	98	180	49.2	34.8	50
4204P2234	4 x 2 x 22 awg		7.50	73					
4206P2234	6 x 2 x 22 awg		9.19	103					
4209P2234	9 x 2 x 22 awg		10.59	151					
4211P2234	11 x 2 x 22 awg		11.79	170					
4212P2234	12 x 2 x 22 awg	11.79	194						
4215P2234	15 x 2 x 22 awg		13.92	239					

**420Series** Two-Pair 20awg  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

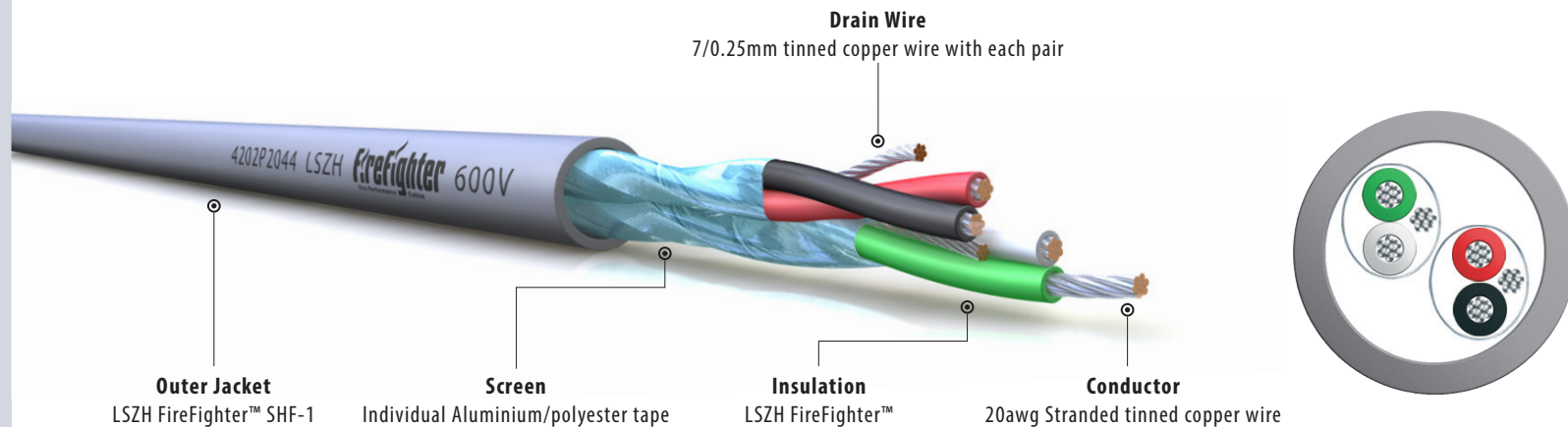
*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation <i>(No. of pairs x awg)</i>	Colour Code	Nom. Ø <i>mm</i>	Weight <i>kg/km</i>	Nom. Capacitance <i>pF/m</i>	Nom. Conductor DC Resistance <i>Ω/km</i>
4202P2024	2 x 2 x 20 awg	Chart 9	6.619	68	183.9	30.4

**420Series Multi-Pair 20awg**  
600 Volts LSZH FireFighter™

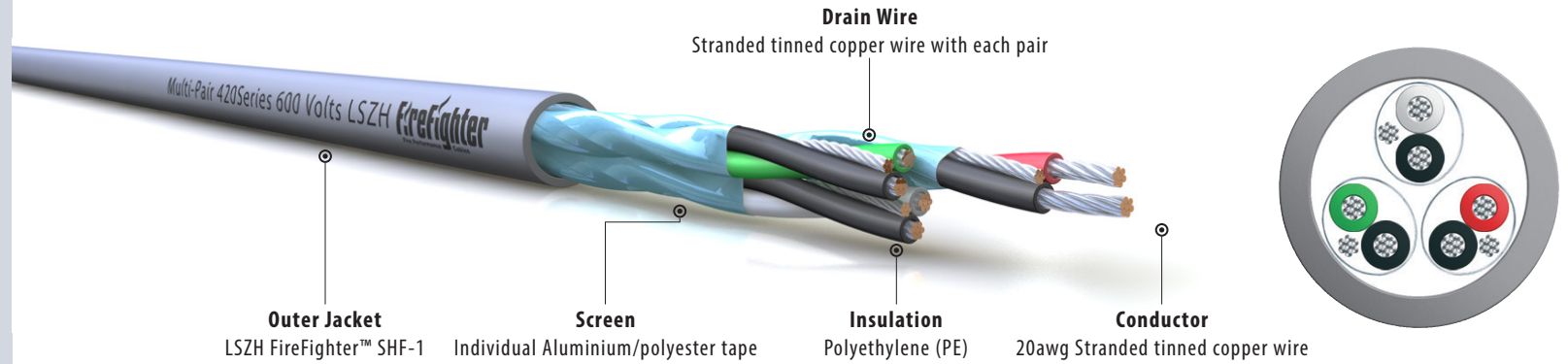
**Fire Performance:**  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

**Temperature range:**  
Static : -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

**Voltage Rating:**  
600 V

**Voltage Test core - core :**  
2000 Vdc x 1 min

**Voltage Test core - screen :**  
1000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/km	Nom. Capacitance (C./C./S.) pF/km	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4203P2024	3 x 2 x 20 awg	Chart 3	8.66	75	98	180	34.4	45.	50
4206P2024	6 x 2 x 20 awg		11.30	142	9	180	34.4	37.1	50
4209P2024	9 x 2 x 20 awg		14.10	199	98	180	34.4	37.1	50

*Images used are an example from the range and indicative only.*

**420Series Multi-Pair 18awg**  
600 Volts LSZH FireFighter™

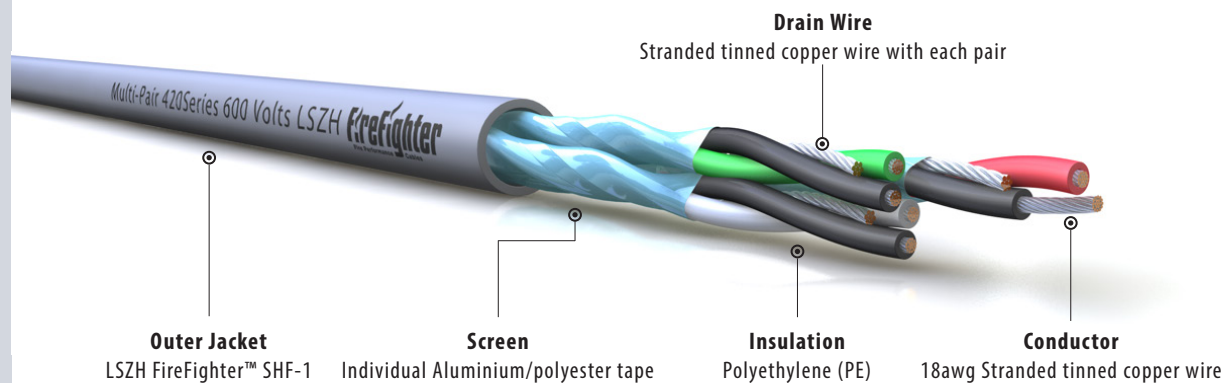
*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4203P1824	3 x 2 x 18 awg	Chart 3	10.26	118	98	180	21	27.2	50
4206P1824	6 x 2 x 18 awg		14.22	209	98	180	21	27.2	50
4209P1824	9 x 2 x 18 awg		16.64	289	98	180	21	27.2	50

*Images used are an example from the range and indicative only.*

**460Series** Two-Pair 22awg  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

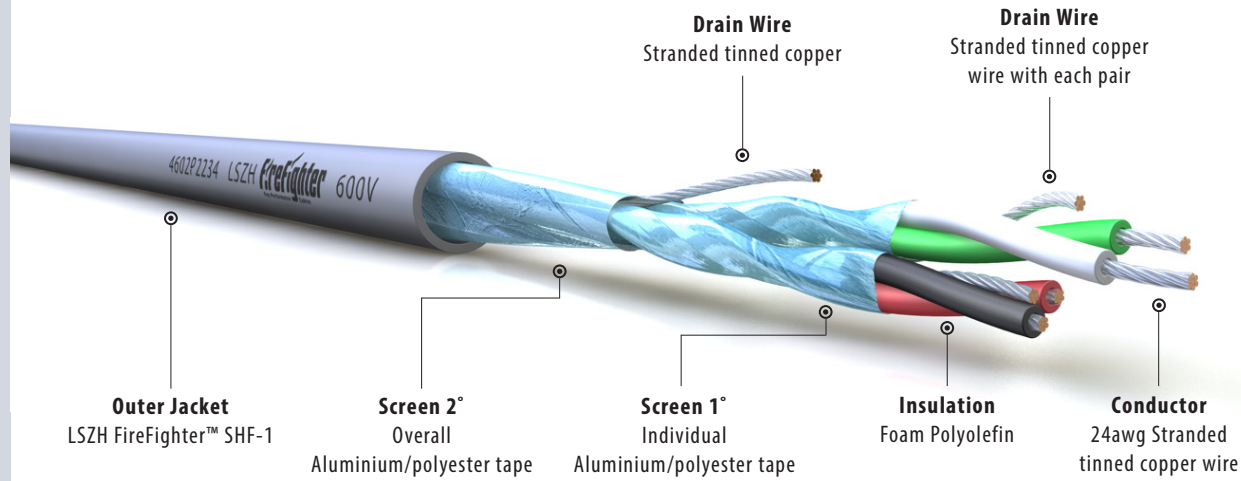
*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range  
and indicative only.*



