

MIL-V-50433 (MU)
3 July 1969

MILITARY SPECIFICATION
VINYL ALCOHOL - ACETATE RESIN SOLUTION
(VAAR)
(FOR USE IN AMMUNITION)

1. SCOPE

1.1 This Military Specification covers one type of Vinyl Alcohol Acetate Resin Solution for use as a binder in pyrotechnic compositions (see 6.4).

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.

STANDARDS

MILITARY

MIL-STD-109 - Inspection Terms and Definitions

(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

49 CFR - 171-190 - Interstate Commerce Commission 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, Government Printing Officer, Washington, D. C. Orders for the above publications should cite: "49 CFR 171-190 (latest revision)."

FSC: 1376

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3. REQUIREMENTS

3.1 Material.-The vinyl alcohol acetate resin solution is a mixture of approximately 28 percent solids and 72 percent solvent. The solids consist of approximately 18 percent hydroxyl content by weight, calculated as vinyl alcohol, and 82 percent vinyl acetate. The solvent is technical grade methyl acetate, 82 percent purity.

3.1.1 Color.-The color of the vinyl alcohol acetate resin solution shall be equivalent to a No. 300 platinum cobalt standard when tested as specified in 4.3.1.

3.1.2 Polyvinyl alcohol.-The polyvinyl alcohol content shall be 16 to 19 percent by weight calculated on a dry resin basis when tested as specified in 4.3.2.

3.1.3 Total solids.-The total solid content shall be 26 to 29 percent by weight when tested as specified in 4.3.3.

3.2 Workmanship.-The vinyl alcohol acetate resin solution shall be free from impurities, such as wood chips, water, oil, and other solvents not specified in 3.1.

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 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:

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- a. A statement that the lot complies with all of the quality assurance provisions specified within this specification.
- b. Drawing, specification number and date, together with an identification and date of changes thereto.
- c. A statement that all material purchased by the contractor meets requirements, when such material is controlled by Government or commercial specifications referenced in any of the contractual documents, and that certificates of conformance are on file and available for review.
- d. Number of items 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 Inspection provisions

4.2.1 Lot formation.-The term "lot", as used throughout this specification, refers to an inspection lot, which is defined as an essentially homogeneous collection of units of product from which a representative sample is drawn and inspected to determine conformance of the lot with applicable requirements. The sample selected shall represent only that quantity of units from which the sample was drawn and shall not be construed to represent any prior or subsequent quantities presented for inspection. Homogeneity shall be considered to exist provided the lot has been produced by one manufacturer, in one unchanged process, in accordance with the same drawing, specification, or revision thereof. Changes to either the process, specification, not affecting safety, performance, interchangeability, or storage, as determined by the Government, shall not be deemed to alter the homogeneity of the lot.

4.2.2 Testing

4.2.2.1 Sample.-A random sample of 10 containers shall be selected from each lot, all containers being of the same size. When lots are comprised of 10 containers or less, each container shall be sampled.

4.2.2.2 Preparation of composite samples.-Four-ounce samples of VAAR shall be removed from each of the ten containers selected to form a composite sample. The four ounces selected shall be blended to form two 20-ounce composite samples. The two samples shall be tested in accordance with the requirements of 3.1 through 3.2. If either of the composite samples fails to meet the requirements specified, the lot shall be rejected.

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4.3 Test methods and procedures

4.3.1 Color, Major Defect, Code No. 01001 (see 6.2).

4.3.1.1 Preparation of the No. 500 Platinum-Cobalt Standard.- Measure 500 ml of distilled water into a 1000-ml volumetric flask. Add 100 ml concentrated hydrochloric acid and mix well. Weigh 1.245 gm of potassium chloroplatinate, K_2PtCl_6 , and 1.000 gm of cobaltous chloride, $CoCl_2 \cdot 6H_2O$, to the nearest mg, and transfer to the flask. Swirl until complete solution is effected. Dilute the solution in the flask to the mark with distilled water and mix thoroughly. The color of this standard solution is equivalent to 500 platinum-cobalt units (500 mg of metallic platinum per liter), or each ml of this standard contains 0.5 mg of metallic platinum.

