

MIL-T-339C
9 February 1973
SUPERSEDING
MIL-T-00339B
16 April 1971

MILITARY SPECIFICATION

TETRYL (TRINITROPHENYLMETHYLNITRAMINE)

This specification is approved for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Tetryl covered by this specification is a high explosive intended for use in ammunition.

2. APPLICABLE DOCUMENTS

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

STANDARDS

- 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-1168 - Lot Numbering of Ammunition
- MIL-STD-1235 - Single and Multilevel Continuous Sampling Procedures and Tables for Inspection by Attributes

DRAWINGS

ORDNANCE CORPS

- 7548644 - Box, Packing for High Explosives, Assembly, Details, Packing and Marking

FSC: 1376

MIL-T-339C

7548645 - Carton, Packing, Reusable-Collapsible
for High Explosives, Assembly, Details
Packing and Marking

(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.

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARDS

E168 - General Techniques of Infrared Quantitative
Analysis

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, Pennsylvania 19103).

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal Agencies).

3. REQUIREMENTS

3.1 Tetryl shall be trinitrophenylmethylnitramine of high chemical purity; light yellow in color; manufactured from raw materials that will produce tetryl meeting the requirements of this specification; refined by a solvent process; crystallized from an approved solvent. Tetryl that has been reworked because of non-compliance with specification requirements, or tetryl that has been recovered from spent acid or filter catch boxes and reworked, shall be considered for acceptance. Tetryl reclaimed from loading operations shall not be offered for acceptance unless the material has been reworked to meet the requirements of this specification.

3.1.1 No sodium carbonate or other alkali shall be added to any of the wash water used in the manufacture of tetryl.

3.2 Chemical and Physical Properties

MIL-T-339C

3.2.1 Moisture.-The moisture shall be 0.10 percent maximum (max.), when tested as specified in 4.4.2.

3.2.2 Melting point.-The melting point shall be 129.5 degree Centigrade ($^{\circ}\text{C}$) max., and 128.8 $^{\circ}\text{C}$ minimum (min.), when tested as specified in 4.4.3.

3.2.3 Insoluble material.-The insoluble material shall be 0.10 percent max., when tested as specified in 4.4.4.

3.2.4 Acidity (as sulfuric acid).-The acidity (as sulfuric acid) shall be 0.02 percent max., when tested as specified in 4.4.5.

3.2.5 Grit, number of particles.-The number of grit particles shall be 3 max., when tested as specified in 4.4.6.

3.3 Granulation.-The tetryl shall comply with the following granulation requirements when determined as specified in 4.4.7.

<u>Through U.S. Standard Sieve Number (#)</u>	<u>Percent</u>
12, min.	100
16, min.	95
60, max.	30
100, max.	5

3.4 Infrared Spectrum.-The tetryl shall have an infrared spectrum with peaks consistant with those in Figure 1 when tested as specified in 4.4.8. The infrared spectrum shall contain no extraneous significant peaks. A significant peak is defined as a peak having an absorbance greater than 10 percent beyond the normal background.

3.5 Adhesion of glued carton joints.-If glued cartons are used for packaging, each glued joint shall meet the requirements for fiber failure as given on dwg. 7548645 when determined as specified in 4.4.9.

3.6 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

MIL-T-339C

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 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.

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 tetryl in accordance with instructions issued by the Contracting Officer for evaluation in accordance with paragraph 4.2.2. All samples submitted shall have been produced by the contractor using

MIL-T-339C

the same production process, 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.

4.3 Inspection provisions

4.3.1 Lot formation.-A lot shall consist of one or more batches of tetryl produced by one manufacturer in accordance with the same specification, or same specification revisions under one continuous set of operating conditions. Whenever the source of supply changes for dimethylaniline the lot shall be changed. Each batch shall consist of that quantity of tetryl 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). The criteria and procedures for the assignment of lot numbers shall be in accordance with Standard MIL-STD-1168.

4.3.2 Examination.-Sampling plans and procedures for the following classifications of defects shall be in accordance with MIL-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 Box or carton prior to closing (see dw.g 7548644 and 7548645)

Categories	Defects	Method of Inspection	Code No. (see 6.3)
Critical: None defined			
Major:	AQL 0.65 percent		
101.	Foreign matter	Visual	01001
102.	Liner pierced or torn	Visual	01002
103.	Liner improperly closed	Visual	01003
Minor:	AQL 0.65 percent		
201.	Type of liner incorrect	Visual	01004

4.3.2.2 Sealed boxes (see dwg. 7548644)

Categories	Defects	Method of Inspection	Code No.
Critical: None defined.			
Major:	AQL 0.65 percent		
101.	Top improperly assembled	Visual/Manual	02001
102.	Box damaged	Visual	02002
103.	Lot number misleading or unidentifiable	Visual	02003
104.	Strapping missing, broken, or loose	Visual/Manual	02004

MIL-T-339C

Minor: AQL 1.00 percent
 201. Strapping improperly assembled Visual/Manual 02005
 202. Marking misleading or unidentifiable

