

METRIC

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26 June 2002

COMMERCIAL ITEM DESCRIPTION

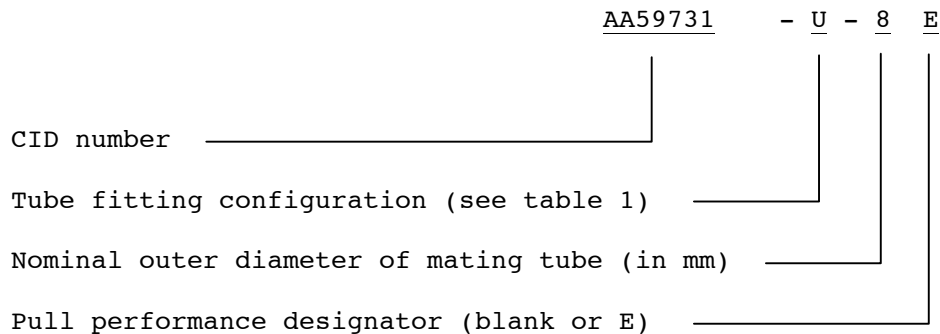
TUBE FITTINGS, BLOWN OPTICAL FIBER

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 fittings (straight tube couplers, tee tube couplers and end caps) that are used to join together two or more BOF tubes or to terminate a single BOF tube. These tube fittings 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).



3. SALIENT CHARACTERISTICS.

3.1 Design, construction and dimensions. Design, construction and dimensions shall be as specified in figures 1, 2 and 3.

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

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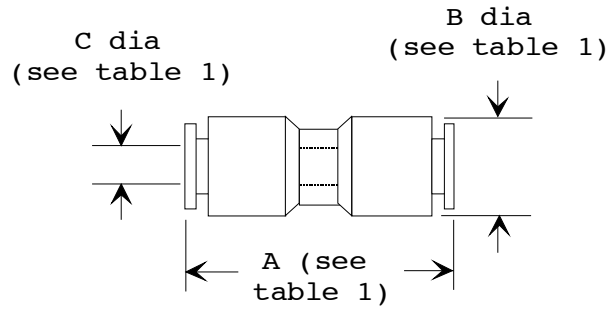


Figure 1. BOF tube union/straight tube coupler (configuration U).

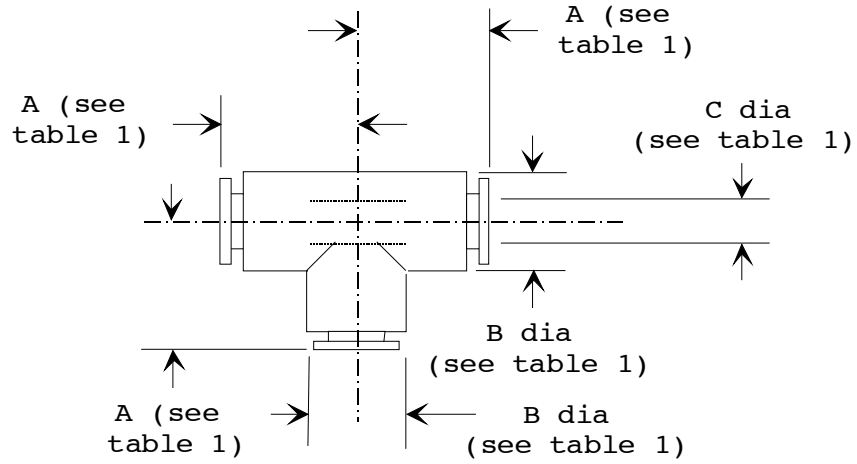


Figure 2. BOF tube tee/tee tube coupler (configuration T).

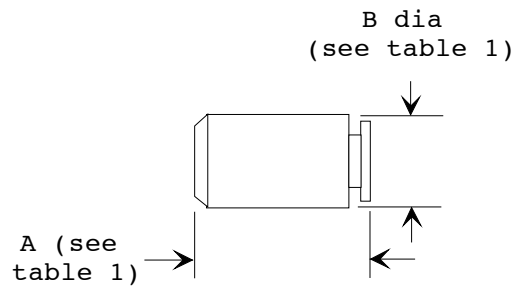


Figure 3. BOF end cap (configuration EC).

