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PERFORMANCE SPECIFICATION

SPLICE, FIBER OPTIC CABLE
GENERAL SPECIFICATION FOR (METRIC)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers environmental and nonenvironmental resistant (chemical, mechanical and fusion) splices suitable for military use with optical cables and fibers. Fiber and cable splices specified herein cover a family of general purpose, interconnection hardware providing a variety of compatible optical arrangements.

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 documents cited 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 listed in the issue of the Department of Defense Index of Specifications and Standards (DoDISS) and supplement thereto, cited in the solicitation (see 6.2).

SPECIFICATIONS

FEDERAL

QQ-P-35 - Passivation Treatments For Corrosion-Resistant Steel.

MILITARY

MIL-S-901 - Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment and Systems, Requirements for.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 05Q, 1333 Isaac Hull Ave SE, Washington Navy Yard, Washington, D.C. 20376, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A FSC 6060

HANDBOOKS

MILITARY

MIL-HDBK-454 - General Guidelines for Electronic Equipment.

(Unless otherwise indicated, copies of above specifications, standards, and handbooks are available from the Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

2.3 Non-Government publications. The following document(s) form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DoDISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DoDISS are the issues of the documents cited in the solicitation (see 6.2).

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM-E-595 - Standard Test Methods for Total Mass Loss and Collected Volatile Condensable Materials from Outgassing in a Vacuum Environment (DoD adopted).

ASTM-D-1141 - Standard Specification for Substitute Ocean Water (DoD adopted).

(Application for copies should be addressed to the American Society for Testing and Materials, 100 Bar Harbor Drive, Conshohocken, PA 19428-2959.)

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)

EIA-364-81	-	Combustion Characteristics of Connector Housings, Connector Assemblies and Sockets.
TIA/EIA-455	-	Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices (DoD adopted).
TIA/EIA-455-1	-	Cable Flexing for Fiber Optic Interconnecting Devices.
TIA/EIA-455-2	-	Impact Test Measurements for Fiber Optic Devices (DoD adopted).
EIA/TIA-455-3	-	Procedure to Measure Temperature Cycling Effects on Optical Fibers, Optical Cable, and Other Passive Fiber Optic Components (DoD adopted).
TIA/EIA-455-4	-	Fiber Optic Connector/Component Temperature Life Test (DoD adopted).
TIA/EIA-455-5	-	Humidity Test Procedure for Fiber Optic Components (DoD adopted).
EIA/TIA-455-6	-	Cable Retention Test Procedure for Fiber Optic Cable Interconnecting Devices (DoD adopted).
TIA/EIA-455-11	-	Vibration Test Procedure for Fiber Optic Components and Cables.
EIA/TIA-455-12	-	Fluid Immersion Test for Fiber Optic Components.
EIA/TIA-455-13	-	Visual and Mechanical Inspection of Fiber Optic Components, Devices, and Assemblies (DoD adopted).
EIA/TIA-455-16	-	Salt Spray (Corrosion) Test for Fiber Optic Components (DoD adopted).
TIA/EIA-455-20	-	Measurement of Change in Optical Transmittance (DoD adopted).
EIA/TIA-455-22	-	Ambient Light Susceptibility of Fiber Optic Components (DoD adopted).
TIA/EIA-455-26	-	Crush Resistance of Fiber Optic Interconnecting Devices (DoD adopted).
TIA/EIA-455-32	-	Fiber Optic Circuit Discontinuities (DoD adopted).
TIA/EIA-455-34	-	Interconnection Device Insertion Loss Test (DoD adopted).
EIA/TIA-455-35	-	Fiber Optic Component Dust (Fine Sand) Test (DoD adopted).
TIA/EIA-455-36	-	Twist Test for Fiber Optic Connecting Devices.
TIA/EIA-455-42	-	Optical Crosstalk in Fiber Optic Components (DoD adopted).
TIA/EIA-455-56	-	Test Method for Evaluating Fungus Resistance of Optical Waveguide Fibers and Cables (DoD adopted).

TIA/EIA-455-64	-	Procedure for Measuring Steady State Gamma Radiation-Induced Attenuation in Optical Fibers and Cables (DoD adopted).
TIA/EIA-455-71	-	Procedure to Measure Temperature-Shock Effects on Fiber Optic Components.
EIA/TIA-455-98	-	Fiber Optic Cable External Freezing Test.
EIA/TIA-455-107	-	Determination of Component Reflectance or Link/System Return Loss Using a Loss Test Set (DoD adopted).

(Application for copies should be addressed to the Telecommunications Industry Association/Electronic Industries Association, 2500 Wilson Boulevard, Arlington, Virginia 22201-3834.)

(Non-Government standards and other publications are normally available from the organizations which prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

2.4 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated specifications or specification sheets), 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 Specification sheets. The individual item requirements shall be as specified herein and in accordance with the applicable specification sheet. In the event of any conflict between the requirements of this specification and the specification sheet, the latter shall govern.

3.2 Qualification. Fiber optic splices furnished under this specification shall be products that are authorized by the qualifying activity for listing on the applicable qualified products list before contract award (see 4.5 and 6.3). The provisions of 4.5.4 for retention of qualification are included in this requirement.

3.3 Materials. The splice shall be constructed of materials as specified herein and in the specification sheet (see 3.1). In all cases, materials selected for splice usage shall meet all qualification requirements as specified, and be of a type and quality to assure physical, chemical and optical compatibility with the requirements of this specification. All materials used shall be nontoxic (see 3.3.1), non-nutrient to fungus (see 3.3.8), and manufactured to good workmanship quality (see 3.8). For space flight applications, materials shall not release in excess of 1 percent total mass loss or 0.1 percent collected volatile condensable materials when tested in accordance with ASTM-E-595.

3.3.1 Toxic and hazardous products and formulations. The products used in the splice 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.

3.3.2 Interior parts. The materials used for splice interior parts shall provide 20 year service. No incompatibility shall exist between the materials employed such that degradation of these materials can result from in-service use or from test exposures as specified herein.

3.3.3 Exterior parts. Exterior parts of the assembled splice, if metallic, shall have a passivated finish which permits the attainment of a suitable surface finish condition in accordance with high workmanship standards and shall be compatible with external coatings or platings of the type and color specified in the specification sheet (see 3.1).

3.3.4 Finish. The resultant finish on all cable splice closures (see 6.4.13) shall meet the requirements herein.

3.3.5 Solvents, adhesives and cleaning agents. If epoxy or comparable cement is used in the splicing processes, no incompatibility shall exist between the materials employed such that degradation of the materials can result from in-service use or when tested in accordance with the requirements of the life aging test of 3.7.2.

3.3.6 Nonmetallic materials. Nonmetallic materials used in the construction of splices shall not be affected by the use of solvents, adhesives, or cleaning agents, nor be degraded at the specified environmental conditions.

