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IN REPLY REFER TO

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Ser W23/005

JUN 8 2009

From: Commander, Dahlgren Division, Naval Surface Warfare Center
To: Defense Logistics Agency, Defense Supply Center Columbus
(Code VQP), P.O. Box 3990, Columbus, OH 43216-5000

Subj: MIL-PRF-64266 CONFIGURATION AND QUALIFIED PRODUCTS LIST (QPL)
TEST SAMPLE CLARIFICATIONS

Ref: (a) Military Specification MIL-PRF-64266, Connectors, Fiber
Optic, Circular, Plug and Receptacle Style, Multiple
Removable Genderless Termini, Environment Resisting,
General Specification For, of 25 November 08

Encl: (1) MIL-PRF-64266 Connector Tool Approval Process, of
Rev A: 10 February 09
(2) MQJ Refurbishment Plans, of Rev A: 10 February 09
(3) Resolution to Dimensional Issues, of Rev C: 21 April 09

1. Purpose. This letter addresses the clarifications for the connector configuration and for QPL test samples specified in MIL-PRF-64266, reference (a). These clarifications were discussed during four government-coordinated teleconferences. These teleconferences took place with primary vendors involved with the NGCon (MIL-PRF-64266) connector. The purpose of these teleconferences was to address outstanding issues not resolved or standardized in the original release of MIL-PRF-64266. The primary outstanding issue was standardizing the method to ensure (interoperability for) shell-to-shell conductivity. A series of teleconferences were held to discuss and resolve outstanding MIL-PRF-64266 connector issues for both component design and expanded to support items required for both qualification (such as standardization of backshell configurations) and successful fielding of this connector (such as required tools and the measurement of remaining ferrule protrusion height). The outcome of the fourth teleconference was the inability to obtain primary vendor consensus on the method/conductive path for shell-to-shell conductivity standardization. Vendor recommendations were to poll end users and government requirements authorities then have the Government make the determination. This letter addresses the Government determinations for shell-to-shell conductivity standardization and the other outstanding issues discussed during the four teleconferences. These resolutions will be prepared in form of a MIL-PRF-64266 clarification letter on government letterhead. This clarification letter has been prepared in advance of the changes or revision to MIL-PRF-64266 in an effort to expedite the qualification process.

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2. Constraints influencing determinations. The determination must be done in a manner to have the least impact on current connector design, not require additional testing to verify acceptability or impact of design changes, and not further hold up connector qualification for further redesign. It is the intent of the Government to initiate the qualification process as expeditiously as possible.

a. Shell-to-shell conductivity. As such, the determination of the method/conductive path for shell-to-shell conductivity standardization is the one with minimum impact on current connector design after weighing the pros and cons. Also, the method/conductive path were limited to the two approaches discussed during the fourth teleconference (insert-to-insert bottoming with use of a conductive, resilient member in the trepan, shell-to-shell bottoming with changes limited to shortening the inserts and lengthening the trepan).

b. Other outstanding issues. The determination will stand for instances in which a determination was obtained (spring force, locking mechanism of the connector plug coupling nut, connector plug and receptacle polarization keying). The Government will continue to participate in support efforts for tool submittal evaluation (tools used in the terminus termination and connector accessories assembly procedures) and coordinate the determination for the minimum allowed height of the protruding ferrule from the terminus barrel (body). The Government will continue the effort to specify the standardization of backshells for both single fiber (aircraft) and multiple fiber (shipboard) backshell configurations and inform the vendors once finalized.

3. Distribution statement. Distribution Statement A: Approved For Public Release, Distribution Is Unlimited.

4. Shell-to-shell conductivity standardization. The conductive path used shall be from the connector plug to the connector receptacle with a conductive resilient member located in the trepan area of the connector receptacle. Also, insert-to-insert bottoming shall be retained as the mating plane. Required specification changes: Add a linear dimension of "0.085 minimum (see note 9)" for the length of the trepan in the receptacle. Add note 9 (to figure A-2 on page 54) to state "A conductive resilient member which will accommodate contact of connector plug shell and deflect down to .040 is specified as the standardized means to ensure shell to shell conductivity." Also, add a note to state that notes 1 to 8 are the same as and refer to those notes on figure A-1 on page 53).

