

NOT MEASUREMENT SENSITIVE
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MILITARY SPECIFICATION

REMOVER, PAINT, EPOXY, POLYSULFIDE, AND POLYURETHANE SYSTEMS

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

1. SCOPE

1.1 Scope. This specification covers the requirements for four types and two classes of paint remover for epoxy, polysulfide, and polyurethane paint systems.

*1.2 Classification. The paint remover shall be of the following types and classes, as specified (see 6.2.1):

<u>Type</u>	<u>Description</u>
I	For epoxy and polyurethane topcoat systems.
II	For polyurethane topcoat systems.
III	For polysulfide basecoat systems.
IV	For polyurethane intercoat systems.

* <u>Class</u>	<u>Description</u>
1	Phenolic, chromate inhibited.
1A	Phenolic, non-chromate.
2	Non-phenolic, chromate inhibited.
2A	Non-phenolic, non-chromate.
3	Limited phenol, limited methylene chloride, chromate inhibited.
3A	Limited phenol, limited methylene chloride, non-chromate

Beneficial comments (recommendations, additions, deletions) and any data which may be of use in improving this document should be addressed to: Systems Engineering and Standardization Department (Code 53), Naval Air Engineering Center, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

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2. APPLICABLE DOCUMENTS

2.1 Government documents.

2.1.1 Specifications and standards. The following specifications and standards 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).

SPECIFICATIONS

FEDERAL

P-C-444	-	Cleaning Compound, Solvent Soluble, Grease Emulsifying.
QQ-A-250/4	-	Aluminum Alloy 2024, Plate and Sheet.
QQ-A-250/5	-	Aluminum Alloy Alclad 2024, Plate and Sheet.
QQ-A-250/13	-	Aluminum Alloy Alclad 7075, Plate and Sheet.
QQ-M-44	-	Magnesium Alloy Plate and Sheet (AZ31B).
QQ-P-416	-	Plating, Cadmium (Electrodeposited).
TT-T-291	-	Thinner, Paint, Mineral Spirits, Regular and Odorless.
CCC-C-440	-	Cloth, Cheesecloth, Cotton, Bleached and Unbleached.
PPP-C-96	-	Can, Metal, 28 Gage and Lighter.
PPP-D-729	-	Drums, Shipping and Storage, Steel, 55-Gallon (208 liter).

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MIL-M-3171	-	Magnesium Alloy, Processes for Pretreatment and Prevention of Corrosion on.
MIL-S-5000	-	Steel, Chrome-Nickel-Molybdenum (E4340) Bars and Reforging Stock.
MIL-H-6875	-	Heat Treatment of Steels (Aircraft Practice), Process for.
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-S-8802	-	Sealing Compound, Temperature Resistant, Integral Fuel Tanks and Fuel Cell Cavities, High Adhesion.
MIL-T-9046	-	Titanium and Titanium Alloy, Sheet, Strip and Plate.
MIL-A-9962	-	Abrasive Mats, Non-Woven, Non-Metallic.
MIL-C-22750	-	Coating, Epoxy-Polyamide.
MIL-P-23377	-	Primer Coating: Epoxy Polyamide, Chemical and Solvent Resistant.
MIL-T-23397	-	Tape, Pressure-Sensitive Adhesive, for Masking During Paint Stripping Operations.
MIL-C-43616	-	Cleaning Compound, Aircraft Surface.
MIL-C-81706	-	Chemical Conversion Materials for Coating Aluminum and Aluminum Alloys.
MIL-S-81733	-	Sealing and Coating Compound, Corrosion Inhibitive.
MIL-C-83286	-	Coating, Urethane, Aliphatic Isocyanate, for Aerospace Applications.
MIL-C-85570	-	Cleaning Compound, Aircraft, Exterior

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AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

- ASTM F 519 - Mechanical Hydrogen Embrittlement Testing of Plating Processes and Aircraft Maintenance Chemicals
- ASTM F 1080 - Standard Test Method for Determining the Consistency Of Viscuous Fluids Using a Consistometer.

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

NASC STANDARDS

- NAS 517 - Screw, 100° Close Tolerance Flat-Head, 160,000 psi

(Application for copies should be addressed to Aerospace Industries Association of America, Inc., 1250 Eye Street N.W., Washington DC 20005.)

UNIFORM CLASSIFICATION COMMITTEE, AGENT

Uniform Freight Classification Rules

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

(Nongovernment 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 (except for related associated detail specifications, specification sheets or MS standards), 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 Qualification. The paint remover furnished under this specification shall be products which are authorized by the qualifying activity for listing on the applicable qualified products list at the time of award of the contract (see 4.3 and 6.3). Each type shall be qualified individually.

3.2 Material. The material covered by this specification shall be a paint remover consisting of organic solvents, thickeners, corrosion inhibitors, evaporation retarders, and other ingredients to produce a satisfactory product and shall be of such consistency that a smooth, even coating can be applied to a painted surface by spraying, brushing or flowing. This shall be determined during the paint stripping efficiency and service evaluation tests.

* 3.2.1 Composition. The formulation of the remover shall be optional with the manufacturer, except that it shall contain no abrasives and shall be restricted by other requirements specified herein and in Table I.

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*TABLE I. Composition restrictions.

Class	weight % Chromium	Phenol	Methylene chloride
Class 1	0.15 to 0.60	> 10	No limit
Class 1A	None	> 10	No limit
Class 2	0.15 to 0.60	None	No limit
Class 2A	None	None	No limit
Class 3	0.15 to 0.60	≤ 15	≤ 50.5
Class 3A	None	≤ 15	≤ 50.5

3.2.2 Toxicity. The material shall have no adverse effect on the health of personnel when used for its intended purpose in accordance with the directions specified herein. The remover shall contain no components which produce noxious vapors in such concentrations as to be an annoyance to personnel during paint removal operations under conditions of adequate ventilation while exercising caution to avoid prolonged contact with the skin and while observing Occupational Safety and Health Administration (OSHA) guidelines. Questions pertaining to the toxic effect shall be referred by the contracting activity to the appropriate departmental medical service who will act as an advisor to the contracting agency (see 6.5).

3.3 Consistency.

*3.3.1 Flow. When tested as specified in 4.6.1.1, the remover shall flow not less than 18 and no more than 23 centimeters (cm) (7 and 9 inches) in 5 minutes.

3.3.2 Viscosity. When tested as specified in 4.6.1.2, the viscosity of the remover shall be not more than 5 pascal second (Pa.s) (5000 cps) at 20 rpm.

3.4 Volatility. The volatility of the remover shall be equal to or less than the volatility of distilled water when tested under the conditions specified in 4.6.2.

3.5 Flammability. When subjected to the test specified in 4.6.3, the remover shall not continue to burn longer than 3 seconds after removal of the flame.

3.6 Effects on metals. The remover shall not adversely affect any metal listed herein when tested as specified in 4.6.4.1, 4.6.4.2, and 4.6.4.3 .