3.3.7 Liquid materials. Liquid materials shall not be used.

3.3.8 Fungus resistance. When tested in accordance with 4.7.2.14, polymeric splice 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.

3.3.9 Recovered materials. Unless otherwise specified herein, all equipment, material, and articles incorporated in the products covered by this specification shall be new and shall be fabricated using materials produced from recovered materials to the maximum extent practicable without jeopardizing the intended use. The term "recovered materials" means materials that have been collected or recovered from solid waste and reprocessed to become a source of raw materials, as opposed to virgin raw materials. None of the above shall be interpreted to mean that the use of used or rebuilt products is allowed under this specification unless otherwise specifically specified.

3.4 Design and construction. The splices shall be of the construction, weight, and physical dimensions specified (see 3.1 and 6.1).

3.4.1 General. Splice designs may be single fiber or multiple fibers.

3.4.1.1 Fiber splice. The fiber splice shall include the waveguide splice and the fiber splice housing (see 6.1).

3.4.1.2 Waveguide splice. The waveguide splice shall optically align the core and cladding of the optical fiber (see 3.6.1 and 3.6.3).

3.4.1.1.2 Fiber splice housing. The fiber splice housing shall restore the environmental and mechanical integrity of the coating or buffer of the optical fiber.

3.4.1.2 Cable splice. The cable splice shall include the cable splice closure and the fiber splices. The cable splices shall seal the cables to meet the environmental requirements specified herein.

3.4.1.2.1 Cable splice closure. The cable splice closure shall include cable seals necessary to restore mechanical strength and environmental protection to the cable. The cable splice closure shall seal the fiber splice against moisture and contamination as specified herein.

3.4.2 Maintainability. The splices shall require no preventative maintenance.

3.4.3 Interchangeability. All splice parts having the same military part number shall be physically and functionally inter-changeable without need for modification of such items or of the splicing equipment.

3.4.4 Metals. Metals shall be corrosion resistant. Unless otherwise specified (see 3.1), metals shall be nonmagnetic, and all exposed corrosion resistant steel parts shall have a passivated surface that is compatible with external coatings or platings as specified (see 3.1).

3.4.5 Dissimilar metals. The use of dissimilar metals in intimate contact should be avoided. When dissimilar metals are used in intimate contact with each other, protection against electrolysis and corrosion shall be provided.

3.4.6 Seals. Cable splice closure seals shall provide environmental isolation for splice interior parts including the fiber splices. Cable splice closures shall seal to attached cables. Grommets, O-rings, boots, gaskets or other sealing methods may be used and shall accomplish their intended purposes and meet all of the requirements specified herein.

3.4.7 Strain relief. The splice enclosures shall accept and retain a cable support or cable strain relief to maintain cable strength continuity from one cable to the other cable (see 3.5.13).

3.4.8 Tools. Tools used to splice fibers and cables shall be as specified in the specification sheets (see 3.1). The splice manufacturer shall provide the tools when specified in the acquisition documents (see 6.2).

3.5 Visual and mechanical.

3.5.1 Size. When examined in accordance with 4.7.2.1, the dimensions and dimensional tolerances for the splice parts shall be as specified in the specification sheets (see 3.1).

3.5.2 Weight. When tested in accordance with 4.7.2.2, the weight and weight tolerances of the splice parts shall be as specified in the specification sheets (see 3.1).

3.5.3 Color. When visually inspected in accordance with 4.7.2.3, the color of the splice parts shall be as specified in the specification sheets (see 3.1).

3.5.4 Identification marking. Unless otherwise specified (see 3.1), all splices or splice packages shall be identified with markings that are permanent, clearly visible and legible. Identification marking information shall include the PIN and either the manufacturer's CAGE code, name or logo (see 4.7.2.4).

3.5.4.1 JAN and J marking. The United States Government has adopted, and is exercising legitimate control over the certification marks "JAN" and "J" respectively, to indicate that items so marked or identified are manufactured to, and meet all the requirements of specifications. Accordingly, items acquired to, and meeting all of the criteria specified herein and in applicable specifications shall bear the certification mark "JAN" except that items too small to bear the certification mark "JAN" shall bear the letter "J". The "JAN" or "J" shall be placed immediately before the part number except that if such location would place a hardship on the manufacturer in connection with such marking, the "JAN" or "J" may be located on the first line above or below the part number. Items furnished under contracts or orders which either permit or require deviation from the conditions or requirements specified herein or in applicable specifications shall not bear "JAN" or "J". In the event an item fails to meet the requirements of this specification, and the applicable specification sheets or associated specifications, the manufacturer shall remove completely the military part number and the "JAN" or the "J" from the sample tested and also from all items represented by the sample. The "JAN" or "J" certification mark shall not be used on products acquired to contractor drawings or specifications. The United States Government has obtained Certificate of Registration Number 504,860 for the certification mark "JAN" and Registration Number 1,586,261 for the certification mark "J".

3.5.5 Cable seal flexing (for cable splice only). When tested in accordance with 4.7.2.5, splice strain relief mechanisms shall prevent loss of environmental sealing or other damage that may impair the splice operation.

3.5.6 Twist (for cable splice only). When tested in accordance with 4.7.2.6, a visual examination of the splice enclosure shall reveal no seal impairment nor any other splice damage. The splice shall meet the requirements of 3.6.2 during and after the test.

3.5.7 Axial compressive loading (for cable splice only). When tested in accordance with 4.7.2.7, a post test visual examination of the splice shall reveal no indication of cracking, splitting, tearing or buckling of the splice.

3.5.8 Crush (for cable splice only). When tested in accordance with 4.7.2.8, a visual examination of the splice enclosure shall reveal no cracking, splitting, or other effect to permit environmental penetration. Splice enclosure deformation shall not be considered as splice failure. The splice shall meet the requirements of 3.6.2 during and after the test.

3.5.9 Impact. When tested in accordance with 4.7.2.9 and 4.7.2.9.1, the impact resistive property of the splice shall be determined by post test visual examination of the splice enclosure. This examination shall reveal no cracking, splitting or other defect to permit environmental penetration. Splice enclosure deformation shall not be considered as splice failure. Splice shall meet the requirement of 3.6.2 after impact test.

3.5.10 Vibration. When tested in accordance with 4.7.2.10, the splices shall exhibit no visual evidence of loosening of parts, relative motion between splice and cable parts, nor any other damage which can produce physical distortion or wear and may result in fatigue of the mechanical parts or failure of the splice operation. The splice shall meet the requirements of 3.6.4 during the test.

3.5.11 Mechanical shock. When tested in accordance with 4.7.2.11, the splices shall not be damaged and there shall be no loosening of parts. The splice shall meet the requirements of 3.6.4 during the test and 3.6.2 after the test.

3.5.12 Fiber pull out force. When tested in accordance with 4.7.2.12, the minimum fiber to fiber splice pullout strength shall be 14.0 N (3.1 pounds). The splice shall meet the optical requirements specified in 3.6.2 during and after the test.

