

REVISIONS			
LTR	DESCRIPTION	DATE	APPROVED
A	<p>1) Change "hybrid" to "mixed fiber". Per JFOWG (military Joint Fiber Optic Working Group), the following terminology has been established, Cables, Hybrid - contain both optical fibers and metallic conductors, Cables, Mixed Fiber - contain more than one size and/or type of optical fiber.</p> <p>2) Delete rip cord from figure 1. Cable does not include a rip cord.</p> <p>3) Revise table II to add 62.5 μm fiber column and its associated optical characteristics.</p> <p>4) Replace text of paragraph 3.9 "crush resistance" with text from MIL-PRF-85045.</p> <p>5) Paragraph 3.3, revise "Material".</p> <p>6) Delete dynamic bend, paragraph 3.13. Not applicable to MIL-PRF-85045/8 cable.</p> <p>7) Paragraph 3.21, change "...method a procedure I..." to change "...method A procedure I...".</p> <p>8) Insert new paragraph between 3.9 and 3.10, new requirement "Crosstalk. Crosstalk shall be performed during the application of the crush resistance load."</p> <p>9) Revise paragraph 6.5 to specify approved source of supply and add table V providing OCC information as approved source of supply.</p>	2 November 2011	M. Radecki
B	Revised table V to add Draka Cableteq as approved source of supply.	31 May 2013	M.Radecki

| ALL SHEETS ARE REVISION B

Prepared in accordance with ASME Y14.100

PMIC N/A	PREPARED BY Eugene A. Ebert	DESIGN ACTIVITY DLA LAND AND MARITIME COLUMBUS, OH 43218-3990
Original date of drawing 7 April 2011	CHECKED BY Eugene A. Ebert	TITLE CABLE, FIBER OPTIC, MIXED FIBER (MULTIMODE AND SINGLE MODE FIBERS)
	APPROVED BY Michael A Radecki	
	SIZE A	CODE IDENT. NO. 037Z3
	DWG NO. 09001	
	SCALE N/A	REV B
	PAGE 1 OF 7	

SCOPE

1.1 Scope. This drawing describes the requirements for mixed fiber optic cable for ground tactical application. The mixed fiber cable detailed in this drawing consists of two multimode and two single mode optical fibers. Buffer colors identify individual fibers.

1.2 Part or Identifying Number (PIN). The complete PIN shall be as follows:



TABLE I. Dash number.

Dash number	Fibers (MM and SM)
01	50/125 and <9/125
02	62.5/125 and <9/125

2. APPLICABLE DOCUMENTS

2.1 General. The documents listed in this section are specified in sections 3 and 4 of this specification. This section does not include documents cited in other sections of this specification or recommended for additional information or as examples. While every effort has been made to ensure the completeness of this list, document users are cautioned that they must meet all specified requirements of documents in sections 3 and 4 of this specification, whether or not they are listed.

2.2 Government documents.

2.2.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

DEPARTMENT OF DEFENSE SPECIFICATIONS

- [MIL-PRF-49291](#) - Fiber, Optical, (Metric), General Specification For.
- [MIL-PRF-85045](#) - Cables, Fiber Optic (Metric), General Specification For.

DEPARTMENT OF DEFENSE STANDARD

- [MIL-STD-1285](#) - Marking of Electrical and Electronic Parts.

(Copies of these documents are available online at <http://quicksearch.dla.mil> or from the Standardization Document Order Desk, 700 Robbins Avenue, Building 4D, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those cited in the solicitation or contract.

ASTM INTERNATIONAL

- [ASTM - D470](#) - Wire and Cable, Crosslinked Insulations and Jackets for.

Copies of this document are available online at <http://www.astm.org> or from ASTM International, 100 Barr Harbor Drive, P.O. Box C700, West Conshohocken, PA 19428-2959.)

