STANDARD OVERHAUL PRACTICES MANUAL

APPLICATION OF CHEMICAL AND SOLVENT RESISTANT FINISHES

PART NUMBER NONE

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STANDARD OVERHAUL PRACTICES MANUAL

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To: All holders of APPLICATION OF CHEMICAL AND SOLVENT RESISTANT FINISHES 20-41-02.

Attached is the current revision to this STANDARD OVERHAUL PRACTICES MANUAL

The STANDARD OVERHAUL PRACTICES MANUAL is furnished either as a printed manual, on microfilm, or digital products, or any combination of the three. This revision replaces all previous microfilm cartridges or digital products. All microfilm and digital products are reissued with all obsolete data deleted and all updated pages added.

For printed manuals, changes are indicated on the List of Effective Pages (LEP). The pages which are revised will be identified on the LEP by an R (Revised), A (Added), O (Overflow, i.e. changes to the document structure and/or page layout), or D (Deleted). Each page in the LEP is identified by Chapter-Section-Subject number, page number and page date.

Pages replaced or made obsolete by this revision should be removed and destroyed.

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	NO HIGHLIGHTS

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INTRODUCTION

1. General

A. The instructions in this manual tell how to do standard shop procedures during maintenance functions from simple checks and replacement to complete shop-type repair.

B. This manual is divided into separate sections:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) Effective Pages

(5) Contents

(6) Revision Record

(7) Record of Temporary Revisions

(8) Introduction

(9) Procedures

C. Refer to SOPM 20-00-00 for a definition of standard industry practices, vendor names and addresses, and an explanation of the True Position Dimensioning symbols used.

D. The data is general. It is not about all situations or specific installations. Use it as a guide to help you write minimum standards.

E. If the component overhaul instructions are different from the data in this subject, use the component overhaul instructions.

APPLICATION OF CHEMICAL AND SOLVENT RESISTANT FINISHES

1. INTRODUCTION

A. The data in this subject comes from Boeing Process Specification BAC5736. The airline has a copy of the Boeing Process Specifications Manual.

B. The data is general. It is not about all situations or specific installations. Use this data as a guide to help you write minimum standards.

C. This tells how to apply catalyzed BMS 10-11, Type 1 chemical and solvent resistant primer, MIL-P-23377 primer, and BMS 10-11, Type 2 enamel. Application is by spray, brush, dip, fill and drain, curtain coating, and flood coating.

D. BAC5736 puts the materials in different classes and grades.

(1) Class A material is for usual application methods such as air or airless spray. Class B material is also for application with electrostatic painting equipment.

(2) Grade A primer has a volatile organic compound (VOC) content of approximately 650 grams/liter when mixed. Grade B primer has a maximum VOC of 350 grams/liter when mixed, and contains exempt solvents. Grade E primer can be thinned with water and has a maximum VOC of 350 grams/liter when mixed and thinned. If the grade of primer is not specified, you can use Grade A, B, or E. But use only Grade A or E or BAC5710, Type 59 for wet installation of such parts as fasteners, shims, and bushings.

(3) Grade A enamel has a VOC of approximately 600 grams/liter when mixed. Grade D enamel has a maximum VOC of 420 grams/liter when mixed. If the grade of enamel is not specified, you can use Grade A or D.

E. Refer to SOPM 20-00-00 for a list of all the vendor names and addresses.

2. MATERIALS

A. Coatings

WARNING: SOME OF THESE MATERIALS ARE POISONOUS AND FLAMMABLE. USE THEM IN A WELL-VENTILATED AREA. OBEY SAFETY AND FIRE PRECAUTIONS. DO NOT BREATHE VAPORS. IF MATERIAL GETS IN YOUR EYES, FLUSH WITH WATER FOR 15 MINUTES AND GET MEDICAL ATTENTION IMMEDIATELY. IF MATERIALS GET ON YOUR SKIN, WASH WITH WATER. WIPE UP SPILLS IMMEDIATELY.

(1) BMS 10-11, type 1, epoxy primer

NOTE: This primer comes in green 452 or 5700, and yellow 377. When the color is not specified, use green. But if the surface will be topcoated, you can use green or yellow.

