



DEFENSE LOGISTICS AGENCY
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29 March 2016

MEMORANDUM FOR MILITARY/INDUSTRY DISTRIBUTION

SUBJECT: Initial Draft(s) of: MIL-PRF-29504D w/Amendment 3 and MIL-PRF-29504/5D w/
Amendment 3
Project Number(s): 6060-2016-001 and 6060-2016-002, respectively.

The initial draft(s) for these subject document(s), are now available for viewing and downloading from the DLA Land and Maritime-VA Web site:

<http://www.landandmaritime.dla.mil/programs/milspec/>

These QPL documents are undergoing a modification and correlation to MIL-STD-1678-4, MIL-STD-1678-5 test methods. Table V was revised in MIL-PRF-29504/4 to separate out the regular from polyimide coated fiber in the qualification by similarity table. This will allow companies to meet QPL requirements. Concurrence or comments are required at this Center within 30 days from the date of this letter. Late comments will be held for the next coordination of the document. Comments from military departments must be identified as either "Essential" or "Suggested". Essential comments must be justified with supporting data. Military review activities should forward comments to their custodians of this office, as applicable, in sufficient time to allow for consolidating the department reply. Lack of response to this draft will be construed as concurrence.

If these document(s) are of interest to you, please provide your comments or suggested changes. The point of contact for this document is Ms. McWilliams, phone number 614-692-0571, facsimile transmission, 614-692-6939, e-mail Mary.McWilliams@dla.mil, or may be mailed via the US Postal Service to DLA LAND AND MARITIME, ATTN: VAT (Attention: Mary McWilliams), P.O. Box 3990, Columbus, OH 43218-3990.

Sincerely,

/signed/

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Chief,
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cc:
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NOTE: This draft, dated 29 March 2016 prepared by DLA-CC, has not been approved and is subject to modification. DO NOT USE PRIOR TO APPROVAL. (Project 6060-2016-002)

INCH-POUND

MIL-PRF-29504/5D
w/Amendment 3
DRAFT
SUPERSEDING
MIL-PRF-29504/5D
w/Amendment 2
8 January 2015

PERFORMANCE SPECIFICATION SHEET

TERMINI, FIBER OPTIC, CONNECTOR, REMOVABLE, ENVIRONMENT RESISTING, SOCKET TERMINUS, SIZE 16, REAR RELEASE, MIL-DTL-38999, SERIES III

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 and MIL-PRF-29504.

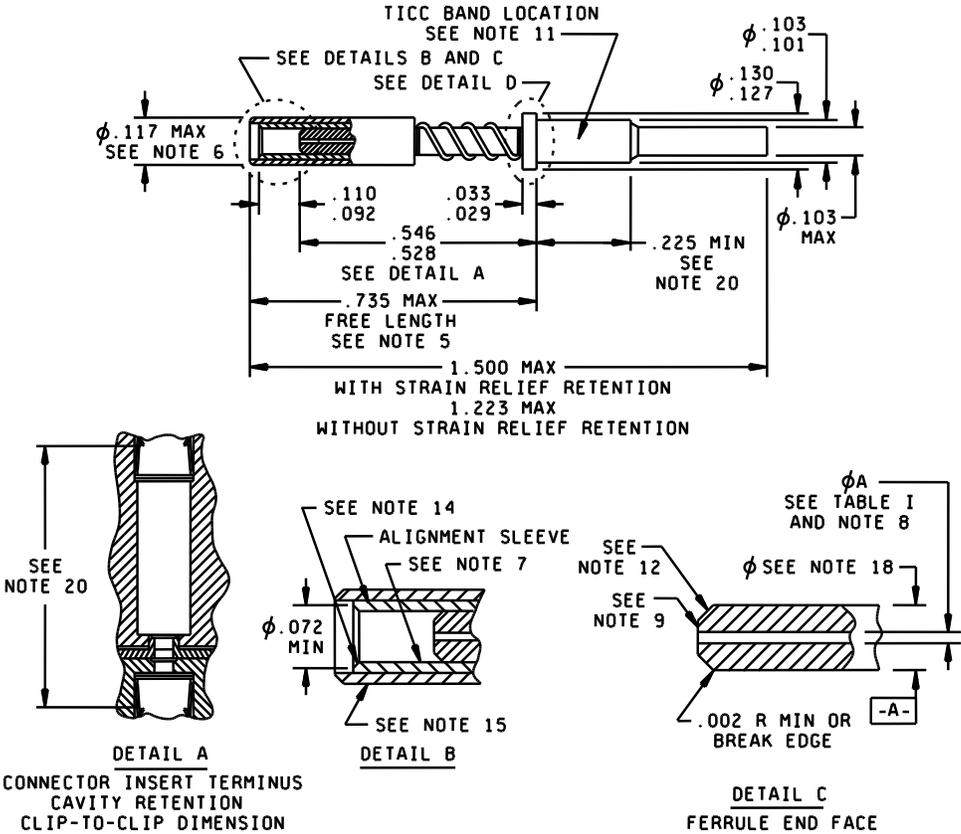
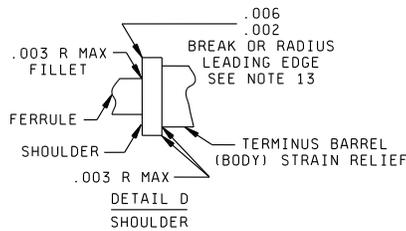


