MIL-S-16917B
27 August 1984
SUPERSEDING
MIL-S-16917A
27 August 1952
(See 6.5)

MILITARY SPECIFICATION

SODIUM BISULFATE (NITER CAKE)

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

1. SCOPE

1.1 Scope. This specification covers sodium bisulfate (niter cake) for use as a flux in dissolving minerals, and in pickling baths as a substitute for sulfuric acid.

1.2 Classification. Sodium bisulfate shall be of the following types and grades, as specified (see 6.2.1):

Type I - Globular
Type II - Granular

Grade A - Fine
Grade B - Coarse

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. Unless otherwise specified, the following specifications and 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.

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 55Z3, 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.

FSC 6810

SPECIFICATIONS

FEDERAL

PPP-D-723 - Drums, Fiber.
PPP-D-729 - Drums, Shipping and Storage, Steel, 55-Gallon (208 Liters).

MILITARY

MIL-C-15000 - Water-testing Chemicals, Boiler, Shipboard Use.

STANDARDS

FEDERAL

FED-STD-313 - Material Safety Data Sheets, Preparation and the Submission of.
FED-STD-536 - Soap and Soap Products (Including Synthetic Detergents); Sampling and Testing.

MILITARY

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

2.1.2 Other Government publications. The following Government publications form a part of this specification to the extent specified herein.

DEPARTMENT OF TRANSPORTATION (DOT)

Code of Federal Regulations (CFR)
CFR 49, Parts 100-199 - Hazardous Material Regulations

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

NAVY DEPARTMENT

NAVSUP Publication 4500 - Consolidated Hazardous Items List.

(Application for copies should be addressed to Navy Fleet Material Support Office, Mechanicsburg, PA 17055.)

(Copies of specifications, standards, handbooks, drawings and publications required by contractors 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 forms 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.

ASTM

D 1193 - Reagent Water. (DoD adopted)

(Applications for copies should be addressed to ASTM, 1916 Race Street, Philadelphia, PA 19103.)

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies should be addressed to the National Motor Freight Traffic Association, Inc., ATA TRAFFIC Dept., 1616 "P" Street, NW, Washington, DC 20036.)

UNIFORM CLASSIFICATION COMMITTEE AGENT

Uniform Freight Classification Ratings, Rules and Regulations

(Application for copies should be addressed to the Uniform Classification Committee Agent, Tariff Publication Officer, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(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.

3.1.1 Type I. Sodium bisulfate shall be in the form of colorless to light straw yellow globules.

3.1.2 Type II. Sodium bisulfate shall be in the form of colorless to light straw yellow granules.

3.2 Acidity. The material shall contain a minimum of 30 percent sulfuric acid (H_2SO_4) when tested as specified in 4.5.1.

3.3 Moisture content. The moisture content of the material shall not exceed 1.5 percent when tested as specified in 4.5.2.

3.4 Iron content. The iron content of the material shall not exceed 0.15 percent when tested as specified in 4.5.3.

3.5 Insoluble matters content. The material shall contain not more than 0.25 percent insoluble matter when tested as specified in 4.5.4.

3.6 Particle size. Sodium bisulfate shall conform to table I when tested as specified in 4.5.5.

TABLE I. Particle size.

Sieve number	Percent retained on	
	Minimum	Maximum
	Type I	
6		
8	0	5
20	30	----------
30		
40	90	----------
	Type II - grade A	
20		
30	30	----------
60	90	----------
	Type II - grade B	
8	----------	5
20	30	60
40	60	----------

3.7 Material safety data sheet (MSDS). The contracting activity shall be provided a material safety data sheet (MSDS) at the time of the contract award. The MSDS is DD Form OSHA-20 and found as part of FED-STD-313. The MSDS shall be included with each shipment of the material covered by this specification.

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 Quality conformance inspection.

