

METRIC

MIL-PRF-24623/8
W/AMENDMENT 2
21 October 2024
SUPERSEDING
MIL-PRF-24623/8
W/AMENDMENT 1
14 September 2022

PERFORMANCE SPECIFICATION SHEET

SPLICE, FUSION, FIBER OPTIC, TWELVE FIBER RIBBON, PROTECTOR (METRIC)

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

The requirements for acquiring the product described herein shall consist of this specification sheet and [MIL-PRF-24623](#).

SCOPE. This specification sheet addresses the requirements of fusion splice protectors for an 8 or 12 fiber ribbon or from 8 to 12 loose fibers and are suitable for military use with multimode or single mode optical fiber.

Design constraints. Figure 1 shows the fusion splice protector construction and provides essential dimensioning detail. Following the figure are requirements which include those for design and construction, material, and performance.

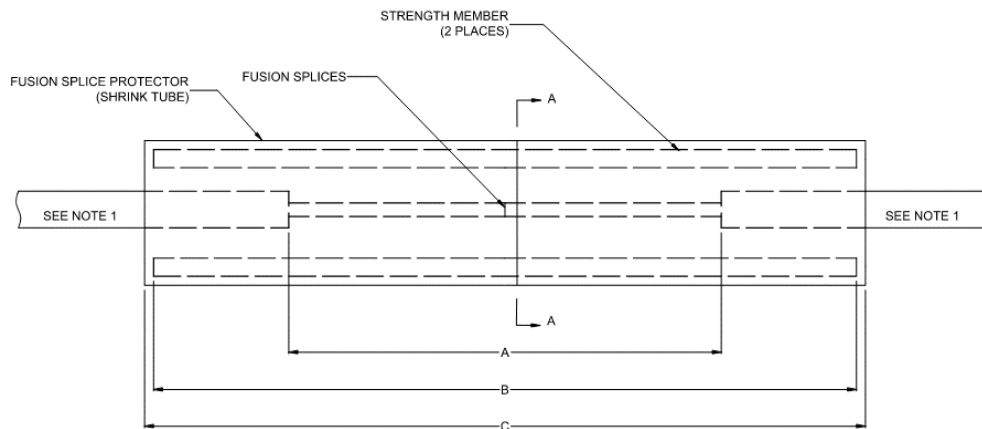


FIGURE 1. Fusion splice protector, 12 fiber ribbon.

AMSC N/A

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Designator	Description <u>5/</u>	Dimensions <u>2/</u>			
		Maximum	Maximum	Minimum	Minimum
		mm	inches	mm	inches
A	Optical fiber splice length	24	0.945	--	--
B	Strength member length	40.2	1.582	39.3	1.547
C	Fusion splice protector length <u>3/</u>	40.8	1.608	39.5	1.555
D	Fusion splice protector outer height (pre-shrink)	5.3	0.21	---	---
E	Fusion splice protector outer height (post shrink)	3.0	0.118	2.1	0.085
F	Fusion splice protector outer width (post shrink)	5.3	0.209	4.5	0.175
G	Fusion splice protector outer width (pre-shrink)	5.6	0.23	---	---

NOTES:

1/ Applicable fiber types include MIL-PRF-49291/6, /7, /11 and /12.

