O-S-595b
May 15, 1967
SUPERSEDING
Fed. Spec. O-S-595a
August 7, 1952

FEDERAL SPECIFICATION

SODIUM DICHROMATE, DIHYDRATE, TECHNICAL

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers a technical grade of sodium dichromate.

1.2 Classification. The sodium dichromate shall be of one type and grade.

2. APPLICABLE DOCUMENTS

2.1 Specifications and standards. The following specifications and standards, of the issues in effect on date of invitation for bids or request for proposal, form a part of the specification to the extent specified herein.

Federal Specifications:

L-P-378—Plastic Sheet and Strip (Polyolefin).
UU-S-48—Sacks, Shipping, Paper.
PPP-C-301—Chemicals, Dry and Paste, Packaging and Packing Of.
PPP-D-705—Drum: Metal Shipping, Steel, (Over 12 And Under 55 Gallon).
PPP-D-723-Drums, Fiber.
PPP-P-704—Pails, Metal: (Shipping, Steel, 1 Through 12 Gallon).

Federal Standard:

Fed. Std. No. 123—Marking For Domestic Shipment (Civilian Agencies).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402.

(Single copies of this specification and other product specifications required by activities outside the Federal Government for bidding purposes are available without charge at the General Services Administration Regional Offices in Boston, New York, Washington, D.C., Atlanta, Chicago, Kansas City, Mo., Ft. Worth, Denver, San Francisco, Los Angeles, and Seattle, Wash.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standards:

MIL-STD-105—Sampling Procedures and Tables for Inspection by Attributes.
MIL-STD-129—Marking for Shipment and Storage.
MIL-STD-147—Palletized and Containerized Unit Loads 40" x 48" 4-Way (Partial) Pallet Skids, Runners, Or Pallet-Type Base.

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring 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. Unless otherwise indicated, the issue in effect on date of invitation for bids or request for proposal shall apply.

U. S. Pharmacopoeial Convention Publication, Inc.:
Pharmacopoeia of the United States.

(Copies are available from the Mack Publishing Company, Easton, Pa.)

3. REQUIREMENTS

3.1 Material. Sodium dichromate shall be sodium dichromate dihydrate, furnished in granular form.

3.2 Sodium dichromate ($Na_2Cr_2O_7$) content. The sodium dichromate content shall be not less than 99.0 percent, by weight, of the ignited sample (see 4.5.1).

3.3 Loss at 120° C. Loss at 120° C. shall be not more than 12.5 percent by weight (see 4.5.2).

3.4 Water-insoluble matter. Not more than 0.2 percent, by weight shall be insoluble in water (see 4.5.3).

3.5 Sulfate. The sulfate (SO_4) content shall not exceed 0.2 percent (see 4.5.4).

3.6 Chloride. The chloride (Cl) content shall not exceed 0.1 percent (see 4.5.5).

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 inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own facilities or any commercial laboratory acceptable to 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 that supplies and services conform to prescribed requirements.

4.2 Sampling for quality conformance.

4.2.1 Lot. A lot shall consist of material from the same batch or blending operation. If a continuous process is used, a lot shall consist of all material subjected to the same processing operations with no change in operating conditions for one day.

4.2.2 Sampling for examination of filled containers. A random sample of filled containers shall be selected in accordance with MIL–STD–105 at inspection level I and acceptable quality level (AQL) = 2.5 percent defective to verify compliance with all requirements regarding fill, closure, marking, and other requirements not requiring tests.

4.2.3 Sampling for tests. Sampling shall be in accordance with inspection level S–2 of MIL–STD–105, at least three specimens. Both lot size and sample number shall be expressed as number of drums or cans. Each specimen shall be kept separate and tested separately, in accordance with 4.5.

4.2.3.1 Each one-pound specimen shall be placed in an airtight container, which shall be nearly filled, and then sealed, marked, accurately weighed, the weight and date recorded on the package, and forwarded to a laboratory satisfactory to the procuring activity for testing. Samples shall be kept cool until tested.

4.3 Examination of filled containers. Each sample 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 also be weighed to determine the amount of contents. Any container in the sample having one or more defects or less than required fill, shall not be offered for delivery; and if the number of defective containers in any sample exceeds the acceptance number for the appropriate sampling plan of MIL–STD–105, this shall be cause for rejection of the lot represented by the sample.

4.4 Tests. The sample specimens, selected in accordance with 4.2.3, shall be subjected to the tests specified in 4.5, separately. If any specimen fails one or more of these tests, this shall cause rejection of the lot.

4.5 Test methods.

4.5.1 Sodium dichromate content.

4.5.1.1 Reagents required:

(a) Hydrochloric acid concentrated (approximately 12N).

(b) Potassium iodide crystals, reagent grade.

