MIL-STD-1444
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MILITARY STANDARD

MISCELLANEOUS INORGANIC COMPOUNDS

FSC 6810

DEPARTMENT OF DEFENSE
Washington, D. C. 20301

Miscellaneous Inorganic Compounds

MIL-STD-1444

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 book format standard on Miscellaneous Inorganic Compounds is mandatory for use by all departments and agencies of the Department of Defense in selecting 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 shall not 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, formulas, chemical and physical properties and requirements, military and commercial uses, packaging data, labeling, storage information and shelf life of miscellaneous inorganic compounds. This standard does not necessarily include all classifications of the items represented by the title or those which are commercially available. It does describe items preferred for use in the selection of miscellaneous inorganic compounds for application by the Department of Defense. This standard covers the following nine (9) items:

NAME	NO. OF ITEMS
ASBESTOS-SODIUM HYDROXIDE MIXTURE	1
BATTERY WATER	2
DISTILLED WATER, REAGENT	1
DISTILLED WATER, TECHNICAL	1
RANEY CATALYST	1
TALC, TECHNICAL	3

1.2 Application. Items listed herein accomodate essential requirements of the military and defense agencies and will effect continued economics in all logistics functions when properly employed in new applications. This MIL-STD supersedes MS36300-4 and MS36300-5.

2. REFERENCED DOCUMENTS

The issues of the following documents in effect on the date of invitations for bid form a part of this standard.

Federal Specifications

O-B-41	Battery Water
RR-S-366	Sieves Test
ZZ-T-416	Tire Rebuilding and Tire and Tube Repair Materials
PPP-C-300	Chemicals, Liquid; Packaging and Packing of
PPP-C-301	Chemicals, Dry and Paste, Packaging and Packing of

Military Specifications

MIL-T-50036	Talc, Technical, T1

3. GLOSSARY

3.1 Definitions

Assay - Analysis of a substance to determine the amount, expressed as a percent by weight, of one or more ingredients.

Density - The mass per unit volume of a concentration of matter. It is usually expressed as grams per milliliter or pounds per cubic foot.

Formula weight - The sum of the atomic weights of all the atoms appearing in a chemical formula. In this standard, the formula weight, where stated, is computed according to the international atomic weight values of 1961.

Hydrous - A term commonly and loosely used of materials to indicate the presence of an indefinite amount of water.

Mixture - Matter containing two or more substances that are not chemically united, and therefore can be separated by taking advantage of differences in their physical properties.

Reagent - Denotes reagent grade chemicals which do not bear a label stating the percentages of the important impurities present. Reagent grade chemicals have limited use in analytical work because of the uncertainty as to the kind and amount of impurities present. These chemicals find extensive use in laboratory synthesis and in certain analytical procedures where the inherent impurities are not critical to the intended reaction.

Technical - Denotes a quality of chemicals which are generally used for industrial solvents and manufacturing applications. Generally, specific processes are not employed by the manufacturer to limit all the impurities aside from the normal precautions which are taken in the manufacturing process. A technical chemical may be specially processed to reduce specific impurities so as to suit the chemical to a given industrial application. In such cases, the identification of the items must be further expanded to indicate the specific impurities limitation.

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 (Centigrade)

F - Fahrenheit

FW - Formula Weight

max - maximum

MIL-STD - Military Standard

min - minimum

no. - number

pct - percent

ppm - parts per million

US - United States

4. GENERAL REQUIREMENTS

4.1 Chemical and physical requirements. Chemical and physical requirements are expressed in percent by weight unless otherwise noted.

4.2 Nomenclature: Department of Defense item names are used and are expressed in capital letters. Other names that are sometimes used commercially are in small letters immediately beneath.

4.3 Granulation: Sieves shall meet Specification RR-S-366.

4.4 Packaging data and labeling. Liquid chemicals described in this standard shall be packaged according to Federal Specification PPP-C-300 and component documents. Dry and paste chemicals described in this standard shall be packaged according to Federal Specification PPP-C-301 and component documents. In case of conflict with component specifications in procurement documents, PPP-C-300 and PPP-C-301 shall be used as criteria.

4.5 Safety. A hazardous compound, when applicable, is noted beneath each list of item names. General safety and hygenic measures must be exercised in the use of all chemical compounds. For more specific information, consult the proper safety or medical authorities.

4.6 Shelf life. Factors such as moisture, temperature, type and condition of container, and exposure to sunlight and the atmosphere cause variations is 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. The term, "indefinite", means stability for 1 year or more. The term, "cool", means temperatures from above freezing up to 110°F but not consistently over 100°F when stored out of direct sunlight. The term "dry" is used to denote an area where condensation does not come in contact with the packages or contents (for example, storing on pallets away from walls in an enclosure or building). Periodic examinations of the material should be made more frequently 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 be of the most recent preparation.

