O-S-588C
June 20, 1985
SUPERSEDING
O-S-588B
November 12, 1970

FEDERAL SPECIFICATION

SODIUM CHROMATE, ANHYDROUS, TECHNICAL

This specification is approved by the Assistant Administrator, Office of Federal Supply and Services, General Services Administration, for the use of all Federal agencies.

1. SCOPE

1.1 Scope. This specification covers one technical grade of anhydrous sodium chromate.

2. APPLICABLE DOCUMENTS

2.1 The following documents of the issue in effect on date of invitation for bids or request for proposal form a part of this specification to the extent specified herein:

Federal Specifications:

NN-P-71	-	Pallets, Material Handling, Wood, Stringer Construction, 2-Way and 4-Way (Partial)
PPP-B-585	-	Boxes, Wood, Wirebound
PPP-B-636	-	Boxes, Shipping, Fiberboard
PPP-C-186	-	Containers, Packaging and Packing for Drugs, Chemicals, and Pharmaceuticals
PPP-C-2020	-	Chemicals, Liquid, Dry, and Paste: Packaging Of
PPP-F-320	-	Fiberboard; Corrugated and Solid, Sheet Stock (Container Grade) and Cut Shapes
PPP-P-704	-	Pails, Metal: (Shipping, Steel, 1 Through 12 Gallons)

Federal Standard:

Fed. Std. No. 123 - Marking for Shipment (Civil Agencies)

(Activities outside the Federal Government may obtain copies of Federal specifications, standards, and commercial item descriptions as outlined under General Information in the Index of Federal Specifications, Standards and

Commercial Item Descriptions. The Index, which includes cumulative bimonthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification, other Federal specifications, and commercial item descriptions required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston, MA; New York, NY; Washington, DC; Philadelphia, PA; Atlanta, GA; Chicago, IL; Kansas City, MO; Fort Worth, TX; Denver, CO; San Francisco, CA; Los Angeles, CA; and Seattle, WA.

(Federal Government activities may obtain copies of Federal standardization documents and the Index of Federal Specifications, Standards and Commercial Item Descriptions from established distribution points in their agencies.)

Military Specification:

MIL-B-117 - Bags, Sleeves and Tubing - Interior Packaging

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 Unit Loads

(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.)

Code of Federal Regulations (CFR)

49 CFR 171 to 179 - Hazardous Materials Regulations

(The Code of Federal Regulations and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

Uniform Classification Committee, Agent:

Uniform Freight Classification

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

National Motor Freight Traffic Association, Inc., Agent:

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 1616 P Street, NW, Washington, DC 20036.)

ASTM Standards:

D 1193 - Reagent Water
E 29 - Indicating Which Places of Figures are to be Considered Significant in Specified Limiting Values.

(Application for copies should be addressed to ASTM, 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 (except for the Code of Federal regulations), the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Chemical characteristics. Anhydrous sodium chromate shall be a powder and shall conform to the chemical characteristics of table I when tested as specified therein.

TABLE I. Chemical characteristics

Characteristic	Percent by weight: Minimum	Maximum	Test paragraph
Assay (as Na_2CrO_4)	98.5		4.2.4.1
Sulfates (as SO_4)		1.0	4.2.4.2
Chlorides (as Cl)		0.1	4.2.4.3
Moisture content		0.5	4.2.4.4

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 Lotting. A lot shall consist of the anhydrous sodium chromate produced by one manufacturer, at one plant, from the same materials, and under essentially the same manufacturing conditions provided the operation is continuous. In the event the process is a batch operation, each batch shall constitute a lot (see 6.3).

4.2.2 Sampling.

4.2.2.1 For examination of packaging. Sampling shall be conducted in accordance with MIL-STD-105.

4.2.2.2 For sodium chromate test. Sampling shall be conducted in accordance with table II. A representative specimen of approximately 50 grams (g) shall be removed from each sample container and placed in a suitable clean, dry container labeled to identify the lot and container from which it was taken.

TABLE II. Sampling for sodium chromate test

Number of containers in batch or lot	Number of sample containers
2 to 25	2
26 to 150	3
151 to 1,200	5
1,201 to 7,000	8
7,001 to 20,000	10
Over 20,000	20

4.2.2.3 For container leakage test. Sampling shall be conducted in accordance with MIL-STD-105.

4.2.3 Inspection procedure.

4.2.3.1 For examination of packaging. The sample unit shall be one filled unit, intermediate, or shipping container, as applicable, ready for shipment. Sample unit, intermediate, and shipping containers shall be examined for the following defects using an AQL of 2.5 percent defective:

(a) Contents per container not as specified
(b) Container not as specified

(c) Container closure not as specified
(d) Container damaged or leaking
(e) Fiberboard pads, liners or partitions missing or not as specified (when required)
(f) Binding of plyes missing or not as specified (see 5.1.2.1.2)
(g) Marking incorrect, missing or illegible
(h) Unitization not as specified

4.2.3.2 For sodium chromate test. Each sample specimen taken in 4.2.2.2 shall be tested as specified in 4.2.4. Failure of any test by any specimen shall be cause for rejection of the lot represented.

