

MIL-R-81835(AS)  
16 September 1971

## MILITARY SPECIFICATION

### REMOVER, ORGANIC COATING, HOT TANK TYPE

This specification has been approved by the Naval Air  
Systems Command, Department of the Navy

#### 1. SCOPE

1.1 This specification covers the requirements for one grade  
of remover of various organic coatings from aircraft parts.

#### 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.

#### SPECIFICATIONS

##### Federal

P-D-680	Dry Cleaning Solvent
QQ-A-250/4	Aluminum Alloy 2024, Plate and Sheet
QQ-A-250/5	Aluminum Alloy Alclad 2024, Plate and Sheet
QQ-A-250/12	Aluminum Alloy 7075, Plate and Sheet
QQ-A-250/13	Aluminum Alloy Alclad 7075, Plate and Sheet
PPP-D-729	Drums, Metal, 55 Gallon (For Shipment of Noncorrosive Material)
QQ-M-44	Magnesium Alloy, Plate and Sheet (AZ31B)
QQ-P-416	Plating, Cadmium (electrodeposited)

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Military

MIL-R-3043	Resin Coating, Unpigmented, For Engine Components and Metal Parts
MIL-M-3171	Magnesium Alloy, Process for Pretreatment and Prevention Of Corrosion On
MIL-C-5541	Chemical Films and Chemical Film Materials For Aluminum and Aluminum Alloys
MIL-O-6082	Lubricating Oil, Aircraft Reciprocating Engine (Piston)
MIL-S-7952	Steel, Sheet and Strip, Uncoated, Carbon (1020 and 1025) Aircraft Quality
MIL-A-8625	Anodic Coatings, For Aluminum and Aluminum Alloys
MIL-T-9046	Titanium and Titanium Alloy, Sheet, Strip and Plate
MIL-C-22750	Coating, Epoxy Polyamide
MIL-P-23377	Primer Coating, Epoxy Polyamide, Chemical and Solvent Resistant
MIL-C-27725	Coating, Corrosion Preventive, For Aircraft Integral Fuel Tanks
MIL-C-81309	Corrosion Preventive Compound, Water Displacing, Ultra-Thin Film
MIL-P-81352	Lacquer, Acrylic (For Naval Weapons Systems)
MIL-C-81773	Coating, Polyurethane, Aliphatic, Weather Resistant

## STANDARDS

Military

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

MIL-STD-129      Marking for Shipment and Storage

(Copies of specifications, 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.)

## 3.            REQUIREMENTS

3.1            Composition - The formulation of the remover shall be optional with the manufacturer, but shall be restricted by other requirements specified herein. The remover shall be a liquid from 60°F to 180°F.

3.1.1          The product shall be free of any materials which may produce obnoxious vapors in such concentrations as to become an annoyance or a medical hazard to personnel when used in accordance with the directions specified herein.

3.2            Seal - The seal shall consist essentially of water, corrosion inhibitors and rinsing agents. The pH of the seal shall be  $10 \pm 0.5$ . The volume of the seal shall be not less than 10% nor more than 15% of the total volume of remover.

3.3            Flammability - When tested as specified in 4.4.3, the solvent layer shall continue to burn no longer than 3 seconds after removal of the flame.

3.4            Stripping properties - When tested as specified in 4.4.4, the remover shall strip all organic finishes normally encountered on removed aircraft parts.

3.5            Oil removal - The material shall remove oil deposits when tested as specified in 4.4.5.

3.6            Corrosiveness - The remover shall show no visible trace of corrosion nor show more than 0.2 mg. loss of weight of panel after 24 hours immersion when tested as specified in 4.4.6.

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3.7 Orthodichlorobenzene content - The manufacturer shall certify that the solvent layer of the remover does not contain more than 20% by volume of orthodichlorobenzene.

3.8 Storage stability - The manufacturer shall certify that the remover will conform to all requirements of this specification after 6 months storage at  $75 \pm 5^{\circ}\text{F}$ .

#### 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 utilize 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.

##### 4.2 Sampling -

4.2.1 Lot - A lot shall consist of remover produced by one manufacturer, with no change in process or materials, provided the operation is continuous. In the event the process is a batch process, each batch shall constitute a lot.

4.2.2 Sampling for inspection of filled containers - A random sample of filled containers shall be selected from each lot offered for inspection in accordance with MIL-STD-105 at Inspection Level I, and Acceptable Quality Level (AQL) = 2.5 percent defective to verify compliance with this specification regarding fill, closure, marking and other requirements not involving tests.

