

MIL-A-159D
16 May 1972
SUPERSEDING
MIL-A-159C
31 January 1962

MILITARY SPECIFICATION

ANTIMONY SULFIDE (For Use in Ammunition)

This specification has been approved by the Department of Defense, and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.

1. SCOPE

1.1 Scope. This specification covers two types and five classes of antimony sulfide.

1.2 Classification. Antimony sulfide shall be of the following types and classes, as specified (see 6.2).

Types

Type I - 0.2 percent free sulfur, maximum

Type II - 0.02 percent free sulfur, maximum

Classes

Class 1 - 100 mesh, nominal

Class 2 - Fine

Class 3 - 100 mesh, nominal, coarse

Class 4 - Lump

Class 5 - 140 mesh, nominal

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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.

SPECIFICATIONS

FEDERAL

- L-P-378 - Polyethylene Film, Thin Gauge
- RR-S-366 - Sieves, Test

MILITARY

- MIL-D-3464 - Desiccants, Activated, Bagged, Packaging Use and Static Dehumidification
- MIL-D-6054 - Drums, Metal, Shipping and Storage
- MIL-D-26993 - Drums, Fibre, for Domestic Shipment of Desiccant

STANDARDS

MILITARY

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

(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.)

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.

DEPARTMENT OF TRANSPORTATION

- 49-CFR-177.10 Department of Transportation rules and regulations for the transportation of hazardous materials

(These regulations may be purchased from the Superintendent of Documents, Government Printing Office, Washington, D.C. 20401.)

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3. REQUIREMENTS

3.1 Material. Antimony sulfide shall be either natural or synthetic.

3.1.1. Preparation. Antimony sulfide shall be prepared by any of the following methods:

- (a) Selection of the natural mineral.
- (b) Liquidation of the crude or needle material.
- (c) Chemical processing of antimony metal, low-grade antimony sulfide, or minerals containing antimony compounds such as antimony oxide.

3.1.2 Characteristics. The product shall have the characteristic shining, needlelike structure, steel-grey color, and hardness of the naturally occurring crystalline mineral. The lump form of the antimony sulfide shall be clean and free from adherent gangue material or scale. Pulverized antimony sulfide shall be free from extraneous material as indicated by visual examination under a magnification that clearly shows the crystal structure. The manufacturer shall certify that the product has these physical characteristics.

3.2 Chemical requirements. Antimony sulfide shall comply with the chemical requirements specified in table I when determined as specified in 4.4.

Table I. Chemical requirements

	Type I percent	Type II percent
Antimony, min.	70.5	70.5
Total sulfur, min.	24.8	24.8
Insoluble material, max.	1.0	1.0
Acidity, max.	0.01	0.01
Lead, max.	0.15	0.15
Iron, max.	0.5	0.5
Free sulfur, max.	0.2	0.02
Arsenic, max.	0.06	0.06
Moisture, max.	0.20	0.20

3.3 Granulation. Antimony sulfide shall comply with the granulation requirements specified in table II when tested as specified in 4.5.

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Table II. Granulation requirements

	Class 1		Class 2		Class 3		Class 4		Class 5	
	min. PERCENT	max. PERCENT								
Through No. 100	95	--	--	--	95	--	--	--	--	--
Retained on No. 140	30	50	--	--	70	--	--	--	--	--
Through No. 140	--	--	97	--	--	--	--	--	--	--
Retained on No. 200	--	--	80	95	--	--	--	--	99.0	--
Through No. 200	20	30	--	--	--	20	--	--	95.0	--

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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 in the contract or order, the supplier 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 Lot formation. The term "lot" as used throughout this specification refers to an inspection lot, which is defined as an essentially homogeneous collection of units of product from which a representative sample is drawn and inspected to determine conformance of the lot with applicable requirements. The sample selected shall represent only that quantity of units from which the sample was drawn and shall not be construed to represent any prior or subsequent quantities presented for inspection. Homogeneity shall be considered to exist provided the lot has been produced by one manufacturer in one unchanged process, in accordance with the same drawings, same drawing revisions, same specifications and same specification revisions. Changes to the process, specification, or drawings not affecting safety, performance, interchangeability, or storage, as determined by the Government, shall not be deemed to alter the homogeneity of the lot. Inspection lots shall comply with MIL-STD-105.

