

MIL-C-43454B  
24 May 1977  
SUPERSEDING  
MIL-C-43454A  
12 March 1968

## 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 items 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 Issues of documents. 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:

#### SPECIFICATIONS

##### FEDERAL

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

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

FSC 6850

MIL-C-43454B

MILITARY

MIL-D-16791 - Detergents, General Purpose (Liquid, Nonionic)

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 and Containerized Unit Loads  
40" x 48" Pallet Skids, Runners, or Pallet-Type Base

(Copies of specifications and standards 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.)

\* LAWS AND REGULATIONS

U.S. TREASURY DEPARTMENT, INTERNAL REVENUE SERVICE REGULATION

27-CFR-212.19, Formula No. 3A

(Application for copies should be addressed to the Superintendent of Documents, Government Printing Office, Washington, DC 20402.)

- \* 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 the date of invitation for bids or request for proposal shall apply:

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM) STANDARD

D156-64 (1973) - Standard Method of Test for Saybolt Color of  
Petroleum Products (Saybolt Chromometer Method)

D1193-74 - Reagent Water

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

NATIONAL MOTOR FREIGHT TRAFFIC ASSOCIATION, INC., AGENT

National Motor Freight Classification

(Application for copies should be addressed to the American Trucking Associations, Inc., Traffic Department, 1616 P Street, N.W., Washington, DC 20036.)

MIL-C-43454B

## UNIFORM CLASSIFICATION COMMITTEE, AGENT

## Uniform Freight Classification

(Application for copies should be addressed to the Uniform Classification Committee, Room 1106, 222 South Riverside Plaza, Chicago, IL 60606.)

(Technical society and technical association specifications and standards are generally available for reference from libraries. They are also distributed among technical groups and using Federal agencies.)

## 3. REQUIREMENTS

3.1 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.

\* 3.1.1 Alcohol. The alcohol shall be special denatured alcohol, Formula 3A, consisting of ethyl alcohol and methyl alcohol in accordance with U.S. Treasury Department, Internal Revenue Service Regulation 27-CFR-212.19.

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

3.1.3 Water. The water shall conform to the requirements of ASTM D1193-74, Reagent Water.

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

3.2 Nonirritating. The cleaning compounds shall not be irritating to the nose or eyes when tested as specified in 4.3.2.

3.3 Color. The color of the cleaning compounds shall be no darker than Saybolt Color + 25 when tested as specified in 4.3.2.

MIL-C-43454B

- \* **3.4 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  
Military Specification MIL-C-43454B  
Manufacturer  
POISONOUS IF TAKEN INTERNALLY.

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.

- \* **3.4.1 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 (-7°C)".

- \* **3.4.2 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 (-40°C)".

**3.5 Workmanship.** The cleaning compounds shall be a clean, clear, homogeneous liquid, free from foreign matter.

#### 4. QUALITY ASSURANCE PROVISIONS

- \* **4.1 Responsibility for inspection.** Unless otherwise specified in the contract, the contractor is responsible for the performance of all inspection requirements as specified herein. Except as otherwise specified in the contract, 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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

MIL-C-43454B

4.1.1 Certificate of compliance. Where certificates of compliance are submitted, the Government reserves the right to check test such items to determine the validity of the certification.

4.2 Quality conformance inspection. Sampling for inspection shall be performed in accordance with MIL-STD-105, except when otherwise indicated hereinafter. For purpose of sampling, an inspection lot for examinations and tests shall consist of all the end items of one type, prepared in a single formulated batch, packaged alike, produced by one manufacturer, at one plant, from the same materials, under essentially the same manufacturing conditions, and submitted for inspection at one time.

4.2.1 Component and material inspection. In accordance with 4.1 above, components and materials shall be inspected in accordance with all the requirements of referenced specifications, and standards unless otherwise excluded, amended or qualified in this specification or applicable purchase documents. The contractor shall submit to the contracting officer or his authorized representative a certificate of compliance covering the material requirements described in 3.1.1, 3.1.2, and 3.1.3 and for the composition specified in table I.