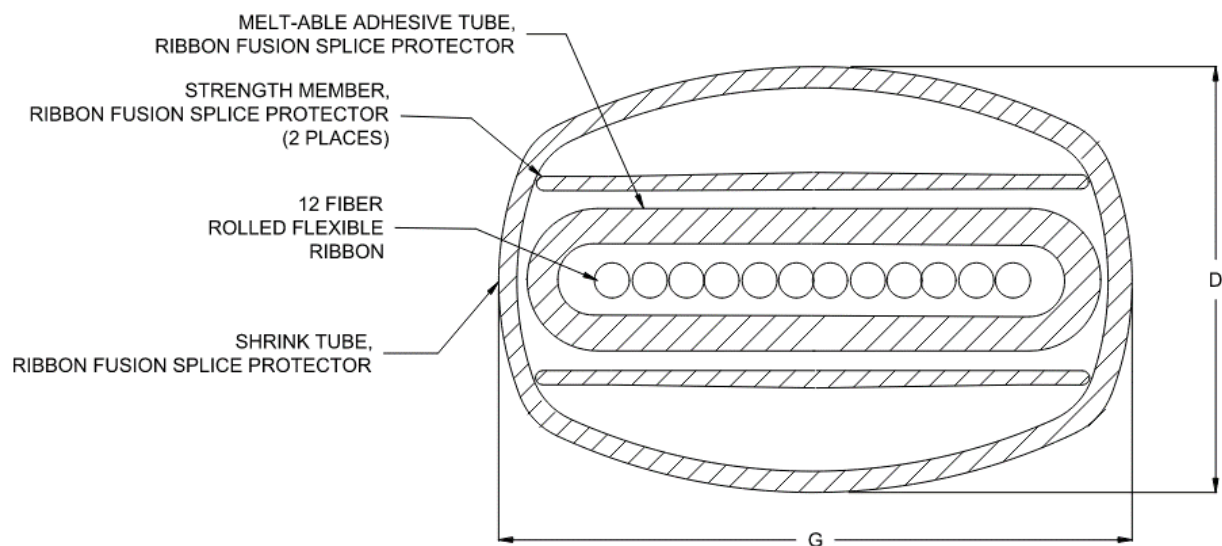
2/ Inch equivalents may contain rounding errors and are given for reference purposes only.

3/ Minimum optical fiber splice length is preferred.

4/ Strength member must be burr free. Slight radius on end of strength member is preferred.

5/ Dimensions A, B, C, D and G are before shrinkage.

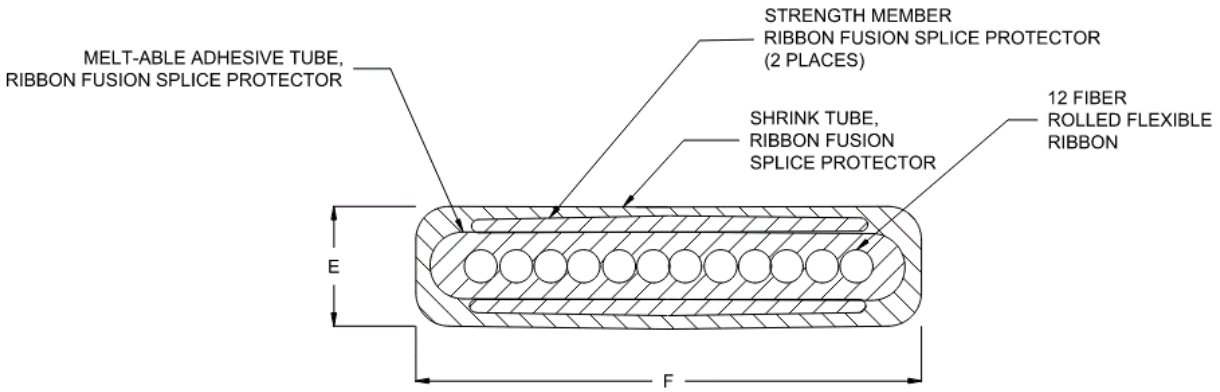
FIGURE 1. Fusion splice protector, 12 fiber ribbon – continued.



Cross-section A-A, Pre-shrink.

FIGURE 1. Fusion splice protector, 12 fiber ribbon - continued.

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Cross-section A-A, Post shrink.

FIGURE 1. Fusion splice protector, 12 fiber ribbon - continued.

Part or identifying number (PIN): See sample below and table I.

<u>M</u>	<u>24623</u>	/	<u>8</u>	<u>X</u>
Military designator	Basic specification		Specification sheet	PIN code (see table I)

TABLE I. PIN numbers.

PIN code	Description	Figure	Temperature range
1	Fusion splice protector, 8 to 12 fiber, ribbon	1	1
2	Fusion splice protector, 8 to 12 fiber	1	2

REQUIREMENTS:

Design and construction: The fusion splice protector shall be of the construction, weight, and physical dimensions specified herein (see figure 1). The fusion splice protector shall consist of two strength members, shrink tube (outer tube or shrinkable protection device at the outer diameter), and melt-able adhesive tube (MAT, or inner tube with an elliptical cavity to accommodate the ribbon or 12 fibers prior to melting).