(2) BMS 10-11, Type 2, epoxy enamel

(3) MIL-P-23377 epoxy polyamide primer

B. Solvents

(1) Methyl Ethyl Ketone (MEK), TT-M-261

(2) Methyl Isobutyl Ketone (MIBK), TT-M-268

(3) Ardrox 241K (was TEC 902), V23373

(4) TL-52, V98502

(5) TL-82, V98502

(6) Toluene, TT-T-548 or JAN-T-171, Grade A

(7) Xylene, TT-X-916, Grade A

(8) Series 86 (Ref SOPM 20-30-80)

C. Alkaline Cleaners

(1) Ardrox 160-B, V23373

(2) Jet Clean E, V61102

(3) Formula 28, V99442

D. Wipers – BMS 15-5

E. Tack Rags

(1) C-60, V0EK96

(2) No. 4B, V17359

F. Abrasives

(1) Abrasive paper, 240 grit or finer

(2) Scotch-Brite sheet, type A, very fine, V76381

(3) Aluminum Oxide Abrasive Pad, very fine, V06565

3. SURFACE PREPARATION

A. If the surface is metal with a treatment in this list, go directly to Paragraph 3.D. for contamination removal.

(1) Aluminum – Anodized per BAC5619, BAC5022, BAC5632, MIL-A-8625 or SOPM 20-43-01 or chemical treated per BAC5719 or MIL-C-5541 or SOPM 20-43-03

(2) Magnesium – Dow treated per BAC5609, BAC5734, MIL-M-3171 , MIL-M-45202 or SOPM 20-43-02)

(3) Titanium – Phosphate fluoride treated per BAC5861

(4) Carbon steel or low-alloy steel – Plated per BAC5804 or phosphate treated per BAC5810

B. If the surface is bare metal (no plating or surface treatment), prepare it as specified in this list. Then go to Paragraph 3.D. for contamination removal.

(1) Titanium – Abrasive clean per BAC5748 (Ref SOPM 20-30-03) or nitric-fluoride clean per BAC5753 Method 2 (Ref SOPM 20-30-03).

(2) Stainless steel – Abrasive clean per BAC5748 (Ref SOPM 20-30-03) or (for 300-series (RES)) acid clean per BAC5625 Method 3 (Ref SOPM 20-30-03)

(3) Carbon steel or low-alloy steel – Abrasive clean per BAC5748 (Ref SOPM 20-30-03)

(4) Copper – Abrasive clean per BAC5748 (Ref SOPM 20-30-03)

(5) Nickel and cobalt alloys – Abrasive clean per BAC5748 (Ref SOPM 20-30-03)

(6) Lead – Abrasive clean per BAC5748 (Ref SOPM 20-30-03)

(7) Tungsten – Abrasive clean per BAC5748 (Ref SOPM 20-30-03). Use aluminum oxide abrasive, 80-100 grit and 50-100 psi.

C. If the surface is not metal, without a layer of primer or enamel, prepare it as specified in this list. Then apply finish per Paragraph 6.

(1) Plastic – Treat per BAC5837 or BAC5322 or SOPM 20-10-06. Then solvent clean per BAC5750 (Ref SOPM 20-30-03).

(2) Wood – Abrasive clean per BAC5748 (Ref SOPM 20-30-03). Then solvent clean per BAC5750 (Ref SOPM 20-30-03).

(3) Adhesive – Abrasive clean per BAC5748 (Ref SOPM 20-30-03) unless this is adhesive primer or adhesive flash. For these last two, reactivate the surface per Paragraph 3.D.(3) or Paragraph 3.D.(4). Then solvent clean per BAC5750 (Ref SOPM 20-30-03).

(4) Sealant – Cure to a tack-free condition per BAC5000 (Ref SOPM 20-50-19). Then solvent clean per BAC5750 (Ref SOPM 20-30-03).

D. If the surfaces of Paragraph 3.A. or Paragraph 3.B. have contamination, clean as specified below. Then apply finish per Paragraph 6.

(1) Aluminum surfaces phosphoric acid anodized per BAC5555

(a) If these are small areas of contamination such as tape adhesive or oil, solvent clean the small areas per BAC5750 (Ref SOPM 20-30-03). Do not solvent clean other areas or vapor degrease.

(b) Alkaline clean per BAC5749, Method 1, with a medium duty soak immersion cleaner (Ref SOPM 20-30-03), but do not soak longer than 20 minutes.

(c) As an option after the alkaline cleaning, chemical treat the surface per BAC5719, class B (Ref SOPM 20-43-03), but do not deoxidize.

(2) Other metal surfaces, unless cadmium-titanium plated

(a) Solvent clean per BAC5750 (Ref SOPM 20-30-03), or

(b) Alkaline clean per BAC5749, Method 1, with a medium duty soak immersion cleaner (Ref SOPM 20-30-03), but do not soak longer than 20 minutes, or

(c) Vapor degrease per BAC5408 (Ref SOPM 20-30-03)

(3) Metal surfaces cadmium-titanium plated – Solvent clean per BAC5750 (Ref SOPM 20-30-03) or vapor degrease per BAC5408 (Ref SOPM 20-30-03).

(4) Tungsten surfaces – Solvent clean per BAC5750 (Ref SOPM 20-30-03). Do this again if the primer is not applied within 24 hours after the abrasive blast.

