MIL-C-45113B(AR)
24 August 1983
SUPERSEDING
MIL-C-45113A(MU)
30 October 1963

MILITARY SPECIFICATION

COMPOSITION B-3

This specification is approved for use by the US Army Armamer Munitions and Chemical Command, and is available for use by all Departments and Agencies of the Department of Defense.

1. SCOPE

1.1 Scope. This specification covers the requirements and quality assurance provisions for the manufacture and acceptance o one type of Composition B-3 for use as a main charge explosive (see 6.1).

2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specification, standards and handbooks. Unless otherwise specified, the following specifications, standards, and handbooks of the issue listed in that issue of the Department of Defense Index of Specifications and Standards (DoDISS) specified in the solicitation form a part of this specification to the extent specified herein.

SPECIFICATIONS

MILITARY

MIL-R-398	- RDX
MIL-T-248	- Trinitrotoluene (TNT)
MIL-A-48078	- Ammunition, Standard Quality Assurance Provisions, General Specification for

FSC 1376

STANDARDS

MILITARY

MIL-STD-105	- Sampling Procedures and Tables for Inspection by Attributes
MIL-STD-650	- Explosives: Sampling, Inspection and Testing
MIL-STD-1168	- Lot Numbering of Ammunition
MIL-STD-1218	- ACS Chemicals
MIL-STD-1235	- Single and Multilevel Continuous Sampling Procedures and Tables for Inspection by Attributes

2.1.2 Other Government documents, drawings and publications. The following Government documents, drawings, and publications form a part of this specification to the extent specified herein.

DRAWING

ARMY

7548644	- Box, Packing for High Explosives. Assembly Details, Packing and Marking
7548645	- Carton, Packing, Reusable-Collapsible for High Explosive, Assembly, Details, Packing and Marking

(Copies of specifications, standards, drawings, and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting activity or as directed by the Contracting Officer.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. The issue of the documents which are indicated as DoD adopted shall be the issue listed in the current DoDISS and the supplement thereto if applicable.

AMERICAN SOCIETY FOR TESTING AND MATERIALS

ASTM E300	- Sampling Industrial Chemicals
ASTM D1457	- TFE - Fluorocarbon Resin Molding and Extrusion Materials

ASTM D2905 - Statement on Number of Specimens Required to Determine the Average Quality of a Textile Material

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

CODE OF FEDERAL REGULATIONS

49 CFR 100-199 (Para. 173.93) - Department of Transportation Rules and Regulations for the Transportation of Explosives and Other Dangerous Articles

(The Interstate Commerce Commission Regulations are now a part of the Code of Federal Regulations, available from the Superintendent of Documents, US Government Printing Office, Washington DC 20402. Orders for the above publications should cite, "49 CFR 100-199 (latest revision)".)

2.3 Order of precedence. In the event of a conflict between the text of this specification and the references cited herein, the text of this specification shall take precedence.

3. REQUIREMENTS

3.1 Formulation. Unless otherwise specified in the purchase order or contract, Composition B-3 shall be formed by adding RDX, conforming with MIL-R-398, Type II, to molten TNT, conforming with MIL-T-248, Type I. The process used shall produce a homogeneous mixture of the RDX in the TNT.

3.2 Form. The Composition B-3 shall be in the form of buds or strips approximately 1 and 1/2 inches in width and 3 inches in length when determined in accordance with 4.5.7.

3.3 Composition. The composition shall comply with the requirements given in Table I when determined in accordance with the applicable test paragraph.

TABLE I. Requirements

Parameter	Requirement	Applicable Test Method
RDX, % (On a moisture free basis)	59.5 ± 1.0	4.5.1
TNT, % (On a moisture free basis)	40.5 ± 1.0	4.5.2
Total Volatiles, % (Max)	0.55	4.5.3 (see 6.2)
Moisture, % (Max)	0.25	4.5.4
Insoluble Particles (Number, Max)	5	4.5.5
Efflux Viscosity (Seconds, Max)	20	4.5.6

3.4 Granulation. The granulation of the RDX extracted from the Composition B-3 shall comply with the requirements given in Table II when tested in accordance with paragraph 4.5.8, and shall have a median particle diameter of 65 (min) to 80 (Max) microns.

TABLE II. Granulation

US Sieve No.	Percent, Through
60	99 ± 1
80	96 ± 4
120	87 ± 7
170	68 ± 12
230	38 ± 10
325	19 ± 9

3.5 First article inspection. This specification contains technical provisions for first article inspection. Requirements for the submission of first article samples by the contractor shall be as specified in the contract.

