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# FINISH SPECIFICATION

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W71 FAN FLIGHT RESEARCH AIRCRAFT PROGRAM

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August 16, 1962

FINISH SPECIFICATION

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FINISH SPECIFICATION FOR MODEL 143 (VZ-11)

1. Purpose. The purpose of this specification is to define the finishes necessary to assure adequate surface protection for the materials used in the Army VZ-11 airplanes (Model 143).

In the event of discrepancies relative to finish information shown on the drawing and the requirements of this specification, the drawing will govern.

2. Reference Specifications.

2.1 Processes.

QQ-P-416	Plating, Cadmium (Electro-deposited) (MPD #30)
MIL-C-490	Cleaning and Preparation of Ferrous and Zinc Coated Surfaces for Or- ganic Protective Coatings
MIL-M-3171A-1	Magnesium Alloy; Process for Corrosion- Protection of
MIL-C-5541	Chemical Films for Aluminum Alloys (MPD #100)
MIL-A-8625A	Anodic Films; Corrosion Protection (for) Aluminum Alloys (MPD #32)
MPD-102	Dow 17 Anodize for Magnesium Alloy, Ryan Aeronautical Company Speci- fication
MIL-S-5002	Surface Treatments (Except Priming and Painting) for Metal Parts in Aircraft

2.2 Finishes.

MIL-P-8585A	Primer Coating, Zinc Chromatic Low Moisture Sensitivity
MIL-P-15930	Primer, Vinyl Zinc Chromate

MIL-V-6894	Varnish, Oil Type, Gloss Finish, Glyceryl Phthalate Base
MIL-C-15328	Pre-Treatment, Wash Primers
MIL-P-15930	Primer, Vinyl Zinc Chromate
MIL-L-7178	Lacquer, Aluminized
W. P. Fuller Co.	#163-W-52 Lacquer Primer Surfacer

2.3 Sealing Compounds and Rust Preventives.

MIL-P-8116	Putty, Zinc-Chromate, General Purpose
MIL-C-11796	Corrosion Preventive, Petrolatum, Hot Application
MIL-C-16173	Compound, Rust Preventive
3M Company	.002 in. Polyester insulating tape #853

2.4 Thinners.

TT-T-266	Thinner, Dope and Lacquer (Cellulose-Nitrate)
TT-T-548	Toluol
TT-X-916	Xylene

3.0 General Requirements.

3.1 Surface Treatment

3.1.1 Aluminum Alloys. - The following surface treatments shall be applied to all aluminum alloys as applicable:

3.1.2 Low Strength and clad aluminum alloys 3003, 5052, 5356, 6061, clad 2024 and clad 7075:

- (a) No chemical treatment required
- (b) No organic protective treatment

3.1.3 All other aluminum alloys not listed in item 3.1.2 shall receive the following:

- (a) Alodine in accordance with Spec. MIL-C-5541 (MPD #100). Anodize per MIL-A-8625A (MPD #32) is an acceptable alternate treatment.
- (b) One coat zinc-chromate primer per MIL-C-5541 (MPD #100).
- (c) See section 5.0 for exceptions to the above.

3.2.1 Magnesium Alloys. The following surface treatments shall be applied to all magnesium alloys:

- (a) Dow 17 anodize per Ryan MPD-102
- (b) One box coat of MIL-C-15328 wash primer
- (c) One box coat of MIL-P-15930 vinyl zinc-chromate primer
- (d) For external applications coat outside surface with two coats aluminized lacquer per MIL-L-7178

Cut edges and abraded spots on magnesium alloys shall be touched up with a chrome pickle solution meeting Type I, Specification MIL-M-3171. Areas treated must be thoroughly rinsed and wiped dry prior to primer application.

3.3.1 Titanium Alloys. The following surface treatments shall be applied to all titanium alloys:

- (a) No chemical treatment
- (b) No organic protective treatment except as specified under item 4.0 - "Dissimilar Materials Protection".

3.4.1 Carbon and Low Alloy Steels.

3.4.1.1 Sheet, Plate, Fittings and Shapes: All carbon steels and low alloy steels shall receive Type II cadmium plate per Spec. QQ-P-416 (MPD #30). Bolts, studs, washers and articles with portions externally threaded shall receive a minimum of Class 3 thickness plate.

Classes of cadmium plating are:

Class 1 - .0005" thick



Class 2 - .0003" thick

Class 3 - .0002" thick

3.4.1.2 Tubing. All carbon and low alloy steel tubing shall be cadmium plated per QQ-P-146 (MPD #30) on the exterior. Interior treatment shall be as follows:

Closed tubing: Coat inside with MIL-C-11796 Class I rust preventive compound per MPD #39.

Open ended tubing: Phosphate treat interior per MPD #15 plus one coat of zinc chromate primer.

3.5.1 Corrosion and Heat Resisting Alloys.

- (a) No chemical treatment
- (b) No organic protective treatment except as specified under item 4.0 "Dissimilar Materials Protection."