4.2.1 Sampling lot. A sampling lot shall consist of not more than 10,000 pounds of material offered for inspection at one time. In case material is produced by a continuous run process, the lot shall contain material from only one continuous run. Material in the inspection lot shall be identified by order of production (in the case of a continuous run process) or by batch number (in the case of a batch process) until ultimate action is taken as to the acceptance or rejection of the lot.

4.2.2 Sampling procedure. From each inspection lot three separate 1-pound samples shall be taken. In case the material is produced by a batch process and the inspection lot contains more than two batches, the three samples shall normally be taken from different batches. Periodically, two or three of the samples shall be taken from the same batch, in which case the samples shall be obtained in a manner calculated to disclose any nonuniformity of the material within the batch. Where material is produced by a continuous run process, the three samples shall be taken so as to represent the first part, the middle part, and the last part respectively, of the run which produced the inspection lot. Each sample shall be thoroughly mixed and divided into three equal portions. The portions shall be placed in separate, clean, dry metal or glass containers which shall be sealed and carefully marked. One of the portions of each sample shall be forwarded to a laboratory designated by the contracting activity, one shall be delivered to the contractor, and one held to be used for retests in case of dispute.

4.3 Examination.

4.3.1 Sampling for inspection of containers. A random sample of filled containers shall be selected in accordance with MIL-STD-105 at inspection level I and acceptable quality level of 2.5 percent defective to verify compliance with this specification regarding fill, closure, marking and other requirements not involving tests.

4.3.2 Inspection of containers. Each filled container shall be examined for defects of construction of the container and the closure, for evidence of leakage, and for unsatisfactory markings. Each filled container shall be weighed to determine the amount of contents. Any container in the sample having one or more defects, or under required fill, shall be rejected. If the number of defective containers in any sample exceeds the acceptance number for the appropriate sampling plan of MIL-STD-105, the lot represented by the sample shall be rejected. Rejected lots may be resubmitted for acceptance tests, provided the contractor has removed or repaired all nonconforming containers.

4.4 Quality conformance tests.

4.4.1 Procedure. The portions of each sample selected as specified in 4.2.2 shall be subjected to the tests specified in 4.5. If any sample is found not in conformance with this specification, the entire lot which it represents (if produced by continuous run process) shall be rejected. If the lot is produced in batches, all untested batches in the lot shall be rejected together with the batch from which the sample was selected.

4.5 Test procedures.

4.5.1 Acidity. Place 5 grams of the sample weighed to the nearest centigram in 250 milliliter (mL) extraction flask and add 100 to 150 mL of distilled water in accordance with type III of ASTM D 1193. Swirl to dissolve and add 3 or 4 drops of methyl purple indicator solution.1/ Titrate with 1.0 N sodium hydroxide to green endpoint. Calculate as follows:

$$\frac{\text{ML NaOH} \times \text{Normality NaOH} \times 0.0490 \times 100}{\text{weight of sample}} = \text{Percent } H_2SO_4$$

4.5.2 Moisture content. Place 15 grams of the sample in a tared covered Petri dish and weigh on an analytical balance. Set the Petri dish in its cover and dry overnight in an electric oven at 105 ± 2 degrees Celsius (°C) for 16 hours. Cool in a desiccator and reweigh. Calculate as follows:

$$\frac{\text{Loss in weight} \times 100}{\text{weight of sample}} = \text{Percent } H_2O$$

4.5.3 Iron content. Dissolve 5 grams of the sample weighed to the nearest centigram, in 60 mL of water and 20 mL of hydrochloric acid and boil gently for 10 minutes. Cool the solution, transfer it quantitatively to a 100 mL volumetric flask, dilute to the mark and mix the flask contents thoroughly. Transfer 10 mL of the solution with a pipette to a 50 mL volumetric flask, dilute to the mark, mix well, transfer the flask contents to a 100 mL beaker and add 30 to 50 milligrams (mg) of ammonium persulfate crystals and 3 mL of ammonium thiocyanate reagent solution (7.61 gram/100 mL). Any red color should not exceed that produced by 0.07 mg of iron in an equal volume of solution containing the quantities of reagents used in this test.

