

INCH-POUND

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SUPERSEDING
MIL-C-6799H
17 September 1984

MILITARY SPECIFICATION

COATINGS, SPRAYABLE, STRIPPABLE, PROTECTIVE,
WATER EMULSION

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

1. SCOPE

1.1 Scope. This specification establishes the requirements for water emulsion, protective, strippable, sprayable, multi-coat coatings for application over metallic, painted, and plastic surfaces.

1.2 Classification. Coatings are furnished as the following type and classes, as specified (see 6.2b):

Type II - Multi-coat system - Exterior (see 3.2.1)

- Class 1 - Basecoat (black)
- Class 5 - Topcoat (white or olive drab)
- Class 6 - Topcoat (white)
- Class 7 - Topcoat, brushable (3.2.1.2)

1.2.1 Relationship. Relationships of the type and classes of this specification to those of the previous revisions are indicated in 6.6.

2. APPLICABLE DOCUMENTS

2.1 Government documents.

Beneficial comments (recommendations, additions, deletions) and any pertinent data which may be of use in improving this document should be addressed to: Commander, Systems Standardization, Code 4.1.11B120-3, Naval Air Warfare Center Aircraft Division, Highway 547, Lakehurst, NJ 08733-5100, by using the Standardization Document Improvement Proposal (DD Form 1426) appearing at the end of this document or by letter.

AMSC N/A

FSC 8030

DISTRIBUTION STATEMENT A. Approved for public release; distribution is unlimited.

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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 6.2c).

SPECIFICATIONS

FEDERAL

- P-P-560 - Polish, Plastic
- QQ-A-250/5 - Aluminum Alloy Alclad 2024, Plate and Sheet
- TT-N-95 - Naphtha, Aliphatic
- TT-T-266 - Thinner, Dope and Lacquer (Cellulose-Nitrate)
- PPP-C-96 - Cans, Metal, 28 Gage and Lighter
- PPP-P-704 - Pails, Metal (Shipping, Steel, 1 Through 12 Gallons)

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- MIL-P-5425 - Plastic; Sheet, Acrylic Heat Resistant
- MIL-C-8514 - Coating Compound, Metal Pretreatment, Resin-acid
- MIL-C-22750 - Coating, Epoxy, VOC Compliant
- MIL-P-23377 - Primer Coatings, Epoxy-Polyamide, Chemical and Solvent Resistant
- MIL-L-81352 - Lacquer, Acrylic (for Naval Weapons Systems)
- MIL-T-81772 - Thinner, Aircraft Coating
- MIL-C-83286 - Coating, Urethane, Aliphatic, Isocyanate, for Aerospace Applications
- MIL-C-85285 - Coatings; Polyurethane, High Solids

STANDARDS

FEDERAL

- FED-STD-313 - Material Safety Data Sheets, Preparation and Submission of
- FED-STD-595 - Colors Used in Government Procurement

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

(Unless otherwise indicated, copies of Federal and Military Specifications, Standards and Handbooks are available from the DODSSP - Customer Service, Standardization Documents Order Desk, 700 Robbins Avenue, Bldg. 4D, Philadelphia, PA 19111-5094.)

2.1.2 Other Government documents, drawings and publications. The following other Government documents, drawings and publications form a part of this specification to the extent specified herein. Unless otherwise specified, the issues are those cited in the solicitation.

DEPARTMENT OF TRANSPORTATION

Code of Federal Regulations (CFR)

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Title 49-Transportation, Parts 100-199

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

(Copies of specifications, standards, handbooks, drawings and publications required by manufacturers in connection with specific acquisition functions should be obtained from the contracting officer or as directed by the contracting officer.)

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

AMERICAN SOCIETY FOR TESTING AND MATERIALS (ASTM)

ASTM-D2369 - Volatile Content of Solvent-Reducible Paints

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

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

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

3. REQUIREMENTS

3.1 Qualification. The coatings 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 contract (see 4.3 and 6.3).

3.2 Materials. The coating shall be made from such materials and by such processes to ensure compliance with this specification.

3.2.1 Form.

3.2.1.1 System coatings. Coatings shall be water emulsions which are capable of being sprayed and stripped as a system. Coatings shall be either:

- a. A Type II two-part coating system consisting of a black pigmented Class 1 basecoat and a compatible white or olive drab pigmented Class 5 topcoat or
- b. A Type II two-part coating system consisting of a black pigmented Class 1 basecoat and a compatible white pigmented Class 6 topcoat.

3.2.1.2 Repair coatings. Repair or patching to either of the systems above shall be accomplished using Type II, Class 7 brushable topcoat only.

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3.2.2 Toxicity. The coatings shall have no adverse effect on the health of personnel when used for its intended purpose. Questions pertinent to this effect shall be referred by the contracting activity to the appropriate medical service who will act as advisor to the contracting agency (see 4.3.2). The maximum permissible background mercury content for all types and classes, based on solids content, shall be 0.25 parts per million (ppm).

3.3 Performance.

3.3.1 Properties. The physical, mechanical and chemical properties of the individual components and the coating systems shall be in accordance with the requirements and related tests listed in tables I and II.