(c) Standard sodium thiosulfate solution (approximately 0.1N). Dissolve 25 grams (g.) reagent grade sodium thiosulfate crystals ($Na_2S_2O_3.5H_2O$) and 0.2 g. sodium carbonate in a liter of recently boiled and cooled distilled water. Following the procedure specified in 4.5.1.2, standardize the solution against Bureau of Standards standard sample of potassium dichromate. The solution should be restandardized frequently.

(d) Starch indicator test solution. Starch indicator test solution shall be in accordance with the latest issue of the United States Pharmacopoeia.

4.5.1.2 Procedure. Weigh to the nearest mg. approximately 4 g. of the sample as received; dissolve in distilled water; transfer the solution quantitatively to a 1-liter volumetric flask; dilute to volume; and mix thoroughly. Transfer a 50-ml. aliquot to a 250-ml. glass-stoppered Erlenmeyer flask. Add 4 to 5 g. reagent-grade potassium iodide crystals; shake to dissolve; and add 10 ml. diluted sulfuric acid (1:3). Allow to stand for 10 minutes. Titrate the liberated iodine with approximately 0.1N sodium thiosulfate solution. When the iodine color is nearly discharged, add 5 ml. starch indicator test solution and continue the titration until the blue color just disappears. Correct for any thiosulfate consumed by a blank. Calculate the percent sodium dichromate by weight on the basis of a sample dried to constant weight as provided in 4.5.2 as follows:

$$\text{Sodium dichromate, percent} = \frac{(A - B) \times N \times 0.0437}{W} \times 100$$

Where: A = Ml. sodium thiosulfate required to titrate sodium dichromate.
B = Ml. sodium thiosulfate required for blank.
N = Normality of sodium thiosulfate.
W = Weight of dried sample (see 4.5.2).

4.5.2 Loss at 120° C. Crush quickly a quantity of the sample to pass a No. 20 sieve. Weigh to the nearest mg. about 5 g. of the crushed sample into a shallow dish 6 to 8 cm. in diameter and 1 to 3 cm. in depth. Heat in an oven at 120° ± 5° C. to constant weight. Calculate the percent loss in weight of the sample.

4.5.3 Water-insoluble matter. Weigh to the nearest mg. about 10 g. of the sample. Dissolve in approximately 100 ml. warm distilled water, and heat the solution on a steam bath for 1 hour. Filter through a tared filter crucible, and wash the crucible and residue with warm distilled water until the washings are colorless (about 100 ml. in small portions). Dry the crucible and residue in an oven at 105° to 110° C. to constant weight. Calculate the gain in weight as percent insoluble matter in the sample.

4.5.4 Sulfate. Dissolve approximately 10 g. of sample, weighed to the nearest mg. in 600 ml. distilled water in a liter beaker. Add 75 ml. ethyl alcohol and 60 ml. concentrated HCl. When the reaction has ceased, bring to a boil and concentrate to a thick syrup. Dilute with water to about 400 ml. and heat to boiling. While boiling slowly, add 50 ml. hot 10 percent barium chloride solution; continue boiling for 5 minutes; then let stand overnight at 40° to 50° C. Filter the precipitate on a tared Gooch crucible; wash with 300 ml. boiling water; dry 30 minutes at 105° C.; ignite over a Meker burner for 3 minutes; cool in a desiccator, and weigh. Calculate the percent sulfate as follows:

$$\text{Sulfate, percent} = \frac{A \times 0.4115}{W} \times 100$$

Where: A = Weight of barium sulfate.
W = Weight of sample.

4.5.5 Chloride. Dissolve approximately 10 g. of sample, weighed to the nearest mg., in 50 ml. distilled water in a 250 ml. beaker. Neutralize with a saturated solution of sodium carbonate (reagent grade) until the color changes to yellow. Titrate with approximately 0.1N standard solution of silver nitrate. The end point is reached when the color first changes from clear yellow to muddy brown.

Correct for any silver nitrate consumed by a blank. Calculate the percent chloride as follows:

$$\text{Chloride, percent} = \frac{(A - B) \times N \times 0.03555}{W} \times 100$$

Where: A = Ml. silver nitrate required to titrate chloride in sodium dichromate.
B = Ml. silver nitrate required for blank.
N = Normality of silver nitrate.
W = Weight of sample.

5. PREPARATION FOR DELIVERY

5.1 Packaging. Packaging shall be level A or C, as specified (see 6.1).

5.1.1 Level A. Sodium dichromate shall be packaged in one- or five-pound bottles, as specified (see 6.1), in accordance with the requirements for level A packaging in type I, class 1, unit containers of PPP-C-301.

5.1.2 Level C. Sodium dichromate shall be packaged to provide adequate protection against corrosion, deterioration, and damage from the supply source to the first receiving activity for immediate use.

