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USNWC Ltr, 30 Aug 1974

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IDEP FORM 12 11 62 **24315** SPECIFICATION 1 of 1

1. COMPONENT/PART NAME PER GENERIC CODE Propulsion Parts & Materials, Solid Fuel Engines, Propellants	2. PROGRAM OR WEAPON SYSTEM Multiple	3. DATE OF: <table border="1" style="width: 100%; border-collapse: collapse;"> <tr> <td>DAY</td> <td>MO.</td> <td>YR.</td> </tr> <tr> <td>ISSUE</td> <td>11</td> <td>1967</td> </tr> <tr> <td>REVISION</td> <td></td> <td></td> </tr> </table>	DAY	MO.	YR.	ISSUE	11	1967	REVISION		
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7. THIS SPECIFICATION COMPLEMENTS REPORT NO.:

8. TYPE OF SPECIFICATION

<input checked="" type="checkbox"/> (A) GENERAL PRODUCT REQUIREMENTS FOR A FAMILY OF PARTS - PROCUREMENT DOCUMENT <input type="checkbox"/> (B) INDIVIDUAL DETAIL PARTS DOCUMENT; STDS BOOK PAGES - FOR PROCUREMENT <input type="checkbox"/> (C) DETAIL INSPECTION, PROCESS CONTROL, AND/OR TEST PROCEDURES FOR SPECIFIC PARTS <input type="checkbox"/> (D) PROCESS (PAINTING, WELDING, FINISHING, HEAT TREATING ETC.) APPLICABLE TO MANY PARTS	<input type="checkbox"/> (E) SPEC. FOR PERFORMANCE, RELIABILITY, AND/OR ENVIRONMENT FOR ASSEMBLIES, EQUIPMENTS, SUBSYSTEMS AND SYSTEMS <input type="checkbox"/> (F) PERFORMANCE AND APPLICATION DATA FOR DESIGN ENG USE ON PARTS - NOT FOR PROCUREMENT <input type="checkbox"/> (G) OTHER (DETAIL IN 10) NOTE: WHEN MULTIPLE FUNCTIONS ARE COMBINED IN ONE DOCUMENT, CHECK ALL APPLICABLE SQUARES
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NOTICES PAGE

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Code Ident
30003

WS 5484

NAVAL AIR SYSTEMS COMMAND
DEPARTMENT OF THE NAVY
PURCHASE DESCRIPTION
AMMONIUM OXALATE

Approved:

G. F. Cleary

By direction

RECORD OF REVISIONS		
Revision Letter	Date	Changes

This document consists of pages i to ii
and 1 to 19 inclusive.

FSC 1340

11ND-NOTS-120/11(8-65)

Code Ident
30003

WS 5484
18 APR 1966

NAVAL AIR SYSTEMS COMMAND

DEPARTMENT OF THE NAVY

PURCHASE DESCRIPTION

AMMONIUM OXALATE

1. SCOPE.

1.1 This purchase description covers one grade of granular ammonium oxalate.

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 document to the extent specified herein.

SPECIFICATIONS

Federal

RR-S-366

Sieves, Standard; for Testing
Purposes.

FSC 1340

WS 5484

STANDARDS

Military

MLL-STD-105

Sampling Procedures and Tables
for Inspection by Attributes.

MLL-STD-129

Marking for Shipment and Storage.

PUBLICATIONS

Bureau of Naval Weapons
(Code Ident 10001)

WS 5051

Ammonium Nitrate Propellant,
N-28.

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

3. REQUIREMENTS.

3.1 Quality verification. Ammonium oxalate furnished under this document shall be sampled from the first production and tested for quality verification (see 4.5 and 6.2). Subsequent to quality verification approval, the materials, procedures, and equipment shall not be changed from those employed in the manufacture of the lot from which the quality verification sample was taken without prior written approval of the procuring activity.

3.1.1 Retest of quality verification. At the discretion of the procuring activity, quality verification tests, or any portion thereof, shall be repeated under any of the following conditions:

- (a) The manufacturer has modified his product (such as a change of raw materials, the process, production procedures, or methods). It shall be the responsibility of the supplier to notify the procuring activity prior to the incorporation of

any such changes, and to provide quantitative evidence of the effect of such changes on the performance or characteristics of the product. Requirement for such tests will be based on an evaluation of the evidence supplied.

