INCH-POUND

MIL-H-48358 (AR)
AMENDMENT 7
14 April 1999
SUPERSEDING
AMENDMENT 6
10 April 1997

MILITARY SPECIFICATION

HMX/RESIN EXPLOSIVE COMPOSITION
LX-14-0
(For Use in Ammunition)

This Amendment forms a part of Military Specification MIL-H-48358 (AR), dated 30 September 1977, and is approved for use by the US Army Armament Research, Development and Engineering Center, and is available for use by all Departments and Agencies of the Department of Defense.

PAGE 1

* 2.1 Applicable documents, standards, delete: "MIL-STD-1235, Single and Multilevel Continuous Inspection by Attributes" and substitute "MIL-STD-1916, DOD Preferred Methods for Acceptance of Product".

PAGE 2

* 2.1 Applicable documents, drawings, add:

"12972281 – Packing and Marking for Bag, Multiwall for Explosives"

Table I, after MIL-P-63196 add "Type I"

3.1.1 Table I, after MIL-P-63196 add "Type I or III"

PAGE 3

3.2.3 Granulation, correct "composition" to "composition" and "specified-in" to "specified in"

PAGE 4

3.4 Foreign matter, correct "woods" to "wood".

3.5 Add the following new paragraph:

"3.5 Vacuum stability test for colorizers. Any new or alternate colorizer(s) used to color the LX-14 lots (see 6.6) shall be subjected to a vacuum stability test (reactivity). The amount of gas evolved from the mixture of colorizer and the explosive shall be less than 3 ml when tested in accordance with 4.6.6."

3.6 Add the following new paragraph:

"3.6 DTA/DSC explosive compatibility test for colorizer(s). Any new or alternate colorizer(s) used to color the LX-14 lots (see 6.6) shall be subjected to a Differential Thermal Analysis. If the resulting time versus delta T curve for the sample demonstrates no significant changes in the HMX transition and decomposition temperature when tested in accordance with 4.6.7, the colorizer passes this test."

4.3.1 Submission, add: "The sample shall be obtained from a 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 during regular production."

4.3.3 Rejection, add: "See MIL-A-48078".

PAGE 5

4.4.1b, Delete in its entirety and substitute:

"4.4.1b Binder from one manufacturer only. Not more than two blended acceptable binder lots of the same type produced in accordance with the same specification or specification revision under one continuous set of operating conditions. Mixing of Types I and III are not permitted."

* 4.4.2 Examination, delete in its entirety and substitute the following:

"4.4.2 Examination. Unless otherwise specified, sampling inspection for quality conformance characteristics listed in the classification of characteristics paragraphs shall be conducted in accordance with MIL-STD-1916 using the attribute sampling plans in MIL-STD-1916 and the verification levels as specified in the classification of characteristics paragraphs. (See MIL-STD-1916 for definitions of critical, major and minor classification of characteristics.) Also, continuous sampling plans in accordance with MIL-STD-1916 may be used if approved by the procuring activity, (See 4.5.1)."

PAGE 6

* 4.4.2.1 Delete in its entirety and substitute included page 6.

PAGE 7

* 4.4.2.2 Delete in its entirety and substitute included page 7.

PAGE 8

* 4.4.2.3 Delete in its entirety and substitute included page 8.

* 4.4.2.4 Add new paragraph 4.4.2.4 as included page 8a.

PAGE 9

4.5 Testing, add: "PRECAUTIONS – This specification covers sampling and testing of toxic and hazardous materials. Accordingly, it is emphasized that all applicable safety rules, regulations, and procedures must be followed in the handling and processing of these materials."

* 4.5.1 Sampling for tests 4.6.1 through 4.6.5, second sentence, delete in its entirety and substitute the following:

"Sampling shall be selected for inspection in accordance with MIL-STD-1916 except that in lieu of Table IV of MIL-STD-1916, the following continuous sampling plan shall be used: i=7, f=1/3 and there shall be no reduced or tightened verification level."

* 4.5.1:

Bottom of the paragraph, delete "as required by MIL-STD-1235." And substitute "In addition, after any failure of a batch the contractor shall return to 100 percent inspection until "i" successive batches are accepted."

Last sentence, delete "classification of defects" and substitute "classification of characteristics".

* Table IV, delete "Defect Classification" and substitute "Classification of Characteristics".