Part Number	Formation <i>(No. of pairs x awg)</i>	Colour Code	Nom. Ø <i>mm</i>	Weight <i>kg/km</i>	Nom. Capacitance <i>pF/m</i>	Nom. Conductor DC Resistance <i>Ω/km</i>
4602P2234	2 x 2 x 22 awg	Chart 9	6.344	48	103	52.5



**430Series Multi-Pair 24awg**  
600 Volts LSZH FireFighter™

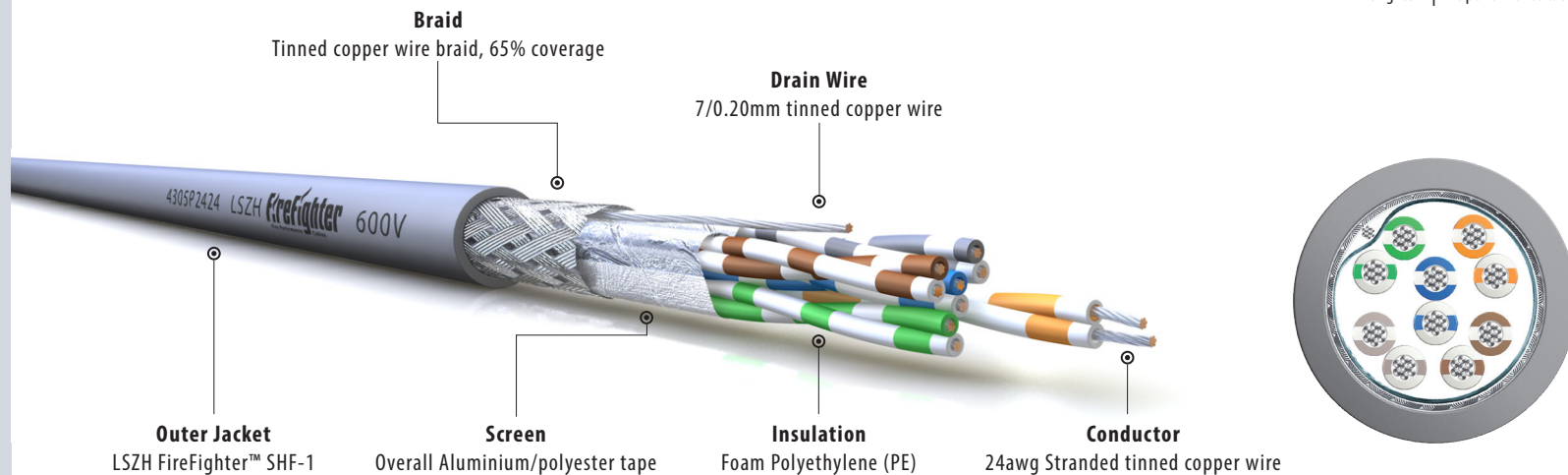
*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/km	Nom. Capacitance (C./C./S.) pF/km	Nom. Conductor DC Resistance Ω/km	Nom. Outer Shield DC Resistance Ω/km	Nom. Velocity of Propagation %	Nom. Inductance μH/m	Nom. Impedance Ω
4302P2424	2 x 2 x 24 awg	Chart 5	6.90	52	41.0125	72.182	78.744	15.0925	78	0.66	100
4303P2424	3 x 2 x 24 awg		7.50	58							
4305P2424	5 x 2 x 24 awg		8.60	83							
4306P2424	6 x 2 x 24 awg		8.90	92							

*Images used are an example from the range and indicative only.*

**440Series Multi-Pair 24awg**  
 Low Capacitance TIA-485  
 600 Volts LSZH FireFighter™

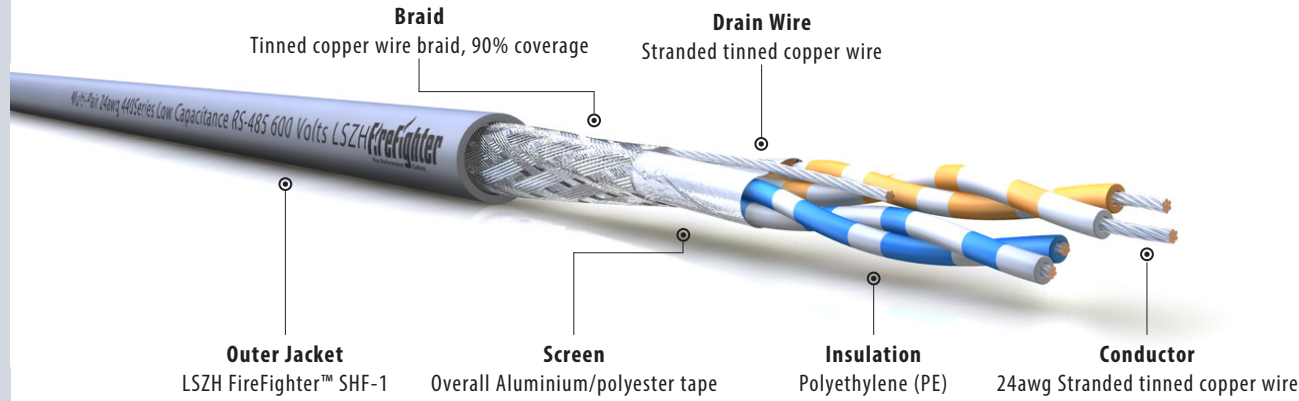
*Fire Performance:*  
 IEC60332-1,  
 IEC60332-3,  
 IEC61034,  
 IEC60754-1,  
 IEC60092.

*Temperature range:*  
 Static : -20 °C up to +80 °C  
 Installation : -5 °C up to +80 °C

*Voltage Rating:*  
 600 V

*Voltage Test core - core :*  
 2000 Vdc x 1 min

*Voltage Test core - screen :*  
 1000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/km	Nom. Capacitance (C./C./S.) pF/km	Electrical Resistance Ω/km	Nom. Velocity of Propagation %	Nom. Inductance μH/m	Nom. Impedance Ω
4401P2454	1 x 2 x 24 awg	Chart 5	6.215	46	42	75.5	82	66	0.56	120
4402P2454	2 x 2 x 24 awg		8.418	60						
4403P2454	3 x 2 x 24 awg		8.508	68						
4404P2454	4 x 2 x 24 awg		9.257	77						
4408P2454	8 x 2 x 24 awg									

*Images used are an example from the range and indicative only.*

**430Series Multi-Pair 22awg**  
TIA-485 Control Cables  
600 Volts LSZH FireFighter™

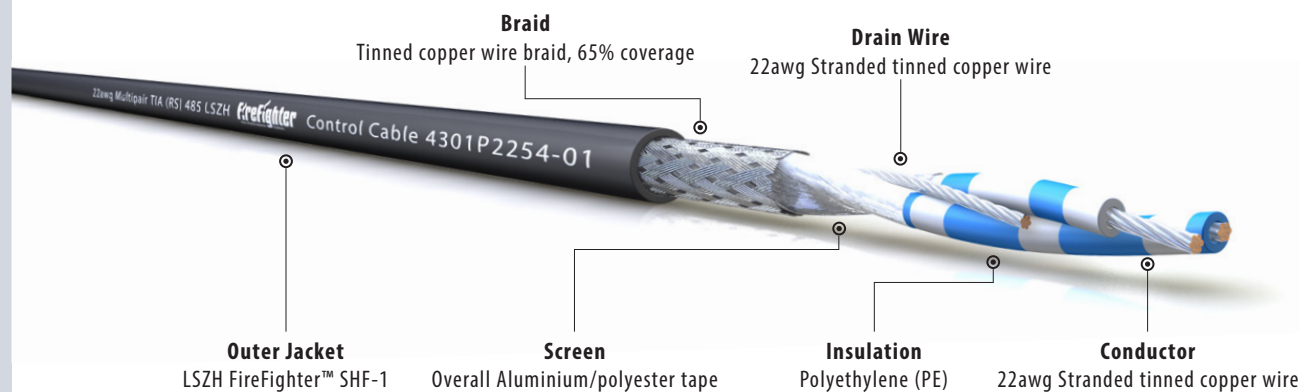
*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/km	Nom. Capacitance (C./C./S.) pF/km	Nom. Velocity of Propagation %	Nom. Impedance Ω	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km
4301P2254-01	1 x 2 x 22 awg	Chart 5	7.20	-	36.1	65.6	78	120	48.2	9.5
4301.5P2254-01	2 x 2 x 22 + 1 x 22 awg		8.00	-						9.2
4302P2254-01	2 x 2 x 22 awg		9.10	-						4.6
4303P2254-01	3 x 2 x 22 awg		10.60	-						4.6
4304P2254-01	4 x 2 x 22awg		12.63	-						3.6

*Images used are an example from the range and indicative only.*

**450Series Multi-Pair 24awg**  
 Low Capacitance  
 EIA RS232 / EIA RS422  
 600 Volts LSZH FireFighter™

*Fire Performance:*  
 IEC60332-1,  
 IEC60332-3,  
 IEC61034,  
 IEC60754-1,  
 IEC60092.

