

MIL-B-50474 (MU)
21 November 1969

MILITARY SPECIFICATION

BLASTING AGENT - TNT

1. SCOPE

1.1 This specification covers a type of spherical Trinitrotoluene (TNT) which is a water-proof free-flowing explosive used for quarrying and/or supplementing large diameter canned or cartridged charges. (See 6.3)

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

MILITARY

MIL-T-248 - Trinitrotoluene (TNT)

STANDARDS

MILITARY

MIL-STD-105	-	Sampling Procedures and Tables for Inspection by Attributes (ABC-STD-105)
MIL-STD-109	-	Quality Assurance Terms and Definitions
MIL-STD-650	-	Explosive: Sampling, Inspection and Testing
MIL-STD-1167	-	Ammunition Data Cards
MIL-STD-1235	-	Single and Multilevel Continuous Sampling Procedures and Tables for Inspection by Attributes

FSC: 1375

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DRAWINGS

ORDNANCE CORPS

- C9249162 - Box, Packing, Ammunition for
TNT Granular
- C9249163 - Container, Ammunition, Fiber,
PA52 for Trinitrotoluene: TNT
Granular

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

3. REQUIREMENTS

3.1 Material.-The material shall be a free-flowing product of TNT complying with the requirements of MIL-T-248 except that the TNT used may have a solidification point of 80.0°C minimum, and the product shall be in the form of spherical pellets. In addition, the material shall conform to the requirements of Table I when tested in accordance with applicable paragraphs of 4.4 NOTE: The tests depicted in 4.4 except for 4.4.3 shall be performed on dried samples (moisture content less than 0.1%) See 4.3.3.

TABLE I

<u>Property</u>	<u>Requirement</u>	<u>Test Paragraph</u>
Color	Light Yellow Through Buff	4.4.1
Solidification Point, degree centigrade (°C)	80.0 min.	4.4.2
Moisture, percent	2.0 max.	4.4.3
Density, bulk, g/cc	0.90 - 1.05	4.4.4
Acidity (as sulfuric acid), percent	0.02 max.	4.4.5
Alkalinity	None	4.4.6
Insoluble matter, percent	0.05 max.	4.4.7
Sodium, percent	0.001 max.	4.4.8

3.2 Granulation.-The spherical TNT shall conform to the granulation requirements of Table II when determined in accordance with 4.4.9.

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TABLE IIDistributionPercent by Weight

Retained on a No. 4 Tyler screen	6.0 max.
Retained on a No. 10 Tyler screen	100.0

3.3 Workmanship.-The material shall be processed in a manner that will produce the high quality material necessary to meet the requirements of this specification. The material shall be free of dirt, chips, and other foreign matter.

3.4 First article testing.-This specification makes provisions for first article testing. Submission of first article quantity by the contractor shall be as specified in the contract.

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. Reference shall be made to Standard MIL-STD-109 in order to define the terms used herein.

4.1.1 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 being submitted:

- a. A statement that the lot complies with all requirements and quality assurance provisions specified in this specification.
- b. Specification number and date, together with an identification and date of changes.
- c. Certificates of analysis on all materials used directly by the contractor when such material is controlled by Government specifications shall be made available upon request by the Contracting Officer.
- d. Quantity of product in the lot.
- e. 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.

4.2 First Article Inspection

4.2.1 Submission.-The contractor shall submit a first article sample consisting of 1 lb of blasting agent in accordance with instructions issued by the Contracting Officer. All samples submitted shall have been produced by the contractor using the same production processes, procedures, and equipment as will be used in fulfilling the contract. All materials, including packaging and packing, shall be obtained from the same sources of supply as will be used in regular production. The sample shall be accompanied by certificates of analysis. A first article quantity, or portion thereof, as directed by the Contracting Officer, shall also be submitted whenever there is a lapse in production for a period in excess of 90 days, or whenever a change occurs in manufacturing process, material used, drawing, specification or source of supply as to significantly affect product uniformity as determined by the Government. Prior to submission, the contractor shall inspect the sample to the degree necessary to assure that it conforms to the requirements of the contract and submit a record of this inspection with the sample. A sample containing known defects will not be submitted unless specifically authorized by the Contracting Officer.

4.2.2 Inspections to be performed.-The sample will be subjected by the Government to any or all of the examinations or tests specified in 4.3 and 4.4 of this specification and any or all requirements of the applicable drawings.

4.2.3 Rejection.-If any sample fails to comply with any of the applicable requirements, the first article quantity shall be rejected. The Government reserves the right to terminate its inspection upon any failure of a sample to comply with any of the stated requirements. In the event of rejection, the Government reserves the right to require the contractor to take corrective action and submit a new first article quantity or portion thereof. Until a first article quantity is accepted, the contractor is in no way authorized by the Government to resume regular production unless otherwise directed by the Contracting Officer.