5. Terminus spring force. Revise from 4 ± 1 lb to $3.25 \pm .25$ lb spring force. Revise note 14 on Figure 1 on MIL-PRF-29504/18 (page 2) and on MIL-PRF-29504/20 (page 2) to state: "Terminus end face shall exert a load of $3.25 \pm .25$ pounds (at nominal pushback) when the terminus has been deflected to a dimension of .702 inches (spring

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working height). Verification of compliance shall be by means of installing the terminus into the fixture shown in figure 2 and deflecting the terminus to a dimension of $.702 \pm .002$ inches. The resultant load at this height or deflection must be within $3.25 \pm .25$ pounds. The deflection to dimension $.702$ inches is the distance measured from the clip-to-tip (from dimension RP1 to ferrule end face, see figure 1). The tolerance of $\pm .002$ on dimension 0.702 is specified only for use to measure the spring force for verification of compliance. Spring shall not take a set at the working height."

6. Locking mechanism on the connector plug coupling nut. Add new 3.4.16 to MIL-PRF-64266 for requiring a locking (ratchet) mechanism on the connector plug coupling nut. Required specification changes: "3.5.1.6 requirement for locking mechanism on the connector plug coupling nut. The connector plug coupling nut shall include a ratchet type locking mechanism (anti-coupling device) to ensure that a mated connector maintains full thread engagement (maintains complete coupling). Complete coupling of the mated connector is achieved by a clockwise rotation of the coupling nut until insert-to-insert bottoming is achieved. The anti-coupling mechanism or feature shall be between the connector plug coupling nut and the connector plug shell only. The locking mechanism shall be sufficient to ensure no backing off of the coupling nut during mechanical shock or vibration."

7. Plug and receptacle polarization (keying). Length of keys and keyways per 3.5.1.5 and figure A-3 shall accommodate a connector plug key length of $.235 \pm .005$ for all three keys (the master primary polarizing key, master secondary polarizing key and clocking key, see figures A-1 and A-2 for identification of keys and keyways). The distance from the front surface (i.e., connector plug-to-connector receptacle interfacing surfaces) to the start of the key shall be $0.60 \pm .005$ for all three keys. Required specification changes: Revise figure A-1 to have the same connector plug key length for the three polarization keys. Specifically, dimension the left view from "2x $.060 \pm .005$ " to "3x $0.60 \pm .005$ ". Dimension the left view from "2x $.235 \pm .015$ " to "3x $.235 \pm .015$ ". Remove section C-C for the clocking key completely. Remove the section C-C designation from the right bottom view.

8. Tool submittal for evaluation (NGCon connector tool approval process). Participants asked to provide connectors, termini, cable assemblies and if applicable termini with crimp sleeves to evaluate crimp tool so evaluation materials are in place to conduct the tool approval process. Participants asked to determine and submit tools for approval listed under termination, installation and connector assembly (Termination: Polishing puck, curing adapters, curing adapters for 900 micron fibers, crimp tool; Installation: Insertion tool, removal tool; Connector assembly. Adapter tool, torque wrench, strap wrench) and that are to be offered to support the MIL-PRF-64266 connector. See

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enclosure (1). Required specification changes: None. Action: Each vendor is requested to submit the tools listed in enclosure (1) that the vendor intends provide as support for the MIL-PRF-64266 connector along with the needed connectors, termini and cable assemblies.

9. NGCon connector measurement quality jumper (MQJ) refurbishment plans. Approach is to re-polish ferrule end face and perform a post re-polish inspection. Length of ferrule protruding from the terminus barrel (body), i.e., exposed ferrule length, must be measured to ensure the length is at or above a minimum acceptable length. This minimum exposed ferrule length is the one required to maintain adequate terminus spring force. Measurement tool has been identified to measure the exposed ferrule length. MQJ refurbishment plans are addressed further in enclosure (2). Required specification changes: None. Action: Each vendor is requested to provide the minimum height of the protruding ferrule that would still meet the specified performance requirements (for the following termini/connectors that are among the ones they provide: M29504/4, /5, /14, /15, /18, ST connector, test probe /4, /5, /18).

