TECHNICAL BULLETIN

ROTOR BLADE EROSION PROTECTION

Distribution Statement A: Approved for public release; distribution is unlimited.

***This TB supersedes TB 1-1500-200-20-28, dated 26 November 1990, including all changes.**

HEADQUARTERS, DEPARTMENT OF THE ARMY
31 December 1991

URGENT

TB 1-1615-351-23

CHANGE

NO. 3

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DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 6 August 2003

ROTOR BLADE EROSION PROTECTION

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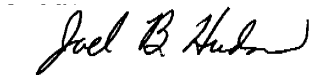

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Secretary of the Army
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CHANGE

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Original …….. 0 …….. 31 December 1991
Change …….. 1 …….. 30 September 1993
Change …….. 2 …….. 29 July 1994
Change …….. 3 …….. 6 August 2003

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TECHNICAL BULLETIN
NO. 1-1615-351-23

HEADQUARTERS
DEPARTMENT OF THE ARMY
WASHINGTON, D.C., 31 December 1991

DEPARTMENT OF THE ARMY TECHNICAL BULLETIN

ROTOR BLADE EROSION PROTECTION

Headquarters, Department of the Army, Washington, D.C.
31 December 1991

REPORTING ERRORS AND RECOMMENDING IMPROVEMENTS

You can improve this manual. If you find any mistakes or if you know of a way to improve these procedures, please let us know. Mail your letter or DA Form 2028 (Recommended Changes to Publications and Blank Forms) located in the back of this manual, directly to: Commander, U.S. Army Aviation and Missile Command, ATTN: AMSAM-MMC-MA-NP, Redstone Arsenal, AL 35898-5000. A reply will be furnished to you. You may also provide DA Form 2028 information to AMCOM via e-mail, fax, or the World Wide Web. Our fax number is: DSN 788-6546 or Commercial 256-842-6546. Our e-mail address is: 2028@redstone.army.mil. Instructions for sending an electronic 2028 may be found at the back of this manual immediately preceding the hard copy 2028. For the World Wide Web use: https://amcom2028.redstone.army.mil.

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CHAPTER 1

INTRODUCTION

Section I. GENERAL

1-1. Scope. This bulletin supplements, clarifies and standardizes the rotor blade erosion protection procedures, in the applicable aircraft -23 Technical Manuals, in a sand environment.

1-2. Maintenance Forms and Records. The maintenance forms and records which are required by personnel who perform the maintenance functions prescribed in this publication are listed in DA PAM 738-751 (Functional Users Manual for the Army Maintenance Management System - Aviation (TAMMS-A)).

1-3. REPORTING Errors and Recommending Improvements. You can help improve this publication. If you find any mistakes or if you know of a way to improve the procedures please let us know. Mail your letter, DA Form 2028 (Recommended Changes to Publications and Blank Forms), or 2028-2 located in the back of this TB directly to: Commander, US Army Aviation and Troop Command, ATTN: AMSAT-I-MP, 4300 Goodfellow Blvd., St. Louis, MO 63120-1798. A reply will be furnished to you.

Section II. DESCRIPTION AND APPLICATION

1-4. Description. Instructions for rotor blade erosion protection consists of a generic description of the task with tables and illustrations which are specific to each aircraft.

1-5. Application. Procedures provide instructions for the application of a kit which protects helicopter rotor blades against sand erosion and attendant sparking which may occur, depending on the material used in the blade leading edge.

Section III. INSTALLATION PROCEDURES

CAUTION

Exposure to rain will deteriorate guard coating.

CAUTION

If TASK L-100 polyurethane paint is being utilized in conjunction with 3M 8663 polyurethane tape, do not apply TASK L-100 polyurethane paint erosion protection where 3M 8663 polyurethane tape will be utilized. 3M polyurethane tape will not adhere sufficiently to TASK L-100 paint surfaces.

1-6. Rotor Blades Erosion/Spark Control Kit.

a. *Personnel Requirements*. Two people (MOS 67 Series).

b. *Supplies*. Refer to the table of supplies for each applicable aircraft in Chapter 2.

c. *Remove Blades (Step 1)(Optional).*

(1) Removing the main rotor blades makes the coating easier, but removal is not mandatory. The tail rotor blades should not be removed. If blades are removed and are expected to be reinstalled on the same aircraft, the blades and grips should be marked so that blades can be reinstalled at the same location. This will greatly reduce track and balance time.

CAUTION

Blades should not be positioned vertically since this promotes movement of the coating away from the leading edge where it is needed most.

(2) If desired, remove main rotor blades per the applicable aircraft TM. Position blades on table or blade rack in horizontal/flat position. Allow the leading edge to stick out over the edge of the rack approximately 2 inches.

d. Layout and Mask (Step 2).

(1) Local greasy spots should be cleaned using denatured or isopropyl alcohol.

(2) Layout and mask the total area of the main and tail rotor blades to be protected with the coating per the applicable aircraft illustrations in Chapter 2. It is important that all blades in a set be masked the same.

e. Surface Preparation and Cleaning (Step 3).

CAUTION

Before sanding and application of TASK L-100, ensure all rotor blades are either primed and/or painted with lacquer or care paint per the applicable aircraft technical manual.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(1) Sand the area to be coated to remove bugs, dirt and oxidized coating. As a minimum, scuff the existing paint over the total area to be protected. Always scuff in a spanwise direction. Use of power polishing sander is allowed for this procedure.

(2) Dry wipe the blade with a clean cheesecloth or towel to remove the sanding residue. Wipe the blade several times with cheesecloth dampened with denatured or isopropyl alcohol, then wipe once again with dry cheesecloth.

CAUTION

Do not touch or contaminate the prepared surface after it is wiped.

(3) Inspect the surface for any greasy looking areas. Sand these areas a little more vigorously to take away the sheen. Wipe the blade again with the cheesecloth. The blade should now be dry and free from sanding residue.

(4) Remove the old masking tape and replace with new as required to repair tape damaged by sanding. Mark coating application spanwise dimensions on the tape before starting to apply the coating. Make sure all screw heads are covered with masking tape. Screw heads must not be coated.

f. Mixing Coating (Step 4).

(1) The coating consists of individual foil packets, each of which contain Part A of the two-pan coating (in a pull-top can which is about half-filled), Part B (in a syringe with a tip cap) and a stir stick to mix them. Parts A and B are pre-measured to assure proper cure.

WARNING

The coating will not wash off and can be irritating to the skin. Wear gloves and safety goggles when mixing and applying this product.

(2) To mix the coating, open Part A. Remove the tip cap from Part B and squirt the full contents into the can containing Part A. Stir the mixture for a full 60 seconds using the stick provided, being careful to scrape the sides of the can with the stick occasionally to assure total mixing of both parts. You have only 5-10 minutes to get the coating out of the can, so don't start mixing until you have read the instructions in step g and h, below, and are ready to start the application. The coating cures faster in the can than it does on the blade.

g. Coating Application - Main Rotor (Steps 5A).

(1) Starting at the outboard tip, coat the leading edge of the main rotor blades using the dimensions and quantities in the applicable tables and illustrations for each individual aircraft in Chapter 2. In the event that a blade erosion tape kit is already installed on the main rotors, it is allowable to apply TASK-L100 around the blade erosion tape areas. However, application of TASK-L100 should be maintained within the dimensional limits of the illustrations for each individual aircraft in Chapter 2. If main rotor blade erosion occurs adjacent to blade erosion tape, application of two TASK-L100 coats, two inches wide, and adjacent to main rotor blade erosion tape is allowable outside the dimensional limits of the illustrations in Chapter 2. Paint all blades identical. Apply all of the coating from the can onto the blade as quickly as possible, then work it with the brush to obtain a smooth, even coat. Pouring the material from the can while spreading with a brush is an acceptable practice to apply the coating quickly. Keep watching the freshly applied material for runs and sags. Rebrush, as required, until the coating begins to set.

(2) Use a new paintbrush when the old brush starts to drag. It should take a new brush every two to three cans to do the job properly.

NOTE

It is normal for some of the hairs from the brush to come off the brush and remain in the coating.

(3) If the blades are on the aircraft, coating the bottom will take a different technique. As you coat the bottom you must keep working the material until it starts to set. Long, smooth spanwise strokes with the brush being pulled at a low angle to the blade works best.

CAUTION

Pull the masking tape off as soon as the application is complete. Do not wait for the coating to set. After the coating sets, masking tape removal becomes very difficult and the edge of the coating will be rough and may debond slightly.

NOTE

It is more efficient for one person to apply the coating and the second person to asset in mixing of the next can of coating, rotating blades, taking care of expended cans and brushes, etc.

NOTE

Successive coats may be applied a rapidly as practical, as long as the material can be spread smoothly and evenly with the maximum build-up at the leading edge.

