MIL-STD-1211
18 June 1969

MILITARY STANDARD

INDICATORS

FSC 6850

DEPARTMENT OF DEFENSE
Washington, D.C. 20301

Indicators

MIL-STD-1211

1. This Military Standard is mandatory for use by all departments and agencies of the Department of Defense, to assure that selection of new items is limited to essential items, for which no comparable standard item exists. This document is not intended to restrict any service in selecting new items required to support state-of-the-art changes.

2. Recommended corrections, additions, or deletions should be addressed to Commanding Officer, Edgewood Arsenal, ATTN: SMUEA-TSE-SM, Edgewood Arsenal, Maryland 21010.

FOREWORD

This is the first book format standard generated on indicators. This standard is mandatory for use by all departments and agencies of the Department of Defense in the selection of items for application. It is intended to prevent the entry of unnecessary items (sizes, types, varieties) into the Department of Defense logistics system. This is not a procurement document. This document is not intended to restrict any service in selecting new items required to support state-of-the-art changes.

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TABLES

1. SCOPE

1.1 Coverage. This standard is a presentation of nomenclature, symbols, chemical and physical properties and requirements, military use, directions for use, packaging data, labeling, storage information, and shelf life of all military standard indicators. This standard does not necessarily include all classifications of the items represented by the title or those which are commercially available. It does contain items preferred for use in the selection of indicators for application by the Department of Defense. This standard covers the following seventeen items:

NAME	NO. OF ITEMS
FLUORESCENT INDICATOR MIXTURE, HYDROCARBON ANALYSIS	1
GASOLINE INDICATING PASTE	1
LEAK TEST COMPOUND, OXYGEN SYSTEMS	2
MAGNETIC INSPECTION POWDER	10
SEA MARKER, FLUORESCEIN (for lifeboat use)	1
SEA MARKER, FLUORESCEIN (for lifejacket use)	1
WATER INDICATING PASTE	1

1.2 Application. Items listed herein accommodate essential requirements of the military and defense agencies and will effect continued economies in all logistic functions when properly employed in new applications.

2. REFERENCED DOCUMENTS

The issues of the following documents in effect on the date of invitation for bids form a part of this standard to the extent specified herein.

Federal Specifications

PPP-C-300	Chemicals, Liquid, Packaging and Packing of
PPP-C-301	Chemicals, Dry and Paste, Packaging and Packing of

Military Specifications

MIL-L-25567	Leak Test Compound, Oxygen Systems
MIL-M-11472	Magnetic-Particle Inspection; Process for Ferromagnetic Materials
MIL-S-16506	Sea Marker, Fluorescein, Rescue, Canister Type
MIL-S-17980	Sea Marker, Fluorescein Dye, Sodium Salt Type, Life Preserver Packet.

3. GLOSSARY

3.1 Definitions

Adsorption - The taking up of a gas, vapor, or dissolved material on the surface of a solid.

Chromatography - A method of separation based on selective adsorption. A solution of the substance(s) desired is allowed to flow slowly through a column of adsorbent (such as activated alumina, activated carbon, or silica gel). Different substances will pass with different speeds down the column and will eventually be separated into zones. The column core can then be pushed out and the zones of material cut apart, or the zones can be eluted by passing more solvent down the column and collecting it in small fractions.

Hydrocarbon - A compound which consists solely of the elements carbon and hydrogen.

Olefin - A class of unsaturated aliphatic hydrocarbons of the general formula C_nH_{2n} and named after the corresponding paraffins by adding "ene" or "ylene" to the stem. Characterized by relatively great chemical activity.

pH value - A means of expressing the degree of acidity or basicity of an aqueous solution. It is defined as the logarithm of the reciprocal of the hydrogen ion concentration in gram equivalents per liter of solution.

$$pH = \log \frac{1}{(H+)}$$

A pH of 7.0 is neutral (neither acidic nor basic); a pH below 7.0 indicates an acidic solution, while a pH above 7.0 indicates a basic solution.

3.2 Abbreviations. The same abbreviation is used for all tenses, the possessive case, and the singular and plural forms of a given word.

C - Celsius (formerly Centigrade)
F - Fahrenheit
max - maximum
min - minimum or minutes

4. GENERAL REQUIREMENTS

4.1 Chemical and physical requirements. All values given in tables of chemical and physical requirements are in percent by weight unless otherwise indicated.

