

**INCH-POUND**

MIL-C-43454C  
17 April 1989  

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SUPERSEDING  
MIL-C-43454B  
24 May 1977

## MILITARY SPECIFICATION

### CLEANING COMPOUND, OPTICAL LENS (READY TO USE)

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

#### 1. SCOPE

1.1 Scope. This specification covers two types of ready-to-use cleaning compounds for cleaning the exposed optical surfaces of optical equipment in the field (see 6.1).

1.2 Classification. The cleaning compound furnished under this specification shall be of the following types, as specified (see 6.2):

Type I - 20 percent solution of alcohol.  
Type II - 57 percent solution of alcohol.

#### 2. APPLICABLE DOCUMENTS

##### 2.1 Government documents.

- \* 2.1.1 Specifications, standards, and handbooks. The following specifications, standards, and handbooks form a part of this document to the extent specified herein. Unless otherwise specified, the issues of these documents are those listed in the issue of the Department of Defense Index of Specifications and Standards (DODISS) and supplement thereto, cited in the solicitation (see 6.2).

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: U.S. Army Natick Research, Development, and Engineering Center, Natick, MA 01760-5014 by using the self-addressed Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 6850

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## SPECIFICATIONS

### FEDERAL

- PPP-B-636 - Boxes, Shipping, Fiberboard
- PPP-C-186 - Containers, Packaging and Packing for Drugs, Chemicals and Pharmaceuticals

### MILITARY

- MIL-D-16791 - Detergents, General Purpose (Liquid, Nonionic)
- MIL-L-35078 - Loads, Unit: Preparation of Semiperishable Subsistence Items; Clothing, Personal Equipment and Equipage; General Specification For

## STANDARDS

### MILITARY

- MIL-STD-105 - Sampling Procedures and Tables for Inspection by Attributes
- MIL-STD-129 - Marking for Shipment and Storage
- MIL-STD-147 - Palletized Unit Loads

(Unless otherwise indicated, copies of federal and military specifications, standards, and handbooks are available from the Naval Publications and Forms Center, (ATTN: NPODS), 5801 Tabor Avenue, Philadelphia, PA 19120-5099.)

- \* 2.2 Non-Government publications. The following documents form a part of this document to the extent specified herein. Unless otherwise specified, the issues of the documents which are DoD adopted are those listed in the issue of the DODISS cited in the solicitation. Unless otherwise specified, the issues of documents not listed in the DODISS are the issues of the documents cited in the solicitation (see 6.2).

### AMERICAN CHEMICAL SOCIETY (ACS)

(Application for copies should be addressed to the American Chemical Society, 16 Street, N.W., Washington, D.C. 20036.)

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

D 1193 - Reagent Water

D 1209 - Test Method for Color of Clear Liquids (Platinum-Cobalt Scale)

D 3951 - Standard Practice for Commercial Packaging

(Application for copies should be addressed to the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA 19103-1187.)

UNITED STATES PHARMACOPEIAL CONVENTION, INC.

The United States Pharmacopeia (USP) and the National Formulary

(Application for copies should be addressed to the United States Pharmacopeial Convention, Inc., 12601 Twinbrook Parkway, Rockville, MD 20852.)

(Non-Government standards and other publications are normally available from the organizations that prepare or distribute the documents. These documents also may be available in or through libraries or other informational services.)

- \* 2.3 Order of precedence. In the event of a conflict between the text of this document and the references cited herein, the text of this document takes precedence. Nothing in this document, however, supersedes applicable laws and regulations unless a specific exemption has been obtained.

3. REQUIREMENTS

- \* 3.1 First article. When specified (see 6.2), a sample shall be subjected to first article inspection (see 6.3) in accordance with 4.3.

3.2 Materials and composition. The cleaning compounds shall be a mixture of alcohol, nonionic detergent, and distilled or deionized water in the proportions shown in table I.

- \* 3.2.1 Alcohol. The alcohol shall be special denatured alcohol, Formula No. 3A, consisting of ethyl alcohol and methyl alcohol in accordance with American Chemical Society (ACS) or United States Pharmacopeial (USP) Standards.