CLASSIFICATION OF CHARACTERISTICS

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER 12972281 7548644. 7548645.
4.4.2.1	Box, Box Fiberboard, or Multiwall Bag Prior to closing				NEXT HIGHER ASSEMBL
CLASSIFICATION	EXAMINATION/CHARACTERISTICS	NO. OF SAMPLE UNITS	VERIF LEVEL	RQMT PARA	PARAGRAPH REFERENCE/INSPECTION METHOD
Critical:	None defined				
Major					
101.	Foreign matter		II	3.4	Visual
102.	Liner pierced or torn		II	5.1	Visual
103.	Liner improperly closed		II	5.1	Visual
104.	Color		II	3.1	Visual
Minor					
201.	Type of liner incorrect		II	5.1	Visual
202.	Bag liner pulled too tight not allowing slack		II	5.1	Visual/Manual
NOTES:					

CLASSIFICATION OF CHARACTERISTICS

PARAGRAPH	TITLE		SHEET 1 OF 1		DRAWING NUMBER 7548644
4.4.2.2	Sealed Boxes				NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION/CHARACTERISTICS	NO. OF SAMPLE UNITS	VERIF LEVEL	RQMT PARA	PARAGRAPH REFERENCE/INSPECTION METHOD
Critical:	None defined				
Major					
101.	Top improperly assembled		II	5.1	Visual/Manual
102.	Box damaged		II	5.1	Visual
103.	Lot number misleading or unidentifiable		II	5.1	Visual
104.	Strapping missing, broken or loose		II	5.1	Visual/Manual
Minor					
201.	Strapping improperly assembled		II	5.1	Visual/Manual
202.	Marking misleading or unidentifiable		II	5.1	Visual
NOTES:					

CLASSIFICATION OF CHARACTERISTICS

PARAGRAPH 4.4.2.3	TITLE Sealed Box Fiberboard		SHEET 1 OF 1		DRAWING NUMBER 7548645
					NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION/CHARACTERISTICS	NO. OF SAMPLE UNITS	VERIF LEVEL	RQMT PARA	PARAGRAPH REFERENCE/INSPECTION METHOD
Critical:	None defined				
Major					
101.	Assembly torn or pierced		II	5.1	Visual
102.	Lot number misleading or unidentifiable		II	5.1	Visual
Minor					
201.	Glued Boxes		II	5.1	Visual
202.	Marking misleading or unidentifiable		II	5.1	Visual
203.	Banding strips missing, broken or improperly applied		II	5.1	Visual/Manual
NOTES:					

CLASSIFICATION OF CHARACTERISTICS

PARAGRAPH 4.4.2.4	TITLE Sealed Multiwall Bag		SHEET 1 OF 1		DRAWING NUMBER 12972281
					NEXT HIGHER ASSEMBLY
CLASSIFICATION	EXAMINATION/CHARACTERISTICS	NO. OF SAMPLE UNITS	VERIF LEVEL	RQMT PARA	PARAGRAPH REFERENCE/INSPECTION METHOD
Critical:	None defined				
Major					
101.	Bag damaged or leaking		II	5.1.3	Visual
102.	Valve opening not securely taped		II	5.1.3	Visual
103.	Lot number incorrect or illegible		II	5.2.3	Visual
Minor					
201.	Marking incorrect or illegible		II	5.2.3	Visual
NOTES:					

4.6.3.1 HMX content, delete paragraph 4.6.3.1.1 and 4.6.3.1.2 in their entirety and substitute the following:

"4.6.3.1.1 Reagent. Prepare the extraction solvent by adding excess RDX and HMX to 1, 2-dichloroethane (EDC). The mixture shall be maintained for at least eight hours at the temperature (+/-2 degrees C) at which time the analysis will be performed. Prior to use for extraction, the EDC solution shall be agitated for two hours and filtered.

4.6.3.1.2 Procedure. Approximately 2.5g of the dried sample shall be accurately weighed (recorded to the nearest 0.1 mg) and quantitatively transferred to a 250 ml screw cap bottle. Add 150 ml of saturated EDC solution (see 4.6.3.1.1), attach the screw cap, and place the bottle on a mechanical shaker. The bottle shall be shaken at least thirty minutes, until visual examination indicates complete dissolution of the elastomeric binder. The sample solution shall then be transferred to a tared filtering crucible attached to a vacuum flask. About 30 ml of the saturated EDC solution shall then be poured into the bottle, the screw cap replaced, the bottle shaken by hand, and the contents transferred to the filtering crucible. This procedure shall be repeated at least twice in order to remove all residue from the bottle. The bottle and cap shall then be rinsed twice with 30 ml aliquots of the EDC solution, with the washings being transferred to the filtering crucible. The crucible shall then be removed from the flask, 20 ml of saturated EDC solution shall be added, and the crucible shall be reconnected to the flask, allowing the liquid to filter through the residue. This procedure shall be performed a total of three times. The crucible shall then be removed from the flask and the interior portions beneath the glass frit shall be carefully rinsed with the saturated EDC. After rinsing, the crucible shall again be connected to the vacuum flask and aspirated for approximately two minutes. The crucible shall then be placed in an oven (100 +/- 5 degrees C) for one hour, or until dry. After cooling to room temperature the crucible shall be accurately weighed (recorded to the nearest 0.1 mg). The HMX content of the sample shall be calculated as shown below:

$$\% \text{ HMX} = \frac{100\,(A-B)}{W}$$

A = Final weight of crucible, g

B = Tare weight of crucible, g

W = Sample weight, g"

4.6.6 Add the following new paragraph:

"4.6.6 Vacuum stability test (reactivity) for colorizer(s). The vacuum stability for reactivity of the colorizer with a mixture of HMX and Estane in the proportions present in LX-14 shall be conducted at 100 degrees C for 40 hours in accordance with MIL-STD-650, method 504.1."