3.6 Process controls. The contractor shall submit a Process Control Document to the Government specifying the process variables which are considered essential or critical for the production of RDX. The Process Control Document shall be submitted in accordance with 4.1.2.

3.7 Workmanship. The manufacturer shall implement procedures and controls to assure that the process and the product produced are not compromised by foreign materials and contaminants or any other

conditions which may degrade the composition. The composition shall not contain any foreign materials. Determination of foreign materials shall be in accordance with 4.5.7.

4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection and standard quality assurance provisions. Unless otherwise specified herein or in the contract, the provisions of MIL-A-48078 shall apply and are hereby made a part of this detailed specification.

4.1.2 Submission of process control data. A Process Control Document shall be submitted to the Technical Agency (DRSMC-QAR-R (D)) in accordance with Data Item Description, DI-P-1604 (Tailored). The document shall contain a description of the process, all materials used, process conditions/procedures and production/inspection equipment used to produce the Comp B 3 meeting the requirements of this specification (see 6.2.1). In addition, whenever a change is made (i.e., source of materials, procedures used, etc.) no matter how slight, the Technical Agency shall be notified of the change and reason for the change.

4.2 Classification of inspections. The following types of inspections shall be conducted on this item:

a. First article inspection (see 4.3).

b. Quality conformance inspection (see 4.4).

4.3 First article inspection.

4.3.1 Submission. The contractor shall submit a first article sample as designated by the Contracting Officer for evaluation in accordance with provisions of 4.3.2. The first article sample shall be ten (10) pounds of Composition B-3. The sample shall be obtained from the first production lot which has been produced by the contractor using the same production processes, procedures and equipment as will be used in fulfilling the contract. All materials shall be obtained from the same sources of supply as will be used in regular production.

4.3.2 Inspection to be performed. The sample will be subjected by the Government to any or all of the examinations or tests specified in this specification (see MIL-A-48078) and Table III.

4.3.3 Rejection. See MIL-A-48078.

TABLE III - FIRST ARTICLE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-C-45113B(AR)

PARAGRAPH	TITLE		SHEET OF		DRAWING NUMBER / NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
	Form			3.2	4.5.7
	RDX Content			3.3	4.5.1
	TNT Content			3.3	4.5.2
	Total Volatiles			3.3	4.5.3
	Moisture			3.3	4.5.4
	Insoluble Particles			3.3	4.5.5
	Efflux Viscosity			3.3	4.5.6
	Granulation			3.4	4.5.8
	Workmanship			3.7	4.5.7

NOTES:

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4.4 Quality conformance inspection.

4.4.1 Lot formation. A lot shall consist of one or more batches of Composition B-3 produced by one manufacturer, in accordance with the same specification, or same specification revision, under one continuous set of operating conditions. Each lot shall consist of that quantity of Composition B-3 that has been subjected to the same unit chemical or physical process intended to make the final product homogeneous. The lot shall comply with the provisions for submission of product as specified in MIL-STD-105. The criteria and procedure for the assignment of lot numbers shall be in accordance with MIL-STD-1168. Also, MIL-A-48078 applies.

In addition each lot of Composition B-3 shall contain:

a. RDX from one interfix lot number.

b. TNT from one interfix lot number.

4.4.2 Examination. See MIL-A-48078.

a. Sampling plans. Unless otherwise specified in the Classification of Defects and test tables, sampling plans and procedures for major and minor defects shall be in accordance with MIL-STD-105, Inspection Level II.

(See 4.5.2).

QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-C-45113B(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER 7548644/7548645
4.4.2.1	Wooden or fiberboard box				NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None defined				
Major					
101	Foreign matter		1.0%		Visual
102	Liner pierced or torn		1.0%		Visual
103	Liner improperly closed		1.0%		Visual
Minor					
201	Type of liner incorrect		1.0%		Visual

NOTES:

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QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-C-45113B(AR)

PARAGRAPH	TITLE	SHEET 1 OF 1	DRAWING NUMBER
4.4.2.2	Sealed wooden box		7548644
			NEXT HIGHER ASSEMBLY

CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None Defined				
Major					
101	Box damaged		1.5%		Visual
102	Lot number incorrect or illegible		1.5%		Visual
103	Board broken or split		1.5%		Visual
104	Strapping missing broken or loose		1.5%		Visual/Manual
105	Top improperly assembled		1.5%		Visual/Manual
Minor					
201	Nail protruding		1.5%		Visual
202	Marking incorrect or illegible		1.5%		Visual
203	Strapping improperly assembled		1.5%		Visual/Manual

NOTES:

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QUALITY CONFORMANCE INSPECTION

CLASSIFICATION OF DEFECTS & TESTS

MIL-C-45113B(AR)