E. Surfaces with a layer of primer or enamel:

(1) With BMS 10-11, Type 1, Grade A or E, or BMS 10-11, Type 2, BMS 10-20, BMS 10-103 MIL-P-23377 cured less than 48 hours, or BMS 10-11, Type 1, Grade B or BMS 10-79, Types 2 and 3 cured less than 24 hours – Solvent clean per SOPM 20-30-03, or if necessary, sand with 240 grit or finer abrasive.

NOTE: For BMS 10-11, Types 1 and 2, Grade B, and BMS 10-79, Types 2 and 3, Grade B cured less than 24 hours, this cleaning is not necessary when the new paint is applied under conditions which prevent contamination.

(2) The same primers and enamels as in step (1) but cured more than the limits given above:

(a) Grade A: Reactivate per Paragraph 4., Methods 1, 2, 3, 4, 5 or 7.

(b) Grade B: Reactivate per Paragraph 4., Methods 1 or 2.

(3) All adhesive primers applied per BAC5514 or BAC5710, Type 60 – Reactivate per Paragraph 4., Methods 1, 2, 3, 4, 5 or 6.

(4) All adhesive flashes – Reactivate per Paragraph 4., Method 3, or vapor degrease per SOPM 20-30-03, or sand with 240 grit or finer and solvent clean. Or remove the flash as an organic coating per SOPM 20-30-02 and solvent clean per SOPM 20-30-03.

(5) Surfaces touched by leak detection paint – Reactivate per Paragraph 4., Methods 1, 2, 3, 4, 5, 6, or 7.

4. PAINTED SURFACE REACTIVATION

A. Method 1

(1) Manual solvent clean per SOPM 20-30-03, unless you are sure the surfaces were given protection from contamination.

(2) Abrasive clean with 320 grit or finer aluminum oxide abrasive paper. Be careful not to go through to the base material.

(3) Manual solvent clean per SOPM 20-30-03.

B. Method 2

(1) Clean with an alkaline cleaner per BAC5744 (Ref SOPM 20-30-02), or use one of the alkaline cleaners listed in Materials, diluted with 3 parts water, and clean by hand or pressure clean with nonatomizing spray gun. (If you use the gun, hit the part a minimum of 5 seconds and do not let the part wait more than 15 minutes). Do not let the cleaner dry on the part.

(2) Rinse off the cleaner with clean water.

(3) Wipe and blow dry with filtered compressed air.

(4) If you can see dirt, solvent clean it away per SOPM 20-30-03. But removal of all the blue stains from leak detection paint is not necessary.

(5) Within 48 hours after you started this method, clean by hand or with a nonatomizing spray gun and Ardrox 241K. If you use the gun, hit the part a minimum of 5 seconds and do not let the part wait more than 2 minutes.

(6) Fully rinse with water before the cleaner evaporates.

(7) Solvent clean with a Series 86 solvent (Ref. SOPM 20-30-86) by hand or with a nonatomizing spray gun. If you use the gun, hit the parts a minimum of 5 seconds.

(8) Blow dry with filtered compressed air.

C. Method 3

(1) Do steps (4) thru (8) of Method 2.

D. Method 4

(1) Solvent clean per BAC5750 (Ref SOPM 20-30-03). Scotch-Brite pads are recommended to help remove the dirt.

(2) Clean with Scotch-Brite pads and alkaline cleaners listed in Materials, diluted with 3 parts water by volume, until you get a water-break-free surface when you rinse the surface.

(3) Rinse fully with clean water. If you do not get a water-break-free surface, do steps (2) and (3) again.

(4) If you went through to the base material, apply surface treatment specified by the overhaul instructions.

(5) Fully dry before you apply the primer or enamel layer.

E. Method 5 (for BMS 10-11, Type 1 and BMS 5-89 primers only)

(1) Soak alkaline clean the BMS 5-89 primer per BAC5749 (Ref SOPM 20-30-03) with Turco 4215 cleaner.

(2) Soak alkaline clean the BMS 10-11, Type 1 primer, per BAC5749 (Ref SOPM 20-30-03). Let the surface soak approximately 5 minutes. Then fully rinse. If you do not get a water-break-free surface, soak again and then rinse until you get a water-break-free surface. Then fully dry the surface.

F. Method 6

(1) Manual solvent clean per BAC5750 (Ref SOPM 20-30-03) with a Series 86 solvent (Ref SOPM 20-30-86).

(2) Do this again with clean wipers and more Series 86 solvent (Ref SOPM 20-30-86).

(3) Dry fully before you apply the primer or enamel layer.

G. Method 7

(1) Manual alkali emulsion clean with this mix:

Methyl ethyl ketone (MEK)	1 part by volume
Isopropyl alcohol	1 part by volume
Pace B-82	1 part by volume
Water	1 part by volume

(2) Mix these cleaners fully before you use the mix. Apply the cleaner to the surface. Clean with Scotch-Brite pads to remove contamination. Do not put the Scotch-Brite pads into the cleaner. Do not let the cleaner dry on the surface

NOTE: Blue stains from leak detection tests can stay.

