| METRIC |

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MILITARY 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 cables and fibers specified in DOD-C-85045 and DOD-F-49291 "Cables, Fiber Optic and Optical Fibers" respectively. Fiber and cable splices specified herein cover a family of general purpose, interconnection hardware providing a variety of compatible optical arrangements.

1.2 Classification.

1.2.1 Part or Identifying Number (PIN). The splices specified herein (see 3.1) shall be identified by PIN which shall consist of the basic specification number, specification sheet number and a sequentially assigned number as shown in the following example:

M24623	/1	-01
Basic specification number	Specification sheet number	Sequentially assigned dash number

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 55Z3), DOD Standardization Program and Documents Division, Department of the Navy, Washington, DC 20362-5101 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

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 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.
QQ-S-766	-	Steel, Stainless and Heat Resisting, Alloys, Plate, Sheet and Strip.
TT-I-735	-	Isopropyl Alcohol.

MILITARY

MIL-S-901	-	Shock Tests, H.I. (High-Impact) Shipboard Machinery, Equipment and Systems, Requirements For.
MIL-H-5606	-	Hydraulic Fluid, Petroleum Base, Aircraft, Missile, And Ordnance.
MIL-T-5624	-	Turbine Fuel, Aviation Grades JP-4, JP-5 And JP-5/JP-8 St.
MIL-F-16884	-	Fuel, Naval Distillate.
MIL-L-17331	-	Lubricating Oil, Steam Turbine and Gear, Moderate Service.
MIL-L-23699	-	Lubricating Oil, Aircraft Turbine Engine, Synthetic Base NATO Code Number O-156.
DOD-S-24623/1	-	Splice, Fiber Optic Cable, Fiber Splice (Metric).
DOD-S-24623/2	-	Splice, Fiber Optic Cable, Fiber Splice Enclosure (Metric).
DOD-S-24623/3	-	Splice, Fiber Optic, Cable/Fiber.
DOD-S-24623/4	-	Splice, Fiber Optic, Shipboard Mechanical (Rotary), Fiber (Metric).
MIL-S-24623/5	-	Splice, Fiber Optic, Shipboard Mechanical, Cable (Metric).
DOD-F-49291	-	Fiber, Optical, General Specification For (Metric).
MIL-C-55330	-	Connectors, Electrical and Fiber Optic, Packaging of.
DOD-C-85045	-	Cable, Fiber Optic (Metric), General Specification For.

STANDARDS

MILITARY

MIL-STD-104	-	Limits For Electrical Insulation Color.
MIL-STD-105	-	Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-202	-	Test Methods For Electronic and Electrical Component Parts.
MIL-STD-454	-	Standard General Requirements For Electronic Equipment.
MIL-STD-810	-	Environmental Test Methods and Engineering Guidelines.
MIL-STD-889	-	Dissimilar Metals.
MIL-STD-1285	-	Marking for Electrical and Electronic Parts.
MIL-STD-1344	-	Test Methods Of Electrical Connectors.
MIL-STD-1678	-	Fiber Optic Test Methods and Instrumentation.
MIL-STD-45662	-	Calibration Systems Requirements.

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

2.2 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).

ELECTRONIC INDUSTRIES ASSOCIATION (EIA)

EIA-455	-	Standard Test Procedures for Fiber Optic Fibers, Cables, Transducers, Connecting and Terminating Devices.
EIA-455-2	-FOTP-2	Impact Test Measurements for Fiber Optic Devices.
EIA-455-6	-FOTP-6	Cable Retention Test Procedure for Fiber Optic Cable Interconnecting Devices.
EIA-455-20	-FOTP-20	Measurement of Change in Optical Transmittance.
EIA-RS-455-22	-FOTP-22	Ambient Light Susceptibility.
EIA-455-35	-FOTP-35	Fiber Optic Component Dust (Fine Sand) Test.
EIA-455-36	-FOTP-36	Twist Test for Fiber Optic Connecting Devices
EIA-455-42	-FOTP-42	Optical Crosstalk In Fiber Optic Components.
EIA PN-455-49	-FOTP-49	Procedure For Measuring Gamma Irradiation Effects in Optical Fibers.
EIA/TIA-455-107	-FOTP-107	Return Loss for Fiber Optic Components.

(Application for copies should be addressed to the Electronic Industries Association, 2001 Eye Street, NW, Washington, DC 20006.)

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.

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103.)

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

2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein (except for related associated detail specifications, specification sheets, or MS standards), 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 splice requirements shall be as specified herein and in accordance with the applicable specification sheets. In the event of any conflict between requirements of this specification and the specification sheets, the latter shall govern.

3.2 Qualification. Fiber optic splices furnished under this specification shall be products which are authorized by the qualifying activity for listing on the *applicable qualified products list* at the time of award of contract (see 4.5 and 6.3).

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), nonnutrient to fungus (see requirement 4 of MIL-STD-454), and manufactured to good workmanship quality (see 3.8). Furthermore, splice materials shall be selected to provide the degree of immunity to nuclear radiation exposure specified in the specification sheet. For spaceflight 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, nor shall they be of such volatility as to permit a vapor pressure buildup of specified level within the splice enclosure. Elemental mercury or asbestos shall not be used. 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 and be:

a. Aluminum components: Cadmium plate over electroless nickel for external parts.

b. Stainless steel component: Passivated in accordance with QQ-P-35.

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 temperature life test of 3.7.2. The splice manufacturer shall certify their acceptability for long term use under high temperature conditions. The splice manufacturer shall pack with each splice, as applicable, a list of recommended solvents, adhesives, and cleaning agents for use with the splice.

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. The liquid materials shall be utilized over the specified test regimes without need for replenishment. When specified the splice manufacturer shall certify their acceptability for 20 year use under high temperature conditions.

3.3.8 Index matching materials. If required, index matching materials shall not degrade the performance of the splice over the specified temperature ranges (see 3.7.1). Index matching materials that flow, migrate, or are otherwise unstable with respect to position, in the completed splice shall not be used.