NOTE

When applying the coating, is particularly important to have a good build-up at the blade leading edge where most severe erosion occurs.

h. Coating Application - Tail Rotor (Step 5B).

(1) Position the tail rotor vertically.

(2) Apply the compound using the dimensions and quantities in the applicable tables and illustrations for each individual aircraft in Chapter 2, and the techniques described for the main rotor. Rotate the tail rotor to apply the coating to the next blade and repeat until the coating has been applied to all blades for the required number of coats.

NOTE

Any unused kits of the coating should be retained for touch up and repair of the coating.

i. Touch Up (Step 6).

NOTE

Runs and sags may cause airfoil distortion resulting in performance degradation and difficulties in track and balance. Runs and sags may be trimmed using a razor blade.

(1) After the coating cures, runs and sags may be touched up using sandpaper backed by a hard sanding block.

(2) Make sure drain holes are open and free of the coating.

j. Install Blades (Step 7) (Optional w/step 1). Install rotor blades per the applicable aircraft Technical Manual.

NOTE

Cure time before track and balance is 6 hours at 77 degrees Fahrenheit. A 24-hour cure time is recommended if temperature during curing is unknown.

NOTE

Mixing of coated blades and uncoated blades is prohibited.

k. Check Track and Balance (Step 8). Check track and balance of the main and tail rotors per the applicable aircraft Technical Manual.

Section IV. REPAIR AND REMOVAL PROCEDURES

1-7. Rotor Blades - Erosion/Spark Guard Coating. (Repair).

a. Peeling and Tattering. This condition is most prevalent where the material is thinnest. The blades should be inspected after flight and the loose material, if any, should simply be trimmed off with a sharp knife. It is not necessary to re-coat the bare area until there is enough area to justify a coating cure cycle of six or more hours.

b. Nicks and Cuts.

NOTE

Cure time before track and balance is 6 hours at 77 degrees Fahrenheit. A 24 hour cure time is recommended if temperature during curing is unknown.

CAUTION

Be careful when using a knife for trimming. Do not cut into the blade. The safest technique is to work the knife under the loose material and cut parallel to the blade surface.

(1) This condition is caused by larger debris and will usually be found close to the leading edge and in the outboard one-third of the rotor span. If the cut is of average size the surrounding material will not be damaged and no debonding will occur. This type of damage to the coating should not be treated until it is expected that further flight would cause that area to debond and tear away. If that is the case, then cut out the debonded area with a sharp knife. Only remove the debonded area. Repair by applying fresh coating, in several applications if necessary, to restore the coating to its original thickness. Allow the coating to set for at least six hours before bringing the rotor up to speed or flying the aircraft.

(2) If mission requirements will not permit the proper time for repair and curing, simply cut away the loosened material and fly.

1-8. Rotor Blades - Erosion/Spark Guard Coating (Removal).

CAUTION

Do not cut the rotor blade structure. Use extra caution when removing the material from rotor blades made from composite materials.

This coating is relatively immune to most solvents and to abrasive cleaning techniques. The recommended removal procedure is by scraping in a direction along the surface of the blade.

WARNING

Rotor Blade Erosion Protection must be removed from the AH-64A and UH-60A aircraft before operation in icing conditions.

1-9. Erosion Kit Cross Reference.

Refer to table 1-1 to identify the quantity of aircraft each kit can modify/support.

For example:

- The UH-60 Kit can modify/support 4 OH-58A/C Aircraft.
- The CH-47D Kit can modify/support 6 1/2 OH-58A/C Aircraft.

Table 1-1.

Erosion Kit Cross Reference

AIRCRAFT TYPE	BLADE, EROSION KIT (UH-60) *NSN 1615-01-209-6097	BLADE, EROSION KIT (CH-47D) NSN 1615-01-180-2624
AH-64A	1	1 1/2
UH-60A	1	1 1/2
AH-1	2	3 1/2
UH-1	3	4
OH-58A/C	4	6 1/2
OH-58D	3	4 1/2
CH-47D	2/3	1
AH/MH-6	3	4 1/2

*CH-47 TEMPLATE NOT INCLUDED

1-10. Recording and Reporting Requirements. The following forms are applicable and are to be completed in accordance with DA PAM 738-751.

a. DA Form 2408-13, Aircraft Inspection and Maintenance Record.

b. DA Form 2408-5, Equipment Modification Record (Component).

CHAPTER 2

ROTOR BLADE EROSION PROTECTION FOR SPECIFIC AIRCRAFT - COATING

Section I. AH-64

Refer to tables 2-1 through 2-3 and figures 2-1 through 2-4 for erosion protection data for the AH-64 aircraft blades.

NOTE

Denatured alcohol (O-E-760) or isopropyl alcohol (TT-I-735) is required for this installation and must be obtained locally. NSN 6810-00-286-5435

Table 2-1.

AH-64 Rotor Blade Erosion/Spark Guard Kit
NSN 1615-01-209-6097, Task Research P/N 25-1012-00

Kit	Quantity
Instruction sheets	2 each
Masking tape, 1" x 60 yd (Grade B)	3 rolls
Sandpaper, 80 grit, 2 1/2 x 18" strip	10 sheets
Wiping cloth, paper cheesecloth	12 each
Gloves, disposable, large size	24 pair
Brushes, disposable, 2" wide bristles	30 each
Trash bag, small	3 each
Paper towel, folded	2 pkg
Task L-100 prepackage kit #25-1004-00	64 kits

Table 2-2.

AH-64 Main Rotor Application Dimensions and Quantities

First coat	1 can to 4 blades (1/4 can per blade)	1" wide by 48" long
Second coat	1 can to 2 blades (1/2 can per blade)	1 1/4" wide by 72" long
Third coat	1 can to 1 blade	1 1/2" wide by 108" long
Fourth coat	2 cans to 1 blade	2" wide by 144" long
Fifth coat	4 cans to 1 blade	Entire top of blade to 1" overlap on bottom plus swept tip area on the bottom as called out on illustration.
Sixth coat	5 cans to 1 blade	Entire bottom of blade to 1" overlap on top.

NOTE: If the fifth coat has produced slight runs or sags, the touch up procedure of para 1-6 i should be performed before the sixth coat is applied. If the blades were removed before painting, then the blade should be turned upside down before applying the sixth coat to the bottom. The sixth coat should not be applied until the fifth coat has set to be at least tacky to the touch.

Table 2-3.

AH-64 Tail Rotor Application Dimensions and Quantities

First coat	1/2 can to 2 blades	1/2" wide by 18" long
Second coat	1/2 can to 2 blades	1 1/2" wide by 20" long
Third coat	1/2 can to 2 blades	2" wide by 22" long
Fourth coat	1 can to 1 blade	Total application area