4.3 Sampling. A portion of the stream of the powder flowing into the container shall be diverted into a five pound container. The portions shall be at such intervals so that the representative material from the bottom, middle and top portions of each container is obtained. The sample in the five pound container shall be put through a 16 to 1 sample reducer and run through once to collect a one pound sample. The one pound sample shall then be run through a sample splitter to obtain two samples. The two samples shall be used for lot testing. If any of the samples fails to comply with any of the requirements specified, the lot shall be rejected.

4.4 Chemical tests.

4.4.1 Determination of moisture. Weigh 10 gm. of sample into a tared large weighing dish, heat at 105°C. for 2 hours, cool in a desiccator, and weigh. Calculate as follows:

$$\text{Percent moisture} = \frac{\text{gm. loss in weight}}{\text{gm. of sample}} \times 100$$

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4.4.2 Determination of antimony. Dry a portion of the material (ground to pass a 60 mesh sieve, if necessary) by heating at 105°C. for 1 hour. Cool in a desiccator for 30 minutes. Weigh a 0.2 gm. sample to 0.1 of a mg. and transfer to a wide-mouthed 500 ml. flask containing 3 gm. of ammonium sulfate and 20 ml. of sulfuric acid. Heat strongly over a free flame until the sample is completely decomposed and any sulfur which is present is volatilized. Continue heating for an additional 10 to 15 minutes. Cool to room temperature. Add 60 mg. of flowers of sulfur to the sample and blank, and heat on a hot plate (surface temperature approximately 360°C.) to the formation of white fumes within the flask. Continue heating for an additional 5 minutes. Transfer the flask to a position over a free flame and heat strongly for 1 minute, during which time the sulfur is volatilized from the sides and neck of the flask by using an auxiliary burner. A small sulfur bead should remain in the solution. Remove the flask to an asbestos board, wait 10 seconds (but not more than 20 seconds), and add directly to the flask 20 ml. of a mixture made of equal parts of sulfuric acid and 85 percent phosphoric acid. Mix well and allow to cool to room temperature. Wash down cautiously with 40 ml. of water, heat to boiling, and boil gently for 5 minutes. Cool in an ice bath to below 10°C. Wash down with 50 ml. of cold dilute hydrochloric acid (1 to 1), shake until the white precipitate is completely dissolved, and dilute to 300 ml. with ice water. The temperature of the solution should be about 10°C. If necessary, cool to this temperature in an ice bath. Titrate with 0.05 N potassium permanganate solution to the first definite pink color that persists for 15 seconds. Deduct a blank carried through all steps of the procedure. Calculate as follows:

$$\text{Percent antimony} = \frac{6.088 \text{ VN}}{W}$$

where V = ml. of potassium permanganate solution corrected for the blank
 N = normality of potassium permanganate solution
 W = gm. of sample

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4.4.3 Determination of total sulfur Weigh a 0.5 gm. sample to 0.1 mg. and transfer to a 250 ml. beaker or flask. Add a mixture of 1 ml. of water, 9 ml. of glacial acetic acid, and 6 ml. of bromine. Cover with a watchglass and allow to stand at room temperature for at least 16 hours. Add 20 ml. of hydrochloric acid, warm gently for 1 hour and then evaporate almost to dryness. Add 20 ml. of a 20 percent hydrochloric acid solution (sp. gr. 1.12) and 2 gm. of tartaric acid, and dilute to approximately 150 ml. by the addition of water at a temperature of 80° to 90°C. Precipitate the antimony by the addition to the warm solution, over a period of 20 minutes, of 0.5 gm. of powdered aluminum, a little at a time. Filter and wash with five 30 ml. portions of hot water. Dilute the combined filtrate and washings to approximately 500 ml. with water, heat to boiling, and add 10 ml. of a 10 percent solution of barium chloride dropwise. Boil for 15 minutes, digest on a steam bath for 2 hours, and allow to stand 4 hours or overnight. Filter through a tared porcelain filtering crucible and wash with five 30 ml. portions of hot water. Ignite gently at first and then a cherry-red heat, cool in a desiccator, and weigh. Calculate as follows:

$$\text{Percent total sulfur} = \frac{13.72 \times \text{gm. of BaSO}_4}{\text{gm. of sample}}$$

