CHAPTER 4 — PAINTING

CONTENTS – MAINTENANCE PROCEDURES

TABLES

PAINTING

4-1. PAINT

4-2. PAINT REMOVERS

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-109	Protective Oil
C-205	Thinner
C-206	Thinner
C-309	Methyl-Ethyl-Ketone
C-318	Cleaning Compound
C-348	Cleaner
C-435	Paint Remover
C-436	Paint Remover

1. Types and usages:

CAUTION

REMOVERS SHALL BE USED ONLY IN AREAS OF ADEQUATE VENTILATION. SUITABLE GOGGLES OR FACE MASKS, CHEMICAL RESISTANT GLOVES, BOOTS AND CLOTHING SHALL BE WORN TO AVOID CONTACT OF CHEMICAL REMOVERS WITH EYES, SKIN AND CLOTHING. CHEMICAL REMOVERS SHALL FURTHER BE HANDLED IN ACCORDANCE WITH APPLICABLE OSHA REGULATIONS, STATE AND LOCAL SAFETY CODES, AND COMPANY ESTABLISHED SAFETY STANDARDS AND POLICIES.

DO NOT USE PAINT REMOVERS OR STRIPPERS ON HONEYCOMB PANELS, COMPOSITE PARTS (INCLUDES FIBERGLASS) OR ADHESIVE BONDED STRUCTURES.

a. General remover, solvent type thinner (C-205), thinner (C-206) and MEK (C-309) may be used to remove all organic finishes, except epoxy and polyurethane base finishes, from all metal of all strength levels.

b. General Remover, chlorinated hydrocarbon paint remover (C-435) may be used to remove all organic finishes except epoxy and polyurethane base finishes, from all metals of all strengths. Water rinseable.

c. General paint remover, alkaline type paint remover (C-436) may be used to remove all organic finishes from all strength levels. Use for removing epoxy polyamide finishes. Will remove super Koropon and polyurethane finishes at a much slower rate. Water rinseable.

2. Precautions.

a. Protect all vulnerable parts and areas, such as acrylic plastic, synthetic and natural rubber, all fabric covered surfaces, exposed bearings, joints, seams, as necessary, by masking with protective materials.

NOTE

Protective materials provide protection for chemical stripping by wipe, brush and spray, or mechanical stripping by plastic media blasting or abrasive sanding. These maskants do not provide suitable protection for chemical stripping by immersion.

b. Magnesium parts and assemblies shall not be immersed in acid type epoxy and polyurethane remover.

c. Magnesium parts immersed in alkaline type general remover shall be restricted to a 12 hour immersion time.

d. Magnesium parts immersed in chlorinated hydrocarbon type remover or solvent type remover shall be restricted to a 24 hour immersion time.

e. Parts that have acrylic lacquer or polyurethane topcoat and epoxy prime need only to have topcoat removed for magnetic particle inspection. Parts that have aluminized acrylic lacquer topcoat must have topcoat and primer removed prior to magnetic particle inspection.

f. All paint and primer shall be removed from parts prior to fluorescent penetrant inspection.

3. Application.

NOTE

When general removers are used on titanium, finish removal shall be followed by alkaline cleaning with materials conforming to cleaner (C-348) or cleaning compound (C-318).

a. Solvent type removers, MEK (C-309), thinner (C-205), thinner (C-206), and paint remover (C-435) may be applied by wiping or squirting on.

b. Spray or brush application:

(1) Liberally spray, using a non-atomizing applicator or use a stiff brittle brush on top surface and work down.

(2) Keep surface moist with stripper. Allow first application to work for 15 to 45 minutes, until finish is loosened (as indicated by wrinkling).

(3) Remove excess stripper with squeegees, rags, or soft scrappers. Fiber brush, if necessary, to assist in finish removal from difficult areas. This cycle may be repeated until paint is removed.

(4) Thoroughly rinse stripped surfaces with high pressure (preferably hot). Allow surfaces to dry.

c. Immersion.

NOTE

Tanks used for immersion stripping shall be equipped with a lid and/or adequate ventilation to prevent stripper fumes from being introduced in to the workplace. Heated immersion tanks shall be equipped with automatic temperature controls capable of maintaining specified operating temperatures to within ± 10°F when stripping with hot tank removers.

(1) Immerse the entire part in paint removal dip tank. Allow to remain immersed for 15 to 45 minutes. Do not exceed 24 hours.

(2) Remove loosened finish and excess stripper with high pressure air and/or water blast. Fiber brush, if necessary, to assist in finish removal from difficult areas. Repeat immersion in stripper and rinsing as necessary to complete stripping. Allow surfaces to dry.

d. Apply a temporary coating of protective oil (C-109) to parts not scheduled for immediate refinishing.

4-3. PAINT STRIPPING — PARTS WITH TEFLON BEARINGS

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-407	Abrasive Pad
C-435	Paint Remover
C-436	Paint Remover

CAUTION

ALL PAINT FINISH REMOVERS ARE INJURIOUS TO TEFLON BEARINGS AND ADHESIVES SECURING TEFLON TO BEARING RACES. CARE MUST BE EXERCISED WHEN USING CLEANING SOLVENTS OR PAINT REMOVERS TO AVOID WASHING WASTE PRODUCTS INTO TEFLON BEARINGS.

1. Degrease or solvent clean parts (Chapter 5) to remove dirt, grease, oil, and other contamination that can lesson action of stripper.

2. Cut masking tape circles to diameter of bearing outside diameter. Apply three or four circles over each side of bearing, press down well to seal.

CAUTION

DO NOT USE ACID BASE PAINT REMOVERS ON PARTS. USE PAINT REMOVER (C-435) OR PAINT REMOVER (C-436).

3. Apply paint remover with a brush, allow to set from 15 to 45 minutes to soften paint.

4. Using a stiff fiber brush and flowing water, rinse paint from part. For stubborn finishes, use abrasive pad (C-407) and paint remover to aid in lifting paint.

5. Rinse part clean with flowing water and dry thoroughly.

6. Refinish part as soon as practical or protect by coating with a light weight water displacing corrosion preventive oil.

4-4. PAINT APPLICATION

4-5. DEFINITIONS

1. A clean surface is a surface that is not contaminated with oil, grease, fingerprints, etc.

2. Contaminated area. A contaminated area is a surface that is contaminated with oil, grease, fingerprints, etc. and/or chemical conversional film or treatment has been damaged.

3. Chemical film. Chemical film is a chemical conversion coating applied to aluminum surfaces to give increased corrosion protection, and to improve paint adhesion.

4. Chemical treatment. Chemical treatment includes etching, pickling, anodizing, metal plating and other such metal treatments intended to provide corrosion resistance, improve paint adhesion and/or alter surface condition of metal for reasons.

5. Corrosion preventive compound. Corrosion preventive compounds are solvent-dispersed compounds which deposit a film. These compounds are used on parts where a paint film might prove detrimental to operation on parts requiring frequent disassembly, and on parts where a paint film would be removed by abrasion or flexing.

6. Sealants. Sealants refer to rubber base or synthetic rubber type materials. Sealants are used to provide water and fuel tightness and as a barrier between magnesium and/or dissimilar metals.

7. Extreme conditions. Extreme conditions include, but are not limited to exhaust trails, gun-blast surfaces, rocket-blast areas, leading edges, areas that may trap or be exposed to fumes from exhaust, guns or rockets, or surfaces subjected to temperatures above 250°F (121°C), as result of thermal radiation, aerodynamic heating, or other sources of heat.

8. External surfaces. External surfaces are outside surface of hollow part whether sealed or not. These surfaces may form an interior, cabin interior or exterior surface.

9. Internal surfaces. Internal surfaces are inside surfaces of hollow parts whether sealed or not.

10. Faying surfaces. Faying surfaces are face-to-face areas of adjoining (contacting) parts.

11. Frequent disassembly. Disassembly which occurs or is anticipated to occur within maximum of 6 months.

4-6. PAINTING — EXTERIOR SURFACES

CAUTION

PROTECT ALL PLASTIC SURFACES AND VULNERABLE PARTS AND AREAS PRIOR TO STARTING PAINTING PROCEDURES.

Refer to table 4-1 for finish requirements.

