

MIL-A-50926A(PA)  
30 June 1975  

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SUPERSEDES  
MIL-A-50926 (MU)  
30 June 1971

## MILITARY SPECIFICATION

### ADHESIVE MR-23 (FOR USE IN AMMUNITION)

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

#### 1. SCOPE

1.1 This specification covers one type of adhesive MR-23 for use as an adhesive in non-metallic cartridge cases.

#### 2. APPLICABLE DOCUMENTS

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

#### SPECIFICATIONS

##### MILITARY

- |             |   |
|-------------|---|
| MIL-D-40030 | - Drums, Plastic, Molded Polyethylene.  |
| MIL-A-48078 | - Ammunition, Standard Quality Assurance Provisions, General Specification For. |

#### STANDARDS

##### MILITARY

- |             |   |
|-------------|---|
| MIL-STD-129 | - Marking for Shipment and Storage.                       |
| MIL-STD-286 | - Propellants, Solid: Sampling, Examination, and Testing. |

#### DRAWINGS

##### PICATINNY ARSENAL

- |         |                  |
|---------|------------------|
| 9255426 | - Adhesive MR-23 |
|---------|------------------|

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(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

Title 49 Transportation CFR Parts 100-199

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

American Society for Testing and Materials (ASTM)

D-1084 Viscosity of Adhesives, Test for  
E-300 Sampling Industrial Chemicals

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

3. REQUIREMENTS

3.1 Composition.-The adhesive shall be a uniform mixture of nitrocellulose and nitroglycerin in acetone and nitromethane. The composition of the adhesive shall be in accordance with drawing 9255426 when determined as specified in 4.5.3.

3.1.1 Viscosity.-The viscosity of the solution shall be  $80 \pm 10.0$  poises when determined as specified in 4.5.1.

3.1.2 Solids.-The solids content of the adhesive shall be 11.0 percent, minimum, by weight when determined as specified in 4.5.2.

3.1.3 Workmanship.-When examined visually, the adhesive shall be a homogeneous material that is free from lumps, gelation, separation, sedimentation and foreign matter.

3.1.4 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 (see 6.2).

#### 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 detail specification.

4.2 Classification of Inspections. - The following types of inspection shall be conducted on this item:

- a. First Article Inspection (see 4.3).
- b. Quality Conformance Inspection (see 4.4)
- c. Preparation for Delivery

#### 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 shall consist of 20 ounces of Adhesive MR-23 obtained by sampling as described in 4.4.2. The samples shall be obtained from a production batch 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 Inspections to be Performed. - The sample will be subjected by the Government to any or all of the examinations or tests specified in 4.5 of this specification.

4.3.3 Rejection. - See MIL-A-48078.

#### 4.4 Quality Conformance Inspection

4.4.1 Inspection Lot Formation. - Inspection lots shall comply with the lot formation provisions of MIL-A-48078. For the material covered by this specification, a lot shall consist of one or more batches of adhesive MR-23 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 adhesive MR-23 that has been subjected to the same chemical or physical process.

4.4.2 Sampling. - The adhesive shall be sampled in accordance with ASTM E300. Two independent, representative samples of approximately 20 ounces each shall be removed from each batch. The Adhesive shall be transferred to a rubber bottle with a rubber stopper. The adhesive shall be subjected to the tests specified in 4.5.

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If either sample fails to comply with any of the requirements specified the batch shall be rejected. Caution should be exercised in handling the material due to its explosive hazards and toxicity (see 6.4).

#### 4.4.2.1 Classification of Defects. - See MIL-A-48078.

<u>Test</u>	<u>Test classification</u>
Viscosity	Major B
Solids	Major B
Composition	Major B
Workmanship	Major B

4.4.3 Inspection Equipment. - The government reserves the right to inspect the contractor's equipment and determine that he has available and utilizes correctly measuring and test equipment of the required accuracy and precision and that the instruments are of the proper type and range to make measurements of the required accuracy. Commercial inspection equipment shall be employed where applicable for all tests and examinations specified in 4.4 and 4.5. The contractor is responsible for assuring proper calibration procedures are followed. Government approval of all inspection equipment is required prior to its use for acceptance purpose.

4.5 Test Methods and Procedures. - The tests in 4.5.1 through 4.5.4 shall be performed using prescribed analytical procedures for duplicate determinations given in standard analytical textbooks. (see 6.3).

4.5.1 Viscosity. The viscosity shall be run in duplicate.

4.5.1.1 Brookfield Viscosity. The viscosity shall be determined in accordance with Method B of ASTM D1084 using a LUF model or equivalent, spindle No 1 at 60 RPM at 25°C.

4.5.1.2 Fall Ball Method. (Alternate).

4.5.1.2.1 Apparatus.

4.5.1.2.2 Viscosimeter. The viscosimeter employed for this determination shall be the falling ball viscosimeter or approved equal. This viscosimeter consists of a glass tube 14 inches in length with an internal diameter of 1 inch. The lower end of the tube is closed by means of a tightly fitting stopper covered with metal foil. A circle is etched on the tube 2 inches from each end, making 2 marks exactly 10 inches apart.

