

**MIL-D-204A**

15 NOVEMBER 1963

SUPERSEDING

JAN-D-304

29 APRIL 1945

## MILITARY SPECIFICATION

# DINITROTOLUENE FOR USE IN EXPLOSIVES

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

**1. SCOPE**

1.1 This specification covers dinitrotoluene for use in explosives.

**2. APPLICABLE DOCUMENTS**

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

**SPECIFICATIONS****FEDERAL**

RR-S-366 —Sieves; Standards, for Testing Purposes.

PPP-D-723 —Drums, Fiber.

**STANDARDS****MILITARY**

MIL-STD-106 —Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-109 —Inspection Terms and Definitions.

**DRAWINGS****ORDNANCE CORPS**

F7548644 —Box, Packing for High Explosives. Assembly Details, Packing and Marking.

F7548645 —Carton, Packing, Reusable-Collapsible for High Explosives, Assembly, Details, Packing and Marking.

**PUBLICATIONS****ORDNANCE CORPS**

ORD-M608-11 —Procedures and Tables for Continuous Sampling by Attributes.

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

2.2 Other publications. The following document forms a part of this specification to the extent specified herein. Unless otherwise indicated, the issue in effect on date of invitation for bids shall apply.

**CODE OF FEDERAL REGULATIONS**

49 CFR 71-90 —Interstate Commerce Commission Rules and Regulations for the Transportation of Explosives and Other Dangerous Articles.

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(The Interstate Commerce Commission Regulations are now a part of the Code of Federal Regulations (1949 Edition and revisions) available from the Superintendent of Documents, Government Printing Office, Washington 25, D.C. Orders for the above publication should cite "49 CFR 71-90 (latest revision)").

**3. REQUIREMENTS**

**3.1 Color.** The dinitrotoluene shall be light yellow through buff.

**3.2** The physical and chemical properties shall be in accordance with Table I. (see 6.2).

TABLE I

Property	Maximum Minimum		Applicable Paragraphs
	Percent		
Solidification point, degree centigrade ("C)	70.5	65.5	4.3.2
Acidity (as Sulfuric acid)	.03		4.3.3
Alkalinity	None		4.3.4
Alcohol or benzene insoluble	.10		4.3.5
Moisture and volatile matter	.25		4.3.6
Granulation through a U.S. Number 16 sieve		95	4.3.7

**4. QUALITY ASSURANCE PROVISIONS**

**4.1 General quality assurance provisions.** The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order. 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. Reference shall be made to Standard MIL-STD-109 in order to define the terms used herein. Inspection shall be performed in accordance with this specification and other specifications referenced in any of the contractual documents.

**4.1.1 Contractor quality assurance system.** If the contractor desires to utilize a quality assurance system, which is at variance with

the quality assurance provisions of 4.2 and 4.3 and other documents referenced herein, he shall submit a written description of the system to the contracting officer for approval prior to initiation of production. It shall include a description covering controls for lot formation and identification, inspections to be performed, inspection stations, sampling procedures, methods of inspection, (measuring and testing equipment), and provisions for control and disposition of non-conforming material. The written description will be considered acceptable when, as a minimum, it provides the quality assurance provisions required by the provisions of 4.2 and 4.3 and the other documents referenced herein. The contractor shall not be restricted to the inspection station or the method of inspection listed in this specification provided that an equivalent control is included in the approved quality assurance procedure. In cases of dispute as to whether certain procedures of the contractor's system provide equal assurance, the comparable procedure of this specification shall apply. The contractor shall notify the Government of, and obtain approval for, any changes to the written procedure that effects the degree of assurance required by this specification or other documents referenced herein.

**4.1.2 Submission of product.** At the time the completed lot of product is submitted to the Government for acceptance, the contractor shall supply the following information accompanied by a certificate which attests that the information provided is correct and applicable to the product submitted:

- (a) A statement that the lot complies with all quality assurance provisions of the approved current written description of the system
- (b) Quantity of product inspected.
- (c) Results obtained for all inspection performed.
- (d) Specification number and date, together with an identification and date of changes.
- (e) Quantity of product in the lot.
- (f) Date submitted.

