INCH-POUND

MIL-PRF-64266/8B
10 June 2014
SUPERSEDING
MIL-PRF-64266/8A
3 February 2014

PERFORMANCE SPECIFICATION SHEET

CONNECTORS, FIBER OPTIC, CIRCULAR, RECEPTACLE STYLE, MULTIPLE REMOVABLE GENDERLESS TERMINI, SCREW THREADS, EMI RETENTION NUT

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

The requirements for acquiring fiber optic connectors described herein shall consist of this specification sheet and MIL-PRF-64266.

SCOPE. The performance requirements specified herein cover an EMI (Electromagnetic interference) retention nut intended for use with a MIL-PRF-64266 or MIL-DTL-38999 connector receptacle in a fiber optic only application. This EMI retention nut is intended for the connector receptacle configuration used at the interface to a panel, console or equipment module. This EMI retention nut is used for interface with the connector receptacle on one end and with the fiber optic cabling within the panel, console or equipment module on the other end. The EMI retention nut may be used with a connector plug; however, is not intended to be used as part of the cable plant where exposed to mechanical and other environmental factors. The only environmental resistant features include ability to act as a waveguide to attenuate EMI penetration through the connector receptacle in addition to resisting corrosion in a corrosive (i.e., salt air) environment.

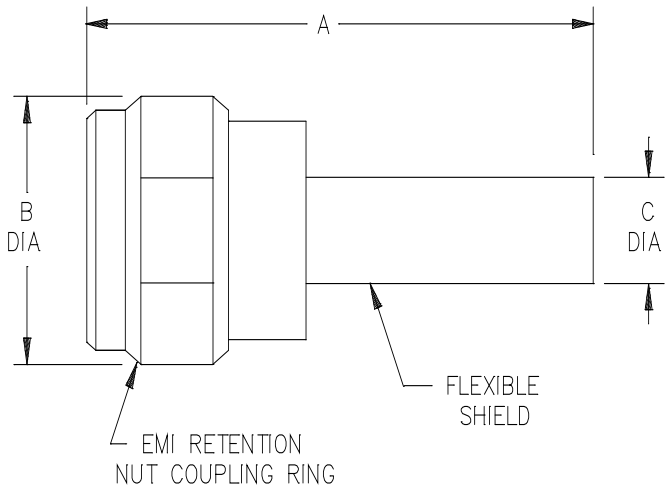

FIGURE 1. EMI retention nut.

AMSC N/A

FSC 6060

Shell size	Shell size designator	Dimension A maximum	Dimension B (diameter) maximum	Dimension C (diameter) maximum
11	B	3.50 (88.9)	1.20 (30.5)	.40 (10.2)
13	C	3.50 (88.9)	1.20 (30.5)	.50 (12.7)
15	D	3.50 (88.9)	1.50 (38.1)	.60 (15.2)
23	H	3.50 (88.9)	2.25 (57.2)	1.00 (25.4)

NOTES:
1. Dimensions are in inches.
2. Metric equivalents are given for general information only.
3. Dimensions apply to plated/finished part.
4. Metric equivalents (mm) are in parentheses.
5. EMI coupling internal configuration not shown. The EMI coupling nut interface dimensions shall be in accordance with figure A-6 of MIL-PRF-64266.

FIGURE 1. EMI retention nut - Continued.

REQUIREMENTS:

Dimensions and configurations: See figure 1 herein and MIL-PRF-64266, figure A-6.

Temperature ranges:
Operating: -67ºF to 329ºF (-55ºC to 165ºC)
Non-operating: -40ºF to 185ºF (-40ºC to 85ºC)
Storage: -40ºF to 185ºF (-40ºC to 85ºC)

Weight: Weight shall not exceed the specified value in table I for the applicable shell size and material.

TABLE I. EMI retention nut weights.

Shell size	Composite		Aluminum		Stainless steel	
	ounces	grams	ounces	grams	ounces	grams
11	.48	14	.59	17	1.06	30
13	.56	16	.69	20	1.28	36
15	.59	17	.75	21	1.38	39
23	.88	25	1.14	32	2.29	65

Fiber optic cable:

Cable diameter: Minimum inside diameter of the EMI retention nut flexible shield that shall accommodate either single fiber cabling (i.e., a bundle of single fiber cables) or a multiple fiber cable that can be placed into the EMI retention nut flexible shield shall conform to table II. Inside diameter of the EMI retention nut flexible shield shall be sized so that fiber optic cabling is not compressed against the inner wall."