4.7 Temperature. If the temperature at which a property was determined is not specified, it is understood to be room temperature (20°C to 25°C, or 68°F to 77°F).

4.8 Use data. Typical commercial uses are given with regard to specific grade covered.

4.9 Substitutability and interchangeability. Unless otherwise stated under the individual descriptive data, none of the chemicals included in this standard are completely interchangeable with other items in the standard or chemicals of another grade. Certain chemicals in this standard may be used as substitutes for a specific application of another grade or of another chemical. This limited substitutability however, would be at the discretion of the chemist and for a specific purpose.

5. DETAIL REQUIREMENTS

5.1 Name: ASBESTOS-SODIUM HYDROXIDE MIXTURE

5.1.1 Specification. None

5.1.2 Technical description. Asbestos-sodium hydroxide mixture shall consist of 91 pct sodium hydroxide and 9 pct asbestos. Components of the mixture shall be of a suitable grade in accordance with commercial practice. The mixture shall be in powder form and shall conform to the granulation of Table I.

TABLE I. Granulation requirements

Through Sieve No.	Pct, min
8	100.0
20	0.0

5.1.3 Use data. Asbestos-sodium hydroxide mixture is intended for military use as a laboratory reagent. Commercial uses are for the

determination of carbon in iron and steel by absorption of carbon dioxide, carbon-hydrogen determinations in quantitative organic micro analysis, and in the analysis of respiratory gases.

5.1.4 Packaging data and labeling. Asbestos-sodium-hydroxide mixture is packaged in one (1) pound unit quantity wide mouth screw cap bottles. Bottles shall be labeled with the name, assay, mesh size, and date of manufacture of contents. Each unit shall be legibly and durably marked with the following label:

CONTAINS 91% SODIUM HYDROXIDE DANGER: CAUSES

SEVERE BURNS TO SKIN AND EYES

Do not get in eyes, on skin, on clothing.
Do not take internally.
When handling, wear goggles or face shield.
While making solutions, add slowly to surface of solution to avoid splattering. In case of contact, immediately flush skin with plenty of water; for eyes, flush with plenty of water for at least 15 minutes and get medical attention.

5.1.5 Storage data. Store in a dry area at room temperature and keep bottles tightly closed. The shelf life is considered to be indefinite.

5.2 BATTERY WATER H_2O FW 18.02

5.2.1 Specification. O-B-41, Battery Water

5.2.2 Technical description. Battery water is less pure than distilled water due to its larger amount of allowable total solids. Battery water shall conform to the level of purity shown in Table II.

TABLE II. - Chemical data for Battery Water
Max allowable impurities

Requirements	PPM
Total solids	100
Organic and volatile matter	50
Calcium and magnesium as CaO	40
Iron	0.5
Copper	2.5
Chloride	5
Nickel	0.2
Ammonia as NH_4	8
Nitrites as NO_2	5
Nitrates as NO_3	10

5.2.3 Use data. Battery water is intended for military use in lead-acid storage batteries. Battery water should not be used in alkaline storage batteries such as nickel-cadmium or silver-zinc. Battery water must not be used to make up solutions for use in chemical analysis and must not be used as a vehicle; solvent, or diluent for substances to be administered parenterally. Commercial use is the same.

5.2.4 Package data and labeling. Battery water shall be packaged in 1 gallon polyethylene bottles and in 5 gallon polyethylene bottles. Each container shall be labeled with name, date of manufacture, and statement of conformance to Specification O-B-41.

5.2.5 Storage data. Store in a dry area at room temperature and keep containers tightly closed when not in use. The shelf life is considered to be indefinite; however, analysis by random sampling plan is recommended every six months for serviceability.

5.3 Name. DISTILLED WATER, REAGENT H_2O FW: 18.02

5.3.1 Specification. None

5.3.2 Technical description. Water described herein shall be a clear, colorless, odorless liquid and shall be water which is distilled from a still suited for the intended purpose. Distilled water, Reagent Grade shall conform to the requirements in Table III.

TABLE III. - Chemical data for Distilled Water, Reagent

Requirements	units
Total solids	5 ppm max
Conductance	3.6 mhos max

NOTE: Deionized water which meets the above requirements and suitable for uses listed in paragraph 5.3.3 shall be considered acceptable.

5.3.3 Use data. Distilled Water, Reagent is intended for military use in the filling of alkaline type storage batteries such as nickel-cadmium or silver-zinc. It is substitutional for Battery Water for use in filling lead-acid storage batteries; however, Battery Water should be used, if available, due to economy. Distilled water, Reagent is also used in the dilution of acids and the preparation of solutions. WARNING: DO NOT USE TO PREPARE SOLUTIONS FOR MEDICAL APPLICATION.

5.3.4 Package data and labeling. Reagent grade distilled water shall be packaged in one gallon unit quantity polyethylene screw cap bottles.