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The certificate shall be signed by a responsible agent of the certifying organization. The initial certificate submitted shall be substantiated by evidence of the agent's authority to bind his principal. Substantiation of the agent's authority will not be required with subsequent certificates unless, during the course of the contract, this authority is vested in another agent of the certifying organization.

**4.1.3 Government verification.** Using the contractor's written quality assurance procedure (see 4.1.1), this detailed specification, and other contractual documents as a guide, the Government inspector shall verify all quality assurance operations performed by the contractor. Verification shall be in accordance with a or b as applicable, the decision being the responsibility of the procuring activity. In either case, the inspector shall also ascertain, prior to acceptance, that all quality assurance provisions of other specifications referenced in any of the contractual documents have been complied with. Deviations from prescribed or agreed upon procedures discovered by the Government inspector shall be brought to the attention of the supplier. Disposition of the product and remedial action shall be as directed by the Government inspector and, depending on the nature of the deviation, may consist of lot rejection, screening, re-sampling, re-instruction of the supplier's employees, or other appropriate action:

- (a) Verification at the point of manufacture shall be accomplished at unscheduled intervals in accordance with 4.1.3.1 and 4.1.3.2.
- (b) Verification at the point of delivery shall be in accordance with 4.1.3.2.

**4.1.3.1 Surveillance.** Surveillance shall include, but is not limited to:

- (a) Observation of procedures concerning lot formation and identification.
- (b) Observation of sampling procedures and application of acceptance criteria.

- (c) Determination that all required examinations and tests are performed in accordance with the prescribed procedures of this specification, or approved equivalents thereto.
- (d) Review of procedures for control and disposition of non-conforming material.

**4.1.3.2 Product inspection.** Product inspection shall consist of Government inspection of product which has been previously inspected by the contractor and found to meet the quality assurance provisions of this specification. The inspection by the Government shall be performed to the extent necessary in order to determine that the product is of the quality required by this specification and that the contractor's records are reliable.

#### **4.2 Inspection provisions.**

**4.2.1 Lot formation.** A lot shall consist of one or more batches of DNT produced by one manufacturer, in accordance with the same specification, or same specification revision, under one continuous set of operating conditions. Each batch shall consist of that quantity of DNT that has been subjected to the same unit chemical or physical process intended to make the final product homogeneous.

**4.2.2 Examination.** Sampling plans and procedures for the following classification of defects shall be in accordance with Standard MIL-STD-105. Continuous sampling plans, in accordance with Handbook ORD-M608-11 may be used if approved by the procuring activity. Also at the option of the procuring activity, AQL's and sampling plans may be applied to the individual characteristics listed using an AQL of 0.25 percent for each major defect and an AQL of 0.40 percent for each minor defect.

**4.2.2.1 Wooden box or fiberboard carton,** prior to closing (see dwgs. F7548644 and F7548645).

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Categories	Defects	Method of inspection	Code No. (See 6.1)
Critical:	None defined		
Major:	AQL 0.40 percent		
	101. Liner pierced or torn	Visual	01001
	102. Liner improperly closed	Visual	01002
	103. Foreign matter	Visual	01003
Minor:	AQL 0.40 percent		
	201. Type of liner incorrect	Visual	01004

4.2.2.2 Sealed wooden box (see dwg. F7548644).

Categories	Defects	Method of inspection	Code No.
Critical:	None defined		
Major:	AQL 1.00 percent		
	101. Box damaged	Visual	02001
	102. DOD symbol misleading or unidentifiable	Visual	02002
	103. Top improperly assembled	Visual	02003
	104. Strapping broken or loose	Visual	02004
Minor:	AQL 1.50 percent		
	201. Nail protruding	Visual	02005
	202. Marking misleading or unidentifiable	Visual	02006
	203. Strapping improperly assembled	Visual	02007

