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PERFORMANCE SPECIFICATION SHEET

CABLE, FIBER OPTIC, SIX-FIBER BUNDLE, BLOWN OPTICAL FIBER, CABLE CONFIGURATION TYPE 3 (CABLE BUNDLE), APPLICATION B (SHIPBOARD), CABLE CLASS SM AND MM

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: 3 (cable bundle)

Fiber optic 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: 250±15 µm

Finished cable:

Dimensions and configuration: See figure 1. An outer jacket shall be applied over six optical fibers and a ripcord or filler.

OFCC kink: Not applicable.

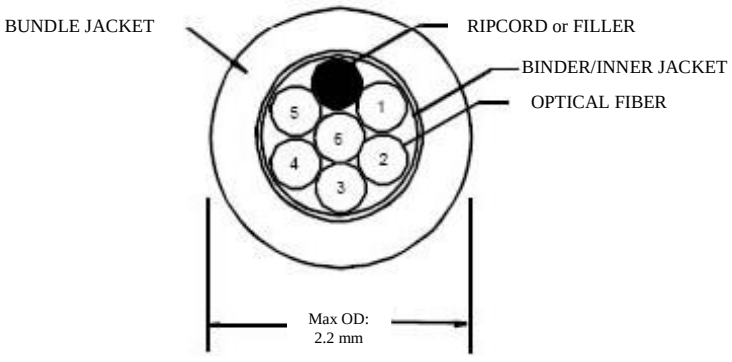

FIGURE 1. Blown optical fiber bundle.

Color:

Slate or blue (MIL-PRF-49291/6 fiber)

Yellow (MIL-PRF-49291/7 fiber)

Concentricity: ≥0.50

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

Mass per unit length: ≤3 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, conformance inspection shall be performed on test specimens not less than 0.5 km in length from which the purchase order lengths are cut.

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

PERFORMANCE REQUIREMENTS:

Optical properties:

Maximum attenuation rate: 3.75 dB/km at 850±20 nm, 1.25 dB/km at 1300±20 nm for Class MM fiber

0.75 dB/km at 1310±20 nm and 1550±20 nm for Class SM fiber

Bandwidth: Shall be in accordance with MIL-PRF-49291/6.

Change in optical transmittance: Measurements shall be made at 1300±20 nm. For shock testing, only four fibers are required to be monitored.

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±2 °C and 100 cycles at –28±2 °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. 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.

Cable jacket tear strength: Applicable, except the cable jacket tear strength shall be 5 N/cm minimum. Test shall be performed in shear orientation on molded samples of the same jacket material: 4 in (L) by 0.5 in (W) by 0.125 in (T), with a single longitudinal slit along the length of the specimen.

Cable jacket material tensile strength and elongation: Not applicable.

Cable scraping resistance: Not applicable.

Cable-to-cable abrasion: Not applicable.

Durability of marking: Not applicable.

Environmental properties:

Temperature range:

Operating: -28 to +65 °C

Non-operating: -40 to +70 °C

Storage: -40 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.

Fluid immersion: Not applicable.

Flame extinguishing and smoke generation: Applicable. Tube ends shall be plugged with a non-flammable sealant to simulate end caps. Testing shall be performed in the following configuration: a MIL-PRF-85045/26 cable that contains one 6-fiber bundle.

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

Paint susceptibility: Not applicable.

Chemical properties:

Acid gas generation: <5.0 percent

Halogen content: <0.2 percent

Part or identifying number (PIN):

M85045/27-01 (multimode)

M85045/27-02 (single-mode)

Qualification and conformance inspection: See table I.

TABLE I. Qualification and conformance inspection.

