

**MIL-T-301A****5 DECEMBER 1961****SUPERSEDING****JAN-T-301****27 FEBRUARY 1946****MILITARY SPECIFICATION****TRIACETIN (GLYCERYL TRIACETATE)**

*This specification has been approved by the Department of Defense and is mandatory for use by the Departments of the Army, the Navy, and the Air Force.*

**1. SCOPE**

1.1 This specification covers Triacetin for use in the manufacture of ammunition.

**2. APPLICABLE DOCUMENTS**

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

**SPECIFICATIONS****FEDERAL**

PPP-D-729 — Drums, Metal, 55-Gallon (For Shipment of Non-Corrosive Material).

**STANDARDS****MILITARY**

MIL-STD-105 — Sampling Procedures and Tables for Inspection by Attributes.

MIL-STD-109 — Inspection Terms and Definitions.

MIL-STD-129 — Marking for Shipment and Storage.

MIL-STD-286 — Propellants: Sampling, Inspection and Testing.

**PUBLICATIONS****ORDNANCE CORPS**

ORD-M608-11 — Procedures and Tables for Continuous Sampling by Attributes.

(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 The following documents form 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.

**UNIFORM FREIGHT CLASSIFICATION RULES**

(Application for copies of these Freight Classification Rules should be addressed to the Consolidated Classification Committee, 202 Chicago Union Station, Chicago 6, Ill.)

FSC 6810

**MIL-T-301A****AMERICAN TRUCKING ASSOCIATION  
PUBLICATION****National Motor Freight Classification  
Rules and Container Specifications.**

(Application for copies should be addressed to the American Trucking Association, 1424 16th St., N.W., Washington, D.C.)

**3. REQUIREMENTS**

**3.1 Color.** The color of the triacetin shall be not darker than the standard solution specified herein.

**3.2 Specific gravity.** The specific gravity of the triacetin shall be  $1.153 \pm 0.003$  at 25° Centigrade (°C.) / 4°C.

**3.3 Acidity (as acetic acid).** The acidity of the triacetin shall not exceed 0.005-percent maximum (max.).

**3.4 Ash content.** The ash content of the triacetin shall be 0.002-percent max.

**3.5 Ester content (as glyceryl triacetate).** The ester content of the triacetin shall be 98-0-percent minimum (min.).

**3.6 Workmanship.** The material shall be free from grit, visible impurities, and foreign matter.

**4. QUALITY ASSURANCE PROVISIONS**

**4.1 General quality assurance provisions.** The supplier is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified, the supplier may utilize his own or any other inspection facilities and services acceptable to the Government. Inspection records of the examinations and tests shall be kept complete and available to the Government as specified in the contract or order. 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 the terms used herein. Inspection shall be performed in accordance with this specification and other specifications referenced in any of the contractual documents.

**4.1.1 Contractor quality assurance system.** If the contractor desires to utilize a quality assurance system, which is at variance with the quality assurance provisions of 4.2 and 4.3 and other documents referenced herein, he shall submit a written description of the system to the contracting officer for approval prior to initiation of production. It shall include a description covering controls for lot formation and identification, inspections to be performed, inspection stations, sampling procedures, methods of inspection (measuring and testing equipment), and provisions for control and disposition of nonconforming material. The written description will be considered acceptable when, as a minimum, it provides the quality assurance provisions required by the provisions of 4.2 and 4.3 and the other documents referenced herein. The contractor shall not be restricted to the inspection station or the method of inspection listed in this specification provided that an equivalent control is included in the approved quality assurance procedure. In cases of dispute as to whether certain procedures of the contractor's system provide equal assurance, the comparable procedure of this specification shall apply. The contractor shall notify the Government of, and obtain approval for, any changes to the written procedure that effects the degree of assurance required by this specification or other documents referenced herein.

**4.1.2 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 submitted:

- (a) A statement that the lot complies with all quality assurance provi-

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sions of the approved current written description of the system.

- (b) Quantity of product inspected.
- (c) Results obtained for all inspection performed.
- (d) Specification number and date, together with an identification and date of changes.
- (e) Certificates of analysis on all material procured directly by the contractor.
- (f) Quantity of product in the lot.
- (g) 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.