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 037Z3	DWG NO. 09001
		REV B	PAGE 2

TELECOMMUNICATIONS INDUSTRY ASSOCIATION

[TIA 455.41](#) - Fiber Optic Cables, Compressive Loading Resistance Of.

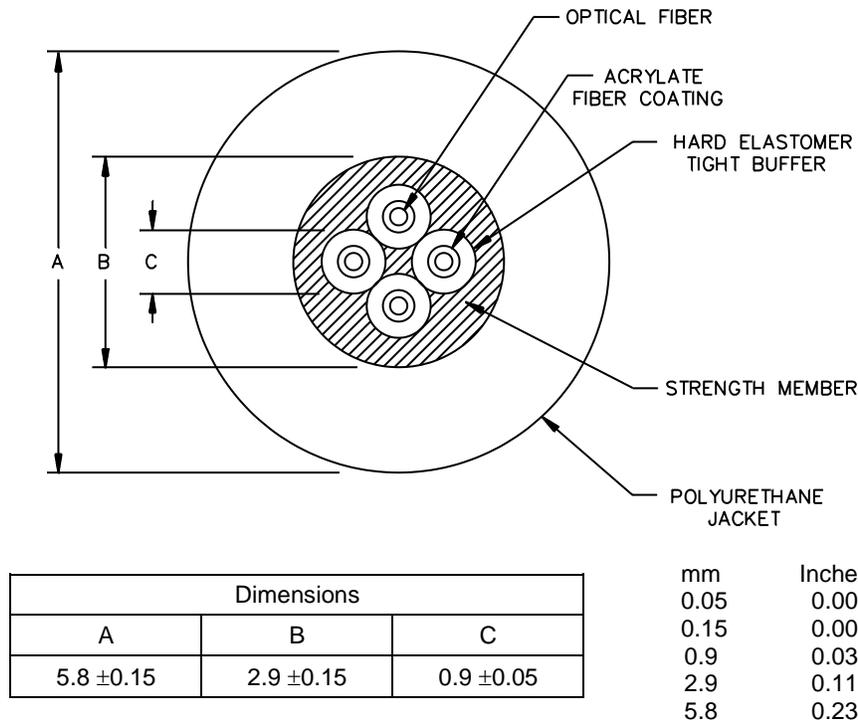
Copies of this document is available online at <http://www.tiaonline.org> or from Telecommunications Industry Association, 1320 North Courthouse Road, Suite 200, Arlington, Virginia 22201.

2.4 Order of precedence. Unless otherwise noted herein or in the contract, in the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

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

3.2 Interface and physical dimensions. See figure 1.



NOTE:

1. Dimensions are in millimeters, inch equivalents are given for reference purposes only.

FIGURE 1. Mixed fiber cable.

3.3 Material.

3.3.1 Recycled, recovered, or environmentally preferable materials. Recycled, recovered, or environmentally preferable materials should be used to the maximum extent possible, provided that the material meets or exceeds the operational and maintenance requirements, and promotes economically advantageous life cycle costs.

3.3.2 Materials. See [MIL-PRF-85045/8](#).

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 037Z3	DWG NO. 09001
		REV B	PAGE 3

3.4 Fibers.

a. Type: Two multimode 50/125 fibers in accordance with [MIL-PRF-49291/1](#) and two single mode <9/125 fibers in accordance with [MIL-PRF-49291/7](#) (see table I dash number 01), or two multimode 62.5/125 fibers in accordance with [MIL-PRF-49291/6](#) and two single mode <9/125 fibers in accordance with [MIL-PRF-49291/7](#) (see table I dash number 02) shall be used.

b. Colors:

Fiber (µm)	Colors
Multimode (50/125)	blue, orange
Multimode (62.5/125)	aqua, rose
Single mode (<9/125)	green, brown

c. Buffer diameter: 900 µm ±0.05 µm.