#### 4.3 Inspection of the end item.

4.3.1 Examination of the end item. The end item shall be examined for the defects in applicable subparagraphs at the inspection levels and acceptable quality levels (AQLs) set forth in 4.3.1.5. Each lot of end items shall be examined for visual, contents and packaging defects. The lot size, for purposes of determining the sample size in accordance with MIL-STD-105, shall be expressed in units of filled unit containers of the same capacity for the examination in 4.3.1.1, 4.3.1.2, 4.3.1.3 and in units of shipping containers and pallets for the examination under 4.3.1.4.

4.3.1.1 Examination for visual defects. The sample unit for this examination shall be one filled unit container.

<u>Examine</u>	<u>Defect</u>
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 3.4. Does not contain legend "The cleaning compound should not be used at temperatures below 20°F (-7°C) (Type I only)." Does not contain legend "The cleaning compound can be used at temperatures as low as -40°F (-40°C)" (Type II only).

MIL-C-43454B

ExamineDefect

Container

Container broken, chipped, dirty, any leaking of contents.

4.3.1.2 Examination of the contents of the unit container. The sample unit for this examination shall be the contents of one filled unit container. The sample shall be transferred into a clear glass container and, after standing for three hours, examined.

ExamineDefect

Workmanship

Dirty; not clear; not uniform; contains foreign matter.

4.3.1.3 Examination for net contents. The sample unit for this examination shall be one filled unit container. The lot shall be unacceptable if the average net contents per container, for all sample units examined, is less than required.

- \* 4.3.1.4 Packaging inspection. An examination shall be made to determine whether the preservation-packaging, packing and marking comply with the Section 5 requirements. Defects shall be scored in accordance with the list below. The sample unit shall be one shipping container fully packaged, except that it need not be closed. The lot size shall be the number of shipping containers in the end item inspection lot.

ExamineDefect

Marking (exterior and interior)

Incorrect, incomplete, illegible, omitted; of improper size, sequence or method of application; not in accordance with contract requirements.

Material

Any component missing, damaged or not as specified.

Workmanship

Inadequate application of components, such as, partitions not of height required, incorrectly slotted, partitions loose and ill fitting either with or without layer pads.  
Bulged or distorted container.

Contents

Number of intermediate boxes per shipping container is more or less than required as applicable.  
Number of unit containers per intermediate package and shipping container is less than specified. 1/

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

MIL-C-43454B

4.3.1.5 Inspection levels and acceptable quality levels (AQLs) for examinations. The inspection levels, for determining the sample size, and the acceptable quality levels (AQLs), expressed in defects per 100 units, shall be as follows:

<u>Examination paragraph</u>	<u>Inspection level</u>	<u>AQLs</u>
4.3.1.1	I	2.5
4.3.1.2	S-4	1.0
4.3.1.3	S-2	N.A.
4.3.1.4	S-2	4.0

4.3.1.6 Inspection of interior and exterior containers. Inspection for closure, waterproofing and reinforcing shall be performed in accordance with quality assurance provisions contained in the appendix to PPP-B-636.

4.3.1.7 Examination for palletization. An examination shall be made to determine that the palletization complies with the Section 5 requirements. Defects shall be scored in accordance with the list below. The sample unit shall be one palletized unit load fully prepared for delivery. The lot size shall be the number of palletized unit loads in the end item inspection lot. The inspection level shall be S-1 and the AQL shall be 6.5 defects per hundred units.

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

4.3.2 Testing of the end item. The end item shall be tested for nonirritancy and color in accordance with 4.4.1 and 4.4.2. The lot size, for test purposes, shall be expressed in quarts (0.95 liter) 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.

MIL-C-43454B

<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

#### 4.4 Test procedures.

4.4.1 Nonirritancy. Apply the cleaning compound to spectacles, safety goggles, faceshield, or other equipment of similar nature following instructions stated in 3.4. After applying the cleaning compound, allow the equipment to dry for five minutes, and then wear for five minutes. Note if there is any indication of irritation to nose or eyes.

- \* 4.4.2 Color. The cleaning compounds shall be tested for color in accordance with ASTM method D156-64 (1973).

