METRIC
MIL-W-83779B
17 January 1985
SUPERSEDING
MIL-W-0083779A
7 November 1983
MIL-W-83779A
8 November 1979

MILITARY SPECIFICATION

WATER INDICATING PASTE, METRIC

This Specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE.

This specification covers water indicating paste used to determine the water level in tanks of petroleum products.

2. APPLICABLE DOCUMENTS.

2.1 Government Documents.

2.1.1 Specifications, standards and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

Federal

PPP-B-636	Box, Shipping, Fiberboard
PPP-C-186	Containers, Packaging and Packing for Drugs, Chemicals and Pharmaceuticals
PPP-F-320	Fiberboard, Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes

Military

MIL-T-5624	Turbine Fuel, Aviation, Grades JP-4 and JP-5
MIL-F-16884	Fuel, Marine Distillate
MIL-I-27686	Inhibitor, Icing, Fuel System
MIL-I-85470	Inhibitor, Icing, Fuel System, High Flash

Beneficial comments (recommendations, additions, deletions) and pertinent data which may be of use in improving this document should be addressed to: SA-ALC/SFRM, Kelly AFB TX 78241, by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

STANDARDS

Federal

FED-STD-313	Material Safety Data Sheets, Preparation and the Submission of

Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage

(Copies of specifications, standards, drawings, and publications required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

2.2 Other Publications. The following documents form a part of this specification to the extent specified herein. The issues of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto, if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM STANDARDS

D 3951 Commercial Packaging, Practice for

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia PA 19103.)

AMERICAN CHEMICAL SOCIETY (ACS) SPECIFICATIONS

ACS REAGENT CHEMICAL STANDARDS

(Application for copies should be addressed to the American Chemical Society, 1155 Sixteenth St., NW, Washington DC 20036.)

CODE OF FEDERAL REGULATIONS

Title 49, Parts 100 to 199, Transportation

(Application for copies of the above publication should be addressed to the Superintendent of Documents, U.S. Government Printing Office, Washington DC 20402.)

(Industry association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

2.3 Order of Precedence. In the event of a conflict between the text of this specification and the reference cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Preproduction Sample. Unless otherwise specified, the contractor shall furnish preproduction samples for preproduction inspection in accordance with

4.3. The preproduction samples shall be produced by the same methods, processes and techniques to be employed in subsequent production of the contract quantity.

3.2 Composition. The manufacturer shall not be restricted in formulation of this compound, though it must conform to all requirements of this specification.

3.3 Toxicity. The cleaning compound shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the procuring activity to the appropriate medical service who will act as adviser to the procuring activity. The manufacturer shall certify that the cleaning compound contains no substance known to be toxic to the user under normal conditions of use. Material safety data sheets shall be prepared in accordance with FED-STD-313.

3.4 Water Indication. The water indicating paste shall clearly indicate contact with water by a definite color change under the following conditions (See 4.6):

a. Ambient temperature range, -23°C to 43°C.

b. In water levels, containing from 0 percent to 60 percent fuel system icing inhibitor.

c. In water levels containing up to 1,000 parts per million (ppm) chlorides.

3.5 Time for color change. The maximum time required for the water indicating paste to change color in contact with the water level shall be 30 seconds (See 4.6.3).

3.6 Storage Stability. The compound shall remain stable and shall be completely suitable for use for one year from date of manufacture (See 4.7).

3.7 Markings. Each container of water indicating paste shall be clearly and legibly marked with the manufacturer's instructions for use. Instructions shall include specific directions for the most effective use of the particular water indicating paste, such as, but not limited to, the recommended thickness of application and approximate drying time before immersion as applicable.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for Inspection. Unless otherwise specified in the contract or purchase order, the supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract or purchase order, the contractor may use his own or any other facilities suitable for the performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in the specification, where such inspections are deemed necessary to assure suppliers and services conform to prescribed requirements. The supplier is responsible for determining that product meets all the requirements of this specification before preproduction test samples are forwarded to the procuring activity for submission for preproduction testing (4.3).

4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

a. Preproduction inspection. Preproduction inspection consists of examination and tests performed after award of contract, to determine if the supplier's product conforms to all specification requirements (See 4.3).

b. Quality conformance inspection. Quality conformance inspection consists of examinations and tests performed on individual products or samples of products extracted from an inspection lot, to determine if the individual product or lot conforms to the requirements of this specification.