Strength members: The strength members shall be as specified herein (see figure 1).

Fiber splice protector: The fiber splice protector shall restore the environmental and mechanical integrity of the coating or buffer of the optical fiber with no impact to optical performance.

Protection device (where installed dimensions are post-shrink dimensions)

Install outer height (figure 1, post shrink cross-section A-A, designator E): 3.0 mm maximum.

Installed outer depth (figure 1, post shrink cross-section A-A, designator F): 5.3 mm maximum.

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Installed length (figure 1, designator C except dimensions are provided for post shrink condition):
Maximum: 40.8 millimeters (1.606 inches), Minimum: 39.0 millimeters (1.535 inches)

Clarity, post assembly inspection requirement: Fusion splice protector shall be configured so that any bubbles in the melt-able adhesive tube can be observed after shrinkage.

Tooling: The tooling used to manufacture splices to this specification shall meet the requirements of [A-A-59799](#) for optical fiber fusion splicer and cleaver.

Temperature ranges. Temperature range of the fusion splice protector shall be as specified herein (see table II).

TABLE II. Temperature range designation.

Temperature range designation	Operating temperature		Non-operating temperature		Storage temperature	
	°F	°C	°F	°C	°F	°C
1	-18 to +149	-28 to +65	-40 to + 158	-40 to +70	-40 to +158	-40 to +70
2	-67 to +329	-55 to +165	-67 to +185	-55 to +85	-67 to +185	-55 to +85

Size: The dimensions of the splice parts shall be as shown on figure 1 and specified herein.

Weight: The weight of the splice parts shall be 2.0 grams (0.07 ounces) maximum.

Color: Splice protection devices requiring a heat shrink process shall allow for visual inspection of defects that may have occurred during the shrinking process.

Identification marking: Applicable.

JAN and J marking: Not applicable.

Cable seal flexing: Not applicable.

Twist: Not applicable.

Axial compressive loading: Not applicable.

Crush: Not applicable.

Vibration, temperature range 1: Applicable with the following modification. Completed fusion splices, with fusion splice protectors installed, shall be vibration tested when installed in tray and tray holders qualified to [MIL-DTL-24728/8](#) and shall be tested in accordance with type I vibration test of [MIL-STD-167-1](#).

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Vibration, temperature range 2. Test samples (fusion splice protectors in cable harnesses) shall be tested for sinusoidal and random vibration in accordance with the vibration tests listed below and shall be tested in accordance with [TIA-455-11](#) using the setup and procedure specified in Measurement 3201 of [MIL-STD-1678-3](#). Also, the same MIL-STD-1678-3 Measurement 3201 appendix B test fixture as specified for the mechanical splice shall be used. Testing shall be performed for both sinusoidal (swept sine) and random (both ambient and at a temperature of 125 °C) vibration in accordance with the vibration tests listed in 5.3 of MIL-STD-1678-3 Measurement 3201. The lower limit of the sinusoidal test shall be extended to 5 Hz. Optical discontinuities shall be measured during the test. A minimum of four fusion splice protectors shall be monitored for optical discontinuity. The change in optical transmittance shall be monitored after the test. The fusion splice protectors shall be visually examined after the test to the extent feasible inside the cable harnesses. Fusion splice protectors shall not be damaged, and there shall be no loosening of parts, no leaking of the index matching material, and no other damage which can produce physical distortion or wear and may result in fatigue of the mechanical parts. The requirement for optical discontinuity shall be met during the test and the requirement for the change in optical transmittance shall be met after the test.

Mechanical shock: Applicable with the following modifications.
Temperature range 1: Completed fusion splices, with fusion splice protectors installed, shall be shock tested when installed in tray and tray holders qualified to [MIL-DTL-24728/8](#).
Temperature range 2: The same [MIL-STD-1678-3](#) Measurement 3201 appendix B test fixture as specified for the mechanical splice shall be used.