4.3.2.3 Sealed fiberboard carton (see dwg. 7548645)

Categories	Defects	Method of Inspection	Code No.
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Critical: None defined

Major:	AQL 0.40 percent		
101.	Assembly torn or pierced	Visual	03001
102.	Lot number misleading or unidentifiable	Visual	03002

Minor:	AQL 1.50 percent		
201.	Stiches missing or loose	Visual	03004
202.	Marking misleading or unidentifiable	Visual	03005
203.	Banding strips missing, broken, or improperly applied	Visual/Manual	03006

4.3.3 Testing

4.3.3.1 Infrared spectrum (see 3.4), Major defect, Code No. 11001.-A representative sample shall be selected from each lot produced. If the sample fails to meet the requirement specified the lot shall be rejected. The test shall be performed as specified in 4.4.8.

4.3.3.2 Moisture (see 3.2.1), Major defect, Code No. 05001.-A representative sample shall be selected from each batch of approximately 50 grams. If the sample fails to meet the requirement the batch shall be rejected. The test shall be performed as specified in 4.4.2.

4.3.3.3 Adhesion of glued carton joints (see 3.5), Major defect, Code No. 12001.-Empty fiberboard cartons shall be sample in accordance with Special Inspection Level S-3 with AQL 4.0%. The test shall be performed as specified in 4.4.9. The sample size represents the number of individual cartons to be sampled. Each glued joint on the sampled cartons will be tested.

MIL-T-339C

4.3.3.4 Sampling for tests 4.4.1 and 4.4.3 through 4.4.7.-A representative sample of approximately 200 grams of tetryl shall be selected from each batch. The inspection of the samples shall be in accordance with MIL-STD-1235, CSP-1 Plan, Inspection Level II, AQL 6.5%. If any sample fails to meet any test requirement the batch represented by the sample shall be rejected. All batches produced between the time that the last batch was tested and accepted and the batch which failed shall be tested in accordance with the applicable methods given in paragraph 4.4. If any of these batches fail to meet any of the test requirements, that batch shall also, be rejected. In addition, after any failure of a batch the contractor will return to 100% inspection until "1" successive batches are accepted as required by MIL-STD-1235. The classification and code number shall be as given in Table I.

TABLE I

<u>Test</u>	<u>Classification</u>	<u>Code No.</u>
Color (see 3.1)	Major	04001
Melting point (see 3.2.2)	Major	06001
Insoluble material (see 3.2.3)	Major	07001
Acidity (see 3.2.4)	Major	08001
Grit (see 3.2.5)	Major	09001
Granulation (see 3.3)	Major	10001

4.4 Test Methods and Procedures

4.4.1 Color.-Color shall be determined by visual examination.

4.4.2 Moisture

4.4.2.1 Moisture and Volatiles (oven method).-This test shall be performed in accordance with Method 101.5 of Standard MIL-STD-650.

4.4.2.2 Karl Fisher Alternate Method.-The moisture shall be determined in accordance with Method 101.4 of Standard MIL-STD-650 with the following modifications:

- a. The specimen shall be 3 to 4 gm. of tetryl.
- b. Commercially available Karl Fisher Reagent, Single Solution, Stabilized shall be used.
- c. The solvent shall be 1:1 Benzene/Methyl Alcohol.

MIL-T-339C

d. Any suitable titration assembly may be used.
e. Preparation of standard water-in-methanol solution
.-Pipette 2.0 ml of water into a dry 2 liter flask. Add anhydrous Methanol to mark and mix well.

4.4.3 Melting point.-This test shall be determined in accordance with Method 209.1 of Standard MIL-STD-650. (Paraffin oil recommended).

4.4.4 Insoluble material.-This test shall be determined in accordance with Method 105.1 of Standard MIL-STD-650 using benzene as the solvent.

4.4.5 Acidity.-This test shall be determined in accordance with Method 102.3 of Standard MIL-STD-650 using benzene as the solvent.

4.4.6 Grit.-This test shall be determined in accordance with Method 106.1 of Standard MIL-STD-650 using acetone as the solvent.

4.4.7 Granulation.-This test shall be determined in accordance with Method 204.1 of Standard MIL-STD-650, except that a small (0.1 gram) amount of graphite powder shall be added to the weighed sample of the screen before granulation is begun in order to reduce static electricity.

4.4.8 Infrared spectrum.-Determine the infrared spectrum of the sample of material using an Infrared Spectrophotometer. Preparation of sample and method used shall be in accordance with the instructions in ASTM-#-168.

4.4.9 Adhesion of glued carton joints.-The glued carton shall be torn apart by lifting a corner of the glued flap and tearing it from the side wall. Examine the manner of separation of the joint and note the percentage of fiber failure.

5. PREPARATION FOR DELIVERY

5.1 Packing

5.5.1 Level A.-Tetryl shall be packed in boxes in accordance with drawing 7548644.

5.1.2 Level C.-Unless otherwise specified tetryl shall be packed in cartons in accordance with drawing 7548645.

5.2 Marking.-The box shall be marked in accordance with drawing 7548644. The carton shall be marked in accordance with drawing 7548645.