3.6.1 Brass, Bronze, Copper, Lead or Tin Alloys. Cadmium plate per QQ-P-416 (MPD #30) if a dissimilar metal contact exists; otherwise none required.

3.7.1 Fiberglass Assemblies. All fiberglass surfaces shall be washed with a solution consisting of equal parts of Shell Solv W. Spec. TT-T-548 or equivalent, and lacquer thinner Spec. TT-T-266 or equivalent prior to finishing.

- (a) After cleaning as noted above, apply 2 box coats of W. P. Fuller 163-W-52 or equivalent lacquer surface primer. Air dry.
- (b) Apply aluminum airfoil putty, Sherwin-Williams No. PX-4045 as necessary. Sand smooth.
- (c) Finish with 2 coats MIL-L-7178 aluminized lacquer.

3.8.1 Ducts Carrying Hot Gases. The finish on all of the hot ducts shall be as specified on individual detail and assembly drawings.

3.9.1 Tubing (Plumbing lines). Tube fittings and tubing shall not be painted. The exterior surfaces of aluminum tubing shall be anodized in accordance with MIL-A-8625A (MPD #32) or alodine per MIL-C-5541.

4.0.0 Dissimilar Materials Protection.

4.1.0 Definition of Similar and Dissimilar Materials. For the purposes of the finish requirements for this airplane, the following table defines the dissimilar metal contacts which require the faying surface protection outlined in Section 4.2. (See page 7).

4.2.0 Faying Surface Protection. - Dissimilar Metal Contacts.

The following protection is required in addition to the surface protection specified in Section 3.0 of this specification.

4.2.1 Magnesium Alloys.

4.2.1.1 Faying surfaces shall be protected from contacting materials by (1) layer of .002 in. polyester tape (3M Company #853 or equivalent). The tape shall overlap the joint by 1/4" on either side wherever possible.

4.2.1.2 Fasteners in Magnesium.

Aluminum fasteners shall be of 5056 material or equivalent.

All other fasteners through magnesium shall be installed with wet prime. In addition, insulating washers (.010 min. thickness) shall be used under the fastener heads in contact with the magnesium.

4.2.2 Dissimilar metals other than magnesium.

All faying surfaces shall receive one coat of zinc-chromate primer with a tolerance of 1/2' on interior surfaces coated beyond the edge of the mating part. Exterior surfaces are to be wiped clean of all excess primer.

Slip fits shall be assembled using wet zinc-chromate primer. Press fits shall be accomplished with a lightly oiled surfaces on the mating parts.

5.0 Special Exceptions and Notes.

5.1 Lubricated or Functional Surfaces. Paint coatings shall not be applied to those parts which are permanently coated with or housed in lubricating oil, hydraulic oil or grease. Paint coatings shall not be applied to working surfaces, adjustable screw threads, sliding mechanisms or to fittings in such a manner as to cause malfunctioning.

5.2 Attaching Parts. Attaching parts such as nuts, washers, rivets, high shear rivets, screws, bushings, spacers etc., need not be painted in detail except when used in contact with wood or magnesium. (See Section 4.0).

5.3 Surface Treatment. All metal surfaces shall receive acceptable surface treatment prior to painting. This treatment shall be in accordance with the requirements of Specification MIL-S-5002.

5.4 Bonded Parts. Aluminum alloy parts which are to be subsequently bonded shall not be painted or primed in the detail. Bonded assemblies shall receive the organic finish specified in Section 3.0 of this specification.

5.5 Drainage Provisions. Where practicable, drainage provisions shall be incorporated in the design of the structure except where such drainage provisions would interfere with the utility or function of the part. Drain holes, 1/4" diameter, shall be so located to drain the structure when the airplane is in a three-point position. When necessary for structural considerations, drain holes may be reduced to 3/16" diameter.

5.6 Tanks. The interiors of all fluid containing tanks shall not be painted or primed.

	5356, 5052, 6061, 6063 Aluminum Alloys	Aluminum Alloy Other Than 5356, 5052, 6061, & 6063	Cadmium Plate	Zinc Plate	Carbon & Alloy Steels	Lead	Tin Coating	Copper & Copper Alloys	Nickel & Nickel Alloys	Titanium & Ti Alloys	Chromium Plate	Corrosion Resist. Steel	Magnesium Alloy
5356, 5052, 5056, 6061, 6063 Alum. Alloys													
Alum Alloys other than 5356, 5052, 5056, 6061, 6063													
Cadmium Plate													
Zinc Plate													
Carbon & Alloy Steels													
Lead													
Tin Coating													
Copper & Copper Alloys													
Nickel & Nickel Alloys													
Titanium & Ti Alloys													
Chromium Plate													
Corrosion Resist. Steel													
Magnesium Alloy													
Fiberglass													
Wood													

Shaded areas denote dissimilar materials.