3.5 Cable weight. Cable weight shall be 31 kg/km maximum.

3.6 Tensile load. Tensile load shall be 1,800 N max during installation and 600 N max during operation.

3.7 Bend radius. Bend radius shall be 8.7 cm minimum during installation and 5.8 cm during operation (corner bend – [3.13](#)).

3.8 Impact resistance. The impact resistance shall be 100 impacts at 25°C and 50 impacts at -46°C to 71°C.

3.9 Crush. Compressive loading testing shall be accomplished in accordance with [TIA 455.41](#) for the finished cable. The following special test conditions shall apply:

- a. The compressive load exposure shall be not less than 2,000 N/cm times the cable outer diameter (in cm), held for 3 minutes, and released.
- b. The compressive loading rate shall be not less than 2,000 N/min.
- c. The change in optical transmittance shall be measured while the specimen is under load and after load removal. Visual inspection of the specimen shall be made under 10X magnification after load removal.
- d. A break in any fiber caused by this test shall be a failure of the cable.
- e. Optical crosstalk shall be monitored in accordance with [3.10](#).

3.10 Crosstalk. Crosstalk shall be measured during the application of the crush resistance load.

3.11 Temperature ranges.

- a. Operating: -46°C (-51°F) to +71°C (160°F).
- b. Storage: -55°C (-67°F) to +85°C (185°F).

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 037Z3	DWG NO. 09001
		REV B	PAGE 4

3.12 Optical characteristics. For optical characteristics, see table II.

TABLE II. Optical characteristics.

	50µm		62.5 µm		Single mode	
Wavelength ± 20 nm	850 nm	1,300 nm	850 nm	1,300 nm	1,310 nm	1,550 nm
Attenuation (max)	3.5 dB/km	1.0 dB/km	3.75 dB/km	1.5 dB/km	0.5 dB/km	0.5 dB/km
Bandwidth (min)	500 MKz-km	500 MKz-km	300 MKz-km	600 MKz-km	---	---
Zero dispersion slope at 1,312 nm ± 20 nm	N/A	N/A	N/A	N/A	<0.092 ps/(nm ² -km)	

3.13 Corner bend. Applicable except the load shall be 500 N.

3.14 Temperature cycling. Change in optical transmittance measurements may be made periodically. At a minimum, one optical measurement shall be made over a period of 1 hour at the end of each temperature plateau.

3.15 Manufacturer eligibility. To be eligible for listing as an approved source of supply, a manufacturer shall be listed on the MIL-PRF-85045 Qualified Products Listing (<http://www.landandmaritime.dla.mil/programs/qmlqpl>) for at least one cable product and submit results of tests specified herein (see 4.1 and table III) to: DLA Land and Maritime-VQP, P. O. Box 3990, Columbus, Ohio 43218-3990.

3.16 Certificate of compliance. Upon request, approved manufacturers shall provide a certificate of compliance.

3.17 Marking. Marking shall be in accordance with [MIL-STD-1285](#), except the mixed fiber optic cable shall be marked with the PIN as specified herein (see 1.2), the manufacturer's name or Commercial and Government Entity (CAGE) code, and date lot codes.

3.17.1 Marking durability. Applicable, except the applied mass shall be 100 grams.

3.18 Thermal shock. Applicable, except schedule A shall be used.

3.19 Barometric pressure (reduced).

a. Operating: 3,000 m (test condition letter B).

b. Nonoperating: 12,200 m.

3.20 Life aging. Test exposure time shall be 240 hours at 110°C (230°F).

3.21 Freezing water immersion. Applicable, except method A procedure I shall be used.

3.22 Flame extinguish. Not applicable.

3.23 Smoke propagation and flame extinguish. Not applicable.

3.24 Shock. Not applicable.

3.25 Water absorption. Applicable except the sample size shall be in accordance with [ASTM-D470](#) and test shall be performed in accordance with the gravimetric method of [ASTM-D470](#).