TABLE II. Inside diameter (ID) for flexible shield.

Shell size	11	13	15	23
Minimum ID (inch)	.50	.50	.75	1.25
Minimum ID (mm)	12.7	12.7	19.5	31.8

Cleaning procedures: Each shipment of connectors shall include recommended cleaning procedures. The following wording or equivalent is recommended "To clean, use lint free wipe dampened with alcohol and blow dry with air."

Qualification: Qualification shall consist of performing testing specified as listed in table III.

Temperature range: For inspections and tests performed for this qualification, tests for temperature range 2 shall be performed for those tests done differently dependent upon the temperature range.

TABLE III. Qualification inspections (except interoperability).

Cable entry angle	Not applicable	Not applicable	Not applicable	Not applicable
Shell size	15	23	11	13
Fiber size (microns)	SM	SM	SM	SM
Temperature range	TR2	TR2	TR2	TR2
Environmental/Non-E	Environmental	Environmental	Environmental	Environmental
Specification sheet	/8	/8	/8	/8
Test performed 2/, 8/, 9/, 11/				
Group 1 (4 mated pairs)				
Interoperability 6/	X 7/	X 7/	X 7/	X 7/
Visual & mechanical				
Size	X	X	X	X
Weight	X	X	X	X
Identification marking	X	X	X	X
Screw threads	X	X	X	X
Workmanship	X	X	X	X
Functional				
Banding strap attachment integrity				
Compression fitting engagement integrity				
Backshell mating durability	X	X	X	X
Optical				
Insertion loss (initial)	X	X	X	X
Return loss (SM only)				
Group 2 (2 mated pairs)				
Backshell-to-connector mating torque	X	X	X	X
Cable pull out force (retention)				
External bending moment				
Cable seal flexing				
Twist				
Impact				
Crush				
Vibration: Swept sine (TR1)				
Vibration: Random (TR1)				
Vibration: Swept sine (TR2) 11/	X			
Vibration: Random (TR2)				
Vibration: Random with temperature (TR2)				
Shock: MIL-S-901 10/, 11/	X			
Shock: Half-sine pulse (TR2)				
Insertion loss verification				
Water pressure				
Modified SO_2/salt spray				

See notes at end of table.

TABLE III. Qualification inspections (except interoperability). – Continued.

Cable entry angle	Not applicable	Not applicable	Not applicable	Not applicable
Shell size	15	23	11	13
Fiber size (microns)	SM	SM	SM	SM
Temperature range	TR2	TR2	TR2	TR2
Environmental/Non-E	Environmental	Environmental	Environmental	Environmental
Specification sheet	/8	/8	/8	/8
Test performed 2/, 8/, 9/, 11/				
Group 3 (2 mated pairs)				
Thermal shock (TR1)				
Thermal shock (TR2) 11/	X			
Temperature/humidity cycling				
Temperature cycling (TR1)				
Temperature cycling (TR2)				
Altitude immersion				
Life aging (Temperature life) (TR1)				
Life aging (Temperature life) (TR2) 11/	X			
Freezing water				
Insertion loss verification				
Sand and dust				
Identification marking	X			
Group 4 1/				
Electromagnetic effects	X	X	X	X
Fluid immersion 3/				
Shell-to-shell conductivity (initial)	X	X	X	X
Salt spray (TR1) see 4.9.6.10.1 in MIL-PRF-64266				
Salt spray (TR2) see 4.9.6.10.2 in MIL-PRF-64266	X 11/			
Shell-to-shell conductivity	X			
Flammability 4/				
Fungus resistance (parts) 5/	X			
Ozone exposure (parts) 5/	X			
Insertion loss verification				

See notes at end of table.

TABLE III. Qualification inspections (except interoperability). – Continued.