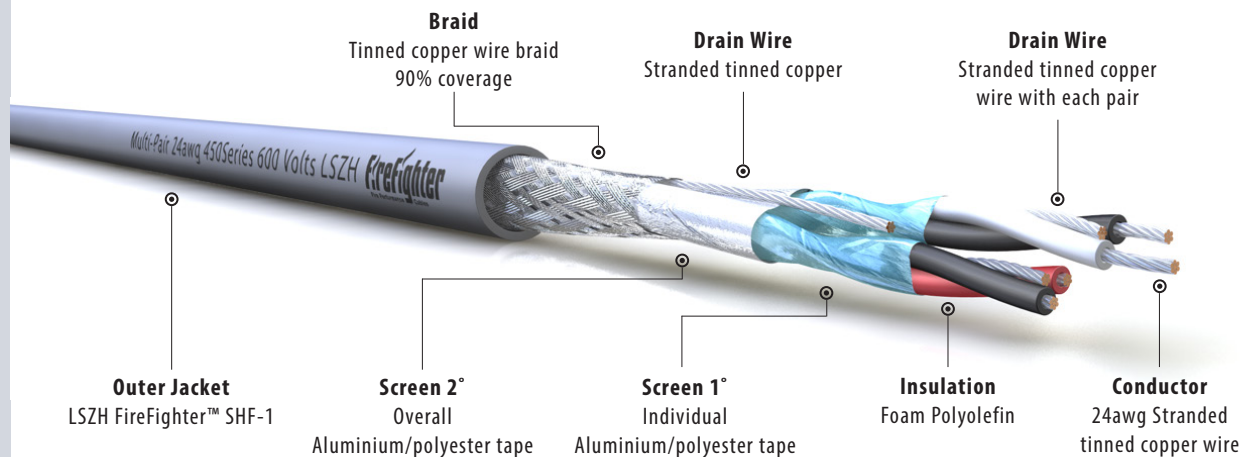
*Temperature range:*  
 Static: -20 °C up to +80 °C  
 Installation: -5 °C up to +80 °C

*Voltage Rating:*  
 600 V

*Voltage Test core - core :*  
 2000 Vdc x 1 min

*Voltage Test core - screen :*  
 1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Conductor DC Resistance Ω/km	Nom. Individual Shield DC Resistance Ω/km	Nom. Overall Shield DC Resistance Ω/km	Nom. Impedance Ω
4502P2454	2 x 2 x 24 awg	Chart 3	8.30	92	41	72.2	78.7	59.1	14.1	100
4503P2454	3 x 2 x 24 awg		8.70	102	41	72.2	78.7	59.1	14.	100
4504P2454	4 x 2 x 24 awg		9.40	121	41	72.2	78.7	59.1	10.	100
4505P2454	5 x 2 x 24 awg		10.00	131	41	72.2	78.7	59.1	11.	100
4506P2454	6 x 2 x 24 awg		10.80	148	41	72.2	78.7	59.1	9.2	100
4507P2454	7 x 2 x 24 awg		10.80	157	41	72.2	78.7	59.1	9.2	100
4508P2454	8 x 2 x 24 awg		11.60	177	41	72.2	78.7	59.1	9.2	100
4510P2454	10 x 2 x 24 awg		14.20	250	41	72.2	78.7	59.1	8.9	100
4515P2454	15 x 2 x 24 awg		16.20	325	41	72.2	78.7	59.1	8.2	100
4518P2454	18 x 2 x 24 awg		16.70	350	41	72.2	78.7	59.1	8.6	100
4525P2454	25 x 2 x 24 awg		20.00	521	41	72.2	78.7	59.1	7.9	100

**480Series 78 Ω**  
 Twinax & Data Cable  
 600 Volts LSZH FireFighter™

*Fire Performance:*  
 IEC60332-1,  
 IEC60332-3,  
 IEC61034,  
 IEC60754-1,  
 IEC60092.

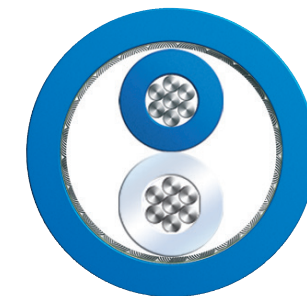
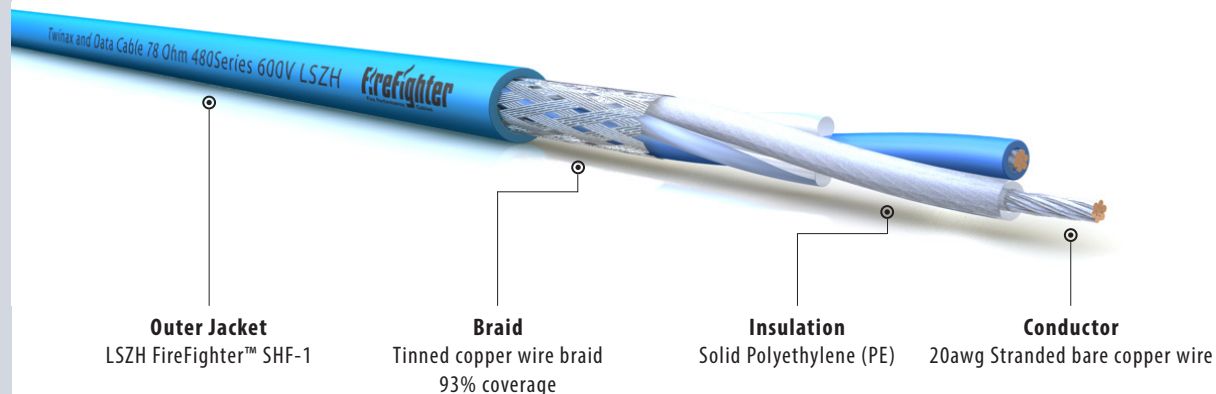
*Temperature range:*  
 Static: -20 °C up to +80 °C  
 Installation : -5 °C up to +80 °C

*Voltage Rating:*  
 600 V

*Voltage Test core - core :*  
 2000 Vdc x 1 min

*Voltage Test core - screen :*  
 1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Velocity of Propagation %	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4802C2024	1 x 2 x 20 awg	Blue / Transparent	6.15	118	64.7	66	31.1	11.1	78

Frequency (MHz)	50	100	.0200	400
Attenuation (dB/100m)	16.4	24.6	36.0	52.5

**410Series 124 Ω**  
Twinax & Data Cable  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

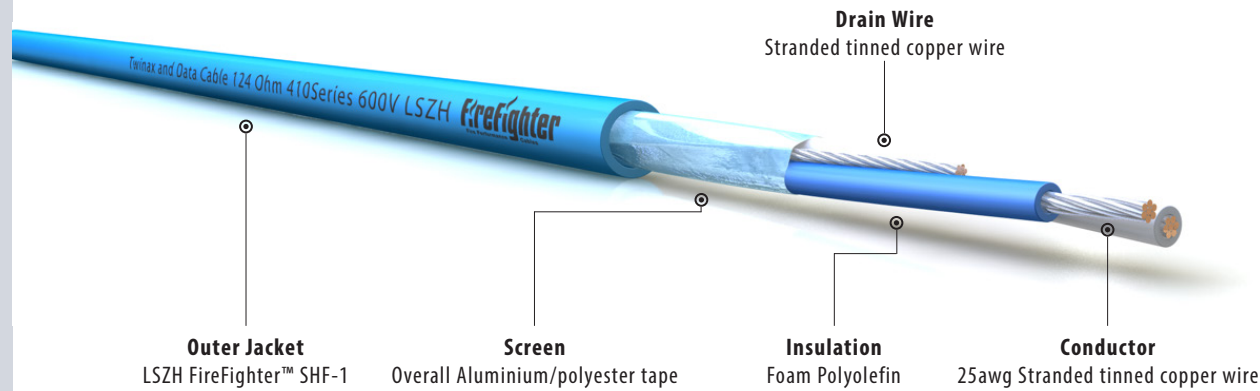
*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range  
and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Inductance µH/m	Velocity of Propagation %	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4102C2524	1 x 2 x 25 awg	Blue / White	4.32	82.5	40	72.2	0.61	66	104.4	39.4	124

Frequency (MHz)	1	10	50	100	200	400
Attenuation (dB/100m)	2.0	5.6	11.80	16.40	22.60	31.50

**410Series 150 Ω**  
Twinax & Data Cable  
600 Volts LSZH FireFighter™

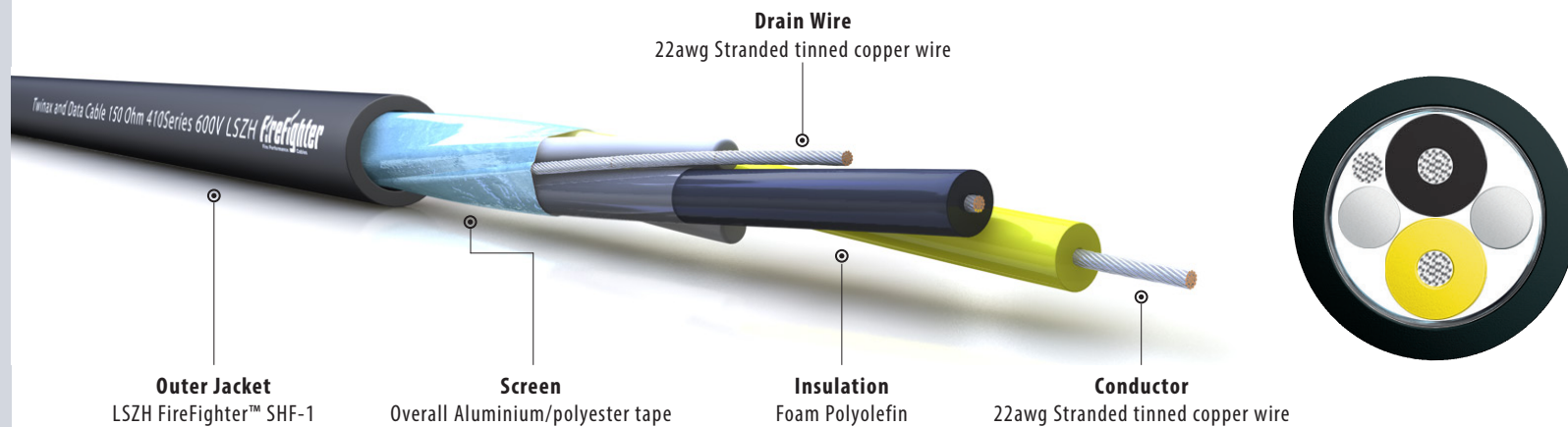
*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Inductance µH/m	Velocity of Propagation %	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4102C2254	1 x 2 x 22 awg	Black / Yellow	8.50	135	28.8	54.1	0.961	78	45.9	20.7	150