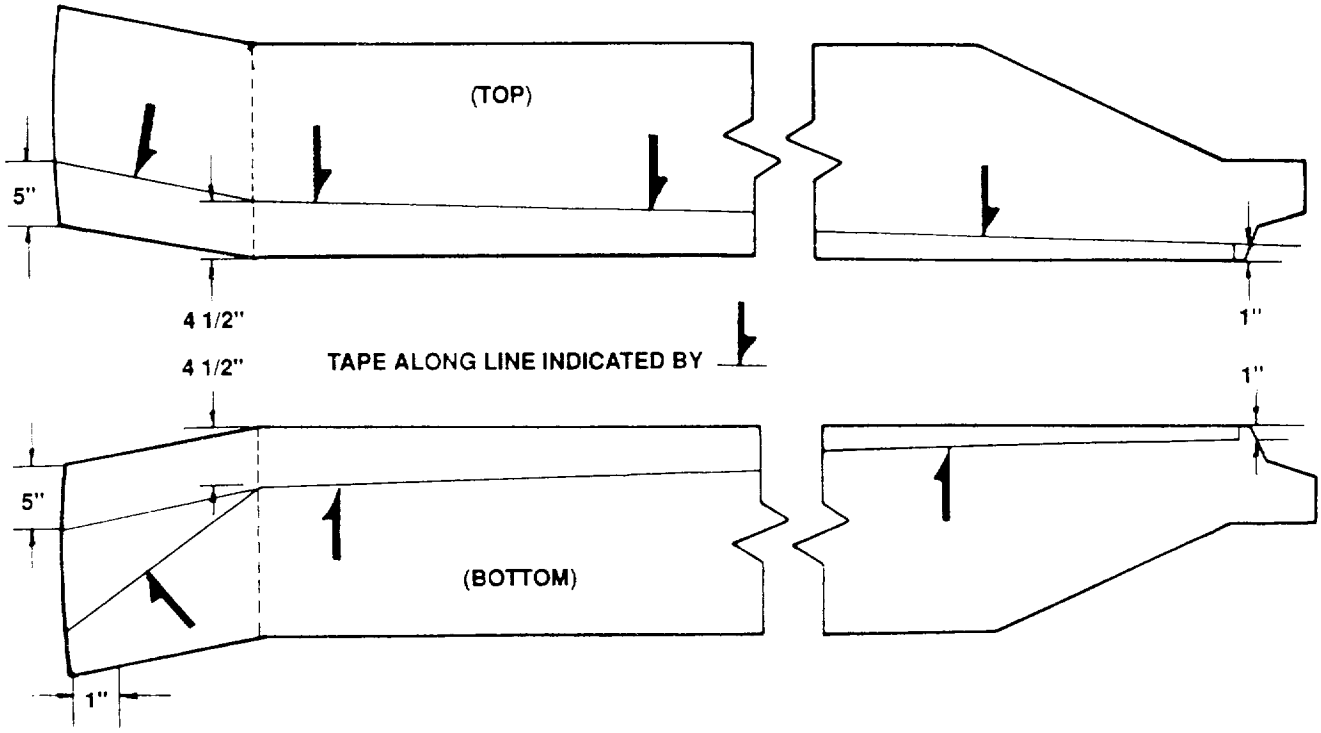


Figure 2-1. AH-64 Tape Layout, Main Rotor

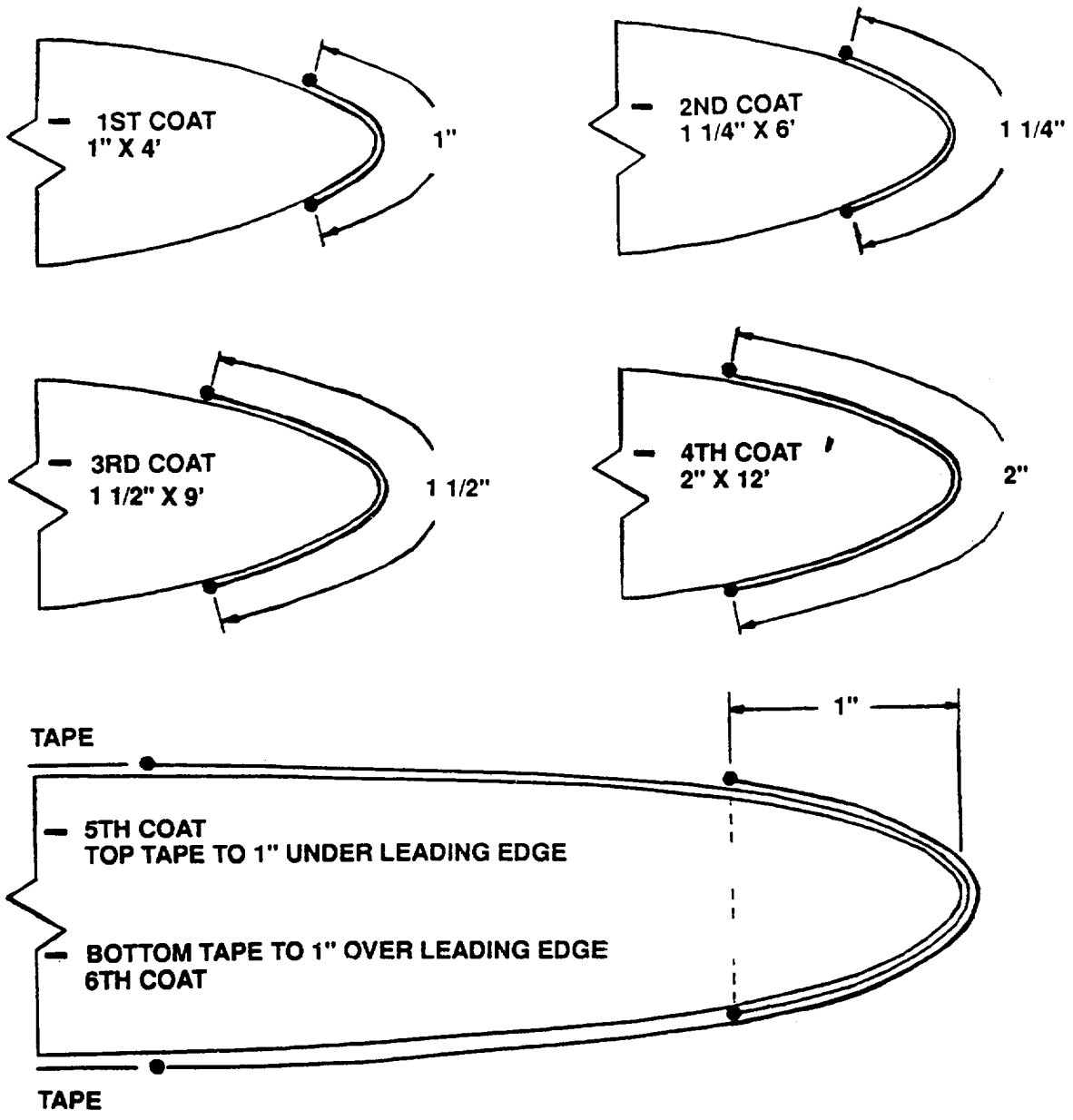


Figure 2-2. AH-64 Coating Pattern Dimensions - Main Rotor (Sheet 1 of 2)

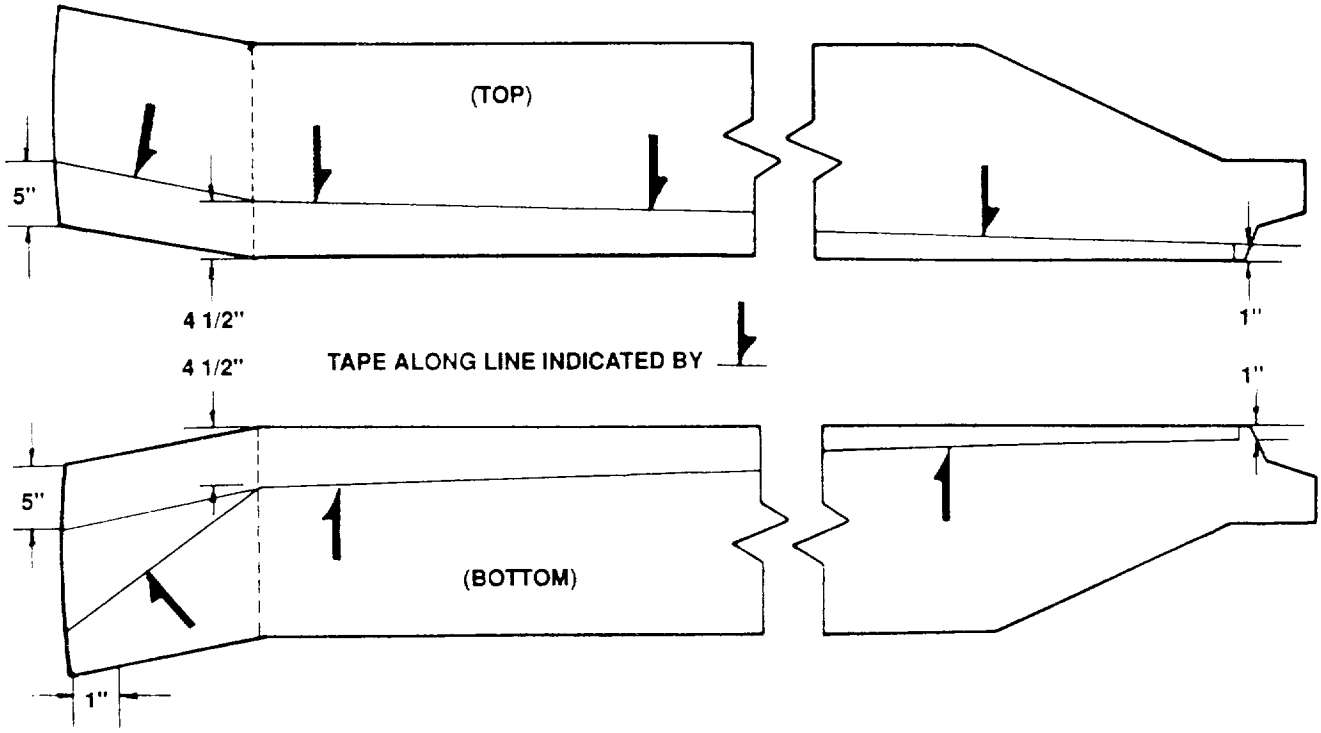


Figure 2-2. AH-64 Coating Pattern Dimensions - Main Rotor (Sheet 2 of 2)