4.2 Nomenclature. The Department of Defense item names, as used throughout this standard, are in capital letters.

4.3 Packaging data and labeling. All liquid chemicals, included in this standard shall be packaged in accordance with Federal Specification PPP-C-300 and all applicable documents mentioned therein. All dry and paste chemicals, included in this standard, shall be packaged in accordance with Federal Specification PPP-C-301 and all applicable documents mentioned therein.

4.4 Safety. No item in this standard is hazardous to handle and use or store; therefore only general safety and hygienic measures should be exercised in service with these items.

4.5 Shelf life. Factors such as moisture, temperature, type and condition of container, and exposure to sunlight and the atmosphere cause variations in shelf life. Ideal storage conditions are outlined for each item. An approximate period of time after which this material will no longer be suitable for its intended use is also presented. Periodic examination of the containers should be made more frequently than recommended when storage conditions vary from the ideal. For applications where quality may be critical each compound should be analyzed prior to use. Shelf life is dated from the date of manufacture. All chemicals in this standard shall not be older than one year from the date of manufacture when purchased except where specified otherwise under storage data.

4.6 Temperature. If the temperature at which a property was determined is not specified, it is understood to be room temperature (20 to 30°C or 68 to 80°F).

5. DETAIL REQUIREMENTS

5.1 Name. FLUORESCENT INDICATOR MIXTURE, HYDROCARBON ANALYSIS

5.1.1 Specifications. None.

5.1.2 Technical description. Fluorescent indicator mixture is a liquid preparation of dyes and carriers conforming to Table I. If the fluorescent indicator mixture is not obtained in prepared form, the olefin and aromatic dyes must be purified by the user. Benzeneazo-para-benzeneazo-beta-naphthol needs no purification. The final mixture will yield 800 ml, a sufficient amount to analyze 160,000 individual gasoline samples by the fluorescent indicator adsorption method of hydrocarbon-type analysis.

Table I. - Dye and carrier components of fluorescent indicator mixture

Components	Proportions
Yellow fluorescent olefin dye	30 ml
Benzeneazo-para-benzeneazo-beta-naphthol (color as specified in Color Index No. 248)	0.300 g
Blue fluorescent aromatic dye	35 ml
Xylenes (sufficient to yield)	800 ml (of mixture)

5.1.3 Use data. For military use, fluorescent indicator mixture is intended for the chromatographic separation of hydrocarbons by silica gel, based on fluorescent dyes, which make the principal hydrocarbon-type boundaries clearly visible: Yellow fluorescent olefin dye which illuminates the olefin-saturate boundry under ultraviolet light; Blue fluorescent aromatic dye which illuminates the aromatic-olefin boundary visible under ultraviolet light; and Benzeneazo-para-bezeneazo-beta-naphthol which makes the alcohol-hydrocarbon boundary more clearly discernible.

5.1.4 Packaging data and labeling. For military use, fluorescent indicator mixture is packaged in 10 ml unit quantity brown glass bottles.

5.1.5 Storage data. Keep containers of fluorescent indicator mixture tightly closed and away from light, when not in use. If stored as recommended this material will have a minimum shelf life of six months.

5.2 Name. GASOLINE INDICATING PASTE

5.2.1 Specifications. None.

5.2.2 Technical description. Gasoline indicating paste is a blue, oily, homogenous paste conforming to Table II.

Table II. - Components of gasoline indicating paste

Components	Proportions
Pigment, percent	58
Vehicle, percent	42
Active oil soluble blue dye	trace

5.2.3 Use data. Gasoline indicating paste is intended for military use as a positive indicator of the liquid level of volatile petroleum products in tanks where "wet-stick" methods are inapplicable. This paste is not suitable for use in pressure tanks where there is effectively no liquid level, and is not suitable for use in kerosene.

5.2.4 Packaging data and labeling. For military use, gasoline paste is packaged in collapsible aluminum tubes, each containing 2-1/2 ounces of paste, net weight.

5.2.5 Storage data. Gasoline paste is stable to temperature changes between freezing and 150°F. No special storage conditions are required except reasonable protection against crushing of intermediate or individual cartons and tubes. If stored as recommended this material will have a minimum shelf life of one year; batch samples consistently remain operative for two years.