3.3.9 Fungus resistance. Materials and finishes shall be certified that they meet requirement 4 of MIL-STD-454. Splices that are not in accordance with MIL-STD-454, requirement 4 for fungus inert materials shall meet grade I classification of MIL-STD-810, method 508. If certification can not be made, two additional sample units shall be tested in accordance with 4.6.1.14.

3.3.10 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 which 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). Figure 1 is an example of a generic splice assembly with splice parts identified.

3.4.1 General. The splices shall operate with optical fibers and cables as specified in DOD-F-49291 and DOD-C-85045. The fiber buffer diameter and cable diameter shall be as specified (see 6.2). The splices may be fusion or mechanical designs. Splice designs may be single fiber or multiple fibers.

3.4.1.1 Fiber splice. The fiber splice shall include the wave guide splice and the fiber splice housing.

3.4.1.1.1 Wave guide splice. The wave guide splice shall optically align the core and cladding of the optical fiber.

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.

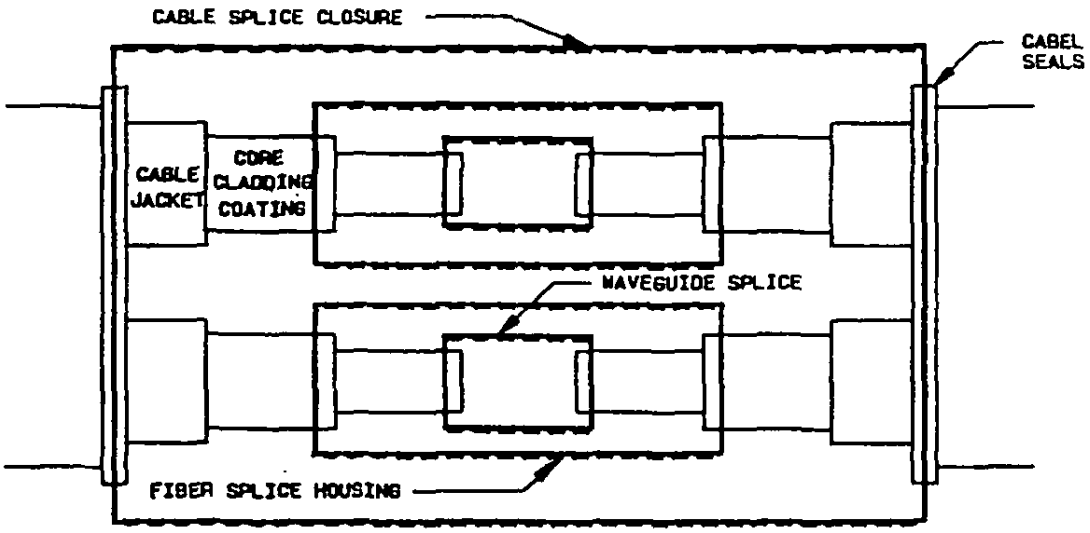


FIGURE 1. Typical splice assembly.

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 the fiber splices and 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 Detailed requirements. Detailed requirements for the splices specified herein shall include means to accomplish the following:

a. Cable splices shall permanently affix fibers of like sizes, compositions and core refractive index profiles between like cables as specified in accordance with DOD-C-85045 specification sheets.

b. Design shall provide tensile strength continuity between spliced cables without application of the cable tensile load to the splice fibers.

c. Design shall provide cable strain relief and environmental sealing between the cable and splice to prevent the entry of external agents. The strain relief shall provide protection from both cable tensile forces (3.5.7) and cable axial compressive forces (3.5.8).

d. Design shall meet the requirements for optical, mechanical, and environmental performance as specified herein, or in the specification sheet (see 3.1).

3.4.3 Maintainability. The splices shall require no preventative maintenance.

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

3.4.5 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).

3.4.6 Dissimilar metals. When dissimilar metals are used in intimate contact with each other, protection against electrolysis and corrosion shall be provided. The use of dissimilar metals in contact, which tends toward active electrolytic corrosion (particularly brass, copper, or steel used in contact with aluminum or aluminum alloy), is not acceptable. However, metal spraying or metal plating of dissimilar base metals to provide similar or suitable abutting surfaces is permitted. Dissimilar metals shall be defined in MIL-STD-889. In hermetic seals, a 0.25 volt or greater difference between the header material and the housing material is not applicable.

3.4.7 Seals. Seals shall provide environmental isolation for splice interior parts including the optical contact junctions. Grommets, O-rings, boots, gaskets, or other sealing devices as required by the design, shall accomplish their intended purpose and meet all test requirements as specified herein.

3.4.8 Optical junction sealing. Optical junctions shall be sealed against moisture, contamination, and mechanical damage as specified herein.

3.4.9 Cable sealing. The splices shall seal the cables to meet the environmental requirements specified herein.

3.4.10 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.

3.4.11 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 4.6.1.1, the dimensions and dimensional tolerances for the splice parts shall be as specified in the specification sheets (see 3.1).

3.5.2 Mass. When tested in accordance with 4.6.1.2, the mass of the splice parts shall be as specified in the specification sheets (see 3.1).

3.5.3 Color. The color of the splice parts shall be as specified (see 3.1). All background colors shall be solid and in accordance with MIL-STD-104, class 1. Background colors shall be distinguishable when performing the test of 4.6.1.3.

3.5.4 Identification marking. The marking shall be legible and permanent and shall be applied in accordance with MIL-STD-1285. When tested in accordance with 4.6.1.4, all marking characters on any face of the splice parts shall be visually identifiable.

3.5.5 Cable seal flexing. When tested in accordance with 4.6.1.5, splice strain relief mechanisms shall prevent loss of environmental sealing or other damage which may impair the splice operation.

3.5.6 Twist. When tested in accordance with 4.6.1.6, a visual examination of the splice enclosure shall reveal no seal impairment nor any other splice damage.