Table 4-1. Painting Requirements for Exterior Surfaces

ITEM	CHEMICAL TREATMENT REQUIREMENTS	PAINTING REQUIREMENTS
ALUMINUM SURFACES	Alodine 1200 MIL-C-5541 (1)	One coat of epoxy polyamide primer (C-204) and two coats of topcoat (C-218).
MAGNESIUM SURFACES	Dow No. 7 or No. 19 MIL-M-3171C	One coat of epoxy polyamide primer (C-204) and two topcoats to be in accordance with marking drawings (#9128508) and/or applicable manual.
PLASTIC		For application of polyurethane enamel as a finish coat, refer to paragraphs 4-33 and 4-39.
1. Non-reinforced		
a. Acrylic		a. None
b. Polycarbonate		b. Sand defective area with No. 400 grit paper. Feather edges and remove sanding residue. Apply one cross coat of Organocerams adhesive (C-301) and allow 15 minutes between coats. Color to match adjacent or surrounding area.
c. Acrylic PVC Alloy (Kydex) (Landing Gear Fairings)		c. Finish to match surrounding or adjacent surfaces.
2. Reinforced (Laminates, etc.)		
a. Acrylic		a. Finish to match surrounding or adjacent surfaces.
b. Epoxy, Phenolic or polyester (Fiberglass) (Facings)		b. Finish to match adjacent or surrounding areas.
BLADES, MAIN AND TAIL ROTOR		Refer to applicable Maintenance Manual and Component Repair and Overhaul Manuals.

Table 4-1. Painting Requirements for Exterior Surfaces (Cont)

ITEM	CHEMICAL TREATMENT REQUIREMENTS	PAINTING REQUIREMENTS
ROTATING CONTROLS	△1 △2	Where applicable, all exterior surfaces of the mast (except splines) and rotating controls located above the transmission (except main rotor blades) and exterior surfaces of the tail rotor rotating controls, located on or outboard of the 90 degree gearbox (except tail rotor blades), shall receive one spray coat of epoxy polyamide primer (C-204) and two spray coats of original color polyurethane.

NOTES:

△1 Model 206 series masts are painted and require a phosphate coating of the cadmium plating prior to priming. Refer to BHT-206-CR&O-1.

△2 Model 204, 205, 212, 214B, 214ST, 222, 230 and 412 series mast do not require painting.

△3 Type of paint required for topcoats shall be determined by applicable manual.

4-7. EPOXY POLYAMIDE PRIMER APPLICATION

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-204	Primer
C-246	Primer

The primer (C-204) and coating (C-246) are intended for use as a prime coating for acrylic, epoxy, and urethane topcoats and as final finish for interior and internal surfaces not requiring topcoats. These primers may be applied to mechanically prepared and/or chemically treated metal, plastic, and composite surfaces or as tie coat over properly prepared, cured, primed or topcoated surfaces.

CAUTION

COATING (C-246) SHOULD NOT BE USED ON IRON OR BARE CARBON STEEL, NOR FOR WET INSTALLATIONS OF FASTENERS OR FAYING SURFACES. REFER TO TABLE 4-2 FOR WET INSTALLATIONS OF FASTENERS.

4-8. Equipment Requirements

1. Spray equipment. Spray guns and accessories used for application of epoxy polyamide primer must be capable of spraying paint film which will conform to the requirements of paragraph 4-9.

2. Hot spray equipment. Hot spray equipment should be of the circulating type. The circulation should be from the gun to the heater, not to include the reservoir. The equipment should have temperature controls such that the prime temperature does not exceed 160°F (71.11°C) in the system and not exceed 135°F (57.22°C) at the spray gun.

Table 4-2. Installation Guidelines

PARTS TO BE JOINED	SPECIFIC SITUATION	LOCATION IN AIRCRAFT	SPECIAL CIRCUM-STANCES	INSTALLATION REQUIREMENTS	NOTES
Similar Metals	All (Except Magnesium)	Interior		NONE	1
		Exterior		NONE	1
Dissimilar Metals	All (Except below or Magnesium)	Interior		Wet install with unreduced primer (C-204).	2 4 5 6
		Exterior		Wet install with adhesive (C-308).	2 7
	Aluminum or Cadmium Plating	Interior		Wet install with unreduced primer (C-204).	2 4 5 6 7 8 9
		Exterior		Wet install with sealant (C-392).	2 3 6
Metal to Com-posite	Aluminum to Carbon Composite	All Locations		Wet install and cap seal fastener end with sealant (C-392).	3
	Cadmium Plated Steel to Carbon Composite	Interior	Permanent Assembly	Wet install with unreduced primer (C-204).	2 4 5 6
		Exterior		Wet install and cap seal fastener end with sealant (C-392).	3
		Interior	Frequent Dis-assembly	Wet install with corrosion preventive (C-106).	
		Exterior		Wet install and cap seal fastener end with sealant (C-392).	3
	Metal (other than Aluminum or Cadmium Plated) to Carbon Composite	Interior		Wet install with unreduced primer (C-204).	4 5
		Exterior		Wet install and cap seal fastener end with sealant (C-392).	
	Metal to Fiberglass (or Plastic)	Interior	Permanent Assembly	NONE	
		Interior	Frequent Disassembly	Wet install with corrosion preventive com-pound (C-104), grade 2.	
		Exterior	All (except below)	Wet install with adhesive (C-308).	8
			Aluminum or Cadmium-Plated	Wet install with sealant (C-392).	3

Table 4-2. Installation Guidelines (Cont)

PARTS TO BE JOINED	SPECIFIC SITUATION	LOCATION IN AIRCRAFT	SPECIAL CIRCUM-STANCES	INSTALLATION REQUIREMENTS	NOTES
Carbon Composite to Carbon Composite	Cadmium Plated or Aluminum Fasteners	Interior or Exterior		PROHIBITED	
	Titanium Fasteners	Interior		NONE	△6
		Exterior		Wet install withsealant (C-392)	△6

NOTES:

△1 Similar metals includes the fastener (aluminum to aluminum with aluminum fastener) if the fastener is dissimilar to the similar metal to be joined, the joint is considered to be dissimilar.

△2 Fasteners or fastener finish should be less active with respect to the most active metal to be joined (where magnesium is considered the most active and carbon (graphite) the least active).

△3 sealant (C-392) should be used preferentially for aluminum or cadmium plated joints.

△4 Where production considerations preclude wet installation, the hole or fastener may be coated with primer and allowed to dry prior to fastener installation.

△5 Do not use MIL-P-85582 waterbase coating (C-246) for wet installation of fasteners.

△6 Use adhesive (C-308) if a pressure tight fuel tight, or water tight joint is required.

△7 Magnesium is a special case - see the applicable finish Specification for finishing instructions.

△8 sealant (C-392) may be used as an alternate.

△9 Use unreduced zinc chromate primer (C-101) if disassembly is required.

3. Compressed air. Compressed air should be filtered to render it moisture and oil free prior to use.

4-9. Process and Product Requirements

1. Appearance. After drying, applied film shall be free from grit, seeds, craters, blisters or other such irregularities.

2. Thickness. The dry film thickness of epoxy polyamide primer should be 0.0006 to 0.0009 inch (0.01524 to 0.02286 mm).

3. Fastener holes that are coated by brush or swab method and internal surfaces and tubing or tubular type parts that are coated by wet install or fill and drain method shall not be subject to thickness requirements, except these areas shall not exhibit any bare (unprimed) areas.

4-10. Procedure Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-204	Primer
C-235	Thinner
C-246	Primer
C-309	Methyl-Ethyl-Ketone (MEK)
C-426	Tape
C-435	Paint Remover
C-462	Tape

1. Surface preparation. Prepare clean aluminum, titanium, stainless steel and cadmium coated surfaces for priming by wiping with tack rag. Prepare other surfaces as specified in table 4-3.

2. Masking. Areas (except plastic surfaces) requiring masking should be masked using tape (C-426) and suitable solvent resistant masking paper. Mask area not to be painted, as required.

NOTE

Plastic surfaces (polycarbonate, acrylic, etc.) requiring masking should be masked using tape (C-462).

3. Primer preparation.

NOTE

Primer preparation for epoxy primers shall be accomplished in accordance manufacturer instructions. If manufactures instructions are not available proceed as follows:

a. Two component epoxy polyamide primer (C-204) should be prepared for spraying as follows:

NOTE

Catalyzed primer should be discarded if not used within 8 hours after mixing. If hot spray equipment is used, heated primer will have usable life of less than 2 hours.

(1) Shake or stir the pigmented resin component (Component I) until uniform.

(2) Add one volume of the activator (Component II) to one volume of the pigmented resin (Component I) and mix thoroughly. Use only components from the same kit.

