MATERIAL AND EQUIPMENT STANDARD

FOR

INHIBITOR, ANTI-ICING TO BE USED IN

JET TURBINE FUELS

ORIGINAL EDITION

JULY 1995

This standard specification is reviewed and updated by the relevant technical committee on Feb. 2000. The approved modifications are included in the present issue of IPS.

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1. SCOPE

This Standard Specification which is mainly generated from military-T-2768-6E covers the type and grade of inhibitor, anti-icing soluble in jet turbine fuels. It is intended for use as an anti-icing agent to be added to jet turbine engine fuels.

Note:

This standard specification is reviewed and updated by the relevant technical committee on Feb. 2000. The approved modifications by T.C. were sent to IPS users as amendment No. 1 by circular No. 118 on Feb. 2000. These modifications are included in the present issue of IPS.

2. REFERENCES

Throughout this Standard the following dated and undated standards/codes are referred to. These referenced documents shall, to the extent specified herein, form a part of this standard. For dated references, the edition cited applies. The applicability of changes in dated references that occur after the cited date shall be mutually agreed upon by the Company and the Vendor. For undated references, the latest edition of the referenced documents (including any supplements and amendments) applies.

ANSI (AMERICAN NATIONAL STANDARDS INSTITUTE)

ANSI Z129.1	"Precautionary Labeling of Hazardous Industrial Chemicals"

ASTM (AMERICAN SOCIETY FOR TESTING AND MATERIALS)

D 270	"Test Methods for Properties"
D 891	"Test Method for Specific Gravity of Liquid Industrial Chemicals (Method C)"
D 1078	"Test Method for Distillation Range of Volatile Organic Liquids"
D 1209	"Test Method for Color of Clear Liquids (Platinium Cobalt Scale)"
D 1218	"Test Method for Refractive Index and Refractive Dispersion of Hydrocarbon Liquids"
D 1364	"Test Method for Water in Volatile Solvents (Fisher Reagent Titration Method)"
D 1613- 61T	"Test Method for Acidity in Volatile Solvents and Chemicals Intermediates Used in Paint, Varnish, Lacquer, and Related Products"
E 70	"Test Method for pH of Aqueous Solutions with the Glass Electrode"

MIL (MILITARY SPECIFICATION)

MIL-T-2768 6E	"Inhibitor Icing Fuel System"

UFS (US FEDERAL STANDARD)

Fed -Test method Std No. 791	"Lubricants, Liquid Fuel, and Related Products Method of Testing (9601)

IPS (IRANIAN PETROLEUM STANDARDS)

IPS-E-GN-100	“Units”

3. UNITS

This Standard is based on International System of Units (SI), except where otherwise is specified.

4. REQUIREMENTS

4.1 Composition

The inhibitor shall be composed entirely of ethylene glycol monomethyl ether and shall conform to the requirements of table 1, when tested in accordance with clause 5.

TABLE 1 - PROPERTY OF THE INHIBITOR

PROPERTY	REQUIREMENTS
ACID NUMBER , mg KOH PER GRAM (MAXIMUM)	0.09
COLOR, PLATINUM COBALT (MAXIMUM)	15
DISTILLATION:	
INITIAL POINT (MINIMUM)	123.5°C
DRY POINT (MAXIMUM)	125.5°C
ETHYLENE GLYCOL (MAXIMUM)	0.025 WEIGHT PERCENT
pH OF 25 PERCENT SOLUTION IN WATER (25° ±2°C)	6.0 TO 7.0
SPECIFIC GRAVITY (20°/20°C)	0.963 TO 0.967
REFRACTIVE INDEX (20°C)	1.4015 TO 1.4025
WATER (MAXIMUM)	0.15 WEIGHT PERCENT

4.2 Appearance

The inhibitor shall be uniform in quality, clear and bright, and free from suspended and foreign matter.

5. TEST

5.1 The inhibitor shall be tested in accordance with the test methods listed in table 2 and as specified in 5.2 and 5.3.

TABLE 2

TEST	ASTM METHOD No.
ACID NUMBER	D 1613-61T
COLOR	D 1209
DISTILLATION	D 1078
REFRACTIVE INDEX	D 1218
SPECIFIC GRAVITY	D 891 (Method C)
WATER	D 1364
pH	E 70

5.2 Ethylene Glycol (percent by weight)

The percent of ethylene glycol in the ethylene glycol monomethyl ether component shall be determined as specified in the following subparagraphs.

5.2.1 Reagents and materials

All reagents shall be analytical grade, and the water shall be distilled or deionized water. The following materials shall be prepared:

a) Oxidizing reagents: To a solution of 5 grams (g) of periodic acid (HIO_4) in 200 cm^3 of water,

add 800 cm^3 of glacial acetic acid. Store the solution in a dark, well-stoppered bottle.

b) Potassium iodide: Twenty percent aqueous solution.

c) Sodium thiosulfate, standard 0.1 N: Standardize by an accepted procedure.

d) Starch indicator solution: One percent aqueous.

