Fiber Optic Cables

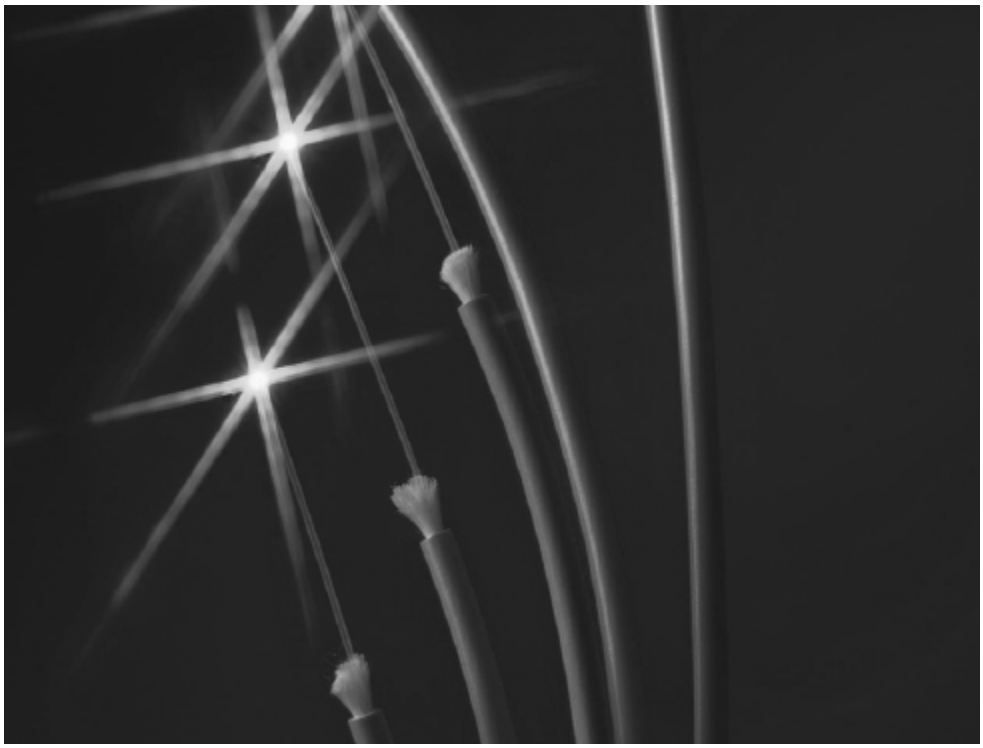
High Performance Interconnection Fiber Optic Link

Product Facts

- Low smoke
- Low corrosive gas emission
- Limited fire hazard
- Halogen free
- Small size and lightweight
- Custom design
- Range of jacket materials
- Inherent security of transmitted signals
- Low loss, high performance cables
- Water-blocking options
- Meets the requirements of Def Stan 60-1 part 2

Typical applications

- Military communications
- Military control systems
- Naval applications
- Underwater and ROV's
- Hazardous Environments



Standard Fiber Optic Cable Constructions

The use of increasingly sensitive and more sophisticated equipment in marine and military applications means a corresponding requirement for high performance interconnection links. Fiber optic links offer high performance and have many advantages over copper systems such as:

- Interference immunity (EMI & RFI)
- High bandwidth (for improved message capacity)
- Small size, lightweight
- Low loss, durability
- Security and safety

However, to ensure the reliability of a fiber system the cable design, materials and interconnection accessories employed are all extremely important.

Tyco Electronics provides a range of single and multicore Fiber Optic Cables offering innovative solutions to interconnect problems. Tyco Electronics leadership in the field of advanced material technology, coupled with more than 15 years experience of supplying ruggedized cables for marine and military applications, ensures superior performance levels in the harshest of environments.

Catalog 1308940
Revised 8-06

www.tycoelectronics.com

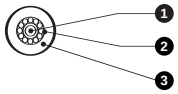
Dimensions are in millimeters and inches unless otherwise specified. Values in brackets are U.S. equivalents.

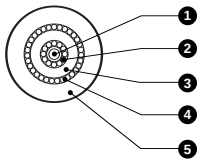
Dimensions are shown for reference purposes only. Specifications subject to change.

