

METRIC

A-A-59729

26 June 2002

COMMERCIAL ITEM DESCRIPTION

FURCATION UNITS, TUBE, BLOWN OPTICAL FIBER

The General Services Administration has authorized the use of this commercial item description (CID).

1. SCOPE. This Commercial Item Description (CID) covers the general requirements for blown optical fiber (BOF) tube furcation units (TFUs) that separate either individual BOF fibers or fiber bundles within a BOF tube into individual single fiber cables that may be terminated using traditional single fiber optic connectors and termination techniques. These furcation units are designed for use in shipboard equipment and enclosures.

2. CLASSIFICATION. This CID uses a classification system that is included in the Part or Identification Number (PIN) as shown in the following example (see 7.2).

2.1 Part or Identification Number (PIN).

	AA59729	-	TFU	04	-	1.5	S	R
CID number	_____							
Number of furcation cables (two digits)				_____				
Minimum length of single furcation cables (in 0.1 meter increments)						_____		
Color code identifier (see 3.7)							_____	
Removable polymer tubing identifier (see 3.1.1)								_____

3. SALIENT CHARACTERISTICS.

3.1 Design, construction and dimensions. Design, construction and dimensions shall be as specified in figure 1.

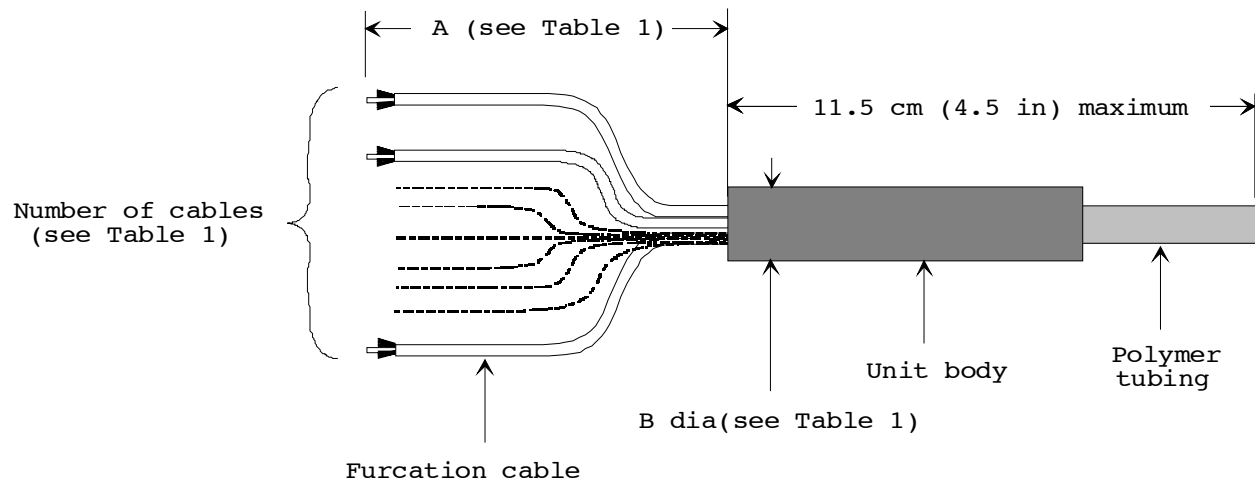
Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be sent by letter to: Commander, Naval Sea Systems Command, ATTN: SEA 05Q, 1333 Isaac Hull Ave SE Stop 5160, Washington Navy Yard, D.C. 20376-5160

AMSC N/A

FSC 6099

DISTRIBUTION STATEMENT A: Approved for public release; distribution is unlimited.

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Figure 1. BOF tube furcation unit.Table I. Furcation unit dimensions.

PIN dash number	Number of cables	A dimension (m)	B diameter (max) (mm)
- TFU Y-Z-X-R	Y	Z	22 (for $Y \leq 12$) 28 (for $Y > 12$)

3.1.1 Polymer tubing. The polymer tubing may be removable or non-removable as identified in the PIN (see 2.1). For BOF tube furcation units with removable polymer tubing, the polymer tubing shall extend beyond the buffer tubes a minimum of 63 mm (2.5 inches). The polymer tubing used in the construction of the BOF tube furcation unit shall be fabricated from a low toxicity material.

3.1.2 Furcation cable. Furcation cable shall be comprised of an inner polymer buffer tube surrounded by an aramid strength member and protective outer jacket (see figure 2). The buffer tube shall have a minimum wall thickness of 100 μ m. The protective outer jacket shall be composed of a low halogen, low smoke, low toxicity polymer material and shall have a minimum wall thickness of 400 μ m. Furcation cable dimensions shall be in accordance with figure 2.

