

O-T-236C  
August 6, 1979  
SUPERSEDING  
Fed. Spec. O-T-236B  
February 28, 1967

FEDERAL SPECIFICATION  
TETRACHLOROETHYLENE (PERCHLOROETHYLENE), TECHNICAL

This specification was approved by the Commissioner, Federal Supply Service, General Services Administration, for the use of all Federal agencies.

1. SCOPE AND CLASSIFICATION

1.1 Scope. This specification covers two grades of tetrachloroethylene (perchloroethylene) (see 6.1).

1.2 Classification. Tetrachloroethylene shall be of the following grades, as specified (see 6.2):

- Grade A - Drycleaning grade.
- Grade B - Vapor degreasing grade.

2. APPLICABLE DOCUMENTS

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

Federal Specifications:

- PPP-D-729 - Drums, Shipping and Storage, Steel, 55-Gallon.
- PPP-P-704 - Pails, Metal: (Shipping, Steel, 1- Through 12-Gallon).

(Activities outside the Federal Government may obtain copies of Federal Specifications, Standards, and Handbooks as outlined under General Information in the Index of Federal Specifications and Standards and at the prices indicated in the Index. The Index, which includes cumulative monthly supplements as issued, is for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402.

(Single copies of this specification and other Federal Specifications required by activities outside the Federal Government for bidding purposes are available without charge from General Services Administration Business Service Centers in Boston; New York; Philadelphia; Washington, DC; Atlanta; Chicago; Kansas City, MO; Fort Worth; Houston; Denver; San Francisco; Los Angeles; and Seattle, WA.

(Federal Government activities may obtain copies of Federal Specifications, Standards, and Handbooks and the Index of Federal Specifications and Standards from established distribution points in their agencies.)

Military Standard :

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

(Copies of Military Specifications and Standards required by contractors in connection with specific procurement functions should be obtained from the procuring activity or as directed by the contracting officer.)

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Federal Regulations:

49 CFR 170-189 - Hazardous Materials Regulations.

(The Code of Federal Regulations (CFR) and the Federal Register (FR) are for sale on a subscription basis by the Superintendent of Documents, U.S. Government Printing Office, Washington, DC 20402. When indicated, reprints of certain regulations may be obtained from the Federal agency responsible for issuance thereof.)

2.2 Other publications. The following documents form a part of this specification to the extent specified herein. Unless a specific issue is identified, the issue in effect on date of invitation for bids or request for proposal shall apply.

American Society for Testing and Materials (ASTM) Standards:

- D 1364 - Standard Method of Test for Water in Volatile Solvents (Fischer Reagent Titration Method).
- D 2106 - Standard Test Method for Amine Acid Acceptance of Halogenated Organic Solvents.
- D 2108 - Standard Method of Test for Color of Halogenated Organic Solvents and Their Admixtures (Platinum-Cobalt Scale).
- D 2942 - Standard Method of Test for Nonamine Acid Acceptance of Halogenated Organic Solvents, Degreasing Grade (Nonreflux Method).

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

## 3. REQUIREMENTS

3.1 Material. Tetrachloroethylene shall be a liquid.

3.2 Chemical and physical requirements. Tetrachloroethylene shall conform to the requirements of table I, when tested as specified therein.

TABLE I. Chemical and physical requirements for tetrachloroethylene

Requirement	Grade A	Grade B	Test paragraph
Distillation range, 760 mm, °C			
Initial boiling point, minimum	120	118	4.2.3.1
Dry point, maximum	122	122	
Odor	Nonresidual	N/A	4.2.3.2
Color, Pt-Co scale, maximum	15	N/A	4.2.3.3
Nonvolatile matter, weight percent, maximum	0.0025	0.01	4.2.3.4
pH of water extraction, minimum	6.5	N/A	4.2.3.5
Total acid acceptance, as NaOH, weight percent, minimum	N/A	0.10	4.2.3.6
Water, ppm, maximum	30	60	4.2.3.7

3.3 Workmanship. Tetrachloroethylene shall be visibly free from foreign matter and suitable for its intended use.

## 4. QUALITY ASSURANCE PROVISIONS

4.1 Responsibility for inspection. Unless otherwise specified in the contract or purchase order, the contractor is responsible for the performance of all inspection requirements as specified herein.

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## 4.2 Quality conformance inspection.

4.2.1 Examination of preparation for delivery. An examination shall be made to determine compliance with the requirements of section 5. Sampling shall be in accordance with MIL-STD-105. Sampling size, acceptance and rejection numbers shall be determined by special inspection level S-2 and acceptable quality level (AQL) 4.0 percent defective.

4.2.2 Examination of material and workmanship. Sample size for this examination shall be 1 quart drawn at random from the lot. Defects shall be determined in accordance with table II at special inspection level S-2 and an acceptable quality level (AQL) of 4.0 percent defective.

TABLE II. Examination of material and workmanship

Examine	Defect
Material	Not a liquid.
Workmanship	Not free from foreign matter: turbid; not suitable for the intended use.