FIGURE 1. Socket terminus



MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

	Inches	mm	Inches	mm
	.002	0.05	.117	2.97
	.003	0.08	.127	3.23
	.006	0.15	.130	3.30
	.029	0.74	.225	5.72
	.033	0.84	.528	13.41
	.072	1.83	.546	13.87
	.092	2.34	.735	18.67
	.101	2.57	1.223	31.06
	.103	2.62	1.500	38.10
	.110	2.79		



NOTES:

1. Dimensions are in inches, except diameter "A" which is dimensioned in metric (microns).
2. Metric equivalents are given for general information only.
3. Unless otherwise indicated, all diameters are to be concentric with respect to datum A within .003 inch (0.08 mm).
4. Dimensions apply after plating when applicable.
5. Free length prior to installation in the connector.
6. Alignment sleeve and body design optional, not to exceed maximum envelope dimensions.
7. For alignment sleeve design, engagement force shall be less than preload force of the spring. For solid alignment sleeve design, the inside diameter (I.D.) shall be .06251 to .06270 inch (1.588 to 1.593 mm). For split alignment sleeve design, the (I.D.) tolerance does not apply.
8. Hole circular run-out in table I is relative to datum A.
9. Ferrule end face may be flat or have a radius that does not exceed a curvature of .39 inch (10 mm). Recommend inspection documentation advises that an end face curvature of .98 inch (25 mm) falls between that of a flat end face and one with a curvature of .39 inch (10 mm).
10. Hole "A" diameter and tolerance are specified in table I.
11. Manufacturer's symbol or trademark location is in front of the first TICC band (see figure 1 of MIL-PRF-29504). As an alternative to TICC bands, each digit of the TICC may be designated by the number which corresponds to the color band. An alternate location of the marking shall be allowed only in the case of insufficient surface area and only if approved by the qualifying activity.
12. Ferrule surface shown to have either a chamfer within 25° to 65° angle X .010 minimum or a .010 R minimum.
13. Optional dimension: Maximum allowable edge break is .015 inch (0.38 mm)
14. Alignment sleeve surface shown to be either .003 R minimum or chamfer within 25° to 65° angle X .003 minimum.
15. Alignment sleeve cover is optional for a non-ceramic alignment sleeve. For use with ceramic ferrules, ceramic alignment sleeves are preferred for new design.
16. Termini qualified to this specification sheet shall meet the performance requirements when inserted into a connector with clip-to-clip dimensions of .756 to .808 inch (19.20 to 20.52 mm).
17. Terminus design shall accommodate a single fiber cable with a maximum diameter of .087 inch (2.2 mm).
18. Ferrule diameter for ceramic: .06246 to .06250 inches (1.5865 to 1.5875 mm), ferrule diameter for metal: .06230 to .06248 inches (1.5824 to 1.5870 mm).
19. For interoperability with a standardized polishing puck, the length of exposed ferrule or the length of ferrule protrusion from the ferrule end face to the terminus first face of barrel (body) shall be .158 inches (4.01 mm) minimum.