3.7 Accelerated storage stability. The paint remover shall not cake, clot, gel or separate when stored in the dark as specified in 4.6.5.2.1. The remover, when tested as specified in 4.6.5.2.2, shall not polymerize or show significant change in physical appearance, nor exhibit evidence of adversely affecting steel surfaces. After being tested for stability, the test sample shall conform to the requirements of 3.8 when tested as specified in 4.6.6.

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3.8 Paint stripping efficiency.

3.8.1 Type I. The remover shall exhibit average stripping efficiencies equal to or greater than the control formulation on the epoxy paint system and the polyurethane paint system, at both $20^{\circ}\pm 2^{\circ}\text{C}$ ($68^{\circ}\pm 4^{\circ}\text{F}$) and $10^{\circ}\pm 2^{\circ}\text{C}$ ($50^{\circ}\pm 4^{\circ}\text{F}$), when tested as specified in 4.6.6.

3.8.2. Type II. The remover shall exhibit average stripping efficiencies equal to or greater than the control formulation on the polyurethane topcoat system, at both $20^{\circ}\pm 2^{\circ}\text{C}$ ($68^{\circ}\pm 4^{\circ}\text{F}$) and $10^{\circ}\pm 2^{\circ}\text{C}$ ($50^{\circ}\pm 4^{\circ}\text{F}$) when tested as specified in 4.6.6.

3.8.3 Type III. The remover shall exhibit average stripping efficiencies of not less than 95% at $20^{\circ}\pm 2^{\circ}\text{C}$ ($68^{\circ}\pm 4^{\circ}\text{F}$) and not less than 90% at $10^{\circ}\pm 2^{\circ}\text{C}$ ($50^{\circ}\pm 4^{\circ}\text{F}$) on the polysulfide sealant system, when tested as specified in 4.6.6.

3.8.4 Type IV. The remover shall exhibit an average stripping efficiency equal to or greater than the control formulation on the polyurethane intercoat system, at both $20^{\circ}\pm 2^{\circ}\text{C}$ ($68^{\circ}\pm 4^{\circ}\text{F}$) and $10^{\circ}\pm 2^{\circ}\text{C}$ ($50^{\circ}\pm 4^{\circ}\text{F}$), as specified in 4.6.6.

3.9 Rinsability. When tested as specified in 4.6.7, the loosened paint and spent remover shall be easily and completely removed by water rinsing.

*3.10 Refinishing properties of stripped surfaces. When tested as specified in 4.6.8, test panels shall exhibit no loss in paint adhesion.

3.11 Storage stability. When stored as specified in 4.6.9, paint removers shall show no visible evidence of deterioration. After twelve months storage, the removers shall meet all the requirements specified herein except accelerated storage stability.

3.12 Service test. When required by the qualifying activity, the remover shall be tested as specified in 4.6.10 and shall show satisfactory performance in actual use.

3.13 Workmanship. The remover shall have a uniform and homogeneous appearance. The component ingredients shall be intimately blended and processed as required in accordance with the best commercial practice for a high quality material.

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 the specification where such inspections are deemed necessary to assure supplies and services conform to prescribed requirements.

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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 assuring 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 acceptance of defective material.

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

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

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

4.3 Qualification inspection. The qualification inspection shall consist of all the tests in Table II.

4.3.1 Qualification samples. The qualification sample shall consist of 7.6 liters (two gallons) of paint remover contained in two, 4 liter (one gallon) glass containers. Samples shall be forwarded to the Supply Officer, Naval Air Development Center, Warminster, PA 18974, ATTN: Director, Aircraft and Crew Systems Technology Directorate, Code 6062. Samples shall be plainly identified by securely attached durable tags with the following information:

Sample for qualification inspection
 Remover, Paint, Epoxy, Polysulfide and Polyurethane Systems
 Type and class
 Manufacturer's formula no. _____
 Date compounded _____
 Manufacturer's name
 Batch or lot number
 Submitted by (name) (date) for qualification
 inspection in accordance with the requirements
 of MIL-R-81294D under authorization of (reference
 authorizing letter) (see 6.3)

*4.3.1.1 Field service test samples. Service test samples shall consist of a minimum of 378.5 liters (100 gallons) to a maximum of 2840 liters (750 gallons) of paint remover as required by the field service activity. No overpacking is required. Samples shall be forwarded in accordance with instructions contained in the authorizing letter granting service test which will be sent to the manufacturer on satisfactory completion of all laboratory tests.

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*TABLE II. Qualification inspection.

Characteristic	Paragraph	
	Requirement	Test
Methylene chloride content	3.2.1	1/
Phenol content	3.2.1	1/
Chromium content	3.2.1	1/
Toxicity	3.2.2	4.3.2.1
Consistency:		
Flow	3.3.1	4.6.1.1
Viscosity	3.3.2	4.6.1.2
Volatility	3.4	4.6.2
Flammability	3.5	4.6.3
Effects on metals	3.6	4.6.4
Accelerated storage stability	3.7	4.6.5
Paint stripping efficiency	3.8	4.6.6
Rinsability	3.9	4.6.7
Refinishing properties of stripped surfaces	3.10	4.6.8
Storage stability	3.11	4.6.9
Service tests	3.12	4.6.10
Workmanship	3.13	Visual and 1/

1/ A certificate of compliance shall be submitted.

4.3.2 Manufacturer's data. The manufacturer shall submit a report, in duplicate, to accompany the qualification inspection sample. This report shall include the results of the manufacturer's tests, reported quantitatively, where applicable, in the units specified for all of the requirements specified herein, except storage stability. Tests not conducted due to lack of special test facilities or materials shall be so noted in the report. Trade names alone will not be considered satisfactory. The formulation shall be clearly identified by the manufacturer's formula number. The percent of each ingredient shall also be furnished. The manufacturer shall also certify compliance with 3.2.1.

4.3.2.1 Toxicological data and formulations. The manufacturer shall furnish the toxicological data and formulations required to evaluate the safety of the material for the proposed use. A statement of the complete formulation of the material shall be furnished. The statement shall include the chemical name and the percent of each ingredient. Material safety data sheets on toxicity (see 3.2.2) shall be prepared in accordance with FED-STD-313 and submitted to the qualifying activity.

4.3.3 Retention of qualification. In order to retain qualification of products approved for listing on the qualified products list (QPL), the manufacturer shall verify by certification to the qualifying activity that his product complies with the requirements of this specification. The time of periodic verification by certification shall be in two year intervals from the date of original qualification. The Government reserves the right to re-examine the qualified product whenever deemed necessary to determine that the product continues to meet any or all of the specification requirements.

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4.4 Quality conformance inspection.

4.4.1 Lot formation. A lot shall consist of all the paint remover of the same type produced by one manufacturer, at one plant, from the same materials, and under essentially the same conditions provided the operation is continuous. In the event the process is a batch operation, each batch shall constitute a lot (see 6.4).

4.4.2 Sampling.

4.4.2.1 Sampling for tests. Quality conformance test samples shall be selected in accordance with the procedures of FED-STD-141 and shall consist of at least 4 liters (1 gallon). Each sample shall be clearly identified by the manufacturer's formula number as specified in 4.3.2. The manufacturer shall furnish with each lot a certificate to the effect that the material has been processed in the same manner and degree using the same base ingredients as the approved qualification sample. The selected samples shall be tested as specified in 4.4.3.1.