(3) For spray application, thin as necessary to achieve viscosity of 16 to 18 seconds Zahn #2 by adding thinner (C-235).

(4) For brush, swab, wet install and fill and drain, the mixed primer shall not be thinned.

(5) Strain the mixed material through a paint strainer. Shake or stir the primer prior to use.

NOTE

Primer preparation for epoxy primers shall be accomplished in accordance manufacturer instructions. If manufactures instructions are not available proceed as follows:

b. Two component epoxy polyamide coating (C-246) should be prepared for spraying as follows:

NOTE

Catalyzed coating (C-246) should be discarded if not used within 4 hours after mixing.

(1) Shake or stir the pigmented resin component (Component A) until uniform.

(2) Add one volume of the activator (Component B) to three volumes of the pigmented resin component (Component A) and mix thoroughly. Use only components from the same kit.

(3) Do not thin material unless directed by the manufacturer's instructions on the label. Unthinned material will have viscosity of approximately 40 seconds using a Ford #4 viscosity cup.

(4) Strain mixed material through paint strainer. Shake or stir primer prior to use.

4. Application procedure.

a. Spraying. Adjust spray equipment and control rate of stroke to apply a film of primer which when dry will meet requirements of paragraph 4-9.

b. Brush or swab. Fastener holes or other small areas which require primer shall be coated using suitable brush or swab of appropriate size to assure complete coverage.

c. Fill and drain. Apply primer to internal surfaces of tubing and tubular type parts using one or both of following techniques:

(1) Seal or plug one end, then flow primer into part. Fill and/or slosh as needed to coat all internal surfaces. Remove seal or plug and allow excess primer to drain.

(2) Flow primer into parts while rotating them so as to coat all internal surfaces. Allow excess primer to drain.

NOTE

Swagged tubes with threaded ends shall have the primer removed from all threads within 3 minutes after primer application. Primer removal shall be accomplished by laying tube horizontally and inserting, with twisting motion, a nylon brush wetted with MEK (C-309). Repeat insertion as necessary to achieve complete primer removal from threaded areas. Allow tubes to remain in horizontal position for minimum of 1 hour to prevent any primer migration back to threaded areas.

d. Wet install. Where possible coat both surfaces with primer using a suitable means. Install within 30 minutes. After installation, remove excess primer with solvent soaked rag. Allow 72 hours ambient temperature for complete cure.

e. Dry time before first overcoating. Primer must be overcoated in not less than 30 minutes and not more than 3 hours (this time limit includes applying primer at elevated temperatures). If required, primed surfaces should be wiped with tack rag to remove lint and dust prior to overcoating.

5. Refinishing. Epoxy primed surfaces requiring refinishing should be processed as follows:

CAUTION

BONDED ASSEMBLIES, PLASTICS AND OTHER PARTS OR AREAS WHICH MIGHT BE DAMAGED BY EPOXY STRIPPER WILL REQUIRE MECHANICAL REMOVAL OF THE PRIMER. CHEMICALLY TREATED SURFACES, DAMAGED BY PRIMER REMOVAL, SHOULD BE REPAIRED IN ACCORDANCE WITH APPLICABLE INSTRUCTIONS PRIOR TO REPRIMING.

a. Strip parts and assemblies using an alkaline type general paint remover (C-435). This remover may be used on all organic finishes and metals of all strength levels.

b. Refinish parts in accordance with paragraphs 4-3, 4-4, and 4-5 above.

4-11. EPOXY SUPER KOROPON PRIMER — APPLICATION

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-100	Chemical Film Material
C-112	Cadmium Chromate Conversion Coating
C-202	Primer
C-305	Aliphatic Naphtha
C-306	Toluene
C-309	Methyl-Ethyl-Ketone (MEK)
C-318	Cleaning Compound
C-319	Chlorothene
C-344	Alcoholic Phosphoric
C-407	Abrasive Pad
C-423	Abrasive Cloth or Paper

Epoxy primer (C-202) is intended for use over mechanically or chemically treated metal surfaces.

1. Prepare for priming by wiping with a tack rag. Prepare surfaces as specified in table 4-3.

2. Mask area not to be painted, as required.

3. Prepare epoxy primer (C-202) as follows:

NOTE

Primer preparation for epoxy primers shall be accomplished in accordance manufacturer instructions. If manufacturers instructions are not available proceed as follows:

a. Shake or stir pigmented resin component until uniform.

b. Add one volume of activator thinner component to one volume of pigmented resin component and mix thoroughly. Use only components from same kit.

c. Strain mixture through paint strainer.

NOTE

Catalyzed primer shall be discarded if not used within 8 hours after mixing.

4. Apply epoxy primer (C-202) by spraying, brush or swab, or for internal use, plug one end, flow epoxy primer into hollow part, slosh as needed to coat surface, drain excess epoxy primer.

5. Epoxy primer (C-202) shall be overcoated in not less than 30 minutes and not more than 4 hours. If necessary, primed surfaces should be wiped with tack rag prior to overcoating to remove lint and dust. Clean primed surfaces which have cured for longer than 4 hours but less than 24 hours, wipe with tack rag and give a mist coat of epoxy primer prior to overcoating. Primed surfaces which have cured for 24 hours or longer shall be prepared per table 4-3. Painted surfaces (cured), shall be given a mist coat of epoxy primer prior to overcoating. Primer on exterior surfaces, may be overcoated 10 minutes after solvent flash-off if epoxy primer is being applied to an unpainted surface.

4-12. URETHANE COMPATIBLE PRIMER — APPLICATION

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-234	Primer

The primer (C-234) is intended for use as a prime for urethane topcoats or as primer coating for the internal surfaces of rotor blade spars.

4-13. Equipment Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-234	Primer

1. Spray guns used for application of primer (C-234) shall be capable of spraying a paint film which will conform to paragraph 4-14.

2. Compressed air shall be trapped and filtered to render it moisture and oil free, prior to use.

3. There shall be up to 65 pounds air pressure available for paint spray atomization at nozzle.

4. Air gauges and regulators should be installed on atomization lines.

5. All hoses and fittings shall be of 3/8 inch diameter with adaptable fittings.

6. Atomization air lines should bypass pressure pot air regulator.

4-14. Process and Product Requirements

1. Appearance. Applied cured film shall be free of runs, sags, streaks, blisters, lifting, or blushing.

2. Adhesion. There shall be no loss of adhesion of urethane coating system when tested.

Table 4-3. Surface Preparation

STEP	OPERATION	MATERIAL											
		ALUMINUM ALLOYS	STAINLESS STEEL	CADMIUM PLATE	TITANIUM	MAGNESIUM ALLOYS	TUNGSTEN AND TUNGSTEN ALLOYS	NICKEL	LEAD	CARBON AND LOW ALLOY STEEL	COMPOSITE SURFACES	PLASTICS	TOP-COATED OR PRIME SURFACES (CURED)
1	DEGREASE												
	Metals - (except Titanium) Vapor Degrease or solvent clean aliphatic naphtha (C-305), toluene (C-306) or MEK (C-309) as applicable.	X	X	X		X	X	X	X	X	X		X
	Titanium - Solvent clean with aliphatic naphtha (C-305), toluene (C-306), or MEK (C-309).				X								
	Composite Surfaces - Solvent clean with toluene (C-306) or alcohol (C-385).										X		
	Plastics - Solvent clean with materials specified in appropriate manual.											X	
2	SAND - Lightly abrade surfaces with 180 grit or finer abrasive coated cloth or paper (C-423) or abrasive pad (C-407).				X						X	X	X
	Note:Exercise extreme care to prevent damage to the outer-most fibers of composite surfaces.										X		
3	SANDBLAST - Dry Abrasive Blasting												
	Carbon and low alloy steel - Uniformly blast with 80 grit aluminum oxide (C-474) at 50 to 80 psi to produce a matte surface finish.									X			
	Lead - Uniformly blast with 80 grit aluminum oxide (C-474) at pressures less than 60 psi to produce a matte surface finish.								X				
	Composite Surfaces - Uniformly blast with 100 grit or finer aluminum oxide (C-474) at pressures less than 40 psi when using hand operated blasting equipment or less than 60 psi when using automatic blasting equipment. △3										X		
	Note:For dry abrasive blasting of composites, the nozzle distance(s), impingement angle(s), and traverse rate shall be adjusted to prevent damage to the outermost fibers.										X		
4	VAPOR BLAST - Wet Abrasive Blasting												
	Nickel - Uniformly blast with 3/0 flint quartz (C-496) at 30 to 80 psi to produce a matte surface finish.						X						
	Tungsten - Uniformly blast with 3/0 flint quartz (C-496) at pressures less than 60 psi to produce a matte surface finish.					X							
	Plastics - Uniformly blast 3/0 flint quartz (C-496) at pressures less than 40 psi to produce a matte surface finish. △3											X	
5	RESIDUE REMOVAL - Remove dry abrasive blasting or sanding residue with a blast of compressed air. △1				X				X	X	X	X	X
6	SOLVENT WIPE - Solvent clean using materials specified in 1.				X						X	X	X
7	SOAP CLEAN - Scrub with abrasive pad (C-407) and an cleaning compound (C-318) solution (4 to 6 fl. oz./gallon in water).	X	X	X	X								
8	RINSE - Thoroughly rinse with clean water.	X	X	X	X								