4.3 Preproduction testing. Preproduction samples consisting of twelve (12) jars or tubes of product, as applicable, shall be forwarded by the contractor, for performance of all examination and tests specified herein, to:

FH 1002 Det 35 SA-ALC/SFTLD
DFSC Terminal-Bldg 1
Mukilteo WA 98275

4.3.1 Preproduction samples. The procuring activity is responsible for insuring that required preproduction test samples of product from all contracts awarded by that activity are forwarded in a timely manner to the laboratory designated by the preparing activity (4.3). Failure of any water indicating paste preproduction sample to pass any examination or test shall be cause for rejection of the preproduction inspection.

4.3.2 Test reports. Copies of preproduction test reports shall be forwarded by the testing laboratory cited in 4.3 to the following offices:

a. The Quality Assurance Representative (QAR) for the contractor providing the product being tested (preproduction test samples).

b. San Antonio ALC/SFTT
Kelly AFB TX 78241

c. Commander, Defense General Supply Center
ATTN: DGSC-SQA
Richmond VA 23297

Test reports will state whether product met the requirements of this specification.

4.4 Quality conformance inspections. Quality conformance inspections shall be accomplished by subjecting the product to all of the examinations and tests specified herein. The sample size or inspection level shall be twelve (12) units. The acceptance number shall be zero (0). The rejection number shall be one (1). The examination for preparation for delivery shall be based on Inspection Level S-2, with an acceptable quality level (AQL) of 4.0 percent defective. In examination for preparation for delivery, sampling and acceptance or rejection shall be in accordance with criteria provided in MIL-STD-105.

4.4.1 Inspection lot. An inspection lot of the compound shall consist of one type of product made in one batch (continuous run).

4.4.2 Preparation for delivery. An inspection lot for preparation for delivery shall consist of the shipping containers prepared from the same material and under the same process required to pack the lot of compound specified in 4.4.1. A unit of sample shall be one shipping container containing compound prepared for delivery in accordance with the specified level (inspection level S-2), except that shipping containers are not required to be sealed.

4.5 Noncompliance. If a sample fails to pass preproduction or quality conformance inspections, the manufacturer shall notify the qualifying activity and the cognizant inspection activity of such failure and take corrective action on the materials or processes, or both, as warranted, and on all units of product which can be corrected and which are manufactured under essentially the same materials and processes, and which are considered subject to the same failure. Acceptance and shipment of the product shall be discontinued until corrective action, acceptable to the qualifying activity has been taken. After the corrective action has been taken, preproduction and quality conformance inspection shall be repeated on additional sample units (all tests and examinations, or the test which the original sample failed, at the option of the qualifying activity). Final acceptance and shipment shall be withheld until both inspections have shown that the corrective action was successful. In the event of failure after reinspection, information concerning the failure shall be furnished to the cognizant inspection activity and the qualifying activity.

4.6 Quality control tests.

4.6.1 Test solutions. These solutions simulate a JP-4 tank containing fuel system icing inhibitor (FSII), a JP-5 fuel tank containing high flash FSII, and a naval distillate fuel tank, all having water bottoms containing salt water.

4.6.1.1 Solution I, JP-4/FSII. This mixture is made up of JP-4, with a synthetic water bottom containing 60 percent fuel system icing inhibitor and 1,000 parts per million (PPM) sodium chloride. Prepare as follows:

a. Add 3,500 ml of JP-4 (NATO Code No. F-40, MIL-T-5624) to a suitable container.

b. In a separate 750 ml beaker, add 0.4895 gm reagent grade sodium chloride, O-C-265 to 200 ml distilled water. Stir to dissolve, and add 300 ml icing inhibitor, MIL-I-27686.

c. Add the FSII- sodium chloride solution to the container of JP-4, allowing the beaker to drain thoroughly. Do not rinse the beaker into the JP-4 container.

4.6.1.2 Solution II, JP-5/high flash FSII. This mixture consists of JP-5, with a synthetic water bottom containing 60 percent high flash fuel system icing inhibitor and 1,000 ppm sodium chloride. Prepare as follows:

a. Add 3,500 ml of JP-5 (NATO Code No. F-44, MIL-T-5624) to a suitable container.

b. In a separate 750 ml beaker, add 0.5069 gm reagent grade sodium chloride, O-C-265 to 200 ml distilled water, stir to dissolve, and add 300 ml high flash fuel system icing inhibitor, MIL-I-85740(AS).

c. Add the high flash FSII - sodium chloride solution to the container of

JP-5, allowing the beaker to drain thoroughly. Do not rinse the beaker into the JP-5 container.