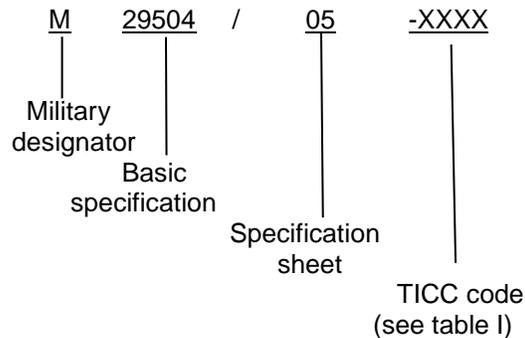
FIGURE 1. Socket terminus - Continued.

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

20. Termini qualified to this specification sheet shall meet the performance requirements when inserted into a connector with clip-to-clip dimensions of .756 to .808 inch (19.20 to 20.52 mm).
21. For style 1 terminus only, reduction of the .225 inch (5.72 mm) minimum length to .025 inch (0.63 mm) is allowed. Additionally there shall be a smooth ramp transition on the terminus between the terminus barrel and the crimp sleeve/heat shrink so as not to restrict the function of the insertion and removal tool during the removal operation.
22. Terminus compression spring shall withstand an applied force of 8 pounds minimum with no damage.

FIGURE 1. Socket terminus - Continued.

Part or identifying number (PIN): See table I of this document and 6.6 of MIL-PRF-29504.



Usage: Termini compliant with this specification sheet are intended to be used in MIL-DTL-38999 connectors as applicable, and may be used in connectors other than MIL-DTL-38999 at the discretion of the acquiring activity. Termini compliant with this specification may not meet all requirements of MIL-DTL-38999 if not used in a series III connector.

REQUIREMENTS:

Temperature ranges:

Operating	-67°F to 329°F	(-55°C to +165°C)
Non-operating	-40°F to 185°F	(- 40°C to + 85°C)
Storage	-40°F to 185°F	(- 40°C to + 85°C)

Fabrication procedure. Standard fabrication procedure (for terminus placement/termination onto the end of an optical fiber), including epoxy specified in the procedure, shall be used for test sample terminations. Test sample configurations and fabrication shall be performed as specified in Requirement 4101 of [MIL-STD-1678-4](#).

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

Design and construction:

Dimensions and configuration: See figure 1 and table I. Pre-polished termini may have either flat or radiused end faces. Regardless of the end face geometry, the terminus shall meet the requirements of this specification when terminated using the procedures specified.

Weight: 1.0 gram maximum.

TABLE I. TICC numbers and "A" (ferrule hole) diameter for specified optical fiber sizes.

Fiber size (core/cladding) μm	Ferrule hole diameter μm	Ferrule material	Circular run-out μm	TICC style 1	TICC style 2
Single mode 9/125 <u>1/</u>	125.3 +1/-0	Ceramic	1 <u>2/</u>	4236	4246
Single mode 9/125 <u>1/</u>	125.5 +1, -0	Ceramic	1 <u>2/</u>	4237	4247
Single mode 9/125 <u>1/</u> , <u>4/</u>	126 +1, -0	Ceramic	1 <u>2/</u>	4238	4248
50/125, 62.5/125	126 +2, -0	Ceramic	2	4239	4249
50/125, 62.5/125	127 +2, -0	Ceramic	2	4046	4250
62.5/125/153	156 +3, -0	Ceramic	3	4240	4251
62.5/125/155	157 +3, -0	Ceramic	3	4241	4252
100/140	142 +3, -0	Ceramic	4	4049	4253
100/140/172	173 +3, -0	Ceramic	4	4088	4255
100/140/172	175 +3, -0	Ceramic	4	4242	4256
50/125, 62.5/125	127 +3, -0	Metal <u>3/</u>	3		4260
62.5/125/155	157 +3, -0	Metal <u>3/</u>	3		4261
100/140	142 +3, -0	Metal <u>3/</u>	4		4262
100/140/172	175 +3, -0	Metal <u>3/</u>	4		4263

- 1/ Applicable to any single mode core size. Also applicable to any multimode core size when enhanced performance is required and cladding tolerances permit.
- 2/ Circular run-out of 0.5 microns preferred, as it becomes more standard in industry.
- 3/ Termini with metal ferrules are intended primarily for legacy systems.
- 4/ Single mode hole size intended for legacy systems.