Table 4-3. Surface Preparation (Cont)

STEP	OPERATION	MATERIAL											
		ALUMINUM ALLOYS	STAINLESS STEEL	CADMIUM PLATE	TITANIUM	MAGNESIUM ALLOYS	TUNGSTEN AND TUNGSTEN ALLOYS	NICKEL	LEAD	CARBON AND LOW ALLOY STEEL	COMPOSITE SURFACES	PLASTICS	TOP-COATED OR PRIME SURFACES (CURED)
9	INSPECT - Inspect washed surfaces to assure a water break free surface. △2	X	X	X	X								
10	DICHROMATE TREATMENT - Apply dichromate treatment.					X							
11	DICHROMATE ETCH						X						
12	CHEMICAL FILM TREATMENT - Apply chemical film (C-100) treatment in accordance with the Brush procedure.	X			X								
13	CHROMATE TREAT - Apply Brush chromate treatment with C-108.			X									
14	ALCOHOLIC PHOSPHORIC TREATMENT - Apply alcoholic phosphoric treatment with C-344.		X										
15	WASH PRIMER - Apply wash primer.												
	Stainless Steel - Application is optional. Wash primer may be applied in addition to or in lieu of alcoholic phosphoric treatment.		X										
	Cadmium Plate - Application is mandatory only as cadmium plate has not received a supplemental chemical treatment such as a chromate conversion or a phosphate coating.			X									
16	RINSE - Thoroughly rinse with clean water.	X	X	X	X	X	X	X					
17	DRY	X	X	X	X	X	XX	X			X	X	X

NOTES:

△1 Carbon and low alloy steels, and lead shall be epoxy primed immediately following removal of the blasting residue.

△2 Apply a film of water to the surface to be inspected. If a flashout occurs within 25 seconds after the flow of water is stopped, the surface shall have failed the test and shall be recleaned and retested. If a flashout does not occur, the surface shall have passed the test.

△3 This operation may be performed in lieu of the operation presented in 2.

3. Thickness. Dry film thickness of one spray coat of primer (C-234) shall be 0.0004 to 0.0010 inch (0.01016 to 0.0254 mm).

4-15. Procedure Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-227	Primer Surfacer
C-234	Primer
C-306	Toluene
C-423	Abrasive Cloth or Paper
C-426	Tape
C-474	Dry Blasting Abrasive

1. Surface preparation.

a. Composite surfaces shall be wiped with clean cloths wetted with toluene (C-306).

b. Composite surfaces shall be abrasive blasted with dry blasting abrasive aluminum oxide (C-474) or sanded with abrasive coated cloth or paper (C-423) to remove glazed surface. Dry blasting abrasive size shall be no coarser than 100 grit and abrasive coated cloth or paper (C-423) shall be no coarser than 180 grit. Blasting pressure shall not exceed 40 psi when using hand operated blasting equipment or 60 psi when using automatic blasting equipment.

CAUTION

FOR ALL DRY BLASTING OPERATIONS, NOZZLE DISTANCE(S), IMPINGEMENT ANGLE(S), AND TRAVERSE RATE SHALL BE ADJUSTED TO PREVENT DAMAGE TO THE OUTERMOST FIBERS.

FOR SANDING OPERATIONS, EXERCISE EXTREME CAUTION TO PREVENT DAMAGE TO OUTERMOST FIBERS.

c. Remove sanding residue with clean cloths wetted with toluene (C-306).

d. Metal surfaces shall be prepared in accordance with table 4-3.

e. Pin holes in composite surfaces shall be filled by one of the following methods as specified in applicable manual.

(1) Method 1 - Sanding surfacer. Apply epoxy sanding surfacer primer surfacer (C-227) to all composite surfaces assuring covering and/or filling of pin holes.

(2) Method 2 - Pin hole filler. All composite surfaces shall receive pin hole filler as follows:

(a) Shake pin hole filler container thoroughly.

(b) Apply, using clean cloths or rags, by rubbing filler into surface with a circular motion. Circular rubbing action produces a static charge which draws the filler into pin holes. Remove excess filler while rubbing filler into surface.

(c) Allow 40 to 60 minutes dry time of filler on surface of blade. Excess filler will dry to a soft powder which shall be removed with clean cloths, rags, or abrasive pads.

NOTE

Filler residue which is not readily removable may be painted over with primer.

(3) After a minimum of 4 hours dry of pin hole filler apply one coat of primer (C-234).

2. Primer preparation.

a. Mix primer (C-234) in accordance with manufacturers recommendation. Thin mixed primer (if required) according to manufacturers recommendation.

NOTE

Allow primer material to reach room temperature (65° to 95°F (18.3° to 35°C)) prior to mixing and applying.

b. After mixing, a viscosity check shall be conducted and shall be 35 ±5 seconds in a Zahn #1 cup or 17 ±5 seconds in a Zahn #2 cup.

3. Application procedures.

a. Areas requiring masking shall be masked using tape (C-426) and/or suitable masking devices as required.

b. Adjust spray equipment and control rate of stroke to apply one wet coat of primer (C-234).

c. Overcoating primer should be between 1 hour and 8 hours. From 8 hours to 24 hours air dry, a mist coat of primer shall be applied prior to overcoating. After 24 hours, primer shall be sanded and a primer coat applied.

4-16. Process Control Requirements

1. Cured coat shall conform to requirements in paragraph 4-14.

2. Prime and topcoated surfaces shall be capable of passing adhesion test (paragraph 4-24) after 72 hours minimum at ambient temperatures or after 1 hour air cure followed by 2 hour minimum cure at 140°F to 160°F (60°C to 71.1°C).

4-17. POLYURETHANE COATINGS APPLICATION

Table 4-4. Cure Times for Sprayed Polyurethane Coating

SEE NOTES (1) (2) (3)		HOURS @ 70°F
Dust Free	(2)	1/2
Dry to Tape	(2)	6
Dry Hard	(2)	8
Water Resistant		24
Oil Resistant		24
Aircraft Ready for Outdoors		48-72

(1) Drying time may be accelerated by holding in a warm atmosphere (90° to 150°F).

(2) Flat colors usually dry 25 - 50 percent faster than gloss colors.

(3) Below 50°F drying times may be more than doubled.

4-18. Polyurethane Coatings

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-213	Coating
C-218	Topcoat
C-245	Coating

The coating (C-245) and coating (C-213) is intended for use over epoxy primer or urethane compatible primer.

NOTE

For topcoat (C-218) application procedures refer to paragraph 4-25.

4-19. Equipment Requirements

Spray equipment shall be capable of applying a film which will conform to the requirements of paragraph 4-20. Cup gun, pressure pot, airless or airless electrostatic may be used.

4-20. Process and Product Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-245	Coating

1. Appearance.

a. Details, parts, assemblies, and exterior of helicopter. Cured film shall be free of runs, sags, streaks, blisters, lifting, and blushing.

b. Rotor blades, main and tail. Cured film shall be free of runs, sags, streaks, lifting, and blushing. Slight burnishing or marring of polyurethane topcoat during handling and shipping is permissible provided no physical damage such as nicks, digs, scratches, imprints, etc., occurs.

2. Adhesion. There shall be no loss of adhesion of polyurethane coating system when tested (paragraph 4-24).

3. Thickness. Dry film thickness of one spray coat of coating (C-245) shall be 0.00085 to 0.00115 inch (0.02159 to 0.02921 mm).