5.2.2 Procedure

The following procedure shall be performed:

a) Pipette 50 cm^3 of the oxidizing reagent into each of four 500 cm^3 iodine flasks. Reserve two of the flasks for the blank determination.

b) Introduce 50 g of the sample, weighed to the nearest 0.1 g, into each of two flasks and swirl to effect solution.

c) Allow the flasks to stand for 30 minutes at room temperature.

d) While swirling, add 10 cm^3 of 20-percent potassium iodide solution to each flask in turn immediately before titrating.

e) Titrate the contents of each flask to a pale yellow color with standard 0.1 N sodium thiosulfate. Add 1 cm^3 of starch indicator and titrate to the disappearance of the blue color.

f) If the net titration is more than 20 cm^3, repeat the determination, using a smaller sample size.

g) Weight percent ethylene glycol= $\frac{B\,A^{i}N^{i}3.103^{i}}{S^{i}}$

Where :

A = cm^3 of sodium thiosulfate required for the sample

B = average cm^3 of sodium thiosulfate required or the blank

N = normality of sodium thiosulfate

S = grams of sample.

5.3 pH of 25 Percent Solution in Water

Twenty-five cm^3 of the inhibitor shall be pipetted into a 100 cm^3 volumetric flask and filled with freshly boiled and cooled distilled water having a pH of 6.5 to 7.5. The pH value shall be measured with a pH meter calibrated in accordance with ASTM method E70.

5.4 Sampling

Sampling shall be in accordance with the ASTM test methods for the specific properties to be determined. The numbers and types of test specimens shall be in accordance with the ASTM test methods for the specific properties to be determined.

6. STORAGE LIFE, AND PREPARATION FOR DELIVERY

6.1 Storage Life

The product shall meet the requirements of clause 4 after storage for 24 months from the date of delivery, in a tightly covered container at temperatures between -20 to +60°C.

6.2 Preparation for Delivery

6.2.1 Packaging

The material purchased according to this Standard specification shall be packaged in suitable new steel drums containing not more than 210 liters of material.

6.2.2 Packing

Packing shall be accomplished in a manner which will insure acceptance by common carrier, at lowest rate, and will afford protection against physical or mechanical damage during shipment.

6.2.3 Marking

Shipment marking information, in addition to the labeling required (see 8) shall be provided on interior package and exterior shipping containers.

7. INSPECTION AND TESTING

7.1 All materials supplied under this Standard Specification shall be subject to timely inspection by the purchaser or his authorized representative. The purchaser shall have the right to reject any material (s) supplied which is (are) found to be defective under this standard specification. In case of dispute, the arbitration or settlement procedure, established in the procurement documents shall be followed.

7.2 The supplier shall place free of charge at the disposal of the purchaser's inspector (s) all means necessary for carrying out their inspection, specification results of tests, checking of conformity of materials with this Standard specification, checking of marking and packing.

7.3 Samples submitted to the purchaser will be tested in the purchaser's laboratory or in a responsible commercial laboratory designated by the purchaser.

7.4 The supplier shall furnish the purchaser with a certified copy of results of tests made by the manufacturer covering physical and performance characteristics of each batch (see 7.7) of product to be supplied under this standard specification. The supplier shall furnish, or allow the purchaser to collect samples of the material representative of each batch of product. Certified test reports and samples (see 7.6) furnished by the supplier or collected by the purchaser shall be properly identified with each lot (see 7.7) of product.

7.5 Prior to acceptance of the supplier's material, samples of material submitted by the supplier or collected by the purchaser will be tested by the purchaser. If any sample is found not to conform to this standard specification, material represented by such sample will be rejected.

7.6 The number of samples for testing shall consist of 10 percent of the lot or batch (see 7.7), but in no case shall be less than one or more than three drums. The results of the tests on two specimens (top and bottom) shall be averaged for each test specified in this Standard Specification to determine conformance with the specified requirements.

7.7 A lot or bach shall consist of an indefinite number of drums, offered for acceptance and filled with a homogenous mixture of material from one isolated container, or filled with a homogeneous mixture of material manufactured by a single plant run (not exceeding 24 hours) through the same processing equipment, with no change in ingredient material.

8. LABELING

8.1 Refer to ANSI Standard Z 129.1 "Precautionary Labeling of Hazardous Industrial Chemicals".

8.2 Marking Of Containers

Each container shall be legibly marked with the following information:

Name: Inhibitor, Anti-Icing for Use in Jet Turbine Fuels

Specification: IPS-M-TP-672.....

MESC No. : .....

Flash Point °C : .....

Lot (Batch) No. : .....

Stock No. : .....

Date of Manufacture : .....

Quantity of Inhibitor in Container: .....

Information and Warnings (if needed): .....

Manufacturer's Name and Address : .....

Storage Life : 24 months from date of delivery

9. DIRECTIONS FOR USE

The manufacturer shall supply detailed directions for use including mixing instruction with each container.