4.4.4 Determination of insoluble material. Weigh a 5 gm. sample into a 400 ml. beaker and add 150 ml. of hydrochloric acid. Digest on a steam bath until no reaction is evident and until most of the hydrogen sulfide has been expelled. Add 50 ml. of nitric acid and allow to stand on a hot plate for 30 minutes to effect solution of the antimony sulfide and expulsion of hydrogen sulfide. Filter through a tared porcelain filtering crucible of fine porosity and wash with three 25 ml. portions of hot water. Dry the crucible at 105°C. for 30 minutes and heat by means of a gas flame for 5 minutes in order to remove any sulfur present. Cool in a desiccator and weigh. Calculate as follows:

$$\text{Percent insoluble material} = \frac{\text{gm. of residue}}{\text{gm. of sample}} \times 100$$

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4.4.5 Determination of acidity. If necessary, grind a portion of the sample so that it passes through a No. 100 U. S. standard sieve and mix thoroughly. Weigh a 10 gm. sample into a 250 ml. beaker and add 100 ml. of hot water. Heat to boiling while stirring, and filter immediately. Add 2 drops of methyl orange indicator, and if the solution is acid, titrate with 0.01 N potassium hydroxide. Calculate as follows:

$$\text{Percent sulfuric acid} = \frac{4.9 \text{ VN}}{W}$$

where V = ml. of potassium hydroxide solution
 N = normality of potassium hydroxide solution
 W = gm. of sample

4.4.6 Determination of lead.4.4.6.1 Reagents.

Tartaric acid (20 percent). Dissolve 100 gm. of tartaric acid in water and dilute to 500 ml.

Dithizone solution (0.02 percent). Dissolve 0.1 gm. of dithizone in 500 ml. of reagent grade chloroform. This solution will keep about a week.

4.4.6.2 Procedure. Weigh a 3 gm. sample into a 250 ml. beaker, add 30 ml. of hydrochloric acid and boil for 8 to 10 minutes to dissolve the sample and drive off the hydrogen sulfide. Add 20 ml. of water and filter through a medium texture filter paper that has been previously washed with dilute hydrochloric acid (1 to 5). Collect the filtrate in a 400 ml. beaker. Wash with dilute hydrochloric acid (1 to 5) and discard the precipitate. Add 30 ml. of tartaric acid solution (20 percent). Neutralize to litmus paper with ammonium hydroxide and add 5 drops excess ammonium hydroxide. Cool, dilute to about 200 ml. with water, and wash into a 500 ml. separatory funnel. Add 50 ml. of dithizone solution (0.02 percent) and shake for 2 minutes. Allow to settle and drain off the chloroform layer into a clean 400 ml. beaker. Add 10 ml. of chloroform to the separatory funnel, and without shaking, drain into the 400 ml. beaker. Repeat this rinsing treatment with another 10 ml. of chloroform. Use this rinsing technique after every extraction. Extract with another 50 ml. portion of dithizone solution, and then extract with 25 ml. portions until the final extract is green or bluish-green. A total of 2 to 3 extractions will usually be required.

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Evaporate the combined extracts to dryness by heating on an electric hot plate under a hood. Add 5 ml. of nitric acid and 3 ml. of sulfuric acid, cover with a watchglass, and evaporate to fumes of sulfuric acid. Add a few drops of nitric acid with a medicine dropper to complete the destruction of the organic matter. Fume for 5 minutes with the cover lid ajar, cool, and wash down the cover lid and sides of the beaker. Evaporate to fumes of sulfuric acid without the cover lid and fume for 5 minutes. Cool, add 50 ml. of water, cover with a watchglass, and boil for a minute. Allow to stand overnight at room temperature. Filter through a tared 20 ml. sintered porcelain crucible, and transfer and wash the precipitate with dilute sulfuric acid (5 percent). Place the sintered crucible into a 30 ml. porcelain crucible and heat the outside crucible with a Meker burner at full valve opening for 5 minutes. Cool in a desiccator and weigh. Calculate as follows:

$$\text{Percent lead} = \frac{68.33 \times \text{gm. of PbSO}_4}{\text{gm. of sample}}$$

