MIL-C-18164A(OS)
11 June 1968
SUPERSEDING
MIL-C-18164(NOrd)
4 November 1954

MILITARY SPECIFICATION

COMPOSITION D-2

This specification has been approved by the Naval Ordnance Systems Command, Department of the Navy.

1. SCOPE

1.1 This specification covers a composition used to emulsify and densensitize explosives.

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

RR-S-366	Sieve, Test
TT-N-350	Nitrocellulose, Technical (For Use in Organic Coatings)

Military

MIL-N-244	Nitrocellulose
MIL-L-3061	Lecithin (For Use in Explosives)
MIL-W-20553	Wax, Densensitizing

STANDARDS

Military

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

FSC 6850

(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 Preproduction samples - Unless otherwise specified in the contract or order, the preproduction sample shall be prepared by using the methods and procedures proposed for the production lot. The sample shall be tested as specified in Section 4 herein for the purpose of determining that the composition meets the requirements of this specification. Provision of the sample shall be as specified in 4.3.1.

3.1.1 No data is required by this specification or by applicable documents referenced in Section 2, unless specified in the contract or order. (See 6.2)

* 3.2 Composition - The composition by weight of Composition D-2 shall conform to the following percentage requirements:

Wax, desensitizing	84 ± 3
Lecithin	2 ± 0.5
Nitrocellulose	14 ± 1

3.3 Component materials -

* 3.3.1 Wax, desensitizing - The wax used in Composition D-2 shall be a product which conforms to MIL-W-20553, Grade A.

3.3.2 Lecithin - The lecithin for use in Composition D-2 shall be a product which conforms to MIL-L-3061.

* 3.3.3 Nitrocellulose - The nitrocellulose for use in Composition D-2 shall be a product which conforms to TT-N-350, Type II before grinding or milling, or other processing common to the military grade of nitrocellulose. After grinding, the requirements for appearance and film properties as described in TT-N-350 are deleted, and the ethyl acetate solubility requirement is amended to a maximum of 0.4 percent in acetone based on dry weight when tested as specified in 4.4.2.4. Either water or alcohol wet nitrocellulose in the form of short, curly fibers without any pills, pellets, or lumps may be used. It shall meet a 50 to 90 cc fineness requirement when tested as specified in 4.4.2.2.

* 3.4 Preparation - Composition D-2 shall be prepared by melting and mixing the required amounts (see 3.2) of wax, lecithin and nitrocellulose to form a uniform mixture free from foreign matter such as dirt, metal objects, wood, and other visible impurities.

* 3.5 Form - Composition D-2 shall be manufactured in flake form approximately 1/16 inch thick.

3.6 Physical properties -

3.6.1 Moisture - The moisture in Composition D-2 shall not exceed 0.75 percent when tested as specified in 4.4.4.

3.6.2 Dispersion - Composition D-2 shall show no separation when tested for complete emulsification as specified in 4.4.5.

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 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 Classification of inspection -

(a) Preproduction inspection.
(b) Quality conformance inspection.

4.3 Sampling -

* 4.3.1 Preproduction samples - After award of contract but prior to entering quantity production, a preproduction sample shall be prepared for inspection and acceptance tests to determine conformance of the sample with the requirements of the specification. The sample shall be manufactured by the procedure and processes and at the same location proposed by the contractor for the execution of the contract. A 1/2 pound sample of each component material shall also be submitted. Manufacturers who have not previously prepared Composition D-2 should submit a 150 pound preproduction sample to the Commanding Officer, U. S. Naval Weapons Station, Yorktown, Virginia, to determine its conformance to requirements when actually batched as a densensitizer in a high explosive composition for which it is intended. The sample shall be plainly identified by securely attached durable tags or labels marked with the following information:

Sample for preproduction inspection
COMPOSITION D-2
Specification MIL-C-18164A(OS)
Name of manufacturer
Product code number
Date of manufacture
Contract or order number
Batch number

4.3.1.1 When the preproduction sample has been approved, the contractor will be notified and will be authorized by the procuring activity to proceed with production. Any production started before such approval shall be at the contractor's risk. Preproduction samples accepted will be applied as part of the quantity specified by the contract or order. Packaging and shipment of the sample will be in accordance with Section 5.

4.3.1.2 Preproduction sample for subsequent contracts - The necessity for a preproduction sample will be determined by the procuring activity when production under a new contract by the same contractor at the same location follows the preparation of any Composition D-2 covered by this specification (See 6.2).