4.4.2.2 Sampling for inspection of filled containers. A random sample of filled containers shall be selected from each lot in accordance with MIL-STD-105, Inspection Level I for the inspection specified in 4.4.3.2. For purposes of this inspection, the lot size shall be the number of shipping containers.

4.4.3 Inspection and test.

4.4.3.1 Physical tests. The sample selected in 4.4.2.1 shall be tested to all the requirements in Table III. In addition, the material may be subjected to any other tests, specified herein, considered necessary to determine conformance with the requirements of this specification. Failure of the sample to pass all the tests shall be cause to reject the lot represented by the sample.

4.4.3.2 Packaging inspection. The sample selected in accordance with 4.4.2.2 shall be examined to determine conformance to all requirements of this specification regarding fill, closure, marking and other requirements not involving tests. The Acceptable Quality Level (AQL) for this inspection shall be 2.5 percent defective.

TABLE III. Quality conformance inspection.

Characteristic	Paragraph	
	Requirement	Test
Consistency (as applicable)	3.3.1 - 3.3.2	4.6.1.1 - 4.6.1.2
Volatility	3.4	4.6.2
Flammability	3.5	4.6.3
Effects on metals	3.6	4.6.4.1 (only)
Accelerated storage	3.7	4.6.5
Paint stripping efficiency	3.8	4.6.6
Rinsability	3.9	4.6.7

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4.5 Inspection conditions. Unless otherwise specified, all tests shall be conducted at $21^{\circ} \pm 3^{\circ}\text{C}$ ($70^{\circ} \pm 5^{\circ}\text{F}$) and 50 ± 10 percent relative humidity.

4.6 Test methods.

4.6.1 Consistency.

* 4.6.1.1 Flow. Flow shall be determined in accordance with ASTM F 1080.

4.6.1.2 Viscosity. A Brookfield Viscometer, Model RVF or equivalent, shall be used with a spindle number RV3. Viscosity shall be determined at 20 rpm. Readings shall be taken after the spindle has been operating for at least 3 minutes.

4.6.2 Volatility. A Petri dish, 9 cm (3.5 inch) in diameter and 1.5 cm (0.6 inch) deep, shall be placed on each pan of a two-pan beam balance. Sufficient remover shall be added to cover the entire bottom of one of the dishes. Distilled water shall be carefully poured in the other dish until the dish containing the remover is counter-balanced. The balance with the petri dishes on the pans shall be exposed for 30 minutes in a draft-free area. At the end of the exposure period, the comparative loss in weights shall be observed.

4.6.3 Flammability.

*4.6.3.1 Preparation of panel. A clean anodized aluminum alloy panel, 10 by 2 cm (4 by 0.75 inch), shall be held at an angle of approximately 45 degrees. The remover shall be poured along the upper edge of the panel, allowing the remover to drain freely over the surface. Remover settling on the reverse side of panel shall be wiped clean before proceeding with the test.

4.6.3.2 Procedure. A micro-burner flame, not exceeding 0.5 cm (0.188 inch) in length shall be passed, within a two second period, back and forth along the lower edge of the panel. This operation shall be repeated three times at three second intervals. If the remover ignites, the panel shall be removed from the burner flame and observation shall be made to ascertain whether the remover continues to burn. The above procedure shall be repeated on another similarly prepared panel except that it shall be placed in an oven for 15 minutes at $45^{\circ} \pm 2^{\circ}\text{C}$ ($113^{\circ} \pm 4^{\circ}\text{F}$). The panel shall then be removed from the oven and subjected to the flame test.

4.6.4 Effects on metals.

4.6.4.1 Single panel corrosion test.

4.6.4.1.1 Preparation of test panels. Test panels 2.5 by 15 by 0.13 cm (1 by 6 by 0.05 inches) shall be made from each of the metals specified in Table IV. The panels shall be bent to form an angle of 45 degrees, approximately 3.2 cm (1.25 inches) from the end of the panel to serve as a holder on the rack. The panels shall then be cleaned in a beaker of boiling petroleum spirits conforming to Type I, Grade A of TT-T-291 by using a surgical gauze swab. The panels shall then be rinsed in boiling petroleum spirits, boiled in 95 percent methanol, and finally, boiled in absolute methanol. In handling the panels, care should be exercised to avoid fingerprint markings.

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TABLE IV. Metals for corrosiveness test.

Metal	Specification	Surface	Specification
Aluminum alloy (Alclad 2024)	QQ-A-250/5	As rolled	-
Aluminum alloy (Alclad 7075)	QQ-A-250/13	As rolled	-
Aluminum alloy (2024)	QQ-A-250/4	Anodize	MIL-A-8625 (Type I or II)
Steel	MIL-S-7952	Polished 65 RMS	-
Steel	MIL-S-7952	Cadmium plated	QQ-P-416 (Type I, Class 3)
Magnesium alloy	QQ-M-44 (Condition H)	Chrome pickled	MIL-M-3171 (Type I)
Titanium alloy 6Al-4V	MIL-T-9046	-	-

4.6.4.1.2 Procedure. Each panel shall be completely immersed in the paint remover for 1 minute, removed and placed on a rack or other suitable device, so that the long dimension forms a 60 degree angle with the horizontal, then placed in an oven maintained at $38^{\circ}\pm 1^{\circ}\text{C}$ ($100^{\circ}\pm 2^{\circ}\text{F}$) for a period of 48 hours. The panels shall then be removed and immediately placed in a desiccator for 48 hours. The lower portion of the desiccator shall be filled with distilled water after which it shall be closed and conditioned at $21.1^{\circ} \pm 2.8^{\circ}\text{C}$ ($70^{\circ} \pm 5^{\circ}\text{F}$). During the test, the desiccator shall be kept tightly sealed and in an area maintained at $21.1^{\circ} \pm 2.8^{\circ}\text{C}$ ($70^{\circ} \pm 5^{\circ}\text{F}$). At the end of the 48 hours period, the panels shall be removed, rinsed with water and brushed, if necessary, until free from paint remover residues. The panels shall then be cleaned with acetone and examined for discoloration or evidence of corrosion.

4.6.4.2 Corrosion test for dissimilar metals.

4.6.4.2.1 Preparation of test panels. Ten test panels 7.6 by 10.2 cm (3 by 4 inches) and of any convenient thickness unless specified, shall be prepared from the following metals:

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<u>Quantity</u>	<u>Composition of panel</u>
Three each	Aluminum alloy 7075, QQ-A-250/13, T-6 condition (0.32 cm (0.125 inch) thick).
Two each	Magnesium alloy, QQ-M-44 (AZ31B-H24), treated in accordance with MIL-M-3171, Type I.
Two each	Steel, MIL-S-7952, cadmium plated (0.0013 cm (.0005 inch) nominal) in accordance with QQ-P-416.
Three each	Titanium alloy, MIL-T-9046, (6Al-4V) (0.16 cm (0.063 inch) thick nominal).