4.2.3.3 For container leakage test. The sample unit shall be one container. The sample containers selected in 4.2.2.3 shall be tested as specified in 4.2.5 using an AQL of 1.5 percent defective.

4.2.3.4 Significant places. For the purpose of determining conformance with this specification, an observed or calculated value shall be rounded off "to the nearest unit" in the last right-hand place of figures used in expressing the limiting value, in accordance with the rounding-off method of ASTM E 29.

4.2.4 Sodium chromate tests. Water in accordance with ASTM D 1193 and reagent grade chemicals shall be used throughout the tests. Where applicable, blank determinations shall be run and corrections applied where significant. Tests shall be conducted as follows:

4.2.4.1 Assay.

(a) Standard sodium thiosulfate solution. Dissolve 25 g of sodium thiosulfate crystals ($Na_2S_2O_3 \cdot 5H_2O$) and 0.2 g of sodium carbonate in 1 liter of recently boiled and cooled water. This will make an approximately 0.1N solution. Following the procedure specified in (b) below, standardize the solution against a National Bureau of Standards standard sample of potassium dichromate. The solution should be restandardized frequently.

(b) Procedure. Dissolve approximately 3 g of specimen, weighed to the nearest 0.001 g in approximately 200 milliliters (mL) of water. Transfer quantitatively to a 1-liter volumetric flask, and make up to the mark with water. Mix well. Pipet 50 mL into a 500-mL glass-stoppered iodine flask containing 50 mL of water, 17 mL of approximately 12N hydrochloric acid, and 3 g of potassium iodide crystals. Allow the reaction to proceed in the dark for 5 minutes, then dilute to 400 mL and titrate with 0.1N sodium thiosulfate solution, adding starch indicator toward the last. Correct for any thiosulfate consumed by the blank. Calculate the percent by weight sodium chromate as Na_2CrO_4 as follows:

$$\text{Percent sodium chromate} = \frac{108\ (A - B)N}{W}$$

where: A = Milliliters of sodium thiosulfate solution used in the titration,
B = Milliliters of sodium thiosulfate solution required for the blank,
N = Normality of sodium thiosulfate solution, and
W = Weight of specimen in grams.

4.2.4.2 Sulfates. Dissolve approximately 10 g of specimen, weighed to the nearest 0.001 g, in 600 mL of water in a 1-liter beaker. Add 75 mL of ethyl alcohol and 60 mL concentrated hydrochloric acid. 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 of 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 weighed to the nearest milligram. Wash with 300 mL of boiling water, dry for 30 minutes at 150°C, ignite over a Meker burner for 3 minutes, cool in a desiccator, and weigh. Calculate percent by weight sulfate as follows:

$$\text{Percent sulfate} = \frac{41.15A}{B}$$

where: A = Weight of precipitate, in grams, and
B = Weight of specimen in grams.

4.2.4.3 Chlorides. Dissolve approximately 10 g of specimen, weighed to the nearest 0.001 g, in 50 mL of water in a 250-mL beaker. Titrate with 0.1N standard solution of silver nitrate. Prepare the silver nitrate solution by dissolving 17.006 ± 0.001 g of silver nitrate, previously dried at 110°C, in sufficient water to make 1000 mL at 25°C. The end point is reached when the color first changes from clear yellow to muddy brown. Correct for any silver nitrate solution consumed by a blank. Calculate the percent by weight chloride as follows:

$$\text{Percent chloride} = \frac{0.355\ (A - B)}{W}$$

where: A = Milliliters of 0.1N silver nitrate solution used in the titration,
B = Milliliters of 0.1N silver nitrate solution required for the blank, and
W = Weight of specimen in grams.

4.2.4.4 Moisture content. Weigh a tared glass-stoppered weighing bottle, approximately 7 centimeters in diameter, to the nearest milligram. Place approximately 10 g of the specimen, weighed to the nearest 0.001 g, into the bottle. Place the bottle and contents in an oven, remove the cover from the bottle, and heat for 1 hour at 105° to 110°C. Replace the cover, cool in a desiccator, and weigh. Calculate the percent by weight moisture content as follows:

$$\text{Percent moisture content} = \frac{100A}{B}$$

where: A = Loss in weight, in grams, and
B = Weight of specimen, in grams.