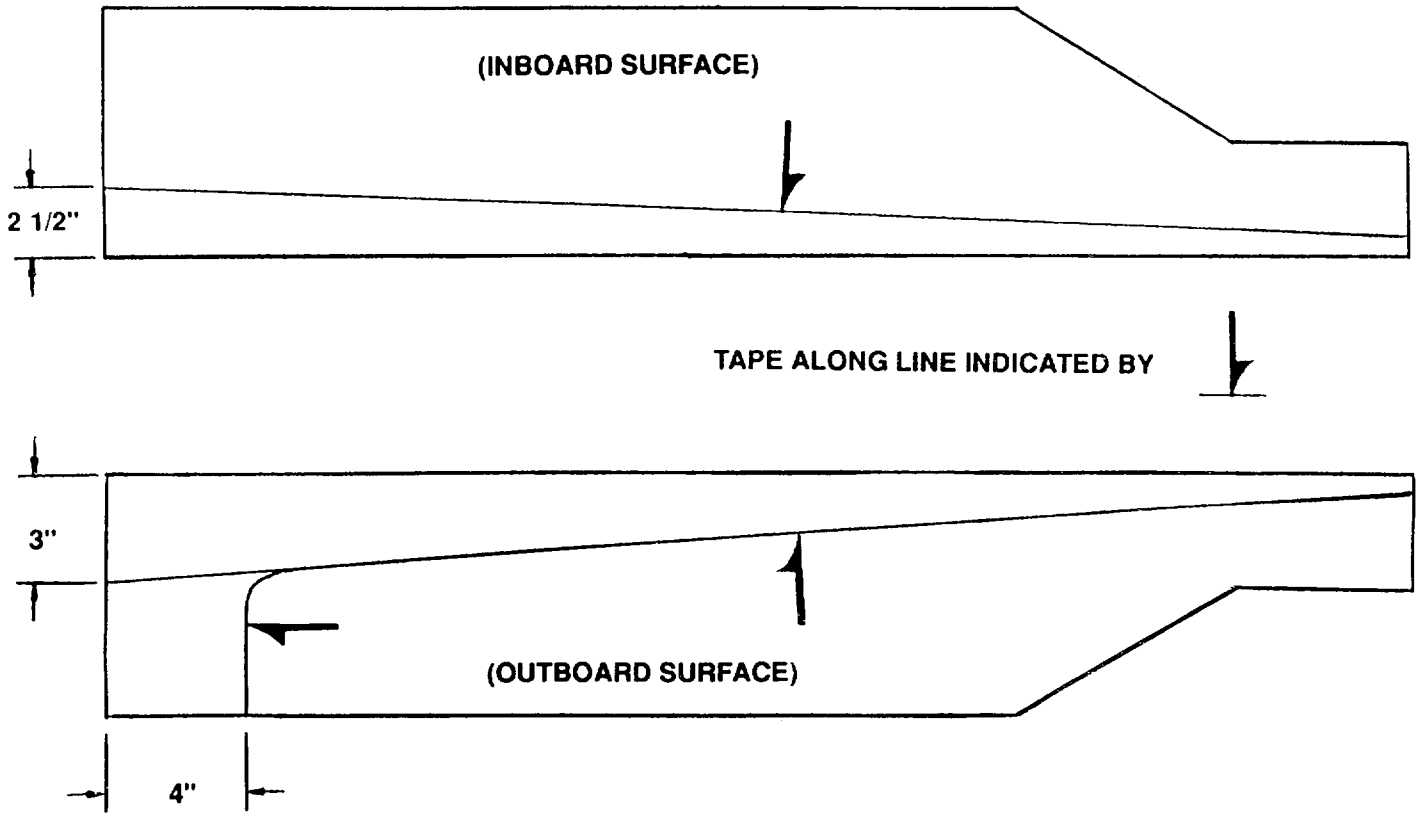


Figure 2-3. AH-64 Tape Layout, Tail Rotor

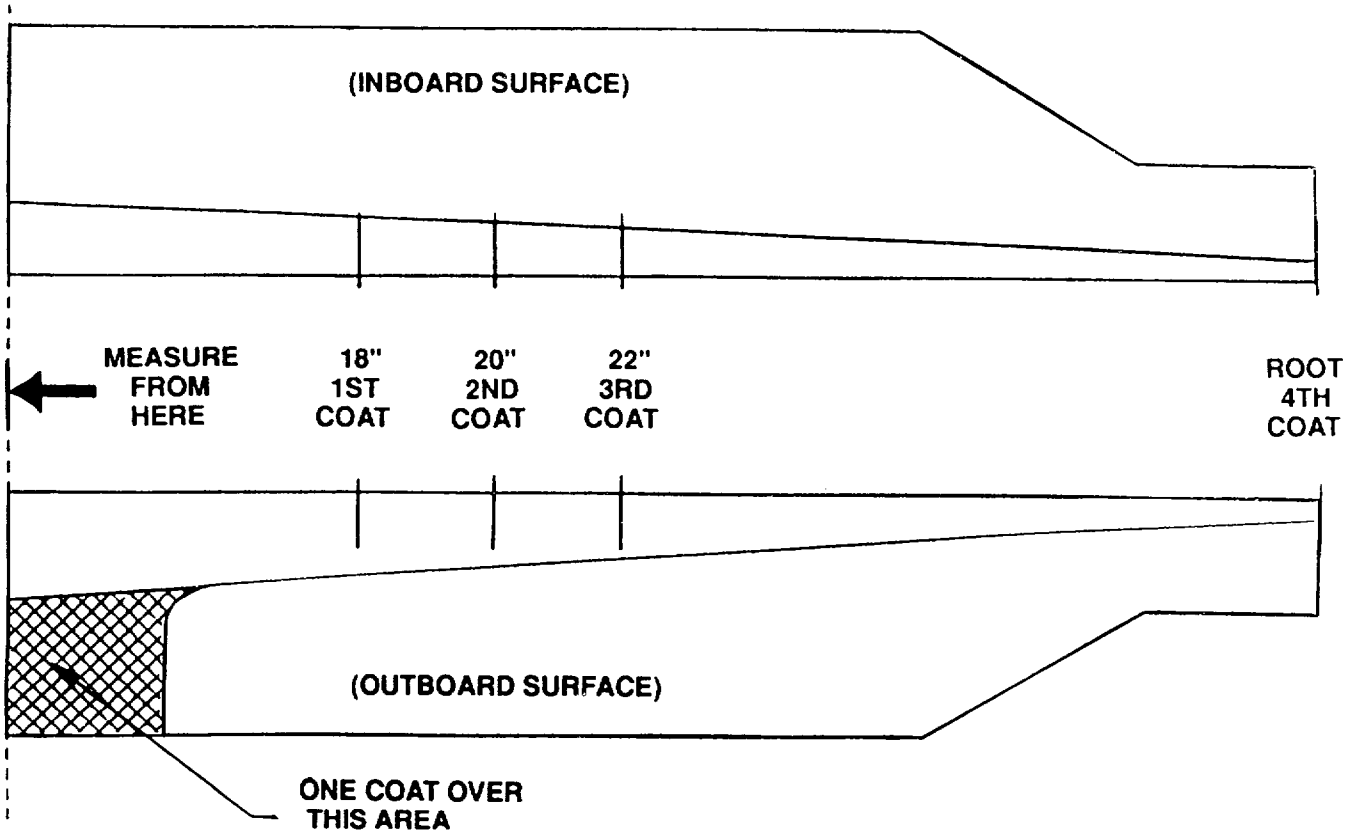


Figure 2-4. AH-64 Coating Pattern Dimensions - Tail Rotor (Sheet 1 of 2)