3.5.7 Axial compressive loading. When tested in accordance with 4.6 1.7, the distance between the fixture clamp and the enclosure or strain relief shall not be less than one half a cable diameter when the load is applied. A post test visual observation shall reveal no indication of cracking, splitting, tearing or buckling of the splice.

3.5.8 Crush. When tested in accordance with 4.6.1.8, 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.

3.5.9 Impact. When tested in accordance with 4.6.1.9 and 4.6.1.9.1, 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 4.6.1.10, 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 3.6.2.

3.5.11 Mechanical shock. When tested in accordance with 4.6.1.11, the splices shall not be damaged and there shall be no loosening of parts. The splice shall meet the requirements of 3.6.2 and 3.6.4.

3.5.12 Fiber dynamic strength. The minimum fiber dynamic strength shall be 50 kpsi (see 4.6.1.12). There shall be no fiber-to-splice seal damage, distortion or bending of splice parts. The splice shall meet the optical requirements specified in 3.6.2 and 3.6.4.

3.5.13 Cable pull out force. The minimum cable to cable splice closure pullout strength shall be the minimum of 50 percent of the cable strength or 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 4.6.1.13). 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.

3.6 Optical requirements. The optical requirements shall be used to monitor effects of the inspection requirements specified in 4.4.2, 4.5.1.3, 4.5.2 and 4.6.2. Center wavelength shall be 1300 ± 20 nm.

3.6.1 Insertion loss (see 4.6.2.2). Unless otherwise specified (see 3.1), the insertion loss shall not exceed 0.9 dB during the life of the splice. The maximum insertion losses for tunable splices shall be as follows:

Untuned	<	0.6 dB
Tuned	<	0.2 dB

3.6.2 Change in optical transmittance. The change in optical transmittance during or after any specified environmental or mechanical requirement shall be not greater than 0.30 dB (see 4.6.2.3).

3.6.3 Return loss. The return loss shall not be greater than -30 dB (see 4.6.2.4).

3.6.4 Discontinuity (see 6.4.10). When measured in accordance with 4.6.2.5, no discontinuity 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 (see 6.4.11). When tested in accordance with 4.6.2.6, the signal power levels or sum of levels for devices with two or more channels of the passive output channel or channels shall be below the output signal level of the active channel by at least 50 dB.

3.6.6 Ambient light susceptibility (see 6.4.9). When tested in accordance with 4.6.2.7, 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 in table I, as specified.

TABLE I. Temperature ranges.

Range	Operating temperature °C	Storage temperature °C
1	-46 to +85	-62 to +85
2	-55 to +125	-65 to +200

3.7.2 Temperature life. When tested in accordance with 4.6.3.1, 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. No evidence of adhesive degradation shall be present. The splice shall meet the requirements of 3.6.1 and 3.6.2.

3.7.3 Thermal shock. When tested in accordance with 4.6.3.2, 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.

3.7.4 Temperature/humidity cycling. When tested to high humidity and cyclic temperature exposures in accordance with 4.6.3.3, 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.

3.7.5 Salt spray (corrosion) (for cable splice only). When tested in accordance with 4.6.3.4, 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 4.6.3.5., visual inspection of the test splice shall reveal no penetration of indicator dye into the sealed region of the splice.

3.7.7 Freezing water (for cable splices only). The splices shall not be damaged during exposure (see 4.6.3.6). The splices shall meet the optical requirements of 3.6.2.

3.7.8 Sand and dust (for cable splice only). The splices shall meet the optical requirements of 3.6.2 (see 4.6.3.7).

3.7.9 Nuclear radiation resistance (lensed splice only). The performance requirements of 3.6.2 shall be met (see 4.6.3.8).

3.7.10 Fluid immersion (for cable splice only). When tested in accordance with 4.6.3.9, 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 (cable splice). The splice shall meet the burning resistance criteria of condition B for flame extinguishing time after removal of applied flame, and there shall be no violent burning or explosive type fire (see 4.6.3.10). The splice shall meet the optical requirements of 3.6.2.

3.7.12 Operating temperature. When tested in accordance with 4.6.3.12, the splice shall not exhibit visual evidence of loss of sealing capability and shall meet the requirements of 3.6.2.

3.8 Workmanship. All details of workmanship shall be in accordance with high grade fiber optic splice manufacturing practice when examined in accordance with 4.7. The splices shall be dimensionally uniform and free of manufacturing flaws that would degrade performance after installation, that would inhibit proper connection to interfacing elements, and would otherwise yield an inferior product. The following shall be a minimal level of visual examination to be performed and is not intended to restrict other pertinent workmanship examinations deemed necessary by the contractor.

a. Splice parts which adversely affect the environmental sealing, permit cable sealant penetration into the splice, or degrade the optical fiber alignment shall not be permitted.

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

3.9 Personnel safety labeling. The splice parts shall be labeled with information describing precautions and safety features as specified in the specification sheets (see 3.1 and 4.8).

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements (examinations and tests) as 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 performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspections set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirement in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Test equipment and inspection facilities. Test and measuring equipment and inspection facilities of sufficient accuracy, quality and quantity to permit performance of the required inspection shall be utilized when performing the tests specified herein. The calibration system used to control the accuracy of the measuring and test equipment shall be established and maintained in accordance with MIL-STD-45662.

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

a. Qualification inspection (see 4.4).

b. Quality conformance inspection (see 4.5).

4.3 Inspection conditions. All inspections shall be performed in accordance with the test conditions in DOD-STD-1678 or as specified herein.

4.4 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.

4.4.1 Test 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 each test listed in group II and two sample units for groups III and IV of table II.

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

4.4.1.2 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, of the type specified in DOD-C-85045 cable specification sheets. 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.

TABLE II. Qualification inspection.