3.3.2 Apparent viscosity. The limits of the apparent viscosity of Type II, Classes 1, 5, and 6, when measured in accordance with 4.6.15, shall be:

- a. Type II, Class 1, when measured at $75 \pm 2^\circ\text{F}$ and at 6 rpm, shall be 12,000 to 16,000 cps.
- b. Type II, Class 5, when measured at $75 \pm 2^\circ\text{F}$ and at 6 rpm, shall be 2000 to 5000 cps.
- c. Type II, Class 6, using an LVT model viscometer when measured at $75 \pm 2^\circ\text{F}$ and at $118 \pm 2^\circ\text{F}$ shall be:
 - at 60 rpm - 450 to 950 cps
 - at 6 rpm - 2,000 to 6,000 cps
 - at 0.3 rpm - 20,000 to 60,000 cps
 and when measured at $45 \pm 2^\circ\text{F}$ shall be:
 - at 60 rpm - 450 to 1,800 cps
 - at 6 rpm - 2,000 to 7,000 cps
 - at 0.3 rpm - 20,000 to 60,000 cps
- d. Type II, Class 7, measured at $75 \pm 2^\circ\text{F}$ shall be:
 - at 0.3 rpm - 600,000 to 900,000 cps
 - at 1.5 rpm - 180,000 to 280,000 cps

TABLE I. Individual component physical properties.

Physical Property	Requirement				Test Method
	Type II, Class 1	Type II, Class 5	Type II, Class 6	Type II, Class 7	
Chemical attack	No attack on plastic	No attack on plastic	No attack on plastic	No attack on plastic	4.6.1
Nonvolatile content min., %, by weight	37	42	48	50	4.6.2
Delivery rate, cc/min	175-700	250-700	250-700	N/A	4.6.3
Vertical application	No sagging 3 mil thickness	No sagging 3 mil thickness	No sagging 3 mil thickness	N/A	4.6.4
Drying time max.	3 hrs.	2 hrs.	2 hrs.	2 hrs.	4.6.5

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Shelf storage	<u>1</u> /	<u>1</u> /	<u>1</u> /	<u>2</u> /	4.6.13
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1/ After storage exposure, coating shall pass the requirements of delivery rate, vertical application, and drying time tests.

2/ After storage exposure, coating shall pass the requirements of the drying time test.

3.3.3 Condition in container. When tested as specified in 4.6.16, the coating shall be free from grit, seeds, skins, lumps and livering and shall show no pigment settling or caking that cannot be returned to a homogeneous state by hand stirring.

3.3.4 Service. When required by the qualifying activity, the applicable Type II coating systems shall be tested as specified in 4.6.17 and shall have satisfactory performance under service conditions.

3.4 Workmanship. The components shall be processed to produce the highest quality material required to meet the requirements of this specification. Each component shall be uniform in quality, consistency and free of agglomerates or foreign particles. There shall be no other defects present that would render the end product unsuitable for its intended purpose.

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TABLE II. Coating system properties.

Property	Requirement	Test method
Craze attack on plastic	Shall protect the surface of the acrylic plastic from attack and shall be strippable after exposure.	4.6.6
Adhesion, oz/inch width		
Initial (as received)	3-20	4.6.7
After accelerated drying	8-50	4.6.8
After exposure to high humidity	8-50, No dissolution of coating	4.6.9
Tensile strength, psi, min	1700	4.6.10
Ultimate elongation, percent	170-350	4.6.10
Stability	Shall meet the requirements of the following tests after exposure to the stability test cycle: a. Strippability after accelerated weathering b. Adhesion (all conditions) c. Tensile strength d. Ultimate elongation	4.6.11
Weathering	Coating shall not show checking, cracking or embrittlement which penetrates to the substrate, and shall be strippable in one continuous sheet. There shall be no crazing of plastic surfaces. Finished surfaces shall not lift, mar or show other irregularities. Aluminum panels shall not corrode.	4.6.12
Water erosion resistance	Coating shall not lift, check or erode.	4.6.14

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

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performance of the inspection requirements specified herein, unless disapproved by the Government. The Government reserves the right to perform any of the inspections set forth in this specification where such inspections are deemed necessary to ensure supplies and services conform to prescribed requirements.

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

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. Qualification inspection of the coatings shall consist of examinations and tests for all the requirements of this specification.

4.3.1 Qualification samples. The qualification sample shall consist of 5 gallons or an equivalent amount of material in smaller containers for all coatings except Type II, Class 7 which shall consist of two one quart containers. The material shall be furnished in containers of the type to be used in filling contracts or orders. Type II samples for qualification of the Class 5 system shall be samples of a black pigmented Class 1 undercoat and a compatible white pigmented Class 5 topcoat. Type II samples for qualification testing of Class 6 system shall be samples of a black pigmented Class 1 undercoat and a compatible white pigmented Class 6 topcoat. A Class 7 material may be submitted for qualification in conjunction with either a Class 5 or Class 6 material. Samples shall be forwarded to the Commander, Naval Air

Warfare Center Aircraft Division, Code 4.3.4.1, P.O. Box 5152, Warminster, PA 18974-0591. The samples shall be plainly identified by securely attached durable tape with the following information:

Samples for qualification inspection
 COATINGS, SPRAYABLE, STRIPPABLE, PROTECTIVE, WATER EMULSION
 Name of manufacturer (include plant where material is manufactured)
 Product code number
 Type
 Class
 Date of manufacture (month and year)
 Submitted by (name) (date) for qualification inspection in
 accordance with the requirements of Specification MIL-C-6799J
 under authority (reference authorizing letter)

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 units specified for all of the

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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 easily identified by the manufacturer's formula number. The percent of each ingredient shall also be furnished. In addition, the manufacturer shall certify compliance with requirements for toxicity (3.2.2) and composition (3.3.1 and 3.3.2).