4.2.2.3 Sealed fiberboard carton (see dwgs. F7548645).

Categories	Defects	Method of inspection	Code No.
Critical:	None defined		
Major:	AQL 0.40 percent		
	101. Carton torn or pierced	Visual	03001
	102. DOD symbol misleading or unidentifiable	Visual	03002
	103. Strapping broken or loose	Visual	03003
Minor:	AQL 0.40 percent		
	201. Marking misleading or unidentifiable	Visual	03004

#### 4.2.3 Testing.

##### 4.2.3.1 Sampling.

4.2.3.1.1 Packed by lot. A random sample of 8 containers shall be selected from each lot. When lots comprise 8 containers or less, each container shall be selected.

4.2.3.1.1.1 Preparation of composite sample. A 2 ounce primary sample of the dinitrotoluene shall be removed from each of the 8 containers in order to equal 16 ounces. If there are less than 8 containers, primary samples in sufficient quantity to equal 16

ounces shall be removed from each container. The individual primary samples shall then be combined in order to form a homogeneous composite sample of 16 ounces. The determinations shall be performed as specified in 4.3. If the composite sample fails to comply with any of the requirements specified, the lot shall be rejected.

4.2.3.1.2 Prior to packing. Equal primary samples shall be taken from different places and depths so as to form a representative sample of the lot. The individual primary samples shall then be combined in order to form a homogeneous composite sample of 16 ounces. The testing shall be performed as specified in 4.3. If the composite sample fails to comply with any of the requirements specified, the lot shall be rejected.

#### 4.3 Test methods and procedures. (See 6.2.)

4.3.1 Color. The color shall be determined by visual examination. Code No. 04001.

4.3.2 Solidification point. Forty to fifty grams (gm.) of the sample shall be dried for 4 hours at 40°C. The specimens shall be transferred to the inner tube of the solidification point apparatus shown in figure 1 and melted. A 76 millimeter partial immersion thermometer number 93C<sup>1</sup> (range 60-90°C) shall be inserted. The specimen shall be stirred vigorously throughout the determination. The temperature shall be carefully watched and recorded every 15 seconds. The temperature shall rise when solidification begins and the maximum temperature obtained shall be the solidification point. Code No. 05001.

4.3.3 Acidity. Ten gm. of the sample shall be dissolved in 30 milliliters (ml.) of benzene and 100 ml. of carbon dioxide free distilled water in a 250 ml. glass stopper bottle. The stopper shall be wet with distilled water and placed in the bottle and the bottle shaken vigorously until the sample dissolves. Bromothymol blue indicator shall be added. If yellow, the solution shall be titrated with .01 normal sodium hydroxide. A blank shall

<sup>1</sup> American Standard Testing Method

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be conducted and the percent acid calculated as follows:

$$\text{Percent acid} = \frac{4.9 (A-B) N}{W}$$

where:

A = ml. of sodium hydroxide used in sample.

B = ml. of sodium hydroxide used in blank.

N = normality of sodium hydroxide.

W = weight of sample.

Code No. 06001.

4.3.4 *Alkalinity.* A definite alkaline reaction to bromethynol blue in the acidity test shall be an indication of excessive alkalinity. Code No. 07001.

4.3.5 *Insoluble matter.* A specimen of 10 gm. shall be dissolved in 150 ml. of boiling benzene or 95 percent ethyl alcohol. The hot solution shall be filtered through a tared filtering crucible. The residue shall be washed with hot benzene or alcohol. The crucible shall be aspirated until the odor of the solvent is no longer detectible. The crucible and residue shall be dried at  $75 \pm 2^\circ\text{C}$ . for 1 hour, cooled in a desiccator and weighed. The gain in weight shall be calculated as percent of insoluble matter. Code No. 08001.