4.5.1.2.3 Spheres. The steel balls shall be ordinary 5/16 inch steel ball bearings, having a diameter of 0.793 to 0.795 centimeter and weighing 2.025 to 2.045 gm.

4.5.1.2.4 Calibration. To calibrate the spheres the viscosimeter tube shall be filled with oil or solution of known viscosity (sugar, glycerin, etc.) and immersed in a constant temperature bath maintained at 25 degrees plus or minus 0.2 degrees C until its contents reach equilibrium. The balls shall be individually dropped through the tube. The time of passage between the etched circles (see 4.5.1.2.2) shall be noted. The tube factor K shall be determined as follows:

$$K = \frac{N}{t (D-d)}$$

where:

- N = viscosity in centipoises of solution
- t = time in seconds
- D = density of the ball gm/ml. at 25 degrees C.
- d = density of the liquid gm/ml. at 25 degrees C.

When 1 ball has been selected by careful measurement, it shall be weighed and the other spheres chosen shall be of approximately the same weight. The other balls shall be calibrated and only those retained which have the same constant within plus or minus 5 percent of that of the first ball selected. Specific gravity and density at 25 degrees C., referred to water at 40 degrees C.

4.5.1.2.5 Procedure. The lower end of the glass viscosimeter tube shall be closed tightly by means of an appropriate stopper covered with metal foil. The tube shall then be filled with the adhesive until the liquid level is at least 1 inch above the upper circle. In order to reach equilibrium, the tube shall then be immersed in a constant temperature bath maintained at 25 degrees C. plus or minus .2 degrees C. for at least 1 hour. At the end of this period the tube shall be withdrawn from the bath, wiped dry and then supported in a vertical position by means of a clamp and ring stand. Two or more steel balls, previously calibrated (see 4.5.1.2.4) shall be allowed to fall separately through the solution, and the time required for each ball to fall from the upper to the lower etched circle shall be noted by means of a stopwatch. The axis of the tube shall be adjusted until the balls fall concentrically, thus showing the glass tube to be in a vertical position. The arithmetic

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average in seconds, of the time required for the balls to fall from the upper to the lower etched circle shall be reported as the desired value. Calculation for viscosity:

$$(n) \text{ Viscosity} = KT (D-d)$$

where:

- n = viscosity in centipoises.
- K = constant expressed in centipoises
- T = average falling time
- D = density of spheres gm/cc at 25 degrees C.
- d = density of liquid gm/cc at 25 degrees C.

4.5.2 Solids. - Run in duplicate. - The solids shall be determined in accordance with Method 101.1 of MIL-STD-286, except that the sample shall be first placed on a steam bath until all the solvents have evaporated and then placed in an oven which is at 70°C.

4.5.3 Composition. - The contractor shall weigh each ingredient on a scale to verify that the composition meets the requirements specified in 3.1.

4.5.4 Workmanship. - The adhesive shall be examined for defects in paragraph 3.1.3.

## 5. PREPARATION FOR DELIVERY

5.1 General. - In addition to the requirements specified below, the MR-23 adhesive shall be packaged, packed, and shipped in containers conforming to 49 CFR Parts 100-199.

5.2 Preservation and packing. - The MR-23 adhesive shall be packed in 5-gallon polyethylene drums conforming to MIL-D-40030, style B, size 1. Polyethylene drums having wider mouth openings or having two openings may be used. The polyethylene drum shall be overpacked in a steel drum which meets the requirements of the Appendix to MIL-D-40030, style B, Type I or Type II. The steel drum shall be overpacked with a wooden box and sawdust.

5.3 Marking. - Marking shall be in accordance with MIL-STD-129.

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## 6. NOTES

6.1 Intended Use. - The Adhesive MR-23 is intended for use in the 152 MM ammunition system.

- 6.2 Ordering data. - a. MIL-A-48078.  
b. Packing (see 5.1)  
c. First Article (see 4.3)

6.3 Prior approval of the Contracting Officer is required for use of equivalent test methods. A description of the proposed method should be submitted thru the Contracting Officer to: Commander, ATTN: SARPA-QA-A-P, Picatinny Arsenal, Dover, New Jersey 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.

6.4 Disposal of sample bottle. - The bottle shall be cleaned as follows:

- (a) Rinse thoroughly with acetone.
- (b) Flush generously with hot tap water (3 minutes under a direct flow is considered adequate).
- (c) Rinse with distilled water and dry.

6.5 Test results. - A copy of the test results should be forwarded to: Commander, Picatinny Arsenal, ATTN: SARPA-QA-A-P, Dover, New Jersey 07801.

Custodian:  
Army - PA

Preparing activity:  
Army - PA

Project Number: 1376-A048

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