4.3.2.1 Toxicological data and formulations. The manufacturer shall furnish the toxicological and formulation data to evaluate the safety of the material for the proposed use. A statement of the complete formulation of the product, to include the chemical name and percent of each ingredient, as well as a material safety data sheet of the product (see 3.2), prepared in accordance with FED-STD-313, shall be 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 the product complies with the requirements of this specification. The time of periodic verification by certification shall be two year intervals from the date of original qualification and shall be initiated by the Government. The Government reserves the right to reexamine the qualified product whenever deemed necessary to determine that the product continues to meet any or all of the specification requirements.

4.4 Quality conformance inspection.

4.4.1 Lot formation. An inspection lot shall consist of a batch of coating compound of one type and class, as applicable, manufactured from the same components, processed at the same time, and offered for inspection at one time.

4.4.2 Sampling.

4.4.2.1 Sampling for tests. Two containers of one type and class shall be randomly selected from each lot offered for inspection. An amount of material sufficient to perform the tests specified in 4.4.3.1 shall be withdrawn from each of the two containers and placed in separate clean, dry, metal or glass containers. Each container shall be tested to the as specified of 4.4.3.1.

4.4.2.2 Examination of end item. A random sample of filled containers shall be selected from each inspection lot by the Government inspector in accordance with MIL-STD-105, Inspection Level I, for examination of the end item as specified in 4.4.3.2.

4.4.2.3 Packaging. The sample unit shall be one shipping container fully prepared for delivery, except that it need not be sealed. Examination shall be as specified in 4.4.3.3.

4.4.3 Inspection and tests.

4.4.3.1 Testing. The samples selected in 4.4.2.1 shall be subjected to the applicable tests of 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 any sample to pass all the applicable tests shall be cause to reject the lot represented by the sample.

TABLE III. Quality conformance tests 1/.

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Property	Requirement	Test
Nonvolatile	Table I	4.6.2
Delivery rate	Table I	4.6.3
Vertical application	Table I	4.6.4
Adhesion initial (as received)	Table II	4.6.7
Apparent viscosity	3.3.2	4.6.15

1/ Quality conformance testing for Type II, Class 7 shall consist only of nonvolatile content and apparent viscosity tests.

4.4.3.1.1 Report. Upon completion of the quality conformance inspection, the Government activity responsible for conducting the inspection program (see 6.2e) shall report the results of tests, with recommendations, to the contracting officer.

4.4.3.2 Visual examination. The sample selected in accordance with 4.4.2.2 shall be examined to determine conformance to the requirements in table IV. There shall be no defects.

TABLE IV. Visual examination of the end item.

Examine	Defect
Form	Not class specified.
Appearance	Color not as specified. Coating filled with lumps. Foreign matter present.
Toxic effects	Adverse effect on testing personnel.
Fill of individual coating container (metal can, pail, drum)	Quantity of coating not as specified.
Closure of individual container	Not tight; coating leaks from container.
Condition in container	Grit, seeds, skins, lumps, livering, pigment settling or caking.

4.4.3.3 Packaging examination. The sample selected in accordance with 4.4.2.3 shall be examined to determine conformance to the packaging, packing and marking requirements specified in this document. Table V shall be used to define the defects. There shall be no defects.

TABLE V. Examination of packaging (Section 5).

Examine	Defect

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Packaging	Not level specified. Size of container not in accordance with contract requirements. Handles not attached to gallon containers. Handles corroded. Handles not galvanized or protectively coated to resist corrosion.
Packing	Not level specified. Not in accordance with contract requirements.
Content	Arrangement and number of one gallon and smaller containers not as specified.

Table V. Examination of packaging (Section 5) - Continued

Examine	Defect
Workmanship	Inadequate application of components, such as incomplete closure of case liners, container flaps, loose strapping, inadequate stapling. Bulging or distortion of containers.
Weight	Gross or net weight of shipping container exceeds requirement.
Marking (exterior and interior)	Omitted, incomplete, incorrect, illegible, or not specified size or location, sequence or method of application. In addition to any special marking specified in the contract or purchase order, any interior container or shipping container not marked in accordance with MIL-STD-129.

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

4.5.1 Plastic test panels. Unless otherwise specified, all plastic test panels shall be made from acrylic plastic sheet conforming to MIL-P-5425, Finish A. The panel shall be given a preliminary cleaning with a cloth saturated with water or aliphatic naphtha conforming to type II of TT-N-95, rinsing with warm water, and drying with a lint-free cloth. Polish conforming to P-P-560 shall be evenly applied, allowed to dry and wiped clean with a lint-free cloth. All applications of the coating shall be made under standard laboratory conditions of $73.5 \pm 3^{\circ}\text{F}$ and 50 ± 5 percent relative humidity.

4.5.2 Aluminum test panels. Aluminum panels shall be made from aluminum alloy (Alclad 2024) conforming to QQ-A-250/5.

4.5.3 Coating of panels. Plastic and aluminum panels shall be coated, unless otherwise specified herein, as follows:

4.5.3.1 Type II, two-coat systems. There are two Type II, two-coat systems; namely a combination of Class 1 with Class 5, and a combination of Class 1 with Class 6.