Frequency (MHz)	1	10	50	100	200	400
Attenuation (dB/100m)	1.31	3.90	8.70	14.10	20.30	28.90

*Images used are an example from the range and indicative only.*

**440Series 78 Ω**  
Twinax & Data Cable  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

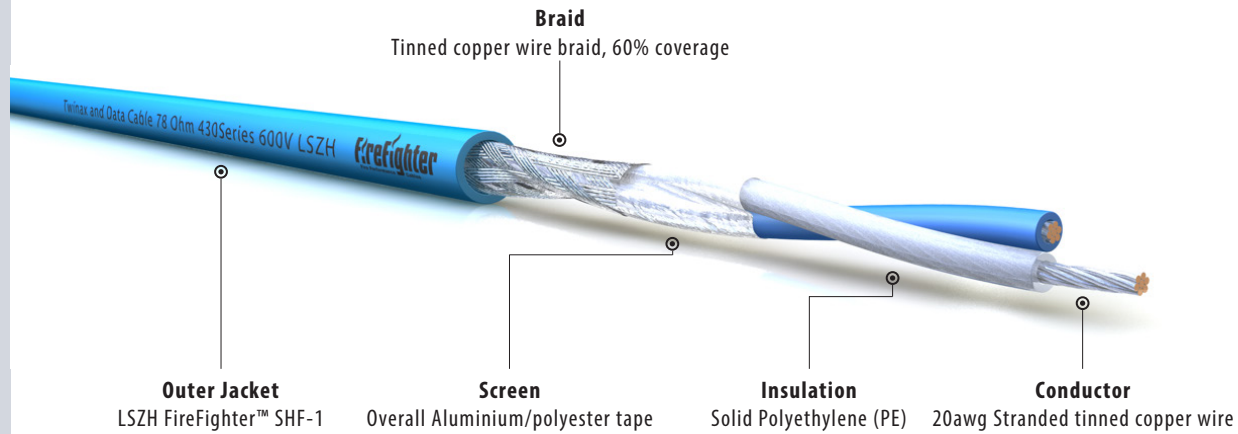
*Temperature range:*  
Static : -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Inductance µH/m	Velocity of Propagation %	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4302C2024	1 x 2 x 20 awg	Blue / Transparent	6.20	129.7	64.7	118	0.07	66	31.1	11.1	78

Frequency (MHz)	50	100	200	400
Attenuation (dB/100m)	16.4	24.6	36.0	52.5



**440Series 100 Ω**  
Twinax & Data Cable  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

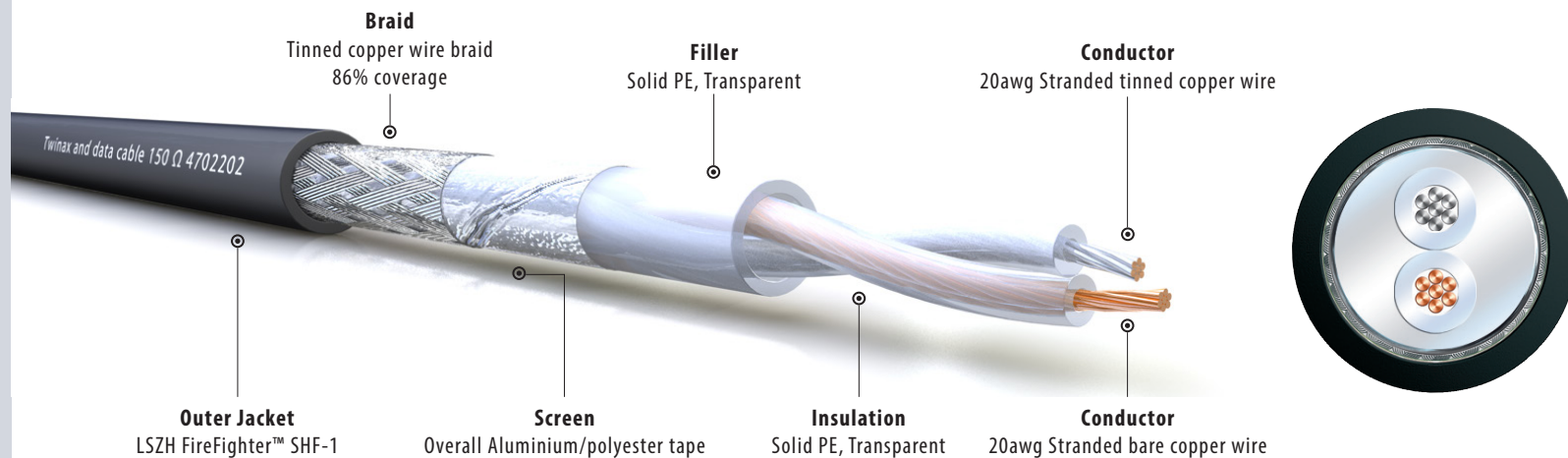
*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Inductance µH/m	Velocity of Propagation %	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4402C204	1 x 2 x 20 awg	Transparent	8.38	130	47.6	75.5	0.51	66	31.1	5.71	100

Frequency (MHz)	1	10	50	100	200	400
Attenuation (dB/100m)	1.30	3.60	8.20	13.40	21.0	33.4

**440Series 124 Ω**  
Twinax & Data Cable  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

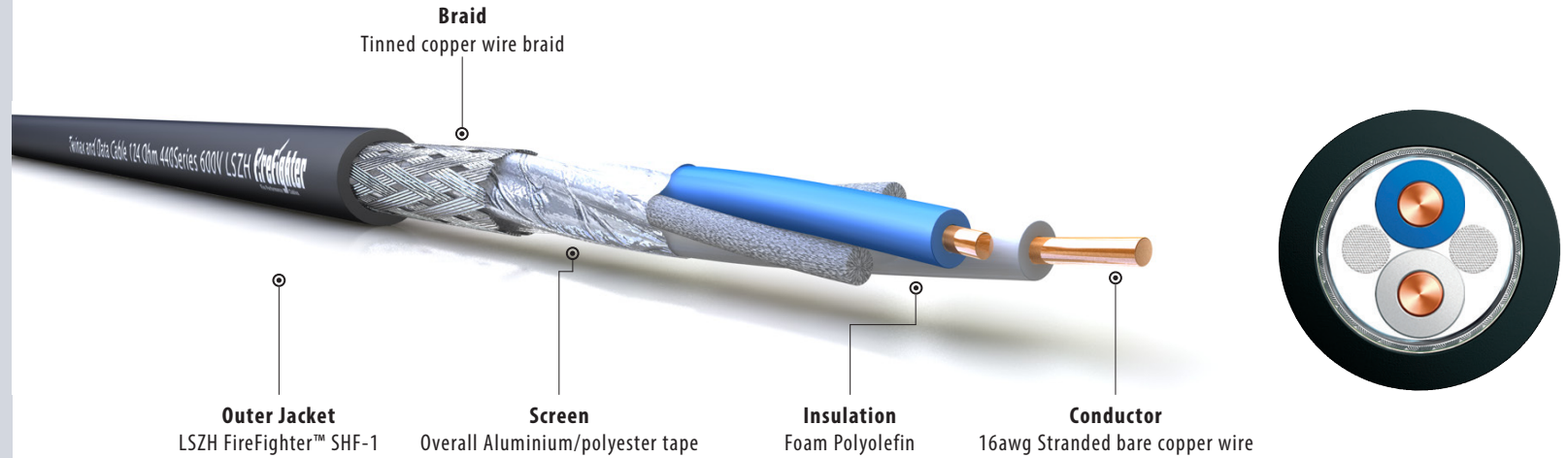
*Temperature range:*  
Static : -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Velocity of Propagation %	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4402C16S54	1 x 2 x 16 awg	White / Blue	11.8	323.4	35.7	63.3	78	13.8	4.3	124
	Frequency (MHz)	1	10	50	100	200	400			
	Attenuation (dB/100m)	0.6	2.3	5.9	9.5	13.5	20.3			