Inspection	Optical tests	Application		Requirement paragraph	Test method paragraph
	Change in optical transmittance	Cable splice	Fiber splice		
Group I (all sample units) 1/					
Visual and mechanical					
Size		X	X	3.5.1	4.6.1.1
Mass		X	X	3.5.2	4.6.1.2
Color		X	X	3.5.3	4.6.1.3
Identification marking		X	X	3.5.4	4.6.1.4
Workmanship		X	X	3.8	4.7
Personnel safety labeling		X	X	3.9	4.8
Optical conformance 2/					
Insertion loss		X	X	3.6.1	4.6.2.2
Return loss		X	X	3.6.3	4.6.2.4
Crosswalk		X		3.6.5	4.6.2.6
Ambient light susceptibility		X	X	3.6.6	4.6.2.7
Group II (2 sample units) 3/					
Salt spray		X		3.7.5	4.6.3.4
Fluid immersion		X		3.7.10	4.6.3.9
Impact	X	X	X	3.5.9	4.6.1.9
Flammability	X	X		3.7.11	4.6.3.10
Group III (2 sample units)					
Operation temperature	X	X	X	3.7.12	4.6.3.11
Thermal shock	X	X	X	3.7.3	4.6.3.2
Twist	X	X		3.5.6	4.6.1.6
Cable pull out	X	X		3.5.13	4.6.1.13
Fiber dynamic strength	X		X	3.5.12	4.6.1.12
Cable seal flexing		X		3.5.5	4.6.1.5
Crush	X	X		3.5.8	4.6.1.8
Temperature/humidity	X	X	X	3.7.4	4.6.3.3
Color		X	X	3.5.3	4.6.1.3
Identification marking		X	X	3.5.4	4.6.1.4
Freezing water	X	X		3.7.7	4.6.3.6
Sand and dust	X	X		3.7.8	4.6.3.7
Nuclear radiation resistance	X		X	3.7.9	4.6.3.8
Fungus		X	X	3.3.9	4.6.1.14
Group IV (2 sample units)					
Temperature life	X	X	X	3.7.2	4.6.3.1
Axial compressive loading		X		3.5.7	4.6.1.7
Mechanical shock	X	X	X	3.5.11	4.6.1.11
Vibration	X	X	X	3.5.10	4.6.1.10
Color		X	X	3.5.3	4.6.1.3
Identification marking		X	X	3.5.4	4.6.1.4
Water pressure		X		3.7.6	4.6.3.5

1/ Visual and mechanical tests listed in this group shall be performed on assembled spice parts. Assembled splices shall be used on the remaining groups except as specified in footnote 2/.

2/ The temperature life test shall be performed on unassembled parts of the splices to be tested in group V. After the temperature life test, the splice parts shall be assembled in accordance with the manufacture's recommended procedures and subjected to the optical tests of group I and other inspection tests of group V.

3/ Each sample unit will be tested in all fluids.

4.4.2 Inspection routine. Splice samples shall be tested in accordance with the test sequence of table II except for groups I and II. In group I, the sequence is not important. In group II, no sequence exists since sample units are exposed to only one test. Optical performance assessment shall be made as specified in table II herein. All sample units shall be subjected to the inspections of group I. Different sample units shall be used for each of groups II, III, and IV, testing may be performed.

4.4.3 Qualification rejection. Qualification approval will not be granted if any of the splices being tested according to table II fail to meet the requirements of 3.3, 3.4, 3.5, 3.6, 3.7, 3.8, and 3.9. However, the manufacturer may take corrective action. This action must be reported to the qualifying agent who may then impose any further test requirements deemed necessary to assure proper splice performance (see 6.3.1).

4.4.4 Retention of qualification. To retain qualification, the contractor shall forward a report at least every 12 months to the qualifying activity. The qualifying activity shall establish the initial reporting date. The report shall consist of:

a. A summary of the results of the tests performed for inspection of product for delivery (groups A and B) indicating as a minimum the number of lots that have passed and the number that have failed. The results of tests of all reworked lots shall be identified and accounted for.

b. A summary of the results of the tests performed for periodic inspection (group C) shall be forwarded at least every 36 months, including the number and mode of failures. The summary shall include results of all periodic inspection tests performed and completed during the 36 month period. If the summary of the test results indicates nonconformance with specification requirements, the corrective action acceptable to the qualifying activity has not been taken, action may be taken to remove the failing product from the qualified products list.

Failure to submit the report within 30 days after the end of each 12 month reporting period may result in loss of qualification for the product. In addition to the periodic submission of inspection data, the contractor shall immediately notify the qualifying activity at any time during the reporting period that the inspection data indicates failure of the qualified product to meet the requirements of this specification. In the event that no production occurred during the reporting period, a report shall be submitted certifying that the company still has the capabilities and facilities necessary to produce the item. If during two consecutive reporting periods there has been no production, the manufacturer may be required, at the discretion of the qualifying activity, to submit the products (a representative product of each series, type, and class) to testing in accordance with the qualification inspection requirements.

4.5 Quality conformance inspection. Quality conformance inspection shall consist of the inspections and optical tests specified for group A inspection (table III), group B inspection (table IV), group C inspection (table V), and packaging inspection (see 4.5.3).

4.5.1 Inspection of product for delivery. Inspection of product for delivery shall consist of groups A and B inspections.

4.5.1.1 Unit of product. A unit of product shall be one splice (see 6.4.6).

4.5.1.1.1 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.

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

4.5.1.1.3 Sample size. Unless otherwise specified, the sample size shall consist of that number of sample units required by the inspection lot size, as determined by the sampling plans in MIL-STD-105.

4.5.1.1.4 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, of the type in DOD-C-85045 as noted in the splice specification sheet (see 3.1). 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.

4.5.1.1.5 Specimen. A specimen shall be a sample unit that has been prepared in accordance with 4.5.1.1.4.

4.5.1.2 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.

4.5.1.2.1 Sampling plan. Tests shall be performed on 100 percent of the product supplied under this specification. There shall be no failures.

4.5.1.2.2 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units (if possible), and resubmit them for inspection. Resubmitted lots shall be inspected using tightened inspection in accordance with MIL-STD-105. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

TABLE III. Group A inspection.