4-21. Procedure Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-213	Coating
C-245	Coating
C-305	Aliphatic Naphtha

1. Area control. Polyurethane coating shall be sprayed in an area where temperature is between 50°F and 100°F (10°C and 37.8°C) and relative humidity is between 50 and 90 percent. In addition, spraying and drying areas shall be as free as possible from airborne contamination.

2. Surface preparation. Normally, polyurethane coating shall be applied over surfaces that have been epoxy primed. Surfaces that have been primed shall receive polyurethane topcoat in 1 to 8 hours after priming. Other surfaces shall be prepared in accordance with following step.

3. Acrylic PUC (Kydex) and reinforced glass sheet. These materials shall be prepared as follows:

a. Degrease with aliphatic naphtha (C-305).

b. Wet and/or dry sand with a suitable grit sandpaper which will not leave scratches which will show after final coat of polyurethane.

NOTE

Sand until glaze has been removed.

c. Remove sanding residue using a clean, dry, lint-free cloth.

d. Wipe surfaces with a tack rag.

e. Apply coating (C-245) or coating (C-213).

f. Use of epoxy primer on above surface is permissible but not required.

4-22. Polyurethane Coating Preparation

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-213	Coating
C-245	Coating

1. The coating (C-213) consists of two components. A resin base component, Component I and aliphatic isocyanate, Component II. These are furnished as a kit. Mix in accordance with manufacturer instructions.

NOTE

Allow coating materials to reach room temperature (65°F to 95°F (16.6°C to 35°C) prior to mixing and applying.

a. Viscosity. After mixing, viscosity check shall be conducted. Viscosity at 70°F – 75°F (21.1°C – 23.9°C) shall be 17-23 seconds using a Zahn No. 2 viscometer.

b. Thinning. If thinning is required to meet viscosity requirements, use appropriate thinner.

2. The coating (C-245) consists of two components. Component A is pigmented and contains polyester resins and solvent. Component B contains clear aliphatic isocyanate catalyst. These components are packaged separately and are furnished in a kit form. Mixing ratio shall be as specified by manufacturer.

a. Viscosity. After thinning to maximum VOC content, viscosity shall not exceed 30 seconds through a Ford #4 cup. If viscosity exceeds this limit, the material is considered to be rejectable.

b. Thinning. If thinning is required, thin according to manufacturer's instruction. However, material shall

not be thinned to point that it is no longer VOC compliant.

4-23. Application Procedures

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-213	Coating
C-234	Primer
C-245	Coating
C-423	Abrasive Cloth or Paper
C-426	Tape

1. Masking. Areas requiring masking shall be masked using tape (C-426) and/or suitable masking devices as required.

2. Spraying. Adjust spray equipment and control rate of stroke and apply a minimum of two wet top coats of coating (C-245) or coating (C-213).

3. Dry time between coats. The dry time between coats of polyurethane coating shall be 30 minutes to 8 hours at room temperature.

4. Striping colors. Striping colors may be applied to top coating without sanding, provided 24 hours cure on coating has been not exceeded. Over 24 hours, striping area shall be sanded to provide adhesion of striping colors to base coating.

NOTE

Polyurethane coating (C-245) on rotor blades shall be thoroughly sanded with 180 grit or finer abrasive coated cloth or paper (C-423) and primed with primer (C-234) prior to stripping.

5. Drying time characteristics. Table 4-4 lists drying time requirements of sprayed coating (C-245) or coating (C-213).

6. Touch-up procedures shall be in accordance with paragraph 4-39.

4-24. Process Control Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-518	Tape

1. Appearance. Cured polyurethane shall conform to paragraph 4-20.

2. Adhesion. Polyurethane coated surfaces shall be capable of passing adhesion test specified in following step after a minimum of 24 hours cure of paint system.

3. Dry tape test. Apply to areas selected a one inch wide strip of tape (C-518). Press tape onto surface with firm finger pressure. Grasp one end of tape and while holding it at approximately 90 degrees from coated surface, remove tape with an abrupt motion. Loss of adhesion shall result in further adhesion tests. If these additional tests indicate generally poor adhesion, area shall be stripped to prime or base material, re-chemically treated as required, and refinished. If additional tests indicate isolated areas of non-adhesion, areas shall be refinished in accordance with touch-up procedures (paragraph 4-39).

4. Total coating thickness. Total coating thickness of polyurethane system shall be 0.0023 to 0.0032 inch (0.0584 to 0.0813 mm).

NOTE

This total coating thickness does not apply to rotor blades.

4-25. Polyurethane Coating (C-218) Application

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-218	Topcoat

Aliphatic polyurethane, chemical agent resistant topcoat (C-218) is a topcoat intended for use over

epoxy polyamide primers to provide aircraft surfaces that may be easily and effectively decontaminated after exposure to liquid chemical agents. Futhermore, depending on color applied, coating provides either a non-specular surface (non-camouflage) or a camouflage surface to aircraft.

4-26. Equipment Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-218	Topcoat

Spray equipment. External mix spray equipment, either siphon or pressure feed, shall be used. Spray equipment shall be capable of applying topcoat (C-218) to requirements of paragraph 4-27.

4-27. Process and Product Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-218	Topcoat

1. Appearance. After drying, applied coating shall show no signs of running, sagging, streaking or blushing.

2. Adhesion. There shall be no loss of adhesion of topcoat (C-218) when tested.

3. Thickness. Dry film thickness of one spray coat shall be 0.0009 to 0.0011 inch (0.02286 to 0.02794 mm).

NOTE

For adequate camouflage properties, it is necessary to apply camouflage topcoat (C-218) to a minimum dry film thickness of 0.0018 (0.0457 mm).

4-28. Procedure Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-204	Primer
C-218	Topcoat
C-235	Thinner
C-423	Abrasive Cloth or Paper
C-426	Tape

1. Surface preparation. Coating (C-218) shall be applied to surfaces primed with primer (C-204).

2. Coating preparation. Coating (C-218) is a two-component material supplied in kit form. Mix in accordance with manufacturer instruction. Thoroughly agitate and check viscosity using Zahn #2 viscometer. Reduce as necessary with thinner (C-235) type I. Strain mixed coating and allow to sweat for 30 minutes prior to application. Pot life of mixed material is 8 hours.

3. Application.

a. Masking. Areas requiring masking shall be masked using tape (C-426) and/or suitable masking devices as required.

b. Spraying. Immediately prior to spraying, wipe all surfaces to be painted with a tack rag. Adjust fluid delivery to 17-20 ounces per minute (for pressure application) and atomization air pressure to 55-60 psi at gun. Mixed coating in spray equipment or containers shall be redispersed prior to spraying. Using a controlled rate of stroke, apply a wet film of topcoat (C-218) which when dry will meet requirements of paragraph 4-27.

c. Dry time between coats. Drying time between coats shall be a minimum of 30 minutes and a maximum of 24 hours at ambient temperatures.

d. Markings. A minimum of 6 to 8 hours air dry shall be allowed prior to masking and marking. Heat curing at 120°F ± 10°F for 2 hours may be used in lieu of air dry, provided a minimum of 1 hour air dry is accomplished prior to heat curing.

e. Final curing. Completed paint system shall be allowed to air dry for a minimum of 48 hours prior to exposure to elements.

4. Touch-up procedures. Damaged surfaces and small areas of non-adhesion shall be repaired in accordance with paragraph 4-39 except use 360 grit or finer abrasive coated cloth or paper (C-423).

4-29. Process Control Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-218	Topcoat
C-518	Tape

1. Appearance. Cured topcoat (C-218) shall conform to paragraph 4-27.

2. Adhesion. Polyurethane coated surfaces shall be capable of passing adhesion test specified in following paragraph after a minimum of 24 hours cure of paint system.

3. Dry tape test. Apply to areas selected a one inch wide strip of tape (C-518). Press tape onto surface with firm finger pressure. Grasp one end of tape and while holding it at approximately 90 degrees from coated surface, remove tape with an abrupt motion. Loss of adhesion shall result in further adhesion tests. If these additional tests indicate generally poor adhesion, area shall be stripped to prime or base material, re-chemically treated as required, and refinished. If additional tests indicate isolated areas of non-adhesion, areas shall be refinished in accordance with touch-up procedures (paragraph 4-39).