Group	Qualification inspection	Requirement paragraph	Test paragraph	Cable length 1/ 2/ 3/ 4/	Conformance inspection
I	Visual and mechanical inspection	3.4, 3.9, 3.10	4.7.2	3 samples, 0.5 km each 5/	A
	Attenuation rate	3.5.1	4.7.4.1	3 samples, 0.5 km each 6/	A
II	Crosstalk	3.5.3	4.7.4.3	3 samples, 0.5 km each 6/	--
III	Temperature cycling	3.7.1	7/	2 samples, 0.5 km each 6/ (1 on reel, 1 off)	C
	Temperature humidity cycling	3.7.3	4.7.6.3	2 samples, 0.5 km each 8/	C
	Storage temperature	3.7.4	4.7.6.4	2 samples, 0.5 km each 8/	--
	Cyclic flexing	3.6.4	4.7.5.4	6 specimens, 5 m each 9/ (2 specimens at each temp)	--
	Temperature life (life aging)	7/	7/	2 specimens, 300 m each 10/	C
	Fungus resistance	3.8.4	4.8.4	2 specimens, 0.5 m each 10/	--
	Cable element removability	3.6.18	4.7.5.18	2 specimens, 0.5 m each 10/	C
IV	Thermal shock	3.7.2	4.7.6.2	1 specimen, 0.49 km each 6/ (on reel)	--
	Jacket self-adhesion or blocking	3.7.11	4.7.6.11	1 specimen, 30 m 11/	--
	Shock	3.7.13	4.7.6.13	1 specimen, 30 m 12/	--
V	Dripping	3.6.13	4.7.5.13	1 specimen, 30 cm 13/	--
	Cable jacket tear strength	3.6.14	4.7.5.14	5 flat extruded jacket material strips 13/	C
	Cable shrinkage	3.6.17	4.7.5.17	3 specimens, 0.5 m 14/	C
	Flame extinguishing and smoke generation	3.7.12.2	4.7.6.12.2	1 specimen, 50 m 13/	C
	Water absorption	3.7.14	4.7.6.14	2 specimens, extruded jacket material strips 15/	--
VI	Acid gas generation	3.8.1	4.8.1	1 specimen, 1 m 16/	C
	Halogen content	3.8.2	4.8.2	1 specimen, 1 m 16/	--
	Toxicity index	3.8.3	4.8.3	1 specimen, 1 m 16/	C
	Smoke index	3.8.5	4.8.6	1 specimen, 1 m 16/	C

TABLE I. Qualification and conformance inspection – Continued.

NOTES:

1/ Tolerance on 0.5 km length is ±5 percent, provided that results are normalized to 1 km.
2/ Tolerance on shorter lengths is ±5 percent.
3/ A sample is the initial 0.5-km cable length.
4/ A specimen is a cable length that is cut from the initial 0.5-km cable length (i.e., the sample) or is cut from a longer previous cut length (i.e., cut from a longer specimen).
5/ The visual and mechanical inspection shall only be conducted on a 2-m section of each sample.
6/ The same samples as used in the visual and mechanical inspection shall be used.
7/ As stated under the applicable tests in this specification sheet.
8/ The same samples as used in the temperature cycling test shall be used.
9/ Three specimens cut from each sample used in the temperature cycling test shall be used.
10/ A specimen cut from each sample used in the temperature cycling test shall be used.
11/ A specimen cut from the specimen used in the thermal shock test shall be used.
12/ A specimen cut from the specimen used in the thermal shock test shall be used.
13/ Flat extruded jacket material strips (i.e., strips of flat extruded material with the same composition of the cable jacket and of sufficient dimensions in which dumbbells can be cut) prepared as specified in 4.7.5.14 cited method and obtained from flat extruded material that underwent the thermal shock test shall be used.
14/ Specimens cut from the specimen used in the thermal shock test shall be used.
15/ Use 76-mm (3-inch) lengths of cable adjacent to one another to form a 76-mm (3-inch) strip. For a 2-mm (0.08-inch) diameter cable, an approximate length of 3 m is needed.
16/ A specimen cut from one of the samples used in the temperature cycling test or specimen used in the thermal shock test shall be used.

Qualification by similarity:

Manufacturers who are qualified under this specification sheet for multimode fiber cable (M85045/27-01) and whose single-mode fiber cable passes the inspections identified in table II are qualified under this specification sheet for single-mode fiber cable (M85045/27-02). 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.

TABLE II. Qualification and conformance by similarity (fiber).

Group	Inspection	Qualification inspection M85045/27-02 1/	Conformance inspection M85045/27-02 2/
I	Visual and mechanical	X	A
	Attenuation rate	X	A
III	Temperature cycling	X	C
	Temperature humidity cycling	X	C
	Storage temperature	X	--
	Cyclic flexing	X	--
IV	Thermal shock	X	--

TABLE II. Qualification and conformance by similarity (fiber) – Continued.

NOTES:

1/ Where manufacturers are qualified for MIL-PRF-85045/27-01 and are pursuing qualification for MIL-PRF-85045/27-02.

2/ Where manufacturers are qualified for MIL-PRF-85045/27-01 and MIL-PRF-85045/27-02 and are performing conformance testing for M85045/27-02.

3/ 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.

CHANGES FROM PREVIOUS ISSUE: Marginal notations are not used in this revision to identify changes with respect to the previous issue due to the extent of the changes.

Custodians:
Army – CR
Navy – SH
Air Force – 85
NASA – NA

Preparing activity:
Navy – SH
(Project 6015-2012-022)

Review activities:
Army – AR, AV, MI
Navy – EC, YD
Air Force – 02, 19, 99
DLA – CC

NOTE: The activities listed above were interested in this document as of the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at https://assist.dla.mil.