3.26 Paint susceptibility. Not applicable.

3.27 Halogen content. Not applicable.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 037Z3	DWG NO. 09001
		REV B	PAGE 5

3.28 Toxicity. Not applicable.

3.29 Workmanship. The cable shall be uniform in quality and free from any defects that will affect life, serviceability, or appearance.

4. VERIFICATION

4.1 Sampling and inspection. Unless otherwise specified, sampling and inspection procedures shall be performed in accordance with [MIL-PRF-85045](#). For approval testing see table III, for conformance testing see [table IV](#).

TABLE III. Approval testing. 1/

Requirement	Test
3.2	Interface and physical dimensions
3.3	Recycled, recovered or environmentally preferred material
3.4	Fibers
3.5	Cable weight
3.6	Tensile load
3.7	Bend radius
3.8	Impact resistance
3.9	Crush
3.10	Crosstalk
3.12	Optical characteristics

1/ For approval, sample must pass these tests.

TABLE IV Conformance inspection.

Requirement	Inspection
3.2	Interface and physical dimensions
3.4	Fibers
3.5	Cable weight
3.12	Optical characteristics

5. PACKAGING

5.1 Packaging. For acquisition purposes, the packaging requirements shall be as specified in the contract or order (see [6.2](#)). When packaging of materiel is to be performed by DoD or in-house contractor personnel, these personnel need to contact the responsible packaging activity to ascertain packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activities within the Military Service or Defense Agency, or within the military service's system commands. Packaging data retrieval is available from the managing Military Department's or Defense Agency's automated packaging files, CD-ROM products, or by contacting the responsible packaging activity.

6. NOTES

(This section contains information of a general or explanatory nature which may be helpful, but is not mandatory.)

6.1 Intended use.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 037Z3	DWG NO. 09001
		REV B	PAGE 6

6.2 Ordering data. The contract or purchase order should specify the following:

- a. Complete PIN (see 1.2).
- b. Requirements for delivery of one copy of the conformance inspection data or certificate of compliance that parts have passed conformance inspection with each shipment of parts by the manufacturer.
- c. Requirements for packaging and packing.

6.3 Changes from previous issue. The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. This was 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 this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

6.4 Users of record. Coordination of this document for future revisions is coordinated only with the approved source(s) of supply and the users of record of this document. Requests to be added as a recorded user of this drawing may be achieved online at FiberOpticGroup@dla.mil or if in writing to: DLA Land and Maritime, ATTN: DLA Land and Maritime-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0571 or DSN 850-0571.

6.5 Approved source(s) of supply. Current approved source(s) of supply are listed in table V. Additional sources will be added as they become available. Assistance in the use of this drawing may be obtained online at FiberOpticGroup@dla.mil, or by contacting Defense Supply Center, Columbus, ATTN: DLA Land and Maritime-VAT, Post Office Box 3990, Columbus, OH 43218-3990 or by telephone (614) 692-0571 or DSN 850-0571.

TABLE V Approved source(s) of supply.

DLA Land and Maritime drawing PIN <u>1/</u>	Vendor similar designation or type number <u>1/</u>	Vendor CAGE	Vendor name and address
09001-01	OC-0003480	6Y528	Optical Cable Corporation 5290 Concourse Drive Roanoke, VA 24019 http://www.occfiber.com
09001-02	OC-0003479	6Y528	Optical Cable Corporation 5290 Concourse Drive Roanoke, VA 24019 http://www.occfiber.com
09001-01	H1537-S1032T-04	71102	Draka Cableteq 22 Joseph E. Warner Blvd. North Dighton, MA 02764 www.draka.com
09001-02	H1538-S1032T-04	71102	Draka Cableteq 22 Joseph E. Warner Blvd. North Dighton, MA 02764 www.draka.com

1/ Parts must be purchased to the DLA Land and Maritime PIN to assure that all performance requirements and tests are met.

DLA LAND AND MARITIME COLUMBUS, OHIO	SIZE A	CODE IDENT NO. 037Z3	DWG NO. 09001
		REV B	PAGE 7