* 4.3.2 *Quality conformance inspection samples* - The quality conformance inspection samples shall consist of a sample for tests (4.3.4) and samples for examination of filled containers (4.3.5).

* 4.3.3 Lot and batch - A lot shall consist of one or more batches of Composition D-2 offered for delivery at one time. Each lot shall not exceed 85,000 pounds net weight. A batch is defined as that quantity of Composition D-2 that has been manufactured (see 3.4) by some unit chemical or physical mixing process intended to make the final product substantially uniform. Each batch shall be sampled as specified in 4.3.4 for conformance to the quality conformance tests (4.4).

* 4.3.4 Samples for tests - Select a sample of Composition D-2 form approximately every tenth container from each batch during loading operations, and before sealing of containers. Each sample selected from the individual containers shall be of such size that the aggregate quantity is sufficient for test purposes. Composite and thoroughly mix the primary samples, withdraw one pound of the material and place in a stoppered container for moisture determination. The sample material remaining in the original container shall be ground to pass a No. 10 U.S. Standard Sieve conforming to RR-S-366. From this ground material, withdraw a one-pound representative sample and place in a stoppered container for the balance of quality conformance tests (4.4).

* 4.3.5 Sample for examination of filled containers - A random sample of filled containers shall be selected from each lot of Composition D-2 in accordance with MIL-STD-105 at Inspection Level I and Acceptable Quality Level (AQL) of 2.5 percent defective (See 4.4.6).

4.4 Quality conformance tests - Physical and chemical values specified in Section 3 apply to the average of the determinations made of the samples for those values which fall within any stated repeatability or reproducibility limits of the applicable test method. If the sample fails to pass one or more tests, the batch represented shall be rejected.

* 4.4.1 Conformance of Composition D-2 in respect to its appearance (see 3.4) and form (3.5) shall be determined by appropriate examination and testing in accordance with Section 3.

* 4.4.2 Nitrocellulose -

4.4.2.1 Assay - Accurately weigh approximately 3 grams of Composition D-2 to the nearest 0.1 mg and carefully transfer to a weighed Alundum extraction thimble. Place the thimble in a Soxhlet extraction apparatus and using benezene or carbon tetrachloride as the solvent, extract the wax and lecithin from the sample. Adjust the temperature of the heat source so that the solvent drips off the ends of the condenser at the rate of 2 to 3 drops per second. Continue the extraction for twenty cycles or until completion is indicated by the absence of residue when a portion of the solvent from the most recent cycle is evaporated to dryness. Remove the thimble, dry at 105 - 110°C (221 - 230°F), cool in desiccator and weigh. Calculate the amount of nitrocellulose present in the sample.

4.4.2.2 Fineness - The fineness of nitrocellulose shall be determined on the component sample of nitrocellulose submitted by the manufacturer when tested in accordance with the fineness test in MIL-N-244.

4.4.2.3 Appearance - The appearance of the nitrocellulose component shall be determined by visual examination of the sample used in 4.4.2.2.

4.4.2.4 Acetone insolubles - Insoluble matter in acetone shall be determined in accordance with the acetone insolubles test in MIL-N-244.

4.4.3 Wax plus lecithin - The percent of wax and lecithin in Composition D-2 is obtained by subtracting the percent nitrocellulose (4.4.2.1) from 100 percent.

* 4.4.4 Moisture - Accurately weigh approximately 25 grams of the sample of Composition D-2 and transfer it to a dry 500-ml round bottom flask. Add a few pieces of boiling chips or glass beads to prevent bumping. Attach a moisture collecting tube graduated in 0.1 ml which has been previously standardized. To the top of this tube attach a small surface condenser. Add 150 to 200 ml of carbon tetrachloride (free from H_2O) through the moisture collecting tube. Place the apparatus on a steam bath and allow the contents to boil for one hour. The CCl_4 and water are volatilized and condensed to fall back into the measuring tube, the water separating on top of the CCl_4, while the excess CCl_4 runs back into the flask. At the end of one hour, hold the tube in a vertical position and read (1) the top of the upper meniscus of the water layer (straight across), and (2) the top of the carbon tetrachloride layer, estimating to 0.01 ml. on each reading. Record the difference as the volume of water in the specimen. Considering one millimeter of water as equal to one gram, calculate (by weight) the percentage of

moisture in the specimen:

$$\text{Percent of moisture} = \frac{100V}{W}$$

where V - Volume of water in ml.
W - Weight of sample in grams.