4.2.5 Container leakage test. Place the container on its side, roll it a distance equivalent to twice its circumference and observe for leakage. Any leakage of contents constitutes failure.

5. PACKAGING

5.1 Preservation. Sodium chromate shall be preserved level A, B or C as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Unit packing. Sodium chromate shall be unit packed level A in a 1-, 5-, 25- or 100-pound (lb) quantity as specified (see 6.2), in accordance with the general requirements of PPP-C-2020.

5.1.1.1.1 One-lb quantity. A quantity of 1.00 (+0.01 or -0) lb of sodium chromate shall be unit packed in a glass or plastic bottle. The glass bottle shall conform to group A, class 1, type of glass optional, style 2, grade optional, with closure A, B or R and outer seal A of PPP-C-186. The plastic bottle shall conform to group A, class 2, style 2, grade optional with closure A, B or R and outer seal A of PPP-C-186. The closure on the bottle shall be closed to a torque within the range specified by the bottle manufacturer. There shall be no leakage of sodium chromate from the bottle when tested as specified in 4.2.5.

5.1.1.1.2 Five-lb quantity. A quantity of 5.00 (+0.05 or -0) lb of sodium chromate shall be unit packed in the same manner as specified for the 1-lb quantity in 5.1.1.1.1, except for the size of the bottle.

5.1.1.1.3 Twenty-five-lb quantity. A quantity of 25.00 (+0.25 or -0) lb of sodium chromate shall be unit packed in a close-fitting steel pail fitted with a polyethylene bag liner. The pail shall conform to type II, class 3 of PPP-P-704, and shall be furnished with a bail handle. The bag liner shall conform to type I, class B, style 1 or 2 of MIL-B-117 and shall be of a size to permit it to be tied closed by a plastic covered wire tie. The pail shall be tightly closed and there shall be no evidence of leakage of contents when tested as specified in 4.2.5.

5.1.1.1.4 One-hundred-lb quantity. A quantity of 100 (+1 or -0) lb of sodium chromate shall be unit packed in the same manner as the 25-lb quantity in 5.1.1.1.3, except for the size of the pail.

5.1.1.2 Intermediate packing, 1-lb quantity. Twelve 1-lb bottles of sodium chromate shall be intermediately packed with closure end uppermost in a close-fitting fiberboard box fitted with full box-face sized fiberboard liners on all inside faces and full-bottle-height fiberboard partitions forming a close-fitting cell for each bottle. The box shall conform to grade W5c of PPP-B-636.

The partitions shall be formed from material conforming to minimum grade W5c of PPP-F-320. The flutes of the fiberboard in box side-walls, side-wall liner and partitions shall be parallel to the upright position of the box when filled. The box shall be closed as specified for the closure of boxes intended as interior containers in PPP-B-636.

5.1.2 Level B.

5.1.2.1 Unit packing.

5.1.2.1.1 One- and 5-lb quantities. The 1- or 5-lb quantities of sodium chromate, as specified (see 6.2), shall be unit packed level B in the same manner as specified for those unit packed level A in 5.1.1.1.1 and 5.1.1.1.2 respectively.

5.1.2.1.2 Twenty-five- and 100-lb quantities. The 25- or 100-lb quantities of sodium chromate, as specified (see 6.2), shall be unit packed level B in the same manner as specified for level A in 5.1.1.1.3 and 5.1.1.1.4, respectively, except that fiber drums shall be substituted for the steel pails. The fiber drums shall conform to Department of Transportation (DOT) Specification 21C and shall have all kraft plyes completely bonded to adjacent plyes by waterproof hot melt adhesive. The drum shall be sealed tightly after the interior bag liner is filled and tied.

5.1.2.2 Intermediate packing, 1-lb quantity. The 1-lb quantity of sodium chromate shall be intermediately packed level B in the same manner as specified for level A in 5.1.1.2.

5.1.3 Level C. A 1-, 5-, 25- or 100-lb quantity of sodium chromate, as specified (see 6.2), shall be preserved in a manner to assure maintenance of the specified purity and quantity for shipment from supplier to initial destination and for a minimum duration of 1 year. Containers shall be in compliance with all regulatory requirements for the intended modes of transportation and shall have reclosable closures.

5.2 Packing. Sodium chromate shall be packed level A, B or C as specified (see 6.2).

5.2.1 Level A.

5.2.1.1 One-lb quantity. Two intermediate packs of sodium chromate prepared as specified in 5.1.1.2 shall be packed level A in a close-fitting wirebound wood box conforming to class 3, style optional of PPP-B-585. A tight fit of contents within the box shall be assured by insertion of fiberboard pads as needed. The box shall be closed as specified in PPP-B-585.