4.5.3.1.1 Class 1 with Class 5 system. Class 1, black, basecoat material

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shall be applied in one horizontal pass and one vertical pass and allowed to air dry for one hour. This procedure shall be repeated until a total Class 1 dry film thickness of approximately 9 mils has been applied. After a minimum drying period of 2 hours, the applicable Class 5 material shall be applied over the Class 1 material. Class 5 material shall be applied in one horizontal pass and one vertical pass to a dry film thickness of 3 ± 1 mils. Total dry film thickness shall be 12 ± 1 mils.

4.5.3.1.2 Class 1 with Class 6 system. Class 1, black, basecoat material shall be applied in one horizontal pass and one vertical pass and allowed to air dry for one hour. This procedure shall be repeated until a total Class 1 dry film thickness of approximately 9 mils has been applied. After a minimum drying period of 2 hours, the applicable Class 6 material shall be applied over the Class 1 material. Class 6 material shall be applied in one horizontal pass and one vertical pass to a dry film thickness of 6 ± 1 mils. Total dry film thickness shall be 15 ± 1 mils.

4.5.4 Mechanical mixing. All samples to be tested in 4.6 shall be mechanically mixed with a motorized impeller for a minimum of 30 minutes.

4.6 Test methods.

4.6.1 Chemical attack. Three 1 by 4 by 0.125 inch plastic strips shall be cleaned as specified in 4.5.1 and then immersed to one-half of their length in a screw-top bottle containing the coating, the lid tightened, and bottle stored for 24 hours at $100 \pm 3^\circ\text{F}$. The strips shall then be removed and examined for attack on the plastic. The coating shall pass the requirements specified in table I.

4.6.2 Nonvolatile content. The nonvolatile content shall be determined in accordance with ASTM-D2369 and shall pass the requirement specified in table I.

4.6.3 Delivery rate. A DeVilbiss MBC spray gun using a type FF fluid tip, a No. 765 air cap, and a maximum fluid-nozzle screw adjustment shall be used. The line pressure shall be 55 to 75 psi, and the cup pressure shall be 16 psi. One quart of coating shall be placed in a pressure feed cup and sprayed into a graduated cylinder. The volume of coating delivered in 1 minute shall be noted. In the absence of the DeVilbiss MBC spray gun, airless spray equipment such as the Grayco Bulldog Model #205-591 gun having a standard reverse-A-clean tip with an orifice between 0.017 and 0.021 and a spray angle between 40 degrees to 80 degrees shall be used. The delivery rate shall pass the requirements specified in table I.

4.6.4 Vertical application. The coating shall be placed in a pressure feed cup and sprayed with a gun described in 4.6.3 on a vertical plastic panel. The gun shall be held perpendicular to and 6 to 10 inches from the panel and shall be adjusted so that one application of the coating produces the required thickness (see table I). The panel shall be examined for sagging of the coating and shall pass the requirements specified in table I.

4.6.5 Drying time. Four 4 by 8 by 0.250 inch plastic panels shall be coated individually as follows: Type II, Classes 1 and 5 shall be coated to a thickness of 3 ± 1 mils; Type II, Class 6 shall be coated to a thickness of 6 ± 1 mils and Type II, Class 7 shall be coated to a thickness of 12 ± 2 mils. The coated panels shall be conditioned at $70^\circ \pm 1^\circ\text{F}$ and 65 percent relative humidity for the required drying time (table I). After each application, the coating shall be dry to touch within the maximum time specified in table I.

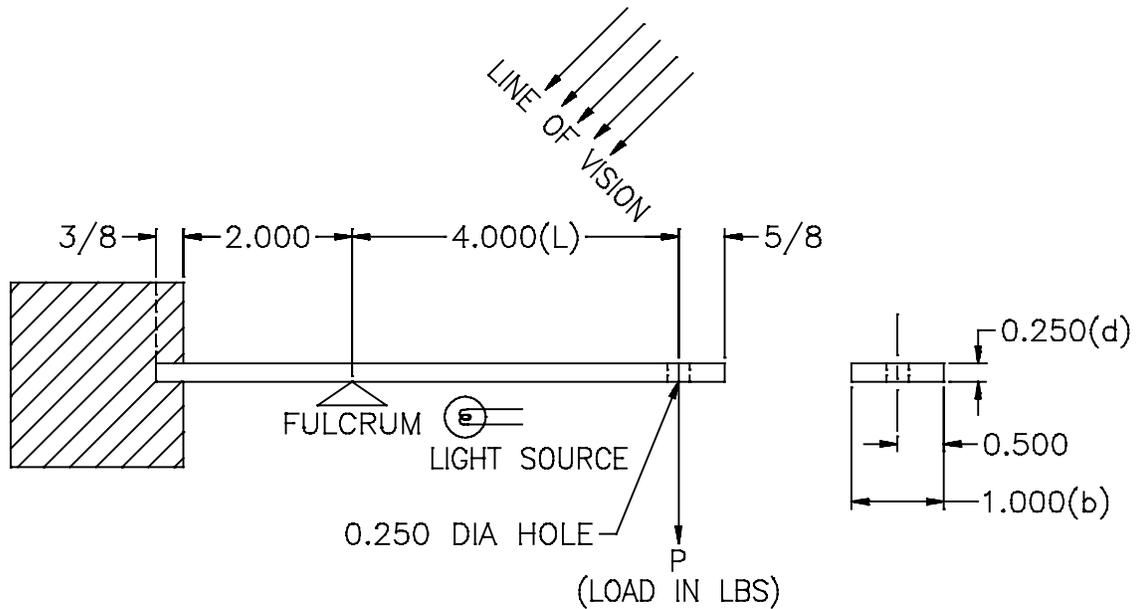
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4.6.6 Craze attack on plastic. Six machined plastic panels, 1 by 7 by 0.250 inch, cleaned as specified in 4.5.1, shall be set up as cantilever beams as shown on figure 1, and stressed to 2400 psi. The formula for calculating load shall be as indicated on figure 1. Ten minutes after the beams have been loaded and while still under load they shall be examined for crazing. Three panels under stress shall then be coated on the top side as specified in 4.5.3, and shall be allowed to air dry overnight, after which the temperature shall be raised to $120^{\circ} \pm 2^{\circ}\text{F}$ for 24 hours. Three uncoated panels shall be used as a control. At the end of the exposure time, the stress shall be removed, the coatings stripped, and all panels examined for crazing. All panels shall pass the requirements specified in table II. In the event controls craze, tests shall be repeated. All craze appearing at the edges of the specimen shall be disregarded unless they extend 1/8 inch or more from either edge of the specimen.