Three aluminum panels and two titanium panels shall have holes drilled in accordance with Figure 1. Two magnesium, two steel and one titanium panel shall have holes drilled according to note 3 of Figure 1. The panels shall be cleaned in accordance with 4.6.4.1.1 and assembled in accordance with Figure 2 as indicated below.

- a. 7075-T6 aluminum alloy to magnesium alloy fastened with NAS-517-3-2 screws (100 degree countersunk structure) heat treated in accordance with MIL-H-6875, nuts (AN315-3R) and washers (AN960-10). The screws, nuts and washers shall be steel and each shall be cadmium plated in accordance with QQ-P-416.
- b. 7075-T6 aluminum alloy to cadmium plated steel fastened same as a.
- c. 7075-T6 aluminum alloy to 6Al-4V titanium alloy fastened same as a.
- d. 6Al-4V titanium alloy to cadmium plated steel fastened same as a.
- e. 6Al-4V titanium to magnesium fastened same as a.

These bimetallic couples shall be joined with a 0.025 cm (0.01 inch) polyethylene shim inserted under one corner. The fasteners shall be finger tight.

4.6.4.2.2 Procedure. The coupled panels shall be completely immersed in the remover. After one hour, they shall be removed and placed in an oven maintained at $38^{\circ}\pm 1^{\circ}\text{C}$ ($100^{\circ}\pm 2^{\circ}\text{F}$) for a period of 48 ± 1 hours. The panels shall then be removed and immediately suspended vertically for 48 hours in a desiccator. Prior to the test, the desiccator shall be cleaned and the lower portion filled with distilled water after which it shall be closed. During the test, the desiccator shall be kept tightly sealed and in an area maintained at $20^{\circ}\pm 2^{\circ}\text{C}$ ($68^{\circ}\pm 4^{\circ}\text{F}$). At the end of the 48-hour period, the panels shall be removed, disassembled, washed with water and dried with acetone. The individual panels shall then be inspected for pitting, etching and corrosion products. For magnesium panels, slight etching under the washers, less than 0.3 cm (0.125 inch) in diameter, shall not be cause for rejection.

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4.6.4.3 Hydrogen embrittlement tests.4.6.4.3.1 Notched C-ring.

4.6.4.3.1.1 Specimen preparation. Four notched C-ring specimens (AISI 4340 steel in accordance with MIL-S-5000) shall be prepared from tubing (or suitable bar stock) so that the notch in the finished specimen shall run parallel to the rolling direction. Specimens shall be rough machined, heat treated to the 1800 MPa to 1930 MPa (260,000 to 280,000 psi) strength level and finished to the final dimensions shown in Figure 3. The rings shall be cleaned (see footnote 1/), then cadmium plated for two minutes at a current density of 50 amperes per square foot. For convenience in plating, the inside surface of the rings may be masked during plating. Following plating, the specimens shall be baked for 100 ± 1 hours at $190 \pm 2^\circ\text{C}$ ($374 \pm 4^\circ\text{F}$).

1/ Cathodic cleaning, acid pickling or other severely embrittling methods shall not be used for the preplate cleaning.

4.6.4.3.1.2 Procedure. The rings shall be stressed to 65 percent of the pre-determined average breaking strength by tightening the nut until the diameter of the ring, measured across the bolt, is reduced to the calculated value. (In most cases the diameter will be reduced by 0.22 cm (0.087 inch)). Any steel bolt of suitable size may be used for the stressing. If equipment is available, this may be done more accurately with a strain indicator and a loading bolt containing a strain gauge, as shown in Figure 3. The stressed rings shall be immersed for 60 seconds in the paint remover sample with the notched side down to a point where the ring is covered approximately one inch on either side of the notch. The rings shall be removed and allowed to hang notched side down in air for 100 ± 1 hours. No rinse of any kind shall be used after dipping. Suitable hangers may be made of plastic or rubber coated wire. The rings shall not break or crack during the 100 hour test period.

*4.6.4.3.2 Unnotched ring specimens. Embrittlement effects shall be determined in accordance with ASTM F 519, Type 2a specimen.

*4.6.5 Accelerated storage stability and appearance test.

4.6.5.1 Preparation of test sample. A 148 ml (5 ounce) portion of well shaken remover shall be poured into each of two chemically clean 355 ml (12 ounce), pressure resistant, clear glass bottles. Carefully cap each bottle. The bottles shall be approximately 24 cm (9.5 inches) in height, with shoulders 6.4 cm (2.5 inches) in outside diameter and 12.7 cm (5 inches) from the base.

4.6.5.2 Procedure.

4.6.5.2.1 Cold cycle test. One bottle shall be stored in the dark at room temperature and left undisturbed for at least six days. The other bottle shall be placed in a water bath maintained at a temperature of $54 \pm 2^\circ\text{C}$ ($129 \pm 4^\circ\text{F}$) for one hour. The bottle in the water bath shall be carefully removed and allowed to cool at room temperature for one hour and then visually examined. Layer formation shall be considered unsatisfactory and further testing shall be discontinued. If the remover appears homogeneous, the bottle shall be placed in a cold box maintained at a temperature of $-10 \pm 2^\circ\text{C}$ ($14 \pm 4^\circ\text{F}$) for one hour, after which it shall be removed and allowed to remain undisturbed, at room temperature for one hour. The remover

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shall again be examined for homogeneity and allowed to stand undisturbed for one hour. If layer formation is evident, further testing shall be discontinued. If the remover appears homogeneous, the contents of the bottle shall be carefully transferred (avoid splashing) to a similar chemically clean bottle for carrying out the following test.

4.6.5.2.2 Hot cycle test. A strip of steel, 0.05 by 1.3 by 15 cm (0.020 by 0.5 by 6 inches), conforming to MIL-S-7952 shall be hand polished with a 240 grit carbide or aluminum oxide cloth or paper to remove surface contamination. The steel strip shall then be cleaned as specified in 4.6.4.1.1. The steel strip shall be immersed in the remover contained in the test bottle and completely coated with remover by rolling the bottle on its side. In subsequent operations, the bottle shall be handled carefully to avoid sloshing of remover onto the steel strip. The bottle shall be capped, placed in a water bath, and heated at a uniform rate to a temperature of $60^{\circ}\pm 2^{\circ}\text{C}$ ($140^{\circ}\pm 4^{\circ}\text{F}$) within five hours. It shall be held at this temperature for three hours. The above heating procedure shall be repeated each day for five days. No heat shall be supplied to the bath overnight. (This test need not necessarily be attended if an interval timer is used to operate the equipment automatically. The test may be started on Wednesday, Thursday or Friday and still have the bottle removed on a normal working day.) On the morning of the sixth day, the bottle shall be removed from the bath, uncapped and the steel strip carefully withdrawn without disturbing the remover. (NOTE: THE BOTTLE SHOULD BE UNCAPPED VERY CAREFULLY DUE TO THE POSSIBLE HIGH VAPOR PRESSURE.) The strip shall be rinsed with tap water and dried. The steel strip shall be examined for evidence of pitting, corrosion and uneven darkening. The remover shall be compared with the remover in the original bottle stored in a dark place. Any difference in appearance, such as layer separation, and evidence of polymerization shall be noted. The opened bottle shall be capped and the two bottles shall be thoroughly shaken for one minute, then allowed to remain undisturbed for one hour at room temperature, and then examined. Any marked variation in general appearance between the two samples shall be considered as showing unsatisfactory stability properties. If considered satisfactory, the remover, which had been heated as stated above, shall be tested also for paint stripping efficiency.