- (b) Where there is evidence that the quality of the product has not been maintained. This evidence may be in the form of accumulated failure reports of the product, of system failures attributable to the product, or failure of the product to pass any of the tests for quality verification that may be conducted by or for the procuring activity.
- (c) Any change in design or documentation by the procuring activity.

3.2 Data. No data is required by this document, or by applicable documents referenced in section 2, unless specified in the contract or purchase order (see 6.2).

3.3 Chemical composition. The material shall have the chemical composition given in Table I.

Table I. Chemical Composition

Characteristic	Requirement	
	Min	Max
Ammonium oxalate, (NH ₄) ₂ C ₂ O ₄ ·H ₂ O; %	99.0	---
Acidity (as oxalic acid); %	---	0.5
Acidity of 0.1 Molar solution; pH	6.3	6.6
Water insolubles; %	---	0.5
Residue after ignition; %	---	0.10
Chloride; %	---	0.005
Sulfate; %	---	0.02
Heavy metals (as lead); %	---	0.05
Iron; %	---	0.004

3.4 Physical properties. This material shall have the physical properties given in Table II.

Table II. Physical Properties

Characteristic	Requirement	
	Min	Max
Particle Size:		
Through No. 40 Sieve; %	80	--
Through No. 80 Sieve; %	--	30

3.5 Workmanship. This material shall be made using good workmanship, and shall be a product free from foreign materials. It shall be uniform in quality and shall be manufactured in accordance with standard manufacturing procedures of the industry.

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 this document where such inspections are deemed necessary to assure that supplies and services conform to prescribed requirements.

4.1.1 Authority and responsibility for final acceptance shall rest with the cognizant Government representative.

4.2 Lot. A lot shall consist of material produced at one plant with no change in formulation or process. If manufacture is by batch process, each batch shall constitute a lot. A batch shall be as defined in 6.3.

4.3 Acceptance sampling. The number of containers to be chosen at random for acceptance sampling shall be equal to the square root of the total number of containers in the lot. If the number thus obtained is not a whole number, the number of containers to be sampled shall be increased to the next higher whole number. In no case, however, shall the number of containers to be sampled be less than seven (unless there are less than seven containers in the lot; in this case, sample each container).

NOTE. If the sampling is to be performed at the manufacturing activity, a random sample may be taken during the packaging operation rather than from the filled and sealed containers.

4.3.1 Primary sample. From each selected container, a sample shall be taken from three or more places throughout the container. The total weight of the samples taken from each container shall weigh at least 50 grams (gm). Each sample thus taken shall be mixed thoroughly, placed in a clean, dry container and labeled to identify the material name, original container designation, contract number, and lot number.

4.3.2 Composite sample. Each primary sample shall be subdivided at random to prepare a composite sample (not in excess of 500 gm). The composite shall consist of approximately equal amounts of the several primary samples. Primary material not used in the composite sample shall be returned to its primary-sample container. After mixing the composite sample thoroughly, place the composite sample in a clean, dry container; seal and identify the composite sample with the material name, container designations, contract number, and lot number. All specified chemical and physical tests shall be made on this composite sample representing the lot. Failure of the composite sample to pass all of the tests herein shall reject the lot represented.

4.4 Acceptance tests. The following procedures shall be used to determine that the requirements of section 3 hereof have been met. Any change in test procedures to be employed:

shall receive prior approval of the procuring activity. In case of dispute between the results from any proposed method or equipment and what is cited herein, the results using the methods and equipment specified in this document shall prevail. Unless otherwise specified, all tests shall be run in duplicate. The average of the two determinations shall be taken as the test result.