Inspection 1/	Optical tests	Application		Requirement paragraph	Test method paragraph
	Change in optical transmittance	Cable splice	Fiber splice		
Visual and mechanical					
Size 2/		X	X	3.5.1	4.6.1.1
Mass 2/		X	X	3.5.2	4.6.1.2
Color 2/		X	X	3.5.3	4.6.1.3
Identification marking 2/		X	X	3.5.4	4.6.1.4
Workmanship		X	X	3.8	4.7
Personnel safety labeling		X	X	3.9	4.8

1/ The tests listed in this group shall be performed on unassembled splice parts.
2/ In process controls may be used by the manufacturer in lieu of this group A test.

4.5.1.2.3 Disposition of sample units. Sample units that have failed any of the group A inspection tests may be reworked to correct defects if possible and subjected to group A inspection again. Sample units that pass all tests of group A inspection may be delivered on the purchase order or contract or tested to group B (4.5.1.3). Units that have not been corrected shall not be delivered on any order even though the inspection lot submitted is accepted.

4.5.1.3 Group B inspection. Group B inspection shall consist of the inspection tests and optical tests specified in table IV, in the order shown, and shall be performed on sample units which have been subjected to and have passed the group A inspection.

TABLE IV. Group B inspection.

Inspection	Optical tests	Application		Requirement paragraph	Test method paragraph
	Change in optical transmittance	Cable splice	Fiber splice		
Thermal shock	X	X	X	3.7.3	4.6.3.11
Size		X	X	3.5.1	4.6.1.1
Cable seal flexing		X	X	3.6.6	4.6.1.6
Color		X	X	3.5.3	4.6.1.3
Identification marking		X	X	3.5.4	4.6.1.4

4.5.1.3.1 Disposition of samples. Samples subjected to group B inspection shall not be delivered on contracts.

4.5.1.3.2 Sampling plan. The sampling plan shall be in accordance with MIL-STD-105 for special inspection level S-4. The sample size shall be based on the inspection lot size from which the sample was selected for group A inspection. There shall be no failures.

4.5.1.3.3 Rejected lots. If an inspection lot is rejected, the contractor may rework it to correct the defects, or screen out the defective units (if possible), and resubmit for inspection. Resubmitted lots shall be inspected using tightened inspection in accordance with MIL-STD-105. Such lots shall be separate from new lots, and shall be clearly identified as reinspected lots.

4.5.2 Periodic inspection (group C). Inspection of product for qualification verification shall consist of group C inspection, inspection tests, and optical tests specified in table V in the order shown, and shall be made on sample units which have passed the groups A and B inspections. The periodic inspections shall be used for qualification verification, and except where the results of the inspections show noncompliance with the applicable requirements (see 4.5.2.4), delivery of inspection lots which have passed group B inspection shall not be delayed pending the results of group C inspections. Group C inspection shall be performed every 36 months following notification of qualification acceptance.

4.5.2.1 Disposition of sample units. Sample units which have been subjected to group C inspection shall not be delivered on the contract or purchase order.

4.5.2.2 Sampling plan. Every 36 months, three sample units which have passed group B inspection shall be selected.

4.5.2.3 Failures. If one or more specimen, or sample unit fail to pass group C inspection, the sample shall be considered to have failed.

4.5.2.4 Noncompliance. If a sample fails to pass group C inspection, the contractor shall 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 shall be discontinued until corrective action, acceptable to the Government, has been taken. After the corrective action has been taken, group C inspection shall 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 shall 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 shall be furnished to the cognizant inspection activity and the qualifying activity.

TABLE V. Group C inspection.

Inspection	Optical tests	Application		Requirement paragraph	Test method paragraph
	Change in optical transmittance	Cable splice	Fiber splice		
Group I					
Insertion loss		X	X	3.6.1	4.6.2.2
Return loss		X	X	3.6.3	4.6.2.4
Crosswalk		X	X	3.6.5	4.6.2.6
Ambient light susceptibility		X	X	3.6.6	4.6.2.7
Group II					
Salt spray		X		3.7.5	4.6.3.4
Fluid immersion		X		3.7.10	4.6.3.9
Impact	X	X	X	3.5.9	4.6.1.9
Flammability	X	X		3.7.11	4.6.3.10
Group III					
Operation temperature	X	X	X	3.7.12	4.6.3.11
Thermal shock	X	X	X	3.7.3	4.6.3.2
Twist	X	X		3.5.6	4.6.1.6
Cable pull out	X	X		3.5.13	4.6.1.13
Fiber dynamic strength	X		X	3.5.12	4.6.1.12
Cable seal flexing		X		3.5.5	4.6.1.5
Crush	X	X		3.5.8	4.6.1.8
Temperature/humidity	X	X	X	3.7.4	4.6.3.3
Freezing water	X	X		3.7.7	4.6.3.6
Sand and dust	X	X		3.7.8	4.6.3.7
Nuclear radiation resistance	X		X	3.7.9	4.6.3.8
Group IV					
Temperature life	X	X	X	3.7.2	4.6.3.1
Axial compressive loading		X		3.5.7	4.6.1.7
Mechanical shock	X	X	X	3.5.11	4.6.1.11
Vibration	X	X	X	3.5.10	4.6.1.10
Water pressure		X		3.7.6	4.6.3.5

4.5.3 Inspection of packaging. The sampling and inspection of the preservation, packing, and container marking shall be in accordance with the requirements of MIL-C-55330.

4.6 Methods of inspection.

4.6.1 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).

4.6.1.1 Size (see 3.5.1). Each of the dimensions 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.

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

4.6.1.3 Color (see 3.5.3). The color of the splice or splice parts shall be visually compared with the matching colors in MIL-STD-104.

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

4.6.1.5 Cable seal flexing (see 3.5.5). The splice shall be tested in accordance with method 2017 of MIL-STD-1344. After test exposure, the assemblies shall be visually examined for seal damage.