10. Dimensional issues. Outstanding dimensional issues were found that were not resolved in the released main specification to MIL-PRF-64266. These dimensional issues mostly address tolerances. Enclosure (3) has been prepared to resolve the dimensional issues found.

11. Backshell standardization efforts for multiple fiber cable configuration. Status: NSWCDD sent survey went out to shipboard user community, received user inputs, and correlated the inputs. Next a determination on standardizing backshell configuration (solid, shroud or split along with some other features) will be made shortly. The Government will prepare specification sheets and a connector accessories assembly procedure then do an internal review for new/revised requirements. Comments must be incorporated into documentation. Vendors will receive copies of draft documentation once ready for initial general review. Backshells to be used for the qualification process will be identified in NAVSEA Drawing 8283460.

12. Backshell standardization efforts for single fiber cable configuration. Status: Comments received on specification sheets and connector accessories assembly procedure. Comments must be incorporated into documentation. Vendors will receive copies of draft documentation once ready for initial general review. Backshells to be used for the qualification process will be identified in NAVSEA Drawing 8283460.

13. Addressees. This letter is intended for vendors and out-of-house (outside the component's vendor facilities or independent) test laboratories performing QPL testing. This letter is to be used by Defense Supply Center Columbus (DSCC) and other government

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agencies/activities, parties in direct support of the government agencies/activities to clarify intent of requirements specified.

14. Point of contact. DSCC, Code VQP is to be the initial point of contact for the qualification issues/inquiries that pertain to this matter. Principle point of contact is A. Baillieul. He can be contacted by telephone: (614) 692-2867 or e-mail: vqp.ab@dla.mil. Alternative point of contact is Richard Marbais. He can be contacted by telephone: (614) 692-0620 or e-mail: richard.marbais@dla.mil. Technical inquires and clarifications on this Navy letter are to be placed in writing and sent by e-mail to the above addressee.



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By direction

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Blind Copy to:

W23/Throm/Good/M. Brown/G. Brown/Cox/files

MIL-PRF-64266 Connector Tool Approval Process

1. Tools involved (i.e., tools requiring connector components and assemblies).
 - a. Termination: Polishing puck, curing adapters, curing adapters for 900 micron fibers, crimp tool.
 - b. Installation: Insertion tool, removal tool.
 - c. Connector assembly. Adapter tool, torque wrench, strap wrench.
2. Tool submittals.
 - a. Approval authority: NSWCCD.
 - b. Mailing address:
ATTN ROBERT THROM ROOM A107
NAVAL SURFACE WARFARE CENTER DAHLGREN
17214 AVENUE B SUITE 126
DAHLGREN VA 22448-5147
 - c. Phone: (540) 653-4203
3. Connector, termini and cable assembly submittals.
 - a. Connector (all submittals, one time only): one connector plug and one connector receptacle (with ASR) for each shell size.
 - b. Termini (all submittals, one time only): 72 un-terminated termini (quantity sufficient to populate one shell size 23 connector).
 - c. Cable assemblies.
 - (1) Quantity. 60 partially terminated cable assemblies.
 - (2) Cable assembly configuration. Each cable assembly shall consist of a terminus placed on the end of single mode, MIL-PRF-85045/16 cable (24 inch minimum length). The other end of the cable shall be terminated with a commercial ST connector. Fiber on the terminus end shall be cleaved, air polished only, then capped. Fiber/connector on the ST connector end shall be fully terminated to achieve a domed ferrule with a PC polish. Ten of the 60 cable assemblies are to be used to evaluate each puck submittal.

i. High-end versus low-end termini. Half of termini provided on the 60 cable assemblies shall be high-end termini, the other half low-end termini. The terms "high-end" and "low-end" refer to termini on the high and low end of their manufacturing tolerance for shoulder-to-tip of ferrule.

ii. Agreement to supply future cable assemblies. Further cable assemblies may be requested in the future if the quantity of pucks being evaluated necessitates such submittal. This agreement to supply future cable assemblies if needed precludes each vendor from needing to supply competing product as part of their submittal.

iii. Crimp sleeves and termini (for crimp tool submittals only, one time submittal): Five termini, un-terminated, with five crimp sleeves.