3.5.13 Cable pull out force. The minimum cable to cable splice closure pullout strength shall be 73.5 kg for splices attaching to the strength members of the cable or 9 kg for splices attaching directly to fiber cable components (see 4.7.2.13). The splices shall show no evidence of cable jacket damage, cable clamp failure, cable to splice seal damage, distortion from bending of splice parts or cable disengagement from the clamp. The splice shall meet the requirements of 3.6.2 during and after the test.

3.6 Optical requirements. Splices shall meet the optical requirements as specified herein. Unless otherwise specified, the center wavelength for all measurements shall be 1300 +/- 20 nm.

3.6.1 Insertion loss. The initial insertion loss for tunable splices shall not exceed 0.6 dB (untuned) and 0.2 dB (tuned). The initial insertion loss for fixed splices shall be 0.6 dB. Unless otherwise specified (see 3.1), the insertion loss shall not exceed 0.9 dB at any time during testing for the splice (see 4.7.3.1).

3.6.2 Change in optical transmittance. When measured in accordance with 4.7.3.2, the change in optical transmittance during or after any specified environmental or mechanical requirement shall be not greater than 0.30 dB.

3.6.3 Return loss. When measured in accordance with 4.7.3.3, return loss (see 6.4.15) shall not be greater than -30 dB.

3.6.4 Discontinuity. When measured in accordance with 4.7.3.4, no discontinuity (see 6.4.10) shall occur. A discontinuity is considered to be a reduction of signal strength of 0.30 dB or more for a duration of 50 microseconds or more.

3.6.5 Crosstalk. When tested in accordance with 4.7.3.5, the signal power level, or the sum of the power levels in the passive output channel or channels, shall be below the output signal level of the active channel by not less than 50 dB.

3.6.6 Ambient light susceptibility. When tested in accordance with 4.7.3.6, the optical power of the light from the fibers (after accounting for cable losses and optical junction losses between the fiber and the detector) shall be less than -50 dBm (dB ref. to 1 mw).

3.7 Environmental requirements.

3.7.1 Environmental properties. The splice shall meet all the specified requirements (see 3.1), during the specified operating environments and after the specified storage environments. The operating and storage temperature ranges shall be as specified (see 3.1) in table I.

TABLE I. Temperature ranges.

Range	Operating temperature (°C)	Non-operating temperature (°C)	Storage temperature (°C)
1	- 46 to +85	-54 to +85	-62 to +85
2	-55 to +125	-55 to +125	-65 to +200

3.7.2 Life aging. When tested in accordance with 4.7.4.1, the splices subjected to these specified accelerated aging exposures shall not exhibit visual evidence of dimensional change, opening of seals, cracking or crazing of components or finishes, identification marking impairment, leakage of waterproofing compounds or other defects detrimental to their operation. The splice shall meet the requirements of 3.6.2 after the test.

3.7.3 Thermal shock. When tested in accordance with 4.7.4.2, a post test visual examination of the test splices shall reveal no leakage of waterproofing compounds or other apparent loss of sealing capability, no surface or identification marking impairment, nor any damage detrimental to the operation of the splice. The splice shall meet the requirements of 3.6.2 after the test.

3.7.4 Temperature/humidity cycling. When tested to high humidity and cyclic temperature exposures in accordance with 4.7.4.3, the splice parts shall not swell, neither shall they have impaired identification markings, nor shall they degrade such that splice performance is impaired. The splice shall meet the requirements of 3.6.2 during and after the test.

3.7.5 Salt spray (corrosion) (for cable splice only). When tested in accordance with 4.7.4.4, no visible evidence of salt penetration into splice enclosures shall be observed and no corrosive effects shall be seen on the external splice parts.

3.7.6 Water pressure (for cable splice only). When tested in accordance with 4.7.4.5., visual inspection of the test splice shall reveal no penetration of water into the sealed region of the splice.

3.7.7 Freezing water immersion (for cable splices only). When tested in accordance with 4.7.4.6, the splices shall not be damaged during exposure. The splices shall meet the optical requirements of 3.6.2 during and after the test.

3.7.8 Sand and dust (for cable splice only). When tested in accordance with 4.7.4.7, the splices shall not be damaged during exposure. The splices shall meet the optical requirements of 3.6.2 during and after the test.

3.7.9 Nuclear radiation resistance (for lensed splice only). When tested in accordance with 4.7.4.8, the splices shall not be damaged during exposure. The performance requirements of 3.6.2 shall be met during and after the test.

3.7.10 Fluid immersion (for cable splice only). When tested in accordance with 4.7.4.9, visual examination of the splice shall reveal no swelling or softening of

material, no loss of sealing capability or identification marking and no discoloration or effects detrimental to the intended use of the splice.

3.7.11 Flammability. When tested in accordance with 4.7.4.10, burning and after-glow of the splice shall cease within 30 seconds after removal of the applied flame and there shall be no violent burning or explosive type fire. The splice shall meet the optical requirements of 3.6.2 during and after the first application of the flame.

3.7.12 Temperature cycling. When tested in accordance with 4.7.4.11, the splice shall not exhibit visual evidence of loss of sealing capability and shall meet the requirements of 3.6.2 during and after the test.

3.8 Workmanship. All details of workmanship shall be as specified herein, when examined in accordance with 4.8. The splices shall be dimensionally uniform and free of manufacturing flaws that would degrade performance, that would inhibit proper assembly or mating, or would otherwise yield an inferior product. Minimum workmanship requirements are listed in a. and b. below and shall be verified under visual examination (see 4.8). This list is not intended to restrict other pertinent workmanship requirements deemed necessary by the contractor.

a. Splice parts which adversely affect environmental sealing or degrade the optical fiber alignment shall not be permitted.

b. Cuts, abrasions, holes, thin spots, peeling or chipping of plating or finish, nicks, burns, or other substandard surface blemishes shall not be permitted.

4. VERIFICATION

4.1 Verification program. Requirements for the verification program shall be as required by the qualifying activity (see 6.3.2).

4.2 Test equipment and inspection facilities. Requirements for test equipment and inspection facilities shall be as required by the qualifying activity (see 6.3.3).

4.3 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Qualification inspection (see 4.5).

b. Conformance inspection (see 4.6).

4.4 Inspection conditions. Unless otherwise specified, all inspections shall be performed in accordance with the standard test conditions specified in TIA/EIA-455 or as specified herein.

4.5 Qualification inspection. Qualification inspection shall be performed at a laboratory acceptable to the government, on sample units produced with equipment and procedures normally used in production (see 3.2 and 6.3).

4.5.1 Sample. Fiber optic splice samples complying with the requirements specified herein and in the specification sheets (see 3.1) shall be submitted for qualification certification. The sample shall consist of two sample units for group II and two sample units for groups III and IV (lensed splices only) of table II.

