

ENGINEERING PRACTICE STUDY

TITLE: PROPOSED CHANGES TO MIL-DTL-25677 AND ASSOCIATED SPECIFICATION SHEETS
REGARDING CAP AND NOZZLE FEMALE COUPLING END REQUIREMENTS

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FINAL REPORT

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Study Conducted by DLA Weapons Support (Columbus)
Document Standardization Division (VA)
Interconnection Branch (VAI)

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I. **OBJECTIVES:** Determine whether the suggested changes to MIL-DTL-25677 and associated specification sheets are warranted, and if so, what the specific requirements should be.

II. **BACKGROUND:** It was brought to DLA's attention that the lack of specific requirements for the female mating end components described in MIL-DTL-25677/2, /3, and /4, has been resulting in reduced interoperability. The mentioned specification sheets do not indicate any definitive requirements for the female coupling ends, stating "COUPLING END SHOULD MATE WITH ADAPTER MIL-DTL-25677/1".

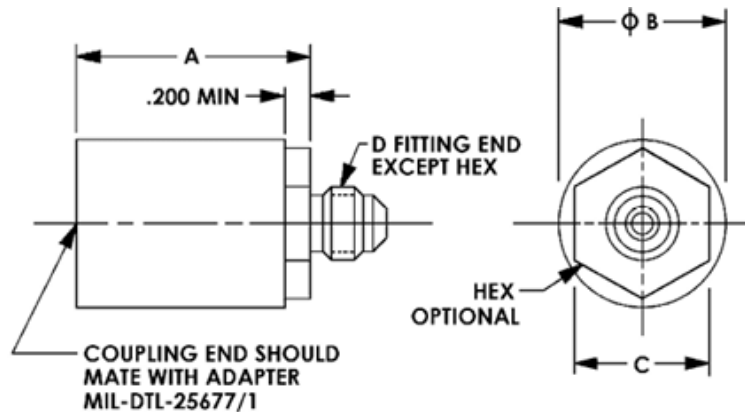


FIGURE 1. MIL-DTL-25667/3 Nozzle.

DLA was also requested to clarify what dimension "F" of MIL-DTL-25677/1 indicates. The specification is currently unclear as to whether dimension "F" indicates the desired poppet travel, or poppet thickness. Preliminary research found identical designs within the related International Standardization Agreement (ISA) STANAG 3595, which refers to ISO-9939 for design. ISO-9939 contains the same dimension "F", with the following note: "F is measured from the face of the connection and shows the OPEN position of the poppet". From this, it appears that dimension "F" indicates the poppet travel from the closed position to the open position.