4.6.6 Paint stripping efficiency.

4.6.6.1 Preparation of test panels. Panels, measuring 0.05 by 12.7 by 40.6 cm (0.02 by 5 by 16 inches), shall be cut from aluminum alloy sheets conforming to QQ-A-250/5 and deburred. Each panel shall then be treated as follows:

a. Abrade with very fine abrasive mat (MIL-A-9962), which has been soaked with deionized water, by manually rubbing the mat back and forth parallel to the long dimension of the panel until the entire surface is water break free.

b. Immediately wipe the panel clean and completely dry with cotton cheesecloth (CCC-C-440, Class 1).

c. Within four hours, immerse the panel in the MIL-C-81706 conversion coating solution for three minutes, taking care that panels do not touch each other or the sides of the tank.

d. Rinse thoroughly with deionized water for one minute.

e. Allow panels to dry in an upright position.

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f. Within 24 hours, paint the panel with one of the coating systems specified in Table V. After drying and baking as specified, each painted panel shall be cut into four test panels, each 10.2 by 12.7 cm (4 by 5 inches), and edge sealed by dipping each edge 0.5 cm (0.2 inches) into melted paraffin wax. (NOTE: The MIL-C-81706 conversion coating solution shall be prepared at a concentration of 1.0 ounce per gallon, aged for at least 24 hours prior to use, and broken in by immersing one panel for each gallon of prepared solution into the treatment tank for ten minutes.)

* 4.6.6.2 Control formulation. The control formulation shall be prepared as follows for use in 4.6.6.4:

<u>Ingredient</u>	<u>Percent by weight</u>
Methylene chloride	60.6
Toluene	1.3
Paraffin wax	1.9
Hydroxypropyl methylcellulose <u>1/</u>	1.27
Ethanol (absolute)	5.8
Sodium petroleum sulfonate <u>2/</u>	5.5
Phenol (90%)	15.8
Water	6.8
Sodium chromate	1.0

1/ Methocel F4M-PRG, manufactured by Dow Chemical Company, Midland, MI.

2/ Petronate HL, manufactured by Witco Chemical Corporation, New York, NY.

Dissolve the paraffin in toluene by heating the mixture to 49°C (120°F). Stir the methylene chloride rapidly and slowly add first the paraffin/toluene solution then the hydroxy methylcellulose thickener. Add ethanol, sodium petroleum sulfonate, and phenol, stirring until homogeneous after each addition. Dissolve sodium chromate in the water and add the solution to the mixture. Stir until homogeneous.

TABLE V. Test panel finishes.

*Epoxy topcoat system					
Processing step	Material	No. of coats and thickness per coat	Drying time between coats	Drying time before baking	Baking time after final coat
1	Primer Coating Epoxy Polyamide MIL-P-23377	one 0.6 to 0.9 mil	1 hour at room temp.	-	-
2	Epoxy Polyamide Light Gull Gray No. 36440 MIL-C-22750	one mist coat	15 min at room temp.	-	-
	Epoxy Polyamide Light Gull Gray No. 36440 MIL-C-22750	one full coat 1.7 to 2.3 mil dry film thickness	-	7 days at room temp.	7 days at 66°C (150°F)

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TABLE V. Test panel finishes. - Continued

Polyurethane topcoat system					
Processing step	Material	No. of coats and thickness per coat	Drying time between coats	Drying time before baking	Baking time after final coat
1	Same as step No. 1 of Epoxy system				
2	Urethane, Aliphatic Isocyanate, Insignia White No. 17875 MIL-C-83286	one mist coat	1 hour	-	-
3	Urethane, Aliphatic Isocyanate, Insignia White No. 17875 MIL-C-83286	one full coat 2.1-2.3 mils dry film	-	7 days at room temp.	7 days at 66°C (150°F)
*Polysulfide sealant system					
1	Same as step No. 1 of Epoxy system				
2	Sealing and coating compound MIL-S-81733, Ty III	one 2 mils	15 min.	-	-
3	Sealing and coating compound MIL-S-81733, Ty III	one 2 mils	15 min.	-	-
4	Sealing and coating compound MIL-S-81733, Ty III	one 2 mils	24 hrs.	-	-
5	Primer coating Epoxy Polyamid MIL-P-23377	one 0.6 to 0.9 mils	1 hr.	-	-
6	Urethane, Aliphatic Isocyanate Insignia White No. 17875 MIL-C-83286	one mist coat	15 min.	-	-
7	Urethane, Aliphatic Isocyanate Insignia White No. 17875 MIL-C-83286	one full coat 1.7 - 2.3 mils	-	7 day at room temp	7 days at 66°C (150°F)

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TABLE V. Test panel finishes. - Continued

Polyurethane intercoat system

Processing step	Material	No. of coats and thickness per coat	Drying time between coats	Drying time before baking	Baking time after final coat
1	Same as step No. 1 of Epoxy system				
2	Chem Glaze TS-3236-23 (Hughson Chemicals, Lord Corporation)	three 1.0 mil	5 min	-	-
3	Chem Glaze TS-3236-23 (Hughson Chemicals, Lord Corporation)	one 1.0 mil	1 hour at room temp	-	-
4	Urethane, Aliphatic Isocyanate, Insignia White 17875 MIL-C-83286	one mist coat	1 hour	-	-
5	Urethane, Aliphatic Isocyanate, Insignia White No. 17875 MIL-C-83286	one full coat 1.7-2.3 mils dry film thickness		7 day at room temp	7 days at 66°C (150°F)

4.6.6.3 Stripping test panels. For each remover/paint system/temperature combination tested, four replicate test panels shall be used. Test panels shall be placed on a rack such that the 12 cm (5 inch) dimension forms a 60-degree angle with the horizontal shorter dimension. Removers shall be applied by pouring the remover along the top edge of the test panel, allowing the product to flow down the panel and taking no more than 15 seconds to completely cover it. When two applications are required, test panels shall be scraped once with a rubber scraper before the remover is reapplied. Test panels shall be exposed to paint remover as follows:

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<u>Type</u>	<u>Paint system</u>	<u>Normal dwell time (min)</u>	<u>Number of Applications</u>
I	Epoxy topcoat system	60	1
	Polyurethane topcoat system	15	1
II	Polyurethane topcoat system	15	1
III	Polysulfide sealant system	30	2
IV	Polyurethane intercoat system	120	2

* 4.6.6.4 Evaluation of efficiency. With the exception of type III removers, Class 1, 1A, 3, 3A and the control formula shall be applied to test panels for the normal dwell time specified above, using the appropriate number of applications. Class 2 and 2A removers shall be applied for twice the normal dwell time, using the appropriate number of applications but shall be compared against results achieved with the control formulation at the normal dwell time. Type III removers shall be applied using normal dwell times and the appropriate number of applications. Immediately after exposure to paint remover, test panels shall be rinsed with brushing under running cool tap water. Test panels stripped with type III products shall then be wiped for five seconds with a cloth soaked in methyl ethyl ketone using only light hand pressure. Stripping efficiency shall be determined for each test panel by determining the percentage of substrate revealed by the stripping process. The four results for each remover/paint system/temperature combination shall be averaged.