3.2.2 Detergent. The detergent shall conform to the requirements for type I of MIL-D-16791.

- \* 3.2.3 Water. The water shall conform to the requirements of ASTM D 1193.

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TABLE I. Composition

Component	Percent by Weight	
	Type I	Type II
Alcohol	20.0 $\pm$ 1.0	57.0 $\pm$ 1.0
Detergent	0.15 $\pm$ 0.01	0.15 $\pm$ 0.01
Water	79.9 $\pm$ 1.0	42.9 $\pm$ 1.0

3.3 Nonirritant. The cleaning compounds shall not be irritating to the nose or eyes when tested as specified in 4.4.5.

\* 3.4 Color. The color of the cleaning compounds shall be no darker than Platinum-Cobalt Scale 25 when tested as specified in 4.4.5.

\* 3.5 Labeling. In addition to the markings specified in 5.4, the following information shall be imprinted on the bottle or printed on a paper label and applied to the main panel of the body of the plastic bottle:

CLEANING COMPOUND, OPTICAL LENS  
NATIONAL STOCK NUMBER  
NET WEIGHT IN OUNCES  
Military Specification MIL-C-43454  
Manufacturer  
POISONOUS IF TAKEN INTERNALLY. -

For type II only:

CAUTION FLAMMABLE LIQUID -

Keep Away From Heat, Sparks and Open Flames.

Directions for use on exposed optical surfaces:

1. Remove loose soil from lens or mirror with a clean, dry, soft brush or stream of air. Wiping with a dry lens tissue may scratch the delicate surface.
2. Lightly wipe the lens or mirror with a folded lens tissue or an absorbent cotton swab slightly dampened with cleaning compound. Use the cleaning compound sparingly. After one stroke, discard the tissue or cotton. Repeat the process, each time use a freshly dampened tissue or cotton, until the surface is clean.

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3.5.1 Additional marking, type I. In addition to the above markings, the label shall contain the following information:

"The cleaning compound should not be used at temperatures below 20°F."

3.5.2 Additional marking, type II. In addition to the above markings, the label shall contain the following information:

"The cleaning compound can be used at temperatures as low as -40°F."

- \* 3.6 Workmanship. The end item shall conform to the quality of product established by this specification and the occurrence of defects shall not exceed the applicable acceptable quality level.

#### 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 (examinations and tests) as specified herein. Except as otherwise specified in the contract or purchase order, the contractor 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 this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

- \* 4.1.1 Responsibility for compliance. All items shall meet all requirements of sections 3 and 5. The inspection set forth in this specification shall become a part of the contractor's overall inspection system or quality program. The absence of any inspection requirements in the specification shall not relieve the contractor of the responsibility of ensuring that all products or supplies submitted to the Government for acceptance comply with all requirements of the contract. Sampling inspection, as part of manufacturing operations, is an acceptable practice to ascertain conformance to requirements, however, this does not authorize submission of known defective material, either indicated or actual, nor does it commit the Government to accept defective material.

4.1.2 Certificates of compliance. When certificates of compliance are submitted, the Government reserves the right to inspect such items to determine the validity of the certification.

- \* 4.2 Classification of inspections. The inspection requirements specified herein are classified as follows:

- a. First article inspection (see 4.3).
- b. Quality conformance inspection (see 4.4).

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- \* 4.3 First article inspection. When a first article is required (see 3.1 and 6.2), it shall be examined for the defects specified in 4.4.2, 4.4.3, and 4.4.4 and tested as specified in 4.4.5.

4.4 Quality conformance inspection. Unless otherwise specified, sampling for inspection shall be performed in accordance with MIL-STD-105.

4.4.1 Component and material inspection. In accordance with 4.1, components and materials shall be inspected in accordance with all the requirements of referenced documents unless otherwise excluded, amended, modified, or qualified in this specification or applicable purchase document.

4.4.1.1 Component and material certification. A certificate of compliance shall be acceptable as evidence that the cleaning compound conforms to the material requirements specified in 3.2.1, 3.2.2, and 3.2.3 and to the composition specified in table I.