4.4.1 Ammonium oxalate, $(\text{NH}_4)_2\text{C}_2\text{O}_4 \cdot \text{H}_2\text{O}$. Place 2.0 to 2.6 gm of composite sample weighed to the nearest 0.001 gm) in a 250 milliliter (ml) volumetric flask. Add 180 to 200 ml of distilled water, swirl the contents of the flask until solution is complete, then dilute to the mark with distilled water. After thorough mixing, pipette a 25-ml aliquot to a 250-ml Erlenmeyer flask and add 65 to 75 ml of distilled water. Carefully add, while swirling, 5 ± 1 ml of reagent-grade, concentrated sulfuric acid (H_2SO_4). Titrate the solution slowly with standardized approximately 0.1 normal (N) potassium permanganate (KMnO_4) solution from a 50-ml or 100-ml burette until 25 to 30 ml have been added. Heat the solution to 70 to 75 degrees centigrade ($^{\circ}\text{C}$), then continue the titration until the first permanent pink coloration is observed. Near the end point, add the KMnO_4 solution dropwise shaking or stirring the solution vigorously after each addition.

$$\text{Percent ammonium oxalate} = \frac{V \cdot .06NV}{W}$$

Where:

- N = Normality of KMnO_4 solution.
- V = Volume of standardized KMnO_4 solution used in the titration; ml.
- W = Weight of sample taken; gm.

4.4.1.1 Reagent; tenth-normal KMnO_4 solution.

- (a) Dissolve 3.0 to 3.6 gm of reagent-grade KMnO_4 in approximately 1050 ml of distilled water. Boil the solution gently in a flask for 20 to 30 minutes. Stopper the flask, and allow it to stand for a minimum of 48 hours in the dark.

(b) Decant the solution through an asbestos filter into a bottle impervious to light. Discard any undissolved residue. Determine the exact normality of the solution in the following manner:

1. Dry (to constant weight) 2 to 10 gm of reagent-grade sodium oxalate ($\text{Na}_2\text{C}_2\text{O}_4$) at 105 to 110°C.

2. Weigh 0.25 ± 0.05 gm of the dried sodium oxalate (weighed to the nearest 0.0001 gm) and transfer it into a mixture consisting of 10 ± 1 ml of reagent-grade concentrated H_2SO_4

plus approximately 250 ml of distilled water. (Boil the solution for a minimum of 10 minutes and cool to room temperature before use.)

3. After the sodium oxalate has dissolved, add from a burette (at the rate of 25 to 35 ml per minute and with stirring) a volume of the KMnO_4 solution corresponding to approximately 75 percent (approximately 30 ml) of the total volume of the KMnO_4 solution required for the quantity of sodium oxalate taken.

4. Allow the solution to stand until the pink color disappears, then heat the contents of the beaker to 60 to 70°C and complete the titration by adding the KMnO_4 solution until a slight pink color persists for a minimum of 30 seconds. The last milliliter or so of solution should be added dropwise, allowing each drop to become decolorized before adding the next.

5. Run a blank titration to determine the volume of KMnO_4 solution required to produce the same pink color in approximately (± 10 percent) the same volume of solution.

$$\text{Normality of } \text{KMnO}_4 \text{ solution} = \frac{149.2W}{V_1 - V_2}$$

Where:

W = Weight of dried sodium oxalate taken; gm.

V₁ = Volume of KMnO₄ solution used in the titration; ml.

V₂ = Volume of KMnO₄ solution used in the blank determination; ml.

NOTE. KMnO₄ solution will gradually become weaker with time. Its normality should, therefore, be redetermined weekly or before use.

4.4.1.2 Acceptance criteria. For the lot represented to satisfy the ammonium oxalate requirement, the value obtained for percent ammonium oxalate shall be no less than the value specified in 3.2.

4.4.2 Acidity (as oxalic acid). Place 4 to 6 gm of composite sample (weighed to the nearest 0.001 gm) into a 250-ml Erlenmeyer flask. Add to the sample 125 ± 25 ml of freshly boiled distilled water (which has been cooled to room temperature) plus 4 to 5 drops of phenol red indicator solution. Swirl the contents to dissolve the sample. Titrate the solution with standardized, approximately 0.1N sodium hydroxide (NaOH) solution to the phenol red end point (a persistent pink color).

$$\text{Percent acidity (as oxalic acid)} = \frac{4.5NV}{W}$$

Where:

N = Normality of NaOH solution.

