

MIL-T-17128C  
29 October 1982  
SUPERSEDING  
MIL-T-17128B  
25 July 1963  
(See 6.3)

## MILITARY SPECIFICATION

### TRANSDUCER FLUID, SONAR

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

#### 1. SCOPE

1.1 Scope. Sonar transducer fluid covered by this specification is a low percentage volatile, low neutralization number, and high volume resistivity castor oil.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

2.1.1 Standards. Unless otherwise specified, the following standards 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.

#### STANDARDS

##### FEDERAL

FED-STD-791 - Lubricants, Liquid Fuels, and Related Products;  
Methods of Testing.

##### MILITARY

MIL-STD-105 - Sampling Procedures and Tables for Inspection by  
Attributes.

MIL-STD-290 - Packaging of Petroleum and Related Products.

(Copies of standards required by contractors in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the contracting officer.)

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Naval Sea Systems Command, SEA 5523, Department of the Navy, Washington, DC 20362 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

## MIL-T-17128C

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)

- D 94 - Saponification Number of Petroleum Products, Test Method for. (DoD adopted)
- D 95 - Water in Petroleum Products and Bituminous Materials by Distillation, Test Method for. (DoD adopted)
- D 97 - Pour Point of Petroleum Oils, Test Method for. (DoD adopted)
- D 128 - Analysis of Lubricating Grease, Methods of. (DoD adopted)
- D 257 - D-C Resistance or Conductance of Insulating Materials, Test Methods for. (DoD adopted)
- D 287 - API Gravity of Crude Petroleum and Petroleum Products (Hydrometer Method), Test Method for. (DoD adopted)
- D 445 - Kinematic Viscosity of Transparent and Opaque Liquids (and the Calculation of Dynamic Viscosity), Test Method for. (DoD adopted)
- D 923 - Sampling Electrical Insulating Liquids, Methods of.
- D 974 - Neutralization Number by Color - Indicator Titration, Test Method for. (DoD adopted)
- D 1544 - Color of Transparent Liquids (Gardner Color Scale), Test Method for. (DoD adopted)
- D 1959 - Iodine Value of Drying Oils and Fatty Acids, Test Method for. (DoD adopted)

(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.)

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

## 3. REQUIREMENTS

3.1 Material. Sonar transducer fluid shall be a clear castor oil, free from suspended matter, water, and sediment, and shall contain no admixture of any other oil.

3.2 Chemical and physical requirements. The sonar transducer fluid shall conform to table I.

## MIL-T-17128C

TABLE I. Chemical and physical requirements.

| Requirement                                   | Limit                 |         |
|---|-----------------------|---------|
|   | Min                   | Max     |
| API degrees                                   | 16.0                  | 15.1    |
| Specific gravity, 60°/60°F <u>1/</u>          | 0.959                 | 0.965   |
| Viscosity:                                    |                       |         |
| At 40°C           centistokes (cSt)           | 237                   | 254     |
| At 100°C       cSt                            | 19                    | ----    |
| Pour point, °C (°F)                           | ---                   | -15(+5) |
| Color, gardner                                | ---                   | 1       |
| Iodine number                                 | 82                    | 88      |
| Saponification number                         | 176                   | 184     |
| Unsaponifiable matter, percent                | ---                   | 0.5     |
| Moisture and volatile, at 100°C, percent      | ---                   | 0.02    |
| Acid number                                   | ---                   | 0.8     |
| Solubility                                    | Soluble               | ---     |
| Acetyl value                                  | 143                   | ---     |
| Volume resistivity, at 100°C, ohm-centimeters | 10 x 10 <sup>10</sup> | ---     |

1/ May be converted from API degrees.

#### 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor 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 supplies and services conform to prescribed requirements.

#### 4.2 Sampling for quality conformance.

4.2.1 Inspection lot. A lot shall consist of all transducer fluid manufactured as one batch. If the material cannot be identified by batch, a lot shall consist of not more than 1,000 gallons of transducer fluid.