4.3 Inspection provisions

4.3.1 Lot formation.-A lot shall consist of one or more batches of blasting agent of the same type from one individual lot of TNT produced by one manufacturer in accordance with the

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same specification, or same specification revision under one continuous set of operating conditions. Each batch shall consist of that quantity of the trinitrotoluene that has been subjected to the same unit chemical or physical mixing process intended to make the final product homogeneous. The product shall be submitted for inspection in accordance with MIL-STD-105 (or Standard MIL-STD-1235 when applicable).

4.3.2 Examination.-Sampling plans and procedures for the following classifications of defects shall be in accordance with MIL-STD-105 (ABC-STD-105), except that inspection for critical defects shall be 100 percent. Contractor's sampling plans, if used, shall be approved by the Government and shall provide, as a minimum, the protection afforded the Government by the sampling plans in MIL-STD-105. Continuous sampling plans in accordance with MIL-STD-1235 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 0.40 percent for each Major defect and an AQL of 0.65 percent for each Minor defect except where 100 percent inspection is specified.

4.3.2.1 Charge, prior to insertion into bag (see dwg. C9249163)

Categories	Defects	Method of Inspection	Code No. (See 6.2)
Critical: None defined			
Major: None defined			
Minor:	AQL 0.65 Percent		
201.	Weight of charge incorrect	Balance	01001

4.3.2.2 Filled Bag, prior to insertion into fiber container (See dwg. C9249163)

Categories	Defects	Method of Inspection	Code No.
Critical: None defined			
Major: None defined			
Minor:	AQL 1.00 Percent		
201.	Bag cut or damaged	Visual	02001
202.	Bag improperly sealed	Visual	02002

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4.3.2.3 Unsealed fiber container, prior to applying cover
(See dwg. C9249163)

Categories	Defects	Method of Inspection	Code No.
Critical: None defined			
Major:	AQL 0.40 Percent		
101.	Contents missing	Visual	03001
Minor:	AQL 0.65 Percent		
201.	Insufficient cushioning material	Visual/Manual	03002

4.3.2.4 Unsealed fiber container (see dwg. C9249163)

Categories	Defects	Method of Inspection	Code No.
Critical: None defined			
Major: None defined			
Minor:	AQL 0.65 Percent		
201.	Gap between cover and body excessive (exceeds 1/8 inch)	Scale	04001

4.3.2.5 Sealed fiber container (See dwg. C9249163)

Categories	Defects	Method of Inspection	Code No.
Critical: None defined			
Major:	AQL 0.65 Percent		
101.	Tape incomplete or badly wrinkled	Visual	05001
102.	Container cut or damaged	Visual	05002
103.	Metal end loose or distorted	Visual/Manual	05003
Minor:	AQL 1.50 Percent		
201.	Tear tab length incorrect	Scale	05004
202.	Color of tape incorrect	Visual	05005
203.	Marking misleading or unidentifiable	Visual	05006
204.	Contents loose in container	Manual	05007

4.3.2.6 Sealed wooden boxes (See dwg. C9249162)

Categories	Defects	Method of Inspection	Code
Critical: None defined			

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Major:		AQL 0.65 Percent	
101.	Top improperly assembled	Visual	06001
102.	Box damaged	Visual	06002
103.	Hardware or strapping missing, broken or loose	Visual/Manual	05003
104.	Board broken or split	Visual	06004
Minor:		AQL 2.50 Percent	
201.	Nail protruding	Visual	06005
202.	Strapping improperly assembled	Visual	06006
203.	Marking misleading or unidentifiable	Visual	06007
204.	Metallic seal missing, unsealed or improperly attached	Visual	06008
205.	Handle missing or insecure	Visual/Manual	06009
206.	Contents loose	Manual	06010
207.	Hardware improperly engaged	Visual	06011

4.3.3 Sampling.--The tests depicted in 4.4 except for 4.4.9 shall be performed on four individual samples selected randomly from each of four batches in the lot. (See NOTE) If any of these four samples fail to comply with any of the requirements specified in 3.1, the lot shall be rejected. When lots are comprised of four batches or less, all the batches in the lot shall be selected. The tests depicted in 4.4.9 shall be performed on a sample which is prepared by taking equal quantities of approximately 100 grams from four batches, combining these portions with mixing to form a composite sample. If this sample fails to comply with the requirements specified in 3.2, the lot shall be rejected.

NOTE: The tests depicted in 4.4 except for 4.4.3 shall be performed on dried samples of TNT (moisture content less than 0.1%).