Mechanical shock, half-sine pulse, temperature range 2 only. Test samples shall be tested in accordance with [TIA-455-14](#), test condition D. Three shocks in each direction shall be applied along the three mutually perpendicular axes of the test sample (18 shocks). The same [MIL-STD-1678-3](#) Measurement 3201 appendix B test fixture as specified for the mechanical splice shall be used.

Fiber pull out force: Not applicable.

Cable pull out force: Not applicable.

Insertion loss: Applicable with the following modification. The insertion loss (initial) for splices shall not exceed 0.2 decibels. The insertion loss (verification) shall not exceed 0.5 decibels at any time during any testing of the splice.

Return loss: Applicable with the following modification. Return loss shall be greater than or equal to 58 decibels for single-mode.

Crosstalk: Not applicable.

Environmental:

Temperature ranges (operating, non-operating, storage): See table II.

Thermal shock, temperature range 1: Applicable.

Thermal shock, temperature range 2.
Method: Test samples (fusion splice protectors with single subunit cable) shall be tested in accordance with [TIA-455-71](#), schedule C-0 (5 cycles). The temperatures of -55°C +0 -5°C and 165°C +5/-0°C shall be used for the low and high soak temperatures, respectively. The change in optical transmittance shall be measured during (towards the end of each soak temperature) and after the test. The fusion splice protectors shall be visually examined after the test.
Requirement: The requirement for the change in optical transmittance shall be met during and after the test. Fusion splice protectors shall not be damaged, and there shall be no loosening, loss of sealing capability, no surface or identification marking impairment or other damage detrimental to the operation of the fusion splice protector.

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Temperature/humidity cycling: Applicable with the following modification. A post test visual examination of the test specimens 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 test specimens.

Water pressure: Not applicable.

Freezing water immersion: Not applicable.

Nuclear radiation resistance: Not applicable.

Fluid immersion: Not applicable.

Flammability: Not applicable.

Temperature cycling, temperature range 1: Applicable with the following modifications: Test shall be performed to the using the test profile (steps) for the general application. A post test visual examination of the test specimens 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 test specimens.

Temperature cycling, temperature range 2. Fusion splice protectors shall be tested in accordance with [TIA-455-3](#) using the setup and procedure specified in measurement 3301 of [MIL-STD-1678-3](#) with the temperature profile in table 3301-III. The change in optical transmittance shall be measured during and after the test. At a minimum for the “during test” measurements, an optical transmittance measurement shall be performed towards the end of each soak period (maintain step) after every cycle. A post test visual examination of the test specimens 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 fusion splice protector. Test fixtures, if used shall be of minimum mass. No other mass (item that causes significant thermal lag) shall be added inside the chamber.

Life aging, temperature range 1: Applicable except perform at a temperature of 85 °C for a duration of 240 hours.

Life aging, temperature range 2. Test samples (fusion splice protectors with single subunit cable) shall be tested in accordance with [TIA-455-4](#). The high exposure temperature shall be 165°C +5, -0°C for the duration of 1,000 hours. The change in optical transmittance shall be measured after the test. The fusion splice protectors shall be visually examined after the test to the extent feasible inside the cable harnesses. Fusion splice protectors shall not be damaged, and there shall be no loosening of parts, leaking of index matching fluid or other damage detrimental to the operation of the fusion splice protectors. The requirement for the change in optical transmittance shall be met after the test. Performance of a cable/fiber retention test is not required as part of the final inspection for this test.

Altitude immersion, temperature range 2 only. Fusion splice protectors shall be tested in accordance with [TIA-455-15](#). The complete sample shall be located within the chamber, with the fusion splice protectors submerged in a distilled water tank within the chamber. Instrument end connections shall not be submerged and shall be either routed outside the chamber or to an optical interface port. The change in optical transmittance shall be measured during and after the test (see [MIL-PRF-24623](#) paragraph 4.6.3.4). During each test cycle, optical transmittance measurements shall be made at each ramp and during the plateau. The requirements for change in optical transmittance shall be met during and after the test.

Salt spray, temperature range 2 only. Applicable except perform on metal parts only. After test exposure of the metal parts, there shall be no corrosive effects on the external surfaces.