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

Cable strain relief capture mechanism. Three styles for a capture mechanism are specified for this terminus design (see table I). Cable strain relief capture mechanism shall not interfere with intended sealing performance of wire grommet seal, a component in the MIL-DTL-38999 connector, or with the functionality of the insertion and removal tools (see table II).

Style 1: Captive strength member outside barrel (body) with shrink sleeve.

Style 2: Captive strength member inside terminus barrel (body).

Tools: See table II.

TABLE II. Tools.

Tool	PIN
Insertion tool	M81969/14-03
Removal tool	M81969/14-03

Mating terminus: MIL-PRF-29504/4.

Circular run-out: Not greater than the value specified in table I.

Frequency of terminus end face cleaning. Unless otherwise specified, terminus may be cleaned before or after each test if the connector is demated. Cleaning shall not be performed during the ten successive mates for the insertion loss test. Unless otherwise specified, cleaning may be performed during mating durability before each optical transmittance measurement. Terminus end face cleaning shall be performed for the post optical transmittance measurement after the salt spray test. The optical transmittance measurement is performed after the general cleaning and inspection for corrosion. Cleaning may be performed at other times when degradation in optical performance occurs. Cleaning performed as a corrective action for degraded optical performance shall be noted on the data sheet. Unless otherwise specified, cleaning of the optical end faces is to occur without removal of termini from the connector.

Qualification inspection. Inspections and sequence shall be performed as listed in table III.

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

TABLE III Qualification inspections.

Test procedure	Sample size
Unterminated termini	<u>1/</u>
Size	
Weight	
Identification markings	
Workmanship	
Circular run-out	
Terminus retention	
Terminus engagement and separation forces	
Terminus cleaning	
Termini as part of single fiber cable	<u>2/</u>
Cable pullout force <u>3/</u>	
Salt spray	
Termini in multiple termini connector	<u>4/</u>
Group 1	<u>5/</u>
Interoperability	<u>6/</u>
Insertion loss (initial)	
Return loss (single mode only)	
Group 2	<u>7/</u>
Mating durability	
Terminus cleaning	
Return loss (single mode only)	
Mechanical tests	
Shock	
Vibration	
Insertion loss (verification)	
Return loss (single mode only)	
Group 3	<u>7/</u>
Environmental tests	
Thermal shock	
Temperature life	
Insertion loss (verification)	
Return loss (single mode only)	

- 1/ Sample size shall be sufficient to ensure quantity of termini for inspections as part of a single fiber cable and inspections as an integral part of a multiple fiber connector.
- 2/ A minimum sample size of 16 socket termini shall be used.
- 3/ Cable pullout force shall be performed when mated to M29504/04 pin termini. Change in optical transmittance shall be measured after the test only. Minimum of 16 socket termini shall be used for salt spray.
- 4/ Six (6) test samples (mated connector assemblies, fully populated with termini, consisting of MIL-DTL-38999 shell size 17 series III connectors with inserts containing 8 cavities) shall be used in accordance with test sample configuration in Requirement 4101 of [MIL-STD-1678-4](#).
- 5/ Four (4) test samples from those in 3/ shall be used for group I inspections except for interoperability.

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

TABLE III Qualification inspections - Continued.

- 6/ Two (2) separately designated test samples (instead of 3/) shall be used for interoperability testing per Requirement 4101 of [MIL-STD-1678-4](#).
- 7/ Two (2) sets of test samples from group I (see 4/) shall be used for groups II and III testing.