5.3 Name. LEAK TEST COMPOUND, OXYGEN SYSTEMS

5.3.1 Specifications. MIL-L-25567, Leak Test Compound, Oxygen Systems

5.3.2 Technical description. Leak test compound, oxygen systems is a clear, free flowing, nonflammable, non-toxic, liquid leak detection compound. It shall not contain mineral oil, vegetable oil, animal oils or fats, or any material which will ignite when in contact with oxygen; materials that have an objectionable odor; or materials that will act as primary skin irritants, skin sensitizers, or produce any other dermatosis. It shall have wetting and spreading characteristics that will form a continuous layer over the surface being examined. It shall pass the corrosive test as listed in the specification. There are two leak detection compounds, one for high temperature use and one for low temperature use. In addition to the above, leak test compound, oxygen system, shall conform to the requirements shown in Table III.

Table III. - Requirements for leak test compound, oxygen systems

Property	Requirements	
	Low Temperature	High Temperature
Neutrality (pH value)	6-7.5	6.75
Residue (max)	1%	1%
Leak detection test	Shall pass test at -65° ± 2°F	Shall pass test at 35° ± 2°F to 160° ± 2°F

5.3.3 Use data. For military use leak test compounds are intended to detect leaks in both high and low-pressure oxygen systems in aircraft. The low temperature leak test compound is intended for use especially on low temperature equipment or in an environment in which the temperatures may be subzero.

5.3.4 Packaging data and labeling. Leak detection compounds, oxygen systems is packaged for military use in 4 oz unit quantity oval bottles. The bottles shall be made of polyethylene with a nozzle and nozzle cap of the same material. The bottle for the high temperature compound is a transparent yellow and the bottle for the low temperature compound is clear transparent. The following label shall be printed on each bottle by a silk screen printing process:

"THE COMPOUND SHOULD BE SHAKEN TO OBTAIN SUDS OR FOAM. THE SUDS OR FOAM SHOULD BE APPLIED SPARINGLY TO THE JOINTS OF A CLOSED SYSTEM AND SHOULD BE WIPED OFF AT THE CONCLUSION OF THE EXAMINATION."

5.3.5 Storage data. Leak test compound, oxygen systems should be stored in a cool, dry place in tightly sealed containers. Under these storage conditions, the shelf life is indefinite.

5.4 Name. MAGNETIC INSPECTION POWDER

5.4.1 Specifications. MIL-M-11472, Magnetic-Particle Inspection: Process for Ferromagnetic Materials.

5.4.2 Technical description. Magnetic inspection materials consist of ferromagnetic particles which are available in powder, concentrated powder or premixed powder in oil suspension. These particles compose a non-toxic, finely divided material which shall be free from rust, grease, paint, dirt, or other material which might interfere with their proper functioning. These particles may be colored black, gray, red, or yellow to provide adequate contrast against the color of the material to be inspected. The particles shall be nonfluorescent and visible in white light for use in a dry method of inspection. For the wet nonfluorescent method, the particles shall be suspended in water or a light oil vehicle such as kerosene, dry cleaning solvent, or other light nonfluorescent oil in a concentration which provides between 1.0 to 1.7 milliliters of solid per hundred milliliters of carrier. For the wet fluorescent method of inspection, the particles shall be suspended in water or a light nonfluorescent oil in a concentration which provides from 0.15 to 1.5 milliliters of solid per hundred milliliters of suspension. In water bath suspension, a water conditioner is required to provide corrosion inhibition and better wetting properties.

5.4.3 Use Data. For military use, magnetic inspection powder, concentrate and premix are intended to locate cracks (flaws) on metal parts being inspected by a magnetic inspection machine. The ferrous powder accumulates at any crack in the surface by magnetic attraction thereby permitting the cracks to be readily discerned. If the ferrous particles are fluorescent, surface cracks will be brilliantly illuminated under black light. The dry method of inspection is generally used on welds, large forgings, and castings, and on other parts having very rough or scaly surfaces. It is particularly valuable in locating defects which do not break the surface and is also used for low volume in-place inspection. Fluorescent wet method magnetic inspection is generally used for in-process parts manufacture and for most maintenance inspections.

5.4.4 Packaging data and labeling. Magnetic inspection powder and dry concentrate are available in 1, 5, 10, and 25 pound unit quantity containers. In addition, for low volume in-place dry method inspection, the powder is available in a 1 pound unit quantity squeeze bottle; for high volume dry method inspection the powder is available in three additional sizes 2, 50, and 300 pound unit quantity containers. Premixed magnetic inspection concentrates in suspension are available in 5 gallon cans and also in 12 ounce unit quantity spray cans. Since no hazards are associated with these materials, no special labeling is necessary.