4.4.7 Determination of iron.

4.4.7.1 Reagents.

Standard iron solution (1 ml. = 0.10 mg. iron). Dissolve 1.000 gm. of pure iron (National Bureau of Standards sample 55d) in 75 ml. of hydrochloric acid by warming on a hot plate. Add 3 ml. of hydrogen peroxide (30 percent) and boil for 10 minutes to destroy the peroxide. Cool and dilute to 1 liter in a volumetric flask. Pipet 50 ml. of this solution into a 500 ml. volumetric flask and dilute to the mark.

Hydroxylamine hydrochloride solution (5 percent). Dissolve 25 gm. of hydroxylamine hydrochloride in water and dilute to 500 ml.

Ortho-phenanthroline solution (0.2 percent). Dissolve 1 gm. of ortho-phenanthroline in water and dilute to 500 ml.

Tartaric acid solution (10 percent). Dissolve 50 gm. of tartaric acid in water and dilute to 500 ml.

Sodium acetate solution (50 percent). Dissolve 250 gm. of sodium acetate trihydrate in water and dilute to 500 ml.

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4.4.7.2 Preparation of calibration curve. Measure accurately 1, 2, 3, 5, 6, and 7 ml. of standard iron solution into 200 ml. volumetric flasks, and add 40 ml. of water, 4 ml. of hydrochloric acid, and 4 ml. of tartaric acid solution (10 percent). Carry along a reagent blank. Add 10 ml. of hydroxylamine hydrochloride solution (5 percent) and allow to stand for 15 minutes. Add 10 ml. of orthophenanthroline solution (0.2 percent) and 20 ml. of sodium acetate solution (50 percent) and dilute to the mark with water. Allow to stand for 30 minutes, and read the color at 500 nm setting the spectrophotometer or colorimeter at 100 percent transmittance with the reagent blank. Plot milligrams of iron against absorbance.

4.4.7.3 Procedure. Transfer a 0.5 gm. sample to a covered 400 ml. beaker and add 20 ml. of hydrochloric acid. Boil on a hot plate to dissolve the sample and drive off the hydrogen sulfide. Cool to room temperature and add 20 ml. of tartaric acid solution (10 percent). Wash into a 100 ml. volumetric flask and dilute to the mark. Pipet a 20 ml. aliquot into a 200 ml. volumetric flask, and add 30 ml. of water and 10 ml. of hydroxylamine hydrochloride solution (5 percent). Allow to stand for 15 minutes and then add 10 ml. of ortho-phenanthroline solution (0.2 percent) and 20 ml. of sodium acetate solution (50 percent) and dilute to the mark with water. Allow to stand for 30 minutes, and read the color at 500 nm, setting the spectrophotometer or colorimeter at 100 percent transmittance with the reagent blank. Convert the readings to milligrams of iron by referring the calibration curve. Calculate as follows:

$$\text{Percent iron} = \frac{\text{mg. of iron as read from curve}}{\text{gm. of sample in aliquot}} \times 10$$

4.4.8 Determination of free sulfur. Weigh a 10 gm. sample into an extraction thimble approximately 22 by 80 mm. Add 75 ml. of methylene chloride into a tared 125 ml. extraction flask and extract for 4 hours in a Soxhlet apparatus. Disconnect the flask and evaporate the solution to a volume 3 to 5 ml. by boiling gently under a hood. Evaporate the residual solvent by aeration at room temperature under a hood. Transfer the flask to a vacuum desiccator or a vacuum oven in which a vacuum of 25 to 30 inches of mercury is maintained for 30 minutes. Weigh and calculate as follows:

$$\text{Percent free sulfur} = \frac{\text{gm. of residue}}{\text{gm. of sample}} \times 100$$

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4.4.9 Determination of arsenic.