Inspections for un-terminated termini:

Test sample configuration. Test fixture for this test shall include MIL-DTL-38999 shell size 11, 13, or 17, series III connectors, utilizing both plug and receptacle for retaining the termini during testing. A minimum sample size shall be used to ensure sufficient quantity for termini inspections as part of a single fiber cable and for termini inspections as an integral part of a multiple fiber connector.

Identification markings. The Termini Identification Color Coding (TICC) bands shall be marked on the barrel of the termini or use of the allowed alternative markings as stated in 11/ of figure 1. Manufacturer's symbol or trademark shall be in accordance with 11/ of figure 1. The manufacturer shall list the symbol or trademark with SAE in accordance with SAE AIR 1351.

Terminus retention. Terminus displacement measurement is not applicable. Test may be used as one operational means to verify acceptable shoulder construction.

Terminus engagement and separation force. Test is not applicable for socket terminus with solid alignment sleeves. For socket terminus with split alignment sleeves, maximum engagement force shall be 30 ounces (8.3 N) using a .0625 inch (1.588 mm) diameter gauge pin. The separation force is not applicable.

Maintenance aging. Not applicable.

Fungus resistance. Not applicable.

Inspections for the terminus as part of a single fiber cable:

Test sample configuration. Each terminus is to be terminated on one end of a single fiber cable. Cable used is to have provisions compatible with termini strain relief, as applicable. Termini, selected from the group that passed inspections for un-terminated termini (group 1), shall be used. A minimum sample size of 16 pin termini and 16 of the applicable counterpart socket termini, selected from the group that underwent inspections for un-terminated termini, shall be used.

Fiber pull out force. Not applicable (This test is used for terminus configurations with no type of cable strain relief).

Cable pull out force. Applicable for terminus configurations with any mechanism for cable strain relief. The change in optical transmittance shall be measured after the test for a socket terminus.

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

Salt spray. Test samples (termini on single fiber cable) shall be tested to TIA-455-16, test condition C. Terminus ferrule may be covered up to half way from the end face to the shoulder with plastic protective (dust) covers. No corrosive effects shall be seen on the external connector parts that would be detrimental to the operation of the connector. No optical degradation shall occur as a result of this test. The criterion for insertion loss verification shall be used to determine if this optical requirement is met. Insertion loss verification, with termini inserted into a MIL-DTL-38999 shell size 17; series III connector, shall be performed both prior to and after the salt spray test.

Inspections for termini as an integral part of a multiple termini connector:

Test sample configuration: Four test samples (mated connector assemblies) shall be used for group I inspections except for interoperability. Two of these four mated connector assemblies shall be used for group II inspections and two for group III inspections. Each mated connector assembly shall be comprised of a cable assembly with termini placed into MIL-DTL-38999 shell size 17, series III connectors. These termini/connectors are located in the middle of the cable assembly. Termini, selected from the group that passed inspections for un-terminated termini, shall be used and inserted into MIL-DTL-38999 shell size 17 or higher, series III connectors as part of the cable assembly that comprises each test sample. Cable assembly length shall be 10 meters with the connector mated pair inserted 5 meters from the cable ends. Cable length may be longer (with added cable at the optical source end) if cut-backs are performed to verify insertion loss. Each connector shall be fully populated with termini. At least 8 randomly selected termini pairs in each cable assembly shall be monitored for optical transmittance after and when specified, during environmental and mechanical testing. Insertion loss shall be performed on all termini pairs in each cable assembly. Connectors used in the cable assembly, both the plug and receptacle types, are to include backshells. Selection of the backshell is to include assurance of proper strain relief for each single fiber cable and not cause degradation in optical performance. Test sample configurations, fabrication methods shall be as specified in Requirement 4101 of [MIL-STD-1678-4](#). Specific test methods and practices shall be as specified in MIL-STD-1678-2 and MIL-STD-1678-3.