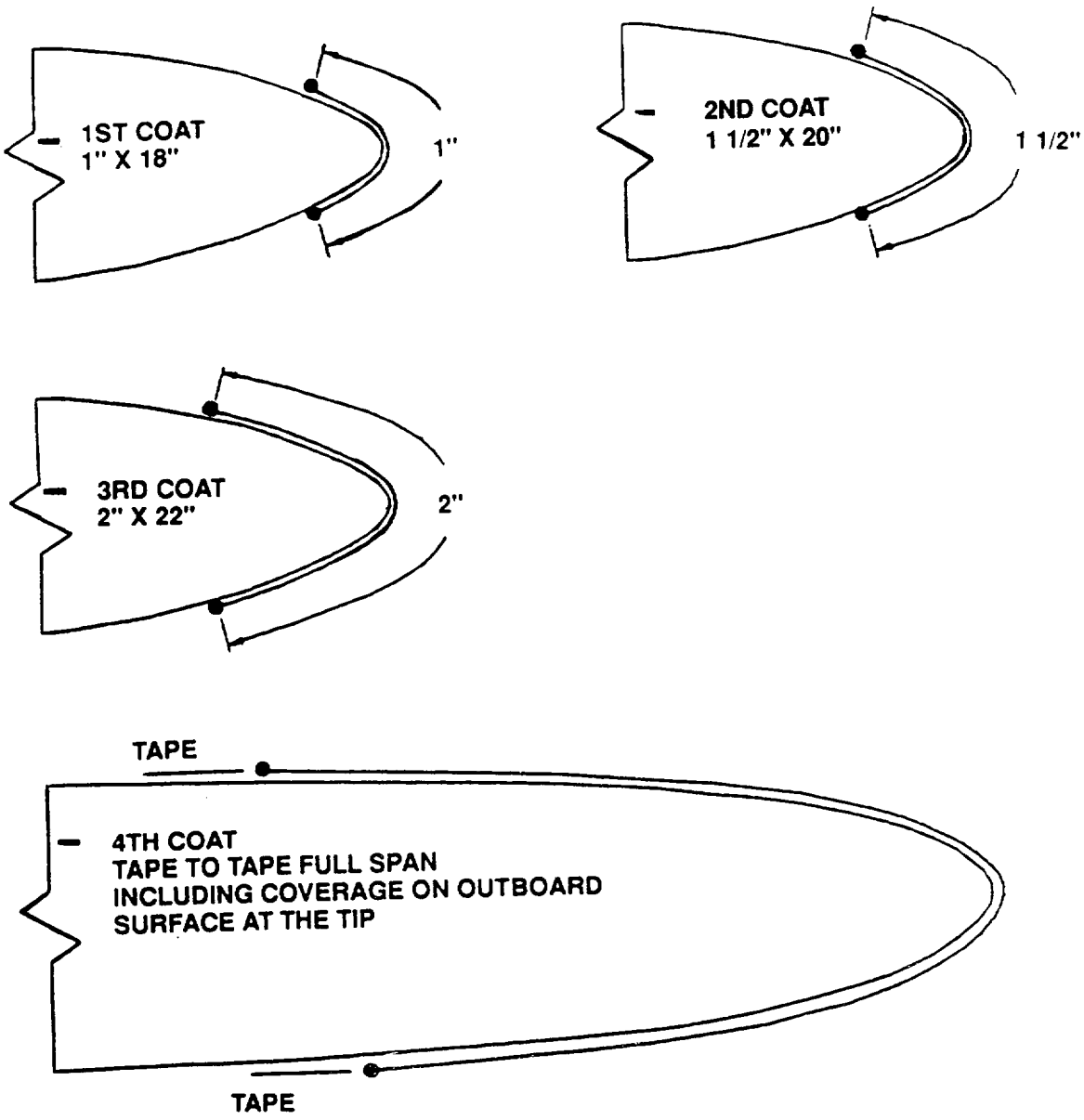


Figure 2-4. AH-64 Coating Pattern Dimensions - Tail Rotor (Sheet 2 of 2)

Section II. AH-1F (540 Main Rotor Blades) (K747 Blades)

Refer to tables 2-4 through 2-6 and figures 2-5 through 2-10 for erosion protection data for the AH-1F aircraft blades.

NOTE

Denatured alcohol (O-E-760) or isopropyl alcohol (TT-I-735) is required for this installation and must be obtained locally. NSN 6810-00-286-5435

Table 2-4.

AH-1F Rotor Blade Erosion/Spark Guard Kit
NSN 1615-01-209-6097, Task Research P/N 25-1012-00

Kit	**Quantity**
Instruction sheets	2 each
Masking tape, 1" x 60 yd (Grade B)	2 rolls
Sandpaper, 80 grit, 2 1/2 x 18" strip	6 sheet
Wiping cloth, paper cheesecloth	10 each
Gloves, disposable, large size	6 pair
Brushes, disposable, 2" wide bristles	25 each
Trash bag, small	3 each
Paper towel, folded	2 pkg
Task L-100 prepackage kit #25-1004-00	40 kits

Table 2-5.

AH-1F Main Rotor Application Dimensions and Quantities

		540 Blades		K747 Blades	
		Blades	Bottom Side (Tip)	Stainless Steel Guard & Tip	Bottom Side (Tip)
First coat	1 can to 2 blades (1/2 can per blade)	1" wide by 48" long	N/A	1 1/2" wide by 51 long	1/3 chord to tip
Second coat	1 can to 2 blades (1/2 can per blade)	1 1/2" wide by 56" long	N/A	2" wide by 51" long	1/3 chord to tip
Third coat	3 cans to 2 blades (1 1/2 cans per blade)	2" wide by 62" long	N/A	2 1/2" wide by 51" long	2/3 chord to tip
Fourth coat	3 cans to 2 blades (1 1/2 cans per blade)	2 1/2" wide by 70" long	N/A	3" wide by 51" long	2/3 chord to tip
Fifth coat	6 cans to 1 blade	Total application area	Total application area	Total application area	Total application area
Sixth coat	6 cans to 1 blade	Total application area	Total application area	Total application area	Total application area

NOTE: If the fifth coat has produced slight runs or sags, the touch up procedure of para 1-6 i should be performed before the sixth coat is applied. If the blades were removed before painting, then the blade should be turned upside down before applying the sixth coat to the bottom. The sixth coat should not be applied until the fifth coat has set to be at least tacky to the touch.

Table 2-6.

AH-1F Tail Rotor Application Dimensions and Quantities

First coat	1/2 can to 2 blades	1/2" wide by 6" long
Second coat	1/2 can to 2 blades	3/4" wide by 8" long
Third coat	1/2 can to 2 blades	1" wide by 10" long
Fourth coat	1 can to 1 blade	Tape to tape by 16" long
Fifth coat	1 can to 1 blade	Entire application area