## CTEOM-Bus 600 Volts LSZH FireFighter™

### Fire Performance:

IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

### Temperature range:

Static: -20 °C up to +80 °C

Installation: -5 °C up to +80 °C

### Voltage Rating:

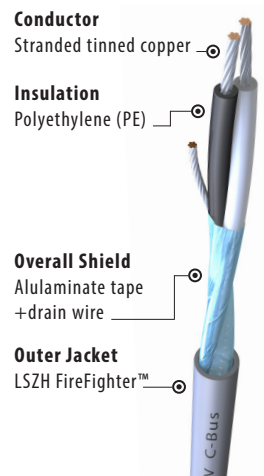
600 V

### Voltage Test core - core :

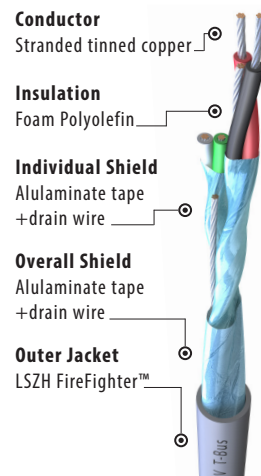
2000 Vdc x 1 min

### Voltage Test core - screen :

1000 Vdc x 1 min



4101P2224 (C-Bus)



4206P2234 (T-Bus)



4001P1844-02 (E-Bus)



4001P1844-10 (E-Bus)



4001P1844-07 (O/M-Bus)

Style	Part Number	Formation <i>(No. of pairs x awg)</i>	Colour Code	Shield Type	Outer Jacket Colour	Nom. Ø <i>mm</i>	Weight <i>kg/km</i>	Nom. Capacitance (cond./cond.) <i>pF/m</i>	Nom. Capacitance (C./C./S.) <i>pF/m</i>	Loop Resistance <i>Ω/km</i>
C-Bus	4101P2224	1 x 2 x 22 awg	Black / White	Overall	Grey	4.45	26	76	140	54
T-Bus	4206P2234	2 x 2 x 22 awg	Black-Red / White-Green	Individual	Grey	6.344	48	103	204	56.1
E-Bus	4001P1844-02	1 x 2 x 18 awg	Black / White	Unshielded	Blue	5.94	39	80	-	44
E-Bus	4001P1844-10	1 x 2 x 18 awg	Black / White	Unshielded	White	5.94	39	80	-	44
O-Bus / M-Bus	4001P1844-07	1 x 2 x 18 awg	Black / White	Unshielded	Pink	5.94	39	80	-	44

Images used are an example from the range and indicative only.

## BEMs

### 600 Volts LSZH FireFighter™

#### Fire Performance:

IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

#### Temperature range:

Static: -20 °C up to +80 °C

Installation: -5 °C up to +80 °C

#### Voltage Rating:

600 V

#### Voltage Test core - core :

2000 Vdc x 1 min

#### Voltage Test core - screen :

1000 Vdc x 1 min

\* ISO 4892-2/A exceeds the requirements of ASTM D2565-99

Images used are an example from the range and indicative only.

## Common Characteristics

### Conductor

Stranded tinned copper wire

### Shield (where applicable)

Alulaminat tape +  
Stranded tinned copper wire

### Outer Jacket

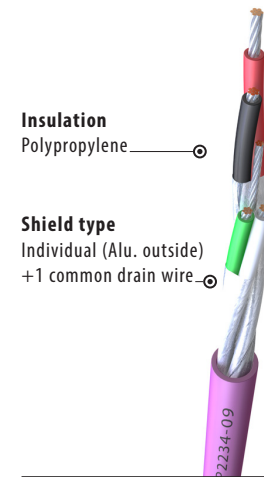
LSZH FireFighter™

\* <UV acc. to ISO 4892-2A>



**Insulation**  
LSZH FireFighter™

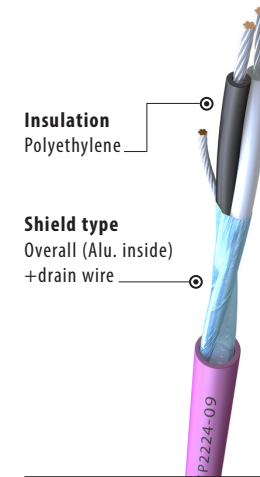
4001P1644-09



**Insulation**  
Polypropylene

**Shield type**  
Individual (Alu. outside)  
+ 1 common drain wire

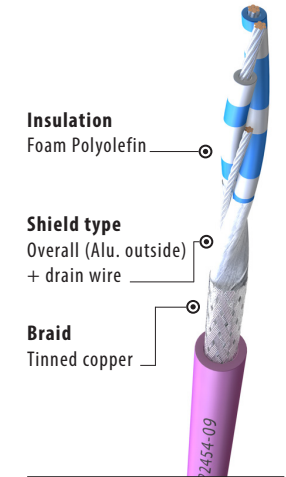
4202P2234-09



**Insulation**  
Polyethylene

**Shield type**  
Overall (Alu. inside)  
+ drain wire

4101P2224-09



**Insulation**  
Foam Polyolefin

**Shield type**  
Overall (Alu. outside)  
+ drain wire

**Braid**  
Tinned copper

4401P2454-09

Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance (cond./ cond.) pF/m	Nom. Capacitance (C./C./S.) pF/m	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Velocity of Propogation %	Nom. Inductance μH/m	Nom. Impedance Ω
4001P1644-09	1 x 2 x 16 awg	■ □	6.70	64	108	-	14.7	-	-	0.56	-
4202P2234-09	2 x 2 x 22 awg	■ ■ □ □	6.35	48	98	180	49.2	34.8	-	-	50
4101P2224-09	1 x 2 x 22 awg	■ □	4.50	28	72.6	140	54	-	-	-	-
4401P2454-09	1 x 2 x 24 awg	■ ■	6.10	46	42	75.5	82	-	66	0.56	120

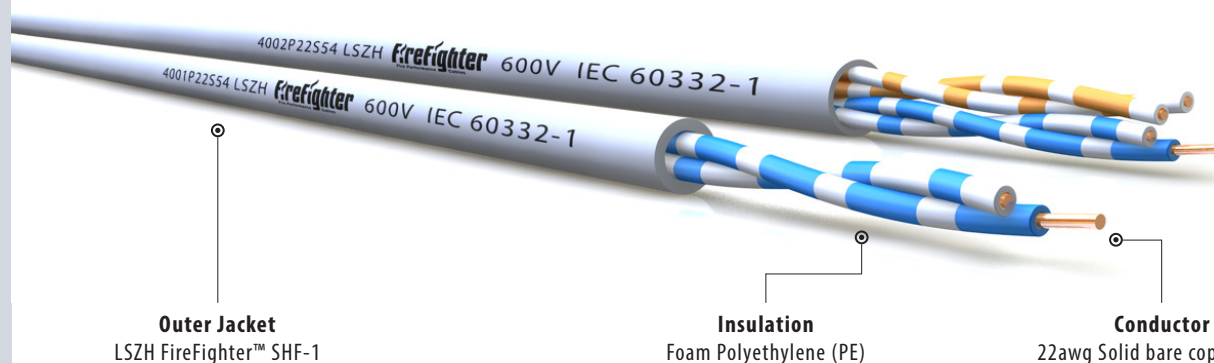
**LONWorks™ Industrial Data**  
**Unscreened**  
**600 Volts LSZH FireFighter™**

*Fire Performance:*  
 IEC60332-1,  
 IEC60332-3,  
 IEC61034,  
 IEC60754-1,  
 IEC60092.

*Temperature range:*  
 Static: -20 °C up to +80 °C  
 Installation : -5 °C up to +80 °C

*Voltage Rating:*  
 600 V

*Voltage Test core - core :*  
 2000 Vdc x 1 min



**Outer Jacket**  
 LSZH FireFighter™ SHF-1

**Insulation**  
 Foam Polyethylene (PE)

**Conductor**  
 22awg Solid bare copper wire

Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance pF/m	Velocity of Propagation %	Nom. Conductor DC Resistance Ω/km	Nom. Impedance Ω
4001P22S54	1 x 2 x 22 awg	Chart 5	4.50	-	46	68	55	100
4002P22S54	2 x 2 x 22 awg		6.20	-	46	68	55	100

Frequency (MHz)	0.722	1	4	10	16	20
Attenuation (dB/100m)	1.3	1.5	3.1	4.9	6.3	6.9

*Images used are an example from the range and indicative only.*

**LONWorks™ Industrial Data**  
**Screened**  
**600 Volts LSZH FireFighter™**

*Fire Performance:*  
 IEC60332-1,  
 IEC60332-3,  
 IEC61034,  
 IEC60754-1,  
 IEC60092.

