

METRIC

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SUPERSEDING
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PERFORMANCE SPECIFICATION SHEET

CABLE, FIBER OPTIC, TWELVE/EIGHTEEN FIBER BUNDLE, BLOWN OPTICAL FIBER
CABLE CONFIGURATION TYPE 3 (CABLE BUNDLE), APPLICATION B (SHIPBOARD),
CABLE CLASS SM AND MM, (METRIC)

This specification is approved for use by all Departments
and Agencies of the Department of Defense.

The requirements for acquiring the product described herein
shall consist of this specification sheet and [MIL-PRF-85045](#).

CLASSIFICATION:

Fiber optic cable configuration type (cable bundle): 3.

Fiber cable class: MM (graded-index, glass core and glass cladding,
multimode)
SM (dispersion-unshifted, glass core and glass cladding,
single mode).

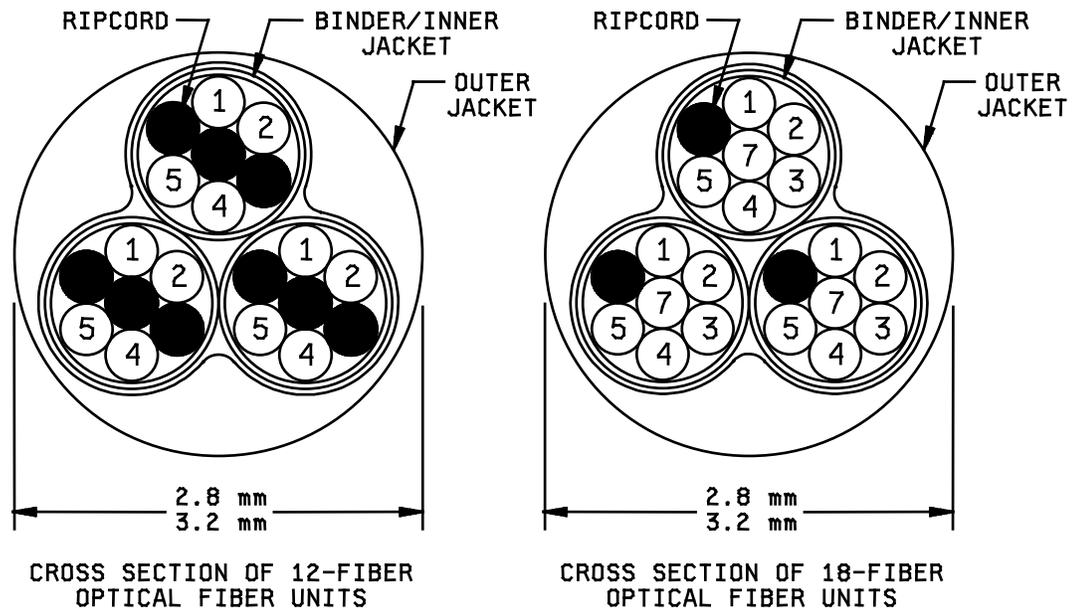


FIGURE 1. Blown optical fiber bundle cable.

Part or Identifying Number (PIN):

12-fiber bundle cable (multimode): M85045/29-0112
18-fiber bundle cable (multimode): M85045/29-0118
12-fiber bundle cable (single mode): M85045/29-0212
18-fiber bundle cable (single mode): M85045/29-0218

DESIGN AND CONSTRUCTION:

Fiber:

Type MM fibers shall be in accordance with MIL-PRF-49291/6.

Type SM fibers shall be in accordance with MIL-PRF-49291/7.

Buffer diameter: $250 \pm 15 \mu\text{m}$.

Finished cable:

Dimensions and configuration: See figure 1. An outer jacket shall be applied over three optical fiber bundle sub-units with rip cords in each sub-unit.

OFCC kink: Not applicable.

Color: Slate or blue (MIL-PRF-49291/6 fiber).
Yellow (MIL-PRF-49291/7 fiber).

