

MIL-N-25161C  
 AMENDMENT 3  
 12 February 1981  
 SUPERSEDING  
 AMENDMENT 2  
 10 August 1971

MILITARY SPECIFICATION

NOZZLE, AERIAL PRESSURE REFUELING, TYPE MA-2

This amendment forms a part of Military Specification MIL-N-25161C, dated 10 July 1969, and is approved for use by all Departments and Agencies of the Department of Defense.

PAGE 1

Add:

\*"1.2 Classification. The MA-2 nozzle shall be of the types and classes specified herein.

\* 1.2.1 Types

a. Type 1: Nozzle capable of off-center disconnects up to 15 degrees maximum (see 3.9.1).

b. Type 2: Nozzle capable of off-center disconnects up to 22-1/2 degrees maximum (see 3.9.1).

\* 1.2.2 Classes

a. Class A: Nozzle capable of operating in the -67°F to 160°F ambient temperature range and fuel temperature range of -67°F to 135°F.

b. Class B: Nozzle capable of operating in the -67°F to 350°F ambient temperature range and fuel temperature range of -67°F to 200°F."

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\* 3.9 Line 19: Delete and substitute "(o) Immersion (leakage) (4.6.15)".

After line 19 "(o)" add: "(p) Emergency disconnect (Type 2 nozzle only) (4.6.16)

(q) Disassembly and inspection (4.6.17)".

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\* 3.9.1 Line 12 (7th sentence): after "22-1/2 degrees" insert "for Type 2 and 15 degrees for Type 1".

Line 15 (8th sentence): after the words "breakage of nozzle parts", add "or, for Type 2 nozzles, permanent set of any part".

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- \* 4.3.1 Line 1 (1st sentence): after the word "nozzles" insert "of the type and class being qualified".

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- \* 4.4.2 Line 8: Delete and substitute "(e) Immersion (leakage) (4.6.15)".  
After line 8 "(e)" add: "(f) Emergency disconnect (Type 2 nozzle only) (4.6.16)  
(g) Disassembly and inspection (4.6.17)".

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4.6.2.2.2: Delete in its entirety.

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Figure 2, Correction Formula: Revise to read:

$$\Delta P_{CORR} = \Delta P_{NC} \left[ \frac{1.34}{\text{VISCOSITY OF TEST FLUID (CS)}} \right]^{0.25} \left[ \frac{0.770}{\text{SG OF TEST FLUID}} \right]$$

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- \* 4.6.11 Lines 6 and 7 (4th sentence): Delete and substitute "Leakage at any time during the test shall not exceed 25 cc per engagement. Leakage per disengagement at 0 degrees and 15 degrees shall not exceed 25 cc and 150 cc respectively. Leakage per disengagement at 22-1/2 degrees shall be reported (Type 2 nozzles only). Type 2 nozzles shall suffer no adverse functional effects as a result of disengagements at 22-1/2 degrees."

PAGE 13 and 14

- \* Table I: Delete and substitute the attached Table I.

PAGE 16

- \* Table II: Delete and substitute the attached Table II.

PAGE 17

- \* 4.6.14 Line 7 (5th sentence): delete and substitute "The Type 2 nozzle shall sustain no permanent set."

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- \* 4.6.15: Delete and substitute the following new paragraphs.

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"4.6.15 Immersion (leakage). The nozzle shall be completely submerged in water for 30 minutes with the sleeve closed. A negative pressure of 4 inches of mercury shall be maintained within the nozzle. There shall be no evidence of water leakage into the nozzle."

"4.6.16 Emergency disconnect (Type 2 nozzle only). While maintaining  $50 \pm 2$  psig fuel pressure in the coupling, the nozzle shall be disengaged 5 times at an angle of 22-1/2 degrees. No evidence of binding or failure shall occur."

"4.6.17 Disassembly and inspection. The nozzle shall be disassembled for inspection of all parts and measurements taken, as necessary, to disclose excessively worn, distorted, or weakened parts, which shall constitute failure. The measurements shall be compared with the contractor's drawing dimensions or with similar measurements made prior to the test. The findings of this inspection, together with photographs, where necessary, shall be included in the test report."

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- \* 6.1: Add the following sentences after line 6.

"Class A nozzles shall not be used for high temperature applications. Type 1 nozzles shall not be used for new designs."

- \* 6.3 Line 9 (3rd sentence): delete and substitute "The activity responsible for the Qualified Products List is the Department of the Air Force, Aeronautical Systems Division, Attn: ENFEF, Wright-Patterson Air Force Base, Ohio 45433."