4.6.7 Add the following new paragraph:

"4.6.7 DTA/DSC explosive compatibility test for colorizer(s). Differential Thermal Analysis shall be conducted by using a DTA or DSC apparatus, and shall be conducted on a sample of LX-14 manufactured with the proposed alternate colorizer. If a sample of LX-14 incorporating the proposed colorizer is not available, then a mixture of HMX, Estane, and the colorizer (in the proportions present in LX-14) may be used.

Place approximately 0.1 to 1.0 mg of the LX-14 sample into a DTA (or DSC) sample cup. Put this cup into the sample side of the DTA apparatus (or DSC apparatus) put an empty cup into the reference side of the apparatus. Heat at a rate of 5 degrees C per minute.

Observe the resulting time vs. delta T curve for any significant changes in HMX transition and decomposition temperature (i.e., extrapolated onset and peak temperature) compared to a time vs. delta T curve obtained for HMX only using the same procedure and apparatus."

5. Delete section 5 in its entirety and replace with:

"5. PREPARATION FOR DELIVERY

5.1 PACKING

5.1.1 Level A. Packing shall be in accordance with Dwg. 7548644.

5.1.2 Level B. Packing shall be in accordance with Level A packing requirements.

5.1.3 Level C. Packing shall be in accordance with Dwg. 7548645 or Dwg. 9257923.

5.2 Marking.

5.2.1 Level A. Mark in accordance with Dwg. 7548644.

5.2.2 Level B. Mark in accordance with Level A marking requirements.

5.2.3 Level C. Marking shall be in accordance with Dwg. 7548645 or Dwg. 9257923."

* 5.1.3 Level C, delete in its entirety and substitute the following:

"5.1.3 Level C. Packing shall be in accordance with Dwg. 7548645, Dwg. 9257923, or Dwg. 12972281."

* 5.2.3 Level C, delete in its entirety and substitute the following:

"5.2.3 Level C. Marking shall be in accordance with Dwg. 7548645, Dwg. 9257923, or Dwg. 12972281."

6.2 Delete all material following "DRDAR-QA, Dover, New Jersey."

6.2 Delete "DRDAR-QA, Dover, New Jersey" and substitute "AMSTA-AR-QAT-P, ARDEC, Picatinny Arsenal, NJ 07806-5000."

6.3 Change "5703 F1" to "5702 F1 (MIL-P-63196 Type I)" and delete "in accordance with MIL-P-63196."

6.3 Change "5702 (MIL-P-63196 Type I) . . . " to ". . . 5702F1 (MIL-P-63196 Type I) or 5703 (MIL-P-63196 Type III). . ."

6.6 Colorizer, delete paragraph 6.6 and substitute the following paragraph:

"6.6 Colorizer. The material shall be colorized with unadulterated finely powdered Pigment Violet #23/C.I. #51319 as identified in the Color Index Registration Book published by the Society of Dryers and Colorists, Perkinhouse, West Yorkshire, England BD12JB, and issued in the U.S. by the American Association of Textile Chemists and Colorists, Research Triangle Park, NC 27709, and controlled chemically in the Chemical Abstracts as C.A.S. 6358-30-1. No extenders or additives to control color intensity shall be used, and the colorizer shall show less than one percent (1%) ash residue when heated to 600 +/- 25 deg. C for four (4) hours.

The colorizer shall be procured and certified to the aforementioned requirements for chemistry and purity. In addition, Vacuum Stability, and DTA/DSC explosive compatibility testing shall be performed on each lot of colorizer prior to use. These tests shall be documented and records retained in accordance with contract requirements.

Heliogen Violet Toner 49-6001 manufactured by General Aniline and Film Corp, Paliogen

Violet Toner VT4414 manufactured by BASF Wyandotte and Carbazole Violet, Sunfast Violet 23 Toner, Product Code 246-0505, manufactured by Sun Chemical Corporation have been found to be satisfactory when procured and certified to the aforementioned requirements for composition and purity. Prior to the use of any other colorizer, the results of the explosives compatibility tests shall be forwarded to U.S. Army Armament Research, Development and Engineering Center, AMSTA-AR-QAT-P and AMSTA-AR-AEE-WE for review and approval."

The margins of this amendment are marked with an asterisk or vertical lines to indicate where changes (additions, modifications, corrections, deletions) from the previous amendment 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 amendment.

Custodian:
Army-AR

Preparing activity:
Army-AR

(Project 1376-0065)