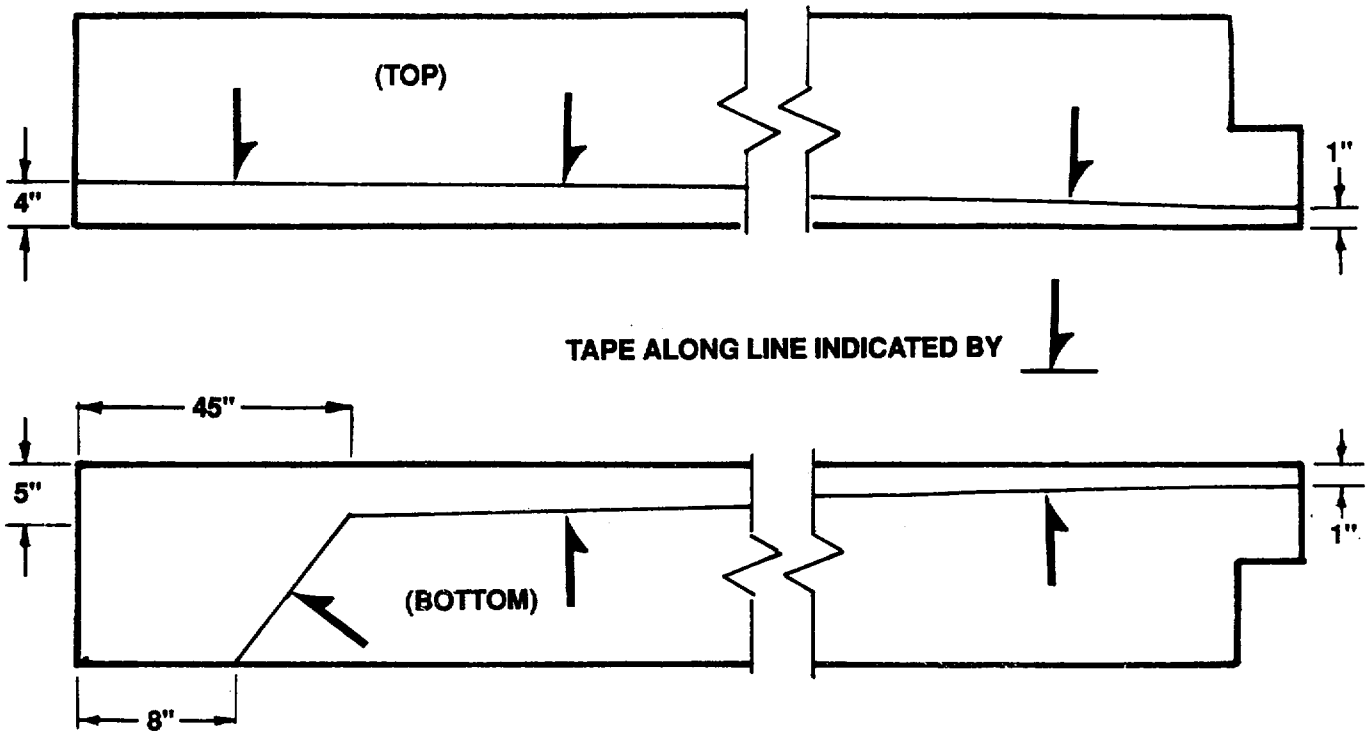


Figure 2-5. AH-1 Tape Layout, 540 Main Rotor

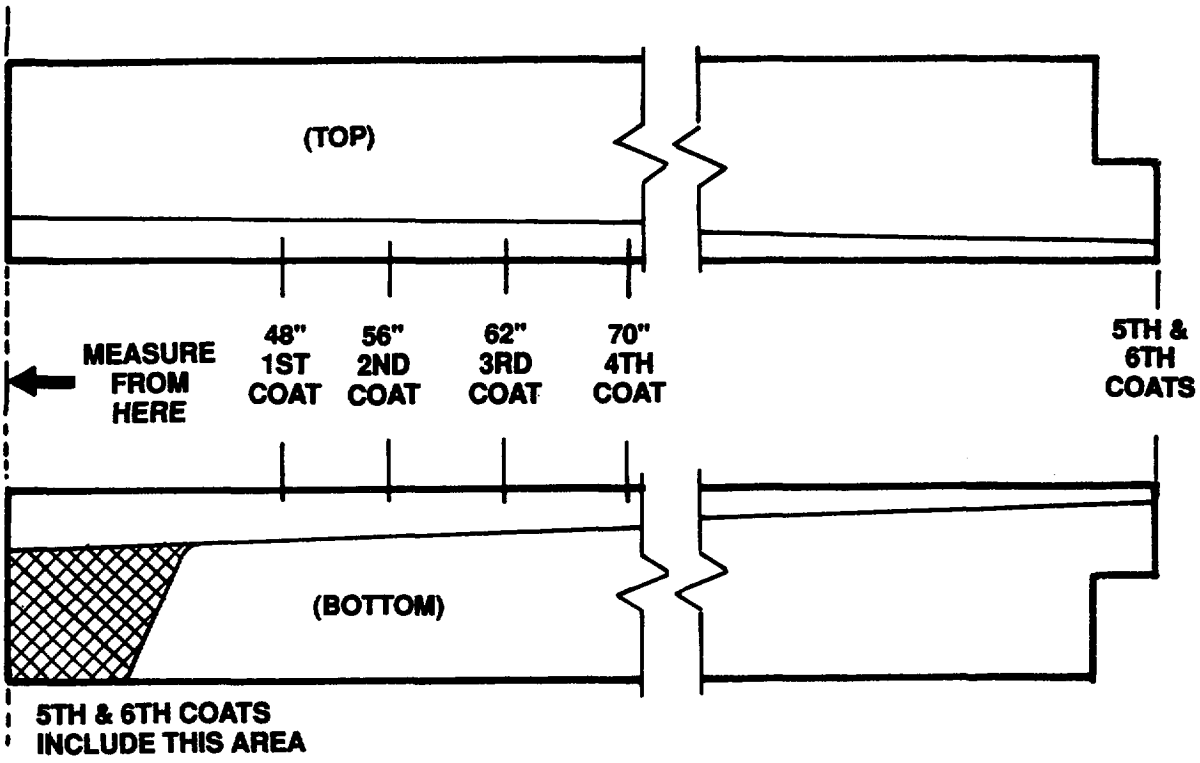


Figure 2-6. AH-1 Coating Pattern Dimensions - 540 Main Rotor (Sheet 1 of 2)

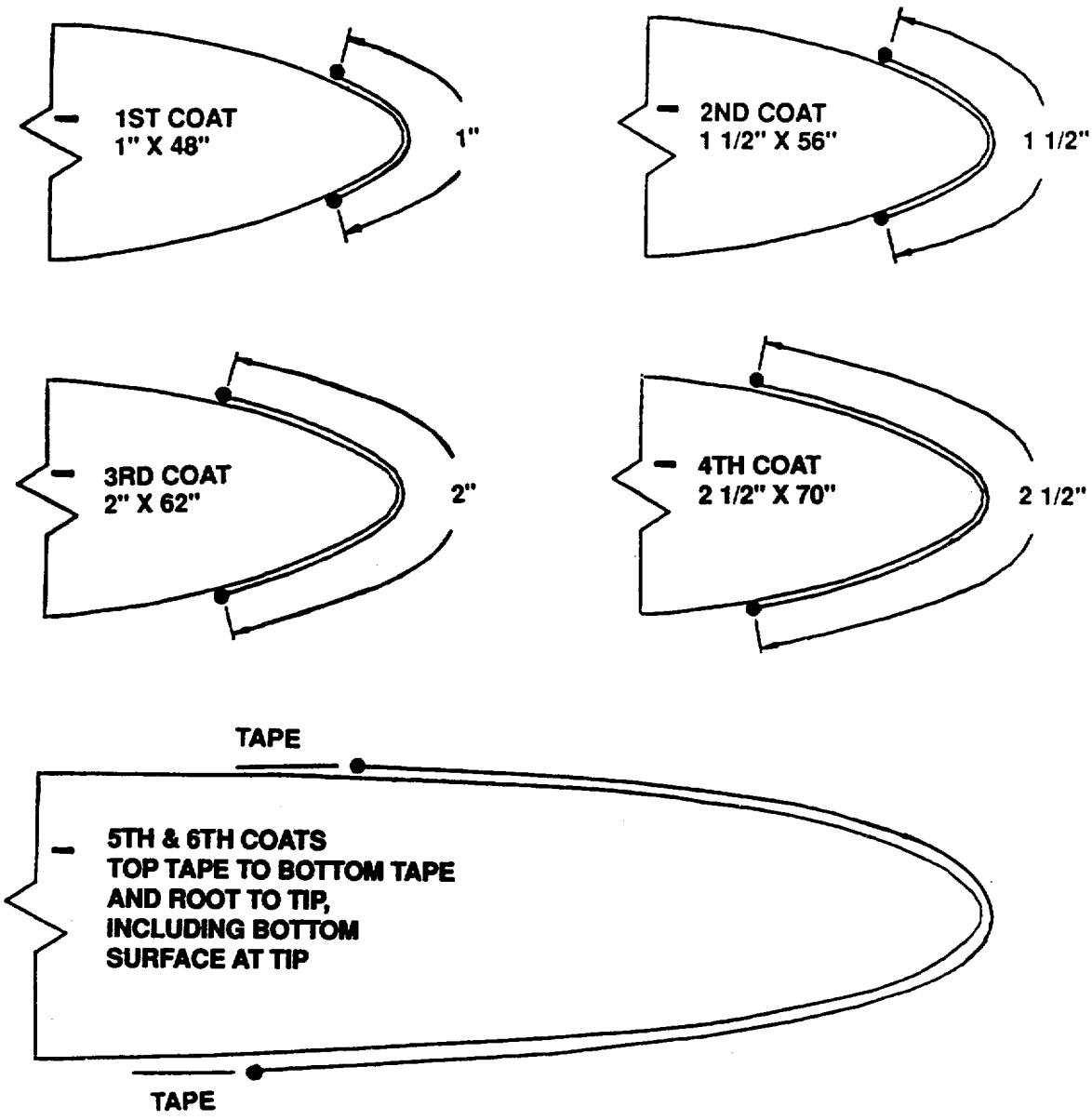


Figure 2-6. AH-1 Coating Pattern Dimensions - 540 Main Rotor (Sheet 2 of 2)