**4.1.3 Government verification.** Using the contractor's written quality assurance procedure (see 4.1.1), this detail specification, and other contractual documents as a guide, the Government inspector shall verify all quality assurance operations performed by the contractor. Verification shall be in accordance with (a) or (b) as applicable, the decision being the responsibility of the procuring activity. In either case, the inspector shall also ascertain, prior to acceptance, that all quality assurance provisions of other specifications referenced in any of the contractual documents have been complied with. Deviations from prescribed or agreed upon procedures discovered by the Government inspector shall be brought to the attention of the supplier. Disposition of the product and remedial action shall be as directed by the Government inspector and, depending on the nature of the deviation, may consist of lot rejection, screening, resampling, re-

instruction of the supplier's employees, or other appropriate action:

- (a) Verification at the point of manufacture shall be accomplished at unscheduled intervals in accordance with 4.1.3.1 and 4.1.3.2.
- (b) Verification at the point of delivery shall be in accordance with 4.1.3.2.

**4.1.3.1 Surveillance.** Surveillance shall include, but is not limited to:

- (a) Observation of procedures concerning lot formation and identification.
- (b) Observation of sampling procedures and application of acceptance criteria.
- (c) Determination that all required examinations and tests are performed in accordance with the prescribed procedures of this specification, or approved equivalents thereto.
- (d) Review of procedures for control and disposition of nonconforming material.

**4.1.3.2 Product inspection.** Product inspection shall consist of Government inspection of product which has been previously inspected by the contractor and found to meet the quality assurance provisions of this specification. The inspection by the Government shall be performed in order to determine that the product is of the quality required by this specification and that the contractor's records are reliable.

## 4.2 Inspection provisions.

**4.2.1 Lot formation.** A lot shall consist of one or more batches of triacetin (glyceryl triacetate), produced by one manufacture in accordance with the same specification, or same specification revision, under one continuous set of operating conditions. Each

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batch shall consist of that quantity of triacetin (glyceryl triacetate) that has been subjected to the same unit chemical or physical mixing process intended to make the final product homogeneous.

#### 4.2.2 Examination. Sampling plans and

procedures for the following classification of defects shall be in accordance with Standard MIL-STD-105 except that inspection for critical defect shall be 100 percent. Continuous sampling plans, in accordance with Handbook ORD-M608-11 may be used if approved by the procuring activity.

Categories	Defects	Method of inspection
Critical .....	Leak in container .....	Visual
<i>Major:</i>	AQL 1.00 percent	
101 .....	Marking misleading or unidentifiable .....	Visual
102 .....	Lead seal missing or unsealed .....	Visual
<i>Minor:</i>	AQL 2.50 percent	
201 .....	Container not filled to correct volume .....	Scale
202 .....	Any component or operation missing other than 102 above .....	Visual

#### 4.2.3 Testing.

**4.2.3.1 Determination of chemical and physical properties (see 3.1 through 3.5).** Samples for these determinations shall be selected as specified herein.

**4.2.3.1.1 Sampling lot.** A sample of ten percent of the containers in the lot shall be selected in such a manner as to be representative of the lot. When lots comprise less than 100 containers either ten containers or all containers in the lot shall be selected.

**4.2.3.1.2 Preparation of composite sample.** Approximate four fluid ounces of the material shall be removed from each selected container and a portion placed in a glass bottle having a glass stopper. Each primary sample shall be labeled so that the container from which it was taken can be easily identified. The remaining portions of the primary samples shall be thoroughly mixed to form a composite sample of approximately one quart. The composite sample shall be placed in a glass stoppered, glass bottle and labeled to show the name of the material, manufacturer, plant, contract or order number, lot number and quantity in the lot. The tests specified in 4.3 shall be performed on the composite sample representative of the lot.

If the sample fails to meet the requirements specified, the lot shall be rejected.

#### 4.3 Test methods and procedures.

**4.3.1 Color.** Twenty-five milliliter (ml) of a sample shall be transferred to a 100-ml Nessler tube and compared for color with a standard, prepared by adding 0.5 ml of 0.1 Normal (N) iodine solution to 100 ml of distilled water in a second Nessler tube. The intensity of the color of the sample shall be compared with the standard by looking vertically downward through the two solutions against a white background. The sample color shall not be darker than the standard.