V = Volume of standardized NaOH solution; ml.

W = Weight of sample taken; gm.

4.4.2.1 Reagent; phenol red indicator solution. Dissolve 0.10 ± 0.01 gm phenol red in 100 ± 10 ml ethyl alcohol (filter if necessary).

4.4.2.2 Acceptance criteria. For the lot represented to satisfy the acidity requirement, the value obtained for percent acidity (as oxalic acid) shall be no greater than the value specified in 3.2.

4.4.3 Acidity of 0.1 molar solution; pH. Dissolve 1.40 ± 0.1 gm of composite sample (weighed to the nearest 0.01 gm) in 100 ± 5 ml of freshly boiled and cooled to room temperature distilled water contained in a 200-ml beaker. Using a pH meter, determine the pH of the solution electrometrically.

4.4.3.1 Apparatus. Electronic pH apparatus, Beckman Zeromatic model (Beckman Instrument, Fullerton, California) or approved equivalent.

4.4.3.2 Acceptance criteria. For the lot represented to satisfy this acidity requirement, the value obtained for the pH number shall be within the range shown in 3.2.

4.4.4 Water insolubles. Dissolve 20 to 25 gm of composite sample (weighed to the nearest 0.01 gm) in 400 to 500 ml of hot, distilled water; heat to boiling, and digest in a covered beaker on a steam bath or low-temperature hot plate for 1 to 2 hours. Filter the solution through a tared filtering crucible (previously dried to constant weight at 105 to 110°C); wash the residue thoroughly with 80 to 100°C distilled water; then dry the crucible to constant weight at approximately 105 to 110°C . The increase in filter-crucible weight is the weight of water-insoluble matter.

$$\text{Percent water insolubles} = \frac{100R}{W}$$

Where:

R = Weight of water-insoluble matter; gm.

W = Weight of sample taken; gm.

4.4.4.1 Acceptance criteria. For the lot represented to satisfy the water-insoluble requirement, the value obtained for percent water insolubles shall be no greater than the value specified 3.2.

4.4.5 Residue after ignition. Heat 5 ± 1 gm of composite sample (weighed to the nearest 0.001 gm) in an ignited ($800 \pm 25^\circ\text{C}$ for 30 minutes minimum), cooled to room temperature, and tared crucible (previously weighed to the nearest 0.001 gm) for one hour minimum at 105 to 110°C , then slowly raise the temperature.

NOTE. The rate of heating should be such that from one to two hours is required to volatilize the sample.

When nearly all the sample has been volatilized (95 to 99 percent), cool the crucible, then moisten the residue with 0.10 to 0.20 ml of reagent-grade concentrated H_2SO_4 . Continue the heating until the remainder of the sample and the excess H_2SO_4 have been volatilized. Finally, ignite the crucible at 775 to 825°C for 15 to 30 minutes. Cool the crucible in a desiccator, and reweigh to the nearest 0.001 gm. The increase in crucible weight is the weight of residue after ignition.

$$\text{Percent residue after ignition} = \frac{100R}{W}$$

Where:

R = Weight of residue after ignition; gm.

W = Weight of sample taken; gm.

4.4.5.1 Acceptance criteria. For the lot represented to satisfy the residue-after-ignition requirement, the value obtained for percent residue after ignition shall be no greater than the value specified 3.2.

4.4.6 Chloride. Dissolve 2 ± 0.1 gm of composite sample (weighed to the nearest 0.01 gm) in 50 ± 25 ml of distilled water. In a 100-ml volumetric flask add 10 ± 1 ml of reagent-grade concentrated nitric acid (HNO_3) and dilute to the mark with distilled water. After thorough mixing, pipette 25 ml of this solution into a Nessler tube. Add 1 ± 0.1 ml of silver nitrate solution (4.4.6.1(a)). Prepare a comparison-standard solution by repeating the above procedure except that a 25-ml portion of chloride solution (4.4.6.1(b)), delivered by pipette, shall be substituted for the two gram composite sample.