4.6.7 Adhesion, initial (as received). Five bare plastic panels, and five aluminum panels painted as described in 4.6.12.1.e, each 1.5 by 6 by 0.125 inches, shall be coated as specified in 4.5.3. The panels shall then be allowed to air dry 24 hours prior to testing. A 1 inch wide strip shall be cut only through the coating and parallel to the long dimension of the panel (allowing 1/4 inch on each side). One end of the 1 inch strip of coating shall be loosened from the panel (not more than 1 inch) and a leader attached. The panel shall be clamped in one jaw of a pendulum-type testing machine and the free end of the leader pulled back 180 degrees and clamped in the other jaw. The testing machine shall have at least a 4-pound range, and the rate of jaw separation shall be 2 inches per minute. The load required to remove the strip of coating from the panel shall be recorded for each panel and the average load in ounces per inch of width reported for each type of panel. The coating adhesion shall pass the requirements specified in table II.

4.6.8 Adhesion after accelerated drying. Five bare plastic panels, and five aluminum panels painted as described in 4.6.12.1.e, each 1.5 by 6 by 0.125 inches, shall be prepared as specified in 4.5.3, and allowed to air dry 24 hours prior to testing and then subjected for 100 hours to accelerated drying by exposure in a desiccator (containing fresh anhydrous calcium chloride) at a temperature of $120^{\circ} \pm 2^{\circ}\text{F}$. The coating shall be removed from each panel in the manner specified in 4.6.7. The load required to remove the strip of coating from the panel shall be recorded for each panel and the average load in ounces per inch of width reported for each type of pane. No residue shall be left on the surface of the plastic or painted aluminum. The coating adhesion shall pass the requirements specified in table II.

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DIMENSIONS IN INCHES. TOLERANCES: DECIMALS, ± 0.005 , FRACTIONS, $\pm 1/64$

FORMULA FOR CALCULATING LOAD: $P = \frac{Sbd^2}{6L}$

WHERE:

S = STRESS IN POUNDS PER SQUARE INCH

P = LOAD IN POUNDS

L = DISTANCE FROM FULCRUM TO LOAD IN INCHES = 4

b = WIDTH OF PANEL IN INCHES (MEASURED TO NEAREST 0.001)

d = THICKNESS OF PANEL IN INCHES (MEASURED TO NEAREST 0.001)

NOTE: TO PREVENT HEATING OF SPECIMENS, THE LIGHT SOURCE SHALL BE UTILIZED ONLY WHEN EXAMINING THE SPECIMEN FOR CRAZE.

FIGURE 1. Typical stress crazing beam.

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4.6.9 Adhesion after exposure to high humidity. Five bare plastic panels, and five aluminum panels painted as described in 4.6.12.1.e, each 1.5 by 6 by 0.125 inches, two hours after coating as in 4.5.3, shall be subjected for 24 hours to an atmosphere of approximately 100 percent relative humidity at $120^{\circ} \pm 2^{\circ}\text{F}$. The panels shall then be air dried for 24 hours at room temperature. The coating shall be removed from each panel in the manner specified in 4.6.7. The load required to remove the strip of coating from the panel shall be recorded for each panel and the average load in ounces per inch of width reported for each type of panel. The coating adhesion shall pass the requirements specified in table II.

4.6.10 Tensile strength and ultimate elongation. Coating as specified in 4.5.3 shall be sprayed on an 8 by 8 inch glass panel and air dried for 24 hours, removed carefully, and cut into five 1 by 6 inch specimens. The specimens shall be oven dried at a temperature of $120^{\circ} + 2^{\circ}\text{F}$ for 24 hours. The specimens shall then be conditioned for 4 hours at a temperature of $73.5^{\circ} \pm 3^{\circ}\text{F}$ and a relative humidity of 50 ± 5 percent. The thickness of film shall then be measured within the gage length using a dial indicator or suitable substitute having an accuracy of 0.0001 inch, with a 1/4 inch diameter flat foot, under a total load of 1.2 ± 0.1 ounces. A pendulum-type testing machine shall be used, and the rate of jaw separation shall be 12 inches per minute. The average tensile strength and ultimate elongation shall be recorded and shall pass the requirements specified in table II.

4.6.11 Stability. One gallon of the coating shall be placed in a container of the same type (except for size and method of closure) as normally used by the supplier, the lid tightened, and the container subjected to the following successive conditions:

- a. One hundred twenty (120) hours at $30^{\circ} \pm 1^{\circ}\text{F}$.
- b. Twenty-four (24) hours at room temperature.
- c. Ninety-six (96) hours at 0°F .
- d. Twenty-four (24) hours at room temperature.
- e. Two hundred forty (240) hours at $150^{\circ} \pm 2^{\circ}\text{F}$.
- f. Twenty-four (24) hours at room temperature.