**4.3.2 Specific gravity.** The specific gravity shall be determined at 25°/4°C. in accordance with Standard MIL-STD-286, Method 510.1.

**4.3.3 Acidity.** Two hundred ml of 95 percent ethyl alcohol shall be added to a 500 ml Erlenmeyer flask. One hundred ml of the sample shall be added and titrated to a pink color with .01 N sodium hydroxide solution using Phenolphthalein as the indicator. A blank shall be run on 200 ml of ethyl alcohol. The percent acidity as acetic acid shall be

calculated as follows:

$$\text{Percent acid as acetic acid} = \frac{6. (V - B) N}{W}$$

V = ml of potassium hydroxide solution the sample required.

B = ml of potassium hydroxide solution the blank required.

N = normality of potassium hydroxide solution.

W = weight of sample determined from volume and density.

**4.3.4 Ash.** Approximately 10 grams (gm) of the sample shall be weighed in an accurately tared porcelain crucible. The sample shall be evaporated to near dryness over a low flame, or on a hot plate. The residue shall be ignited to constant weight at a red heat. The crucible shall be cooled in a desiccator and weighed. The increase in weight shall be calculated as percentage of ash in the sample as follows:

$$\text{Percent ash} = \frac{100 B - A}{W}$$

where:

A = weight of crucible in gm.

B = weight of crucible and residue.

W = weight of the specimen.

**4.3.5 Ester content (as glyceryl triacetate).** An accurately weighed portion of  $1.8 \pm 0.2$  gm of the sample shall be transferred to an appropriate size flask by means of a weighing pipette (triacetin is hygroscopic). An accurately measured portion of approximately 100 ml of 0.33 N sodium hydroxide solution shall be added. The flask shall be fitted to a reflux condenser and boiled gently for approximately 1 hour, with occasional whirling of the flask. The sides of the reflux condenser shall be washed down with approximately 25 ml of distilled water. The solution shall be cooled to 25°C. as quickly as

possible and titrated with .33N sulfuric acid using phenolphthalein indicator. At the same time, a blank determination shall be run on 100 ml of .33N aqueous sodium hydroxide solution which has been carried through the complete process. The ester content shall be calculated as percentage of glyceryl triacetate as follows:

$$\text{Percent glyceryl triacetate} = \frac{7.27 (V - v) N}{W}$$

where:

N = normality of acid used.

V = ml of acid used to titrate blank.

v = ml of acid used to titrate excess of sodium hydroxide after saponification.

W = weight of sample.

## 5. PREPARATION FOR DELIVERY

### 5.1 Packing.

**5.1.1 Level A.** Unless otherwise specified in contract or purchase order, triacetin (Glyceryl Triacetate) shall be packed in 55-gallon metal drums in accordance with Specification PPP-D-729 (type I or type II).

**5.1.2 Level C.** Triacetin (Glyceryl Triacetate) shall be packed to afford protection against damage during direct shipment from the supply source to the first receiving activity for immediate use. Containers shall comply with Uniform Freight Classification Rules and Containers Specifications for rail shipments or National Motor Freight Rules and Container Specifications for truck shipments, as applicable.

**5.2 Marking.** Containers shall be marked in accordance with Standard MIL-STD-129.

## 6. NOTES

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

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Notice. When Government drawings, specifications, or other data are used for any purpose other than in connection with a definitely related Government procurement operation, the United States Government thereby incurs no responsibility nor any obligation whatsoever; and the fact that the Government may have formulated, furnished, or in any way supplied said drawings, specifications, or other data is not to be regarded by implication or otherwise as in any manner licensing the holder or any other person or corporation, or conveying any rights

or permission to manufacture, use, or sell any patented invention that may in any way be related thereto.

**Custodians:**

**Army—Ordnance Corps**

**Navy—Bureau of Naval Weapons**

**Preparing activity:**

**Army—Ordnance Corps**

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004	
<b>INSTRUCTIONS</b>			
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 (as indicated on reverse hereof).			
SPECIFICATION			
ORGANIZATION (Of submitter)		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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