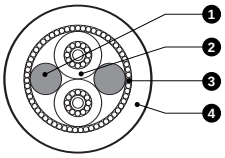
USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 52-55-1106-0800
C. America: 57-1-254-4444

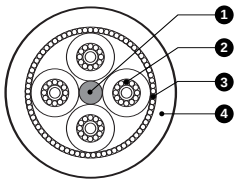
South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-208-420-8341

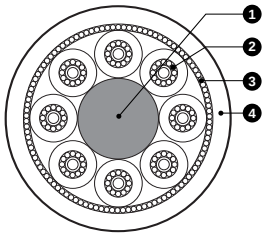
Fiber Optic Cables (Continued)

Simplex Fiber Optic Cable	Component	Fiber Size	Qty/Diameter
	1. Secondary Buffered Fiber	(62.5/125)	1
	2. Strength Member	—	1.5 mm
	3. Zerohal Sheath	—	2.7 ± 0.2 mm

Ruggedized Simplex Fiber Optic Cable	Component	Fiber Size	Qty/Diameter
	1. Secondary Buffered Fiber	(62.5/125)	1
	2. Strength Member	—	1.5 mm
	3. Zerohal Sheath	—	2.7 mm
	4. Strength Member	—	3.3 mm
	5. Zerohal Sheath	—	5.3 ± 0.2 mm

2 Channel Ruggedized Fiber Optic Cable	Component	Fiber Size	Qty/Diameter
	1. Strength Member		2
	2. Simplex Cable	(62.5/125)	2
	3. Strength Member		6.0 mm
	4. Zerohal Sheath		8.2 ± 0.3 mm

4 Channel Ruggedized Fiber Optic Cable	Component	Fiber Size	Qty/Diameter
	1. Strength Member	—	1
	2. Simplex Cable	(62.5/125)	4 / 6.7 mm
	3. Strength Member	—	7.3 mm
	4. Zerohal Sheath	—	9.5 ± 0.5 mm

8 Channel Ruggedized Fiber Optic Cable	Component	Fiber Size	Qty/Diameter
	1. Strength Member	—	1
	2. Simplex Cable	(62.5/125)	8 / 9.8 mm
	3. Strength Member	—	10.4 mm
	4. Zerohal Sheath	—	12.5 ± 0.5 mm

Catalog 1308940
Revised 8-06

www.tycoelectronics.com

Dimensions are in millimeters and inches unless otherwise specified. Values in brackets are U.S. equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 52-55-1106-0800
C. America: 57-1-254-4444

South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-208-420-8341

Fiber Optic Cables (Continued)

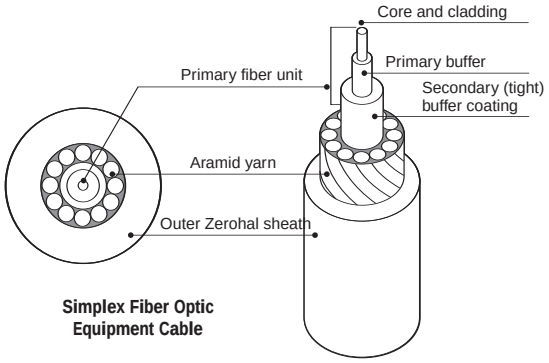
High Performance Interconnection Fiber Optic Link

Fiber Optic Equipment Cable

The diagram on the right shows a typical equipment cable, which can also be used as a sub-unit or simplex component for the larger multi-core cables, as shown in the diagrams on the previous page.

The fiber used is a high performance tight buffer type comprising an all silica fiber, with multiple coatings designed to provide mechanical and environmental protection, microbend resistance, and ease of handling in the field. Most common fiber types are readily available (see table below) and more specialized fibers are available on request.

The equipment cable has a layer of served aramid yarn providing high flexibility and tensile strength, while the outer sheath provides environmental and mechanical protection, along with low smoke emission and chemical resistance.



Simplex Fiber Optic Equipment Cable

The materials and types of designs employed have been thoroughly tested to Def Stan 60-1 (see test data on the next page) and Def Stan 61-12 Part 31 which demonstrate the suitability of the cables and fibers for use in high performance and critical marine applications.

While offering a standard range of tight buffered multi and single mode fiber optic cables, Tyco Electronics also offers the option of custom design for specific applications. These cables capitalize on the small size of the fiber thereby enabling efficient, ergonomic and reliable interconnection.