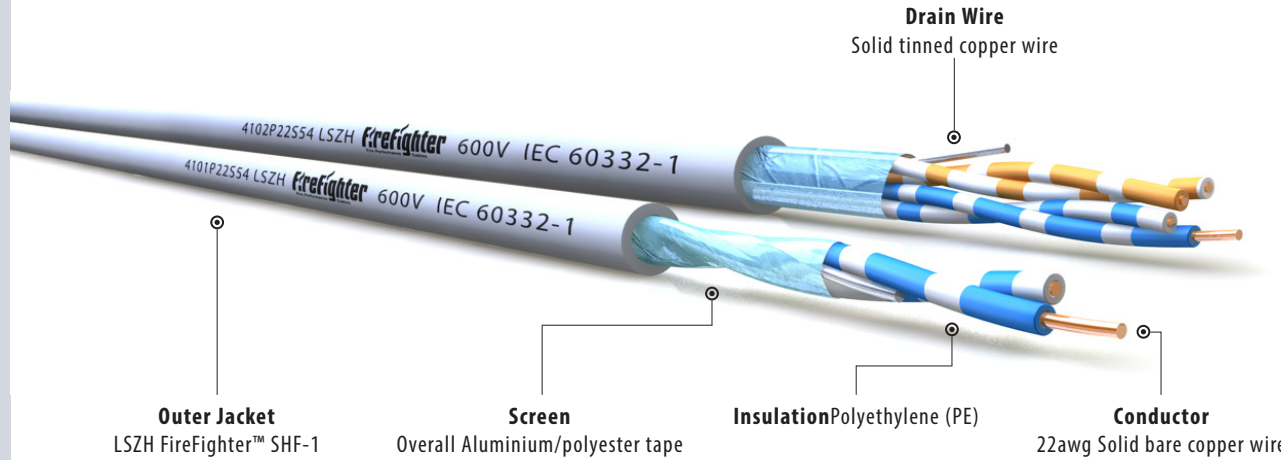
*Temperature range:*  
 Static: -20 °C up to +80 °C  
 Installation: -5 °C up to +80 °C

*Voltage Rating:*  
 600 V

*Voltage Test core - core :*  
 2000 Vdc x 1 min

*Voltage Test core - screen :*  
 1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*



Part Number	Formation (No. of pairs x awg)	Colour Code	Nom. Ø mm	Weight kg/km	Nom. Capacitance pF/m	Velocity of Propagation %	Nom. Conductor DC Resistance Ω/km	Nom. Shield DC Resistance Ω/km	Nom. Impedance Ω
4101P22S54	1 x 2 x 22 awg	Chart 5	5.60	-	80	68	55	34	100
4102P22S54	2 x 2 x 22 awg		7.50	-	40	68	55	17	100

Frequency (MHz)	0.722	1	4	10	16	20
Attenuation (dB/100m)	1.8	2.0	3.6	5.5	7.0	7.8

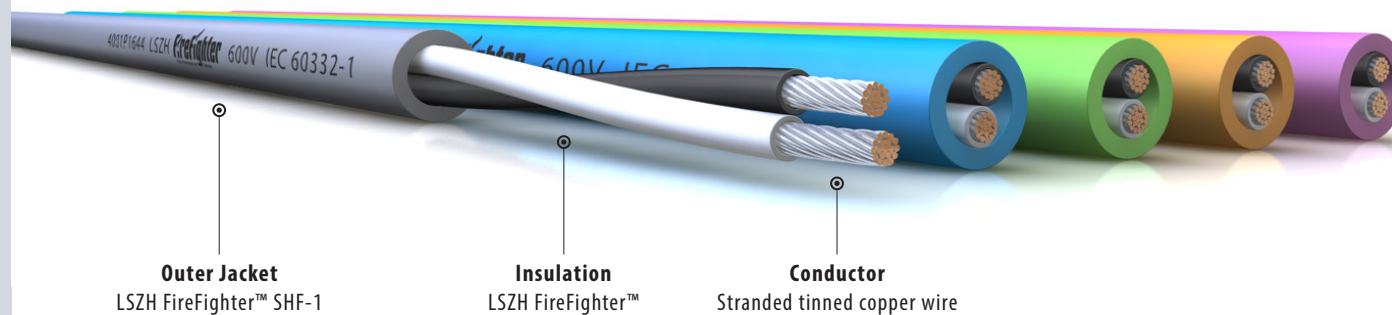
**LONWorks™ Industrial Data**  
 Unscreened 16awg  
 600 Volts LSZH FireFighter™

*Fire Performance:*  
 IEC60332-1,  
 IEC60332-3,  
 IEC61034,  
 IEC60754-1,  
 IEC60092.

*Temperature range:*  
 Static: -20 °C up to +80 °C  
 Installation : -5 °C up to +80 °C

*Voltage Rating:*  
 600 V

*Voltage Test core - core :*  
 2000 Vdc x 1 min



**Outer Jacket**  
 LSZH FireFighter™ SHF-1

**Insulation**  
 LSZH FireFighter™

**Conductor**  
 Stranded tinned copper wire

Part Number	Outer Jacket Colour	Formation <i>(No. of pairs x awg)</i>	Colour code	Nom. Ø (mm) <i>mm</i>	Weight (kg/km) <i>kg/km</i>	Nom. Capacitance (cond./cond.) <i>pF/m</i>	Nom. Conductor DC Resistance <i>Ω/km</i>	Nom. Inductance <i>μH/m</i>
4001P1644	Grey							
4001P1644-02	Blue							
4001P1644-03	Green	1 x 2 x 16 awg	black / white	6.96	51	108	14.7	0.56
4001P1644-08	Orange							
4001P1644-09	Violet							

*Images used are an example from the range and indicative only.*

## Alarm Cables LSZH FireFighter™

**Fire Performance:**  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

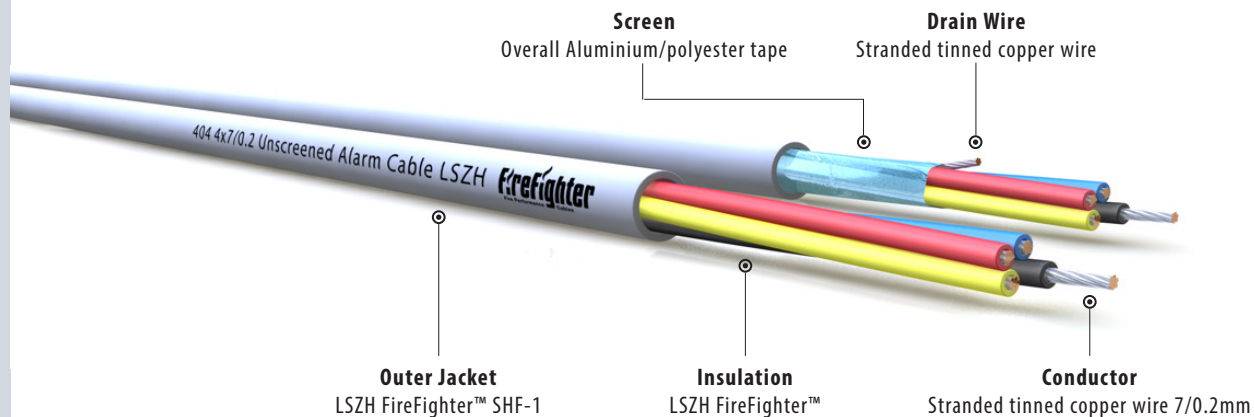
**Temperature range:**  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

**Voltage Rating:**  
600 V

**Voltage Test core - core :**  
2000 Vdc x 1 min

**Voltage Test core - screen :**  
1000 Vdc x 1 min

*Images used are an example from the range  
and indicative only.*



### Unscreened

Part Number	Formation (No. of cores)	Colour Code	Nom. Ø (mm)	Weight (kg/km)	Max. working voltage	Max. Current
404	4 x 7/0.2		3.4	19	50 V	1 amp per core
604	6 x 7/0.2		4.0	26		
804	8 x 7/0.2		4.3	30		
1204	12 x 7/0.2		5.5	38		

### Screened

Part Number	Formation (No. of cores)	Colour Code	Nom. Ø (mm)	Weight (kg/km)	Max. working voltage	Max. Current
414	4 x 7/0.2		3.7	25	50 V	1 amp per core
614	6 x 7/0.2		4.3	28		
814	8 x 7/0.2		4.6	35		
1214	12 x 7/0.2		6.2	72		



## Def-Stan Multi-Core Unscreened 61-12 Part 4 and 5 600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core:*  
2000 Vdc x 1 min

*Images used are an example from the range  
and indicative only.*



7/0.1 mm					7/0.2 mm					16/0.2 mm				
Part Number	No. of Cores	Ø Outer Jacket	Weight	Nom. max Conductor Resistance	Part Number	No. of Cores	Ø Outer Jacket	Weight	Nom. max Conductor Resistance	Part Number	No. of Cores	Ø Outer Jacket	Weight	Nom. max Conductor Resistance
		mm	kg/km	Ω/km at 20 °C			mm	kg/km	Ω/km at 20 °C			mm	kg/km	Ω/km at 20 °C
7-1-2A	2	2.5	5.4	384	7-2-2A	2	3.4	13	92	16-2-2A	2	5.5	34	40.1
7-1-3A	3	2.6	6.5		7-2-3A	3	3.6	16		16-2-3A	3	5.8	42	
7-1-4A	4	2.8	8		7-2-4A	4	3.9	20		16-2-4A	4	6.3	52	
7-1-6A	6	3.3	12		7-2-6A	6	4.6	30		16-2-6A	6	7.3	75	
7-1-9A	9	3.9	15		7-2-8A	8	5.1	38		16-2-8A	8	8.6	94	
7-1-12A	12	4.1	9		7-2-12A	12	6.1	53		16-2-12A	12	9.5	120	
7-1-15A	15	4.5	26		7-2-18A	18	7.4	80		16-2-18A	18	11.0	180	
7-1-18A	18	4.7	30		7-2-20A	20	8.1	88		16-2-25A	25	13.1	230	
7-1-25A	25	5.8	38		7-2-25A	25	8.7	100		16-2-36A	36	14.5	345	
7-1-36A	36	6.4	50		7-2-36A	36	9.8	140						
7-1-50A	50	7.3	80	7-2-50A	50	11.6	200							