4.4.6.1 Reagents.

- (a) Silver nitrate solution (approximately 0.1N). Dissolve 17 ± 2 gm of silver nitrate (AgNO_3) in 1000 ± 50 ml of distilled water.
- (b) Chloride solution (0.001 gm of chloride ion per liter). Dissolve 0.165 ± 0.005 gm of sodium chloride (NaCl) (weighed to the nearest 0.001 gm) in distilled water and make up in a volumetric flask to 1000 ml with distilled water. After thorough mixing, pipette a 10 ml aliquot into a one-liter volumetric flask and dilute to the mark with distilled water.

4.4.6.2 Acceptance criteria. For the lot represented to satisfy the chloride requirement, any turbidity in the sample solution shall not exceed that in the comparison-standard solution.

4.4.7 Sulfate.

- (a) On a steam bath, digest 20 ± 2 gm of composite sample (weighed to the nearest 0.01 gm) plus 0.010 ± 0.001 gm of reagent-grade sodium carbonate (Na_2CO_3) with 40 ± 2 ml of concentrated, reagent-grade HNO_3 plus 35 ± 2 ml of concentrated, reagent-grade hydrochloric acid (HCl) in a covered beaker until no more bubbles of gas are evolved.

- (b) Remove the cover, then continue the evaporation until crystals appear in the beaker.

NOTE. Do not let a crust form on the surface of this solution before continuing on to the next step.

- (c) Add 10 ± 1 ml of 30 percent reagent-grade hydrogen peroxide (H_2O_2) solution, cover the beaker, and digest on the steam bath until gas evolution ceases.
- (d) Add an additional 10 ± 1 ml of the 30 percent reagent-grade H_2O_2 solution, re-cover the beaker, and continue to digest on the steam bath until the reaction ceases.
- (e) Remove the cover, and evaporate the solution to dryness.
- (f) Add 5 ± 1 ml of dilute reagent-grade HCl (one milliliter of concentrated HCl to each milliliter of distilled water). Cover, digest on the steam bath for 15 to 20 minutes, remove the cover, and again evaporate to dryness.
- (g) Dissolve the residue in 50 ± 5 ml of distilled water.
- (h) Filter the solution, if necessary, then dilute it to 100 ml with distilled water in a volumetric flask. Mix thoroughly.

NOTE. Aliquots of this solution are also used in 4.4.8 and 4.4.9.

- (i) Prepare a comparison-standard solution containing the quantities of reagents used in preparing the sample solution. Treat this solution in the identical manner.

NOTE. Aliquots of this solution are also used in 4.4.8 and 4.4.9.

- (j) Pipette 10 ml of the solution from 4.4.7(a) through (n) into a Nessler tube. Add 1 ± 0.1 ml of dilute HCl (one milliliter of concentrated reagent-grade HCl to each 19 ± 1 ml of distilled water). Filter, if necessary to remove any undissolved material.
- (k) At the end of the treatment, add 4.00 ± 0.05 ml of sulfate solution (4.4.7.1(a)) and 1 ± 0.1 ml of the dilute HCl to 6 ± 0.1 ml of the comparison-standard solution and filter, if necessary.
- (l) To each solution in similar containers, add 1 ± 0.05 ml of barium chloride solution (4.4.7.1(b)) and allow to stand for 10 to 15 minutes.

4.4.7.1 Reagents.

- (a) Sulfate solution (0.010 milligrams (mg) of SO_4 ion in one ml). Dissolve 0.148 ± 0.005 gm of anhydrous sodium sulfate, Na_2SO_4 (weighed to the nearest 0.001 gm) in distilled water in a 100-ml volumetric flask, then fill to the mark with distilled water. After thorough mixing, pipette a 10-ml aliquot of this solution to a one-liter volumetric flask, then fill to the mark with distilled water.
- (b) Barium chloride-ion solution. Dissolve 120 ± 1 gm of barium chloride ($\text{BaCl}_2 \cdot 2\text{H}_2\text{O}$) in 1000 ± 50 ml of distilled water. Any turbidity in the sample solution shall not exceed that in the comparison-standard solution.

