

METRIC

MIL-PRF-85045/17B
16 September 1999
SUPERSEDING
MIL-C-85045/17A
26 May 1995

PERFORMANCE SPECIFICATION SHEET

CABLE, FIBER OPTIC, EIGHT FIBERS, ENHANCED PERFORMANCE, CABLE CONFIGURATION TYPE 2 (OFCC), 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 and MIL-PRF-85045.

CLASSIFICATION:

Fiber optic cable configuration type: 2 (OFCC).

Fiber Cable Class: MM (Graded-index, glass core and glass cladding, multimode).
SM (Dispersion-unshifted, glass core and glass cladding, single-mode).

DESIGN AND CONSTRUCTION:

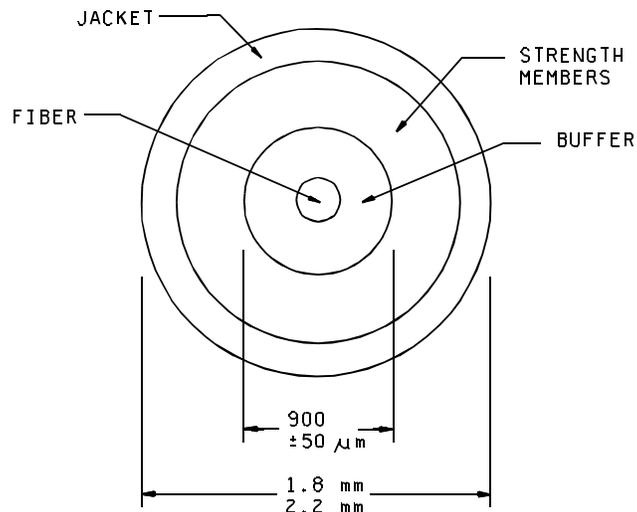
Fiber:

Class MM fibers shall be in accordance with MIL-PRF-49291/6.
Class SM fibers shall be in accordance with MIL-PRF-49291/7.

Buffer diameter: $900 \pm 50 \mu\text{m}$.

OFCC:

Dimensions and configuration: See figure 1.



NOTE:

1. Dimensions are in millimeters.

FIGURE 1. Optical fiber cable component.

Mass per unit length: ≤ 15 kg/km.

Short term minimum bend diameter: Eight times the OFCC outer diameter.

Long term minimum bend diameter: Sixteen times the OFCC outer diameter.

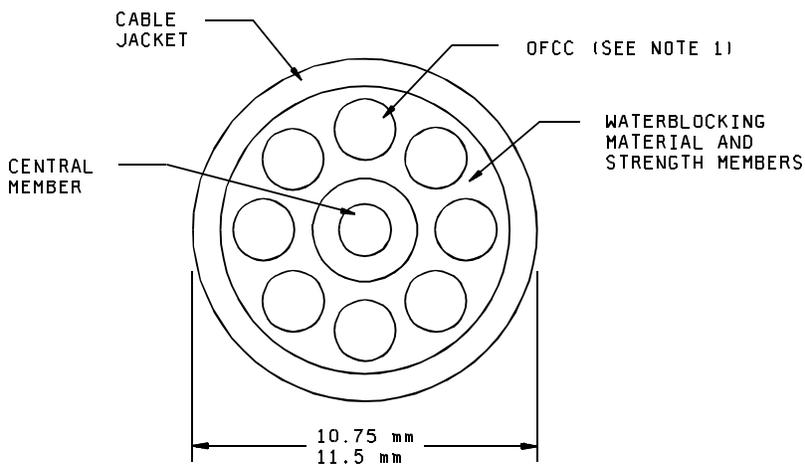
Tensile loading: ≥ 270 N.

Dynamic bend tensile load: 90 N minimum.

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

Finished cable:

Dimensions and configuration: See figure 2. Eight OFCC units shall be helically laid over the central member. The minimum outer jacket thickness shall be not less than 1.2 mm (establishes compatibility with termination and penetration devices).



NOTES:

1. OFCC - Optical fiber cable component.
2. Dimensions are in millimeters.

FIGURE 2. Eight OFCC fiber optic cable.

Number of fibers: 8 (one per OFCC).

Concentricity: ≥ 0.65 .

Mass per unit length: ≤ 175.0 kg/km.