4.5.1.1 Sample unit. A sample unit shall be the parts required to make a completely assembled fiber optic splice submitted for qualification.

4.5.1.2 Sample unit preparation. Except for group I inspection of table II and unless otherwise specified herein, splices shall be fully assembled utilizing two lengths of cable, each at least 5 meters long, compatible with the splice under test. The cable shall contain at least two fibers for those units having the capability to splice more than one fiber. At least two adjacent splices shall be made for each multisplice unit. When optical crosstalk tests are required, crosstalk shall be measured between fibers/splices enclosed in the same sample unit.

4.5.2 Inspection routine. The samples shall be subjected to the qualification inspection specified in table II. Group I inspections may be performed in any order; however, group II and III inspections shall be performed in the order shown. In cases where certain requirements and tests are applicable only when specified (see 3.1), these tests shall be conducted in the order shown when specified in the appropriate specification sheet (see 3.1). Tests which are specified as not applicable to a specific splice construction shall not be conducted. All sample units shall be subjected to the inspections of group I. Test sample units shall then be subjected to the tests of groups II and III, of table I; however, each test specimen shall be subjected to only one group of tests in addition to the tests of group I.

4.5.3 Failures. One or more failures shall constitute qualification inspection failure.

4.5.4 Retention of qualification. To retain qualification, the manufacturer shall verify in coordination with the qualifying activity the capability of manufacturing products which meet the performance requirements of this specification. Refer to the qualifying activity for the guidelines necessary to retain qualification to this particular specification. The manufacturer shall immediately notify the qualifying activity at any time that the inspection data indicates failure of the qualified product to meet the performance requirements of this specification.

4.6 Conformance inspection. Conformance inspection shall consist of the inspections and optical tests specified for group A inspection (table III), group B inspection (table IV), and group C inspection (table V). Requirements for alternate forms of conformance inspection shall be as identified in the qualification instructions (see 6.3.4).

4.6.1 Inspection of product for delivery. Inspection of product for delivery shall consist of group A inspections.

4.6.1.1 Unit of product. A unit of product shall be one splice (see 6.4.1).

4.6.1.1.1 Inspection lot. The inspection lot shall consist of the number of units of product, offered for inspection at one time, and all of the same design as covered by one specification sheet (see 3.1). All of the units of product in the inspection lot submitted shall have been produced during the same production period with the same materials and processes.

4.6.1.1.2 Sample unit. A sample unit shall be a unit of product selected at random from the inspection lot.

4.6.1.1.3 Sample unit preparation. No preparation of the sample unit is required for group A inspections. Unless otherwise specified herein, sample unit splices for groups B and C inspections shall be fully assembled utilizing two lengths of cable, at least 5 meters long, compatible with the splice under test. The cable shall contain at least two fibers for those units having the capability to splice more than one fiber (i.e. multisplice units). At least two adjacent splices shall be made per unit. When optical crosstalk tests are required, crosstalk shall be measured between fiber splices enclosed in the same unit. The non-spliced fiber ends of the sample unit shall be optically finished to permit optical assessment of the splice.

4.6.1.1.4 Specimen. A specimen shall be a sample unit that has been prepared in accordance with 4.6.1.1.3.

4.6.1.2 Group A inspection. Group A inspection shall consist of the inspection tests specified in table III. The inspection tests may be performed in any convenient order.

4.6.1.2.1 Sampling plan. Tests shall be performed on 100 percent of the product supplied under this specification.

4.6.1.2.2 Failures. One or more failures shall constitute group A inspection failure of the sample unit.

4.6.1.2.3 Disposition of sample units. Sample units that have failed any of the group A inspection tests shall not be shipped or submitted for group B testing.

TABLE II. Qualification inspection.

Inspection	Application		Requirement Paragraph	Test method paragraph
	Cable splice	Fiber splice		
Group I (all sample units) 1/				
Visual and mechanical				
Size	X	X	3.5.1	4.7.2.1
Weight	X	X	3.5.2	4.7.2.2
Identification marking	X	X	3.5.4	4.7.2.4
Workmanship	X	X	3.8	4.8
Optical				
Insertion loss	X	X	3.6.1	4.7.3.1
Return loss	X	X	3.6.3	4.7.3.3
Ambient light susceptibility	X	X	3.6.6	4.7.3.6
Crosstalk	X		3.6.5	4.7.3.5
Group II (2 sample units)				
Cable pull out	X		3.5.13	4.7.2.13
Fiber pull out		X	3.5.12	4.7.2.12
Cable seal flexing	X		3.5.5	4.7.2.5
Twist	X		3.5.6	4.7.2.6
Impact	X	X	3.5.9	4.7.2.9
Crush	X		3.5.8	4.7.2.8
Axial compressive loading	X		3.5.7	4.7.2.7
Vibration	X	X	3.5.10	4.7.2.10
Mechanical shock	X	X	3.5.11	4.7.2.11
Water pressure	X		3.7.6	4.7.4.5
Salt spray	X		3.7.5	4.7.4.4
Group III (2 sample units)				
Thermal shock	X	X	3.7.3	4.7.4.2
Temperature/humidity cycling	X	X	3.7.4	4.7.4.3
Temperature cycling	X	X	3.7.12	4.7.4.11
Life aging	X	X	3.7.2	4.7.4.1
Insertion loss	X	X	3.6.1	4.7.3.1
Freezing water immersion	X		3.7.7	4.7.4.6
Fluid immersion 2/	X		3.7.10	4.7.4.9
Sand and dust	X		3.7.8	4.7.4.7
Flammability	X		3.7.11	4.7.4.10
Group IV (lensed splices only-2 sample units)				
Nuclear radiation resistance		X	3.7.9	4.7.4.8
Group V (polymeric parts only)	X	X	3.3.8	4.7.2.14
Fungus resistance				

1/ Visual and mechanical tests listed in this group shall be performed on unassembled splice parts. Assembled splices shall be used on the remaining groups.
2/ Each sample unit shall be tested in all fluids.

TABLE III. Group A inspection.

Inspection	Application		Requirement paragraph	Test method paragraph
	Cable splice	Fiber splice		
Visual and mechanical				
Size 1/	X	X	3.5.1	4.7.2.1
Identification marking 1/	X	X	3.5.4	4.7.2.4
Workmanship	X	X	3.8	4.8

1/ In process controls may be used by the manufacturer in lieu of this group A test.

4.6.1.3 Group B inspection. Group B inspection shall consist of the optical test specified in table IV and shall be performed on sample units which have been subjected to and have passed the group A inspection. The maximum time from the end of one group B inspection to the beginning of the following group B inspection shall be not greater than 24 months.

TABLE IV. Group B inspection.

Inspection	Requirement paragraph	Test method paragraph
Insertion loss	3.6.1	4.7.3.1

4.6.1.3.1 Disposition of samples. Samples subjected to group B inspection shall not be shipped.

4.6.1.3.2 Sampling plan. Six specimens shall be selected from a lot of the same PIN within 24 months after the date of notification of qualification and during every 24 month period thereafter, except when the total production in a 24 month period is less than 250 units of product or a total of 60 months have elapsed since the inspection was performed, in which case only three specimens shall be tested.