4.3.1.2 Preparation of the platinum-cobalt color standards.- Prepare the required color standards by diluting the No. 500 platinum-cobalt standard solution as shown in the following table. Usually an experienced analyst can make a sufficient estimation of the color from these standards. If more exact color comparison is desired, prepare additional standards to supplement those given below. One color unit is equivalent to one mg of metallic platinum per liter.

<u>Platinum-Cobalt Color Standard Number</u>	<u>Platinum-Cobalt Standard, ml</u>	<u>Distilled Water, ml</u>
200	40.0	60.0
300	60.0	40.0
400	80.0	20.0

4.3.1.3 Procedure.-Transfer 100 ml of the sample to one of two matched 100-ml tall-form Nessler tubes. Fill the second tube to the mark with platinum-cobalt standard which seems to match the color of the sample, as indicated by a preliminary estimation. Compare the colors to the sample and the standard by viewing vertically down through tubes against a white background. Replace the liquid in the second tube with lighter or darker standards until an exact match is obtained.

4.3.2 Polyvinyl alcohol, Major Defect, Code No. 02001.-Prepare and store in 1-pint screw-cap bottles the series (or such part of the series needed) of water-acetone mixtures shown in the table below. To 30 ml of one of the mixtures in a test tube, add 4 drops of the sample resin and shake. Continue until two successive mixtures are found, in one of which the resin forms a clear solution and in the other of which the resin forms a cloud or haze. Read from the table the weight percent polyvinyl alcohol, on the dry resin basis, corresponding to the mixture in which the resin forms a cloud.

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TABLE OF MIXTURES

Percent by Weight Polyvinyl Alcohol; Dry Resin Basis	Mixture	
	Water, ml.	Acetone, ml.
15.0	206	194
15.5	208	192
16.0	210	190
16.5	214	186
17.0	216	184
17.5	220	180
18.0	222	178
18.5	226	174
19.0	228	172
19.5	232	168
20.0	234	166
20.5	238	162

4.3.3 Total solids, Major Defect, Code No. 03001.-Weigh rapidly into a tared, three-inch, aluminum dish, 3 to 5 gm of the sample resin to the nearest mg. Add 20 ml of SD-2B alcohol to the dish, place in a steam oven maintained at 135 + 1°C, and allow the SD-2B alcohol to evaporate. After the evaporation of SD-2B alcohol is complete, allow the dish to remain in the oven for one hour. Cool to room temperature and obtain the dry weight of the sample resin. Calculate as follows:

$$\frac{\text{gm dried sample}}{\text{gm original sample}} \times 100 = \text{total solids, \% by weight}$$

5. PREPARATION FOR DELIVERY

5.1 Packing.-Vinyl alcohol acetate resin shall be packed and shipped in such a manner as to insure acceptance by common or other carrier for safe transportation at the lowest rate to the point of delivery. Containers shall conform to the ICC Regulation.

5.2 Marking.-Marking to insure safe handling shall conform to the ICC Regulations stipulated in the Code of Federal Regulations.

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6. NOTES

6.1 Ordering data.-Procurement documents should specify the title, number, and date of this specification.

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

6.3 Test results.-A copy of the test results should be forwarded to: Commanding Officer, Picatinny Arsenal, ATTN: SMUPA-ND2, Dover, New Jersey, 07801.

6.4 VAAR.-An approved source of supply for VAAR is Union Carbide Plastic Company, 270 Park Avenue, New York City, New York, 10017. The VAAR has a designation number of MA-28-18.

Custodian:
Army-MU

Preparing Activity:
Army-MU

Project Number: 1376-A-048

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004
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.		
SPECIFICATION		
ORGANIZATION		CITY AND STATE
CONTRACT NO.	QUANTITY OF ITEMS PROCURED	DOLLAR AMOUNT \$
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)		DATE

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