4.4.2 End item visual examination. The end item shall be examined for the defects listed in table II. The lot size shall be expressed in units of filled, unit containers. The sample unit shall be one filled, unit container of one type, prepared in a single formulated batch. The inspection level shall be I and the acceptable quality level (AQL), expressed in terms of defects per hundred units, shall be 2.5.

TABLE II. End item visual defects

Examine	Defect
Construction	Not as specified (see 5.1)
Closure	Not as specified (see 5.1)
Labeling	Missing, incomplete, incorrect Does not contain "Directions for use" specified in 3.5 Does not contain legend "The cleaning compound should not be used at temperatures below 20°F" (Type I only) Does not contain legend "The cleaning compound can be used at temperatures as low as -40°F" (Type II only)
Container	Broken, chipped, dirty, or shows some leakage of contents

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4.4.3 End item product examination. The end item shall be examined for defects of the content of the unit container as listed in table III. The lot size shall be expressed in units of filled unit containers. The sample unit shall be the contents of one filled unit container. The sample shall be transferred into a clear glass container, let to stand for 3 hours, and then examined. The inspection level shall be S-4 and the AQL, expressed in terms of defects per hundred units, shall be 1.0.

TABLE III. End item product defects

Examine	Defect
Workmanship	Dirty Not clear Not uniform Contains foreign matter

4.4.4 Net contents examination. The end item shall be examined for net contents. The lot size shall be expressed in units of filled unit containers. The sample unit shall be one filled unit container. The inspection level shall be S-2. The lot shall be unacceptable if the average net contents per container, for all sample units examined, is less than specified on the label.

4.4.5 End item testing. The end item shall be tested for nonirritancy and color in accordance with 4.5.1 and 4.5.2. The lot size, for test purposes, shall be expressed in quarts of cleaning compound. The sample unit for testing shall be one filled unit container for irritancy and one pint for the color determination. The sample size shall be as indicated below. The lot shall be unacceptable if any sample unit fails to meet the test requirement specified.

<u>Lot size (quarts)</u>	<u>Sample size</u>
800 or less	2
801 up to and including 22,000	3
22,001 or more	5

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4.4.6 Packaging examination. The fully packaged end items shall be examined for the defects listed below. The lot size shall be expressed in units of shipping containers. The sample unit shall be one shipping container fully packaged. The inspection level shall be S-2 and the AQL, expressed in terms of defects per hundred units, shall be 2.5.

<u>Examine</u>	<u>Defect</u>
Marking (exterior and interior)	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application
Materials	Any component missing, damaged, or not as specified
Workmanship	Inadequate application of components, such as incomplete sealing or closure of flap, improper taping, loose strapping, or inadequate stapling Bulged or distorted container
Content	Number of intermediate containers per shipping container is more or less than specified Number of unit packs per intermediate container is more or less than specified <u>1/</u>

1/ For this defect, one intermediate container from each shipping container in the sample shall be examined.

4.4.7 Palletization examination. The fully packaged and palletized end items shall be examined for the defects listed below. The lot size shall be expressed in units of palletized unit loads. The sample unit shall be one palletized unit load, fully packaged. The inspection level shall be S-1 and the AQL, expressed in terms of defects per hundred units, shall be 6.5.

<u>Examine</u>	<u>Defect</u>
Finished dimensions	Length, width, or height exceeds specified maximum requirement
Palletization	Pallet pattern not as specified Interlocking of loads not as specified Load not bonded as specified
Weight	Exceeds maximum load limits
Marking	Omitted; incorrect; illegible; of improper size, location, sequence, or method of application



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4.5 Methods of inspection.

- \* 4.5.1 Nonirritancy. Apply the cleaning compound to spectacles, safety goggles, faceshield, or other equipment of similar nature following instructions stated in 3.5. After applying the cleaning compound, allow the equipment to dry for five minutes, and then wear for five minutes. If there is any indication of irritation to nose or eyes, the sample unit shall be rejected.
- \* 4.5.2 Color. The cleaning compounds shall be tested for color in accordance with ASTM D 1209.

## 5. PACKAGING

5.1 Preservation. Preservation shall be level A or Commercial as specified (see 6.2).

5.1.1 Level A.

5.1.1.1 Unit packaging (types I and II). The cleaning compound shall be unit packed in two-ounce, six-ounce, or one-quart containers conforming to group A, class 2, style 1, grade 2, closure A of PPP-C-186 (see 6.2). Each two-ounce and six-ounce plastic bottle shall be provided with a spray orifice type plug.