4.3.6 *Moisture and volatile matter.* A 5 gm. specimen shall be spread on a tared watch glass and dried for 1 hour in a desiccator containing calcium chloride and evacuated to a pressure of  $380 \pm 20$  millimeters of mercury. The desiccator shall be kept at a temperature of  $25 \pm 5^\circ\text{C}$ . The loss in weight shall be calculated as percent of moisture and volatile matter. Code No. 09001.

4.3.7 *Granulation.* A specimen of 100 gm. shall be placed in a U. S. Standard number 16 sieve along with a metal washer or similar object. A cover shall be placed on the sieve and sieved by hand or by a tap machine for 3 minutes or until no more material passes through the sieve. The material remaining on the sieve shall be weighed and calculated to percent passing through the sieve. Code No. 10001.

## 5. PREPARATION FOR DELIVERY

## 5.1 Packing.

5.1.1 *Level A.* Dinitrotoluene shall be packed as shown on Drawing 7548644 except that a polyethylene coated bag liner as specified on the drawing shall be used. Alternately, a fiber drum complying with Type II, Grade A, foil laminated construction, in accordance with Specification PPP-D-723 may be used. A polyethylene coated, creped kraft paper bag liner shall be used in the drum. The polyethylene coating shall be not less than .0015 inch thick. Net weight shall be approximately 300 pounds.

5.1.2 *Level B.* Dinitrotoluene shall be packed as shown on Drawing 7548645 except that a polyethylene coated bag liner as shown on the drawing shall be used. Alternatively, a fiber drum complying with Type I, Grade A, Class 2 (foil laminated construction), in accordance with Specification PPP-D-723 may be used. A liner as specified in 5.1.1 shall be used. Net weight shall be approximately 300 pounds.

5.2 *Marking.* Boxes shall be marked as specified on the applicable drawings except that the ICC Nomenclature, "HIGH EXPLOSIVES—DANGEROUS" shall be omitted. Drums shall be marked on the sidewall only with the same information as required for marking the side of boxes.

## 6. NOTES

6.1 *Ordering data.* Procurement documents should specify the title, number and date of this specification.

6.2 *International standardization agreement.* Certain provisions, section 3 and 4.3, of this specification are subject to international standardization agreement STANAG No. 4041. When amendment, revision, or cancellation of this specification is proposed, the departmental custodians will inform their respective Departmental Standardization Offices so that appropriate action may be taken respecting the international agreement concerned.

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**6.3 Inspection code numbers.** The five-digit code numbers assigned to the inspection herein are to facilitate future data collection and analysis by the Government.

**Notice.** When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government

thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

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Army—MU

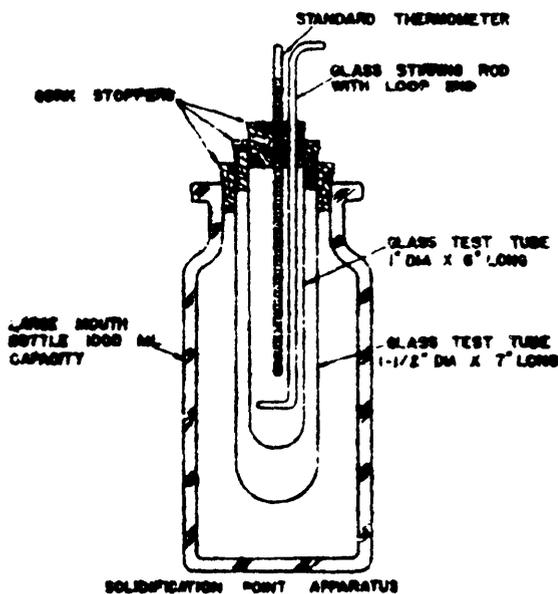
Navy—Bureau of Naval Weapons

Air Force—OAMA

International Interest (see 6.2)

**Preparing activity:**

Army—MU



**FIGURE 1**

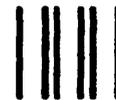
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