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

Short term minimum bend diameter: Eight times the cable outer diameter. (The short term minimum bend diameter is to be used in all environmental and mechanical tests which specify a cable minimum bend diameter.)

Long term minimum bend diameter: Sixteen times the cable outer diameter.

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, Quality Conformance Inspection shall be performed on test specimens not less than 0.5 km in length from which the purchase order lengths are cut.

PERFORMANCE REQUIREMENTS:

Optical properties:

Maximum attenuation rate: 4.5 dB/km at 850 ± 20 nm, 2.0 dB/km at 1300 ± 20 nm for class MM fiber.
1.5 dB/km at 1310 ± 20 nm and 1550 ± 20 nm for class SM fiber.

For cables with radiation cross-linked jackets, the change in attenuation rate measurement may be made up to 30 days after cross-linking of the cable jacket.

Bandwidth: Fiber with a minimum bandwidth of 500 Mhz-km at 1300 nm shall be used (multimode cables only).
Bandwidth is not specified at 850 nm.

Change in optical transmittance: Measurements to be made at 1300 ± 20 nm.

Crosstalk: Applicable.

Mechanical properties:

Tensile loading and elongation: Applicable, tensile loading ≥ 2700 N.

Operating tensile loading: Applicable.

Low temperature flexibility: The exposure temperature shall be -40°C .

Cyclic flexing: 500 cycles at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and 100 cycles at $-28^{\circ}\text{C} \pm 2^{\circ}\text{C}$. 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.

Crush: Applicable.

Cable twist bending: 500 cycles at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and 100 cycles at $-28^{\circ}\text{C} \pm 2^{\circ}\text{C}$. 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.

Radial compression: Applicable.

Impact: 50 cycles at $25^{\circ}\text{C} \pm 2^{\circ}\text{C}$ and 20 cycles at $-40^{\circ}\text{C} \pm 2^{\circ}\text{C}$. Upon final visual examination at all tested temperatures, there shall be no jacket damage such as splitting or cracking.

Hosing: Both low pressure and hydrostatic pressure are applicable.

Hydrostatic: 7.7 MPa for M85045/17-01P and M85045/17-02P.

Dripping: Applicable.

Cable scraping resistance: 750 cycles.

Cable to cable abrasion: 500 cycles.

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 1 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.

Life aging: Applicable, except that the jacket material shall be tested at 175°C for 4 hours.

Weathering: Applicable.

Fluid immersion: Exposure to automobile gasoline and tap water are not required and the following test temperatures shall be used for the fluids indicated: fuel oil (98°C to 100°C), turbine fuel (48°C to 50°C) and lubricating oil (98°C to 100°C).

Flame extinguishing: Applicable.

Smoke generation and flame propagation: Applicable, except 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 0.5 and 0.15 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.

Shock: Applicable.

Paint susceptibility: Applicable.

Electromagnetic effects: Applicable.

Chemical properties:

Halogen content: < 0.2 percent.

Cross-link verification: This test is applicable for cables with cross-linked jackets only. The test shall be conducted in accordance with ICEA standard T-28-562 and run at 200°C. The test shall be sequenced after the weathering test in the qualification test sequence and after the fluid immersion test in the group C quality conformance test sequence. The hot creep elongation shall not exceed 100 percent and the hot creep set shall not exceed 10 percent.

Part or Identifying Number (PIN) (see table I):

M85045/17-01P (Multimode).
M85045/17-02P (Single-mode).

"P" designates 7.7 Mpa hydrostatic pressure proof cable.

TABLE I. Supersession data.

PIN	Superseding
M85045/17-01P	M85045/17-01
	M85045/17-01N
	M85045/17-01T
M85045/17-02P	M85045/17-02
	M85045/17-02N
	M85045/17-02T

Qualification by similarity.

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, humidity, storage temperature, cyclic flexing, crush, cable twist-bending, impact (low temperature only), tensile loading and elongation, operating tensile loading, thermal shock and dynamic bend 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 had 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.

Custodians:

Army - CR
Navy - SH
Air Force - 11
NASA - NA

Preparing activity:

Navy - SH

Agent:

DLA - CC

Review activities:

Army - AR, AV, MI
Navy - EC, YD
Air Force - 02, 19, 80, 99
DLA - CC

(Project 6015-0034-05)