4.6.1.3 Solution III, marine distillate fuel/salt water (water bottom). This mixture consists of marine distillate fuel with a synthetic water bottom containing 1,000 ppm sodium chloride. Prepare as follows:

a. Add 3,500 ml naval distillate fuel (NATO Code No. F-76, MIL-F-16884) to a suitable container.

b. In a separate 750 ml beaker, add 0.5000 gm reagent grade sodium chloride, O-C-265 to 500 ml distilled water, and stir to dissolve.

c. Add the salt solution to the container of marine distillate fuel, allowing the beaker to drain thoroughly. Do not rinse the beaker into the container of marine distillate fuel.

4.6.1.4 These solutions are used in evaluating effectiveness of water indicating paste in determining the water cut in fuel tanks containing JP-4/FSII, JP-5/high flash FSII, and naval distillate fuel/salt water (water bottom).

4.6.2 Test procedures.

4.6.2.1 Preparation of water indicating paste. Prepare water indicating paste for test as follows:

a. Chill six (6) tubes or jars of water indicating paste (whichever the contract or order specified) to -23°C, and maintain at this temperature for at least two hours.

b. Heat six (6) tubes or jars of water indicating paste (whichever the contract or order specified) to 43°C, and maintain at this temperature for at least two hours.

4.6.2.2 Preparation of solutions.

a. Chill Solution I (JP-4/FSII solution) and Solution II (JP-5/high flash FSII) until the fuel phase is -7°C.

b. Chill Solution II (naval distillate fuel/salt solution) until the fuel phase is 2°C.

4.6.3 Testing water indicating paste.

4.6.3.1 Chilled paste, Solution I (JP-4/FSII).

a. Remove an unused jar or tube chilled to -23°C from the cold box and immediately spread the paste on a typical dip stick or rod, according to the instructions on the tube or jar.

b. Lower the stick or rod into Solution I through the JP-4 and into the water phase containing FSII. Allow the rod or stick to remain in the water bottom for 30 ± 5 seconds. Raise the rod or stick into the fuel level and let it remain there for 60 ± 5 seconds. Remove from the fuel and observe the color change at the water cut.

c. The water cut shall be clearly identifiable by a distinct, sharp color

change. (see 3.4 and 4.3.1)

4.6.3.2 Chilled paste, Solution II (JP-5/high flash FSII).

a. Remove an unused tube or jar from the cold box, and follow the same procedure as in para 4.6.3.1, using solution II chilled to -7°C as in that paragraph.

b. The water cut shall be clearly identifiable by a distinct, sharp color change. (see 3.4 and 4.3.1)

4.6.3.3 Chilled paste, Solution III (marine distillate fuel/salt solution).

a. Remove an unused tube or jar from the cold box and immediately spread the paste on a typical dip stick or rod, according to instructions on the tube or jar.

b. Lower it into Solution III through the marine distillate fuel and into the water phase (salt solution). Allow the rod or stick to remain in the water bottom for 30 ± 5 seconds. Raise the rod or stick into the fuel level and let it remain there for 60 ± 5 seconds. Remove from the fuel and observe the color change at the water cut.

c. The water cut shall be clearly identifiable by a distinct, sharp color change. (see 3.4 and 4.3.1)

4.6.3.4 Heated paste, Solution I (JP-4/FSII).

a. Remove a tube or jar of paste (heated to 43°C) from the oven and immediately spread the paste on a dip stick or rod according to instructions on the tube or jar.

b. Lower it into Solution I through the JP-4 and into the water phase containing FSII. Allow the rod or stick to remain in the water bottom for 30 ± 5 seconds. Raise the rod or stick into the fuel level and let it remain 60 ± 5 seconds. Remove from the fuel and observe the color change at the water cut.

c. The water cut shall be clearly identifiable by a distinct, sharp color change. (see 3.4 and 4.3.1)

4.6.3.5 Heated paste, Solution II (JP-5/high flash FSII).

a. Remove an unused tube or jar of paste from the oven and follow the same procedure as in 4.6.3.4, using Solution II chilled to -7°C, as in that paragraph.

b. The water cut shall be clearly identifiable by a distinct, sharp color change. (see 3.4 and 4.3.1)

4.6.3.6 Heated paste, Solution III (marine distillate fuel/salt solution).

a. Remove an unused tube or jar from the oven and immediately spread the paste on a dip stick or rod, according to instructions on the tube or jar.

b. Lower it into Solution III through the fuel and into the water phase. Allow the rod or stick to remain in the water bottom for 30 ± 5 seconds. Raise the rod or stick into the fuel level and let it remain there for 60 ± 5 seconds. Remove from the fuel and observe the color change at the water cut.

c. The water cut shall be clearly identifiable by a distinct, sharp color change. (see 3.4 and 4.3.1)

4.6.3.7 Ambient fuel-water mixtures.

a. Allow the three fuel-water mixtures made up in para 4.6.1 (Solution I, JP-4/FSII, Solution II, JP-5/high flash FSII, and solution III, marine distillate fuel/salt solution) to reach ambient temperature.

b. Using one previously unopened chilled sample and one previously unopened heated sample (prepared as in para 4.6.2.1) with each of the above solution at ambient temperature, perform the tests described in 4.6.3.1 through 4.6.3.6. That is, follow the original test procedures, with all fuel-water mixtures at room temperature.