3.1.3 Buffer tube. For BOF tube furcation units with non-removable polymer tubing, the buffer tube shall be continuous and shall extend completely through the furcation cable, the furcation unit body and the polymer tubing. For BOF tube furcation units with removable polymer tubing, the buffer tube shall be continuous and shall extend from within the polymer tube completely through the furcation unit body and the furcation cable.

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3.2 Materials.

3.2.1 Nonmetallic materials. Nonmetallic materials shall not be affected by the use of alcohol based cleaning solutions. Nonmetallic materials shall not degrade when the furcation unit is operated under the environmental conditions defined herein.

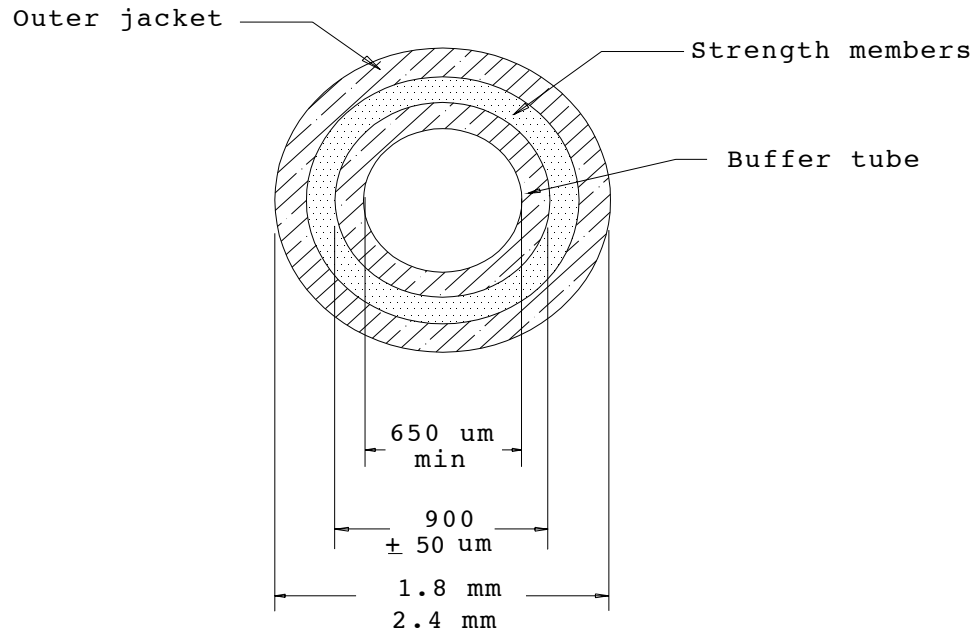


Figure 2. Furcation cable.

3.2.2 Metallic materials. Metallic materials shall be corrosion resistant. Dissimilar metals shall not be used in intimate contact unless suitably finished to prevent electrolytic corrosion.

3.2.3 Toxic and hazardous products and formulations. The products used in the furcation unit construction shall not give off toxic or explosive fumes when exposed to flame. Materials used shall have no adverse effect on the health of personnel when used for the intended purpose.

3.2.4 Fungus. When tested in accordance with TIA/EIA-455-56 for a duration of 28 days, furcation unit materials shall show sparse or very restricted microbial growth and reproduction with minor or inhibited substrate utilization. There shall be little or no chemical, physical, or structural change detectable.

3.2.5 Flammability. When tested in accordance with UL-94, furcation unit materials shall have a rating of V-0 or V-1.

3.2.6 Sealing compounds. Sealing compounds shall not flow at the maximum specified storage temperature or exhibit cracking at the minimum specified storage temperature.

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3.3 Mechanical properties.

3.3.1 Cable pull-out. When tested in accordance with EIA/TIA-455-6, the furcation unit shall sustain a static tensile load not less than 67 N (15 lb) applied for 1 minute between the furcation unit body and each selected furcation cable. Upon visual examination, there shall be no evidence of physical damage detrimental to the operation of the furcation unit body or the furcation cables.

3.3.2 Flex. When tested in accordance with TIA/EIA-455-1, selected furcation cables shall withstand 100 flexing cycles under a load of 1.0 kg (2.2 lb). After the test, the furcation unit shall meet the buffer integrity requirements specified herein. Upon visual examination, there shall be no evidence of physical damage detrimental to the operation of the furcation unit body or to the furcation cables.