4.2.2. Sampling for examination of filled containers. A random sample of filled containers shall be selected from each lot in accordance with MIL-STD-105, at inspection level 1, and Acceptable Quality Level (AQL) = 2.5 percent defective.

## MIL-T-17128C

4.2.3. Sampling for tests. Two containers shall be selected at random from each lot. From each of these two containers, two 1-quart specimens shall be taken in accordance with ASTM D 923. These specimens shall be tested in accordance with 4.4 for compliance with 3.2.

4.3 Quality conformance inspection. Quality conformance inspection shall be conducted in accordance with method 9601 of FED-STD-791.

4.3.1 Examination of filled containers. Filled containers shall be examined for defects of the container and the closure, for evidence of leakage, and for unsatisfactory markings. Containers shall also be weighed to determine the amount of the contents.

4.3.2 Rejection of lots.

4.3.2.1 If the number of defective or underfilled containers examined in accordance with 4.3.1 exceeds the acceptance number for the appropriate sampling plan of MIL-STD-105, the lot represented by the sample shall be rejected.

4.3.2.2 If the samples of transducer fluid fail in any of the tests specified in 4.4, the entire lot shall be rejected.

4.4 Tests.

4.4.1 Test methods. Tests shall be conducted in accordance with the applicable method given in table II on each 1-quart specimen. Each specimen shall be individually identified and marked. Recorded test data shall be identifiable to each individual specimen.

TABLE II. Tests.

| Test                  | Test method             |                 |
|-----------------------|-------------------------|-----------------|
|                       | Specification paragraph | ASTM method no. |
| Specific gravity      | --                      | D 287           |
| API degrees           | --                      | D 287           |
| Viscosity kinematic   | --                      | D 445           |
| Pour point            | --                      | D 97            |
| Color                 | --                      | D 1544          |
| Iodine number         | --                      | D 1959          |
| Saponification number | --                      | D 94            |
| Volume resistivity    | --                      | D 257           |
| Acetyl value          | 4.4.2                   | --              |
| Unsaponifiable matter | --                      | D 128           |
| Acid number           | --                      | D 974           |
| Solubility            | 4.4.3                   | --              |
| Moisture and volatile | --                      | D 95            |

4.4.1.1 Disposition of test samples. At least 4 ounces of uncontaminated fluid from each specimen shall be retained such that properties tested in table II shall not be altered. These uncontaminated sample specimens shall be identifiable to the original test data and shall be stored for at least 1 year from the date of the final test in table II.

## MIL-T-17128C

4.4.2 Acetyl value. Approximately 30 milliliters (mL) of oil shall be refluxed with an equal volume of acetic anhydride for 2 hours in an Erlenmeyer flask, or equal, fitted with a ground-in-air condenser, consisting of a straight glass tube approximately 2 feet in height and 10 millimeters in diameter. At the end of the 2-hour refluxing period, the mixture shall be poured into 500 mL of boiling distilled water contained in a liter beaker. (A slow stream of carbon dioxide gas shall be passed through the boiling liquid, or add a pinch of pumice, or bits of carborundum brick to prevent bumping at this stage.) Vigorous boiling shall continue for 30 minutes. The mixture shall be allowed to cool slightly and the water shall be siphoned off, removing the last drops with a pipette after tilting the beaker. The boiling and siphoning operations shall be repeated twice. After removing the water, following the third boiling, the still warm acetylated oil shall be transferred to a centrifuge tube and centrifuged to remove any remaining water. After centrifuging, two samples of the clear acetylated oil, each of approximately 2.5 grams, shall be carefully removed. The acetylated oil only, shall be removed, without contamination with water. The samples removed shall be transferred to a clean tared 300-mL Erlenmeyer flask or equal, and the flask and contents shall be accurately weighed to ascertain the exact weight of sample. The saponification number of the acetylated oil samples shall be determined following the procedure specified in ASTM D 94. The acetyl value shall be calculated as follows:

$$\text{Acetyl value} = \frac{S_1 - S_2}{1 - 0.00075 S_1} \quad \begin{array}{l} \text{where } S_1 = \text{Saponification no. of original oil} \\ S_2 = \text{Saponification no. of acetylated oil} \end{array}$$

4.4.3 Solubility.

4.4.3.1 Absolute ethyl alcohol. Fifteen mL of the transducer fluid shall be placed in a 100-mL graduated cylinder. Absolute ethyl alcohol in 5- to 10-mL portions shall be poured in gradually and shall be shaken after each addition until the 100-mL graduation mark is reached. The solution shall be maintained between 65 and 70 degrees Fahrenheit (°F) during the test. The transducer fluid and absolute ethyl alcohol shall be mutually soluble at all concentrations.