4.6.1.3.3 Failures. If one or more sample units fail to pass group B inspection, the lot from which the samples were selected shall be rejected.

4.6.1.3.4 Rejected lots. Requirements regarding the rework of rejected lots shall be as identified in the qualification instructions (see 6.7.1).

4.6.2 Periodic inspection (group C). Inspection of product for qualification verification shall consist of group C inspections, as specified in table V. The inspections shall be run in the order shown on sample units which have passed groups A and B inspections. Except where the results of the inspections show noncompliance with the applicable requirements (see 4.6.2.4), delivery of inspection lots which have passed group B inspection shall not be delayed pending the results of group C inspection. Group C inspection shall be performed every 60 months following notification of qualification acceptance.

4.6.2.1 Disposition of sample units. Sample units which have been subjected to group C inspection shall not be shipped.

4.6.2.2 Sampling plan. Every 60 months, eight sample units of the same PIN, which have passed group B inspection, shall be selected.

4.6.2.3 Failures. One or more specimen or sample units failures shall constitute group C inspection failure.

4.6.2.4 Noncompliance. Requirements regarding failure of group C inspection shall be as identified in the qualification instructions (see 6.7.2).

TABLE V. Group C inspection.

Inspection	Application		Requirement paragraph	Test method paragraph
	Cable splice	Fiber splice		
Group I (all sample units)				
Optical	X	X	3.6.1	4.7.3.1
Insertion loss	X	X	3.6.3	4.7.3.3
Return loss	X		3.6.5	4.7.3.5
Crosstalk				
Group II (4 sample units)	X		3.5.13	4.7.2.13
Cable pull out		X	3.5.12	4.7.2.12
Fiber pull out	X		3.5.7	4.7.2.7
Axial compressive loading	X		3.5.6	4.7.2.6
Twist	X	X	3.5.9	4.7.2.9
Impact	X		3.5.8	4.7.2.8
Crush	X	X	3.5.11	4.7.2.11
Mechanical shock				
Group III (4 sample units)				
Temperature/humidity cycling	X	X	3.7.4	4.7.4.3
Temperature cycling	X	X	3.7.12	4.7.4.11
Life aging	X	X	3.7.2	4.7.4.1
Insertion loss	X	X	3.6.1	4.7.3.1

4.7 Methods of inspection.

4.7.1 Equivalent test methods. The use of equivalent test methods is allowed provided the preparing activity and the qualifying activity have approved the use of that equivalent test method by that manufacturer (see 6.3.4).

4.7.2 Visual and mechanical examination. The splice and splice parts shall be examined to verify that materials, design, construction, physical dimensions, marking, and workmanship are in accordance with the applicable requirements (see 3.3 and 3.4).

4.7.2.1 Size. Each dimension identified in the specification sheet (see 3.1) for the splice parts shall be measured using calibrated measuring devices with the range, precision and accuracy appropriate for the tolerances specified (see 3.5.1).

4.7.2.2 Weight. The splice or splice parts shall be weighed using calibrated scales having the range, precision and accuracy appropriate for the tolerances specified (see 3.5.2).

4.7.2.3 Color. The color of the splice or splice parts shall be visually inspected for compliance, as specified in the specification sheets (see 3.5.3).

4.7.2.4 Identification markings. Identification markings on the splice parts shall be visually examined and measured for conformance with the requirements of 3.5.4.

4.7.2.5 Cable seal flexing (for cable splice only). The splice shall be tested in accordance with TIA/EIA-455-1. After test exposure, the assemblies shall be visually examined for seal damage. The cable splice assembly shall be exposed to 100 flexing cycles, the assembly rotated approximately 90° in the flexing fixture and then exposed to another 100 flexing cycles (see 3.5.5).

4.7.2.6 Twist (for cable splice only). The splice shall be tested in accordance with TIA/EIA-455-36, for 50 cycles. The tensile load shall be 5 newtons and the number of loads to be applied shall be one (see 3.5.6). The change in optical

transmittance shall be measured during and after the test (see 4.7.3.2). Change in optical transmittance measurements shall be made after the 10th, 25th, and 50th cycle. At the completion of the test, the splice shall be visually examined in accordance with 4.7.2.

4.7.2.7 Axial compressive loading (for cable splice only). Axial compressive loading shall be tested as specified herein. If the two ends of the splice assembly are essentially identical, only one end of each splice assembly need be tested (see 3.5.7).

a. The test cable forming a part of the assembled splice shall be gripped over a length equal to at least three cable diameters, starting one cable diameter from the splice enclosure or the strain relief if it is external to the enclosure. The splice enclosure shall be gripped so as not to alter any of its mechanical properties.

b. The gripped cable and splice enclosure shall be forced together along the direction of the cable axis where the cable enters the splice assembly. The force magnitude is a function of the cable diameter as listed in table VI. Loading and unloading rates are such that the splice is compressively loaded and unloaded linearly in time, with the loading and unloading times each less than 10 seconds. The time spent under full compressive load shall be at least 1 minute. No tensile load shall be applied.

c. Any suitable test fixture may be used provided it properly grips the splice enclosure and cable, allows control and measurement of the applied compressive axial force, and allows visual observation of the region where the cable meets the splice assembly. The test fixture must also allow for the performance of any optical tests called for while the splice assembly is subject to the compressive axial load.

d. With load applied, measure the distance between the fixture clamp and the enclosure or strain relief and measure the insertion loss.

e. Remove the load.

f. Visual observations and examinations shall be made with 3X magnification.

TABLE VI. Force magnitude.

Nominal cable diameter (millimeters)	Compressive axial force (newtons)
0 to 2.9	10
3 to 5.9	20
6 to 9.9	50
10 to 19.9	100
20 and larger	200

4.7.2.8 Crush. Cable splices shall be tested in accordance with TIA/EIA-455-26, with the exception that the test sample shall be a splice (see 3.5.8). The test load shall be 1250 newtons, and the number of loads shall be one. Rubber pads shall not be used on the two bearing surfaces. The change in optical transmittance shall be measured during and after the test (see 4.7.3.2). At the completion of the test, the splice shall be visually examined in accordance with 4.7.2.

4.7.2.9 Impact, cable splice. Cable splices shall be tested in accordance with method A of EIA/TIA-455-2, moderate service class (see 3.5.9).

4.7.2.9.1 Impact, fiber splice. Fiber splices shall be tested in accordance with method C of TIA/EIA-455-2. The change in optical transmittance shall be monitored after the test in accordance with 4.7.3.2 (see 3.5.9).

4.7.2.10 Vibration. Splices shall be tested in accordance with test condition II and test condition VI of TIA/EIA-455-11. Test condition VI shall be performed to condition letter C for a duration of 0.5 hours. Discontinuity shall be monitored during the test in accordance with 4.7.3.4 (see 3.5.10).