4. Source of supply constraint. Tools will only be evaluated for approval from vendors that manufacture and qualify connectors and termini to the applicable military specification.

MQJ Refurbishment Plans

1. Approach 1. Re-polish ferrule end face using automated polishing machine specified in subordinate Work Package WP 010 03 of the general Series Maintainers Technical manual for Fiber Optic Cabling (NAVAIR 01-1A-505-4, T.O. 1-1A-14-4, TM 1-1500-323-24-4).
2. Approach 2. Re-polish ferrule end face using a hand polishing process. Develop the process. Determine if refurbishment is consistent enough that post re-polish interferometer inspection is not required.
3. Post re-polish inspection requirement. Length of ferrule protruding from the terminus barrel (body), i.e., exposed ferrule length, must be measured to ensure the length is at or above a minimum acceptable length. This minimum exposed ferrule length is the one required to maintain adequate terminus spring force.
4. Measurement tool. Discussions are to be held with a tool manufacturer to provide tooling to measure the exposed ferrule length.
5. Previous request for dimensional verification and actions. Dimension for minimum length will be provided for review and comment. Dimensions for minimum length will be provided participant's review.
6. Current situation and inquiries.
 - a. Minimum ferrule protrusion. Each participant is to provide the minimum height of the protruding ferrule that would still meet the specified performance requirements (complete items in table 1).
 - b. Polishing puck. Can a polishing puck be provided that would not allow the height of the protruding ferrule material to be ground below the determined minimum length?

Enclosure (2)

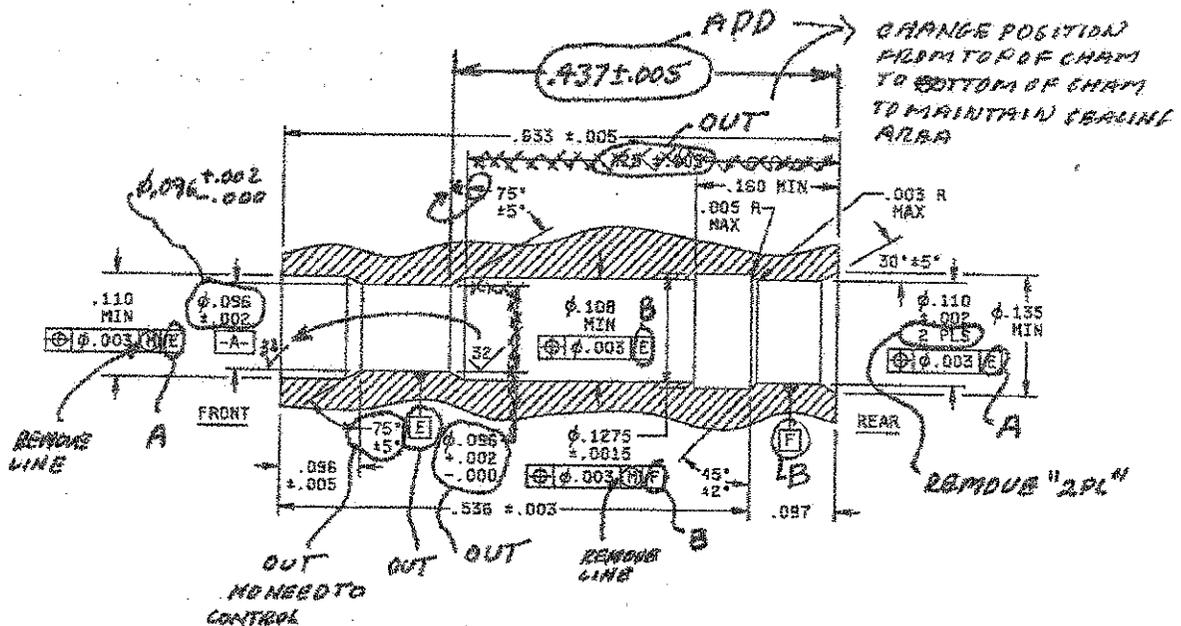
7. Table 1. Termini/connector type versus Protruding ferrule length.