4.6.3.8 Test results. Each water cut, as in the previous tests, must be clearly identifiable by a distinct, sharp color change, and failure of any test by a sample shall be cause for rejection of the product.

4.7 Storage stability. Product shall pass all specification requirements when tested one year from date of manufacture.

4.8 Examination of preparation for delivery. Shipping containers and contents shall be examined to determine if the preservation, packaging, and marking conform to the levels specified in the contract or order and for the existence of the following specific defects:

a. Manufacturer's instructions for use are not provided on individual containers (jar or tube); label, or instructions, are incomplete or are not easily legible.

b. The contract and batch or lot numbers under which product was procured, the date of manufacture, and manufacturer's name and address, are not printed on individual jars or tubes or on intermediate or outer containers or shipping container. NOTE: Date of packaging is not acceptable, and shall be cause for rejection of containers (product).

c. Caps of tubes, or lids of jars, are loose (not completely tightened).

d. Non-conforming components are used; there are missing, damaged or defective containers or components; or containers do not meet all requirements of Section 5, Preparation for delivery.

e. Quality of packaging is not adequate; for example, there is incomplete closure of unit, intermediate, or outer packaging; individual containers are leaking, bulging, or distorted; or markings are not permanently affixed to containers or intermediate or outer containers.

5. PACKAGING

5.1 Packaging. Packaging shall be Level A, or Industrial for required net fill, as specified.

5.1.1 Level A. Water indicating paste shall be packaged in jars, conforming to PPP-C-186, Group A, Class 1, Type d, Style 2, closure B, with opening wide enough to permit easy removal of all contents, or in tubes, conforming to PPP-C-186, Group B,Class 2, Type a, Closure A.

5.1.2 Industrial. The water indicating paste shall be packaged in accordance with ASTM D 3951. Containers shall be in accordance with Uniform Freight Classification rules or regulations of other carriers applicable to the mode of transportation.

5.2 Packing. Packing shall be levels A, B, or Industrial, as specified.

5.2.1 Level A. Twelve jars or twenty tubes packaged as specified in 5.1 shall be packed in fiberboard boxes conforming to Type CF, Class WR, Variety SW, Grade V3c, PPP-B-636, within the weight limitations of the container. Full height separators made of fiberboard conforming to PPP-F-320 shall be provided. Top and bottom pads of the same material as the separators will be provided as necessary to restrict movement of the jars or tubes within the fiberboard container.

5.2.2 Level B. Twelve jars or twenty tubes packaged as specified in 5.1 shall be packaged in fiberboard boxes conforming to Type CF, Class WWVR, Variety SW, Grade V3c, PPP-B-636, within the weight limitations of the container. Full height separators made of fiberboard conforming to PPP-F-320 shall be provided. Top and bottom pads of the same material as the separators will be provided as necessary to restrict movement of jars or tubes within the fiberboard container.

5.2.3 Industrial. The water indicating paste shall be packed in accordance with ASTM D 3951.

6. NOTES.

6.1 Intended use. Water indicating paste covered by this specification is intended to be applied to dip sticks, rods, plumb bobs, etc, used to determine depth of water (water bottoms) in aircraft fuel storage tanks.

6.2 Procurement data. Procurement documents should specify:

a. Title, number, and date of this specification.

b. Type of container.

c. Level of packaging and packing required (see 5).

6.3 Environmental protection. All Federal, state, and local regulations on environmental protection should be observed in manufacture of this product, and in waste disposal, transfer or storage of the product, components, and related products. The manufacturer/distributor should insure that manufacturing, handling, and waste disposal meet all applicable regulations on protection of the environment.

6.4 Recycled and reclaimed materials. Recycled and reclaimed materials shall not be used in the manufacture of this product.

CUSTODIANS:

NAVY - SH
AIR FORCE - 68

REVIEW ACTIVITIES:

NAVY - SA
DLA - GS

USER ACTIVITY:

NAVY - AS, YD, MC

PREPARING ACTIVITY:

AIR FORCE - 68

PROJECT NO: 6850-0766