4.4.3.2 Ninety-percent ethyl alcohol. Pure ethyl alcohol shall be diluted with water to a concentration of 90 percent by volume of ethyl alcohol. Ten mL of transducer fluid shall be placed in an Erlenmeyer flask, or equal. The contents shall be maintained at a temperature of 65 to 70°F. Forty mL of 90 percent alcohol shall be added gradually, with constant stirring. The transducer fluid shall dissolve completely, forming a clear or not more than faintly turbid solution.

4.4.3.3 Glacial acetic acid. Twelve mL of transducer fluid shall be placed in an Erlenmeyer flask, or equal. The contents shall be maintained at 65 to 70°F. Twenty grams of glacial acetic acid in 1-gram portions shall be added, stirring after each addition. The transducer fluid and glacial acetic acid shall be mutually soluble at all concentrations.

4.5 Inspection of packaging. Sample packages and packs, and the inspection of the preservation-packaging, packing and marking for shipment and storage shall be in accordance with the requirements of section 5 and the documents specified herein.

## MIL-T-17128C

## 5. PACKAGING

(The preparation for delivery requirements specified herein apply only for direct Government acquisitions.)

5.1 Packaging and packing. Transducer fluid furnished in one gallon containers shall be packaged and packed for the level specified (see 6.2) in accordance with MIL-STD-290. The type of container shall be as specified by the contracting activity (see 6.2). Materials used in the construction of containers shall not affect or be affected by the contained transducer fluid. Before filling, all containers shall be thoroughly cleaned and examined to assure absolute absence of dirt, corrosion products, water, or other materials which would either contaminate the oil or interfere with the satisfactory operation of the transducer.

5.2 Marking of shipments. Interior and shipping containers shall be marked in accordance with MIL-STD-290.

5.2.1 Special markings. Containers containing transducer fluid shall be marked as follows: "Caution - This fluid shall not be used in transducers after initial opening and use."

## 6. NOTES

6.1 Intended use. Primary application of fluid covered by this specification is for use with sonar transducers aboard ship.

6.2 Ordering data. Acquisition documents should specify the following:

- (a) Title, number, and date of this specification.
- (b) Quantity of transducer fluid required in gallons. The material should be purchased by volume, the unit being the U.S. gallon at 15.6°C (60°F) (see 5.1).
- (c) The type of container required (see 5.1).
- (d) Level of packaging and packing required (see 5.1).

6.3 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodians:  
Navy - SH

Preparing activity:  
Navy - SH  
(Project 9150-0664)

Review activities:  
Navy - OS  
DLA - GS, PS

User activity:  
Army - SC



FOLD

DEPARTMENT OF THE NAVY



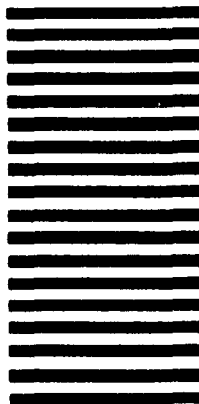
NO POSTAGE  
NECESSARY  
IF MAILED  
IN THE  
UNITED STATES

**OFFICIAL BUSINESS**  
PENALTY FOR PRIVATE USE \$300

**BUSINESS REPLY MAIL**  
FIRST CLASS      PERMIT NO 12503      WASHINGTON D C

POSTAGE WILL BE PAID BY THE DEPARTMENT OF THE NAVY

Commander  
Naval Sea Systems Command (Sea 55Z3)  
Department Of The Navy  
Washington, DC 20362



FOLD