

**METRIC**  
DOD-F-87935  
12 January 1984

## MILITARY SPECIFICATION

### FLUID, MAGNETIC PARTICLE INSPECTION, SUSPENSION MEDIUM (METRIC)

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

#### 1. SCOPE

1.1 Scope. This specification covers Magnetic Particle Inspection fluid for use as a suspension vehicle while performing magnetic particle nondestructive inspections.

#### 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-P-704

PPP-D-729

Pails: Shipping, Steel

Drums: Shipping and Storage, Steel, 55 Gallons  
(208 Liters)

#### STANDARDS

##### Federal

FED-STD-313

Material Safety Data Sheets, Preparation and  
Submission of

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

FSC 6850

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Military

MIL-STD-105	Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-129	Marking for Shipment and Storage
MIL-STD-147	Palletized Unit Loads
MIL-STD-290	Packaging of Petroleum and Related Products

2.1.2 Other Government Documents, Drawings, and Publications. The following other Government documents, drawings and publications form a part of this specification to the extent specified herein.

DEPARTMENT OF TRANSPORTATION - DOT 49 CFR PARTS 100-199

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

2.2 Other publications. The following document(s) 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 issues listed in the current DoDISS and the supplement thereto, if applicable.

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.)

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

## ASTM STANDARDS

D 93	Flash Point by Pensky-Martens Closed Tester, Test for
D 445	Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity), Test for
D 1500	ASTM Color of Petroleum Products (ASTM Color Scale) Test for
D 2276	Particulate Contaminant in Aviation Turbine Fuels, Test for
D 3242	Total Acidity in Aviation Turbine Fuels, Test for
D 3951	Practice for Commercial Packing

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

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

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### 3. REQUIREMENTS

3.1 Materials. The suspension medium shall consist completely of hydrocarbon compounds.

3.2 Chemicals and physical requirements. The chemical and physical requirements of the fluid shall conform to those listed in Table I when tested in accordance with the tests in Section 4.

3.3 Workmanship. The suspension vehicle shall be free from undissolved water, sediment, grit and suspended matter. No substance of known toxicity shall be added. The magnetic particle inspection fluid shall not cause separation of the fluorescent dye material from the magnetic particles for a period of one year (12 months).

3.4 Toxicity. The fluid shall have no adverse effect on the health of personnel when used for its intended purpose. The fluid shall not contain any components which produce noxious vapors in such concentrations as to be an annoyance to personnel during use under conditions of adequate ventilation.

TABLE 1  
CHEMICAL AND PHYSICAL REQUIREMENTS

TEST	REQUIREMENT		METHOD
	MIN	MAX	
Flash point, °C	93	--	ASTM D 93
Odor	--	none	Para 4.5.4
ASTM Color	--	1.0	ASTM D 1500
Background Fluorescence	Less than STD		Para 4.5.3
Viscosity, cs @ 38°C	--	3.0	ASTM D 445
Particulate Matter, mg/l	--	0.5	ASTM D 2276
Total Acid Number, mgKOH/l	--	0.015	ASTM D 3242

### 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 the inspection requirements as specified herein. Except as otherwise specified in the contract or order, the supplier may use his own or any other facilities suitable for 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 conformance of the product to specification requirements.

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4.2 Lotting. A lot shall consist of a definite quantity of a homogeneous solvent or mixture of solvents manufactured in a single plant run (not exceeding 24 hours) through the same processing equipment, with no change in ingredient material.

4.3 Sampling. A random sample of filled containers shall be selected from each lot in accordance with MIL-STD-105 at inspection level II and acceptable quality level (AQL) of 2.5 percent defective. The samples shall be examined in accordance with paragraph 4.5.

4.4 Examination of Filled Containers for Delivery. Samples selected as specified in paragraph 4.3 shall be examined for conformance to MIL-STD-290 with regard to fill, closure, sealing, leakage, packaging, packing and marking requirements. Any container having one or more defects, or under the required fill, shall be rejected. If the number of defective or underfilled containers exceeds the acceptance number for the appropriate plan of MIL-STD-105, the entire lot(s) offered as deliverable shall be rejected.