4.7.2.11 Mechanical shock. Splices shall be tested in accordance with grade A, class I, type A of MIL-S-901. Discontinuity shall be monitored during the test (see 4.7.3.4) and the change in optical transmittance shall be monitored after the test in accordance with 4.7.3.2 (see 3.5.11).

4.7.2.12 Fiber pull out force. The fiber pull out force shall be tested by applying the axial tensile load specified between the fiber and the fiber splice housing for a duration of one minute. The change in optical transmittance shall be monitored during and after the test in accordance with 4.7.3.2 (see 3.5.12). At the completion of the test, the splice shall be visually examined in accordance with 4.7.2.

4.7.2.13 Cable pull out force. Cable splices shall be tested in accordance with EIA/TIA-455-6. The axial tensile load shall be applied up to the load specified and shall be maintained for 10 minutes. The change in optical transmittance shall be measured during and after the test in accordance with 4.7.3.2 (see 3.5.13). At the completion of the test, the splice shall be visually examined in accordance with 4.7.2.

4.7.2.14 Fungus resistance. Splices composed of materials not listed as fungus inert in guideline 4 of MIL-HDBK-454 shall be tested in accordance with TIA/EIA-455-56 (see 3.3.8).

4.7.3 Optical conformance test methods. Cladding power shall be removed. In those cases where the fiber coating does not adequately perform this function, cladding mode strippers shall be used between the source and the splice and between the splice and the detector. Multiple fibers may not be concatenated during the measurement of change in optical transmittance or optical discontinuity. In splices with one, two, or three optical channels, optical measurements shall be made simultaneously on each channel (see 3.6). In splices with four or more channels, optical measurements shall be made simultaneously on three randomly selected channels unless otherwise specified herein. The center wavelength of test shall be 1300 ± 20 nm. Launch conditions shall be as in table VII.

TABLE VII. Light launch conditions.

Fiber type	Launch condition
Single mode	30 mm diameter mandrel
Multimode	Uniform overfill (initial insertion loss only) and 70/70 restricted or equivalent

4.7.3.1 Insertion loss. The initial insertion loss (see 6.4.12) of multimode splices shall be measured in accordance with method A of TIA/EIA-455-34, using both 70/70 and overfill launch conditions. For subsequent insertion loss tests, 70/70 launch conditions or equivalent shall be used. The insertion loss of single mode splices shall be measured in accordance with method B of TIA/EIA-455-34 (see 3.6.1).

4.7.3.2 Change in optical transmittance. The change in optical transmittance shall be measured in accordance with TIA/EIA-455-20, utilizing a monitor fiber to evaluate the change in transmittance due to exposure of the splice to environ-mental and physical tests (see 3.6.2).

4.7.3.3 Return loss. The return loss (see 6.4.15) shall be measured in accordance with EIA/TIA-455-107 or equivalent (see 3.6.3).

4.7.3.4 Discontinuity. Splices shall be tested in accordance with TIA/EIA-455-32 (see 3.6.4) using equipment having a time resolution sufficient to resolve discontinuities (see 6.4.10) of duration not less than 50 microseconds (µs).

4.7.3.5 Crosstalk. Crosstalk (see 6.4.11) shall be measured in accordance with TIA/EIA-455-42 (see 3.6.5).

4.7.3.6 Ambient light susceptibility. Ambient light susceptibility (see 6.4.9) shall be tested in accordance with EIA/TIA-455-22 (see 3.6.6). The following exceptions apply. The measurement shall be performed at the maximum specified irradiance of 100 mW/cm^2. The power measured in the "on" state shall be referenced to 1 mW. The test temperature shall be +25 °C ± 5 °C.

4.7.4 Environmental test methods.

4.7.4.1 Life aging. Splices shall be tested in accordance with TIA/EIA-455-4 and as specified herein (see 3.7.2). The following special test conditions and modifications to TIA/EIA-455-4 shall apply to these tests:

a. The specimen shall be exposed to dry air at +85 °C -0 °C, +3 °C for a period of 240 hours. (For space application the test duration shall be 1000 hours.)

b. Only the splice and the portions of the test cables nearest the splice shall be exposed to the test environment.

c. Pretest and post test measurements of the splice outer diameter shall be made and reported.

d. Visual inspection of the splice shall be made using 3X magnification.

e. Monitor change in optical transmittance (see 4.7.3.2).

4.7.4.2 Thermal shock. Splices shall be tested in accordance with TIA/EIA-455-71 using test condition C-0 (see 3.7.3). The temperature extremes shall be the specified non-operational temperature extremes (see 3.1). The change in optical transmittance shall be measured after the test in accordance with 4.7.3.2.

4.7.4.3 Temperature/humidity cycling. The splices shall be tested in accordance with TIA/EIA-455-5 method B. The sub-cycle shall be included in the test. The change in optical transmittance shall be monitored during and after the test in accordance with 4.7.3.2 (see 3.7.4).

4.7.4.4 Salt spray (corrosion) (for cable splices only). The splices shall be tested in accordance with test condition I of EIA/TIA-455-16 for 500 hours (see 3.7.5). After test exposure, the splices shall be externally cleaned and examined for possible salt penetration into the splice watertight areas (the enclosure shall be removed).

4.7.4.5 Water pressure (cable splices only). The splices shall be tested for water pressure susceptibility by immersion in water to a depth of 10.4 meters for a period of 48 hours (see 3.7.6). The water temperature shall be maintained between 10 and 35 °C during the exposure period. The splices shall be externally cleaned and examined (with enclosures removed) for possible water penetration into the splice watertight areas.

4.7.4.6 Freezing water immersion (ice crush). Cable splices shall be tested in accordance EIA/TIA-455-98, method A, procedure 1 (see 3.7.7). The size of the water vessel shall be such that, when the cable splice is placed in the center of the vessel, the cable splice is within 150 mm of the sides, top and bottom. The change in optical transmittance shall be monitored during and after the test in accordance with 4.7.3.2. At the completion of the test, the splice shall be visually examined in accordance with 4.7.2.

4.7.4.7 Sand and dust. Cable splices shall be tested in accordance with EIA/TIA-455-35 (see 3.7.8). The change in optical transmittance shall be measured during and after the test in accordance with 4.7.3.2.

4.7.4.8 Nuclear radiation resistance. Lensed splices shall be tested for susceptibility to gamma radiation in accordance with TIA/EIA-455-64 (see 3.7.9). The splice shall be subjected to a total dose as specified by the qualifying activity at a dose rate of 50 +0, -20 rads(Si)/sec. The change in optical transmittance (see 4.7.3.2) shall be measured during and after the test. The test shall be conducted at the low operating temperature and at +25°C ± 5°C. If the change in optical transmittance at +25°C ± 5°C is greater than the change in optical transmittance at the low operating temperature, the splice shall be tested at the high operating temperature.