5.1.1.2 Intermediate packaging (types I and II).

5.1.1.2.1 Two-ounce compound. Forty-eight bottles of two-ounce cleaning compound of one type unit, unit packed as specified in 5.1.1.1, shall be placed in a fiberboard intermediate container conforming to style RSC, grade W6c or W6s of PPP-B-636. Each intermediate container shall be provided with full height, half-slotted partitions constructed of minimum 0.040-inch thick paperboard. Each container shall be closed and waterproofed with tape in accordance with the appendix of PPP-B-636.

5.1.1.2.2 Six-ounce compound. Twelve bottles of six-ounce cleaning compound of one type, unit packed as specified in 5.1.1.1, shall be placed in a fiberboard intermediate container conforming to style RSC, grade W6c or W6s of PPP-B-636. Each intermediate container shall be provided with full height, half-slotted partitions constructed of minimum 0.040-inch thick paperboard. Each container shall be closed and waterproofed with tape in accordance with the appendix of PPP-B-636.

- \* 5.1.2 Commercial. The cleaning compound shall be preserved in accordance with ASTM D 3951.

5.2 Packing. Packing shall be level A, B, or Commercial as specified (see 6.2).

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5.2.1 Level A packing.

- \* 5.2.1.1 Two-ounce compound. One hundred and ninety-two bottles of two-ounce cleaning compound of one type, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, grade V2s of PPP-B-636. Each shipping container shall be closed in accordance with method III or V and reinforced as specified in the appendix of PPP-B-636. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.2). When unit loads are strapped, strapping shall be limited to nonmetallic strapping, except for type II, class F loads.
- \* 5.2.1.2 Six-ounce compound. Seventy-two bottles of six-ounce cleaning compound of one type, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, grade V2s of PPP-B-636. Each shipping container shall be closed in accordance with method III or V and reinforced as specified in the appendix of PPP-B-636. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.2). When unit loads are strapped, strapping shall be limited to nonmetallic strapping, except for type II, class F loads.
- \* 5.2.1.3 One quart compound. Twelve bottles of one-quart cleaning compound of one type, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, grade V2s of PPP-B-636. Each shipping container shall be provided with top and bottom pads and full height, half-slotted partitions fabricated from type CF, class weather-resistant fiberboard conforming to PPP-B-636. Each shipping container shall be closed in accordance with method III or V and reinforced as specified in the appendix of PPP-B-636. Shipping containers shall be arranged in unit loads in accordance with MIL-L-35078 for the type and class of load specified (see 6.2). When unit loads are strapped, strapping shall be limited to nonmetallic strapping, except for type II, class F loads.

5.2.2 Level B packing.

5.2.2.1 Two-ounce compound. One hundred and ninety-two bottles of two-ounce cleaning compound of one type, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, type CF (variety SW) or SF, class domestic, grade 200 of PPP-B-636. Each shipping container shall be closed in accordance with method II as specified in the appendix of PPP-B-636.

5.2.2.2 Six-ounce compound. Seventy-two bottles of six-ounce cleaning compound of one type, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, type CF (variety SW) or SF, class domestic, grade 200 of PPP-B-636. Each shipping container shall be closed in accordance with method II as specified in the appendix of PPP-B-636.

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5.2.2.3 One-quart compound. Twelve quart bottles of 1-quart cleaning compound of one type, preserved as specified in 5.1, shall be packed in a snug-fitting fiberboard shipping container conforming to style RSC, type CF (variety SW) or SF, class domestic, grade 200 of PPP-B-636. Each shipping container shall be provided with top and bottom pads and full height, half-slotted partitions fabricated from the same material as the shipping container. Each shipping container shall be closed in accordance with method II as specified in the appendix of PPP-B-636.

5.2.2.4 Weather-resistant fiberboard containers. When specified (see 6.2), the shipping container for two-ounce, six-ounce, or one-quart cleaning compound shall be grade V3c, V3s, or V4s fiberboard box fabricated in accordance with PPP-B-636 and closed in accordance with method III as specified in the appendix of PPP-B-636.