Typical 2-Channel Cable

Fiber Types and Common Features

Type	Attenuation	Bandwidth	Dispersion Slope	Numerical Aperture
—	dB/km@850/1300/1550nm	MHz-km@850/1300nm	ps/(nm2-km)	—
8/125	—/0.4/0.25	n/a	0.093	0.1
50/125	3.5/1.2/—	400/600	n/a	0.20
62.5/125	3.5/1.2/—	160/500	n/a	0.275
100/140	4.5/2.0/—	200/200	n/a	0.29

All fibers supplied with a high performance three layer tight buffer. Cables can be supplied with water-blocking and marking to suit customer requirement, and any combination of the fiber types listed above.

Catalog 1308940
Revised 8-06

www.tycoelectronics.com

Dimensions are in millimeters and inches unless otherwise specified. Values in brackets are U.S. equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 52-55-1106-0800
C. America: 57-1-254-4444

South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-208-420-8341

Table of Requirements and Results from Def Stan 60 – 1 Part 2

Definition	Requirements								Part 2
Cable tensile strength	<0.5% cable elongation no increase in attenuation at full load and after test compared to pre-test value.						1000N applied at 100N/minute		Pass
Cable bend	No cracking or deformation of cable sheath. <0.5dB change after test.						20N load, 10 cycles of wind and unwind. 6 wraps.		Pass
Cold bend	No cracking or deformation of cable sheath. <0.5dB change after test.						20N load, 10 cycles of wind and unwind. 6 wraps, -30°C.		Pass
Cyclic bend	No cracking or deformation of cable sheath. <0.5dB change after test.						40N, 1000 cycles.		Pass
Cable impact	No cracking or deformation of cable sheath. <0.5dB change after test. 100 impacts.						12.5 mm radius, 1kg hammer, 100 mm height		Pass
Cable crush	No cracking or deformation of cable sheath. <0.5dB change after test <20% reduction from original diameter.						2000N/5 min		Pass
Cable snatch	No cracking or deformation of cable sheath. <0.5dB change after test <20% reduction from original diameter.						1kg, 10 cycles		Pass
Dynamic cut through	≥ 25N						85°C, 60N/minute, 0.45mm diameter needle blade		Pass
Tear resistance	5 N/mm						—		Pass
Shrinkage	<3mm total						16 hrs at -30°C and 16 hrs at 85°C		Pass
Scrape abrasion	500 cycles minimum						5N, 85°C, 0.45 mm diameter needle blade		Pass
Fluids	Volume	25	TS ret	60	Eb ret	60	Diesel F76	28 days @ 20°C	Pass
	swell	15	min %	60	min %	60	OX-30	28 days @ 50°C	Pass
	max %	15		60		60	OX-40 HS200X	28 days @ 50°C	Pass
		10		60		60	OMD-113	28 days @ 50°C	Pass
		50		50		50	OX-28	28 days @ 50°C	Pass
		10		80		80	Deionized water	28 days @ 50°C	Pass
		10		80		80	Deionized water + 3.5% NaCl	28 days @ 50°C	Pass
Accelerated ageing	<20% change in TS/Eb/tear between 14 and 28 days. Eb ≥ 150%						110°C for 14 and 28 days.		Pass
Arrhenius plot	40,000 hours at 85°C						End point measurement: 50% absolute elongation		Pass
Stability	175% max. elongation, 25% max. permanent elongation.						105°C, 0.2N/mm2 stress.		Pass
Pressure	Indentation not to exceed 50%.						85°C for 4 hrs.		Pass
Ozone	No cracks with normal vision.						80 – 100ppm for 120 hrs		Pass
UV light resistance	≤ 80% Eb change, ≤ 20% TS change.						8 hrs UV 55°C, 4 hrs humidity 40°C, (UV-B) 1000 hrs.		Pass
Smoke Index	20 maximum						NES 711		Pass
Toxicity index	5 maximum						NES 713		Pass
Halogen index	No detectable halogens.						Sodium fusion test (Lassaigne)		Pass
Oxygen index	29 minimum						BS 2782 Part 1 Method 141D		Pass
Temperature index	250°C minimum						Nes 715		Pass
Flammability	Not to reach within 50 mm of the lower clamp.						BS 4066 Part 1		Pass

Catalog 1308940
Revised 8-06

www.tycoelectronics.com

Dimensions are in millimeters and inches unless otherwise specified. Values in brackets are U.S. equivalents.

Dimensions are shown for reference purposes only. Specifications subject to change.

USA: 1-800-522-6752
Canada: 1-905-470-4425
Mexico: 52-55-1106-0800
C. America: 57-1-254-4444

South America: 55-11-2103-6000
Hong Kong: 852-2735-1628
Japan: 81-44-844-8013
UK: 44-208-420-8341