4.4.9.1 Reagents.

Standard arsenic solution (1 ml. = 0.10 mg. arsenic). Add 0.2641 gm. As_2O_3 to 5 ml. of sodium hydroxide solution (5 percent) contained in a 250 ml. beaker. Swirl for a few minutes, wash down the sides of the beaker with water, and heat to 50°C. to dissolve. Dilute to about 100 ml. and make acid to litmus paper with nitric acid. Cool and dilute to 2 liters in a volumetric flask.

Hydrazine sulfate solution (0.15 percent). Dissolve 0.75 gm. of hydrazine sulfate in 500 ml. of water.

Ammonium molybdate solution (1 percent). Add 70 ml. of sulfuric acid to about 300 ml. of water, cool, and dilute to 500 ml. with water. Add 5 gm. of $(NH_4)_6Mo_7O_{24} \cdot 4H_2O$ and stir to dissolve.

Hydrazine sulfate - ammonium molybdate reagent. Add 30 ml. of ammonium molybdate solution (1 percent) to about 200 ml. of water. Add 3 ml. of hydrazine solution (0.15 percent) and dilute to 300 ml. Prepare fresh daily.

4.4.9.2 Preparation of calibration curve. By means of a microburet or micropipet transfer 0.5, 1, 1.5, 2, 2.5, and 3 ml. aliquots of standard arsenic solution to 250 ml. beakers, and add 10 ml. of water and 15 ml. of nitric acid. Carry along a blank. Place the beakers on the hotplate away from the direct heat and evaporate to complete dryness. Remove from the hotplate and add 50 ml. of hydrazine-ammonium molybdate reagent. Place the 250 ml. beaker into 600 ml. beakers which contain about 525 ml. of tap water that is boiling vigorously. Allow to stand in the boiling water for 15 minutes. Cool to room temperature, transfer to 50 ml. volumetric flasks, and dilute to the mark with water. Read the color at 660 nm, setting the spectrophotometer or colorimeter at 100 percent transmittance with the reagent blank. Plot mg. of arsenic against absorbance.

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4.4.9.3 Procedure. Weigh a 0.5 gm. sample into a 400 ml. beaker and add 10 ml. of nitric acid and 5 ml. of sulfuric acid. Evaporate to fumes of sulfuric acid and with the cover lid ajar, fume strongly for 7 minutes. Allow to cool, and wash down the cover lid with exactly 5 ml. of water. Cool.

Assemble the distillation apparatus as shown in figure 1. Add 20 ml. of water to the graduate, and ice and water to the 400 ml. beaker.

Pour the solution of the sample into the distillation flask and retain the beaker. Add 0.5 gm. hydrazine sulfate and 2 ml. of hydrobromic acid (48 percent) to the distillation flask. Add a total of 10 ml. of hydrochloric acid in two portions to the 250 ml. beaker and decant into the flask. Pour the last portion of the hydrochloric acid around the top of the flask to wash down any adhering material. Do not use any water. Displace the air in the flask with an inert gas (helium, argon, nitrogen, or carbon dioxide) and regulate the flow of the inert gas to 5 bubbles per second at the exit tube. Adjust the Bunsen burner so that its flame is about 3/4 inch in height and heat until the temperature rises to 93°C. (this will take about 4 minutes). Remove the flame momentarily. Now brush the flame back and forth across the bottom of the flask so that the temperature remains at 92° to 95°C. for 5 minutes. Detach the adapter and rinse it with a little water. Wash the solution into a 250 ml. beaker and add 15 ml. of nitric acid. Place the beaker on the hot plate away from the direct heat and evaporate to complete dryness. Carry along blank. Add 50 ml. of hydrazine sulfate-ammonium molybdate reagent and detach the precipitate from the bottom of the beaker by rubbing with a policeman. Rinse down and remove the policeman. Place the 250 ml. beaker into 600 ml. beakers which contain about 525 ml. of tap water that is boiling vigorously. Allow to stand in the boiling water for 15 minutes. Cool to room temperature, transfer to 50 ml. volumetric flasks, and dilute to the mark with water. Read the color at 660 nm, setting the spectrophotometer or colorimeter at 100 percent transmittance with the reagent blank. Convert the reading to mg. of arsenic by referring to the calibration curve. Calculate as follows:

$$\text{Percent arsenic} = \frac{\text{mg. of arsenic as read from curve}}{\text{gm. of sample in aliquot} \times 10}$$