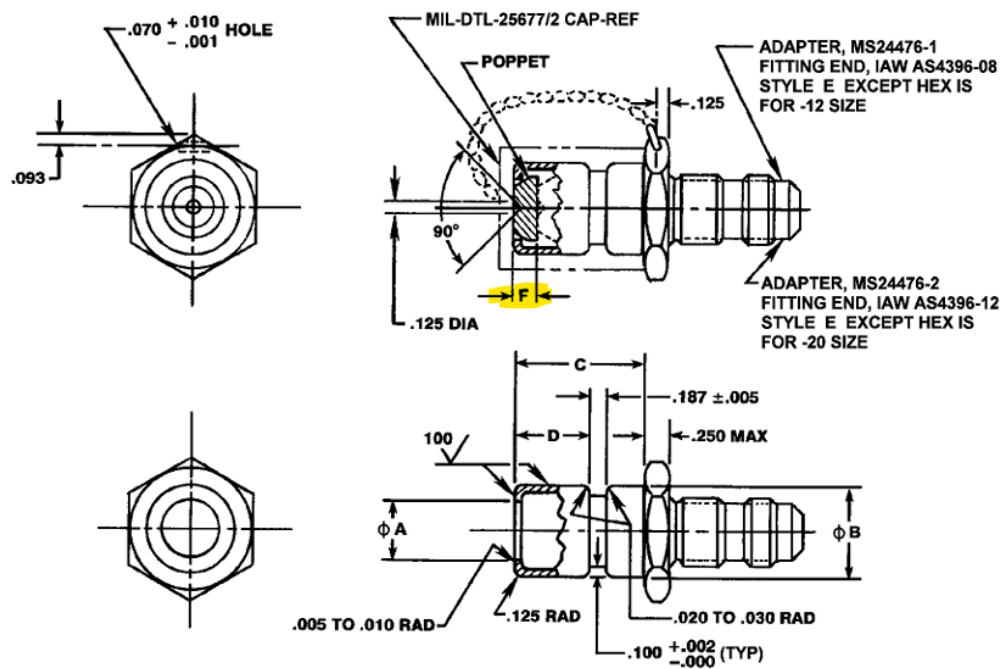


FIGURE 2. MIL-DTL-25667/1 Adapter with dimension "F" indicated.

III. RESULTS: In addition to the initial comments from Lockheed Martin that inspired this study, a response was provided by Northrop Grumman. There were no comments from the military custodians.

IV. CONCLUSIONS: A project will be initiated to revise MIL-DTL-25677/1 to clarify dimension F in a way similar to ISO-9939.

A project will be initiated to revise MIL-DTL-25677/3 to include more specific dimensional requirements, which should ensure improved interoperability between adapters and nozzles constructed by different manufacturers. Judging by the recommendations provided, the primary dimensions that needs to be specified are the minimum travel distance within the nozzle, and the center pin dimensions.

V. RECOMMENDATIONS: The following comments were provided in response to this EP Study:

- a. Is it desirable to add specific requirements to the MIL-DTL-25677/2, /3, and /4 coupling ends? If so, what should these requirements be? For example, specific dimensions, general fitment tolerances, bearing count and placement, or other features.

Lockheed Martin: MIL-DTL-25677 spec should identify additional dimensions that will ensure that any MIL-DTL-25677/2, /3, or /4 made female QD from any vendor will correctly interface with any male QD MIL-DTL-25677/1 from any vendor. This should include a tolerance stack up analysis and detail specific dimensions, fitment tolerance, bearing size and placement. I think number of bearings may be less critical, but we have seen differences across manufacturers. We have seen firsthand that the lack of critical dimensions or tolerances on the female QD spec has resulted in some QDs not interfacing with the male side.

In total, we know of 13 Safran made female QDs and 1 HII made female QD that DO NOT Interface on Male QDs made by Crane. Two of the Safran female QDs checked good on a Safran Male QD but failed on a Crane Male QD. This illustrates the inconsistencies in a cross-vendor interface.

Visually, different manufactures of the female QD MIL-DTL-25677/3 are different, and a critical travel distance and center pin distance are absent.

Northrop Grumman: Specific requirements defining the interface between MIL-DTL-25667/1 and /3 are necessary to ensure compatibility between supplier's designs. Unfortunately, NGC does not have visibility on the possible variation that may exist across the suppliers' designs so we can't offer tolerances.

- b. Is DLA's preliminary analysis of the intent behind dimension "F" of the MIL-DTL-25667/1 adapter accurate, and is it appropriate to incorporate the note from ISO-9939 into this specification?

Lockheed Martin: I agree with the clarification to dimension F and do believe it was intended to be the travel of the poppet head measured from the face of the male port. This is critical for the QD function.

Northrop Grumman: The illustrations in ISO 9939 help clarify the definition for the poppet travel. They would be helpful to include.

- c. Are there any other suggested changes to MIL-DTL-25667 or its associated specification sheets?

Lockheed Martin: Should the outer envelope dimension be further specified?

Northrop Grumman: Recommend that DLA design a test fixture for the MIL-DTL-25667/1 and /3 that can be used to independently confirm compatibility with any other suppliers' fitting.