1/ Group 1 mated pair are to be used for Groups 2 and 3 tests. Group 4 can be done before Group 1 with separate samples.
2/ TR1 = test as specified for temperature range 1. TR2 = test as specified for temperature range 2.
3/ Two options: a. Use same two mated pair from the fluid immersion test. b. Use separate mated pair (If option b, can use one cable of sufficient length to loop around to the cable entrance of each backshell).
4/ One mated pair from the fluid immersion, salt spray, or Group 2/3 samples after that Group's test completion may be used.
5/ Parts only; assembly not required.
6/ Interoperability. This testing is done by DLA Land and Maritime-TEB which maintains/retains the interoperability standards. Please note that separate test samples are required for interoperability testing. These test samples will then be retained by DLA Land and Maritime as interoperability standards.
7/ Interoperability is performed on both single mode and multimode for each shell size.
8/ Specific test practices for physical, mechanical, environmental and material tests, including clarifications and further details, are found in MIL-STD-1678-3.
9/ Specific test practices for the optical performance tests, including clarifications and further details, are found in MIL-STD-1678-2.
10/ Shock test. Standard shock fixture 4A for bulkhead mounting shall be used. Supplement test fixture that shall be used and mounting that shall be performed specified in Measurement 3202 of MIL-STD-1678-3.
11/ Optical performance testing. Except for insertion loss and electromagnetic effects tests, performance of change in optical transmittance as part of the mechanical or environmental testing is not required. This exception takes effect only if the inside diameter of the EMI retention nut flexible shield is sized so that fiber optic cabling is not compressed against the inner wall (see Fiber optic cable: Cable diameter).

Identification marking: Applicable. Both initial and after environmental testing.

Banding strap attachment integrity. Not applicable.

Backshell and backshell accessory attachment: Not applicable.

Backshell-to-connector mating torque: The EMI retention nut threads shall withstand the applied torque to mate (affix) the EMI retention nut to the connector receptacle that is specified in table IV with no damage. The EMI retention nut shall be mated to a connector receptacle mounted in a suitable fixture to prevent movement of the connector receptacle during the test. The torque shall be applied to the EMI retention nut at a rate of approximately 10 in-lb per second until the specified applied torque is obtained. This torque shall be applied for a minimum of 1 minute.

TABLE IV. Backshell-to-connector mating torque.

Shell size	Mating torque 1/ ± 5 in-lb (± .55 N-m)	
	Metal	
	in-lb	N-m
11	100	11.30
13	150	16.95
15	150	16.95
23	175	19.75

1/ Increments are rounded to nearest 0.05 N-m for compatibility with a torque wrench.

Cable pull-out force: Not applicable.

Cable seal flexing: Not applicable.

Twist: Not applicable.

Mating durability: Not applicable.

Backshell mating durability: EMI retention nuts shall be assembled and completely disassembled for 25 assembly (mating) cycles. Each cycle shall include connector-to-EMI retention nut coupling (mating) as performed for the EMI retention nut assembly. No optical measurements need to be performed during or after this test. This test may be performed prior to test sample assembly for Group I optical tests

External bending moment: Not applicable.

Impact: Not applicable.

Crush: Not applicable.

Water pressure: Not applicable.

Freezing water: Not applicable.

Sand and dust: Not applicable.

Electromagnetic effects: Applicable. The EMI retention nut shall be assembled to a MIL-PRF-64266/1 or MIL-PRF-64266/3 receptacle configured with a non-metallic insert. Electromagnetic effects testing shall be conducted without mating the MIL-PRF-64266/1 or MIL-PRF-64266/3 receptacle to a mating plug connector or dust cover.

Shell-to-shell conductivity: Applicable. Perform both initial and after salt spray (if salt spray is performed). For an EMI retention nut mated to a connector receptacle, the voltage drop of the mated connector receptacle-to- EMI retention nut shall be measured from a point on the flange of the connector receptacle adjacent to the mounting hole to a point on the EMI retention nut .25 +/- .13 inch from the rear of the flexible shield. When tested as part of the initial qualification, the voltage drop between the connector receptacle and the connector plug shall be measured also.

Salt spray: Applicable. Not less than 96 hours.

Modified SO_2/salt spray: Not applicable.

Altitude immersion: Not applicable.

Fluid immersion: Not applicable.

Qualification by similarity:

EMI retention nut configurations to test: The below qualification by similarity is valid if an M64266/8 EMI retention nut was placed on the connector receptacle and one M64266/12 or M64266/19 backshell was placed on the connector plug for each connector mated pair going through one group of tests.