4.6.1.6 Twist (see 3.5.6). The splice shall be tested in accordance with EIA-455-36, for 50 cycles. The tensile load shall be 5 newtons and the number of loads to be applied shall be one. The change in optical transmittance shall be measured during and after the test (see 4.6.3.2). At the completion of the test, the splice shall be visually examined in accordance with 4.6.1.

4.6.1.7 Axial compressive loading (see 3.5.7). 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.

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 diamter (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

4.6.1.8 Crush (see 3.5.8). Cable splices shall be tested in accordance with MIL-STD-1344, method 2008, with the exception that the test sample shall be a splice. The test load shall be 1250 newtons, and the number of loads shall be one. The change in optical transmittance shall be measured during and after the test. At the completion of the test, the splice shall be visually examined in accordance with 4.6.1.

4.6.1.9 Impact, cable splice (see 3.5.9). Cable splices shall be tested in accordance with EIA-455-2, moderate service class.

4.6.1.9.1 Impact, fiber splice (see 3.5.9). Fiber splices shall be tested in accordance with the following:

a. The impact test facility shall consist of a clamp for securing a single jumper cable and a concrete block as shown on figure 2.

b. The impact test shall be conducted as follows: The fiber is clamped so that, with the splice hanging under its own weight, the end of the splice extends to the center of the concrete block. The splice is then raised to the height of the clamp, and with the cable extended, released so as to strike the block. This procedure shall be repeated eight times.

c. Change in optical transmittance shall be monitored after the test.

4.6.1.10 Vibration (see 3.5.10). Splices shall be tested in accordance with test condition II and test condition VI condition letter C of method 2005 of MIL-STD-1344. Discontinuity shall be monitored during the test (see 4.6.2.5).

4.6.1.11 Mechanical shock (see 3.5.11). Splices shall be tested in accordance with grade A, class 1, type B of MIL-S-901. Discontinuity shall be monitored during the test (see 4.6.2.5).

4.6.1.12 Fiber dynamic strength. The fiber pigtail dynamic strength shall be tested as follows:

The fiber pigtail shall have an axial tensile load applied up to the load specified at an angle of 45° to the normal (see figure 3). With the load applied, the pigtail shall be rotated through one rotation (360°). The change in optical transmittance shall be monitored during and after the test (see 4.6.2.5). At the completion of the test, the splice shall be visually examined in accordance with 4.6.1.

4.6.1.13 Cable pull out force (see 3.5 14). Cable splices shall be tested in accordance with EIA 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. At the completion of the test, the splice shall be visually examined in accordance with 4.6.1.

4.6.1.14 Fungus resistance (see 3.3.9). Splices shall be tested in accordance with MIL-STD-810 method 508.

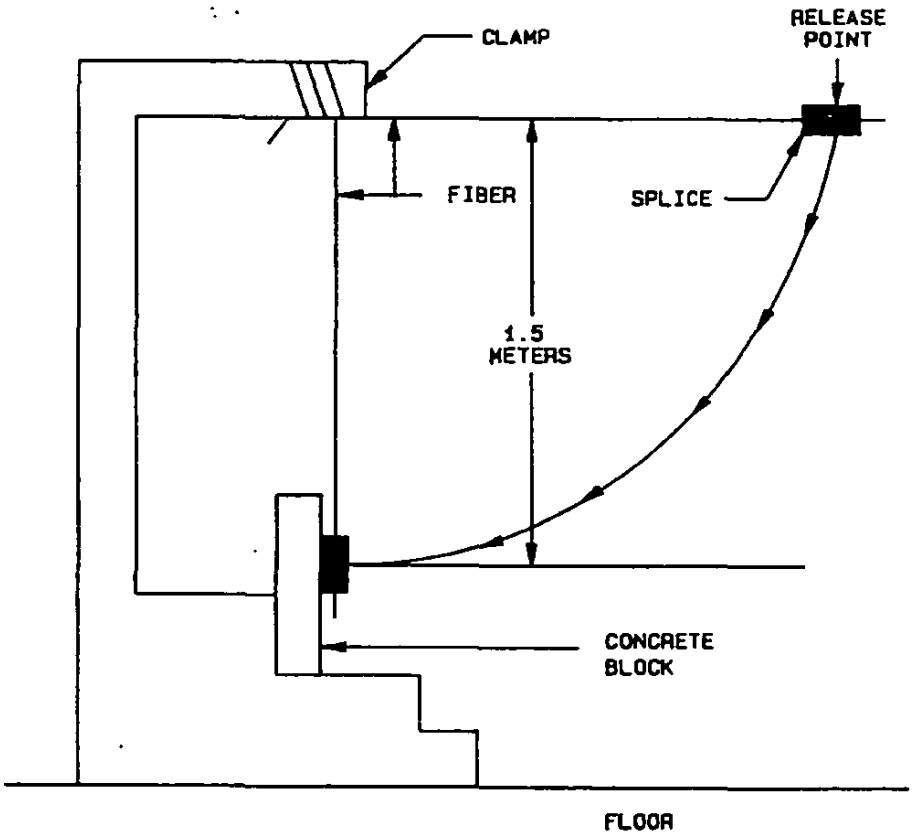


FIGURE 2. Impact test facility.