4.2.3 Sampling for tests - Two containers shall be selected at random from each inspection lot. If more than one lot is represented in the shipment, each lot represented shall be treated as a separate shipment for sampling purposes. The contents of each container having been selected at random for sampling, shall be thoroughly mixed immediately prior to sampling. Each sample shall be tested to determine compliance with this specification.

##### 4.3 Quality assurance inspection -

4.3.1 Inspection of filled containers - Each sample filled container selected in accordance with 4.2.2 shall be examined for defects of the container and the closure, for evidence of leakage, and for unsatisfactory marking; each sample filled container shall also be weighed to determine the amount of contents. Any container in the sample, having one or more defects, or under required fill, shall be rejected and if the number of defective containers in any sample exceeds the acceptance number for the applicable sampling plan of MIL-STD-105, the lot represented by the sample shall be rejected.

4.3.2 Lot acceptance tests - The samples selected in accordance with 4.2.3 shall be subjected separately to the tests specified in 4.4. If either sample fails one or more of these tests, the lot shall be rejected.

#### 4.4 Test procedures

4.4.1 Composition - A representative sample of the remover shall be cooled to 60°F and held at that temperature for 1 hour. There shall be no evidence of solidification. The sample shall then be heated to 180°F and held at that temperature for 1 hour. There shall be no evidence of boiling.

4.4.2 Seal - 200 ml of a representative sample of the remover shall be placed in a graduated cylinder and allowed to stand overnight. The seal volume shall then be determined. The pH value of the seal shall be determined using a pH meter with a high alkali resistant glass electrode.

#### 4.4.3 Flammability -

4.4.3.1 Preparation of panel - One end of a clean metal panel, 6 by 1 inch shall be held at an angle of approximately 45 degrees. The solvent layer of the material shall be poured along the upper edge of the panel, allowing the liquid to drain freely over the surface. The liquid wetting the reverse side of panel shall be wiped clean before proceeding with the test.

4.4.3.2 Procedure - A microburner flame, not exceeding 3/16 inch in length, shall be passed back and forth along the lower edge of the panel within a 2 second period. This operation shall be repeated three times at 3 second intervals. If the liquid ignites, the burner shall be removed and observation made to determine whether the liquid continues to burn. If the liquid continues to burn the duration of burning shall be noted.

4.4.4 Stripping Properties - Three by six inch panels shall be prepared as described in Table I. The panels shall be completely immersed in the active layer of the remover. The remover shall be maintained at a temperature not exceeding 160°F. The coating shall be completely removed after one

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TABLE I - Test Panel Finishes

Panel	Surface Treatment	Processing Steps	Material	Number of Coats	Thickness Per Coat (Mil)	Drying Time Between Coats	Drying Time After Final Coat	Baking After Final Coat
Aluminum Alloy 2024-T3	MIL-C-5541	1	Lacquer Epoxy Primer MIL-P-23377	1	0.5 - 1.0	1 hour at room temp.	---	---
		2	Lacquer Acrylic MIL-L-81352	2	0.7 - 1.0	1 hour at room temp.	72 hours	---
As Above	As Above	1	Primer Coating Epoxy Polyamide MIL-P-23377	1	0.5 - 0.6	1 hour at room temp.	---	---
		2	Epoxy Polyamide Gloss White MIL-C-22750	mist coat		30 min at room temp.	---	---
		3	Epoxy Polyamide Gloss White MIL-C-22750	wet coat	1.5 - 2.10		Air dry one week at room temp.	18 hours at 180° ± 3°F (62° ± 2°C)
As Above	As Above	1	Primer Coating Epoxy Polyamide MIL-P-23377	1	0.6 - 0.9	1 hour at room temp.		
		2	Polyurethane Gloss White MIL-C-81773	mist coat		15 minutes at room temp.		
		3	Polyurethane Gloss White MIL-C-81773	1	1.0 - 1.5		Air Dry one week at room temperature	24 hours at 250°F then one hour at 325°F.
Steel MIL-S-7952	surface roughness of 10 - 16 micro inches rms.	1	Resin coating Permanent MIL-R-3043	1	0.3 - 0.7		Air Dry one hour at room temp.	30 minutes at 325°F
As Above	As Above	1	Nupon SF - 13371 "160S1 Engine Grd"	mist coat		5 minutes at room temp.		30 minutes at 375°F
		2		1	1.0 - 1.5			
As Above	As Above	1	Nubolon "S" 283-E-200 "1647J Grd"	1	1.0 - 1.5			30 minutes at 425°F
Aluminum Alloy 2024-T3	MIL-C-5541	1	Coating Corrosion Preventive MIL-C-27725 Type II	1	0.8 - 1.2		Air Dry 14 days at room temperature	

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hour except for the permanent resin. Over 75% of the permanent resin shall be removed within three hours. Moderate brushing may be used.