3.3.3 Twist. When tested in accordance with EIA-455-36, selected furcation cables shall withstand 100 twisting cycles under a load of 1.5 kg (3.3 lb). After the test, the furcation unit shall meet the buffer integrity requirements specified herein. Upon visual examination, there shall be no evidence of physical damage detrimental to the operation of the furcation unit body or to the furcation cables.

3.3.4 Impact. When tested in accordance with TIA/EIA-455-2 method A, furcation units shall show no visual evidence of physical damage detrimental to the operation of the furcation unit body or to the furcation cables.

3.4 Environmental properties.

3.4.1 Temperature ranges. The furcation unit shall operate over a temperature range from -28 degrees C to +65 degrees C and shall be capable of withstanding storage under temperatures from -40 degrees C to +70 degrees C.

3.4.2 Temperature cycling. When tested for 5 cycles in accordance with EIA/TIA-455-3, the furcation unit shall withstand exposure to cyclical temperatures between the operating temperature extremes. The furcation unit shall have optical fibers installed within the buffer tubes during exposure. When measured in accordance with EIA-455-20, the change in optical transmittance of the installed fibers shall not exceed 0.25 dB during and after exposure. Change in optical transmittance measurements shall be made at each temperature plateau during the exposure. Upon visual examination, there shall be no evidence of physical distortion, separation of bonded surfaces, or other physical damage detrimental to the operation of the furcation unit.

3.4.3 Temperature/humidity cycling. When tested for 10 cycles in accordance with EIA/TIA-455-5, the furcation unit shall withstand exposure to cyclical temperature in the presence of high humidity. The sub-cycle shall be included in the test. The furcation unit shall have optical fibers installed within the buffer tubes during exposure. When measured in accordance with EIA-455-20, the change in optical transmittance of the installed fibers shall not exceed 0.25 dB during and after exposure. Change in optical transmittance measurements shall be made at each temperature plateau during the exposure. Upon visual examination, there shall be no evidence of deterioration of component parts or materials, physical distortion, corrosion of metals, separation of bonded surfaces, or other physical damage detrimental to the operation of the furcation unit.

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3.4.4 Life aging. When tested for 240 hours at 110 degrees C in accordance with EIA/TIA-455-4, the furcation unit shall withstand exposure to accelerated aging conditions. The furcation unit shall have optical fibers installed within the buffer tubes during exposure. When measured in accordance with EIA-455-20, the change in optical transmittance of the installed fibers shall not exceed 0.25 dB after exposure. Upon visual examination, there shall be no evidence of deterioration of component parts or materials, physical distortion, cracking, separation of bonded surfaces, or other physical damage detrimental to the operation of the furcation unit. The furcation unit shall meet cable pull-out requirements after exposure.

3.4.5 Thermal shock. When tested for 5 cycles over the storage temperature extremes in accordance with EIA/TIA-455-71 condition C-0, the furcation unit shall withstand cyclical exposure to the defined storage temperature extremes. After the test the furcation unit shall meet the buffer integrity and pressure sealing requirements specified herein. Upon visual examination, there shall be no evidence of deterioration of component parts or materials, physical distortion, separation of bonded surfaces, cracking or other physical damage detrimental to the operation of the furcation unit.

3.4.6 Vibration. When tested in accordance with TIA/EIA-455-11, test condition II, the furcation unit shall withstand exposure to sinusoidal vibration over frequencies from 5 to 500 Hz (the frequency range for test condition II shall be extended to a low frequency of 5 Hz). From 5 to 55 Hz the vibration amplitude shall be 1.52 mm double amplitude. Acceleration levels shall be 10 g from 55 to 500 Hz. After the test the furcation unit shall meet the buffer integrity and pressure sealing requirements specified herein. Upon visual examination, there shall be no evidence of broken, loose, deformed, or displaced parts, cracks, chips, or other physical damage detrimental to the operation of the furcation unit.

3.4.7 Shock. When tested in accordance with MIL-S-901, Grade A, Class I, Type B, the furcation unit shall withstand exposure to shipboard shock levels. After the test the furcation unit shall meet the buffer integrity and pressure sealing requirements specified herein. Upon visual examination, there shall be no evidence of broken, loose, deformed, or displaced parts, cracks, chips, or other physical damage detrimental to the operation of the furcation unit.