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Table 1. Tube fitting dimensions.

Tube fitting configuration	A dimension max (mm)	B diameter max (mm)	C diameter (mm)
U (tube union / straight tube coupler)	52	18.5	6.0 ± 0.1
T (tube tee / tee tube coupler)	26	18.5	6.0 ± 0.1
EC (tube end cap)	20	18.5	N/A

Note: C diameter is tube fitting internal bore diameter.

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 tube fitting is operated under the environmental conditions defined herein.

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 tube fitting 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, tube fitting 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, tube fitting materials shall have a rating of V-0 or V-1.

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

3.2.7 Lubricants. If utilized, lubricants used shall be permanent and shall not require replacement during the lifetime of the tube fitting. Lubricants shall be useful over the environmental conditions specified herein.

3.2.8 Tube retention mechanism. Tube retention mechanisms shall utilize metallic materials.

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3.3 Mechanical properties.

3.3.1 Tube pull-out. When tested in accordance with EIA/TIA-455-6, the tube fitting shall sustain a static tensile load not less than 67 N (15 lb) applied for 1 minute between the tube fitting and a polymer BOF tube (polyethylene or equivalent). Tube ends shall be fully seated within the tube fitting at the beginning of the test. After the test, the tube fitting shall meet the pressure sealing requirements specified herein. Upon visual examination, there shall be no evidence of physical damage detrimental to the operation of the tube fitting or the polymer tube. For enhanced pull performance straight tube couplers and tee tube couplers (see 2.1), the movement of the tube end within the tube fitting during the pull test shall be not greater than 0.5 mm.

3.3.2 Impact. When dropped eight times onto a steel block from a height of 1.5 m, tube fittings shall show no visual evidence of physical damage detrimental to the operation of the tube fitting. After the test, the tube fitting shall meet the pressure sealing requirements specified herein.

3.3.3 Mating durability. When subjected to ten mate/demate cycles, the tube fitting seals and tube capture mechanisms shall maintain physical integrity. Mated tube fitting/polymer BOF tube (polyethylene or equivalent) assemblies shall be used for test purposes. After the test, the tube fitting shall meet the tube pull-out and pressure sealing requirements herein. Upon visual examination, there shall be no evidence of physical distortion, or other physical damage detrimental to the operation of the tube fitting.

3.4 Environmental properties.

3.4.1 Temperature ranges. The tube fitting 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 tube fitting shall withstand exposure to cyclical temperatures between the operating temperature extremes. Mated tube fitting/polymer BOF tube (polyethylene or equivalent) assemblies shall be used for test purposes. During one high temperature extreme and one low temperature extreme the tube fitting shall be demated and mated from the polymer tubes a minimum of two times. At the high and low temperature extremes and after the exposure, the tube fitting shall meet the pressure sealing requirements specified herein. 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 tube fitting.

3.4.3 Temperature/humidity cycling. When tested for 10 cycles in accordance with EIA/TIA-455-5, the tube fitting shall withstand exposure to cyclical temperature in the presence of high humidity. Mated tube fitting/polymer BOF tube (polyethylene or equivalent) assemblies shall be used for test purposes. The sub-cycle shall be included in the test. At the high and low temperature extremes and after the exposure, the tube fitting shall meet the pressure sealing requirements specified herein. After the test, the tube fitting shall be demated from and mated with the polymer tubes a minimum of two times, after which it shall meet the pressure sealing requirements specified herein. Upon visual examination, there shall be no evidence of deterioration of component parts or materials, physical distortion, corrosion of metals,

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separation of bonded surfaces, or other physical damage detrimental to the operation of the tube fitting.

3.4.4 Life aging. When tested for 240 hours at 110 degrees C in accordance with EIA/TIA-455-4, the tube fitting shall withstand exposure to accelerated aging conditions. Mated tube fitting/polymer BOF tube (polyethylene or equivalent) assemblies shall be used for test purposes. After the exposure, the tube fitting shall meet the pressure sealing and tube pull out requirements specified herein. After the test, the tube fitting shall be demated from and mated with the polymer tubes a minimum of two times, after which it shall meet the pressure sealing requirements specified herein. 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 tube fitting.