**Def-Stan Multi-Core**  
Screened 61-12 Part 4 and 5  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

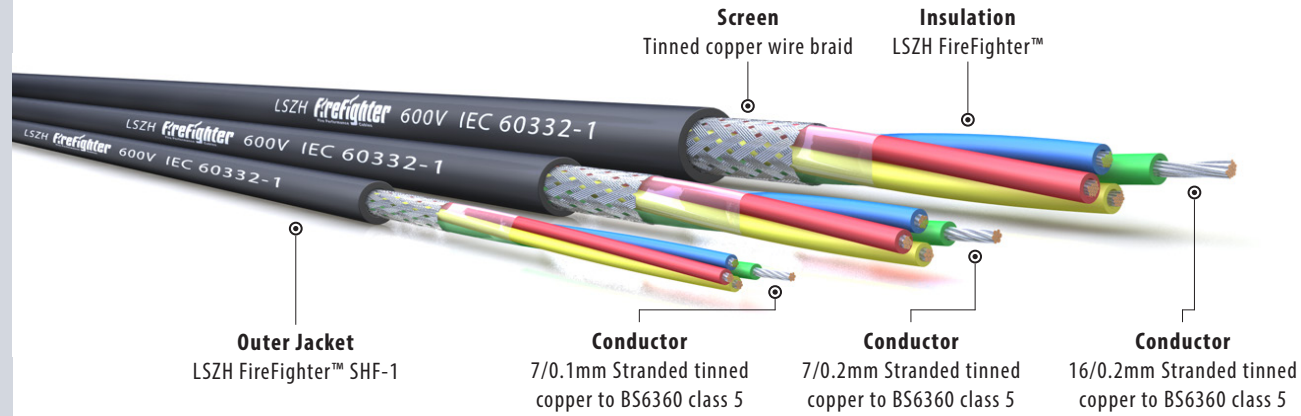
*Temperature range:*  
Static : -20 °C up to +80 °C  
Installation : -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min

*Images used are an example from the range  
and indicative only.*



7/0.1 mm					7/0.2 mm					16/0.2 mm				
Part Number	No. of Cores	Ø Outer Jacket	Weight	Nom. max Conductor Resistance	Part Number	No. of Cores	Ø Outer Jacket	Weight	Nom. max Conductor Resistance	Part Number	No. of Cores	Ø Outer Jacket	Weight	Nom. max Conductor Resistance
		mm	kg/km	Ω/km at 20 °C			mm	kg/km	Ω/km at 20 °C			mm	kg/km	Ω/km at 20 °C
7-1-2C	2	2.7	13	384	7-2-2C	2	3.9	23	92	16-2-2C	2	5.87	69	40.1
7-1-3C	3	2.9	15		7-2-3C	3	4.1	27		16-2-3C	3	6.8	79	
7-1-4C	4	3.1	17		7-2-4C	4	4.23	32		16-2-4C	4	7.3	92	
7-1-6C	6	3.5	21		7-2-6C	6	5.6	55		16-2-6C	6	8.3	120	
7-1-9C	9	4.0	26		7-2-8C	8	5.9	69		16-2-8C	8	8.9	146	
7-1-12C	12	4.3	31		7-2-10C	10	6.3	76		16-2-10C	10	11.3	190	
7-1-15C	15	4.8	41		7-2-12C	12	6.10	83		16-2-12C	12	10.5	190	
7-1-18C	18	5.4	50		7-2-15C	15	7.6	97		16-2-18C	18	12.5	250	
7-1-25C	25	6.1	62		7-2-18C	18	8.2	110		16-2-20C	20	13.4	280	
7-1-36C	36	6.8	79		7-2-20C	20	8.5	120		16-2-25C	25	14.1	320	
7-1-50C	50	8.0	100	7-2-25C	25	9.5	150	16-2-36C	36	16.1	450			
					7-2-36C	36	10.8	200	16-2-50C	50	18.5	564		
					7-2-50C	50	12.6	270	16-2-60C	60	19.7	670		

**280Series Single-Pair  
Data & Control Cables  
600 Volts LSZH FireFighter™**

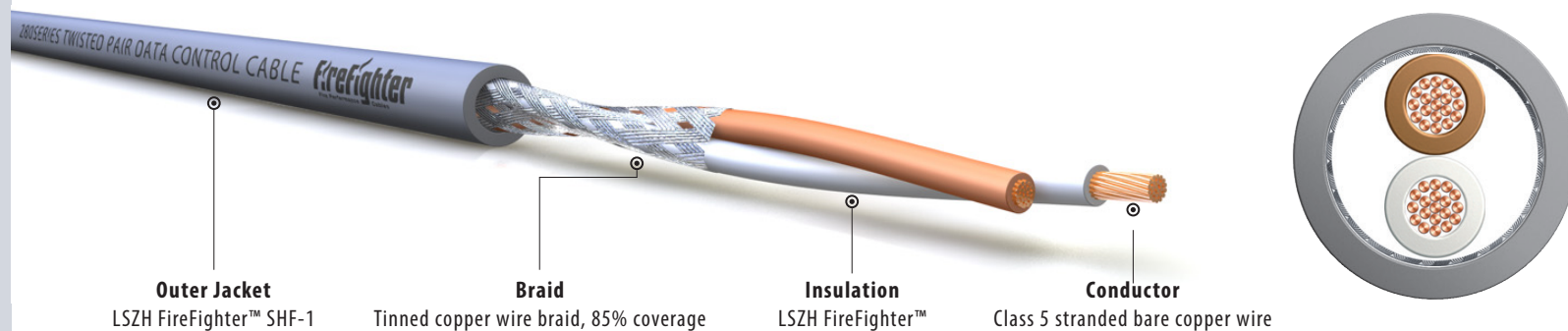
*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

*Voltage Rating:*  
600 V

*Voltage Test core - core :*  
2000 Vdc x 1 min

*Voltage Test core - screen :*  
1000 Vdc x 1 min



Part Number	Formation (No. of pairs x mm <sup>2</sup> )	Colour Code	Nom. Ø mm	Weight kg/km	Nominal Voltage V	Test Voltage V	Insulation Resistance GΩ/km	Nom. Capacitance (cond./cond.) nF/km
2801P0.2544	1 x 2 x 0.25	DIN 47100	4.4	23	500	1200	2	< 70
2801P0.5044	1 x 2 x 0.50		5.2	37				
2801P0.7544	1 x 2 x 0.75		5.6	45				
2802P0.2544	2 x 2 x 0.25		5.9	44				
2802P0.5044	2 x 2 x 0.50		7.6	76				
2802P0.7544	2 x 2 x 0.75		9.0	105				

*Images used are an example from the range and indicative only.*

**FF90 Panel Wire**  
600 Volts LSZH FireFighter™  
BS <HAR> BASEC

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

*Temperature range:*  
Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

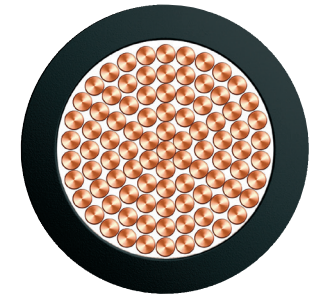
*Voltage Rating:*  
450/750 V

*Images used are an example from the range and indicative only.*



**Insulation / Outer Jacket**  
Cross-linked technical polymer  
acc. to BS7211

**Conductor**  
Stranded flexible copper (BS6360 VDE0295/IEC60228 class 5)



Part Number	Formation <i>(No. of cores x mm<sup>2</sup>)</i>	Stranding <i>mm</i>	Nom. Ø <i>mm</i>	Weight <i>kg/km</i>	Min. bend radius <i>(fixed)</i>	Min. bend radius <i>(moved)</i>	Nom. Voltage <i>V</i>	Test Voltage <i>V</i>	Max. Cond. Temperature <i>(fixed)</i> <i>°C</i>	Max. Ambient Temperature <i>(fixed)</i> <i>°C</i>
4007504	1x 0.75	24/0.2	2.70	11.6	> 4 x Ø	> 6 x Ø	450 / 750	3300	+ 90	- 10
4001004	1x 1.0	32/0.2	2.80	14.5						
4001504	1x 1.5	30/0.25	3.40	21						
4002504	1x 2.5	50/0.25	4.10	32.5						
4004004	1x 4.0	56/0.3	4.80	46						
4006004	1x 6.0	84/0.3	5.30	66.5						
4010004	1x 10.0	80/0.4	6.80	112						
4016004	1x 16.0	126/0.4	8.10	210						
4025004	1x 25.0	196/0.4	10.20	320						
4035004	1x 35.0	276/0.4	11.70	460						
4050004	1x 50.0	396/0.4	13.90	680						
4070004	1x 70.0	360/0.5	16.00	870						
4095004	1x 95.0	475/0.5	18.20	1180						
40120004	1x 120.0	608/0.5	20.20	1320						

## ZHH Flexible Control Cables 600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.



Voltage Rating	Laying temperature (min.)	Operating temperature	Conductor temperature (max.)	Short-circuit temperature (max.)	Bending radius (min.)
V	°C	°C	°C	°C	mm
300 / 500	+5	-40 to +80	+60	150	4 x Ø