4.5.4 Percent insoluble matter. Dissolve 50 grams of the sample weighed to the nearest centigram, in 300 mL of hot distilled water in accordance with ASTM D 1193 in a 600 mL beaker. Allow the insoluble matter to settle and filter by decanting through a tared weighed Gooch crucible. Wash the insoluble matter into the crucible with more hot distilled water in accordance with ASTM D 1193. When the insoluble matter is completely filtered place the crucible in an electric oven at 100 to 110°C for 1 hour. Cool in a desiccator and reweigh. Calculate as follows:

$$\frac{\text{weight of residue} \times 100}{\text{weight of sample}} = \text{Percent insoluble matter}$$

1/ Methyl purple may be obtained from a local chemical supply house. Formulation of the indicator solution is described in MIL-C-15000.

4.5.5 Particle size-screen test. Sieving tests shall be made in accordance with the applicable provisions of method 2101 of FED-STD-536.

4.6 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 therein.

5. PACKAGING

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

5.1 Preservation-packaging, packing and marking. Preservation-packaging and packing shall be level A, B or C, as specified (see 6.2.1).

5.1.1 Level A. Sodium bisulfate shall be preserved-packaged and packed in quantities of 45 kilograms (kg) in fiber drums in accordance with type II of PPP-D-723 or in quantities of 159 kg in steel drums in accordance with PPP-D-729, as specified (see 6.2.1). Fiber drums shall be lined with a polyethylene bag liner having a minimum thickness of 152.4 microns. Bag liners shall be sealed or closed to prevent the entrance of moisture after filling of drums.

5.1.2 Level B. Sodium bisulfate shall be preserved-packaged and packed in quantities of 45 or 159 kg in fiber drums in accordance with type I of PPP-D-723, as specified (see 6.2.1). Fiber drums shall be lined with polyethylene bag liners as specified in 5.1.1.

5.1.3 Level C. Sodium bisulfate shall be preserved-packaged and packed in a manner to insure acceptance and safe destination. Containers shall comply with DoT Regulations, title 49, Uniform Freight or National Motor Freight Classification Rules or Regulations and other common carrier regulations applicable to the mode of transportation.

5.2 Marking and labeling. In addition to any special marking required (see 6.2.1) shipping containers shall be marked in accordance with MIL-STD-129.

5.2.1 Additional marking. Additional marking for handling and storage shall be in accordance with NAVSUP publication 4500.

5.3 Material safety data sheet. A copy of the material safety data sheet (Form OSHA-20) shall be attached to the shipping document for each destination (see 3.7).

6. NOTES

6.1 Intended use. Sodium bisulfate (niter cake) covered by this specification is used as a substitute for sulfuric acid in chemical cleaning operations where storage or handling the acid would constitute an unacceptable safety hazard (used on submarines for descaling vapor compression stills).

tion. Packing shall be in compliance with appli- Supply source to first destinat

6.2 Ordering data.

6.2.1 Acquisition requirements. Acquisition documents should specify the following:

(a) Title, number and date of this specification.
(b) Type and grade required (see 1.2).
(c) Capacity of container required (see 5.1).
(d) Level of preservation-packaging and packing required (see 5.1).
(e) Special marking required (see 5.2).

6.3 Action in case of rejection. Rejected material may be resubmitted for inspection and testing provided the manufacturer, after having been informed of the reasons for rejection, has reworked the material or has tested it thoroughly for the deficiency noted, and has removed all nonconforming material. In the case of rejected material produced by a batch process, such tests should be made on each batch.

6.4 Material safety data sheet (MSDS). In order to obtain the MSDS, which is found as part of FED-STD-313, FAR clause 52.233-3 must be in the contract.

6.5 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
Air Force - 68

Review activity:
DLA - GS

User activity:
Navy - AS

Preparing activity:
Navy - SH
(Project 6810-B412)

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-S-16917B	SODIUM BISULFATE (NITER CAKE)

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ USER
	☐ MANUFACTURER
	☐ OTHER *(Specify)*:

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)*

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