4.6.7 Rinsability. Using all the panels from 4.6.6.2, again cover the panels with test sample. Wait 15 minutes for any remaining paint film to become loosened from the panels. The panels shall then be rinsed with tap water for one minute with gentle brushing with a soft bristled brush. The rate of flow shall be 15 liters (4 gallons) of water per minute. The panels shall be examined for removal of spent remover.

4.6.8 Refinishing properties of stripped surfaces. Panels from the rinsability test shall be washed with a 10% solution of MIL-C-85570, Type II; rinsed and allowed to dry for 24±1 hours. The panels shall then be recoated in accordance with Table V, polyurethane topcoat system and tested for wet tape adhesion as specified in Method 6301.2 of FED-STD-141.

*4.6.9 Storage stability. Four liters (1 gallon) of remover shall be stored in a glass bottle to which have been added six 2.5 by 15.2 cm (1 by 6 inch) clean steel strips conforming to MIL-S-7952. The bottle shall be protected from the light and stored for twelve months at 21.1° ± 2.8°C (70° ± 5°F). After such storage, the remover shall be subjected to all of the foregoing tests, except the accelerated storage stability and appearance test.

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4.6.10 Service test. The service test, performed by a Naval Aviation Depot (NADEP) designated by the activity responsible for qualification, shall consist of field evaluation of the service test sample under service conditions conducted in accordance with standard operating procedures on as many aircraft as needed to determine suitability of the product for military use. The service test shall be performed when paint removers have met all the requirements of Section 3 including storage stability.

5. PACKAGING

5.1 Preservation-packaging. Preservation-packaging shall be Level A or Commercial, as specified (see 6.2.d).

* 5.1.1 Level A. Unless otherwise specified, all interior surfaces of the container shall be coated with a lining which will resist the paint remover for the duration of storage period. Unless otherwise specified, the paint remover shall be furnished in 208 liter (55 gallon drums) conforming to PPP-D-729, Type V.

5.1.2 Commercial. The paint remover shall be packaged in specified quantities in a manner that will afford adequate protection against deterioration and physical damage during shipment from supply source to the first receiving activity and for the useable life of the remover (see 3.11), utilizing containers required by the Code of Federal Regulations, 49 CFR, Parts 100-178. The container selected shall be of a design that permits the contents to be readily removed.

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

* 5.2.1 Levels A and B. The paint remover, when packaged in accordance with 5.1.1.1, shall require no overpacking. Standard four-way entry pallets are required for handling with mechanical equipment.

5.2.2 Commercial. The paint remover as packaged in 5.1.2 shall be packed in shipping containers in a manner that will afford adequate protection, at the lowest rate, against damage during direct shipment from the supply source to the first receiving activity. The containers shall conform to the National Motor Freight Classification or the Uniform Freight Classification rules and regulations for the mode of transportation utilized. Twenty liter (five gallon) pails require no overpacking. Handling pallets are required to permit handling by mechanical equipment.

5.3 Marking. In addition to any special markings required by the contract, each container shall have the Code of Federal Regulation required labels and shall be marked in accordance with MIL-STD-129, plus the following:

5.3.1 Precautions.

- a. Paint remover contained herein is toxic and contains ingredients harmful to skin and eyes.
- b. Avoid contact of the paint remover with rubber, asphaltic base floors, and walkways.

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- c. Attach suitable safety devices to stands or staging used in the removing procedure.
- d. Avoid use in enclosed or unventilated areas.
- e. Personnel shall not enter the interior of the aircraft during removing or subsequent clean-up procedure.
- f. Mix thoroughly prior to use.
- g. Store below 30°C (85°F) but not below 0°C (32°F).
- h. Do not store in direct sunlight.
- i. CONTENTS MAY BE UNDER PRESSURE IN STORAGE. OPEN CAUTIOUSLY TO AVOID INJURY.
- j. Discard any bulging or distorted containers.
- k. To open:
 - (1) Extend the spout (full length)
 - (2) Slowly turn the cap counter clockwise only far enough to break the seal
 - (3) Allow the internal and external pressures to equalize
 - (4) Remove the cap

* 5.3.2 Directions.

- a. Preparation of aircraft. Work with this material should be performed outdoors in shaded areas, sheltered from excessive wind. Indoor use requires adequate ventilation. Take off detachable parts, close and mask off openings (with MIL-T-23397 tape) and all sensitive areas prior to stripping. Use an appropriate solvent to remove wax from surface (if wax is present) to increase the efficiency of the paint remover. If wax is not present, use MIL-C-43616 or P-C-444 in order to remove films of grease which will interfere with the adhesion of the paint remover. Cool overheated surfaces with water spray prior to stripping. Allow to dry before applying remover.
- b. Handling. Use approved cartridge respirators or air supplied respiration for inhalation protection, where required. Wear goggle-type eye glasses and solvent resistant gauntlet style gloves, aprons and boots. If remover gets on skin, immediately flush affected area with large quantities of water. If remover gets in eye, flush with large quantities of water for at least 15 minutes and obtain medical attention. It is believed that further treatment at the worksite by nonmedical personnel, such as use of boric acid solution, castor oil, alcohol rinses, etc., is undesirable and may only serve to delay the receipt of proper medical care for the victim.

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- c. Paint removal. Thoroughly agitate the paint remover. Begin application on top surface by spraying with a non-atomizing fluid spray, flowing or daubing with a brush. Allow to dwell a minimum of 0.25 hours or two hours maximum. Brush off all loosened paint and reapply the paint remover, if necessary, and allow to dwell again for a minimum of 0.25 hour to 2 hours maximum; then scrub and thoroughly rinse the loosened paint and spent remover from the entire aircraft. Spot strip any remaining paint. Remove the masking. Carefully apply paint remover using a small brush on the remaining finishes which were covered with masking tape. When softened, remove with a micarta scraper.

5.4 Safety data. Material safety data sheets shall be prepared and submitted in accordance with FED-STD-313, one copy of which shall be forwarded to the preparing activity of this specification.

6. NOTES

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

*6.1 Intended use.

Types. The Types covered by this specification are intended for use in stripping the following systems:

- Type I - Designed for use on epoxy primers (MIL-P-23377) topcoated with either epoxy (MIL-C-22750) or polyurethane (MIL-C-83286) paint. Local waste treatment regulations and facilities should be investigated prior to use.
- Type II - Designed for use on polyurethane (MIL-C-83286) paint topcoat systems. Local waste treatment regulations should be investigated prior to use.
- Type III - Designed for use on polysulfide sealants or primers (MIL-S-8802 or MIL-S-81733) which have been topcoated with epoxy and/or polyurethane coatings. This remover may not strip an epoxy primer underlying the polysulfide coating.
- Type IV - Designed for use on a coating system comprised of an epoxy primer (MIL-P-23377), a polyurethane intermediate coating (Hughson Chemicals, Chem Glaze (TS-3236-23), and a polyurethane (MIL-C-83286) topcoat.