4.4.7.2 Acceptance criteria. For the lot represented to satisfy the sulfide requirement, any turbidity in the sample solution shall not exceed that in the comparison-standard solution.

4.4.8 Heavy metals. To another 10-ml aliquot of 4.4.7(a) through (h) (taken with a pipette), add 1 ± 0.01 ml of approximately one normal acetic acid, and dilute to 40 ± 0.5 ml with distilled water. For the comparison-standard solution, pipette 10 ml of lead (Pb) solution (4.4.8.1(a)) and add 1 ± 0.1 ml of approximately one normal acetic acid to 10 ± 1 ml of 4.4.7(i) and dilute to 40 ± 0.5 ml. Add 10 ± 0.5 ml of hydrogen sulfide solution (4.4.8.1(b)) to each solution.

4.4.8.1 Reagents.

- (a) Lead solution (0.1 gm of Pb in one liter). In a one-liter volumetric flask, dissolve 0.160 ± 0.001 gm of reagent-grade lead nitrate in 100 to 150 ml of distilled water to which has been added 1 ± 0.1 ml of reagent-grade concentrated HNO_3 , and dilute to the mark with distilled water. The solution should be stored in containers free from lead. Its strength should be checked every few months to learn if the lead content has changed by reaction with the container.
- (b) Hydrogen sulfide water. Saturate distilled water with hydrogen sulfide (H_2S) gas. This solution must be freshly prepared within 4 hours of use.
- (c) Acetic acid solution (approximately one normal). To a one-liter volumetric flask, add 55 ± 2 ml of reagent-grade glacial acetic acid, and dilute to the mark with distilled water.

4.4.8.2 Acceptance criteria. For the lot represented to satisfy the heavy-metals requirement, any color in the sample solution shall not exceed that of the comparison-standard solution.

4.4.9 Iron. Add 2 ± 0.1 ml of reagent-grade HCl to 25 ± 0.1 ml of the solution from 4.4.7(a) through (h) in a Nessler tube, and dilute to 50 ± 0.5 ml. For the comparison-standard solution, add 20 ± 0.1 ml of the iron solution of 4.4.9.1(a) and 2 ± 0.1 ml of reagent-grade concentrated HCl to 25 ± 0.1 ml of the solution from 4.4.7(1) in a Nessler tube, and dilute to 50 ± 0.5 ml. To each solution, add 0.030 to 0.050 gm of reagent-grade ammonium persulfate crystals and 3 ± 0.3 ml of the ammonium thiocyanate solution of 4.4.9.1(b).

4.4.9.1 Reagents.

- (a) Iron solution (0.01 gm of iron Fe) in one liter. Dissolve 0.702 ± 0.001 gm of ferrous ammonium sulfate, $\text{Fe}(\text{NH}_4)_2(\text{SO}_4)_2 \cdot 6\text{H}_2\text{O}$ in 10 ± 0.5 ml of 10 percent H_2SO_4 , and dilute to the mark in a 100-ml volumetric flask. Pipette 10 ml of this solution into a one-liter volumetric flask, add 10 ± 0.5 ml of 10 percent H_2SO_4 and dilute to the mark. (To make 10 percent H_2SO_4 , slowly add 60 ± 0.5 ml of concentrated reagent-grade H_2SO_4 to 750 ml of distilled water, then dilute to one liter in a volumetric flask.)
- (b) Ammonium thiocyanate solution. Dissolve 300 ± 5 gm of ammonium thiocyanate, NH_4CNS , in distilled water and make up to one liter in a volumetric flask.

4.4.9.2 Acceptance criteria. For the lot represented to satisfy the iron-content requirement, any red color in the sample solution shall not exceed that in the comparison-standard solution.

4.4.10 Particle-size determination. Using sieves numbered 40 and 80 (4.4.10.1(a)), assemble the sieves with the coarser sieve on top. Place a tight fitting bottom pan at the base of the stack. Place 200 ± 5 gm of sample (weighed to the nearest 0.1 gm) on the top sieve. Add a sieve cover, and place the stack of sieves in a mechanical shaker (4.4.10.1(b)). Set the electric timer to 15 minutes and start the shaker.