(3) Rinse with clean water.

(4) Manual clean with this mix:

Pace B-92	1 part by volume
Water	3 parts by volume

(5) Clean with this mix and Scotch-Brite pads until you get a water-break-free surface after the rinse. Do not let the cleaner dry on the surface.

(6) Rinse with clean water. If you do not get a water-break-free surface, clean again per steps (4) and (5).

(7) Use pH paper to make sure the alkaline cleaner is completely removed. When the cleaner is completely gone, the pH of the rinse water on the surface will be the same as the incoming rinse water.

(8) If you went through to the bare metal, apply replacement surface treatments as necessary.

(9) Fully dry the surface.

5. MIXING INSTRUCTIONS

CAUTION: BASES, CATALYSTS, CONVERTERS, AND THINNER COMPONENTS FROM DIFFERENT MANUFACTURERS MUST NOT BE MIXED.

A. Mix base, catalyst, and thinner in the proportions shown in the Qualified Products List (QPL) of the paint specification or as shown in BAC5736.

B. Shake each component by itself before you mix them together.

C. Let BMS 10-11, Type 1, Grade A and B primers wait 30 minutes before you apply them. No wait is necessary for BMS 10-11, Type 1, Grade E primer.

D. Let BMS 10-11, Type 2, Grade A enamel wait 1 hour before you apply it.

E. See Table 1 for the pot life of mixed BMS 10-11 materials.

F. Mix the materials in clean containers. Do not use paper containers or containers that have organic coatings.

Table 1: Pot Life of Mixed BMS 10-11 Materials

TYPE	GRADE	TEMPERATURE	VENDOR PRODUCTS	POT LIFE
1	A	Below 80°F	All	16 hours
		80-85°F	All	12 hours
		Above 85°F	All	8 hours
	B	Below 80°F	Cortaulds Aerospace	6 hours
			Dexter Aerospace	16 hours
	E	70-80°F	Deft 44-GN-11	4 hours max.
			Deft 44-Y-22	4 hours max.
			Deft 44-Y-32	4 hours max.
			Deft-44-GN-60	6 hours max.
		50-70°F	All	16 hours max.
2	A	Below 80°F	All	16 hours
		80-85°F	All	12 hours
		Above 85°F	All	8 hours
	D	Below 80°F	All	4 hours

6. APPLICATION OF COATING

A. You can apply with:

WARNING: SOME OF THESE MATERIALS ARE POISONOUS AND FLAMMABLE. USE THEM IN A WELL-VENTILATED AREA. OBEY SAFETY AND FIRE PRECAUTIONS. DO NOT BREATHE VAPORS. IF MATERIAL GETS IN YOUR EYES, FLUSH WITH WATER FOR 15 MINUTES AND GET MEDICAL ATTENTION IMMEDIATELY. IF MATERIALS GET ON YOUR SKIN, WASH WITH WATER. WIPE UP SPILLS IMMEDIATELY.

(1) Spray (pressure feed, siphon feed, or electrostatic). Spray is preferred for external surface

(2) Brush (optional to the spray procedure)

(3) Dip coat

(4) Fill and drain

(5) Curtain coat, with Steinman Model 130, or equivalent

(6) Flood coat, with Binks Model 31, or equivalent

B. Cotton swabs (such as Q-tips) can be used for touchup if this does not get cotton strands in the finish.

C. Mask or give protection to all areas not to be cleaned and coated.

D. Apply these primers and enamels at 50°F minimum air temperature and 85% maximum relative humidity.

E. Clean the equipment as quickly as possible after you are done. Methyl isobutyl ketone is recommended.

F. Spray Application

(1) If possible, use a spray booth.

(2) Tank-type pressure-feed spray guns can be used for high production painting of large areas. Siphon or pressure feed cup guns can be used for small areas or touchup.

(3) Give adjacent areas protection from overspray, fumes and dust.

(4) Use a clean, dry air supply. Clean the air filters two or more times each day.

(5) Use these pressures:

(a) Material pressure: 8-10 psig plus 2 psig for each 5 feet that the gun is located above the pressure pot gage.

(b) Line pressure: 40-60 psig (hose up to 25 feet long) or 65 psig (hose 25-50 feet long).

(6) Use a wide fan spray nozzle for large areas such as panels. Use a medium fan spray nozzle for smaller work. Adjust the flow and paint pattern to apply a fine, continuous layer.

(7) Hold the gun perpendicular to the surface and 6-10 inches away. Follow the contour if the surface is curved. Turn cylindrical items.

(8) Move the gun at a steady speed across and parallel to the work.

(9) Make an overlap of a minimum of one-third of the last pass.