4.3.4 Inspection equipment.--For the performance of all tests and examinations specified in 4.3 and 4.4, commercial inspection equipment should be employed (see 6.4). The contractor shall have available, and utilize correctly, this equipment and is charged with the responsibility of insuring that proper calibration procedures are followed. Government approval of all inspection equipment is required prior to its use for acceptance purposes.

4.4 Test Methods and Procedures

4.4.1 Color, Major Defect, Defect Code No. 07001.--The color of the TNT shall be determined from visual examination.

4.4.2 Determination of solidification point, Major Defect, Defect Code No. 08001.--The determination shall be conducted as follows: Melt a sample of approximately 50 grams (gm) of TNT in a covered 250 milliliter (ml) beaker by immersing the beaker in a water bath at 95° to 100° centigrade for 15 minutes. Fill the inner tube of the solidification point apparatus shown on figure 1 to within 1.5 inches of its top, with the molten TNT. Insert the stirrer and

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thermometer in the tube and place the tube and contents in a water bath at 95° to 100° centigrade for 5 minutes. Remove the tube from the water bath and place it in the apparatus. Stir the molten material constantly, making approximately one up and down motion of the stirrer per second. Using a 76 millimeter particle immersion American Standard Testing Method Thermometer, number 93 C., with a range of 60° - 130° centigrade, record the temperature of the molten material every 30 seconds until solidification begins as indicated by the temperature of the samples rising after reaching a minimum. Continue the stirring until the temperature reaches a maximum, which is taken as the freezing point.

NOTE: A glycerin bath and a National Bureau of Standard Thermometer with a range of 79-82 degrees centigrade (°C) may be used as an alternate bath and thermometer.

4.4.3 Moisture, Major Defect, Defect Code No. 09001.-The moisture shall be determined in accordance with Standard MIL-STD-650 Method 101.4.

4.4.4 Density, bulk, Major Defect, Defect Code No. 10001.-The density of the TNT shall be determined in accordance with MIL-STD-650, Method 201.3.

4.4.5 Acidity, Major Defect, Defect Code No. 11001.-Ten grams 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, 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 0.01 normal sodium hydroxide. A blank shall be run 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.

4.4.6 Alkalinity, Major Defect, Defect Code No. 12001.-The sample from 4.4.5 shall be considered unsatisfactory with respect to alkalinity when there is a definite alkaline color reaction with bromothymol blue.

4.4.7 Insoluble matter, Major Defect, Defect Code No. 13001.-A 10 gram sample, weighed to the nearest 0.01 g, shall be dissolved in 100 ml benzene and then filtered through a filtering crucible. The residue in the filtering crucible shall be washed thoroughly.

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with small portions of benzene. After washing, the crucible shall be dried at 100°C until the constant weight is reached. Calculate the percent of benzene-insoluble material as follows:

$$\text{Percent benzene-insoluble material} = \frac{100 A}{W}$$

Where:

A = weight of residue, in g

W = weight of sample used, in g

4.4.8 Sodium, Major Defect, Defect Code No. 14001.-The sodium content of the TNT shall be determined in accordance with MIL-T-248, paragraph 4.3.7.

4.4.9 Granulation, Major Defect, Defect Code No. 15001.-Place a weighed sample of 100 grams, together with a metal washer or porcelain crucible lid, on the specified sieve. If more than one sieve is required, nest the series in increasing order of fineness with the coarsest sieve on top so that material passing through a sieve is transferred directly to the next sieve in the series. Attach a bottom pan to the assembly, cover and shake for 3 minutes by hand, or mechanically. The portions retained or passed by the various sieves shall be weighed and the results shall be calculated as follows:

$$\text{Retained, percent} = \frac{A + B}{W} \times 100$$

$$\text{Through, percent} = \frac{W - (A + B)}{W} \times 100$$

Where:

A = weight retained on designated sieve, in g.

B = weight retained on sieves nested above designated sieve, in g

W = weight of sample, in g.

5. PREPARATION FOR DELIVERY

5.1 Packaging.-Level A.-The blasting agent - TNT shall be packaged in accordance with Dwg. C9249163.

5.2 Packing.-Level A.-Packing shall be in accordance with Dwg. C9249162.

5.3 Marking.-The marking shall be in accordance with Dwg. C9249162 and Dwg. C9249163.

6. NOTES

6.1 Ordering data.-Procurement documents should specify the following:

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- a. Title, number and date of this document.
- b. Data cards shall be prepared for each lot in accordance with Standard MIL-STD-1167.
- c. Provisions for submission of first article samples.