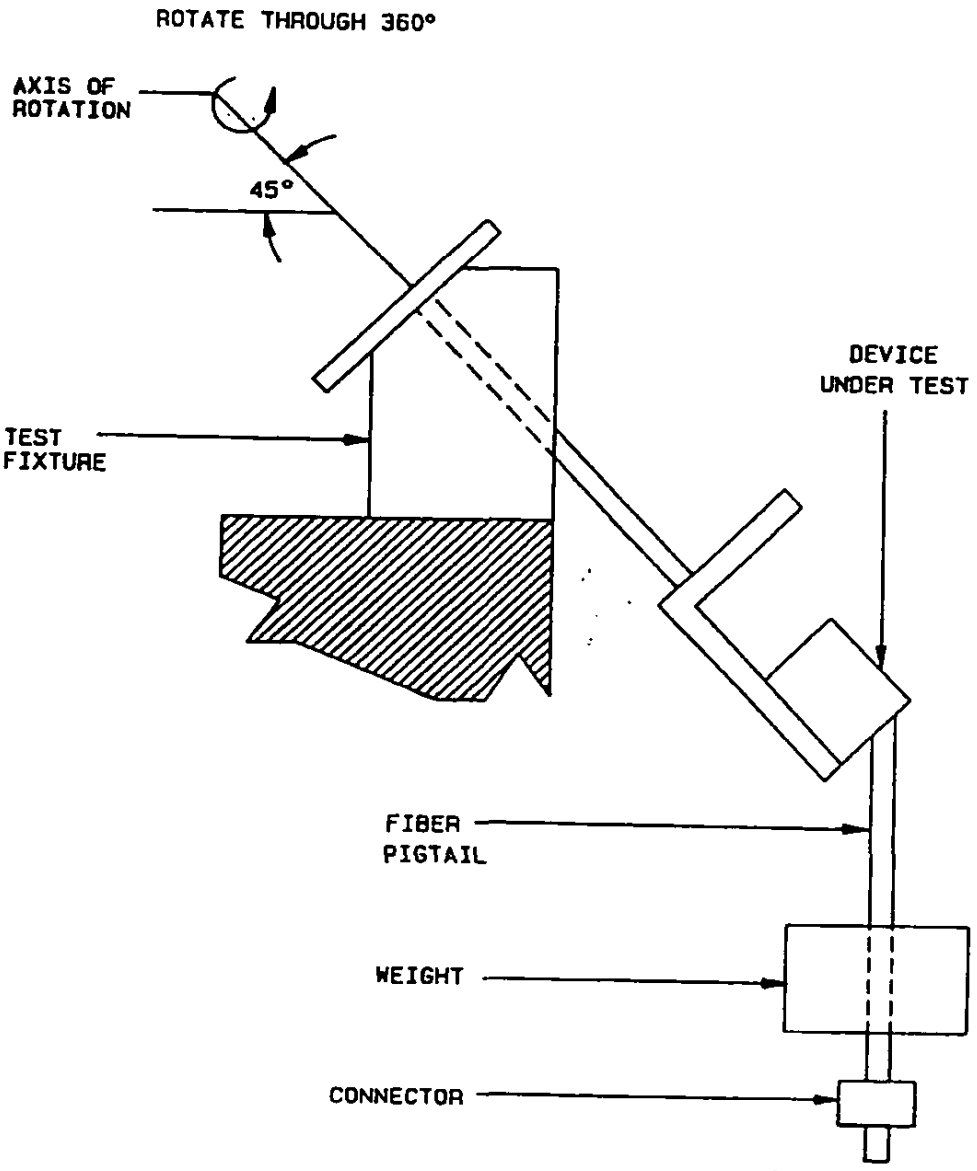


FIGURE 3. Fiber dynamic strength.

4.6.2 Optical conformance test methods (see 3.6). Unless otherwise specified, cladding mode stripping devices shall be used when making optical measurements. The mode stripper shall be installed in the test circuit between the source and the splice and between the splice and the detector unless otherwise specified herein. In splices with one, two, or three optical channels, optical measurements shall be made simultaneously on each channel. 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.

Single mode	30 mm diameter mandrel
Multimode	70/70 restricted or equivalent

4.6.2.1 Equivalent test methods. The use of equivalent test methods is allowed subject to the following conditions:

a. The specific test paragraph allows an equivalent test method.

b. The manufacturer has conducted both test methods during qualification testing and has submitted complete test data to the preparing activity.

c. The preparing activity has approved the use of that method by that manufacturer.

4.6.2.2 Insertion loss (see 3.6.1). The insertion loss shall be measured in accordance with EIA-455-34.

4.6.2.3 Change in optical transmittance (see 3.6.2). The change in optical transmittance shall be measured in accordance with EIA-455-20.

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

4.6.2.5 Discontinuity (see 3.6.4). Splice shall be tested in accordance with EIA-455-32.

4.6.2.6 Cross talk (see 3.6.5). Cross talk shall be measured in accordance with EIA/TIA-455-42.

4.6.2.7 Ambient light susceptibility (see 3.6.6). Ambient light susceptibility shall be tested in accordance with EIA 455-22. The following exceptions apply. The power measured in the "on" state shall be referenced to 1 mW. The test temperature shall be +25°C.

4.6.3 Environmental test methods.

4.6.3.1 Temperature life (see 3.7.2). Temperature life exposures shall be in accordance with method 108 of MIL-STD-202 and as specified herein. The following special test conditions and modifications to method 108 shall apply to these tests:

a. The specimen shall be exposed to dry air at +85°C for a period of 250 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 4.6.2.3)

4.6.3.2 Thermal shock (see 3.7.3). The splices shall be tested in accordance with test condition A of method 1003 of MIL-STD-1344. Extreme temperature exposure durations in steps 1 and 3 of method 1003 shall be at least 30 minutes. The test temperature extremes shall be the nonoperational temperature extremes. The change in optical transmittance shall be monitored after the test (see 4.6.2.3).

4.6.3.3 Temperature/humidity (see 3.7.4). The splices shall be tested in accordance with method 4030 of MIL-STD-1678. The change in optical transmittance shall be monitored during and after the test.

4.6.3.4 Salt spray (corrosion) (see 3.7.5). The splices shall be tested in accordance with test condition C of method 1001 of MIL-STD-1344 for 500 hours. 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).

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

4.6.3.6 Freezing water. Cable splices shall be tested in accordance with DOD-STD-1678, method 4050, with the exception that the splices shall be completely immersed in water for 6 hours at the specified minimum operating temperature (see 3.7.7). The vessel containing the water need not be sealed. The size of the vessel shall be such that, when the cable splice is placed in the center of the vessel, the cable splice is within 150 millimeters of the sides, top and bottom. The change in optical transmittance shall be measured during and after the test (see 4.6.2.3). At the completion of the test, the splice shall be visually examined in accordance with 4.5.1.