Interoperability. Applicable, except test for terminus insertion and removal forces is not required. Testing shall be performed using two separately designated cable assemblies with fully populated, MIL-DTL-38999, series III, shell size 17 connectors. Test sample configurations/fabrication shall conform to Requirement 4101 of [MIL-STD-1678-4](#). Specific test methods and practices shall be as specified in MIL-STD-1678-2 and MIL-STD-1678-3. As part of the interoperability inspection, terminus on the end of single fiber cable, shall be inserted and removed from the connector to verify that the strain relief is compatible with the tools listed in table II. At the discretion of the preparing activity, selected configurations may be specified to undergo inspections for shock, vibration, and mating durability. Interoperability is applicable only for termini among vendors with the same TICC such as fiber size, ferrule hole diameter, and ferrule material (see table I) with one addition. Termini shall be interoperable regardless of the style. Qualification by similarity will be given to a terminus in the same row in table I as the terminus tested for interoperability. This qualification by similarity is valid if the only difference between the terminus tested for interoperability and the terminus configuration in the same row in table I is a different cable strain relief capture mechanism and TICC markings.

Optical source wavelength. Termini with single mode fiber shall be tested using an optical source at the 1,310 nm wavelength. Termini with multimode fiber can be tested using an optical source at either the 850 nm or the 1,300 nm wavelength.

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

Launch conditions shall conform to Requirement 2102 of [MIL-STD-1678-2](#).

Insertion loss. The initial insertion loss and the insertion loss verification for the various fiber sizes and ferrule materials shall be as specified in table IV. The insertion loss limits specified are the maximum allowed values for each measurement (each mating with respect to the pre-cut back measurement), not the average of the ten mating or other averaging schemes.

TABLE IV. Optical insertion loss performance. ^{1/}

Fiber size (um)	Termini in non-tight tolerance M38999 ^{2/}		Termini in tight tolerance M38999/60 & M38999/61 ^{3/}		Ferrule material
	Initial insertion loss (dB)	Insertion loss verification (dB) ^{4/}	Initial insertion loss (dB)	Insertion loss verification (dB) ^{4/}	
Single mode 9/125	0.75	1.25	0.75	1.25	Ceramic
50/125	1.50	2.00	1.00	1.50	Ceramic
62.5/125	1.00	1.50	0.75	1.25	Ceramic
62.5/125/polyimide	1.50	2.00	1.00	1.50	Ceramic
100/140	0.75	1.25	0.75	1.25	Ceramic
100/140/polyimide	1.50	2.00	1.00	1.50	Ceramic
50/125	1.50	2.00	1.25	1.75	Metal
62.5/125	1.25	1.75	1.00	1.50	Metal
62.5/125/polyimide	1.50	2.00	1.25	1.75	Metal
100/140	1.25	2.25	1.00	1.50	Metal
100/140/polyimide	1.50	2.50	1.00	1.75	Metal

^{1/} Optical loss performance based on use of specified fabrication procedure.

^{2/} Termini in a MIL-DTL-38999 connector that is other than MIL-DTL-38999 tight tolerance series III connector (the latter being built to specification sheets MIL-DTL-38999/60 and MIL-DTL-38999/61 specific to fiber optic applications), the former distinguished from the tight tolerance type by denoting as the MIL-DTL-38999 non-tight tolerance connector.

^{3/} Termini in a MIL-DTL-38999 tight tolerance series III connector (the MIL-DTL-38999/60 and MIL-DTL-38999/61 specific to fiber optic applications) for shell sizes 9 through 19. For shell sizes 21 through 25, use performance requirements when termini are used in a MIL-DTL-38999 non-tight tolerance connector.

^{4/} Insertion loss verification is an insertion loss performed after a series of environmental tests or mechanical tests.

Mechanical. The following mechanical tests shall be performed in the sequence listed following the post mating durability, return loss test: mechanical shock, vibration. For single mode termini, a discontinuity is considered to be a reduction of optical transmittance of 0.5 dB or more for a duration of 50 microseconds or more (during vibration) or 100 milliseconds or more (during shock).