3.4.5 O-ring material aging. When dry air aged in accordance with ASTM D 573 for 70 hours at 125 degrees C, the change in o-ring material elongation shall be not greater than 35 percent compared to the unaged material elongation.

3.4.6 Thermal shock. When tested for 5 cycles over the storage temperature extremes in accordance with EIA/TIA-455-71 condition C-0, the tube fitting shall withstand cyclical exposure to the defined storage temperature extremes. Mated tube fitting/polymer BOF tube (polyethylene or equivalent) assemblies shall be used for test purposes. After the exposure, the tube fitting shall meet the 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 tube fitting.

3.4.7 Vibration. When tested in accordance with TIA/EIA-455-11, test condition II, the tube fitting 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. Mated tube fitting/polymer BOF tube (polyethylene or equivalent) assemblies shall be used for test purposes. There shall be no tube detachment during the test. During and after the exposure, the tube fitting shall meet the 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 tube fitting.

3.4.8 Shock. When tested in accordance with MIL-S-901, Grade A, Class I, Type B, the tube fitting shall withstand exposure to shipboard shock levels. Mated tube fitting/polymer BOF tube (polyethylene or equivalent) assemblies shall be used for test purposes. The use retaining clips or equivalent on the tube fitting release mechanism is not allowed. There shall be no tube detachment during the test. After the exposure, the tube fitting shall meet the 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 tube fitting.

3.4.9 Pressure withstand. When the tube fitting is subjected to an internal pressure not less than 1724 kPa (250 PSI), the tube fitting shall maintain physical integrity. Mated tube fitting/polymer BOF tube (polyethylene or

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equivalent) assemblies shall be used for test purposes. The pressure shall be maintained for a minimum of 30 seconds. There shall be no tube detachment during the test. Upon visual examination, there shall be no evidence of broken, loose, deformed, or displaced parts, cracks, or other physical damage detrimental to the operation of the tube fitting.

3.4.10 Pressure sealing. When the tube fitting is subjected to an internal pressure not less than 938 kPa (136 PSI), the tube fitting shall exhibit no leakage (including leakage at tube fitting to mating tube interfaces). Mated tube fitting/polymer BOF tube (polyethylene or equivalent) assemblies shall be used for test purposes. The pressure shall be maintained for a minimum of 5 minutes. The tube fitting may be immersed under water during the test to visually inspect for leakage.

3.5 Mass. When measured with scales, the mass of the tube fitting shall be not greater than 15 gms.

3.6 Size. When visually inspected in accordance with TIA/EIA-455-13, tube fitting dimensions shall be in compliance with figures 1, 2 or 3 and table 1.

3.7 Marking. When visually inspected, tube fittings shall be marked with the manufacturer's CAGE code, name, or logo and the tube fitting PIN. Alternatively the tube fitting shall be marked with the manufacturer's CAGE code, name, or logo, and the manufacturer's commercial part number or size designation. Markings shall be legible and permanent.

3.7 Workmanship. When visually inspected, tube fittings shall be free from sharp edges, burrs, or other defects that adversely affect performance or appearance.

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.

5.2 Conformance tests. Tube fittings for delivery under this CID shall be subjected at a minimum to the following inspections:

- a. Marking
- b. Workmanship

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,

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specifications, standards, quality assurance practices, and is the same as the product provided as a bid 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 tube fittings 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. Tube fittings 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 blown optical fiber tube furcation units in accordance with A-A-59729.

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

7.3 Sources of documents.

ASTM standards are available from the ASTM International, 100 Barr Harbor Drive, West Conshohocken, Pennsylvania, 19428-2959.

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.

7.5 Storage. Tube fitting materials may degrade upon extended exposure to ozone, sunlight, or sources of ultraviolet radiation. Storage of tube fittings in a dark airtight environment is recommended.