Table 2: Cured Coating Thickness Data

APPLICATION METHOD	COATING SYSTEM	COATING THICKNESS, INCHES *[1]	MAXIMUM THICKNESS IN LOCAL AREAS, INCHES
Spray, Brush, or Dip	BMS 10-11, Type 1		
	One Coat	0.0003-0.0008	0.0015
	Two Coats	0.0008-0.0016	0.0030
	BMS 10-11, Type 2 *[2]		
	Over Green Type 1	0.0010-0.0020	0.0036
	Over Yellow Type 1	0.0008-0.0012	0.0036
	MIL-P-23377		
	One Coat	0.0005-0.0009	0.0015
	Two Coats	0.0010-0.0018	0.0032
Fill and Drain, Curtain Coat, Flood Coat	All	0.0005-0.0020	0.0032

*[1] Total thickness can be more than those values in local areas of overlap and touchup.

*[2] Thicknesses are applicable to enamel only and do not include primer.

(10) Remove all runs and falls immediately with clean wiper and toluene.

G. Brush Application

(1) Thin as necessary. But do not use more thinner than recommended by the vendor instructions.

(2) Use good quality natural bristle paint brushes. Do not use synthetic bristle brushes because the material will dissolve them.

(3) Apply the coating in one direction as much as possible. Use light pressure on the brush to make a smooth continuous layer.

(4) Try not to brush out the wet coating because pickup, air bubbles and voids could occur and make touchup necessary.

H. Fill and Drain

(1) Prepare materials by the vendor's instructions.

(2) Apply the coatings in a clean, dust-free area.

(3) Put plugs into the holes of the part.

(4) Flush the part with toluene. Shake the part to clean all internal surfaces. If you can, push a clean wiper wet with toluene through the part. Then follow with a clean, dry wiper.

(5) Drain all solvent from the part. Remove all plugs. Fully dry with a good flow of warm air (160°F maximum) through the part.

(6) Put plugs back into the holes as necessary.

(7) Fill the part with primer. Shake and turn the part to make sure the primer gets on all of the surfaces.

(8) Remove the plugs and let the primer drain. Turn the part as necessary to let all primer drain out. Then put the part in a vertical position, if you can.

(9) Now put an air supply tube into one or more of the holes and send warm filtered air (160°F maximum) through the part for 1 hour or more. Use an air pressure, measured at the regulator, of 10-15 psi. If the part has only one hole, put the air supply tube as far into the part as possible, but be careful not to touch more of the wet primer than necessary.

(10) If two coats are specified, reverse the part to let you fill it from the opposite end. Wait a minimum of 2 hours before you apply the second coat of primer. Then do steps (b) thru (d) again. Air circulation through tubing is optional.

7. CURING

A. Give the new coating protection from dust, moisture, or other contamination until cured.

B. Cure coatings per Table 3.

(1) Do not heat or cure bonded assemblies higher than 180°F.

(2) Do not heat or cure shot peened aluminum parts higher than 200°F. Do not heat or cure other aluminum parts higher than 250°F.

(3) The times given in Table 3, and Figure 1 thru Figure 6 are for the one-coat layer thicknesses given in Table 2. Increase the times in proportion for thicker layers. All times are approximate. Use them only as a guide.

Table 3: Cure and Dry Data

CURE/DRY	FINISH SYSTEM	TIMES AND CONDITIONS*[1]
Flash off before an accelerated cure	All	10 minutes at room temperature. Or 1 minute minimum, if the cure will be under infrared lamps.
Flash off before wet fastener installation	All	5 minutes minimum.
Before masking, handling, stacking, or overcoating	BMS 10-11, Type 1	See Figure 1. See Figure 2 for infrared cure.
	MIL-P-23377	See Figure 5. For a faster cure of some MIL-P-23377 primers, see Table 1.
	BMS 10-11, Type 2	See Figure 6.
Before packaging	BMS 10-11, Type 1 only	Flash off 10 minutes, then 10 minutes at 130-150°F, then 10 minutes at room temperature. Do not stack the parts. Put them on edge, or use the minimum cure times for "before service."
	All other coatings	Use the minimum cure time for "before service."
Before service	All	Minimum cure: 48 hours at 75°F maximum. Then 24 hours at 75-160°F. Best cure: 7 days at 70-80°F.
Before overcoating	Grade B primer only	Minimum cure time: 1 hour.

*[1] These conditions are for one coat thickness. Increase them in proportion for thicker films.