- \* Concluding material: Change to read:

Custodians:

Air Force - 11

Navy - AS

Preparing activity:

Air Force - 11

Review activity:

Air Force - 99

International interest (see 6.4)

NOTES: The margins of this amendment are marked with an asterisk to indicate where changes from the previous amendment 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 amendment.

Custodians:

Air Force - 11

Navy - AS

Preparing Activity:

Air Force - 11

Review Activity:

Air Force - 99

Project 1680-0464

International interest (see 6.4)

TABLE I. Fuel resistance and low temperature tests.

Test Period 1/	Fuel resistance				Low temperature
	Phase I soak	Phase I dry	Phase II soak	Phase II dry	Phase III soak
Nozzle configuration	2/	Drained and blown dry	2/	Drained and blown dry	2/
Test fluid	TT-S-735, type III 3/	None	TT-S-735, type III 3/	None	TT-S-735, type I
Minimum period duration	96 hours	24 hours	18 hours	30 hours	18 hours
Ambient and test fluid temperature 4/ Class A Class B	158 $\pm 2^{\circ}\text{F}$ 236 $\pm 5^{\circ}\text{F}$	Circulating air at: 158 $\pm 2^{\circ}\text{F}$ 350 $\pm 2^{\circ}\text{F}$	158 $\pm 2^{\circ}\text{F}$ 236 $\pm 5^{\circ}\text{F}$	Circulating air at: 158 $\pm 2^{\circ}\text{F}$ 350 $\pm 2^{\circ}\text{F}$	-67 $\pm 2^{\circ}\text{F}$ -67 $\pm 2^{\circ}\text{F}$
Operation and tests during period	Actuate nozzle sleeve at least four times per day. The sleeve shall not hang-up.	None	Actuate nozzle sleeve at least four times per day. The sleeve shall not hang-up.	None	None
Operation and tests immediately after period	Perform functional tests using TT-S-735, type III.	Actuate nozzle sleeve at least four times. There shall be no sleeve hang-up. Perform functional test using TT-S-735, type I.	Perform functional test using TT-S-735, type III.	Actuate nozzle sleeve at least four times. There shall be no sleeve hang-up. Perform functional test using TT-S-735, type I.	Maintaining the ambient and test fluid at $-67^{\circ}\text{F} \pm 2^{\circ}\text{F}$ the nozzle shall be subject to fuel pressures of 2 and 60 psig for periods of 15 minutes. There shall be no leakage. The pressure shall then be relieved and the sleeve actuated four times. After each sleeve closure a pressure of 2 psig shall be applied to assure proper sleeve sealing. There shall be no sleeve hang-up nor leakage.

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TABLE I. Fuel resistance and low temperature tests - (Continued)

NOTES:

- 1/ Each period shall follow immediately after the preceding one in the order noted.
- 2/ The nozzle shall be subjected to the test fluid in such a manner to assure complete contact, as would be expected under normal service conditions.
- 3/ For class B application use P-D-680 at sufficient pressure (less than 15 psig) to prevent boiling.
- 4/ Class for qualification is determined by operating range expected in normal service use (see 1.2.2)

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TABLE II. Impact and endurance test.

Engagement			Disengagement		
Condition <u>1/</u>	Displacement of coupling centerline from nozzle centerline (inches)	Drop Distance nozzle nose to coupling poppet (inches)	Angle of disconnect  (degrees)	Latching mechanism setting  (lb. $\pm 20$ )	Cycles  <u>2/</u>
Impact <u>1/</u>	0	18	0	500	100 <u>6/</u>
	2	18	0	500	400
	4	20	0	500	500
Endurance <u>3/</u>	0	9	15 <u>1/</u>	500 <u>4/</u>	1250 <u>6/</u>
	0	9	0 <u>1/</u>	500	2750 <u>5/ 6/</u>

NOTES:

- 1/ During the impact test, engagement shall be complete. If impact does not cause engagement, manual force shall be applied as required to complete engagement.
- 2/ A cycle is defined as one engagement and one disengagement.
- 3/ Drop test not required. Mechanical engagement permissible, provided engaging velocity is not less than 5 fps just prior to seating the sleeve upon the master coupling seal.
- 4/ Disengagement shall be accomplished with 50  $\pm 2$  psig fuel pressure applied to the reception coupling.
- 5/ The 1,000 cycles called out for the contaminated fuel test (4.6.10) may be considered as part of this test provided the engaging velocity during the contaminated fuel test is not less than 5 fps.
- 6/ 50 cycles shall be accomplished with zero fuel pressure and a dry nozzle.
- 7/ Thirty percent of the cycles at each condition shall be performed at  $-67^{\circ}\text{F} \pm 2^{\circ}\text{F}$ .