The coating shall then be subjected to and successfully pass the following tests. If the coating is too viscous, enough water shall be added to obtain the recommended delivery rate.

- a. Strippability after accelerated weathering.
- b. Adhesion, initial (as received).
- c. Adhesion after accelerated drying in Fadeometer.
- d. Adhesion after exposure to high humidity.
- e. Tensile strength and ultimate elongation.

4.6.12 Weathering.

4.6.12.1 Preparation of panels. Three inch by six inch panels, prepared as shown below, shall be coated as specified in 4.5.3.

- a. 3 bare panels of 0.125 inch thick plastic conforming to MIL-P-5425 and prepared as in 4.5.1.
- b. 3 bare panels of aluminum alloy (Alclad 2024) conforming to QQ-A-250/5.
- c. 3 aluminum panels sprayed with one coat of epoxy-polyamide primer conforming to MIL-P-23377 to a dry film thickness of 0.6 mils to 0.8 mils and air dried for three hours. Panels shall then be sprayed with two cross coats of lacquer conforming to MIL-L-81352 to a total dry film thickness of 1.2 ± 0.2 mils, with a one half

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- hour air dry interval between coats. The lacquer shall have been reduced 1 volume package material to 1 1/2 volumes thinner composed of 2 parts toluol to one part xylol by volume. Unless otherwise specified, air dry panels for 1 week before testing.
- d. 3 aluminum panels sprayed with one coat of wash primer conforming to MIL-C-8514 to a dry film thickness of 0.2 mils to 0.3 mils and air dried for 30 minutes. Panels shall then be coated as specified in 4.6.12.1c.
 - e. 3 aluminum panels sprayed with one coat of epoxy-polamide primer conforming to MIL-P-23377 to a dry film thickness of 0.6 mils to 0.8 mils and air dried for three hours. Panels shall then be sprayed with two cross coats of polyurethane coating, conforming to MIL-C-83286 or MIL-C-85285 (color number 36440 of FED-STD-595) to a total dry film thickness of 1.2 ± 0.2 mils with a one-half hour air dry interval between coats. The polyurethane coating material shall have been reduced with MIL-T-81772 thinner to a viscosity of 16-18 seconds (#2 Zahn cup). Unless otherwise specified, air dry panels for one week before testing.
 - f. 3 aluminum panels prepared as follows: Spray the panels with one coat of epoxy primer conforming to MIL-P-23377 to a dry film thickness of 0.6 mils to 0.8 mils and air dry for one hour. Apply a mist coat of white epoxy finish conforming to MIL-C-22750 and air dry 60 minutes. Then apply a full coat of the white epoxy finish to a dry film thickness of 1.1 mils to 1.5 mils. The white epoxy finish shall have been reduced 2 volumes of admixed epoxy topcoat to 1 volume of TT-T-266 thinner. Let dry a minimum of 24 hours.

4.6.12.2 Procedure. After application of the coating, the panels shall remain for at least 20 hours at 70° to 80°F and then be placed on exterior racks located in the Philadelphia metropolitan area at a 45-degree angle facing south for a period of 1 year. At the end of the exposure period the coated panels shall be examined for checking, cracking, embrittlement, lifting or peeling, and erosion; coating shall be examined for strippability; plastic surface examined for crazing, haze, or other residue; and the painted surface examined for lifting, marring, staining, or other irregularities. The aluminum panels shall be examined for corrosion. The coating shall pass the requirements specified in table II.

4.6.13 Storage. For qualification, a closed, filled container of coating shall be stored at a nominal 70°F with no temperature exceeding a range of 40°F to 115°F for one year. At the end of the storage period the container shall be opened and the coating shall not be permanently gelled nor shall it show indication of livering or separation. In addition, the coating shall meet the requirements as specified for delivery rate, vertical application and drying time.

4.6.14 Water erosion resistance. Three bare plastic panels, and three aluminum panels painted as described in 4.6.12.1e, each 3 by 6 by 0.125 inches, shall be coated as specified in 4.5.3. After two hours air dry, the panels shall be exposed in a vertical position to a simulated rainfall for two hours. The rainfall shall consist of a steady spray of water producing uniform droplets at a rate of 2 ± 0.5 inches per hour. After waiting 24 hours, the panels shall be examined for lifting, checking, or erosion of the coating and shall pass the requirements specified in table II.