8. REPAIR

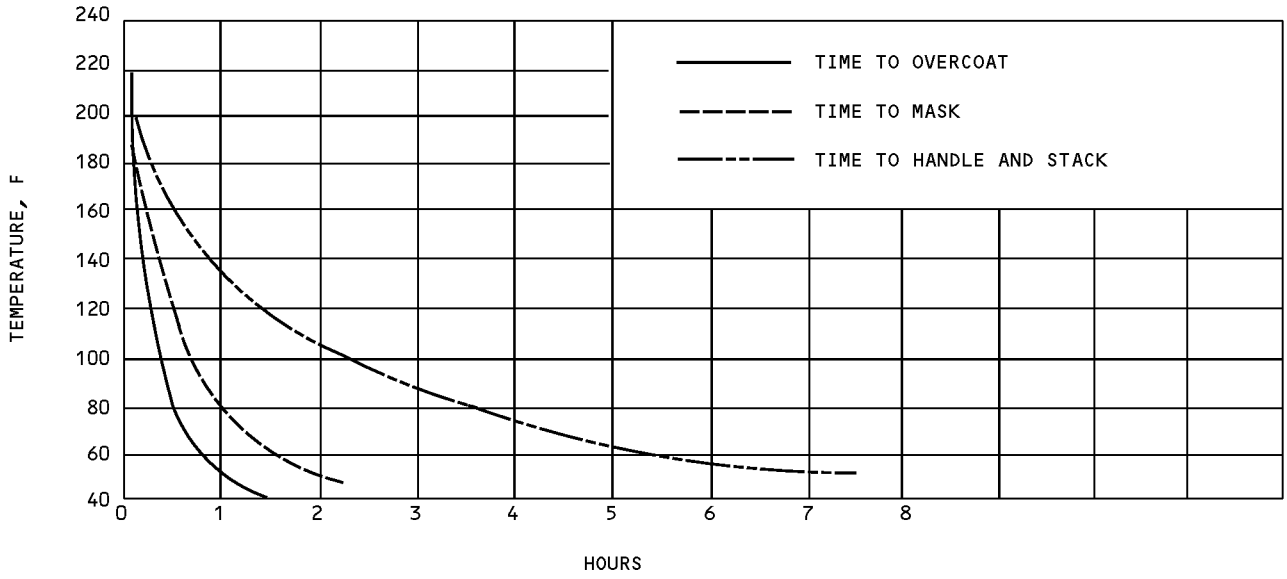
A. If the damage goes through to the base material, remove the primer and enamel layers from the damaged area by the procedure for organic finishes in SOPM 20-30-02. If the damage is only scratches and other defects that do not go through to the base material, go to step B.

B. Solvent clean the area per SOPM 20-30-03.

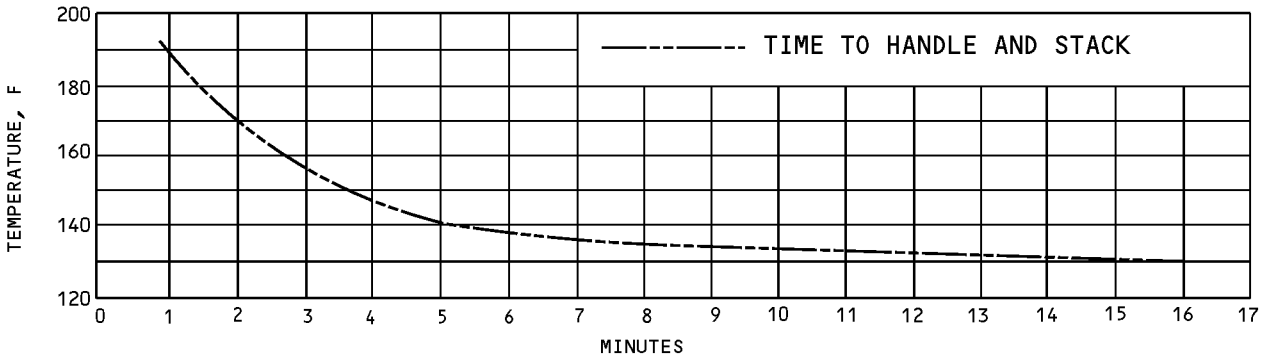
C. Lightly sand the area with 240-grit or finer abrasive. Make the area smooth and blend into the adjacent area. Do not go through to the base material. Clean off the dust and dirt with tack rags, or solvent clean per SOPM 20-30-03.

D. If the damaged area has bare base metal, manually repair the surface treatment (such as anodize or plating) as applicable.