4.4.5 Dispersion - Weigh approximately 5 grams of the sample of Composition D-2 and approximately 20 grams of TNT. Place in a 3/4 inch test tube. Support the tube in a water or oil bath maintained at 90 ± 2°C (194 ± 4°F). As soon as the TNT is melted, mix contents thoroughly by vertical motion of a looped wire. After mixing, let the sample stand undistrubed for 5 minutes. No clear layer of TNT should separate in this time.

* 4.4.6 Examination of filled containers - Each sample of filled containers selected in accordance with 4.3.5 shall be examined for defects of contruction of the container and closure, evidence of leakage, and unsatisfactory markings. Any container in the sample having one or more defects or under required fill shall be rejected, and if the number of defective containers in any sample exceeds the acceptance number for the appropriate sampling plan of MIL-STD-105, the lot represented by the sample shall be rejected.

5. PREPARATION FOR DELIVERY

* 5.1 Package and packing -

5.1.1 Levels A and B - Not applicable.

5.1.2 Level C - The Composition D-2 shall be packaged and packed in accordance with the suppliers commercial practice and to insure carrier acceptance and safe delivery to destination in containers complying with the rules and regulations applicable to the mode of transportation. Each container shall be packed not exceeding 50 pounds net weight.

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

6. NOTES

6.1 Intended use - Composition D-2 is intended for use as a densensitizer for explosives.

* 6.2 Ordering data - Procurement documents should specify the following:

(a) Title, number and date of this specification.
(b) Unit quantity and total quantity in pounds.
(c) Special markings when required (see 5.2).
(d) Whether supplemental data is required (See 3.1.1).
(e) Whether preproduction sample is required for subsequent contracts (See 4.3.1.2).

* 6.3 Supersession data - Composition D-2 furnished under MIL-C-18164A(OS) has percentage composition requirements identical to that furnished under the previous issue, MIL-C-18164(NOrd), dated 4 November 1954. Changes in the component material specifications for wax, densensitizing (See 3.3.1), and nitrocellulose (See 3.3.3), do not affect the intended use as specified in the previous issue.

* 6.4 Changes from previous issue - The margins of this specification are marked with an asterisk to indicate where changes (additions, modifications, corrections, deletions) from the previous issue were made. This was done as a convenience only and the Government assumes no liability whatsoever for any inaccuracies in these notations. Bidders and contractors are cautioned to evaluate the requirements of this document based on the entire content irrespective of the marginal notations and relationship to the last previous issue.

Preparing activity:
Navy - OS

(Project 6850-N320)

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DEPARTMENT OF THE NAVY
Naval Weapons Services Office
Attention: Code SSS
Philadelphia, Pennsylvania 19112

POSTAGE AND FEES PAID
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SPECIFICATION ANALYSIS SHEET

Form Approved
Budget Bureau No. 119-R004

INSTRUCTIONS

This sheet is to be filled out by personnel either Government or contractor, involved in the use of the specification in procurement of products for ultimate use by the Department of Defense. This sheet is provided for obtaining information on the use of this specification which will insure that suitable products can be procured with a minimum amount of delay and at the least cost. Comments and the return of this form will be appreciated. Fold on lines on reverse side, staple in corner, and send to preparing activity *(as indicated on reverse hereof).*

SPECIFICATION
MIL-C-18164A(OS), Composition D-2

ORGANIZATION *(Of submitter)*	CITY AND STATE

CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT

MATERIAL PROCURED UNDER A

☐ DIRECT GOVERNMENT CONTRACT ☐ SUBCONTRACT

1. HAS ANY PART OF THE SPECIFICATION CREATED PROBLEMS OR REQUIRED INTERPRETATION IN PROCUREMENT USE?
   A. GIVE PARAGRAPH NUMBER AND WORDING.

   B. RECOMMENDATIONS FOR CORRECTING THE DEFICIENCIES.

2. COMMENTS ON ANY SPECIFICATION REQUIREMENT CONSIDERED TOO RIGID

3. IS THE SPECIFICATION RESTRICTIVE?

   ☐ YES ☐ NO IF "YES", IN WHAT WAY?

4. REMARKS *(Attach any pertinent data which may be of use in improving this specification. If there are additional papers, attach to form and place both in an envelope addressed to preparing activity)*

SUBMITTED *(Printed or typed name and activity)*	DATE

DD FORM 1 NOV 64 1426 REPLACES NAVSHIPS FORM 4863, WHICH IS OBSOLETE C-8277