4.2.3 Testing. Sampling shall be as specified in 4.2.2. Sample shall be tested as specified herein. Lot shall be rejected if sample fails one test.

4.2.3.1 Distillation range. Perform a simple distillation with 100 ± 0.5 ml of sample. Read and record the atmospheric pressure. Record as the initial boiling point the temperature at the instant the first drop of condensate leaves the condenser tube. Record as the dry point the temperature at the instant the last drop of sample evaporates from the lowest point in the distillation flask. Disregard any liquid on the side of the flask. Correct the boiling temperatures to standard atmospheric pressure.

4.2.3.2 Odor (grade A). Dip a 25 by 75-mm strip of filter paper (odor-free) into the sample to a depth of 50 mm. Remove the strip and allow to dry completely in air. No residual odor should be detectable.

4.2.3.3 Color (grade A). Color shall be determined by ASTM method D 2108. Make only two determinations.

4.2.3.4 Nonvolatile matter. Dry to constant weight and weigh a 1,000 ml beaker. Using a graduated cylinder, accurately pour 1,000 ml of tetrachloroethylene into the beaker and evaporate the sample to dryness. Dry the beaker and residue at 105° ± 5° C to constant weight and weigh. Calculate the percent weight of nonvolatile matter by:

$$\frac{(W_1 - W_0) \times 100}{1624} = \text{weight percent}$$

where:  $W_1$  = weight of beaker and residue, g  
 $W_0$  = weight of beaker, g.

4.2.3.5 pH (grade A). Transfer 50 ml of the sample to a 250-ml separatory funnel containing 50 ml of freshly boiled neutral distilled water (pH 7.0 to 7.3). Shake the mixture for 2 minutes, then let stand and allow the layers to separate. Discard the solvent layer and transfer the aqueous layer to a beaker. Determine the pH to the nearest 0.1 pH unit with a calibrated glass electrode pH meter.

4.2.3.6 Total acid acceptance (grade B). Total acid acceptance shall be determined by ASTM method D 2942.

4.2.3.7 Water. Water shall be determined by ASTM D 1364.

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## 5. PREPARATION FOR DELIVERY

5.1 Packing. Packing shall be level A or commercial, as specified (see 6.2). In addition, containers shall be packed, marked, and labeled in accordance with 49 CFR 170-189, as applicable.

5.1.1 Level A.

5.1.1.1 Seven hundred-pound quantity. Seven hundred pounds of one grade of tetrachloroethylene shall be packed in a 55-gallon drum conforming to PPP-D-729, type II.

5.1.1.2 Sixty-four pound quantity. Sixty-four pounds of one grade of tetrachloroethylene shall be packed in a 5-gallon pail conforming to PPP-P-704, type I, class 3. The pail shall be closed with a nozzle assembly and screwcap in accordance with the appendix to the specification.

5.1.2 Commercial. The tetrachloroethylene shall be preserved and packaged in accordance with normal commercial practice. The complete package shall be designed to protect the item against damage during shipment, handling, and storage. The quantity of product supplied per package shall be as specified in the procurement document.

5.2 Marking. The container shall be marked as specified in the contract or order (see 6.2).

5.3 Labeling. Containers shall bear the following precautionary labeling:

Tetrachloroethylene  
(Perchloroethylene)

WARNING: VAPOR HARMFUL  
Avoid breathing vapor.  
Keep container closed.  
Use with adequate ventilation.  
Avoid prolonged or repeated contact with skin.  
Do not take internally.  
Keep away from heat, flame, sparks or other ignition sources.

## 6. NOTES

6.1 Intended use.

6.1.1 Grade A. Grade A tetrachloroethylene is intended for use as a drycleaning solvent.

6.1.2 Grade B. Grade B tetrachloroethylene is intended for use as a vapor degreasing solvent.

6.2 Ordering data. Purchasers should select the preferred options permitted herein, and include the following information in procurement documents:

- (a) Title, number, and date of this specification.
- (b) Grade required (see 1.2 and 6.1).
- (c) Level of packing required (see 5.1).

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MILITARY INTEREST:

Custodian:

Army - EA  
Navy - SH  
Air Force - 68

Review activities:

Army - EA, EL, GL, MD, SM  
Navy - SH  
Air Force - 68  
DSA - GS

User activity:

Navy - YD

Military coordinating activity:

Army - EA

CIVIL AGENCY COORDINATING ACTIVITIES:

DOT - ACO  
GSA - FSS  
NASA - JFK  
USDA - ARS  
VA - DMS

Preparing activity:

GSA-FSS

Orders for this publication are to be placed with General Services Administration, acting as an agent for the Superintendent of Documents. See Section 2 of this specification to obtain extra copies and other documents referenced herein.



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5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
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c. Reason/Rationale for Recommendation:			
6. REMARKS			
7a. NAME OF SUBMITTER (Last, First, MI) - Optional		8. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
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