

**INCH-POUND**  
**MIL-H-22240F(SH)**  
**AMENDMENT 1**  
**15 February 1989**

## MILITARY SPECIFICATION

HOSE, RUBBER, PETROLEUM BASED FUELS AND WATER SERVICES,  
DISCHARGE ONLY, SMOOTH BORE, LIGHTWEIGHT BUOYANT TYPE

This amendment forms a part of Military Specification MIL-H-22240F(SH), dated 22 March 1988, and is approved for use by the Naval Sea Systems Command, Department of the Navy and is available for use by all Departments and Agencies of the Department of Defense.

### PAGE 2

2.1.1: Delete "TT-S-735 - Standard Test Fluids, Hydrocarbon."

### PAGE 3

2.2: Under the American Society for Testing and Materials (ASTM); add:

"D471 - Rubber Property - Effect of Liquids, Test Method for.  
(DoD adopted)"

3.1, Line 4: Delete "friction" and substitute "skim or friction".

### PAGE 4

3.3, Last line: Delete "inspected" and substitute "specified."

3.6, Lines 3 and 4: Delete "1 degree per foot" and substitute "0.5 degrees per foot."

### PAGE 5

3.9.1: Delete and substitute:

"3.9.1 Tube and friction. The rubber used in the tube and friction shall be a copolymer of butadiene and acrylonitrile. The tube shall be smooth, free of seams with any significant depth profile, and shall be of uniform thickness. Minor tube seams, if present, shall have rounded edges and root, shall exhibit no evidence of delamination or disbonding of tube component layers and shall have the minimum specified tube thickness. Mandrel marks or scores present in the tube must exhibit a good molded appearance and indicate no evidence of tearing. A few indentations arising from air entrapment between mandrel and tube may be accepted provided such minor indentation has rounded edges and root, is not deeper than 10 percent of the minimum tube thickness, is firm and has full tube thickness."

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TABLE III: Delete and substitute:

"TABLE III. Requirements for rubber components in the hose.

	Tube	Cover	Friction	Test paragraph
<u>Initial properties:</u>				
Tensile strength, lb/in <sup>2</sup> , min	2300	1600	Record	4.8.11.1
Ultimate elongation, percent, min	300	350	Record	4.8.11.1
Adhesion, lb/in, min	30	30	30	4.8.11.5
<u>Properties after immersion in test fluid:</u>				
Tensile strength, lb/in <sup>2</sup> , min	1400	800	Record	4.8.11.2
Ultimate elongation, percent, min	200	200	Record	4.8.11.2
Volume increase, percent, max (no shrinkage permitted)	30	30	30	4.8.11.4
Adhesion, lb/in, min	20	20	20	4.8.11.6
<u>Properties after oven aging:</u>				
Tensile strength, lb/in <sup>2</sup> , min	2000	1450	-	4.8.11.3
Ultimate elongation, percent, min	250	250	-	4.8.11.3
Nonvolatile extract from tube, percent max	3.0	-	-	4.8.11.7
Phosphate plasticizer in tube, qualitative determination	Absent	-	-	4.8.11.8
Resistance of cover to ozone	-	No cracks	-	4.8.11.9
Specific gravity	Record	Record	Record	4.8.11.11
Durometer hardness	Record	Record	Record	4.8.11.12"

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4.4, Line 2: Delete "4.7".

4.4.1.1: Delete and substitute:

"4.4.1.1 Visual examination. The exterior surfaces, interior surfaces, and ends shall be examined for visual defects described in FED-STD-162 and 3.9.1. A borescope shall be used to inspect the hose tubes. Any hose containing major or critical defects shall be rejected. Hose branding and marking shall be examined for conformance to 3.11. Hose incorrectly marked or branded shall be rejected."

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4.5.1, Last sentence: Delete "specified in 4.7, 4.8.1, 4.8.2, 4.8.3, 4.8.4, 4.8.6 and 4.8.7 and substitute "specified in 4.4.1.1, 4.8.1, 4.8.2, 4.8.3, 4.8.4, 4.8.6 and 4.8.7.

PAGE 10

4.7: Delete last sentence in its entirety.

PAGE 11

4.8.10, Line 3 and 4: Delete "type III fluid of TT-S-735" and substitute "reference fuel B of ASTM D471."

4.8.11.2: Delete and substitute:

"4.8.11.2 Tensile properties after immersion. The tensile strength and ultimate elongation after immersion in Reference Fuel B of ASTM D 471 shall be determined in accordance with ASTM D 471, using specimens cut with die C of ASTM D 412. The thickness of the die C specimens shall be  $0.080 \pm 0.010$  inches. The specimens shall be immersed in fuel at a temperature of  $73.4^{\circ} \pm 3.6^{\circ}\text{F}$  for  $46 \pm 1/4$  hours."

PAGE 12

4.8.11.4: Delete and substitute:

"4.8.11.4 Volume change after immersion. The change in volume in percent of the original volume after immersion in Reference Fuel B of ASTM D 471, shall be determined on specimens of the tube, cover, and friction prepared and tested in accordance with ASTM D 471. The specimens shall be immersed in fuel at a temperature of  $73.4^{\circ} \pm 3.6^{\circ}\text{F}$  for  $46 \pm 1/4$  hours."

4.8.11.6, first sentence: Delete "type III fluid of TT-S-735" and substitute "reference fuel B of ASTM D471."

4.8.11.6, last line: Delete "fluid" and substitute "fuel".

4.8.11.7.2, line 3: Delete "type I fluid of TT-S-735" and substitute "reference fluid A of ASTM D471."

4.8.11.7.2, line 7: Delete "type I fluid" and substitute "reference fuel A".

Review Activity:  
DLA-CS

Preparing Activity:  
NAVY-SH  
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