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

Mechanical shock. Mated connector assemblies shall be tested in accordance with the applicable mechanical shock test listed below. Optical discontinuities shall be measured during the test. For connectors of shell sizes 17 and greater, a minimum of four termini shall be monitored for discontinuity. The change in optical transmittance shall be monitored after the test. The termini shall be visually examined after the test to the extent feasible inside the connector. Termini shall not be damaged and there shall be no loosening of 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. For testing, initially mate the connector assemblies and apply the specified torque value. Mark the position after the torque has been applied and check/record position after each impact. For a mating connector containing a coupling ring ratchet mechanism, do not tighten the coupling ring after each impact if the connector is being tested in addition to the terminus. Otherwise, retighten after each impact.

- a. MIL-S-901. Mated connector assemblies shall be tested in accordance with MIL-S-901, grade A, type B, class I. Standard shock fixture 4A for bulkhead mounting shall be used. Supplement test fixture with mounting shall be performed as specified in Measurement 3202 of MIL-STD-1678-3.
- b. Half-sine pulse. Mated connector assemblies 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).

Vibration. Mated connector assemblies shall be tested for sinusoidal vibration in accordance with the applicable vibration tests listed below. Optical discontinuities shall be measured during the test. For connectors of shell sizes 17 and greater, a minimum of four termini shall be monitored for discontinuity. The change in optical transmittance shall be monitored after the test. The termini shall be visually examined after the test to the extent feasible inside the connector. Termini shall not be damaged, and there shall be no loosening of parts, no backing off of the coupling mechanism, 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. For testing, initially mate the connector assemblies and apply the specified torque value. Mark the position after the torque has been applied and check/record position after each axis. For a mating connector containing a coupling ring ratchet mechanism, do not tighten the coupling ring during testing.

Sine vibration shall be performed in accordance with [MIL-STD-1678-3](#) Measurement 3201, test conditions C, 5.3.a (60 G at ambient temperature only). This cycle shall be performed 12 times in each of three mutually perpendicular directions at ambient temperature. This results in a total of 36 cycles being applied for approximately 12 hours. The sequence shall be repeated twice. (36 hours total at ambient temperature). Interruptions are permitted provided the requirements for rate of change and test duration are met. Completion of cycling within any separate band is permissible before proceeding to the next band.

Random vibration shall be performed in accordance with [MIL-STD-1678-3](#) Measurement 3201, test conditions C, 5.3.b (41.7 G rms at temperature of 125°C).

Random vibration shall be performed in accordance with [MIL-STD-1678-3](#) Measurement 3201, test conditions C, 5.3.c (49.5 G rms at ambient temperature)

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

Environmental. The following environmental tests shall be performed in the sequence listed: Thermal shock and temperature life.

Thermal shock. The temperatures of $-55^{\circ}\text{C} +0^{\circ}\text{C}$, -5°C and $+165^{\circ}\text{C} +5^{\circ}\text{C}$, -0°C shall be used for the low and high soak temperatures, respectively. Mated connector assemblies shall be tested in accordance with TIA-455-71, schedule C-0 (5 cycles). The mated connector assemblies shall not be un-mated then re-mated after the test as part of the inspection. The change in optical transmittance shall be measured during (towards the end of each soak temperature) and after the test. The termini shall be visually examined after the test only if optical performance is not met. Termini shall not be damaged, and there shall be no loosening of parts, separation of bonded surfaces or other damage detrimental to the operation of the termini. The requirement for the change in optical transmittance shall be met during and after the test.

Temperature life. The high exposure temperature shall be $165^{\circ}\text{C} +5^{\circ}\text{C}$, -0°C . Mated connector assemblies shall be tested in accordance with TIA455.4 for the duration of 1,000 hours at the high exposure temperature. The change in optical transmittance shall be measured after the test. The termini shall be visually examined after the test to the extent feasible inside the connector. Termini shall not be damaged, and there shall be no loosening of parts, separation of bonded surfaces or other damage detrimental to the operation of the termini. 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.

Insertion loss verification: If the cut back method is used after the mechanical or environmental tests are concluded, then the return loss may be performed prior to the insertion loss verification.

Qualification connector: The qualification connector for this termini shall be a qualified MIL-DTL-38999 connector.

Qualification by similarity. Qualification inspection shall be performed on test samples configured in accordance with MIL-STD-1678-4 Requirement 4101.

a. Qualification of termini with different ferrule hole diameters.