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

6.3 Intended use.-The material covered by this specification is intended to be used for quarrying and/or supplementing large diameter canned or cartridged charges when it is difficult or impractical to get high loading densities by slitting and tamping, as in water filled holes or in extremely cold weather.

6.4 Inspection equipment

6.4.1 Commercial inspection equipment is defined in AMC Regulation 702-2.

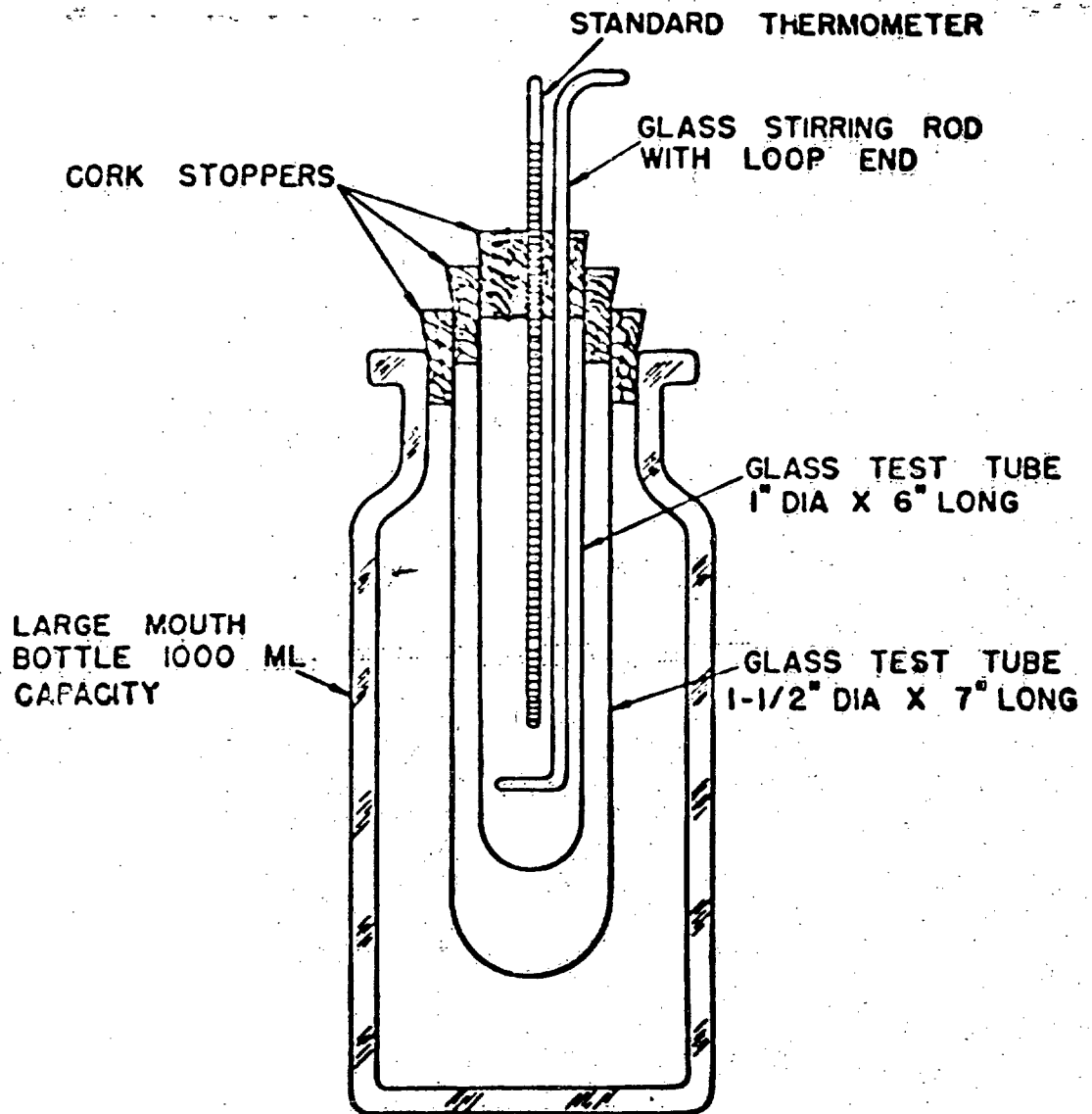
6.4.2 Contractor-designed equipment.-In the event that a contractor elects to design his own inspection equipment, details of the design (drawings, description, materials, etc.) shall be submitted to: Commanding Officer, Picatinny Arsenal, ATTN: SMUPA-ND8, Dover, New Jersey, for approval prior to fabrication and use. Approval of such designs may be delegated to the contract administration office for minor defects only.

Custodian:
Army-MU

Preparing activity:
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SOLIDIFICATION POINT APPARATUS

FIGURE 1.