* Classes. Class use is dependent upon local environmental/occupational regulations.

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6.2 Acquisition requirements. Acquisition documents should specify the following:

- a. Title, number and date of this specification.
- b. Quantity required in liters (gallons).
- c. Type and size of container (see 5.1.1).
- d. Levels of packaging and packing.
- e. Marking data with requirements in detail, if other than as specified in Section 5.
- f. Type and class required (see 1.2).
- g. 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)

6.3 Qualification. With respect to products requiring qualification, awards may be made only for products which are, at the time set for opening of bids, qualified for inclusion in Qualified Products List (QPL-81294) whether or not such products have actually been so listed by that date. The attention of the contractors is called to these requirements, and manufacturers are urged to arrange to have the products that they propose to offer to the Federal Government tested for qualification in order that they may be eligible to be awarded contracts or purchase orders for the products covered by this specification. The activity responsible for the Qualified Products List is Commander, Naval Air Systems Command, Washington, DC 20361; however, information pertaining to qualification of products may be obtained from the Naval Air Development Center, ATTN: Director, Aircraft and Crew Systems Technology Directorate, Code 6062, Warminster, PA 18974. Prior to submission of the samples for qualification, the manufacturer shall submit a request to the Naval Air Development Center (Code 6062), indicating a date on which the samples can be forwarded and also request an authorization number to accompany the samples.

6.3.1 Qualification information. The remover furnished under contract shall be identical in every respect to the qualification samples which have been inspected and approved. In the event that the remover furnished under contract is found to deviate from the composition of the approved product or that the product fails to perform satisfactorily, approval of such product will be subject to immediate withdrawal from the qualified products list.

6.4 Batch. A batch is defined as that quantity of material which has been manufactured by some unit chemical process or subjected to some physical mixing operation intended to make the final product substantially uniform.

6.5 Toxicity. Questions pertaining to the requirements of 3.2.2 should be referred, by the acquiring activity, to the Navy Environmental Health Center, Naval Station, Norfolk, VA 23511, who will act as an advisor to the acquiring activity.

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*6.6 Supersession data. Type II of MIL-R-81294C for epoxy and polyurethane topcoat systems has been superseded by Type II - For polyurethane topcoat system (Class 2 only). This was done since there have been no National Stock numbers issued under the type described in MIL-R-81294C.

*6.7 Subject term (key word) listing.

Remover
 Paint
 Polyurethane
 Epoxy
 Polysulfide
 Aircraft
 Methylene chloride
 Phenol

6.8 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.

Custodians:

Army - ME
 Navy - AS
 Air Force - 99

Preparing activity:

Navy - AS
 (Project 8010-0380)

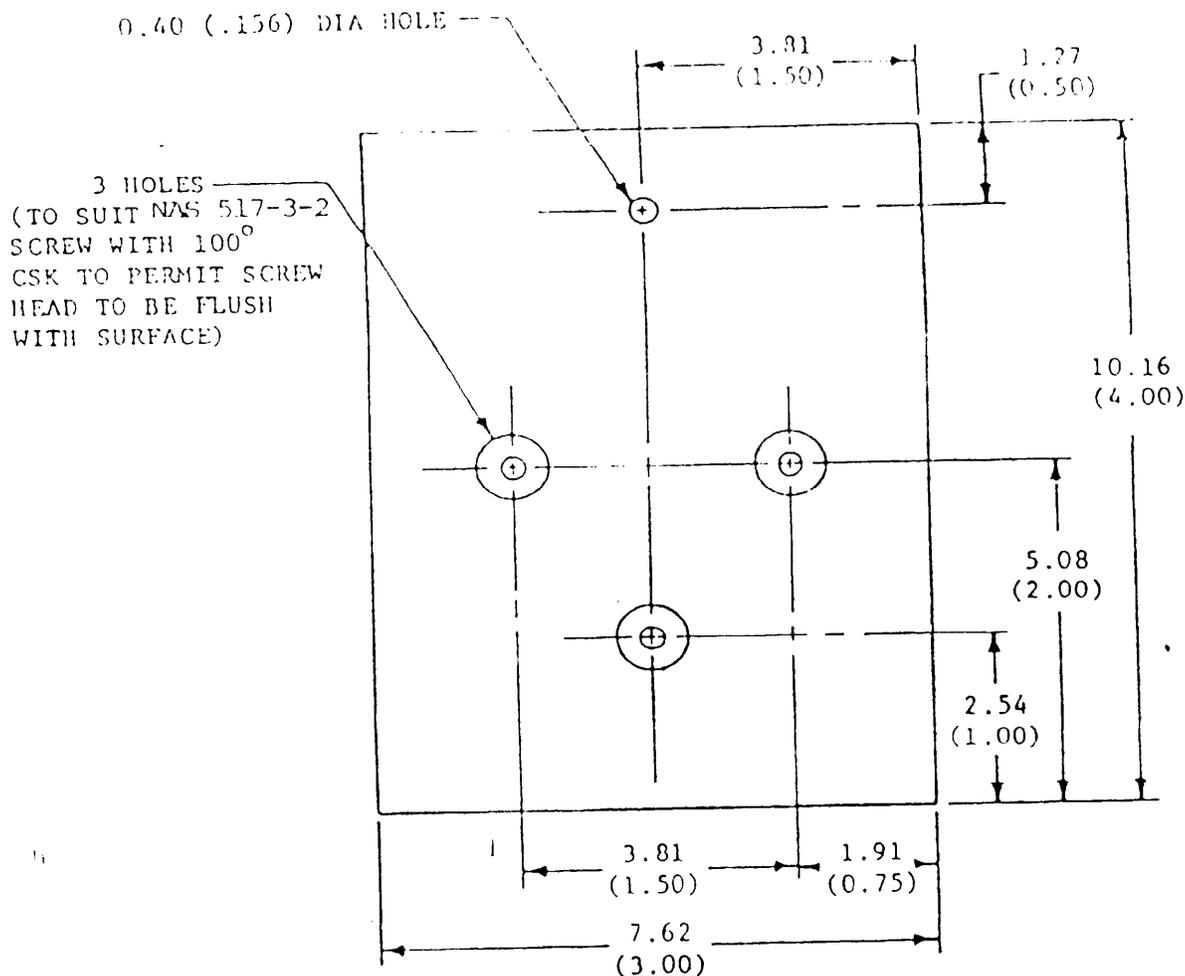
Review activities:

Army - AV, MR
 Air Force - 84
 GSA - FSS
 NSA - NS

User activities:

Navy - MC

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**NOTES:**

1. DIMENSIONS IN CENTIMETERS (INCHES).
2. UNLESS OTHERWISE SPECIFIED, TOLERANCES: DIMENSIONS SHOWN SHALL BE NOMINAL, EXCEPT THAT TOLERANCES FOR THE SCREW HOLES SHALL BE WITHIN LIMITS THAT WILL PERMIT ASSEMBLY OF THE PANELS AS SHOWN IN FIGURE 2.
3. THE THREE HOLES ON SECOND PANEL OF COUPLE SHALL BE POSITIONED TO ALLOW FOR 1 INCH OVERLAP WHEN CONNECTED. (SEE FIGURE 2.)