Previously qualified product: Vendors that are qualified to MIL-PRF-64266/12 or MIL-PRF-64266/19 backshell and meet the size, weight, identification markings, insertion loss, electromagnetic effects, and shell-to-shell connectivity for shell size 15 and size, weight, identification markings, insertion loss, electromagnetic effects and shell-to-shell conductivity, for shell sizes 11, 13 and 23 are qualified to this specification sheet. This qualification by similarity is granted under the constraint that the same materials and processes are used to produce the product to this specification sheet as are used for MIL-PRF-64266/12 or the MIL-PRF-64266/19. Testing shall be performed on a minimum of one mated pair.

Temperature range: For inspections and tests performed for this qualification by similarity, tests for temperature range 2 shall be performed for those tests done differently dependent upon the temperature range.

Alternate EMI retention nut material: If an EMI retention nut in this specification sheet made from aluminum is qualified, and EMI retention nuts made from stainless steel in this specification sheet meet the visual and mechanical, size, weight, identification marking, workmanship, screw thread, backshell mating durability, insertion loss, shell-to-shell conductivity, vibration (as performed in the qualification test sequence), electromagnetic effects, salt spray, fungus resistance, and ozone exposure inspections, then the EMI retention nuts of the alternate material inspected are qualified. A similar qualification to be performed on aluminum EMI retention nuts once stainless steel EMI retention nuts are qualified is shown in table V (along with other qualification by similarity configurations).

TABLE V. Qualification by similarity performed inspections.

Previously qualified to:	M64266/12 or /19	M64266/8	M64266/8	
Applicable shell sizes	11, 13, 15, 23	11, 13, 15, 23	11, 13, 15, 23	
Fiber size (microns)	SM	SM	SM	
Temperature range	TR2	TR2	TR2	
Alternate material	No 3/	Al -> SS	SS -> Al	
Specification sheet	/8	/8	/8	
Test performed 1/				
Size	X	X	X	
Weight	X	X	X	
Identification marking	X	X	X	
Workmanship		X	X	
Screw threads		X	X	
Backshell mating durability		X	X	
Insertion loss	X	X	X	
Vibration		X	X	
Electromagnetic effects	X	X	X	
Shell-to-shell conductivity	X	X	X	
Salt spray		X 2/	X 2/	
Fungus resistance		X 2/	X 2/	
Ozone exposure		X 2/	X 2/	

1/ Applicable notes from table III apply.
2/ Test applies to shell size 15 only.
3/ Refer to paragraph “Previously qualified product” under Qualification by similarity.

Alternate plating or plating process. If an EMI retention nut with one plating or plating process in this specification sheet is qualified, and EMI retention nuts made with an alternate (different type) plating or same type plating using an alternate plating process in this specification sheet meet the plating and plating process specified in 4.7.5.5 of the MIL-PRF-64266 base specification, then the EMI retention nuts with the alternate plating or plating process, as applicable, inspected are qualified.

Marking:

PIN: Marked on coupling ring of the EMI retention nut.

M64266/8 - B - X

Basic PIN

Shell size designator letter

Material designator letter
A = Aluminum with conductive plating
B = Stainless steel, passivated.

Mating counterpart: EMI retention nut mates with MIL-PRF-64266/1 receptacle, MIL-PRF-64266/2 plug, and MIL-PRF-64266/3 receptacle.

Installation and removal tools: Adjustable or 1.25 inches (31.8 mm) open end wrench and strap wrench.

Referenced documents. In addition to MIL-PRF-64266, this specification sheet references the following documents:

MIL-DTL-38999
MIL-PRF-64266/1
MIL-PRF-64266/2
MIL-PRF-64266/3
MIL-PRF-64266/12
MIL-PRF-64266/19
MIL-S-901
MIL-STD-1678-2
MIL-STD-1678-3

Changes from previous issue. Marginal notations are not used in this revision to identify changes with respect to the previous issue, due to the extent of the changes.

CONCLUDING MATERIAL

Custodians:
Army - CR
Navy - SH
Air Force - 85
DLA - CC

Review activities:
Navy - AS
Air Force - 13, 19, 93, 99
NASA - NA

Preparing activity:
DLA - CC

(Project 6060-2014-045)

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.