5.2 Packing. Packing shall be level A, B, or C, as specified (see 6.1).

5.2.1 Level A. Sodium dichromate, packaged in one-or five-pound quantities as specified in 5.1.1, shall be packed in accordance with 5.2.1.1. Twenty-five or 100 pound quantities, as specified (see 6.1), shall be packed in accordance with 5.2.1.2.

5.2.1.1 One or 5-pound bottles. Sodium dichromate, packaged in one-or five-pound bottles as specified in 5.1.1, shall be arranged, intermediately packaged, and packed in accordance with the applicable level A packing requirements of PPP-C-301.

5.2.1.2 Pails or drums.

5.2.1.2.1 Twenty-five pound pails. Twenty-five plus or minus one pound of sodium dichromate shall be packed and closed for level A shipment in a pail conforming to type II, class 4, of PPP-P-701. Each pail shall be provided with a close-fitting bag liner formed from plastic film of 3 mil minimum thickness, conforming to type I, grade and finish optional, of L-P-378. All seams shall be heat sealed and shall meet the heat seal requirements of L-P-378. Bag liner may be closed by tying, knotting, or heat sealing.

5.2.1.2.2 One-hundred pound drums. One-hundred plus or minus two pounds of sodium dichromate shall be packed and closed for level A shipment in a steel drum conforming to type IV of PPP-D-705. Each drum shall be provided with a close-fitting bag liner, formed and closed as specified for the bag liner for the pail, specified in 5.2.1.2.1, except that the minimum thickness of the plastic film shall be 4 mils.

5.2.2 Level B. Sodium dichromate, packaged in one-or five-pound quantities, as specified in 5.1.1, shall be packed in accordance with 5.2.2.1. Twenty-five or 100 pound quantities as specified (see 6.1), shall be packed in accordance with 5.2.2.2 and 5.2.2.3, respectively.

5.2.2.1 One-or 5-pound bottles. Sodium dichromate, packaged as specified in 5.1.1, shall be arranged, intermediately packaged, and packed in accordance with the applicable level B packing requirements of PPP-C-301.

5.2.2.2 Twenty-five or 100-pound fiber drums. Twenty-five or one-hundred pound quantities of sodium dichromate shall be packed for level B shipment as specified in 5.2.1.2, except that pails and drums, specified therein, shall be replaced by fiber drums conforming to type IV, class 1 of PPP-C-301, utilizing type II, grade A drums of PPP-D-723.

5.2.2.3 One-hundred pound sacks. When specified (see 6.1), one-hundred pound quantities of sodium dichromate, shall be packed in 100 pound paper sacks conforming to the level B packing requirements of UU-S-48.

5.2.3 Level C. Sodium dichromate, packaged as specified in 5.1.2, shall be packed to insure carrier acceptance and safe delivery to the first domestic destination. Shipping containers shall comply with the carrier rules and regulations applicable to the mode of transportation.

5.3 Pallets. When specified (see 6.1), material shall be palletized in accordance with MIL-STD-147.

5.4 Marking.

5.4.1 Military agencies. In addition to any special marking required by the contract or order and the marking specified in 5.1.3, interior containers, shipping containers, and palletized unit loads shall be marked in accordance with MIL-STD-129. Markings shall include the specification number.

5.4.2 Civil agencies. In addition to the marking specified in 5.4.3, shipments shall be marked in accordance with Fed. Std. No. 123.

5.4.3 Warning label. The following warning label shall be attached to all containers:

SODIUM DICHROMATE
WARNING! HARMFUL DUST
MAY CAUSE RASH OR
EXTERNAL ULCERS

Keep container closed.
Avoid contact with skin and eyes.
Avoid breathing dust or solution spray.
In case of contact, immediately flush skin with plenty of water for at least 15 minutes; for eyes, get medical attention. Wash clothing before re-use.
Use fresh clothing daily. Take hot shower after work using plenty of soap.

6. NOTES

6.1 Ordering data. Purchasers should select the preferred options permitted herein and include the following information in procurement documents.

(a) Title, number, and date of this specification.
(b) Pound quantity per unit container required (see 5.1 and 5.2).
(c) Selection of the applicable levels of packaging and packing required (see 5.1 and 5.2).
(d) Whether sacks for level B packing is required (see 5.2.2.3).
(e) Whether palletization is required (see 5.3).
(f) Additional marking, if required (see 5.4).

MILITARY INTEREST:

Custodians:
Army—MU
Navy—SH
Air Force—68

Review activities:
Army—MU
Navy—SH
Air Force—68

User activities:
Navy—AS, OS, YD

Preparing activity:
Navy—SH

Review and user information is current as of the date of this document. For future coordination of changes to this document, draft circulation should be based on the information in the current DODISS.

CIVIL AGENCY INTEREST:

Interested activities:
COM—NBS
GSA

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See section 2 of this specification to obtain extra copies and other documents referenced herein. Price 5 cents each.

☆ GPO : 1967 O - 302-502 (227)

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE

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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