4.4.5 Oil removal - A 0.020 by 3 by 6 inch anodized aluminum alloy panel shall be coated with grade 1100 oil conforming to Specification MIL-O-6082 and completely immersed in the solvent layer of the compound (with seal). The panels shall be removed and rinsed thoroughly under tap water at room temperature 25°C (77°F). The panel shall be free of oil.

#### 4.4.6 Corrosiveness

4.4.6.1 Preparation of test panels - Test panels 1 by 1 by 0.05 inches shall be made from each of the metals specified in Table II. Panels shall be cleaned with mineral spirits using a swab of absorbent cotton. The panels shall then be wiped with paper toweling, dipped in acetone and dried with paper toweling.

TABLE II

#### Metal Test Panels

<u>No.</u>	<u>Metal</u>	<u>Specification</u>	<u>Surface</u>	<u>Specification</u>
1	Aluminum Alloy	QQ-A-250/5		
2	Aluminum Alloy	QQ-A-250/13		
3	Aluminum Alloy	QQ-A-250/4	Anodized	MIL-A-8625, Type I or II
4	Steel	MIL-S-7952	Polished	
5	Steel	MIL-S-7952	Cadmium Plated	QQ-P-416
6	Magnesium Alloy	QQ-M-44 (Condition H)	Chrome Pickled	MIL-M-3171 Type I
7	Titanium Alloy	MIL-T-9046		

4.4.6.2 Procedure - Weigh the cleaned panels and immerse them in the solvent layer maintained at  $155 \pm 5^\circ\text{F}$  for 24 hours. The panels shall not touch each other on the sides of the container. After 24 hours remove the panels, rinse with mineral spirits, dry, and re-weigh. Examine for severe visible attack such as pitting and staining.

## 5. PREPARATION FOR DELIVERY

5.1 Preservation and Packaging - Preservation and packaging shall be level A or C as specified.

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5.1.1 Level A - Unless otherwise specified, the remover shall be furnished in 55 gallon drums conforming to PPP-D-729.

5.1.2 Level C - Unless otherwise specified, packaging shall be in accordance with the manufacturer's commercial practice.

5.2 Packing -

5.2.1 Level A - Remover, packaged in accordance with 5.1.1, shall require no overpacking.

5.2.2 Level C - Remover, packaged in accordance with 5.1.2, shall be packed to afford protection against damage during direct shipment from the supply source to the first receiving activity for immediate use. Container shall be in accordance with Uniform Freight Classification Rules or regulations of other carriers applicable to the mode of transportation.

5.3 Marking -

5.3.1 Normal Marking - Containers shall be marked in accordance with MIL-STD-129. The shipment marking nomenclature shall be:

REMOVER, ORGANIC COATING, HOT TANK TYPE

5.3.2 Additional Marking - Each container of remover shall be marked with the manufacturer's directions for use. Each container shall also have a label with the following precautions:

#### PRECAUTIONS

1. Organic coating remover contains ingredients harmful to skin and eyes.
2. Avoid contact of remover with rubber, asphaltic base floors, and walkways.
3. Avoid enclosed or unventilated areas.
4. Store remover indoors, or in an area well protected against weather conditions.

6. NOTES

6.1 Intended Use - The organic finish remover covered by



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this specification is intended for removing coatings from engine parts, wheels, and small airframe section parts that have been removed from the aircraft. The material is for use in the  $160 \pm 5^{\circ}\text{F}$  temperature range. The parts should be degreased prior to stripping. All parts shall be completely immersed in the active layer and withdrawn slowly through the seal.

Rinse with warm water and spray the parts with a water displacing preservative, MIL-C-81309. Any residual preservative is easily removed with mineral spirits, P-D-680 prior to refinishing.

6.2      Ordering data - Procurement documents should specify the following:

- (a) Title, number and date of this specification.
- (b) Quantity of remover desired.
- (c) Type and size of containers if other than as specified in 5.1.
- (d) Selection of applicable levels of preservation, packaging and packing (see 5.1 and 5.2).

6.3      Unit of purchase - The unit of purchase for the remover is the U. S. gallon of 231 cubic inches at  $15.6^{\circ}\text{C}$  ( $60^{\circ}\text{F}$ ).

Preparing activity  
Navy - AS  
Project No. 8010-N074

SPECIFICATION ANALYSIS SHEET		Form Approved Budget Bureau No. 119-R004
<p style="text-align: center;"><u>INSTRUCTIONS</u></p> <p>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).</p>		
SPECIFICATION MIL-R-81835(AS) REMOVER, ORGANIC COATING, HOT TANK TYPE		
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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