4-30. EPOXY ENAMEL — APPLICATION

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-100	Chemical Film Material
C-202	Primer
C-207	Enamel
C-318	Cleaning Compound
C-344	Alcoholic Phosphoric Cleaner
C-407	Abrasive Pad
C-423	Abrasive Cloth or Paper
C-426	Tape

Epoxy enamel (C-207) may be applied directly to mechanically or chemically treated metal surfaces, reinforced plastic laminates, and epoxy primed surfaces. (Refer to table 4-3 for surface preparation.) Epoxy enamel (C-207) is intended for use where a paint coating with good abrasion and chemical resistance is desired.

4-31. Process and Product Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-207	Enamel

1. Appearance. After drying, applied film shall be free from grit, seeds, craters, blisters or other such surface irregularities.

2. Thickness. Dry film thickness of enamel (C-207) shall be 0.0005 to 0.0007 inch (0.0127 to 0.01778 mm) per coat.

NOTE

Epoxy enamel coatings applied to internal surfaces by fill and drain, or flowing, do not have a thickness requirement. Only requirement is that epoxy enamel shall cover all surfaces.

3. Adhesion. When tested there shall be no loss of adhesion. The enamel (C-207) shall have air dried a minimum of 48 hours prior to testing.

4-32. Procedure Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-204	Primer
C-207	Enamel
C-235	Thinner
C-423	Abrasive Cloth or Paper
C-426	Tape

1. Surface preparation. The enamel (C-207) shall be applied to surfaces primed with primer (C-204).

2. Masking. Areas requiring masking, should be masked using tape (C-426) suitable for masking.

3. Prepare epoxy enamel as follows:

a. Shake or stir pigmented resin until uniform.

b. Add one (1) volume of activator to one (1) volume of pigmented resin component and mix thoroughly. Reduce as necessary, with thinner (C-235) (type II) to a spray viscosity of 20-24 second Zahn # 2.

c. Strain through a paint strainer.

NOTE

Catalyzed enamel shall be discarded if not used within four hours after mixing.

4. Apply epoxy enamel (C-207) by spray, or brush. For internal use, seal or plug end of tube, flow epoxy enamel (C-207) into hollow part, slosh as needed to coat surface, drain excess enamel.

5. Time between coats shall not be less than 30 minutes nor more than eight hours. If 8 hours is exceeded, initial coat(s) of epoxy enamel shall be thoroughly sanded with 180 grit abrasive coated cloth or paper (C-423), prior to overcoating. Following exceptions are:

a. Second coat may be applied 10 minutes after solvent flash off if first coat was applied to an unpainted surface.

b. Under fast drying conditions (high temperature), second coat shall be applied within two hours after application of first.

6. Cure. Sprayed parts are normally dry to handle within one hour. Full cure is obtained after a minimum of 48 hours air dry.

7. Touch up small areas by sanding through enamel using 320 grit or finer abrasive coated cloth or paper (C-423). Smooth damaged area and fair in surrounding surfaces to a feather edge. Reapply primer (C-204), if necessary and epoxy enamel (C-207).

4-33. POLYURETHANE ENAMEL — APPLICATION

4-34. Equipment Requirements

1. Spray equipment. Spray equipment should be capable of spraying a film which will conform to requirements of paragraph 4-36.

4-35. General Information

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-233	Enamel

NOTE

Polyurethane enamel is not intended for use on polycarbonate (Kydex) surfaces.

Intended use. The enamel (C-233) covered by these instructions is intended for use on exterior surfaces over epoxy polyamide primed substrates and acrylic, PVC (Royalite), and reinforced acrylic glass sheet.

4-36. Process and Product Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-233	Enamel

1. Appearance. After curing, sprayed polyurethane enamel film shall be smooth, uniform and free from seeds, blisters, pinholes, cracks and other such film irregularities.

2. Adhesion. There shall be no loss of adhesion when tested (paragraph 4-38).

3. Thickness. Dry film thickness of one spray coat of enamel (C-233) shall be 0.0005 to 0.0008 inch (0.0127 to 0.0203 mm).

4-37. Procedure Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-233	Enamel
C-426	Tape

1. Area control. Enamel should be sprayed in an area where temperature is between 50°F and 100°F (10°C and 37.78°C) and relative humidity is between 30 and 90 percent. In addition, spraying and drying areas should be as free as possible from airborne contamination. When dew point and temperature come within five degrees of each other, application of polyurethane enamel should be stopped.

2. Surface condition. Normally, enamel (C-233) should be applied over surfaces that have been epoxy polyamide primed. Surfaces that have been epoxy primed should receive enamel within 4 to 6 hours after priming. Other surfaces that will receive enamel without prime should be prepared in accordance with following steps:

a. Acrylic, PVC (Royalite) and reinforced acrylic glass, materials shall be prepared as follows:

(1) Degrease with aliphatic naphtha.

(2) Wet and/or dry sand with a suitable grit sandpaper that will not leave scratches which will show after final coat of enamel.

NOTE

Sand until glaze has been removed.

(3) Remove sanding residue using clean, dry, lint-free cloths.

(4) Wipe surfaces with a tack rag.

(5) Apply enamel (C-233).

3. Polyurethane enamel preparation. Polyurethane enamel must be prepared for spraying in accordance with manufacturers instructions. After thoroughly mixing components, allow mixture to stand for at least 30 minutes prior to straining through a paint strainer. After straining, enamel is ready to be sprayed. Enamel shall be used within 6 hours after mixing.

4. Application procedures.

a. Masking. Areas requiring masking, should be masked using tape (C-426) suitable for masking when using polyurethane paint.

b. Spraying. Immediately prior to spraying, primed surface should be wiped with a tack rag. Adjust spray equipment and control rate of stroke to apply a wet film of enamel which (when dry) will have appearance (paragraph 4-36) and meet adhesion test as stated in paragraph 4-38. Enamel in spray equipment or containers which has settled should be dispersed prior to spraying.

c. Dry time between coats. Drying time between coats shall be a minimum of 30 minutes and a maximum of 24 hours at ambient temperature.

d. Final cure. The completed paint system shall be allowed to air dry for a minimum of 48 hours prior to exposure to the elements.

5. Touch-up procedure. Damaged surfaces and small areas of nonadhesion shall be repaired by one of the methods applicable as stated in paragraph 4-39.

4-38. Process Control Requirements

1. Appearance. After curing, the sprayed polyurethane enamel film shall be smooth uniform and free from seeds, blisters, pinholes, cracks and other such film irregularities.

2. Adhesion. Polyurethane enamel coated surfaces should have no loss of adhesion and shall be capable of passing the adhesion test (refer to step a.) after curing 96 hours at ambient temperature.

a. Adhesion test.

NOTE

Do not apply adhesion tape test over rivets, fasteners or skin edges.

(1) Apply a strip of masking tape approximately 1 by 3 inches to the curved flat surfaces in several areas over large painted surfaces.

(2) Press tape onto the surface with firm finger pressure. Grasp one end of tape, holding it at approximately 90 degrees from the painted surface. Remove tape with an abrupt motion.

(3) If the above test shows evidence of loss of paint adhesion, this usually indicates surface was dirty or improperly prepared prior to painting. These nonadhesion areas shall be refinished in accordance with instructions in paragraph 4-39.

4-39. TOUCH–UP PAINTING PROCEDURES

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-204	Primer
C-423	Abrasive Cloth or Paper

NOTE

The following instructions are primarily for the touching up of scuffed or damaged areas of the exterior painted surfaces.

1. The finish repair procedures cover three methods as follows:

a. Method 1. Areas where the finish has been removed down to the base metal or fiberglass.

b. Method 2**.** Areas where the finish has been removed down to the primer coat.

c. Method 3. Areas where the top coat has been damaged within itself, but not down to the primer coat.

2. The mixing instructions and precautions for application of polyurethane topcoat are as follows:

a. All equipment used for mixing, straining and spraying must be clean.

b. All polyurethane coating colors are mixed per manufacture instructions.

CAUTION

DO NOT PUNCTURE THE CATALYST CONTAINER. CATALYST AND BASE MATERIALS ARE VERY SENSITIVE TO MOISTURE PRIOR TO MIXING AND SPRAYING. AFTER OPENING AND MEASURING, IMMEDIATELY REPLACE LIDS AND CAPS TIGHTLY.

c. When mixing small amounts of polyurethane coating that results in leaving some base and some

catalyst in original containers, be certain to use measuring units to maintain manufacture instructions.

d. Mixed polyurethane material should have 15 to 30 minute wait prior to spraying.

e. The pot life of polyurethane material, as mixed, is 8 hours at ambient room temperature. When possible, spray the mixed material within four hours.

f. Always strain mixed polyurethane material prior to use.