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4.5 Determination of granulation. Using sieves conforming to RR-S-366, the specified sieve or sieves shall be nested on a bottom pan. A weighed portion of 100 grams of the sample shall be placed on the upper sieve. This shall be covered and shaken for 10 minutes by hand or for 5 minutes by means of a mechanical shaker geared to produce 300 plus or minus 15 gyrations and 150 plus or minus 10 taps of the striker per minute. The amounts retained on the sieves and the bottom pan shall be weighed and the percentage calculated to determine compliance with 3.3.

4.6 Rejection. If the sample subjected to test fails to pass the requirements of paragraphs 3.1 and 3.2, the lot shall be rejected. If the sample subjected to test meets the above requirements but fails to pass the requirement of paragraph 3.3, the individual representative samples from each container comprising the lot shall be subjected to this test. A container of the material shall be considered acceptable provided that the individual sample from this container passes the granulation test requirement of paragraph 3.3. If a sample from a container fails to pass this test, the individual container shall be rejected.

5. PREPARATION FOR DELIVERY

5.1 Packing. Packing shall be level A, B, or C, as specified (see 6.2).

5.1.1 Level A. Antimony sulfide shall be packed in 8 gallon (150 lbs.) steel drums conforming to MIL-D-6054. Steel drums shall be with a full open head provided with a twist lock or bolted ring closure. The lid shall have a tubular rubber gasket. The drums shall be provided with a bag liner fabricated from nominal 6 ml. thick polyethylene. Polyethylene bags shall be made from plastic film conforming to L-P-378, type 1, finish 1. All bag seams and closure shall be heat sealed. Three units of desiccant conforming to MIL-D-3464 shall then be put on top of the sealed polyethylene bag (to absorb any moisture which may be entrapped). A printed card identified with marking in accordance with MIL-STD-129 shall be inserted just before the drum is closed.

5.1.2 Level B. Antimony sulfide shall be packed in fiber drums conforming to MIL-A-26993. Polyethylene bag as specified in 5.1.1 shall be provided. Fiber drums shall be a full open head provided with a locking ring closure. Net weight of the material of each drum shall be 150 pounds.

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5.1.3 Level C. Antimony sulfide shall be packed in accordance with manufacturer's commercial practice to assure acceptance by common carrier for safe delivery at first destination for immediate use. Container shall comply with Interstate Commerce Commission Regulations (see Code Federal Regulations 49-CFR-0-10) and regulations of carriers as applicable to the mode of transportation.

5.2 Marking. In addition to any special marking required by the contract or order, shipments shall be marked in accordance with MIL-STD-129.

5.2.1 Each label shall bear the following precautionary marking:

DANGER! MAY BE FATAL IF SWALLOWED OR INHALED.

Do not breathe dust.

Keep container closed.

Use only with adequate ventilation.

Wash thoroughly after handling.

Avoid contact with eyes, skin and clothing.

WARNING! FLAMMABLE. CONTACT WITH ACID OR WATER LIBERATES
POISONOUS GAS OR VAPOR

Keep away from heat, sparks, and open flame.

Keep from contact with oxidizing materials and water or steam.

6. NOTES

6.1 Intended use. Type I is intended for use in the usual priming compositions and also matchhead compositions. Type II is intended for use in Tacot priming compositions. Classes 1, 2, 3, and 5 are intended for use in priming compositions. Class 4 is intended for use in matchhead compositions.

6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Type and class required (see 1.2, 3.2 and 3.3).
- (c) Level of packing required (see 5.1).