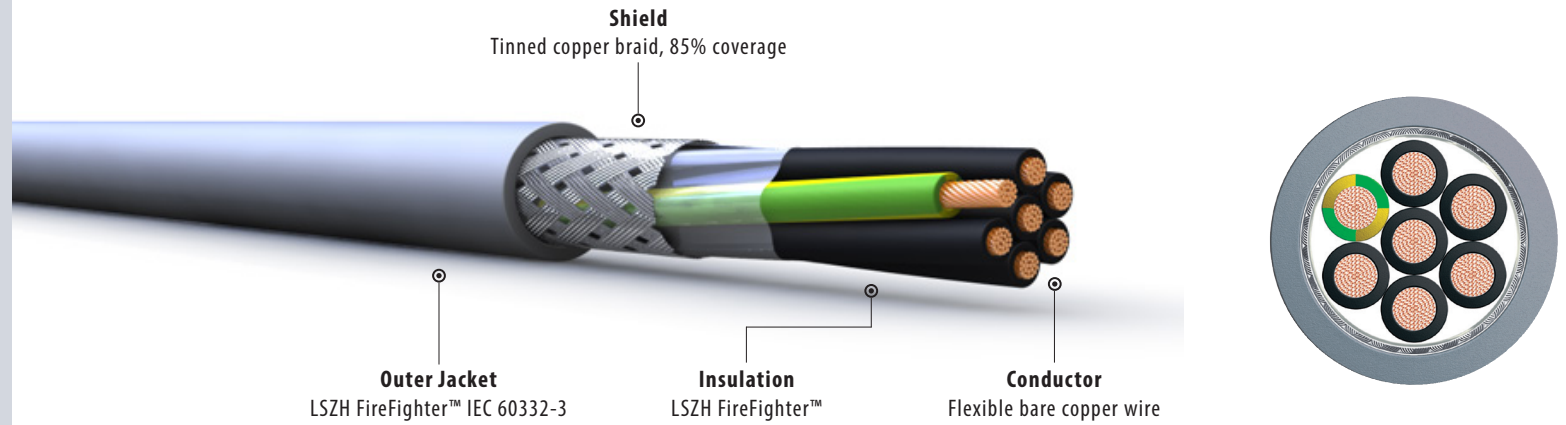
### Application

A range of flexible LSZH insulated and sheathed control cables manufactured to VDE specifications, for use in control, instrumentation and electronic applications. Insulated and sheathed with oil resistant LSZH they are particularly beneficial in the machine tool, automotive and processing industries. This LSZH range is ideally suited for applications where in close confinement areas where public health and safety are paramount, where it's critical to protect people and equipment from toxic and corrosive gases in the event of a fire.

*Images used are an example from the range and indicative only.*

**ZCH Flexible Control Cables**  
600 Volts LSZH FireFighter™

*Fire Performance:*  
IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.



Voltage Rating	Laying temperature (min.)	Operating temperature	Conductor temperature (max.)	Short-circuit temperature (max.)	Bending radius (min.)
V	°C	°C	°C	°C	mm
300 / 500	+5	-40 to +80	+60	150	4 x Ø

**Application**

A range of flexible LSZH insulated and sheathed control cables manufactured to VDE specifications, for use in control, instrumentation and electronic applications. Insulated and sheathed with oil resistant LSZH they are particularly beneficial in the machine tool, automotive and processing industries. This LSZH range is ideally suited for applications in close confinement areas where public health and safety are paramount, where it's critical to protect people and equipment from toxic and corrosive gases in the event of a fire.

*Images used are an example from the range and indicative only.*

## Colour Code Charts

### Fire Performance:

IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

### Temperature range:

Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

### Voltage Rating:

600 V

### Voltage Test core - core :

2000 Vdc x 1 min

### Voltage Test core - screen :

1000 Vdc x 1 min

Images used are an example from the range  
and indicative only.

## Chart 1

1	Black
2	White
3	Red
4	Green
5	Brown
6	Blue
7	Orange
8	Yellow
9	Purple
10	Grey
11	Pink
12	Tan

## Chart 2

1	Black	26	Orange/Black/White
2	White	27	Blue/Black/White
3	Red	28	Black/Red/Green
4	Green	29	White/Red/Green
5	Orange	30	Red/Black/Green
6	Blue	31	Green/Black/Orange
7	White / Black	32	Orange/Black/Green
8	Red / Black	33	Blue/White/Orange
9	Green / Black	34	Black/White/Orange
10	Orange / Black	35	White/Red/Orange
11	Blue / Black	36	Orange/White/Blue
12	Black / White	37	White/Red/Blue
13	Red / White	38	Black/White/Green
14	Green / White	39	White/Black/Green
15	Blue / White	40	Red/White/Green
16	Black / Red	41	Green/White/Blue
17	White / Red	42	Orange/Red/Green
18	Orange / Red	43	Blue/Red/Green
19	Blue / Red	44	Black/White/Blue
20	Red / Green	45	White/Black/Blue
21	Orange / Green	46	Red/White/Blue
22	Black / White / Red	47	Green/Orange/Red
23	White/Black/Red	48	Orange/Red/Blue
24	Red/Black/White	49	Blue/Orange/Red
25	Green/Black/White	50	Black/Orange/Red

## Colour Code Charts

### Fire Performance:

IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

### Temperature range:

Static : -20 °C up to +80 °C

Installation : -5 °C up to +80 °C

### Voltage Rating:

600 V

### Voltage Test core - core :

2000 Vdc x 1 min

### Voltage Test core - screen :

1000 Vdc x 1 min

Images used are an example from the range  
and indicative only.

## Chart 3

1	Black paired with Red	26	Brown paired with Yellow
2	Black paired with White	27	Brown paired with Orange
3	Black paired with Green	28	Orange paired with Yellow
4	Black paired with Blue	29	Purple paired with Orange
5	Black paired with Yellow	30	Purple paired with Red
6	Black paired with Brown	31	Purple paired with White
7	Black paired with Orange	32	Purple paired with Dark Green
8	Red paired with White	33	Purple paired with Light Blue
9	Red paired with Green	34	Purple paired with Yellow
10	Red paired with Blue	35	Purple paired with Brown
11	Red paired with Yellow	36	Purple paired with Black
12	Red paired with Brown	37	Grey paired with White
13	Red paired with Orange		
14	Green paired with White		
15	Green paired with Blue		
16	Green paired with Yellow		
17	Green paired with Brown		
18	Green paired with Orange		
19	White paired with Blue		
20	White paired with Yellow		
21	White paired with Brown		
22	White paired with Orange		
23	Blue paired with Yellow		
24	Blue paired with Brown		
25	Blue paired with Orange		

## Chart 5

1	WHITE/blue + BLUE/white
2	WHITE/orange + ORANGE/white
3	WHITE/green + GREEN/white
4	WHITE/brown + BROWN/white
5	WHITE/grey + GREY/white
6	RED/blue + BLUE/red
7	RED/orange + ORANGE/red
8	RED/green + GREEN/red
9	RED/brown + BROWN/red
10	RED/grey + GREY/red
11	BLACK/blue + BLUE/black
12	BLACK/orange + ORANGE/black
13	BLACK/green + GREEN/black
14	BLACK/brown + BROWN/black
15	BLACK/grey + GREY/black
16	YELLOW/blue + BLUE/yellow
17	YELLOW/orange + ORANGE/yellow
18	YELLOW/green + GREEN/yellow
19	YELLOW/brown + BROWN/yellow
20	YELLOW/grey + GREY/yellow
21	PURPLE/blue + BLUE/purple
22	PURPLE/orange + ORANGE/purple
23	PURPLE/green + GREEN/purple
24	PURPLE/brown + BROWN/purple
1/2	Green/Yellow



## Colour Code Charts

### Fire Performance:

IEC60332-1,  
IEC60332-3,  
IEC61034,  
IEC60754-1,  
IEC60092.

### Temperature range:

Static: -20 °C up to +80 °C  
Installation: -5 °C up to +80 °C

### Voltage Rating:

600 V

### Voltage Test core - core :

2000 Vdc x 1 min

### Voltage Test core - screen :

1000 Vdc x 1 min

*Images used are an example from the range and indicative only.*

## Chart 9

1	Black paired with Red
2	Green paired with White

## Chart 13

Cable containing up to 25 cores		Cable containing up to 36 cores		Cable containing up to 25 cores		Cable containing up to 36 cores	
Red	1	Red	19	Yellow/blue	19	Yellow/blue	19
Blue	2	Blue	20	White/blue	20	White/blue	20
Green	3	Green	21	Blue/black	21	Blue/black	21
Yellow	4	Yellow	22	Orange/blue	22	Orange/blue	22
White	5	White	23	Yellow/green	23	Green/blue	23
Black	6	Black	24	White/green	24	Grey/blue	24
Brown	7	Brown	25	Orange/green	25	Yellow/green	25
Violet	8	Violet	26		26	White/green	26
Orange	9	Orange	27		27	Green/black	27
Pink	10*	Pink	28		28	Orange/green	28
Turquoise	11	Turquoise	29		29	Grey/green	29
Grey	12	Grey	30		30	Yellow/brown	30
Red/blue	13	Red/blue	31		31	White/brown	31
Green/red	14	Green/red	32		32	Brown/black	32
Yellow/red	15	Yellow/red	33		33	Grey/brown	33
White/red	16	White/red	34		34	Yellow/violet	34
Red/black	17	Red/black	35		35	Violet/black	35
Red/brown	18	Red/brown	36		36	White/violet	36

Cables with 50 or more cores are identified by a red and blue core laid adjacent to one another in each layer, the remainder of the cores in each layer being white. (Multicoloured cores are also available)

\*Cable reference 16-2-10C is a 5 pair cable coloured as follows: Pair 1 white, blue; Pair 2 white, orange; Pair 3 white, green; Pair 4 white, brown; Pair 5 white, grey.

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