NOTE

Refer to applicable Component Repair and Overhaul Manual for detailed structural repair instructions.

(1) Method 1. Areas which have been damaged to the base material shall be repaired by removing the finish in the damaged area. The damaged area shall be faired-in with the surrounding surface using 320 grit abrasive coated cloth or paper (C-423) (wet or dry sanding), and the base material, if metal, rechemically treated as required (refer to chapter 3) and the primer and topcoat reapplied. The application of the topcoat should cover a complete panel or section to provide the best possible blending with the surrounding area.

(2) Method 2. Areas which have been damaged to the extent that the primer has not been removed to the base material shall be repaired by removing only the damaged area, fair-in with the surrounding area, reapply a coat of epoxy polyamide primer (C-204) to this area, and finish with a minimum of two coats of polyurethane as outlined in method 1.

(3) Method 3. Areas which have been damaged within the topcoat only shall have this area faired-in with the surrounding surface and a minimum of two coats of polyurethane applied as outlined in method 1.

3. When finish repairs have been made on the paint, allow a minimum of 48 hours prior to subjecting repaired area to inclement weather conditions.

4-40. EPOXY/ZINC COATING — APPLICATION

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-208	Epoxy/Zinc Coating

The Epoxy/Zinc Coating (C-208) is intended for use as a protective coating for low alloy steel tubing and tubular parts. The coating shall not be used on exterior surface without overcoating. The epoxy will provide barrier protection against moisture and the zinc filler will provide galvanic protection for steel surfaces.

For optimum adhesion and corrosion protection, Epoxy/Zinc Coating (C-208) should be applied over steel surfaces which have been initially prepared by abrasive or shot blasting to remove scale and oxides then phosphatized. Particular parts and/or manufacturing procedures may necessitate the use of multiple cleaning operations.

4-41. Process and Product Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-208	Epoxy/Zinc Coating

1. Appearance. After drying, coating shall be free from pit, mud cracking, craters, blisters and other such defects which expose base metal. Runs, sag, nodules and similar type surface irregularities on internal surfaces, coated by fill and drain or by spraying, are acceptable provided they meet the requirements in paragraph 2. Metallic zinc filler shall be dispersed in coating and shall present a relatively uniform grey appearance. Dark streaks will be visible on coatings applied by fill and drain. These streaks indicate areas of heavier zinc concentration and are acceptable. Clear areas where zinc is not visible are not acceptable but may be overcoated with an additional coat of Epoxy/Zinc Coating (C-208) to obtain an acceptable appearance.

2. Thickness. Dry film thickness of sprayed coatings on flat surfaces shall be 0.0005 to 0.001 inch (0.0127 to 0.0254 mm). Internal surfaces of tubing and tubular type parts shall not be subjected to thickness requirements.

3. Coating shall be free from chipping, cracking or peeling.

4-42. Procedure Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-206	Thinner
C-208	Epoxy/Zinc Coating
C-305	Aliphatic Naphtha
C-309	Methyl-Ethyl-Ketone (MEK)
C-435	Paint Remover
C-436	Paint Remover

1. Clean surface to be painted with aliphatic naphtha (C-305) or MEK (C-309).

2. Mix components of Epoxy/Zinc Coating (C-208) as follows:

a. Measure desired volume of base material.

b. Add equal volume of accelerator/thinner and mix thoroughly.

c. Weigh mixture.

d. Calculate required amount of zinc powder to produce 35 to 45 percent (by weight) of mixed material. Each 100 grams of base/thinner mixture will require 35 to 45 grams of zinc powder.

e. Weigh required amount of zinc powder and add to base/thinner mixture, stirring constantly to achieve a uniform mixture.

f. Allow mixture to set for a minimum of 1 hour prior to use. Stir thoroughly prior to use.

NOTE

Epoxy/Zinc mixture shall be discarded if not used within twenty-four hours after mixing. Under some temperature/humidity conditions the mixture may exhibit a shorter pot life as indicated by a pronounced thickening of material. Do not attempt to thin. Discard mixed material when this occurs.

3. Apply Epoxy/Zinc Coating (C-208) as follows:

a. Mask areas not to be painted.

b. Apply Epoxy/Zinc Coating (C-208) by spraying, brushing, swabbing, or fill and drain.

NOTE

Continuously agitate mixture to insure a uniform distribution of zinc powder.

(1) Spraying. Adjust spray equipment and control rate of stroke to apply a film which, when dry, will meet requirements in paragraph 4-41. Reduce coating material to a sprayable viscosity of 20-24 seconds (#2 Zahn) with thinner (C-206).

(2) A brush or swab of suitable size may be used to apply coating in specific area.

(3) Fill and drain. Apply coating to internal surfaces using following technique:

NOTE

Epoxy/zinc coating material shall be agitated prior to and during use to assure that zinc powder is distributed uniformly throughout applied coating. A kitchen blender has been proven to be an excellent tool for this purpose.

(a) Seal or plug one end of tubing or tubular type (hollow) parts as required. Flow coating material into hollow part. Fill and/or slosh as needed to coat entire surface.

(b) Drain excess coating material from part. Allow coating to air dry for a minimum of one hour then apply a second coat by fill and drain. Drying time must be extended when slow drying conditions exist.

NOTE

Material drained from parts into clean containers may be reused for other parts provided pot life is not exceeded.

4. Equipment cleaning. Uncured Epoxy/Zinc Coating (C-208) may be removed using MEK (C-309) or lacquer thinner. Cured coatings may be removed by using acid type remover paint remover (C-435) or paint remover (C-436).

5. Cure epoxy/zinc coating as follows:

a. Tubular type parts which are coated by fill and drain method shall remain in a vertical or near vertical position for a minimum of one hour to prevent puddling.

b. Heat cure coating as follows:

(1) Dry at room temperature for at least 2 hours.

(2) Cure at 150°F to 160°F (66°C to 71°C) for one hour.

c. Coating will reach final cure in 72 hours at room temperature.

6. Touch up areas which have been missed during painting using methods in step 3. If surface has been contaminated with oils or grease, it shall be solvent cleaned prior to application of coating.

7. Rework. When a coating exhibits a complete lack of adhesion (large blisters, mud cracking or peeling) it shall be removed and surface re-treated prior to recoating. Cured coatings may be removed by abrasive blasting. Use of chemical paint removers must be approved on a part number basis (referenced in applicable maintenance/component repair manual). Coatings which exhibit minor defects and/or removal because of mechanical rework, etc., may be replaced by overcoating.

4-43. CONTROL TUBE INTERNAL SURFACE — REFINISHING

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-204	Primer
C-309	Methyl-Ethyl-Ketone (MEK)

1. Refinish internal surfaces of steel control tubes as follows:

a. Flush internal surface with MEK (C-309) and allow to air dry.

b. Prepare epoxy/zinc coating according to paragraph 4-44.

c. Plug one end of tube, flow coating material into tube. Fill and/or slosh as needed to coat entire internal surface.

d. Remove plug, and drain excess coating material from tube. Position tube in a vertical position for a minimum of 1 hour.

e. After allowing coating to air dry for 1 hour, apply a second coat.

f. Remove coating from internal surface of tube end where end fittings will be installed with swab wetted with MEK (C-309).

g. Allow coating to dry prior to further work. Coating will reach final cure in 72 hours at ambient temperature. Drying time may be accelerated by allowing coating to dry at ambient conditions for a least 2 hours followed by heat cure at 150°F to 160°F (66°C to 71°C) for a minimum of 1 hour.

2. Refinish internal surfaces of aluminum control tubes as follows:

a. Flush internal tube surfaces with MEK (C-309) and allow to air dry.

b. Plug one end of tube. Flow primer (C-204) into tube. Fill and/or slosh as needed to coat entire internal surface.

c. Remove plug and allow excess primer to drain.

d. Remove wet primer from internal surface of tube where end fittings will be installed using a suitable swab wetted with MEK (C-309). This must be accomplished within 3 minutes after primer application.

e. Lay tubes horizontally and allow them to remain in this position for a minimum of 1 hour.

f. After allowing primer to air dry for not less than 1 hour and not more than 8 hours, apply a second coat by repeating steps b through e.

g. Allow primer to dry prior to further work.

4-44. WALKWAY COATING — APPLICATION

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-223	Nonslip /Compound

Walkway coating nonslip compound (C-223) has superior nonslip properties and is intended for use where maximum nonslip characteristics are a desired factor.