Concentricity: Applicable with the following modification. The concentricity shall be measured by first locating the areas where the binder/inner jacket is nearest the jacket outside diameter. From these measurements the minimum and the maximum wall thicknesses will be selected and used to calculate concentricity. The ratio of the minimum wall thickness to the maximum wall thickness shall be ≥ 0.50 .

Jacket material: The overall jacket shall be composed of a low halogen, low toxicity polymer material.

Mass per unit length: $\leq 6 \text{ kg/km}$.

Short-term minimum bend diameter: 76 mm. (The short term minimum bend diameter is to be used in all environmental and mechanical tests that specify a cable minimum bend diameter.)

Long term minimum bend diameter: 76 mm.

Minimum continuous length: The minimum continuous length of all cables shall be not less than 0.5 km. If lengths less than 0.5 km are specified in the purchase order, the delivered cable shall be accompanied by certified test data demonstrating that the conformance inspection was performed on a test specimen not less than 0.5 km in length.

Marking: Marking of blown optical fiber bundles is not required. Shipping containers and bundle reels shall be marked.

Fiber color coding: See table I.

TABLE I. Fiber color coding.

Sub-unit number	Position number	Fiber color	
		12-fiber bundle	18-fiber bundle
1	1	Blue	Blue
	2	Orange	Orange
	3	N/A - ripcord	Green
	4	Green	Brown
	5	Brown	Slate
	6	N/A - ripcord	N/A - ripcord
	7	N/A - ripcord	Red
2	1	Slate	Blue
	2	White	Orange
	3	N/A - ripcord	Green
	4	Red	Brown
	5	Black	Slate
	6	N/A - ripcord	N/A - ripcord
	7	N/A - ripcord	Violet
3	1	Yellow	Blue
	2	Violet	Orange
	3	N/A - ripcord	Green
	4	Pink	Brown
	5	Aqua	Slate
	6	N/A - ripcord	N/A - ripcord
	7	N/A - ripcord	Yellow

NOTE: PINs M85045/29-0112 and M85045/29-0212 only contain 4 fibers in each sub-unit.

PERFORMANCE REQUIREMENTS:

Optical properties:

Maximum attenuation rate: 3.75 dB/km at 850 ± 20 nm, 1.25 dB/km at $1,300 \pm 20$ nm for type MM fiber.
0.75 dB/km at $1,310 \pm 20$ nm and $1,550 \pm 20$ nm for type SM fiber.

Bandwidth: Fiber with a minimum bandwidth of 500 MHz-km at 1,300 nm shall be used (multimode cables only). Bandwidth is not specified at 850 nm.

Change in optical transmittance: Measurements to be made at $1,300 \pm 20$ nm. For shock testing only four fibers are required to be monitored. (At least one fiber per sub-unit.)

Crosstalk: Applicable.

Mechanical properties:

Tensile loading and elongation: Not applicable.

Operating tensile loading: Not applicable.

Dynamic bend: Not applicable.

Low temperature flexibility: Not applicable.

Cyclic flexing: 500 cycles at +25°C ±2°C and 100 cycles at -28°C ±2°C. Minimum load shall be 1.0 kg. Change in optical transmittance measurements are to be made every 100 cycles for the 500-cycle exposure and every 25 cycles for the 100-cycle exposure. Each change in optical transmittance measurement shall be performed with the test specimen in the same position in the test cycle. The cycling may be halted to perform the change in optical transmittance measurement. At low temperature, splitting, cracking or crazing of bundle jacket may be permitted so long as there is no splitting, cracking, or crazing of inner jacket.

Crush: Not applicable.

Cable twist bending: Not applicable.

Impact: Not applicable

Corner bend: Not applicable.

Dripping: Applicable.

Cable jacket tear strength: Applicable, except the cable jacket tear strength shall be 5 N/cm minimum. Test shall be performed on test samples in shear orientation.

Cable scraping resistance: Not applicable.

Cable to cable abrasion: Not applicable.

Durability of marking: Not applicable.

Environmental properties:

Temperature range:

Operating: -28°C to +65°C.

Nonoperating: -40°C to +70°C.

Storage: -40°C to +70°C.

