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[INCH-POUND]
A-A-59290
21 July 1998
SUPERSEDING
MIL-H-5559A
22 April 1964

COMMERCIAL ITEM DESCRIPTION

HYDRAULIC FLUID, ARRESTING GEAR

The General Services Administration has authorized the use of this commercial item description for all federal agencies.

1. SCOPE. This commercial item description (CID) covers a commercially available ethylene glycol that has been modified with corrosion inhibitors. The modified glycol is generally used in aircraft arresting gear systems as a hydraulic fluid and is not interchangeable with any other type or grade of hydraulic fluid.

2. SALIENT CHARACTERISTICS.

2.1 Composition. The hydraulic fluid shall be a mixture of ethylene glycol, water, triethanolamine phosphate, and sodium mercaptobenzothiazole (NaMBT) as specified in table I. The sodium mercaptobenzothiazole shall conform to the requirements in table II.

2.2 Chemical and Physical Properties. The hydraulic fluid shall conform to the requirements in table III.

3. QUALITY ASSURANCE PROVISIONS.

3.1 Product Conformance. The product provided shall meet the salient characteristics of this CID, conform to the producer's own drawings, specifications, standards, and quality assurance practices, and be the same product offered for sale in the commercial market. The Government reserves the right to require proof of such conformance.

Beneficial comments, recommendations, additions, deletions, clarifications, etc. and any other data which may improve this document should be sent to: Commander, Naval Air Warfare Center Aircraft Division, Code 414100B120-3, Highway 547, Lakehurst, NJ 08733-5100.

FSC 9150

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TABLE I. Composition.

Component	Percent by Weight	
	Minimum	Maximum
Ethylene glycol	93.95	—
Water 1/	2.50	3.00
Triethanolamine phosphate 2/	2.25	2.75
NaMBT 3/	0.20	0.30

1/ Total percent water includes any water present in the other components.
2/ A mixture of commercially pure triethanolamine and commercially pure phosphoric acid.
3/ An aqueous solution of not less than 45 percent by weight of NaMBT and water. Chemically pure sodium sulfite, when used as a stabilizer, shall be not greater than 1 percent by weight of the formulated NaMBT solution. NaMBT shall conform to the requirements of table II.

TABLE II. Chemical and physical properties of NaMBT inhibitor.

Property	Requirement	Test Method
Color	Not darker than 15	ASTM-D1544
Specific gravity at 25°C/25°C (77°F/77°F)	1.27 ±0.03	ASTM-D1122
Suspended matter	None	Visual
Solubility at 25° ±5°C (77° ±8°F) in: Water after 24 hours 1/ Ethylene glycol after 24 hours 2/ Water and ethylene glycol after 16 hours 3/	 Soluble; slight haze, maximum Soluble; no haze or cloudiness Soluble; slight opalescence, maximum	Visual
Free alkalinity at 25° ±3°C (77° ±5°F), grams of NaOH per 100 mL of sample 4/	0.05 to 0.75	ASTM-D1121

1/ NaMBT inhibitor diluted with distilled water to 0.2 percent by weight.
2/ NaMBT inhibitor diluted with ethylene glycol (containing 2.5 percent by weight triethanolamine phosphate) to 3.0 percent by weight.
3/ Mix 0.134 gram NaMBT inhibitor with 30 mL of ethylene glycol (containing 2.5 percent by weight triethanolamine phosphate). Dilute with distilled water to 100 mL.

4/ grams of NaOH per 100 mL of sample $= \frac{AB\,(0.040)}{C} \times 100$

Where: A = mL of HCl
B = normality of HCl
C = mL of sample

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TABLE III. Chemical and physical properties of hydraulic fluid.

Property	Requirement	Test Method or Paragraph
Phosphate content (calculated as phosphoric acid), percent, minimum	0.56	3.3.1
pH value of a 50 percent aqueous solution (by volume) at 25° ±3°C (77° ±5°F)	7.2 to 7.8	ASTM-D1287
Boiling point, minimum	165°C (329°F)	ASTM-D1120
Ash content, percent by weight, maximum	0.52	ASTM-D1119
Specific gravity of undiluted material at 15.5°C/15.5°C (60°F/60°F)	1.111 to 1.123	ASTM-D1122
Viscosity at 37.7°C (100°F), centistokes, minimum	9.0	ASTM-D445

3.2 Market Acceptability. The following market acceptability criteria are necessary to document the quality of the product to be provided under this CID.

3.2.1 The company producing the hydraulic fluid must have been producing a product meeting the requirements of this CID for at least 6 months.

3.3 Test Procedures.

3.3.1 Phosphate Content. Dilute 20 grams (g) of hydraulic fluid with 100 milliliters (mL) of distilled water. Add 10 mL of a 50 percent aqueous solution of hydrochloric acid and 30 mL of magnesia mixture (see 3.3.2). Add concentrated aqueous ammonia until the solution is neutral to methyl red indicator. Stir for 5 minutes and, while continuing to stir, add an additional 15 mL of aqueous ammonia. Allow the solution to stand for not less than 4 hours. Filter the solution and ignite the precipitate in a weighed platinum crucible at a temperature of 1000 to 1050°C (1832 to 1922°F) to constant weight. Calculate the phosphate content (as H_3PO_4) from the weight of the magnesium pyro-phosphate ($Mg_2P_2O_7$).

3.3.2 Magnesia Mixture. Dissolve 50 g of crystalline magnesium chloride ($MgCl_26H_2O$) and 100 g of ammonium chloride in 500 mL of water. Add 10 mL of concentrated aqueous ammonia and allow the solution to stand overnight. Filter the solution if a precipitate is evident. Add hydrochloric acid to make the solution slightly acidic and dilute to 1 liter.

4. PACKAGING.

4.1 Preservation, Packing, and Marking. Preservation, packing, and marking shall be as specified in the contract or order and 4.1.1.

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4.1.1 Marking.

4.1.1.1 Warning Marking. The following warning marking shall appear on each container:

WARNING: This product, while undiluted, will freeze at about 0°F.
For use at lower temperatures, water must be added as required to obtain lower freezing point.

4.1.1.2 Instruction Marking. The following instruction marking shall appear on each container:

INSTRUCTIONS: Obliterate all markings when empty. This fluid is not interchangeable with any other type or grade of hydraulic fluid.

5. NOTES.

5.1 National Stock Numbers.

9150-00-224-8729
9150-00-243-1987

5.2 Source of Documents.

5.2.1 ASTM Standards are available from the American Society for Testing and Materials, 100 Barr Harbor Drive, West Conshohocken, PA 19428-2959.

5.3 Ordering Information. The purchaser should select the preferred options permitted herein and include the following information in procurement documents:

a. Title, number, and date of this CID.
b. Quantity.
c. Preservation, packing, and marking.

MILITARY INTERESTS:

Custodians:
Army - AR
Navy - AS
Air Force - 11

Review Activities:
Army - MI
DLA - GS

CIVIL AGENCY COORDINATING ACTIVITY:
GSA/FSS - 10FTE

Preparing Activity:
Navy - AS

(Project 9150-1221)