4.6.15 Apparent viscosity. The apparent viscosity shall be measured with

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a Brookfield Model LVT viscometer under the following conditions. The immersed portion of the rotating spindle shall be a cylinder 3.1 cm long and 0.32 cm in diameter (No. 3 spindle immersed to center of immersion groove). The sample shall be contained in a beaker or cylinder not less than 3.0 cm in diameter to a depth of not less than 4.5 cm. All measurements shall be made with the rotor guard removed from the instrument, and apparent viscosity shall be computed without the application of the correction factors normally applied when the instrument is used without a guard. Samples shall be stirred to ensure uniformity but shall not be worked. The temperature of the sample shall be checked before measurements by immersing a thermocouple or thermometer in the sample to ensure that the temperature is at $75^{\circ} \pm 2^{\circ}\text{F}$. Type II, Class 6, shall be tested at $45^{\circ} \pm 1^{\circ}\text{F}$ and $118^{\circ} \pm 1^{\circ}\text{F}$ as well as $75^{\circ} \pm 2^{\circ}\text{F}$. When measuring the apparent viscosity at 45°F , the sample shall be held undisturbed at 45°F , with the spindle immersed, for two hours before beginning measurements. The instrument proper shall remain outside the cold chamber, using an extension shaft if necessary. The spindle shall be rotated at 60 rpm for at least one minute, after which readings shall be made at 60, 6, and 0.3 rpm followed immediately by a series at 0.3, 6, and 60 rpm. The spindle shall be allowed to rotate at each speed until a constant reading is obtained. Pairs of readings at the same speed should not differ by more than 10 percent, and the apparent viscosity shall be within the ranges specified in 3.3.2. A No. 2 spindle may be used for the 0.3 rpm readings when a dial reading of less than 10 is obtained using the No. 3 spindle. A No. 4 spindle shall be used when testing Type II, Class 7 material.

4.6.16 Condition in container. The coating shall be examined visually for the defects cited in 3.3.3 and shall be stirred by hand with a paddle to determine compliance with the requirements of 3.3.3.

4.6.17 Service test. The service test, performed by the military unit designated by the activity responsible for qualification, shall consist of field evaluations of the service test sample under service conditions. The test shall be conducted in accordance with standard operating procedures on various aircraft to determine the suitability of the applicable Type II system for military use. The Type II coating system shall pass the requirements specified in 3.3.4.

5. PACKAGING

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

5.1.1 Level A. Coating shall be furnished in containers up to five gallon capacity in the size container as specified in the contract or order (see 6.2f). One gallon and smaller containers shall conform to the requirements of PPP-C-96, Type V, Class 2; one gallon containers shall be provided with handles attached. Five-gallon pails shall conform to the requirements of PPP-P-704, Type III.

5.1.2 Commercial. The coatings shall be packaged in specified quantities in a manner that shall afford adequate protection to prevent damage during shipment under environmental conditions utilizing containers required by the Code of Federal Regulations, parts 100-199.

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

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5.2.1 Level A. Coatings, preserved and unit packed in accordance with 5.1.1 in one gallon or smaller containers, shall be arranged and packed in overseas wood type containers in accordance with PPP-C-96 and appendix thereto. Five-gallon pails require no overpacking. Unitization of loads is required to permit handling by mechanical equipment.

5.2.2 Level B. Coatings, preserved and unit packed in accordance with 5.1.1 in one gallon or smaller containers shall be arranged and packed in accordance with PPP-C-96 and appendix thereto utilizing weather resistant fiberboard boxes. Five-gallon pails require no overpacking. Unitization of loads is required to permit handling by mechanical equipment.

5.2.3 Commercial. The coatings, packaged as specified 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 source to the first receiving activity. The shipping containers shall be in compliance with the requirements of the National Motor Freight Classification and the Uniform Freight classification rules.

5.3 Marking. In addition to precautionary marking and any special marking required in the contract or order, the marking of unit, intermediate and shipping containers shall be in accordance with MIL-STD-129.

5.3.1 Precautionary marking. Each container shall be marked with the following precautionary marking in letters not less than 0.75 inch high:

"AVOID FREEZING"
and
"SHAKE BEFORE USE"

6. NOTES

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

6.1 Intended use. These coatings are intended for use as follows:

- a. Type II, Class 1, black: This material is intended for use as (1) a strippable, protective coating for acrylic plastic bulk materials and assemblies containing acrylic plastics when the protected item is shipped fully covered or stored under cover, and (2) as a basecoat for Type II, Class 5 and 6 materials.
- b. Type II, Class 5, white or olive drab: This material is intended to be used only as a topcoating for Type II, Class 1 material. In combination this protective system serves as a sprayable, strippable, protective coating for application on metallic, painted and plastic surfaces, such as entire aircraft, missiles, rockets and transportation vehicles during outdoor storage and overseas deck-loaded shipments. For Army use the color shall conform to FED-STD-595, Color No. 24087.
- c. Type II, Class 6 white: This material is intended to be used only as a topcoating for Type II, Class 1 material. In combination this protective system serves as a sprayable, strippable, protective coating for applications on metallic, painted and plastic surfaces, such as entire aircraft, missiles, rockets, and transportation vehicles during outdoor storage and overseas deck-loaded shipments. It is recommended for use with Binks Model No. 18 or DeVilbiss MBC spray gun or equal.
- d. Type II, Class 7: This material is intended as a brushable coating for patching or repairing damaged Class 5 or Class 6

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coatings.

6.1.1 Unintended use. The coatings should not be used as a barrier or intermediate coat under lacquers, primers, enamels or similar materials.

6.2 Acquisition requirements. Acquisition documents must specify the following:

- a. Title, number and date of this specification.
- b. Type and class (see 1.2).
- c. Issue of DODISS to be cited in the solicitation, and if required, the specific issue of individual documents referenced (see 2.1.1 and 2.2).
- d. Quantity desired.
- e. Name and address of the Government activity responsible for conducting the quality conformance inspection program (see 4.4.3.1.1).
- f. Type and capacity of containers required (see 5.1.1).
- g. Selection of applicable levels of preservation and packing (see 5.1 and 5.2).
- h. Special marking, when required (see 5.3).
- i. Items of data required (see 6.4).