Bottles shall be labeled with name, chemical data, and date of distillation. In addition each bottle shall be labeled: WARNING: NOT FOR SOLUTIONS USED IN MEDICAL APPLICATION.

5.3.5 Storage data. Distilled water, reagent grade should be stored in a dry area at room temperature. The shelf life is considered to be indefinite; however if item has been in storage for 1 year, test for conductance before use.

5.4 Name. DISTILLED WATER, TECHNICAL H_2O FW: 18.02

5.4.1 Specification. None

5.4.2 Technical description. Technical grade distilled water shall be a clear, colorless, odorless liquid and shall be distilled from a still suitable for the purpose. The total solids content shall be 5 ppm max. Deionized water meeting total solids requirement also will be considered as acceptable.

5.4.3 Use data. Technical grade distilled water is intended for military use in alkaline type storage batteries such as nickel-cadmium or silver-zinc and as a solvent in making up solutions where conductance is not a critical requirement. Commercial uses are the same.

5.4.4 Package data and labeling. Technical grade distilled water shall be packaged in 5 gallon unit quantity polyethylene bottles with a screw cap closure. The threads shall be of buttress type. Each bottle shall be labeled with name, total solids, uses as in paragraph 5.4.3 and date of distillation. In additiona each bottle shall be labeled: WARNING: DO NOT USE TO PREPARE SOLUTIONS FOR MEDICAL APPLICATION.

5.4.5 Storage data. Storage data is same as in pragraph 5.3.5 except conductance test not required.

5.5 Name. RANEY CATALYST

5.5.1 Specifications. None

5.5.2 Technical description. Raney catalyst shall be a powder form mixture consisting of 50 to 51 pct aluminum and 49 to 50 pct nickel. Components of the mixture shall be of a suitable grade in accordance with commercial practice. The mixture shall conform to the granulation of Table IV.

TABLE IV. - Granulation requirements

Through Sieve No.	pct min
140	100.0
325	83.0

5.5.3 Use data. Raney Catalyst is intended for military use as catalyst in various reactions in the laboratory. Commercial use is for hydrogenation.

5.5.4 Package data and labeling. Raney catalyst shall be packaged in one pound unit quantity screw cap glass bottles. Each bottle shall be labeled with name, assay, and date of manufacture.

5.5.5 Storage data. Store in a dry area at room temperature. The shelf life is considered to be indefinite.

5.6. Name. TALC, TECHNICAL $Mg_3 Si_4O_{10} (OH)$
Mineral graphite
Steatite
Soapstone
Talcum

5.6.1 Specifications. ZZ-T-416, Type IV, Class C; MIL-T-50036.

5.6.2 Technical description. Talc is a natural hydrous magnesium silicate, usually occuring as a natural alteration if magnesium silicate rocks or in metamorphosed dolomites. Compact varieties may be called steatite in distinction to the foliated varieties which are called talc. Talc is rarely found in free crystals, is usually massive, fine grained and is white, gray, or green in color. Talc is soft, easily cut has a greasy feel and is translucent to opaque. The hardness is 1-1.5 on the mohs scale and the specific gravity is 2.7-2.8. Talc procured under Specification ZZ-T-416 shall pass 90 pct min. by weight through a US Sieve No. 270 (53 micron). Talc procured under Specification MIL-T-50036 shall retain 5 pct maximum by weight on a US Sieve No. 400 (37 micron) and shall conform to the requirements in Table V.

TABLE V. - Chemical requirements

Component	Pct	
Silica (SiO_2)	65 max	35 min
Magnesium Oxide (MgO)	40 max	20 min

5.6.3 Use data. Talc procured under Specification ZZ-T-416, Type IV, Class C is intended for the following military uses:

a. For dusting the interior surfaces of tires when assembling tubes.

b. For preservation of eye pieces, face pieces, etc.

c. For making sectional curing bag paint for tire repair.

d. For dusting synthetic rubber gas check pads after washing with soap and water.

Talc procured under MIL-T-50036 is intended for military use to simulate an irritant solid dispersant. Talc conforming to MIL-T-50036 is also suitable for dusting rubber items to keep their surfaces from becoming sticky and to preserve them. Commercial uses are extender, pigment, ceramics, roofing material, as a filler in various materials, as a dusting agent, in gas burner tips, and electrical insulation.

5.6.4 Package data and labeling. Talc supplied under Specification ZZ-T-416, Type 4, Class C shall be packaged in 1 pound quantity in sifter type can with cap and in 5 pound sacks. Talc supplied under Specification MIL-T-50036 shall be furnished in 12 bags, each bag containing 29 pounds, and packed in a 55 gallon drum. Each container shall be labeled with the name, weight of contents and procurement specification as applicable.

5.6.5 Storage data. Store in a dry area at room temperature. The shelf life is indefinite.

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: - DGSC

Preparing activity: Army - MU(EA)

Review activities: Army - MO, ME, MU(FA)
Navy - AS, MC
Air Force - None

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