4.7.4.9 Fluid immersion. Cable splices shall be exposed to each of the fluids identified in EIA/TIA-455-12 in accordance with EIA/TIA-455-12, except that exposure to automobile gasoline is not required and the test temperature for lubricating oil exposure shall be 73°C to 77°C (see 3.7.10). Sample preconditioning shall be done under ambient conditions for at least 4 hours. After the 24 hour immersion in each fluid, the splice shall be cleaned and examined for possible fluid penetration.

4.7.4.10 Flammability. Cable splices shall be tested in accordance with EIA-364-81 except that the flame shall be applied for 60 seconds during the second flame application and only one sample shall be tested (see 3.7.11). The flame shall be applied to the approximate center of the cable splice. The cable splice shall be configured with a full complement of fiber splices. No conditioning is required before the test. The change in optical transmittance shall be measured during and after the first application of the flame in accordance with 4.7.3.2.

4.7.4.11 Temperature cycling. Splices shall be tested in accordance with EIA/TIA-455-3 using the test condition schedule and soak times in accordance with table VIII (see 3.7.12). The change in optical transmittance shall be measured during and after the test in accordance with 4.7.3.2.

TABLE VIII. Temperature cycling steps.

Step	Temperature (°C)	Duration (hours)
1. Maintain	Room ambient	4 (min)
2. Ramp to	Low operating temp +0, -3	2
3. Maintain	Low operating temp +0, -3	2 (min)
4. Ramp to	25 ± 2	2
5. Maintain	25 ± 2	2 (min)
6. Ramp to	High operating temp +3, -0	1
7. Maintain	High operating temp +3, -0	2 (min)
8. Ramp to	25 ± 2	1
9. Maintain	25 ± 2	2 (min)
10. Repeat steps 2 through 9 four additional times (a total of five cycles).		

4.8 Workmanship. Splice parts shall be visually examined in accordance with EIA/TIA-455-13 to verify that they meet the workmanship requirements of 3.8.

5. PACKAGING

5.1 Packaging. For acquisition purposes, packaging requirements shall be as specified in the contract or order (see 6.2). When actual packaging of material is to be performed by DoD personnel, these personnel need to contact the responsible packaging activity to ascertain requisite packaging requirements. Packaging requirements are maintained by the Inventory Control Point's packaging activity within the Military Department or Defense Agency, or within the Military Department's System Command. 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 that may be helpful, but is not mandatory.)

6.1 Intended use. The fiber optic cable splices covered by this specification are intended for use in military applications where their performance characteristics are required. The splices covered by this specification are unique due to the fact that these devices must be able to operate satisfactorily in systems under the following demanding conditions: 10 g's vibration and over 1000 g's shock. In addition, these requirements are verified under a qualification system. Commercial splices are not designed to withstand these environmental conditions. Figure 1 is an example of a generic splice assembly with splice parts identified.

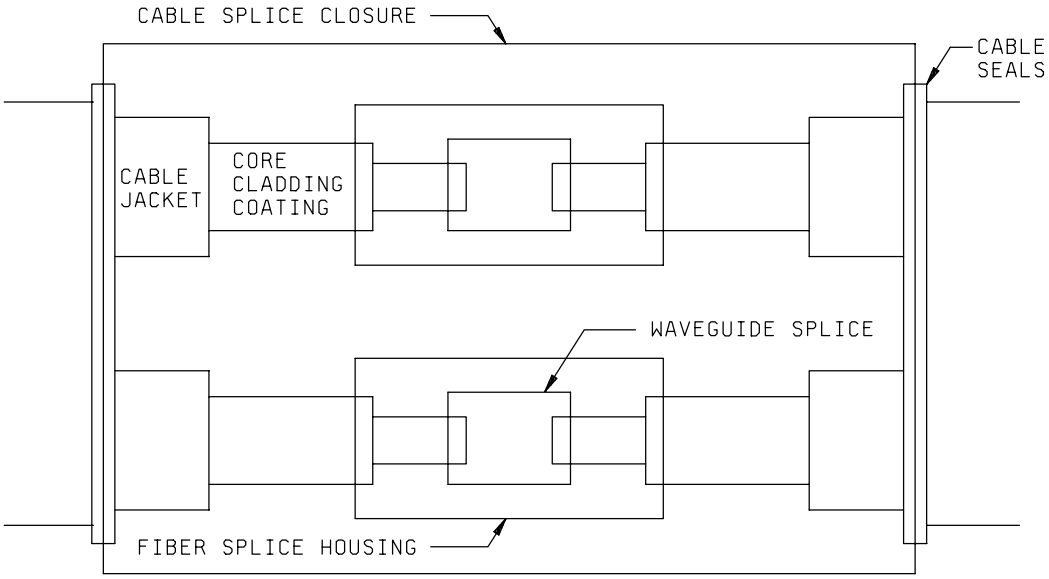


FIGURE 1. Typical splice assembly.

6.2 Acquisition requirements. Acquisition documents should specify the following:

a. Title, number, and date of the specification.

b. Issue of DoDISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.2).

c. Packaging requirements (see 5.1).

d. Specification sheet number, title, and date.

e. PIN (see 6.6).

f. Quantity of splices required.

g. Inclusion of splicing tools, if desired (see 3.4.8).

h. Exception, if any, to the optional provisions of this specification including:

(1) Responsibility for inspection.

(2) Special preparation for delivery requirements, if applicable (section 5).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List QPL No. 24623 whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is Commander, Naval Sea Systems Command (SEA 05Q), 2531 Jefferson Davis Highway, Arlington, VA 22242-5160; however, information pertaining to qualification of products may be obtained from the agent for the qualifying activity: Defense Supply Center Columbus (ATTN: DSCC-VQ), 3990 East Broad Street, Columbus, Ohio 43216-5000 (see 3.2 and 4.5).

6.3.1 Provisions governing qualification SD-6. Copies of "Provisions Governing Qualification (Qualified Products Lists) SD-6" may be obtained upon application to Standardization Documents Order Desk, Building 4D, 700 Robbins Avenue, Philadelphia, PA 19111-5094.

6.3.2 Verification program. A verification program must be established and maintained in accordance with MIL-STD-790 or equivalent standard. Evidence of such compliance will be verified by the qualifying activity of this specification as a prerequisite for qualification and continued qualification. The verification system procedures, planning and all other documentation and data that comprise the verification system must be available to the Government for review. The Government may perform any necessary inspections, verifications and evaluations to ascertain conformance to the requirements and the adequacy of the implementing procedures (see 4.1).

6.3.3 Test equipment and inspection facilities. Provision for test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspections must be the responsibility of the contractor. The establishment and maintenance of a calibration system to control the accuracy of the measuring and test equipment must be in accordance with NCSL Z540-1 or equivalent standard (see 4.2).