4-45. Procedure

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-223	Nonslip Compound
C-305	Aliphatic Naphtha
C-423	Abrasive Cloth or Paper

1. Surface preparation.

a. Freshly primed or painted surfaces that are clean may have nonslip compound (C-223) applied directly to surface.

b. Primed or painted surfaces which are dry, hard, aged, and firmly bonded shall be scuff sanded using 400 grit abrasive coated cloth or paper (C-423). Remove sanding residue and clean surfaces with clean cloths dampened with aliphatic naphtha (C-305). Dry surfaces with a clean cloth before naphtha evaporates.

2. nonslip compound (C-223) shall be thoroughly stirred before placing in dispensing containers in order to assure a homogeneous mixture. When spraying is used, coating material shall be thinned as necessary to a suitable consistency for application, using solvents specified by manufacturer. For brush and roller application material need not be thinned.

4-46. Application

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-223	Nonslip Compound

1. Apply a light first coat of walkway coating nonslip compound (C-223) to required area using brush, spray, or roller.

2. Apply a second heavy cross-coat by same application method. Allow a minimum of 30 minutes drying time between coats. This produces a coating weight of 20 to 25 ounces per square yard.

3. Removal of masking tape may be accomplished when walkway coating is dry to touch. There shall be a minimum of 24 hours air dry time prior to walking on coating.

4-47. ACRYLIC LACQUER — APPLICATION

The lacquers covered by these instructions are intended for use on exterior surfaces over epoxy primers. Acrylic lacquers have excellent diester oils and possess excellent weathering characteristics.

4-48. Equipment Requirements

Spray guns and accessories. Spray equipment used for application of acrylic lacquer should be capable of spraying a paint film which conform to requirements of paragraph 4-32.

4-49. Procedure Requirements

MATERIALS REQUIRED

Refer to chapter 13 for specification and source.

NUMBER	NOMENCLATURE
C-245	Coating
C-246	Coating
C-235	Thinner
C-305	Aliphatic Naphtha
C-323	Filler
C-423	Abrasive Cloth or Paper
C-424	Putty
C-426	Tape

1. Surface condition. Normally, acrylic lacquers should be applied over surfaces that have been epoxy primed. Refer to paragraph 4-11.

Surfaces that have been primed with epoxy primer shall receive first coat of lacquer topcoating within 4 hours after priming. Surfaces that have been primed with polyamide epoxy primer, at room temperature, shall receive first coat of lacquer topcoating within 8 hours after priming.

2. When epoxy primer is applied at elevated temperatures, first coat shall be applied within 3 hours after priming. Other surfaces that may have received acrylic lacquer without prime should be prepared as follows:

a. Acrylic PVC alloy (Kydex), reinforced acrylic laminates, Acrylic lacquer surfaces (air dried more than 120 hours) and contaminated acrylic lacquer. Surface preparation should be as follows:

NOTE

Primer not required on Kydex parts prior to application of finish.

(1) Sand acrylic laminated plastics until glaze has been removed.

(2) Degrease with aliphatic naphtha (C-305).

(3) Sand with any grit abrasive coated cloth or paper (C-423) that will not leave scratches which will show after final coat of lacquer. Wet or dry sanding is permissible.

(4) Wipe sanded surfaces using aliphatic naphtha (C-305) and clean cloths.

(5) Wipe surfaces with a tack rag.

b. Acrylic lacquer surfaces (air dried more than 120 hours) and/or contaminated acrylic lacquer surfaces. These surfaces shall be prepared for painting in accordance with subparagraph a. above.

3. Lacquer preparation.

a. Aluminized lacquer. Aluminized lacquer (C-203) should be prepared by incorporating 8 ounces (226.8 g) of coating (C-246) into one gallon (4.546 l) of coating (C-245) with aid of thinner (C-235) conforming to manufacture's instructions.

b. Procedure. Thoroughly wet aluminum powder with thinner. Add a small amount of clear lacquer to wet powder and stir to a paste consistency. Incorporate paste into a gallon (4.546 l) of clear lacquer by use of a mechanical mixer. Thin lacquer for spraying in accordance with subparagraph c. below.

c. Thinning for spraying. Acrylic lacquers should be thinned for spraying in accordance with manufacture's instruction. Prior to thinning, lacquer must be shaken to redisperse any settling.

d. Straining. After thinning and prior to initial use, strain lacquer using a paint strainer.

e. Intermixing products. Acrylic lacquers from different manufactures shall not be mixed, nor shall different types of acrylic lacquers from same manufacture be mixed.

4. Application procedures.

a. Masking. Mask areas as required, using tape (C-426) and/or suitable masking devices.

b. Spraying. Adjust spray equipment and control rate of stroke to apply wet film of lacquer which will result in dry film thickness of 0.0004 to 0.0006 inch (0.0102 to 0.0152 mm).

c. Drying time between coats. Drying time between coats shall be 30 minutes to 72 hours at room temperature. Lacquer surfaces not overcoated within one hour should be tack rag prior to overcoating.

CAUTION

APPLICATION OF SPOT PUTTY SHALL BE LIMITED TO LOCAL AREAS OF MINOR POROSITY OR OTHER SIMILAR IMPERFECTIONS. USE SPOT PUTTY IN WELL VENTILATED AREA. FLAMMABLE FLASH POINT IS APPROXIMATELY 50F (10° C).

d. Application of filler (C-323) or putty (C-424). Prior to final lacquer topcoat, minor porosity such as pin holes and other similar imperfections may be filled with spot putty. Allow putty to dry hard. Lightly sand to fair-in with surrounding surfaces.

e. Temperature and humidity. Acrylic lacquers may be applied over a wide temperature and humidity range. However, if blushing or dry spraying of lusterless MIL-L-19537 or MIL-L-19538 lacquers occur, TT-E-776 retarder may be used to replace up to 10 percent of prescribed amount of thinner. These lacquers shall not be applied if blushing occurs after addition of maximum amount of retarder. Retarder shall not be added to Gloss or Lucite lacquers. If blushing of these lacquers occur, painting shall be stopped.

f. Cure. Acrylic lacquer system should be cured by one of following methods

(1) Cure at room temperature for 48 hours minimum.

(2) Accelerated cure may be accomplished by air drying at room temperature for one hour at approximately 150°F (65.56°C). Air dry time prior to accelerated curing of porous surfaces (fiberglass, etc.) should be adjusted as necessary to prevent surface blisters.

5. Touch-up procedure. Damaged surfaces and areas of nonadhesion shall be repaired by one of following methods as applicable:

a. Method 1. Areas which have been damaged to extent that prime has not removed to base material or small areas of nonadhesion of finish to base material shall be repaired by removing finish in damaged area to base material. Fair-in repaired area with surrounding surfaces 320 grit or finer abrasive coated cloth or paper (C-423) (wet or dry sanding is permissible). Retreat chemically (refer to Chapter 3, Chemical Film Treatment) as required and reapply organic finish in accordance with applicable instructions.

b. Method 2. Areas which have been damaged to extent that prime has not been removed to base material or small area of nonadhesion between coats of lacquer or lacquer topcoating and prime, should be repaired by removing defective coating. Damaged area shall be faired-in with surrounding surfaces as described in method 1. In cases where lacquer has been removed from prime, prime shall be reapplied in accordance with applicable instructions followed by a reapplication of lacquer topcoating in accordance with step 3, Lacquer Preparation and step 4, Application Procedures. In cases where lacquer has not been removed to prime, prime need not be applied.

4-50. Process Control Requirements

1. Appearance. After drying, acrylic lacquer shall not exhibit blushing, blisters sags, streaks, or other such surface irregularities.

2. Adhesion. Acrylic lacquer coated surfaces shall be capable of passing adhesion test after curing, in accordance with curing instructions in paragraph 4-32.

a. Adhesion test:

NOTE

Do not apply adhesion tape test over rivets, fasteners or skin edges.

(1) Apply a strip of masking tape approximately 1 by 3 inches (25 by 76 mm) to curved flat surface in several areas over large painted surfaces.

(2) Press tape onto surface with firm finger pressure. Grasp one end of tape, holding it at approximately 90 from painted surface. Remove tape with an abrupt motion.

(3) If above test shows evidence of loss of paint adhesion, this usually indicates that surface was dirty or improperly prepared prior to painting. These non-adhesion areas should be refinished in accordance with touch-up procedure (paragraph 4-32 or 4-43).