### 5. PACKAGING

5.1 Preservation-packaging. Preservation-packaging shall be level A or C 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 packaged in two ounce (59 ml), six ounce (177 ml), or one quart (0.95 liter) immediate containers conforming to group A, class 2, style 1, grade 2, closure A of PPP-C-186 (see 6.2). Each two ounce (59 ml) and six ounce (177 ml) 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 (59 ml). Forty-eight bottles of 2-ounce (59 ml) cleaning compound of one type unit packaged 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 (1 mm) 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 (177 ml). Twelve bottles of 6-ounce (177 ml) cleaning compound of one type, unit packaged 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 (1 mm) thick paperboard. Each container shall be closed and waterproofed with tape in accordance with the appendix of PPP-B-636.



MIL-C-43454B

- \* 5.1.2 Level C. Cleaning compound shall be packaged to afford adequate protection against physical damage during shipment from the contractor to the first receiving activity. The package and the quantity per package shall be the same as that normally used by the contractor for retail distribution.

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

5.2.1 Level A packing.

- \* 5.2.1.1 Two-ounce compound (59 ml). One hundred and ninety-two bottles of 2-ounce (59 ml) cleaning compound of one type, unit-packaged as specified in 5.1.1.1 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.

5.2.1.2 Six-ounce compound (177 ml). Seventy-two bottles of 6-ounce (177 ml) cleaning compound of one type, unit-packaged as specified in 5.1.1.1, 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.

- \* 5.2.1.3 One quart compound (0.95 liter). Twelve bottles of 1-quart (0.95 liter) cleaning compound of one type, unit-packaged as specified in 5.1.1.1, 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.

5.2.2 Level B packing.

- \* 5.2.2.1 Two-ounce compound (59 ml). One hundred and ninety-two bottles of 2-ounce (59 ml) cleaning compound of one type, unit-packaged as specified in 5.1.1.1, 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 (177 ml). Seventy-two bottles of 6-ounce (177 ml) cleaning compound of one type, unit-packaged as specified in 5.1.1.1, 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.

MIL-C-43454B

- \* 5.2.2.3 One-quart compound (0.95 liter). Twelve quart bottles of 1-quart (0.95 liter) cleaning compound of one type unit-packaged as specified in 5.1.1.1, 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 2-ounce (59 ml), 6-ounce (177 ml), or 1-quart (0.95 liter), 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 Level C packing. Cleaning compound, packaged as specified in 5.1, shall be packed in a manner to insure carrier acceptance and safe delivery at destination at the lowest transportation rate for such supplies. The quantity per shipping container shall be the same as that normally used by the contractor for retail distribution. Containers shall comply with the Uniform Freight Classification or National Freight Classification, as applicable.

5.3 Palletization. When specified (see 6.2) cleaning compound, packed as specified in 5.2, shall be palletized in accordance with load type I of MIL-STD-147. Each prepared load shall be bonded with primary and secondary straps in accordance with bonding means K and L. Pallet patterns shall be in accordance with the appendix of MIL-STD-147. Interlocking of loads shall be effected by reversing the pattern of each course. If the container is of a size which does not conform to any of the pallet patterns specified in MIL-STD-147, the pallet pattern used shall first be approved by the contracting officer.

5.4 Marking. In addition to any special marking required by the contract; intermediate boxes, shipping containers and palletized unit loads shall be marked in accordance with MIL-STD-129.

## 6. NOTES

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 (-7°C). 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 (-40°C).

MIL-C-43454B

\* 6.2 Ordering data. Procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Type required (see 1.2).
- (c) Selection of the applicable levels of packaging and packing (see 5.1 and 5.2).
- (d) Whether the cleaning compound shall be unit packaged in quantities of 2-ounces (59 ml), 6-ounces (177 ml), or 1-quart (0.95 liter) (see 5.1.1.1).
- (e) When weather-resistant grade fiberboard shipping containers are required for level B packing (see 5.2.2.4).
- (f) When palletization is required (see 5.3).

\* 6.3 Changes from previous issue. The outside margins of this specification are marked with an asterisk(\*) 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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