Manufacturers who qualify under this specification sheet for the terminus with the ferrule hole diameter specified in column three of table V are qualified under this specification sheet for the other cladding hole diameter(s) in column four on the same row of table V.

- (2) Constraint for qualification by similarity case listed above. This qualification by similarity case is valid if the only difference between the qualified termini and the other termini listed in the same row of table V is a change in the terminus ferrule hole diameter and TICC markings.

b. Qualification of termini for different cable strain relief capture mechanisms.

- (1) Manufacturers who qualify under this specification sheet for the terminus with the ferrule hole diameter specified in column three of table V for termini with one style of cable strain relief capture mechanism and pass the insertion loss, cable pullout, thermal shock, temperature life and insertion and removal force verification for termini with the same ferrule hole diameter(s) with a different style of cable strain relief capture mechanism are qualified under this specification sheet for a different cable strain relief capture mechanism for termini in column four on the same row of table V. Insertion and removal verification of the termini to and from the connector shall be

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016

performed, with the termini on the ends of single fiber cable; to verify that strain relief is compatible with tools in table II.

(2) Constraint for qualification by similarity case listed above. This qualification by similarity case is valid if the only difference between the qualified termini and the termini undergoing qualification is a different cable strain relief capture mechanism and TICC markings.

c. Qualification of termini for change in design or material.

(1) Perform complete re-qualification.

TABLE V. Termini qualification by similarity.

Fiber type ^{1/}	Ferrule material	Qualified with hole diameter	Get other hole diameter(s)	Remarks
SM	Ceramic	126	125.3, 125.5	
MM	Ceramic	126	127	<u>2/</u>
MM	Ceramic	156	157	<u>3/</u>
MM100	Ceramic	173	142, 175	
MM/MM100	Metal	175	127, 142, 157	<u>4/</u>
^{1/} SM = Single mode, MM = Multimode (50/125, 62.5/125 fiber sizes, MM100 = Multimode 100/140 fiber sizes ^{2/} Qualified with 50/125 micron fiber size, see MIL-STD-1678-4 Requirement 4101 ^{3/} Qualified with polyimide coated optical fiber, see MIL-STD-1678-4 Requirement 4101 ^{4/} Manufacturers who qualify under this specification sheet for the termini single mode and for multimode fiber sizes with ceramic ferrules (per column 3) and perform the full qualification inspection for the 100/140/172 fiber size using a 175 +3, -0 ferrule hole diameter and the size and insertion loss inspections for the other ferrule hole diameter(s) listed in the same row (and column four) are qualified under this specification sheet for the other ferrule hole diameters in the same row.				

Cleaning prior to packaging. Termini shall be cleaned prior to packaging/shipment internally (for ensuring proper adherence of epoxy to terminus barrel (body) and ferrule and externally (for minimizing contamination).

PIN cross reference list. M29504/5 will no longer be built nor qualified. The preferred and non-preferred markings are shown in table VI, these termini are directly interchangeable. The M29504/05 will be used in place of M29504/5. M29504/5 and M29504/05 are structurally identical. The preferred part number is M29504/05.

TABLE VI. PIN cross reference.

Preferred PIN	Non-preferred PIN
M29504/05	M29504/5

Referenced documents. In addition to MIL-PRF-29504, this specification references the following:

MIL-PRF-29504/4	MIL-STD-1678-2	TIA-455-14
MIL-DTL-38999	MIL-STD-1678-3	TIA-455-16
MIL-DTL-38999/60	MIL-STD-1678-4	TIA-455-71
MIL-DTL-38999/61	SAE AIR 1351	

MIL-PRF-29504/5D
w/AMENDMENT 3
DRAFT DATED 29 MARCH 2016
TIA455.4

MIL-S-901

Changes from previous issue: The margins of this specification are marked with vertical lines to indicate where changes from the previous issue were made. 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 and relationship to the last previous issue.

CONCLUDING MATERIAL

Custodians:

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

Preparing activity:

DLA - CC

(Project 6060-2016-002)

Review activities:

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

NOTE: The activities listed above were interested in this document as of 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/>.