FIGURE 1. Dimensions for dissimilar metal test panels.

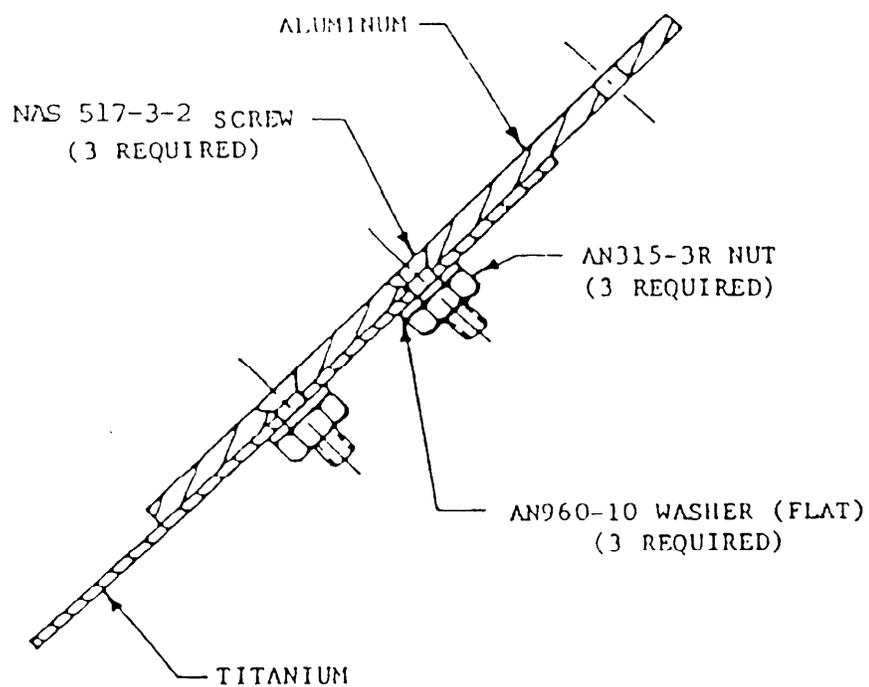
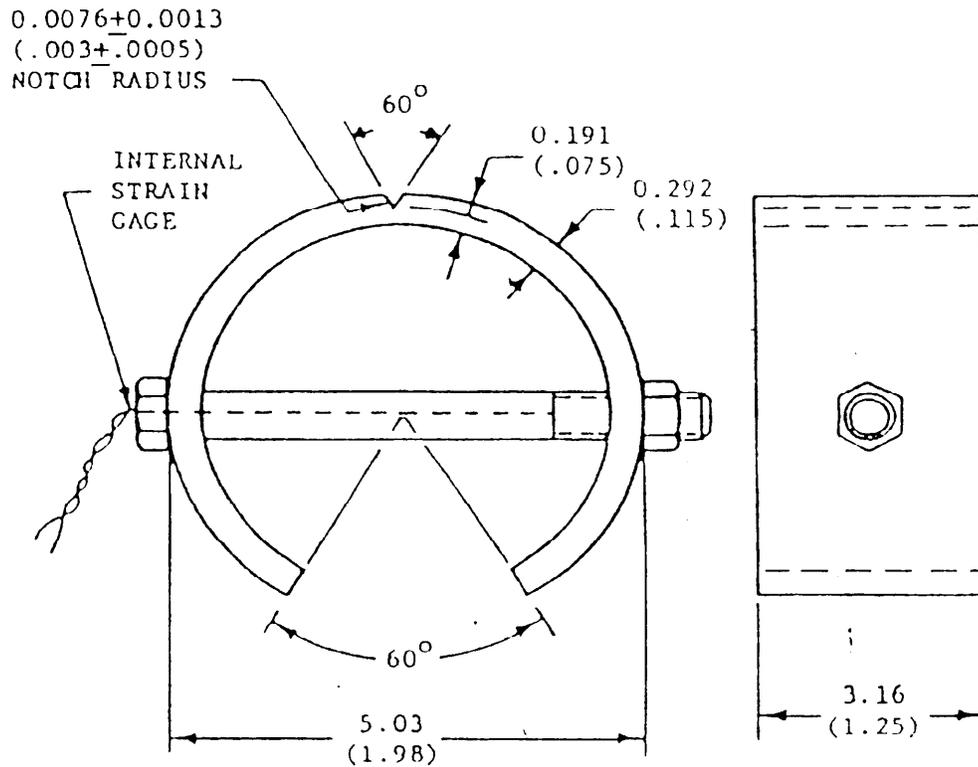


FIGURE 2. Coupling of dissimilar metal test specimens.

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**NOTES:**

1. DIMENSIONS IN CENTIMETERS (INCHES)
2. WHEN LOADING C-RINGS WITH THE STRAIN GAUGES, KNIFE EDGE OR LOADING WASHERS SHOULD BE USED ON EACH SIDE OF C-RINGS TO PREVENT GAUGE AND BOLT FROM BENDING.

FIGURE 3. Notched C-Ring (AISI 4340 steel).

STANDARDIZATION DOCUMENT IMPROVEMENT PROPOSAL

INSTRUCTIONS

1. The preparing activity must complete blocks 1, 2, 3, and 8. In block 1, both the document number and revision letter should be given.
2. The submitter of this form must complete blocks 4, 5, 6, and 7.
3. The preparing activity must provide a reply within 30 days from receipt of the form.

NOTE: This form may not be used to request copies of documents, nor to request waivers, or clarification of 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.

I RECOMMEND A CHANGE:

1. DOCUMENT NUMBER
MIL-R-81294D

2. DOCUMENT DATE (YYMMDD)
90/12/31

3. DOCUMENT TITLE
REMOVER, PAINT, EPOXY, POLYSULFIDE, AND POLYURETHANE SYSTEMS.

4. NATURE OF CHANGE (Identify paragraph number and include proposed rewrite, if possible. Attach extra sheets as needed.)

5. REASON FOR RECOMMENDATION

6. SUBMITTER

a. NAME (Last, First, Middle Initial)	b. ORGANIZATION	
c. ADDRESS (Include Zip Code)	d. TELEPHONE (Include Area Code) (1) Commercial (2) AUTOVON (if applicable)	7. DATE SUBMITTED (YYMMDD)

8. PREPARING ACTIVITY

a. NAME NAVAL AIR ENGINEERING CENTER SESD (Code 5314)	b. TELEPHONE (Include Area Code) (1) Commercial (908) 323-1280 (2) AUTOVON 624-1280
c. ADDRESS (Include Zip Code) LAKEHURST, NJ 08733-5100	IF YOU DO NOT RECEIVE A REPLY WITHIN 45 DAYS, CONTACT: Defense Quality and Standardization Office 5203 Leesburg Pike, Suite 1403, Falls Church, VA 22041-3466 Telephone (703) 756-2340 AUTOVON 289-2340