3.4.8 Pressure sealing. When the furcation unit polymer tubing is subjected to an internal pressure not less than 234 kPa (34 psi), the furcation unit shall exhibit no leakage (including leakage between the polymer tube and furcation unit body, within the furcation unit body, or between the furcation unit body and the furcation cables). Leakage through the furcation cable buffer tubes is acceptable. The pressure shall be maintained for a minimum of 30 seconds. The furcation unit body may be immersed under water during the test to visually inspect for leakage (NOTE: The ends of the furcation cables should not be immersed during testing).

3.5 Mass. When measured with scales, the mass of the furcation unit shall be not greater than 200 gms.

3.6 Size. When visually inspected in accordance with TIA/EIA-455-13, furcation unit dimensions shall be in compliance with figure 1 and table 1.

3.7 Marking. When visually inspected, furcation units shall be marked with the manufacturer's CAGE code, name, or logo and the furcation unit PIN.

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Furcation cables shall be color coded or provided with user selectable color coding as identified in Table II. Markings shall be legible and permanent.

Table II. Furcation unit color coding.

PIN color designator	Color code	Applicable fiber type
S	Slate or supplied with user selectable color coding mechanism	Multimode
Y	Yellow or supplied with user selectable color coding mechanism	Single mode
Blank	Supplied with user selectable color coding mechanism	Multimode or Single Mode

NOTE: User selectable color coding refers to marking products provided by the vendor which can be used by the user to appropriately color code the furcation unit.

3.8 Workmanship.

3.8.1 General. When visually inspected, furcation units shall be free from sharp edges, burrs, furcation cable jacket bubbles or other defects that adversely affect performance or appearance.

3.8.2 Buffer tube integrity. When tested using a fiber with a 500-micron outer diameter, or equivalent diameter monofilament, each buffer tube shall allow passage of the fiber (monofilament) completely through the furcation unit.

4. REGULATORY REQUIREMENTS.

4.1 Recovered materials. Products provided are encouraged to be manufactured with recovered materials to the maximum extent practicable, in accordance with paragraph 23.403 of the Federal Acquisition Regulation (FAR).

5. QUALITY ASSURANCE PROVISIONS.

5.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection, examination, and test requirements specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections, examinations, or tests set forth in this description where such inspections, examinations, and tests are deemed necessary to assure supplies and services conform to prescribed requirements.

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5.2 Conformance inspections. Furcation units for delivery under this CID shall be subjected at a minimum to the following inspections:

- a. Marking (see 3.7).
- b. Workmanship (see 3.8.1).
- c. Pressure sealing (see 3.4.8).

5.3 Product conformance. The contractor shall certify and maintain objective quality evidence that the product offered meets the requirements of this CID, and that the product conforms to the producer's own drawings, specifications, standards, quality assurance practices, and is the same as the product provided as a product sample. The Government reserves the right to require proof of such conformance prior to the first delivery and thereafter as may be otherwise provided for under the provisions of the contract.

5.4 Market acceptability. The item offered must have been sold to the government or commercial market for a minimum of one year.

5.5 Certificate of compliance. A certificate of compliance shall accompany all furcation units supplied to this CID.

6. Packaging.

6.1 Preservation, packaging, packing, labeling, and marking. Preservation, packaging, labeling, and marking shall be as specified in the contract or purchase order.

7. NOTES.

7.1 Intended use. Furcation units in accordance with this CID are intended to be used as specified in MIL-STD-2042 with blown optical fiber cables in accordance with MIL-PRF-85045 and straight tube couplers and tee tube couplers in accordance with A-A-59731.

7.2 PIN. The PIN defined in paragraph 2.1 should be used for Government procurement.

7.3 Sources of documents.

EIA standards are available from the Electronics Industry Alliance, Engineering Department, 2500 Wilson Blvd. Suite 300, Arlington, VA 22201-3834.

UL standards are available from the Underwriters Laboratory Inc. 333 Pfingsten Road, Northbrook, IL 60062.

Federal Government publications are available from the Standardization Documents Order Desk, 700 Robbins Avenue, Philadelphia, PA 19120-5094.

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

- a. CID number, revision, and CID PIN.
- b. Quality assurance provisions.
- c. Packaging requirements.

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7.5 Suggested sources of supply. Suggested sources of supply are listed herein. Additional sources will be added as they become available.

CID PIN	Vendor CAGE	Vendor commercial PIN
<hr/>		<hr/>
<i>TBD</i>		<i>TBD</i>

Custodian:

Navy - SH
Air Force - 11
Army - CR

Preparing activity:

Navy - SH

(Project 6099-0006-001)

Review Activities:

Air Force - 13, 19, 93, 99
Misc - DI