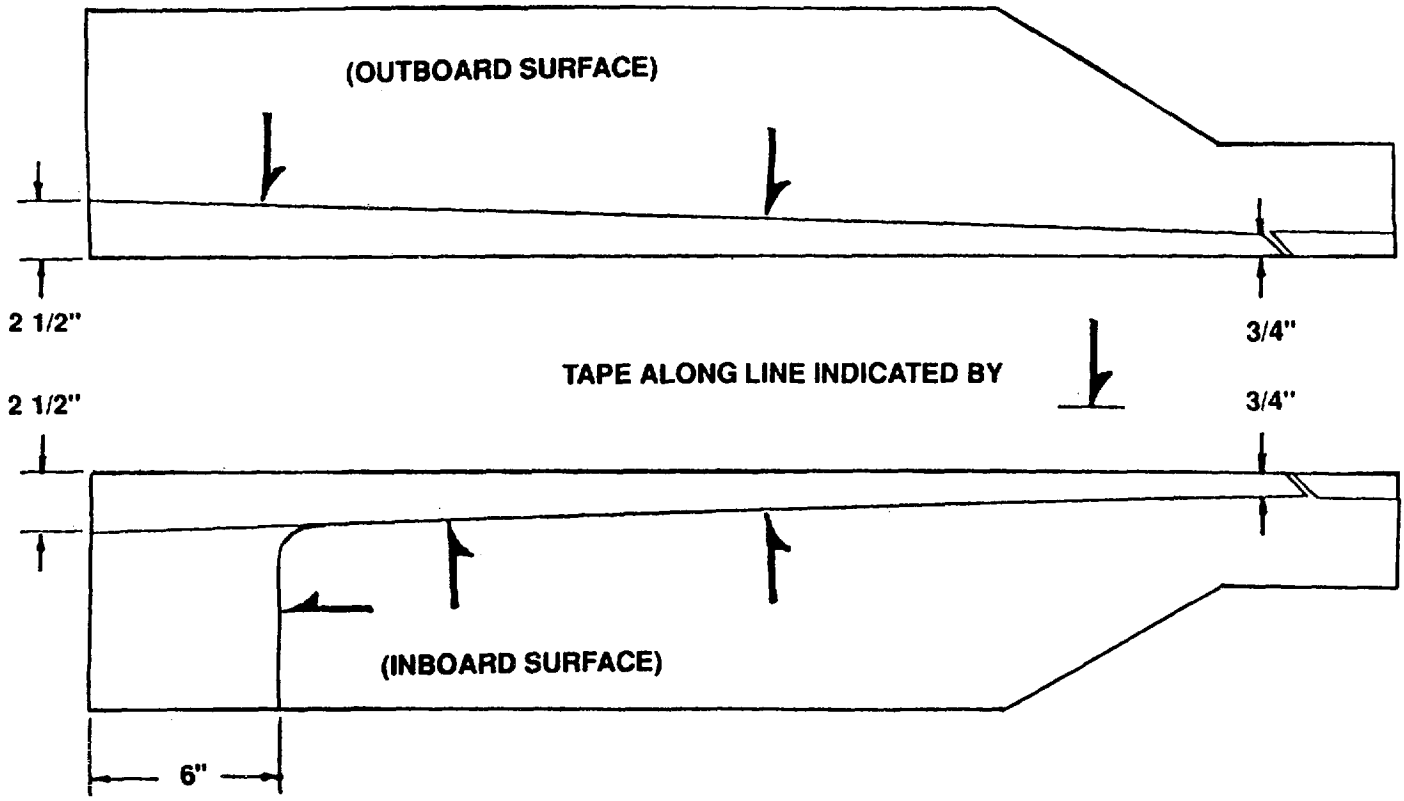


Figure 2-7. AH-1 Tape Layout, Tail Rotor

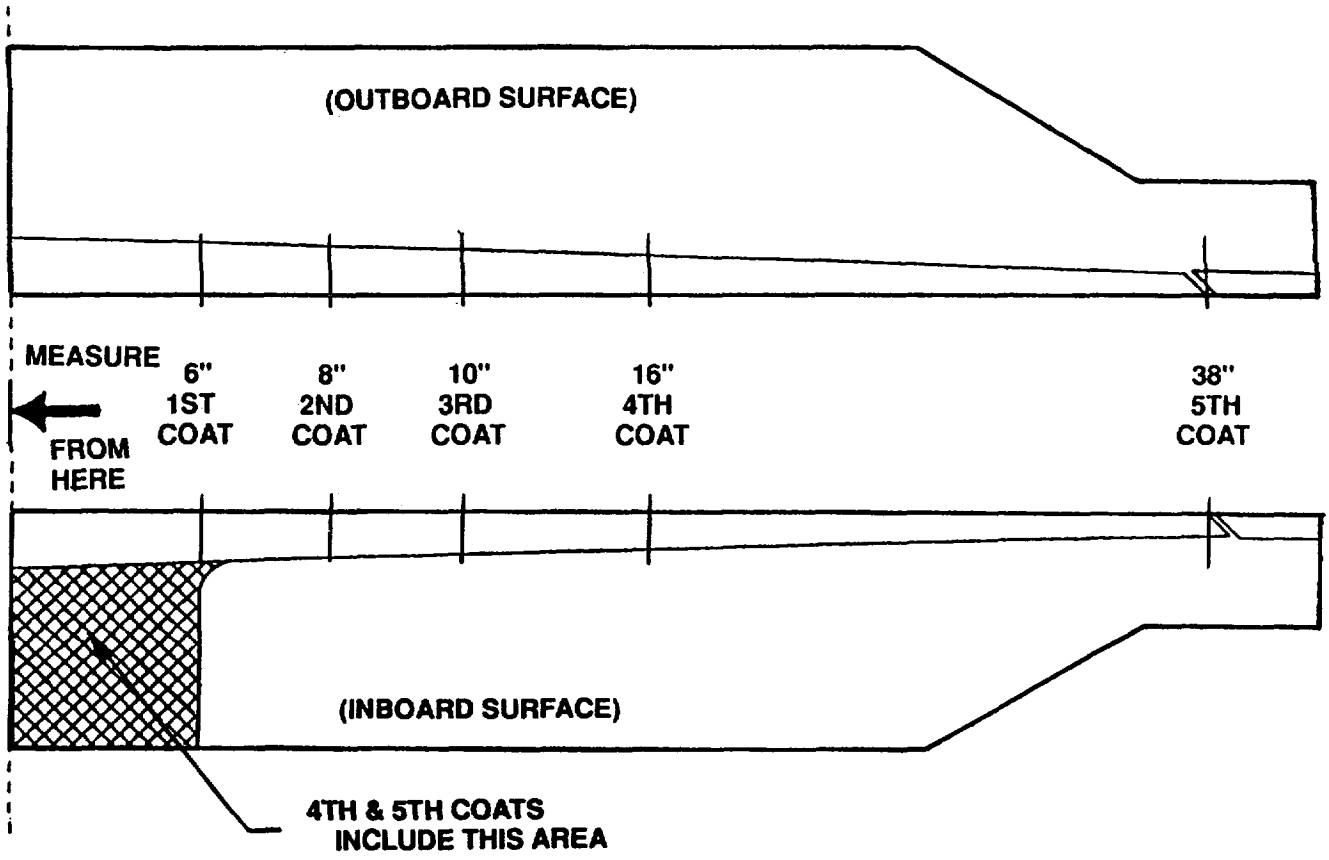


Figure 2-8. AH-1 Coating Pattern Dimensions - Tail Rotor (Sheet 1 of 2)

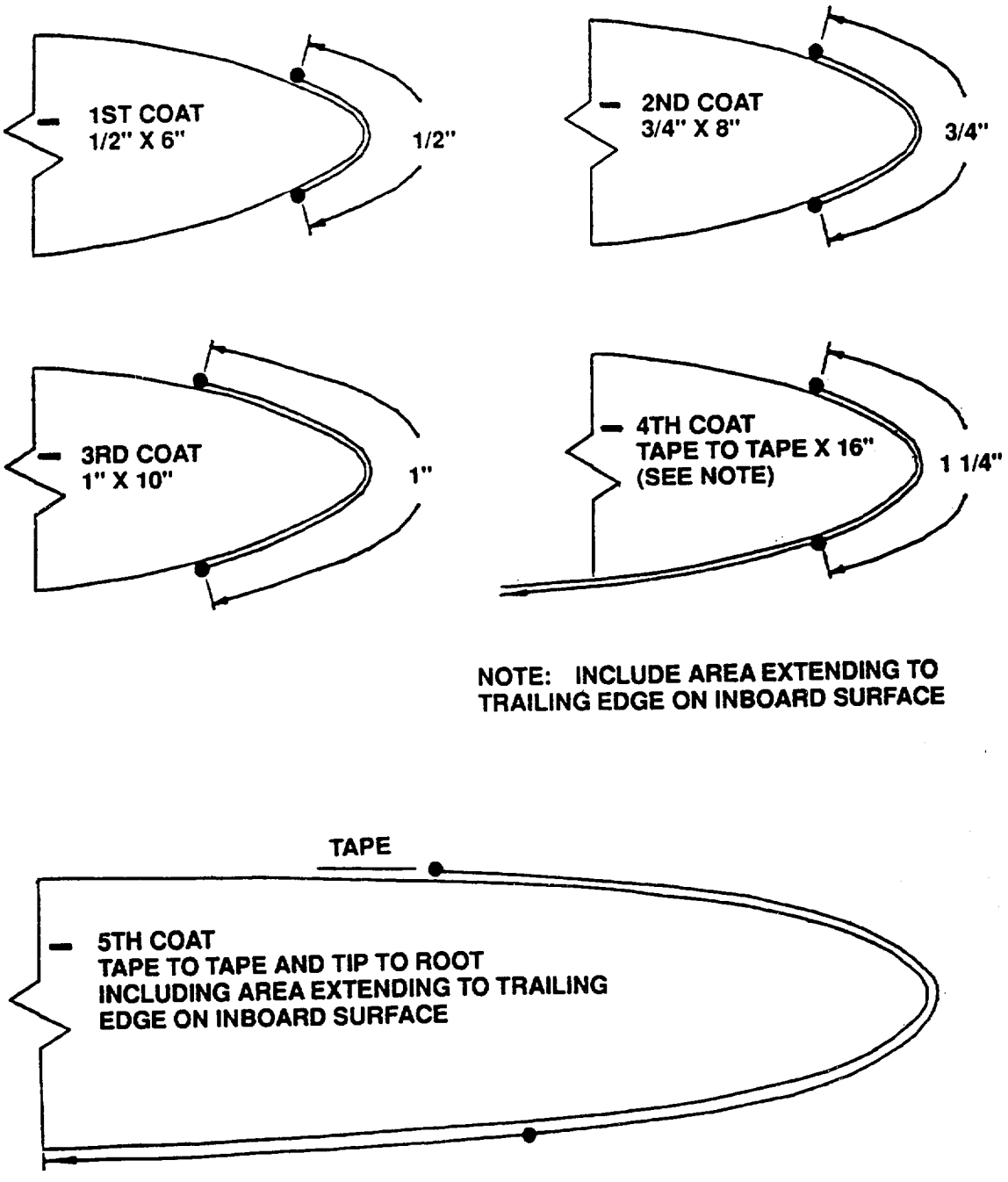


Figure 2-8. AH-1 Coating Pattern Dimensions - Tail Rotor (Sheet 2 of 2)