Custodian:
Army - MU

Preparing activity:
Army - MU

Review activities:
Army - MU, MD

Project No. 6810-0911

User activities:
DSA - GS

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KEY TO FIGURE 1

1. Distillation flask made from 250 ml. Erlenmeyer flask by attaching an inlet tube 7 mm in width
2. 24/40 ground glass joint
3. Connecting tube (Scientific Glass Apparatus Co., J-225, Catalogue J-5?)
4. 10/30 ground glass joint
5. Thermometer, 0 to 110°C (Scientific Glass Apparatus Co., J-2300, Catalogue J-5?)
6. Condenser, 20 inches in length
7. Adapter, vertical part 4 inches long and is made from tubing 7mm in width
8. 30 ml pharmaceutical graduate
9. 400 ml. beaker
10. Ice and water
11. Bunsen burner

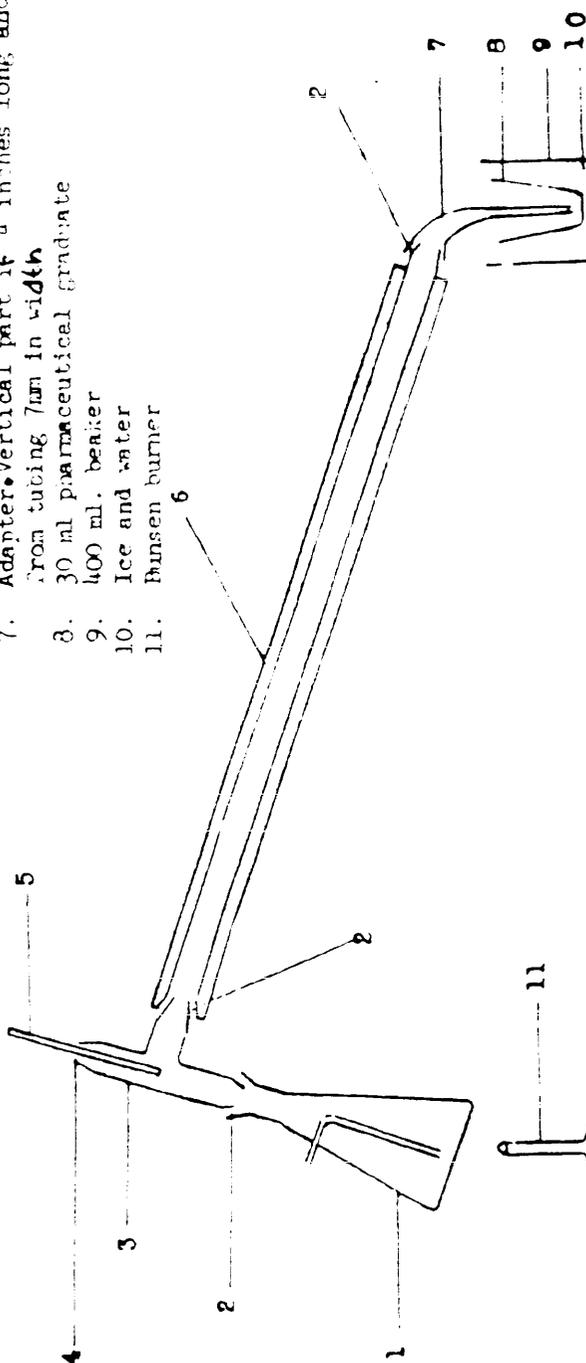


Figure 1. Apparatus for the distillation of arsenic

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DEPARTMENT OF THE ARMY

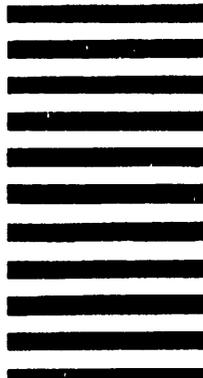


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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

DOCUMENT NUMBER

2. DOCUMENT TITLE

3. NAME OF SUBMITTING ORGANIZATION

4. TYPE OF ORGANIZATION *(Mark one)* VENDOR USER MANUFACTURER OTHER *(Specify):* _____ADDRESS *(Street, City, State, ZIP Code)*

PROBLEM AREAS

a. Paragraph Number and Wording

b. Recommended Wording

c. Reason/Rationale for Recommendation

REMARKS

NAME OF SUBMITTER *(Last, First, MI) - Optional*b WORK TELEPHONE NUMBER *(Include Area Code) - Optional*MAILING ADDRESS *(Street, City, State, ZIP Code) - Optional*

B DATE OF SUBMISSION (YYMMDD)