6.3 Qualification. With respect to products requiring qualification, awards will be made only for products which are, at the time of award of contract, qualified for inclusion in Qualified Products List (QPL-6799) 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 the Naval Air Systems Command, Department of the Navy, Washington, DC 20361; however, information pertaining to qualification of products and letter of authorization for submittal of sample may be obtained from the Commander, Naval Air Warfare Center Aircraft Division, Code 4.3.4.1, P.O. Box 5152, Warminster, PA 18974-0591.

6.3.1 Sample information. It is to be understood that upon receipt of the Letter of Authorization, samples shall be furnished at no cost to the Government, and that the manufacturer shall pay the transportation charges to and from the designated point where tests are to be made. In the case of failure of the sample or samples submitted, consideration will be given to the request of the manufacturer for additional tests only after it has been clearly shown that changes have been made in the product which the Government considers sufficient to warrant additional tests. The costs of retest will be borne by the manufacturer.

6.4 Consideration of data requirements. The following data requirements should be considered when this specification is applied on a contract. The applicable Data Item Descriptions (DID's) should be reviewed in conjunction with the specific acquisition to ensure that only essential data are requested/provided and that the DID's are tailored to reflect the requirements of the specific acquisition. To ensure correct contractual application of the data requirements, a Contract Data Requirements List (DD Form 1423) must be prepared to obtain the data, except where DOD FAR Supplement 227.405-70 exempts the requirement for a DOD Form 1423.

<u>Reference Paragraph</u>	<u>DID Number</u>	<u>DID Title</u>	<u>Suggested Tailoring</u>
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4.4.3.1.1 DI-NDTI-80809 Test/Inspection Report Use contractor format

The above DID's were those cleared as of the date of this specification. The current issue of DOD 5010.12-L, Acquisition Management Systems and Data Requirements Control List (AMSDL), must be researched to ensure that only current, cleared DID's are cited on the DD Form 1423.

6.5 Material Safety Data Sheets. Contracting officers will identify those activities requiring copies of completed Material Safety Data Sheets prepared in accordance with FED-STD-313. The pertinent government mailing addresses for submission of data are listed in FED-STD-313.

6.6 Supersedure data. The relationship of types and classes to previous revisions is as follows:

MIL-C-6799C	MIL-C-006799D(AS)	MIL-C-6799E	MIL-C-6799F	MIL-C-6799G	MIL-C-6799H	MIL-C-6799J
Type I	Type I, Class 1	Type I, Class 1	Type I, Class 1	Type I, Class 1	_____	_____
Type II, Class 1, Black or Gray	Type II, Class 1 (Black)	Type II, Class 1 (Black)	Type II, Class 1 (Black)	Type II, Class 1 (Black)	Type II, Class 1 (Black)	Type II, Class 1 (Black)
Type II, Class 1, Black or Gray	Type II, Class 2 (Gray)	Type II, Class 2, (Gray)	Type II, Class 4 (Gray)	Type II, Class 4 (Gray)	_____	_____
Type II, Class 2, White (waterbase)	Type I, Class 2	Type I, Class 2	Type I, Class 2	Type I, Class 2	_____	_____
_____	Type II, Class 3 (White)	Type II, Class 3 (White)	Type II, Class 5 (White or Olive Drab)	Type II, Class 5 (White or Olive Drab)	Type II, Class 5 (White or Olive Drab)	Type II, Class 5 (White or Olive Drab)
Type II, Class 3, White (solvent base)	Not Applicable <u>1/</u>	Not Applicable <u>1/</u>	Not Applicable <u>1/</u>	Not Applicable <u>1/</u>	Not Applicable <u>1/</u>	Not Applicable <u>1/</u>
_____	_____	_____	_____	Type II, Class 6 (White)	Type II, Class 6 (White)	Type II, Class 6 (White)
_____	Type III	Type III	Type III, Class 1 Type III, Class 2	Type III, Class 1 Type III, Class 2	_____	_____
Type II, Class 7	_____	_____	_____	_____	_____	Type II, Class 7

1/ Solvent Base Coating not covered by revision.

6.7 Subject term (key word) listing.

Metallic protection
 Military hardware
 Plastic protection
 Shipment protection

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Storage protection

Toluol

Urethane

Xylol

6.8 Changes from previous issue. Asterisks are not used in this revision to identify changes with respect to the previous issue due to the extensiveness of the changes.

Custodians:

Army - MR

Navy - AS

Air Force - 11

Preparing activity:

Navy - AS

(Project No. 8030-0687)

Review Activities

Army - AV

Air Force - 99

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-C-6799J

2. DOCUMENT DATE
(YYMMDD)

941220

3. DOCUMENT TITLE

COATINGS, SPRAYABLE, STRIPPABLE, PROTECTIVE, WATER EMULSION

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)

7. DATE SUBMITTED
(YYMMDD)

(1) Commercial:

(2) DSN:

(If Applicable)

8. PREPARING ACTIVITY

a. NAME
COMMANDER
NAVAL AIR WARFARE CENTER
AIRCRAFT DIVISION

b. TELEPHONE NUMBER (Include Area Code)

(1) Commercial
(2) DSN
(908) 323-7488
624-7488

c. ADDRESS (Include Zip Code)
CODE 4.1.11.2B120-3
HIGHWAY 547
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 DSN 289-2340

COMMANDER
NAVAL AIR WARFARE CENTER
AIRCRAFT DIVISION
CODE 4.1.11.2B120-3
HIGHWAY 547
LAKEHURST, NJ 08733-5100