5.4.5 Storage data. If kept free of moisture this material may be stored indefinitely.

5.5 Name. SEA MARKER, FLUORESCEIN (for lifeboat use)

5.5.1 Specifications. MIL-S-16506, Sea Marker, Fluorescein, Rescue, Canister Type.

5.5.2 Technical description. Sea marker, fluorescein shall be a mixture of soluble sodium salt of fluorescein and a water soluble salt. The material shall contain no foreign material which will in any way detract from its brilliance or solubility. A sea-water solution of this material shall produce a brilliant fluorescent yellow-green color. This material shall not clump into agglomerates after standing or after agitation due to vibration. In addition to the above, sea marker, fluorescein shall conform to the requirements shown in Table IV.

Table IV. - Requirements for sea marker, fluorescein

Property	Requirements
Sodium fluorescein content (min)	50.67%
Insoluble material (max)	1.0%
Moisture content (max)	10%
Passing US Standard sieve size no. 30 (min)	99%

5.5.3 Use data. Sea marker, fluorescein is intended for military use to attract the attention of rescue parties to personnel forced to abandon ships at sea in lifeboats.

5.5.4 Packaging data and labeling. Sea marker, fluorescein is packaged for military use in 8 oz unit quantity cans.

5.5.5 Storage data. Sea marker, fluorescein should be stored in a cool, dry place in tightly sealed containers. Under these storage conditions, the shelf life is indefinite.

5.6 Name. SEA MARKER, FLUORESCEIN (for lifejacket use)

5.6.1 Specifications. MIL-S-17980, Sea Marker, Fluorescein, Dye, Sodium Salt Type, Life Preserver Packet.

5.6.2 Technical description. Sea marker, fluorescein, sodium salt type, is a packet containing a water soluble dye and a water soluble salt. A water solution of the dye shall produce a brilliant yellow green color. It shall contain no foreign matter which will in any way detract from its brilliance or solubility. The dye powder shall contain no more than 12 percent moisture to preclude clumping after it has been placed in the pack. In addition, it shall conform to the requirements shown in Table V.

Table V. - Requirements for sea marker, fluorescein

Property	Requirements
Sodium fluorescein content (min)	75%
Water soluble salt (max)	25%
Insoluble material	1%
Passing US Standard sieve size no. 40 (min)	100%

5.6.3 Use data. Sea marker, fluorescein is intended for military use to attract the attention of rescue parties to personnel in lifejackets forced down or adrift at sea.

5.6.4 Packaging data and labeling. Sea marker, fluorescein is packaged for military use in an 3-3.5 oz unit quantity inner container, fabricated of a porous material that will allow the dye to dissolve when the packet comes in contact with water. This inner container shall be packaged in a waterproof outside container fabricated of heat and cold resistant coated fabric. The total weight of the completed packet and contents shall not exceed 5 oz.

5.6.5 Storage data. Sea marker, fluorescein should be stored in a cool, dry place. Under these storage conditions, the shelf life is indefinite.

5.7 Name. WATER INDICATING PASTE

5.7.1 Specifications. None.

5.7.2 Technical description. Water indicating paste is a sticky semi-liquid homogenous paste containing the ingredients outlined in Table VI. This paste remains red in contact with petroleum products but bleaches white in contact with water. The water may be neutral, acid, or basic in chemical reaction.

Table VI. - Components of water indicating paste

Components	Proportions
Pigment, percent	45
Vehicle, percent	55
Active ingredient - cerise-red dye	trace

5.7.3 Use data. Water indicating paste is intended for military use as a positive indicator of the water-level in tanks of petroleum products.

5.7.4 Packaging data and labeling. For military use, indicating paste is packaged in 3 ounce unit quantity collapsible aluminum tubes.

5.7.5 Storage data. This paste is stable to temperature changes between freezing and 150°F. No special storage conditions are required except reasonable protection against crushing. This material has a shelf life of at least one year; batch samples consistently remain operative for two years.

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

Assignee activity: Defense General Supply Center

Custodians: Army - MU
Navy - SH

Preparing activity: Army - MU

User activity: Army - ME

Review activities: Army - MD
Navy - SH

Project No. 6850-0292

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