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VERIFICATION PROGRAM: 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 adequacy of the implementing procedures.

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 solicited by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the 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. Information pertaining to qualification of products may be obtained from the DLA Land and Maritime, DLA-VQ, 3990 East Broad Street, Columbus, OH 43218-3990, or by e-mail to vqp.chief@dla.mil. An online listing of products qualified to this specification may be found in the Qualified Products Database (QPD) at <https://assist.dla.mil>.

Inspections/tests: Qualification shall consist of performing testing specified for temperature range 1 or temperature range 2, or both temperature ranges 1 and 2 as listed in TABLE III.

Re-qualification period: As long as the material supplied is identical in every respect to the qualification sample tested and found satisfactory, then the period for re-qualification is to be every 10 years.

Qualification by similarity for same material and material formulations: Manufacturers who produce products for both MIL-PRF-24623/6-1 and this specification sheet, who are qualified under M24623/6-1, and pass the tests and inspections specified in [TABLE III](#) are qualified under this specification sheet for MIL-PRF-24623/8-1. This qualification by similarity is applicable if the same material formulations are used for the shrink tube (outer tube) and melt-able adhesive tube (inner tube) and the same material is used for the strength member for the MIL-PRF-24623/8-1 fusion splice protector under test as are used in the previously qualified MIL-PRF-24623/6-1 single fiber fusion splice protector.

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Table III. Qualification and conformance inspections.

Inspection	Qualification	Qualification	Conformance	Conformance	Qualification by similarity 3/ (same material)
	Temperature range 1	Temperature range 2	Temperature range 1	Temperature range 2	
Group I (all sample units) 1/					
Visual and mechanical					
Size	X	X	A	A	X
Weight	X	X			X
Identification marking	X	X	A	A	X
Workmanship	X	X	A	A	X
Optical					
Insertion loss	X	X	B, C	B, C	X
Return loss	X	X	C	C	X
Ambient light susceptibility	X	X			
Group II (2 sample unit)					
Impact	X	X			X
Vibration	X	X			X
Mechanical shock	X	X	C	C	X
Salt spray (metal parts only)		X			
Group III (2 sample units)					
Life aging	X	X		C	X
Thermal shock	X	X		C	
Temperature cycling	X	X	C	C	X
Temperature/humidity cycling	X	X	C	C	X
Altitude immersion		X			
Insertion loss	X	X	C	C	X
Fluid immersion 2/		X			
Group IV (lensed splices only-2 sample units)					
None					
Group V (polymeric parts only)					
Fungus resistance	X	X			

NOTES:

- 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.
- 3/ Qualification by similarity for same material and material formulations when qualified to MIL-PRF-24623/6-1 and are qualifying to this specification sheet for temperature range 1.

Intended use: The splice and fusion splice protector are intended for use in all applications inside protective enclosures. For temperature range 1, applications are those utilizing splice trays and splice tray holders in accordance with [MIL-DTL-24728](#).

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Referenced documents: In addition to [MIL-PRF-24623](#), this document references the following:

MIL-DTL-24728	MIL-PRF-49291/12	TIA-455-4
MIL-DTL-24728/8	MIL-STD-167-1	TIA-455-11
MIL-PRF-24623/6	MIL-STD-1678-3	TIA-455-14
MIL-PRF-49291/6	A-A-59799	TIA-455-15
MIL-PRF-49291/7	TIA-455-3	TIA-455-71
MIL-PRF-49291/11		

Amendment notations. The margins of this specification are marked with vertical lines to indicate modifications generated by this amendment. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations.

CONCLUDING MATERIAL

Custodians:
Navy - SH
Air Force - 85
DLA - CC
NASA - NA

Preparing activity:
DLA-CC

(Project 6060-2024-015)

Review activity:
Army- AR, MI
Navy - AS, CG, EC, MC
Air Force - 13, 19, 93

NOTE: The activities listed above were interested in this document on the date of this document. Since organizations and responsibilities can change, you should verify the currency of the information above using the ASSIST Online database at <https://assist.dla.mil>.