4.5 Tests.

4.5.1 Workmanship. Samples selected in accordance with paragraph 4.3 shall be visually examined for compliance with paragraph 3.3.

4.5.2 Other Tests. Tests to determine conformance to the chemical and physical requirements shall be conducted in accordance with the applicable test method listed in Table 1.

4.5.3 Background Fluorescence. This test shall be performed using a photo-electric fluorometer (Coleman 12C, Turner 110, 111, 112 or equivalent) equipped with Corning 7-37 or 7-39 primary filter, Corning 3-77 and Kodak 2A secondary filters and 10 X 75 mm round glass cuvettes.

4.5.3.1 Limit. This suspension medium shall have a background fluorescence no greater than that of the reference standard as stated in 4.5.3.2.

4.5.3.2 Reference Material. The fluorescence standard shall consist of 10ppm ( $1.2 \times 10^{-8}$  molar) solution of quinine sulfate in 0.1 N  $H_2SO_4$ .

4.5.4 Odor. The fluid shall not have any offensive, objectionable or disagreeable odors.

4.6 Test Reports. The vendor of the product shall furnish with each shipment two copies of the test report showing the results of tests performed to determine conformance to the specification requirements. This report shall include the purchase order number, specification number, vendor's material designation, lot number, date of manufacture and quantity.

5 PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A or Industrial (See 6.2).

5.1.1 Level A. Packaging for the appropriate size quantity shall be per PPP-P-704, Type I, Class 3 or PPP-D-729, Type II.

5.1.2 Industrial. Packaging shall be in accordance with ASTM D 3951.

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5.2 Packing. No further packing is required if packaged per 5.1.

5.3 Markings. Markings shall be in accordance with MIL-STD-129 and applicable DOT Regulations.

5.4 Palletization. When specified (see 6.2), containers shall be palletized in accordance with MIL-STD-147.

5.5 Material Safety Data Sheet. Manufacturer shall comply with the requirements of FED-STD-313.

## 6 NOTES

6.1 Intended Use. The suspension medium fluid covered by this specification is intended for use in doing magnetic particle inspections, which is used for the detection of discontinuities at or immediately below the surface of ferromagnetic material.

6.2 Ordering Data. Procurements should specify the following:

- (a) Title, number, and date of this specification.
- (b) Type and size of containers required.
- (c) Level of packaging required, as applicable.
- (d) Special markings, if required.

### CUSTODIANS:

ARMY - AV  
NAVY - AS  
AIR FORCE - 68

### PREPARING ACTIVITY:

Air Force - 68  
PROJECT NO. 6850-0748

### REVIEW ACTIVITIES:

NAVY - SH  
AIR FORCE - 20  
DLA - GS

## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER DOD-F-87935		2. DOCUMENT TITLE Fluid, Magnetic Particle Inspection, Suspension Medium (METRIC)	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)  <input type="checkbox"/> VENDOR  <input type="checkbox"/> USER  <input type="checkbox"/> MANUFACTURER  <input type="checkbox"/> OTHER (Specify): _____	
b. ADDRESS (Street, City, State, ZIP Code)			
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		b. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
c. MAILING ADDRESS (Street, City, State, ZIP Code) - Optional		8. DATE OF SUBMISSION (YYMMDD)	

**INSTRUCTIONS:** In a continuing effort to make our standardization documents better, the DoD provides this form for use in submitting comments and suggestions for improvements. All users of military standardization documents are invited to provide suggestions. This form may be detached, folded along the lines indicated, taped along the loose edge (*DO NOT STAPLE*), and mailed. In block 5, be as specific as possible about particular problem areas such as wording which required interpretation, was too rigid, restrictive, loose, ambiguous, or was incompatible, and give proposed wording changes which would alleviate the problems. Enter in block 6 any remarks not related to a specific paragraph of the document. If block 7 is filled out, an acknowledgement will be mailed to you within 30 days to let you know that your comments were received and are being considered.

**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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