4.6.3.7 Sand and dust. Cable splices shall be tested in accordance with EIA 455-35 (see 3.7.8). The change in optical transmittance shall be measured during and after the test (see 4.6.2.3).

4.6.3.8 Nuclear radiation resistance. The splice shall be tested in accordance with EIA 455-49 (see 3.7.9). Unless otherwise specified (see 3.1), tests shall be performed at the low, high end operating temperatures and at room temperature. The wavelength to be used shall be 1.30 ±0.02 µm. The dose rate shall be 30 rads/sec. The total dose shall be as specified contractually. The change in optical transmittance measured during and after the test (see 4.6.2.3).

4.6.3.9 Fluid immersion (see 3.7.10). A cable splice shall be tested for 24 hours in each fluid specified in table VIII in accordance with method 1016 of MIL-STD-1344. After test exposure the splices shall be cleaned and examined for possible fluid penetration.

TABLE VIII. Fluid temperatures.

Fluid type	Temperature °C
MIL-F-16884	33 - 37
MIL-T-5624	20 - 25
TT-I-735	20 - 25
MIL-H-5606	48 - 50
MIL-L-17331	73 - 77
MIL-L-23699	73 - 77
Coolant (Monsanto)	20 - 25
Water	20 - 25

4.6.3.10 Flammability (see 3.7.11). Splices shall be tested in accordance with the following:

a. MIL-STD-1344, method 1012, condition C. The change in optical transmittance shall be measured during and after the test (see 4.6.2.3).

b. MIL-STD-1344, method 1012, condition A. The splice shall be tested without fibers in them.

4.6.3.11 Operating temperature (see 3.7.12). The splices shall be tested at high and low temperature as specified herein.

4.6.3.11.1 High temperature. Splices shall be tested in accordance with method 501 of MIL-STD-810. The change in optical transmittance shall be monitored during and after the test (see 4.6.2.3).

4.6.3.11.2 Low temperature. Splices shall be tested in accordance with method 502 of MIL-STD-810. The change in optical transmittance shall be monitored during and after the test (see 4.6.2.3).

4.7 Workmanship. The splice parts shall be visually examined to verify that they meet the workmanship requirements of 3.8.

4.8 Personnel safety labeling. The splice parts shall be visually examined to verify that they are labeled with the information required by 3.9.

5. PACKAGING

5.1 Packaging requirements. The requirements for packaging shall be in accordance with MIL-C-55330.

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 application where their performance characteristics are required. The splices are suitable for installation in military systems when used within the limitations of their specified performance requirements.

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 2.1).

c. Specification sheet number, title, and date.

d. PIN.

e. Quantity of splices required.

f. Inclusion of splicing tools, if desired (see 3.4.11).

g. 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 qualifications, 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 order for the products covered by this specification. The activity responsible for the Qualified Products List is the Naval Sea Systems Command (SEA 5523), DOD Standardization Program and Documents Division, Washington, DC 20362, however, information pertaining to qualification of products may be obtained from Defense Electronics Supply Center (DESC-E), 1507 Wilmington Pike, Dayton, OH 45444-5000 and information pertaining to qualification of products may be obtained from the activity.

6.3.1 Provisions governing qualification SD-6. Copies of "Provisions Governing Qualifications SD-6" may be obtained upon application to Standardization Documents Order Desk, Building 40, 700 Robbins Avenue, Philadelphia, PA 19111-5094.)

6.4 Definitions. Definitions of terms shall be in accordance with DOD-STD-1678 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 Cross talk. Cross talk 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.

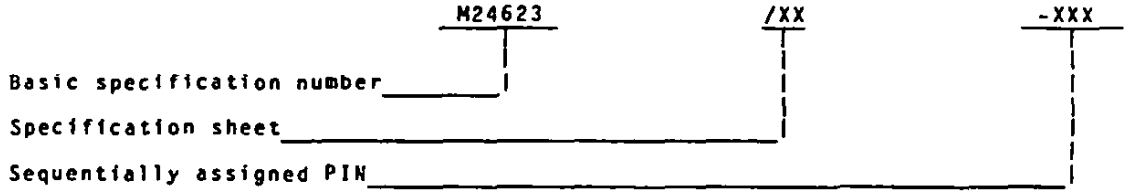
6.4.15 Return loss. Return loss is the optical power (dB) that is reflected back towards the source of optical power by the splice.

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

6.4.17 Index matching materials. The splice manufacturer should certify their acceptability for not less than 20 years of use under the specified conditions without the need for replacement.

6.5 Safety note. Care will 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: M24623/01-001

6.7 Subject term (key word) listing.

Closure
Fiber
Fusion splice
Housing
Joint
Mechanical splice
Return loss
Watertight
Wave guide

CONCLUDING MATERIAL

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

Review activities:
Army - MI
Navy - AS, EC
Air Force - 11, 17, 19, 80, 99

User activities:
Army - AR
Navy - CG, MC

Preparing activity:
Navy - SH

Agent:
DLA - ES

(Project 6060-0090)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the 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	2. DOCUMENT DATE (YYMMDD)
	MIL-S-24623B	10 June 1991

3. DOCUMENT TITLE
SPLICE, FIBER OPTIC CABLE GENERAL SPECIFICATION FOR (METRIC)

4. NATURE OF CHANGE *(Identify paragraph number and include proposed rewrite, if possible. 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	b. TELEPHONE (Include Area Code)	
Technical point of contact(TPC) TPC: Walt Isengard, SEA 51J1	(1) Commercial 703-602-0789	(2) AUTOVON 332-0789
c. ADDRESS (Include Zip Code) COMMANDER NAVAL SEA SYSTEMS COMMAND ATTN: 55Z33 WASHINGTON, D.C. 20362-5101	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340	