- \* 5.2.3 Commercial packing. Cleaning compound, preserved as specified in 5.1, shall be packed in accordance with ASTM D 3951.

5.3 Palletization. When specified (see 6.2), cleaning compound, packed as specified in 5.2.2 or 5.2.3, shall be palletized on a 4-way entry pallet in accordance with load type Ia of MIL-STD-147. Pallet type shall be type I (4-way entry), type IV or type V in accordance with MIL-STD-147. Each prepared load shall be bonded with primary and secondary straps in accordance with bonding means K and L or film bonding means O or P. Pallet pattern shall be in accordance with the appendix of MIL-STD-147. Interlocking of loads shall be effected by reversing the pattern of each course.

- \* 5.4 Marking. In addition to any special marking required by the contract or purchase order, shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129 or ASTM D 3951, as applicable.

## 6. NOTES

(This section contains information of a general or explanatory nature that may be helpful, but is not mandatory.)

6.1 Intended use. The cleaning compounds covered by this specification are ready-to-use solutions for use on exposed optical surfaces of optical equipment in the field. It is not intended for cleaning of internal optical components during assembly. The type I solution is safe to use on optical components which are not adversely affected by the solvent action of a 20 percent alcohol solution and the abrasive action of lens tissue. Type I cleaning compound is not intended for use at temperatures below 20°F. The type II solution is safe to use on optical components which are not adversely affected by the solvent action of a 57 percent alcohol solution and the abrasive action of lens tissue. Type II cleaning compound can be used at temperatures as low as -40°F.

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6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number, and date of this specification.
- b. Type required (see 1.2).
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. When a first article is required (see 3.1, 4.3, and 6.3).
- e. Levels of preservation and packing (see 5.1 and 5.2).
- f. Whether the cleaning compound shall be unit packed in quantities of 2 ounces, 6 ounces, or 1 quart (see 5.1.1.1).
- g. Type and class of unit load required (see 5.2.1).
- h. When weather-resistant grade fiberboard shipping containers are required for level B packing (see 5.2.2.4).
- i. When palletization is required (see 5.3).

6.3 First article. When a first article is required, it shall be inspected and approved under the appropriate provisions of FAR 52.209. The first article should be a preproduction sample. The contracting officer should specify the appropriate type of first article and the number of units to be furnished. The contracting officer should also include specific instructions in acquisition documents regarding arrangements for selection, inspection, and approval of the first article.

6.4 Subject term (key word) listing.

Equipment, optical  
Glass, optical  
Solutions, cleaning  
Surfaces, optical

6.5 Changes from previous issue. The margins of this specification are marked with asterisks to indicate where changes (additions, modifications, corrections, deletions) from the previous issue 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 issue.

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Custodians:

Army - GL  
Navy - OS  
Air Force - 68

Preparing activity:

Army - GL  
(Project 6850-1044)

Review activities:

Army - MD  
DLA - GS

User activity:

Army - AR



## STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

(See Instructions - Reverse Side)

1. DOCUMENT NUMBER 11L-C-43454C		2. DOCUMENT TITLE Cleaning Compound, Optical Lens (Ready To Use)	
3a. NAME OF SUBMITTING ORGANIZATION		4. TYPE OF ORGANIZATION (Mark one)  <input type="checkbox"/> VENDOR  <input type="checkbox"/> USER  <input type="checkbox"/> MANUFACTURER  <input type="checkbox"/> OTHER (Specify): _____	
b. ADDRESS (Street, City, State, ZIP Code)			
5. PROBLEM AREAS			
a. Paragraph Number and Wording:			
b. Recommended Wording:			
c. Reason/Rationale for Recommendation:			
6. REMARKS			
NAME OF SUBMITTER (Last, First, MI) - Optional		A. WORK TELEPHONE NUMBER (Include Area Code) - Optional	
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**NOTE:** This form may not be used to request copies of documents, nor to request waivers, deviations, or clarification of specification requirements on current contracts. Comments submitted on this form do not constitute or imply authorization to waive any portion of the referenced document(s) or to amend contractual requirements.

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