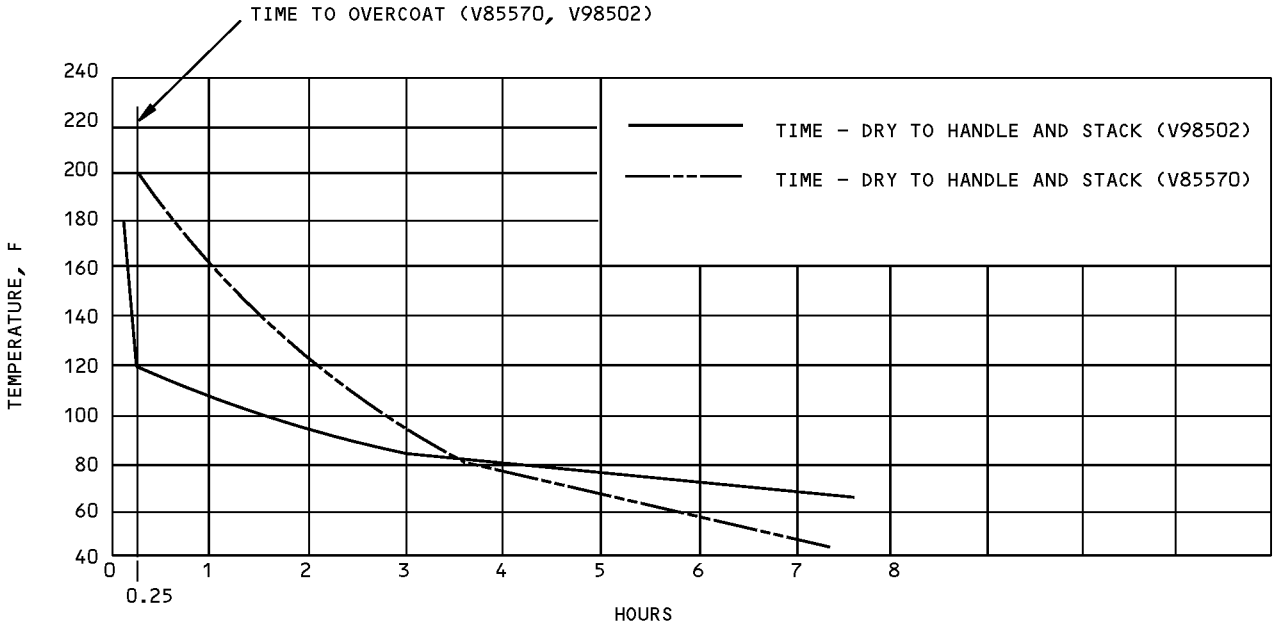
E. Apply new layers of primer and enamel, as applicable, per Paragraph 6. above. Cure per Paragraph 7.



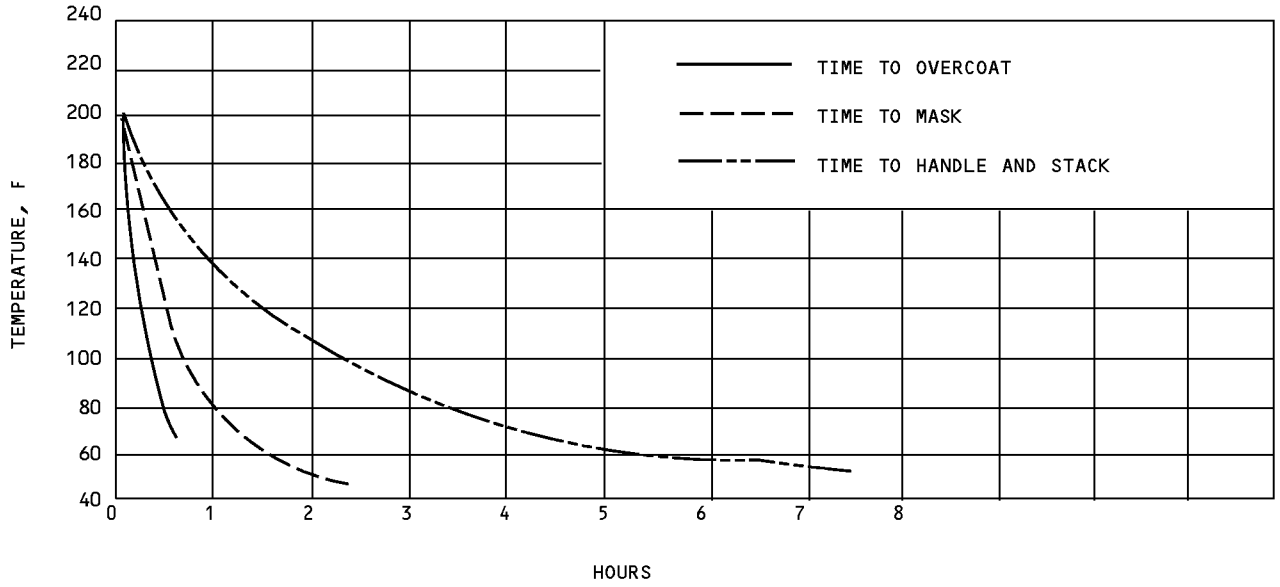
Cure of Primer BMS 10-11, Type 1, Grade A
Figure 1