5.2.1.2 Five-lb quantity. Twelve 5-lb quantity bottles of sodium chromate, unit packed as specified in 5.1.1.1.2, shall be packed level A in a close-fitting wirebound wood box conforming to class 3, style optional of PPP-B-585.

All inside faces of the box shall be lined with fiberboard pads. Each bottle shall be placed with closure end uppermost in a close-fitting cell formed from fiberboard partitions. Pads and partitions shall be formed from material conforming to class weather-resistant, variety DW, grade V11c of PPP-F-320. The box shall be closed as specified in PPP-B-585.

5.2.1.3 Twenty-five- and 100-lb quantities. The 25- and 100-lb quantities, unit packed as specified in 5.1.1.1.3 and 5.1.1.1.4, respectively, shall require no further protection for shipment other than unitization.

5.2.2 Level B.

5.2.2.1 One-lb quantity. The 1-lb quantity of sodium chromate shall be packed level B in the same manner as specified for level A except that the box shall conform to grade V3c of PPP-B-636, and the box shall be closed as specified for the closure of boxes intended for use as exterior containers in PPP-B-636.

5.2.2.2 Five-lb quantity. The 5-lb quantity shall be packed level B in the same manner as specified for level A in 5.2.1.2 except that the box shall conform to grade V3c of PPP-B-636.

5.2.2.3 Twenty-five- and 100-lb quantities. The 25- and 100-lb quantities, unit packed as specified in 5.1.2.1.2, shall require no further protection for shipment other than unitization.

5.2.3 Level C. Sodium chromate shall be packed level C in a manner to assure acceptance by common carrier and safe delivery to first destination. Containers shall be in compliance with DOT requirements, Uniform Freight Classification Rules, National Motor Freight Classification Rules and the rules and regulations of any other intended mode of transportation.

5.3 Unitization. The quantities of each size or type of container palletized shall be uniform within each size or type category. The level A and B boxes of 1- and 5-lb quantities of sodium chromate shall be palletized in accordance with the requirements for load type I of MIL-STD-147. The level A pails of the 25- and 100-lb quantities shall be palletized in accordance with the requirements for load type IV of MIL-STD-147; the level B fiber drums shall be palletized in accordance with load type XIII of MIL-STD-147. The pallets shall conform to type IV, softwood of NN-P-71. Level C packs shall be unitized in a manner to assure protection during transportation and storage for a minimum of 1 year, safety during stacking and acceptability by common carrier.

5.4 Marking. Packs, unit packs, and intermediate packs shall be marked and labeled in accordance with DOT regulations and any other regulatory requirements applicable to the intended mode of transportation.

5.4.1 Civil agencies. Containers and pallet loads shall be marked in accordance with Fed. Std. No. 123.

5.4.2 Military activities. Containers shall be marked in accordance with MIL-STD-129. Pallet loads, packs, unit packs, and intermediate packs shall be marked using the "3 of 9" bar code as specified in MIL-STD-129.

5.4.3 Precautionary marking. Unit packs, intermediate packs, and shipping containers shall be marked with the following precautionary marking:

STORE IN A COOL PLACE
KEEP TIGHTLY CLOSED

Avoid inhalation, ingestion, or skin contact. Poisonous if swallowed. Irritating to eyes, nose, and throat. If in eyes, flush with water for 15 minutes. Wash promptly from skin. If swallowed and victim is conscious, induce vomiting and seek medical attention. If swallowed and victim is unconscious, seek medical attention.

6. NOTES

6.1 Intended use. Anhydrous sodium chromate covered by this specification is intended for use as a corrosion inhibitor.

6.2 Ordering data. Acquisition documents should specify the following:

(a) Title, number, and date of this specification,
(b) Level of preservation and packing required (see 5.1 and 5.2),
(c) Quantity to be unit packed level A (see 5.1.1.1),
(d) Quantity to be unit packed level B (see 5.1.2.1.1 and 5.1.2.1.2), and
(e) Quantity to be unit packed level C (see 5.1.3).

6.3 Batch. A batch is defined as that quantity of material which has been manufactured by some unit chemical process or subjected to some physical mixing operation intended to make the final product substantially uniform.

MILITARY INTERESTS:

Custodians:

Army - EA
Air Force - 68

CIVIL AGENCY COORDINATING ACTIVITIES:

COM-NBS
GSA-7FCE

Review activities:

Army - MD, ME
DLA - GS

User activities:

Navy - AS, OS

Preparing activity:

Army - EA

Project No. 6810-B479

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

U.S. GOVERNMENT PRINTING OFFICE: 1988 - 505-038/23749

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
O-S-588C	SODIUM CHROMATE, ANHYDROUS, TECHNICAL

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

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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