When the shaker has stopped, remove the sieve cover (taking note of any foreign materials or agglomerates retained on the coarse sieve). Remove the bottom pan. Carefully, brush any dust clinging to the underside of each sieve into the sieve or pan below it. Weigh the material retained on each sieve and in the pan (weighing to the nearest 0.1 gm).

$$\text{Percent through a given sieve} = \frac{100(W-A-B)}{W}$$

Where:

- W = Weight of sample taken; gm.
- A = Weight of material retained on a given sieve; gm.
- B = Weight of material retained on all sieves above the given one; gm.

4.4.10.1 Apparatus.

- (a) U.S. Standard sieves, 8-inch diameter (RR-S-366).
- (b) Tyler "Ro-Tap" sieve shaker with automatic timer. (W.S. Tyler Company, Cleveland, Ohio) or approved equivalent.

4.4.10.2 Acceptance criteria. For the lot represented to satisfy the particle-size requirement, the value obtained for percent through any given sieve shall meet the requirement given in 3.4 for that sieve.

4.5 Quality verification. Quality verification for this material shall consist of all acceptance tests of this document plus acceptable performance of the product used in a test batch of Ammonium Nitrate Propellant, N-28 (WS 5051). The latter shall be composed, except for the ammonium oxalate under test, of materials previously found to give satisfactory performance in such batches. The test batch shall be mixed, processed, and tested in accordance with the quality verification paragraphs of WS 5051. However, at the discretion of the procuring activity, quality-verification tests may be waived where evidence of quality verification is provided, such as:

- (a) The quality-verification requirements were previously satisfied by the intended source of supply.

NOTE. One copy of all pertinent data from all quality verification tests shall be furnished to Commander, U.S. Naval Ordnance Test Station (Attn: Code 4574), China Lake, California, and one copy shall be furnished to the procuring activity.

4.6 Packaging, packing, and marking. Determine that all packaging, packing, and marking conforms to section 5 of this document.

5. PREPARATION FOR DELIVERY.

5.1 Preservation and packaging.

5.1.1 Level A. Not applicable.

5.1.2 Level B. Not applicable.

5.1.3 Level C. Packaging shall be in accordance with the manufacturer's commercial practice.

5.2 Packing.

5.2.1 Level A. Not applicable.

5.2.2 Level B. Not applicable.

5.2.3 Level C. The material shall be packed as directed in the contract or purchase order to afford protection against damage during direct shipment from the supply source to the first receiving activity for immediate use. Containers shall comply with common carrier regulations applicable to the mode of transportation to be used. See 6.2.

5.3 Marking.

5.3.1 Special markings. None (unless so required by the contract or purchase order).

5.3.2 Normal markings. In addition to the markings required by the contract or purchase order, unit packages and shipping containers shall be marked in accordance with the requirements of MIL-STD-129.

6. NOTES.

6.1 Intended use. Ammonium oxalate described in this document is intended for use as an ingredient in an ammonium-nitrate-based solid propellant (see WS 5051).

6.2 Ordering data. Procurement documents should specify the following information:

- (a) Title, number, and date of this document.
- (b) Data to be furnished (see 3.2 and 4.5).
- (c) Type and size of shipping containers.
- (d) Designation of test facility, if other than the supplier, to conduct the tests of 4.5.
- (e) Retesting required under provisions of 3.1.1 (a) and (b) will be the supplier's responsibility and will be conducted as designated by the procuring activity at no additional cost to the procuring activity.
- (f) Retesting required under provision of 3.1.1(c) will be conducted as designated by the procuring activity and at the procuring activity's expense.

6.3 Definitions.

6.3.1 Batch. A batch is defined as that quantity of material, having substantially uniform characteristics, which has been subjected to one or more chemical or physical processes (or combinations thereof) intended to produce a desired product. The final step in the processing must have treated the entire contents of the batch at one time.

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6.4 Safety and health warning. When the use of any chemical is specified herein, suitable safety and health precautions should be observed.

Custodian:
NASC 52021E

Preparing Activity:
NWC/China Lake, California
(AIM-9C and -9D)
(AGM-45A)
(XMM-72A)