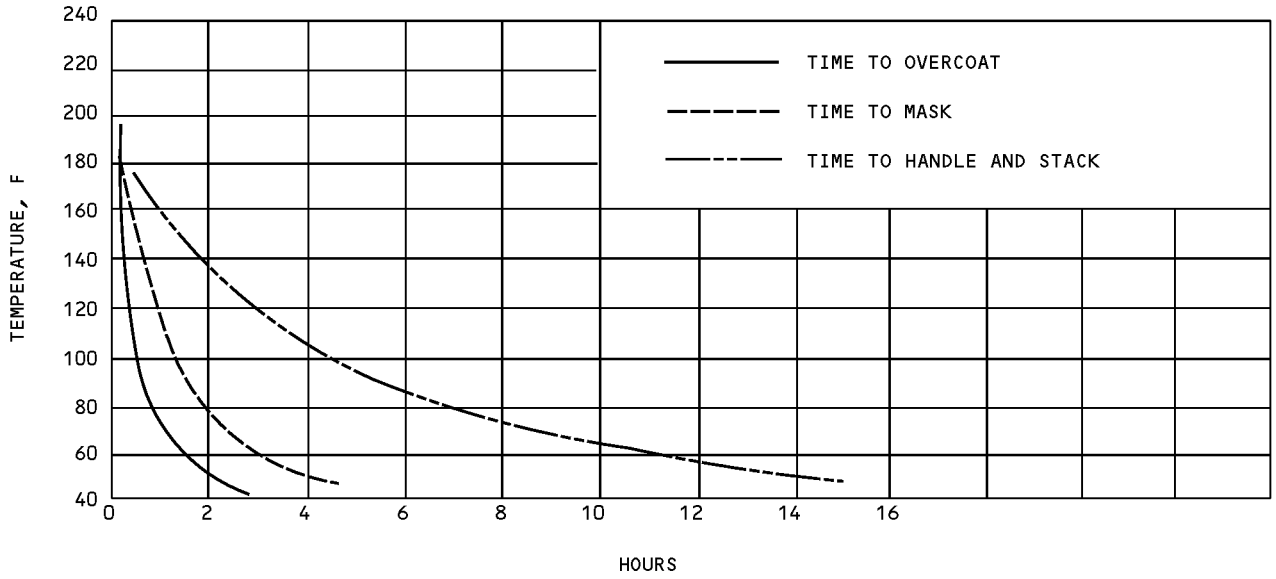
Cure with Infrared Lamps of Primer BMS 10-11, Type 1, Grade A
Figure 2



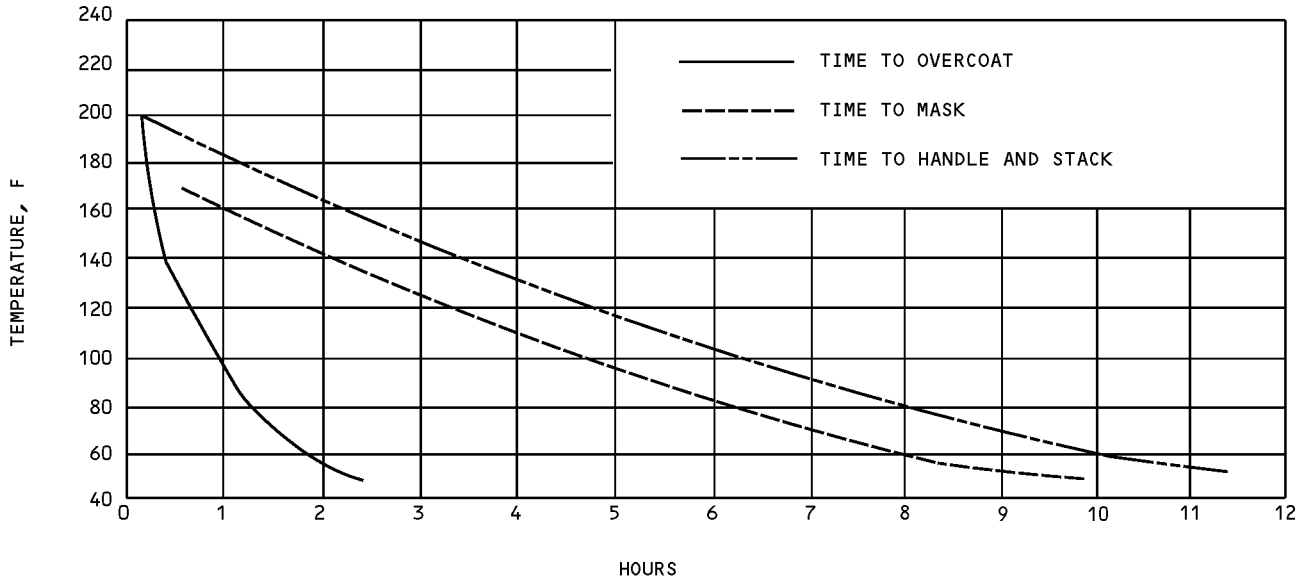
Cure of Primer BMS 10-11, Type 1, Grade B
Figure 3



Cure of Primer BMS 10-11, Type 1, Grade E
Figure 4



Cure of Primer MIL-P-23377
Figure 5



Cure of Enamel BMS 10-11, Type 2
Figure 6