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER 7548645
4.4.2.3	Sealed fiberboard box				NEXT HIGHER ASSEMBLY
CATEGORY	EXAMINATION OR TEST	NO. OF SAMPLE UNITS	AQL OR 100%	REQUIREMENT PARAGRAPH	PARAGRAPH REFERENCE /INSPECTION METHOD
Critical	None defined				
Major					
101	Assembly torn or pierced		1.0%		Visual
102	Lot number incorrect or illegible		1.0%		Visual
103	Banding strips broken, missing or loose		1.0%		Visual/Manual
Minor					
201	Marking incorrect or illegible		1.5%		Visual
202	Stitches missing or loose (when required)		1.5%		Visual/Manual
203	Banding strips improperly assembled		1.5%		Visual/Manual

NOTES:

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4.4.3 Testing. PRECAUTION: This specification covers sampling and testing of toxic and hazardous material. Accordingly, it is emphasized that all applicable safety rules, regulations and procedures must be followed in handling and processing the Composition B-3 (see 6.5).

4.4.3.1 Sampling. Approximately 2.5Kg of the composition shall be selected from each batch using ASTM Procedures E300 70 for solids. Samples shall be selected for inspection 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 batch was tested and accepted and the batch which failed shall be tested in accordance with the applicable methods given in paragraph 4.5. 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 "i" successive batches are accepted as required by MIL-STD-1235. The classification of defects shall be as given in Table IV.

TABLE IV. Classification of defects

Test/Examination	Requirement Paragraph	Defect Classification
RDX	3.3	Major
TNT	3.3	Major
Total Volatiles	3.3	Major
Moisture	3.3	Major
Insoluble Particles	3.3	Major
Efflux Viscosity	3.4	Major
Granulation	3.4	Major

4.4.4 Inspection equipment. For the performance of all tests and examinations specified in 4.4 and 4.5, commercial inspection equipment should be employed. The contractor shall have available, and utilize correctly, this equipment and is charged with the responsibility of assuring that proper calibration procedures are followed. Government approval of all inspection equipment is required prior to its use for acceptance purposes (see 6.3).

4.5 Test methods and procedures. All tests given in this section shall be performed using prescribed procedures for replicate determinations given in standard analytical chemistry

textbooks or ASTM D2905. Also, unless otherwise specified herein, all chemicals shall be Reagent Grade or ACS Grade in accordance with MIL-STD-1218. See 6.4 for use of equivalent test methods.

4.5.1 RDX content (see 6.6). An accurately weighed portion of approximately 5.0g of the sample shall be placed in a 50 mL beaker, and 15 mL of toluene (see 6.5), saturated with RDX, shall be added. The beaker shall be covered with a watch glass and placed on a steam bath for 30 minutes. The lumps shall be broken up with a glass rod and the solution agitated occasionally by swirling. After cooling to room temperature the solution shall be filtered through a tared filtering crucible. The insoluble residue shall be transferred from the beaker to the filtering crucible using four portions or more of 2 to 3 mL each of toluene saturated with RDX. Air shall be drawn through the crucible until the odor of toluene is no longer detectable. The crucible and contents shall be dried for one hour at 100 degrees centigrade (C) plus or minus 5 degrees C, cooled in a desiccator and weighed. The percent RDX shall be calculated as follows:

$$\text{Percent RDX} = \frac{100\ A}{W-(MW)}$$

Where:

A = increase of weight of filtering crucible, g.
W = weight of sample, g.
M = percent moisture in material, expressed as a decimal (see 4.5.4).

4.5.2 TNT content. Determine the TNT content by subtracting the percent RDX found in 4.5.1 from 100.0 percent. The difference is percent TNT.

4.5.3 Total volatiles. Determine the total volatiles in accordance with method 101.6 of MIL-STD-650.

4.5.4 Moisture (see 6.7). Determine the moisture content in accordance with method 101.4.1 of MIL-STD-650. See 6.4 and 6.5 for the special solvent used.

4.5.5 Insoluble particles. Determine the number of insoluble particles retained on a US Standard No. 60 Sieve using acetone as the solvent in accordance with method 106.1 of MIL-STD-650.

4.5.6 Efflux viscosity. Determine the efflux viscosity in accordance with method 212.1 of MIL-STD-650.

4.5.7 Form and workmanship. Using the remainder of the 2.5Kg sample originally selected (4.4.3.1), spread the sample over a sheet of clean white paper and visually examine for form and the presence of foreign materials.

4.5.8 Granulation (see 6.8).

4.5.8.1 Preparation of sample. Use approximately 100g of the sample previously examined in 4.5.7. Completely extract the TNT content using method 301.3 of MIL-STD-650 using a sufficient quantity of toluene (see 6.5) which was saturated with RDX.