Temperature cycling: Change in optical transmittance measurements may be made periodically. At a minimum, one optical transmittance measurement shall be made over a period of one hour at the end of each temperature plateau.

Temperature humidity cycling: Change in optical transmittance measurements may be made periodically. At a minimum, one optical transmittance measurement shall be made at the end of each temperature plateau.

Storage temperature: Applicable.

Fluid immersion: Not applicable.

Flame extinguishing: Applicable with the following modification. Testing shall be performed in the following configuration: A MIL-PRF-85045/26 cable that contains the lowest fiber count bundle pursuing qualification. The tube ends shall be plugged with a non-flammable sealant to simulate end caps.

Smoke generation and flame propagation: Applicable with the following modification: The pass/fail criteria shall be as follows: The peak optical density and the average optical density of smoke produced shall be not greater than 1.2 and 0.25 respectively. In addition, the flame spread-time product at the 10-minute point shall be not greater than 27.5 meters-minutes when calculated in accordance with ASTM-E-84. Testing shall be performed in the following sample configuration: A MIL-PRF-85045/26 cable containing one fiber bundle of configuration with the lowest fiber count bundle pursuing qualification. Tube ends shall be plugged with a non-flammable sealant to simulate end caps.

Shock: Applicable. The bundle shall be tested within a tube cable.

Paint susceptibility: Not applicable.

Chemical properties:

Acid gas generation: Gas generation shall be not greater than 5.0 percent of the weight of the sample

Halogen content: < 0.2 percent.

Qualification by similarity:

Manufacturers who produce products for both MIL-PRF-85045/27 and products for this specification sheet, and are qualified under MIL-PRF-85045/27, and pass the attenuation rate, cyclic flexing, and size inspection specified herein, are qualified under this specification sheet. This qualification by similarity is applicable only if the 6-fiber bundle sub-unit and the bundle cable jacket for the unqualified bundle cable are the same as those for the previously qualified bundle cable. Testing may be performed on a single length of cable, with a minimum length of 0.5 km.

Manufacturers who are qualified under this specification sheet for the 18-fiber bundle cable and whose 12-fiber bundle cable passes the visual and mechanical inspections and temperature humidity cycling specified herein, are qualified under this specification sheet for the 12-fiber bundle cable. This qualification by similarity is applicable only if the fiber bundle sub-unit and the bundle cable jacket for the unqualified 12-fiber bundle cable are the same as those for the previously qualified 18-fiber bundle cable. This qualification by similarity is applicable if the only difference between the previously qualified cable and the cable under test is that the fiber count has been changed from 18 fibers to 12 fibers. Testing may be performed on a single length of cable, with a minimum length of 0.5 km.

Manufacturers who are qualified under this specification sheet for multimode fiber cable and whose single mode fiber cable passes the visual and mechanical, attenuation rate, temperature cycling, temperature humidity cycling, storage temperature, cyclic flexing, and thermal shock inspections specified herein, are qualified under this specification sheet for single mode fiber cable. This qualification by similarity is applicable if the only difference between the previously qualified cable and the cable under test is that the optical fiber has been changed from a multimode fiber to a single mode fiber. Testing may be performed on either one or two lengths of cable, each with a minimum length of 0.5 km. Test order must be observed up to and including the storage temperature test. If only one cable length is used, the thermal shock test shall be performed after the storage temperature test. Manufacturers who are qualified under MIL-PRF-85045/27 for both multimode and single mode fiber cable and under this specification sheet for multimode fiber cable are qualified under this specification sheet for single mode fiber cable.

Referenced documents. In addition to MIL-PRF-85045, this document references the following:

MIL-PRF-49291/6	MIL-PRF-85045/27
MIL-PRF-49291/7	ASTM-E-84
MIL-PRF-85045/26	

The margins of this specification sheet are marked with vertical lines to indicate where changes from the previous issue were made. This is done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of the document based on the entire contents irrespective of the marginal notation and relationship to the last previous issue.

Custodians:

Navy - SH
Air Force - 99
DLA - CC

Preparing activity:
DLA - CC

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