Termini/Connector Type	Ferrule Height Protrusion	
	Unpolished Length (inch)	Post Polish Minimum Length (inch) ^{1/}
M29504/4 (1.58 mm ferrule)	.262 - .276	
M29504/5		
M29504/14 (2.0 mm ferrule)	156 minimum	
M29504/15		
M29504/18 (1.25 mm ferrule)	.234 ₋ .001	
ST connector (2.5 mm ferrule)		
Test probe: M29504/4 & /5		
Test probe: M29504/18		

^{1/} Minimum length is the minimum, post polish, protruding ferrule length in which there is sufficient spring force to meet optical/performance requirements.

1. Purpose. This enclosure lists required dimensional changes to the main specification, including appendices, of Mil-PRF-64266. These changes are mostly in the form of correctly specifying existing tolerances.

2. Dimensions found in appendices versus specification sheets. In general, the appendices address interoperability whereas the specification sheets address configuration. A future revision to MIL-PRF-64266 will be used to properly segregate the locations where material for interoperability and configuration is found.

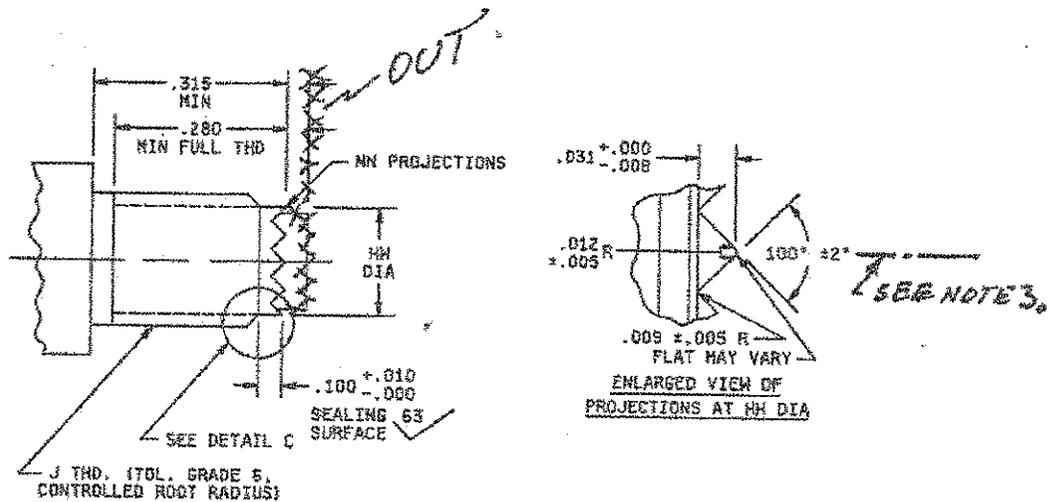


3. Cavity, page 11.

a. Dimension .425 +/- .005. Change position of leftmost dimension line from top of chamfer to bottom of chamfer. Revise dimension from .425 +/- .005 to .437 +/- .005. Purpose of change is to maintain sealing area. (Note: Since the dimension change from .425 to top of chamfer to .437 to the bottom of the chamfer is the same nominal dimension using the old 60 degree angle, this keeps the sealing surface the same as it has always been.)

b. Diameter .110 +/- .002. Remove "2 PLS".

Enclosure (3)



2. Appendix A, page 61.

a. Angle 100 +/- 2 degrees (on enlarged view of projections at HH DIA). Add the wording "See note 3."

b. Add note 3 to state "The centerline of specified projection must be located on the vertical centerline within 2 degrees of the Master Primary Polarizing Key or Keyway."

c. Remove unneeded dimension lines to the left of diameter HH as shown.

3. Appendix B, page 64.

Dimensional requirement B3.1.h. Revise tolerance from "+.010" to "+/- .010" for three place decimals and tolerance from "+.030" to "+/- .030" for two place decimals.

4. Appendix B, page 69.

Diameters of insert cavities shown on figure are too small for relative size of insert. Revise diameters for the cavities shown. (Check other insert sizes to ensure cavities are scaled correctly.)

5. Appendix B, page 72.

Tolerance block for cavity. Add same tolerance block for cavity as shown on page 69 for the six cavity insert.