NOTE: If lumps or large agglomerates are present in the sample a suitable and safe means, such as a rubber policeman, should be employed in breaking up the lumps without rupturing the RDX. Therefore, a grinding method should be avoided.

After the extraction of the TNT has been completed and the toluene has been completely aspirated, wash the RDX remaining in the crucible with 200 ml of cold anhydrous ether saturated with RDX or an equally suitable dehydrant which will not dissolve RDX. Aspirate the dehydrant and dry the RDX in an oven at 60 to 70°C for 1 hour minimum.

4.5.8.2 Procedure. Using a nest of sieves in accordance with Table II of paragraph 3.4, determine the granulation of the extracted RDX in accordance with Method 204.2 of MIL-STD-650.

4.5.8.3 Median particle diameter. Using data obtained in 4.5.8.2 calculate the median particle diameter in accordance with procedure given in ASTM procedure D1457.

5. PACKAGING

5.1 Packing.

5.1.1 Level A. Unless otherwise specified the Composition shall be packed in accordance with drawing 7548644.

5.1.2 Level B. Level B shall be the same as Level A (see 5.1.1).

5.1.3 Level C. (Level C to be used for CONUS shipment only.) Unless otherwise specified the Composition shall be packed in accordance with drawing 7548645,

5.2 Marking.

5.2.1 Level A and level B. Marking shall be in accordance with drawing 7548644.

5.2.2 Level C. Marking shall be in accordance with drawing 7548645. The top and one side of the container shall also be marked "CONUS SHIPMENT ONLY" in addition to the other required marking.

6. NOTES

6.1 Intended use. Composition B-3 covered by this specification is a qualified main charge explosive.

6.2 Ordering data. See MIL-A-48078(PA). If required by the Procuring Activity, total Volatiles should be specified.

6.2.1 Data requirements. When this specification is used in a procurement contract which incorporates DD Form 1423, acceptance and description sheets prepared in accordance with MIL-STD-1171, DRSAR-P-702-102 or as directed in the contracat shall be supplied by the contractor. In addition, the Process Control Document (see 3.6 and 4.1.2) shall be submitted in accordance with DI-P-1604 (Tailored).

6.3 Submission of inspection equipment designs for approval (see MIL-A-48078). Submit equipment designs, as required to Commander, AMCCOM, ATTN: DRSMC-QAR-R (D), Dover, NJ 07801.

6.4 Equivalent test methods. The test methods given in this specification are the official methods to be used. The contractor may request using other methods providing that the proposed method is equivalent (accuracy and precision) to the method given in this specification. Prior approval of the Contracting Officer is required for use of equivalent test methods. A description of the proposed method should be submitted through the Contracting Officer to: Commander, AMCCOM, ATTN: DRSMC-QAR-R (D), Dover, NJ 07801. This description should include, but not be limited to, the procedures used, the accuracy and precision of the method, test data to demonstrate the accuracy and precision and drawings of any special equipment required (see MIL-I-45208).

6.5 Solvents. If the solvent specified in the test procedure conflicts with safety regulations or NIOSH/OSHA, an equivalent solvent may be used providing prior approval has been obtained by the Technical Agency (see 6.4).

6.6 RDX content. Holston Defense Corporation method ASM C-7, dated 21 May 81, has been approved as an alternate method.

6.7 Moisture. Holston Defense Corporation method ASM C-3 has been approved as an alternate method.

6.8 Granulation (particle size distribution). Holston Defense Corporation method ASM P 2 has been approved as an alternate method.

6.9 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue, due to the extensiveness of the changes.

Custodian:
Army-AR

Preparing activity:
Army-AR

(Project no. 1376-A225)

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STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions – Reverse Side)

1. DOCUMENT NUMBER	2. DOCUMENT TITLE
MIL-C-45113B	COMPOSITION B-3

3a. NAME OF SUBMITTING ORGANIZATION	4. TYPE OF ORGANIZATION *(Mark one)*
	☐ VENDOR
	☐ USER
b. ADDRESS *(Street, City, State, ZIP Code)*	☐ MANUFACTURER
	☐ OTHER *(Specify)*: _____

5. PROBLEM AREAS

a. Paragraph Number and Wording:

b. Recommended Wording:

c. Reason/Rationale for Recommendation:

6. REMARKS

7a. NAME OF SUBMITTER *(Last, First, MI)* – Optional	b. WORK TELEPHONE NUMBER *(Include Area Code)* – Optional
c. MAILING ADDRESS *(Street, City, State, ZIP Code)* – Optional	8. DATE OF SUBMISSION *(YYMMDD)*