MIL-T-339C

5.3 Other Regulations.-In addition Department of Transportation (DOT) Regulations, Uniform Classification Rules, National Freight Classification Rules, or other carrier rules as may be applicable to the mode of transportation shall be applied.

6. NOTES

6.1 Intended use

6.1.1 Teteryl is intended for use in detonators, fuze booster systems, projectiles and in the manufacture of tetrytol.

6.2 Ordering data.-Procurement documents should specify

- a. Title, number and date of this specification.
- b. Provisions for submission of first article samples.
- c. Acceptance and description sheets - Acceptance and description sheets shall be prepared for each lot in accordance with MIL-STD-1171.

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.

REVIEWING ACTIVITY:

ARMY-MU

NAVY-OS

PREPARING ACTIVITY:

Army-Munitions Command

PROJECT NUMBER: 1376-0103

MIL-T-339C

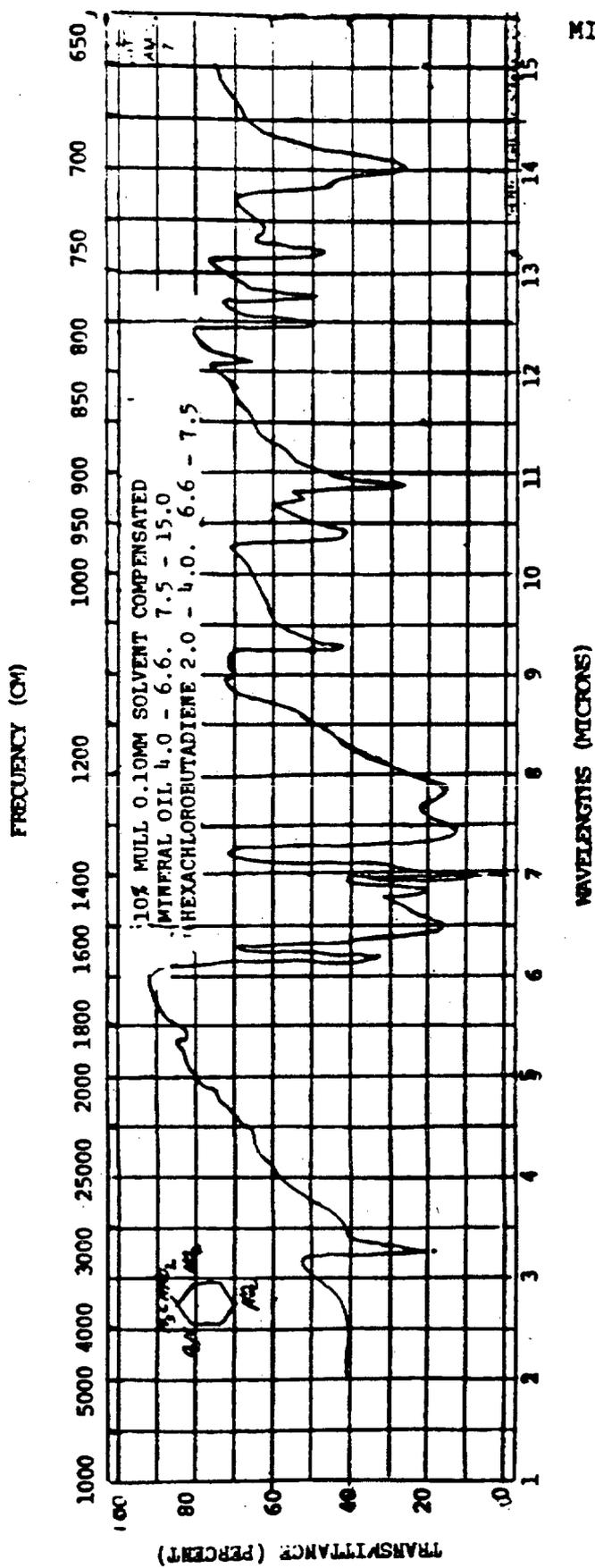


FIGURE 1

INFRARED SPECTRUM OF TETRYL

FOLD

Department of the Army
Picatinny Arsenal
Dover, New Jersey 07801

POSTAGE AND FEES PAID
DEPARTMENT OF THE ARMY
DOD 314

OFFICIAL BUSINESS

Commander
Picatinny Arsenal
ATTN: STUPA-QA-A
Dover, New Jersey 07801

FOLD

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No 22-R255
<p>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. Comments and suggestions submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or serve to amend contractual requirements.</p>		
SPECIFICATION		
ORGANIZATION		
CITY AND STATE		CONTRACT NUMBER
MATERIAL PROCURED UNDER A <input type="checkbox"/> DIRECT GOVERNMENT CONTRACT <input type="checkbox"/> 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? <input type="checkbox"/> YES <input type="checkbox"/> 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 BY (Printed or typed name and activity - Optional)		DATE