6.3.4 Alternate forms of conformance inspection and equivalent test methods. Requests for alternate forms of conformance inspection (see 4.6) must be submitted to the qualifying activity and to the preparing activity. Alternate forms of conformance inspection may be used upon written approval by the qualifying activity and by the preparing activity. The use of equivalent test methods is allowed (see 4.7.1). The manufacturer must have conducted both test methods and have submitted complete test data to the preparing activity and to the qualifying activity verifying the equivalency of each equivalent test method proposed.

6.4 Definitions. Definitions of terms are in accordance with TIA/EIA-440 and as stated below.

6.4.1 Splice. A splice is a generic term for a device which permanently joins optical fibers and cables in a protective manner and may consist of several parts.

6.4.2 Splice enclosure. A splice enclosure is the outermost protective structure of a splice.

6.4.3 Splice junction. A splice junction is the bonded optical interface of mating fibers.

6.4.4 Splice kit. A splice kit consists of all splice parts which are needed to produce a splice.

6.4.5 Splice parts. Splice parts are the individual splicing elements of the splicing kit.

6.4.6 Watertight. The watertight property of a splice is its ability to prevent leakage of water into the internal splice parts.

6.4.7 Fiber splice. A fiber splice is that portion of a splice that joins together two fibers and provides physical protection for them.

6.4.8 Cable splice. A cable splice is that portion of the splice that holds together the cable jackets and strength members for purposes of protecting the fibers from physical stresses.

6.4.9 Ambient light susceptibility. Ambient light susceptibility is the interference of the optical data signals in a splice by ambient optical power incident upon its exterior. The purpose of this optical performance test is to confirm the ability of a splice to exclude ambient optical power from its optical signal circuits.

6.4.10 Discontinuity. Discontinuity refers to measuring the presence of relatively sharp, short duration interruptions or dropouts of the optical signals transmitted by the splice. The purpose of this optical performance test is to confirm the splice's signal discontinuities are not excessive when subjected to physical stress tests.

6.4.11 Crosstalk. Crosstalk is unwanted, coupled optical energy from an optical signal circuit (the active channel) into another optical signal circuit or group of signal circuits (the passive channels). The purpose of this optical performance test is to ensure that the splice circuits have adequate optical channel isolation.

6.4.12 Insertion loss. Insertion loss is the total optical signal power loss in an optical circuit caused by inserting a splice into the optical circuit. The purpose of this optical performance test is to confirm that a splice does not excessively attenuate the optical signal.

6.4.13 Closure. The closure is the portion of a cable splice that covers the fiber splice housing, seals against the outer jackets of the joined cables, provides protection against the environment, and provides mechanical strength for the joint.

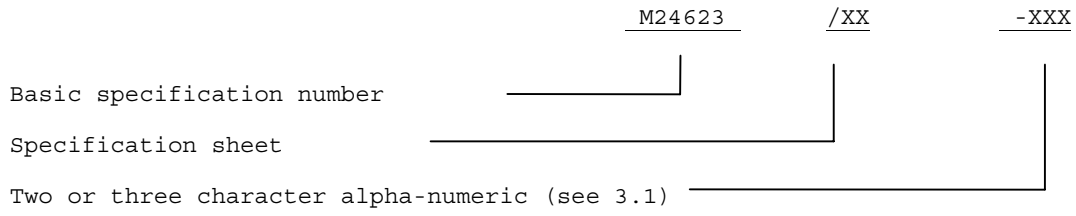
6.4.14 Housing. A housing, such as tapes, jackets, coatings, and other components necessary for attaching, supporting, and aligning fibers, applied over a fiber optic splice and proximate fiber for their protection against the environment, for some mechanical strength, and for preservation of the integrity of the fiber coating, buffer, cladding, and core. The housing includes a means for mounting the aligned assembly in an interconnection box or cable splice closure.

6.4.15 Return loss. Return loss is the optical power (dB) that is reflected back towards the source of optical power by the splice.

6.4.16 Waveguide splice. A waveguide splice is a permanent joint between the transmission elements of two waveguides so that signals may pass from one waveguide to the other with minimal loss, for example, a joint between the cores and claddings of two optical fibers.

6.5 Safety note. Care must be taken when handling the very fine (small diameter) optical fibers to prevent skin puncture or contact of the fiber with the eye. Also, direct viewing of the optical terminal face of a terminated cable, while it is propagating optical energy, is not recommended unless prior assurance has been obtained as to the safe power output of the terminal.

6.6 PIN. The PIN for splices should contain only the following:



Example: M24623/04-001

6.7 Conformance inspection

6.7.1 Rejected lots. If a group B inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units (if applicable), and resubmit the lot for inspection.

6.7.2 Noncompliance. If a sample fails to pass group C inspection, the manufacturer should notify the qualifying activity of the failure and take corrective action on the materials and processes, or both, as warranted, and on all units of product which can be corrected and which were manufactured under essentially the same conditions, with essentially the same materials, processes, and so forth, and which are considered subject to the same failure. Acceptance of the product should be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group C inspection should be repeated on additional sample units (all inspections tests or the inspection test which the original sample failed, at the option of the Government). Groups A and B inspections may be reinstituted; however, final acceptance should be withheld until the group C reinspection has shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure and corrective action taken should be furnished to the cognizant inspection activity and the qualifying activity.

6.8 Subject term (key word) listing.

Closure
Fiber
Fusion splice
Housing
Joint
Mechanical splice
Return loss
Watertight
Waveguide

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

Review activities:
Army - MI, AR
Navy - AS, EC, CG, MC
Air Force - 19, 80, 99
DLA - CC

Preparing activity:
Navy - SH

Agent:
DLA - CC

(Project 6060-0122)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. Preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both document number and revision letter should be given.

2. The submitter of this form must complete blocks 4, 5, 6, and 7.

3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

I RECOMMEND A CHANGE:	1. DOCUMENT NUMBER MIL-PRF-24623C	2. DOCUMENT DATE (YYMMDD)
3. DOCUMENT TITLE SPLICE, FIBER OPTIC CABLE, GENERAL SPECIFICATION FOR		
4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if poss ble. Attach extra sheets as needed.)		
5. REASON FOR RECOMMENDATION		
6. SUBMITTER		
a. NAME (Last, First, Middle initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (If applicable)	7. DATE SUBMITTED (YYMMDD)
8. PREPARING ACTIVITY		
a. NAME Ruth Butler	b. TELEPHONE (Include Area Code) (1) Commercial (202) 781-3726 (2) AUTOVON 326-3726	
c. ADDRESS (Include Zip Code) Naval Sea Systems Command SEA 05Q 1333 Isaac Hull Ave SE Washington Navy Yard Washington, D.C. 20376	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Standardization Program Office (DLSC-LM) 8725 John J. Kingman Road, Suite 2533 Fort Belvoir, Virginia 22060-6221 Telephone (703) 767-6888 DSN 427-6888	

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