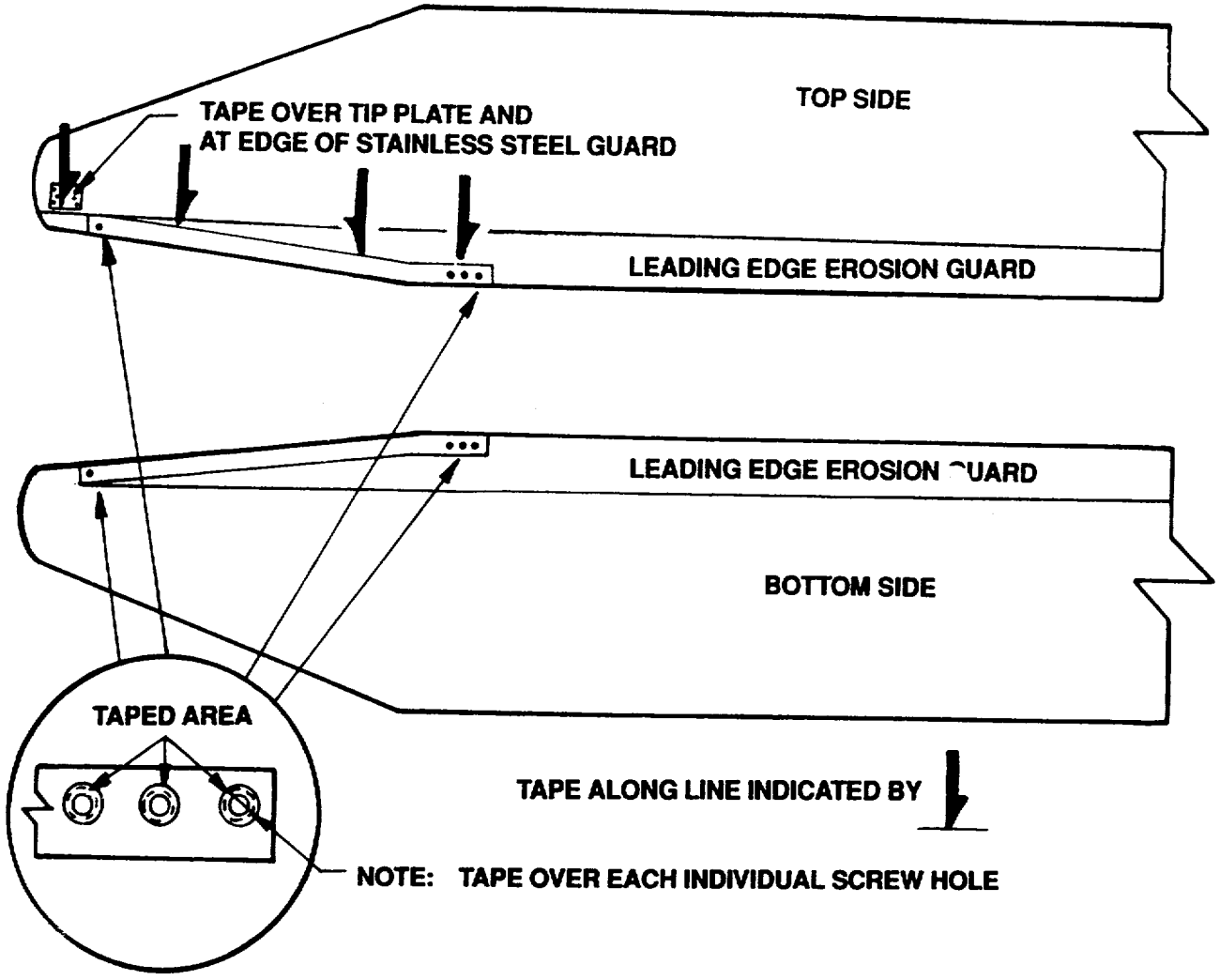


Figure 2-9. AH-1 Tape Layout, K747 Main Rotor

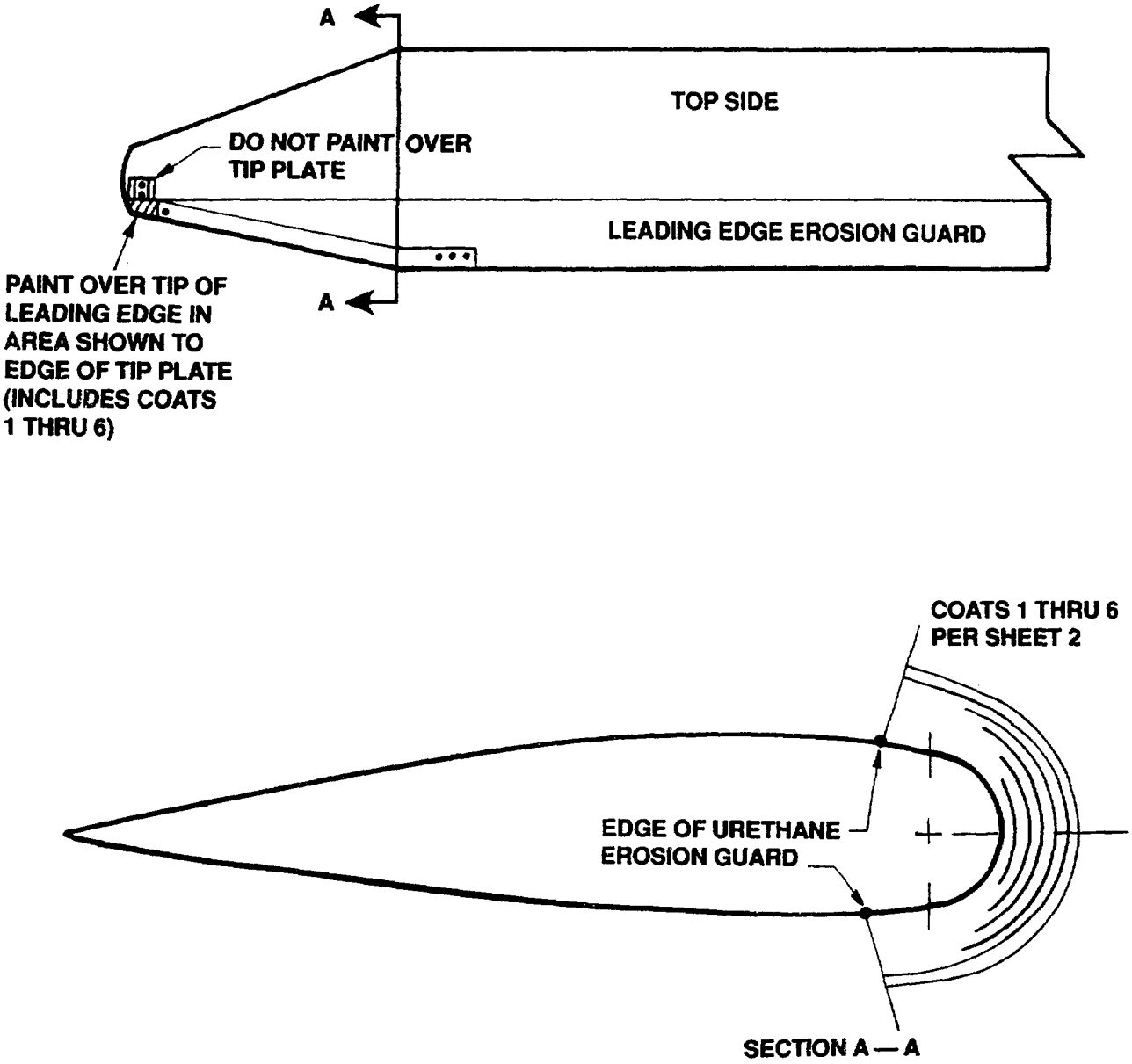


Figure 2-10. AH-1 Coating Pattern Dimensions - K747 Main Rotor (Sheet 1 of 2)

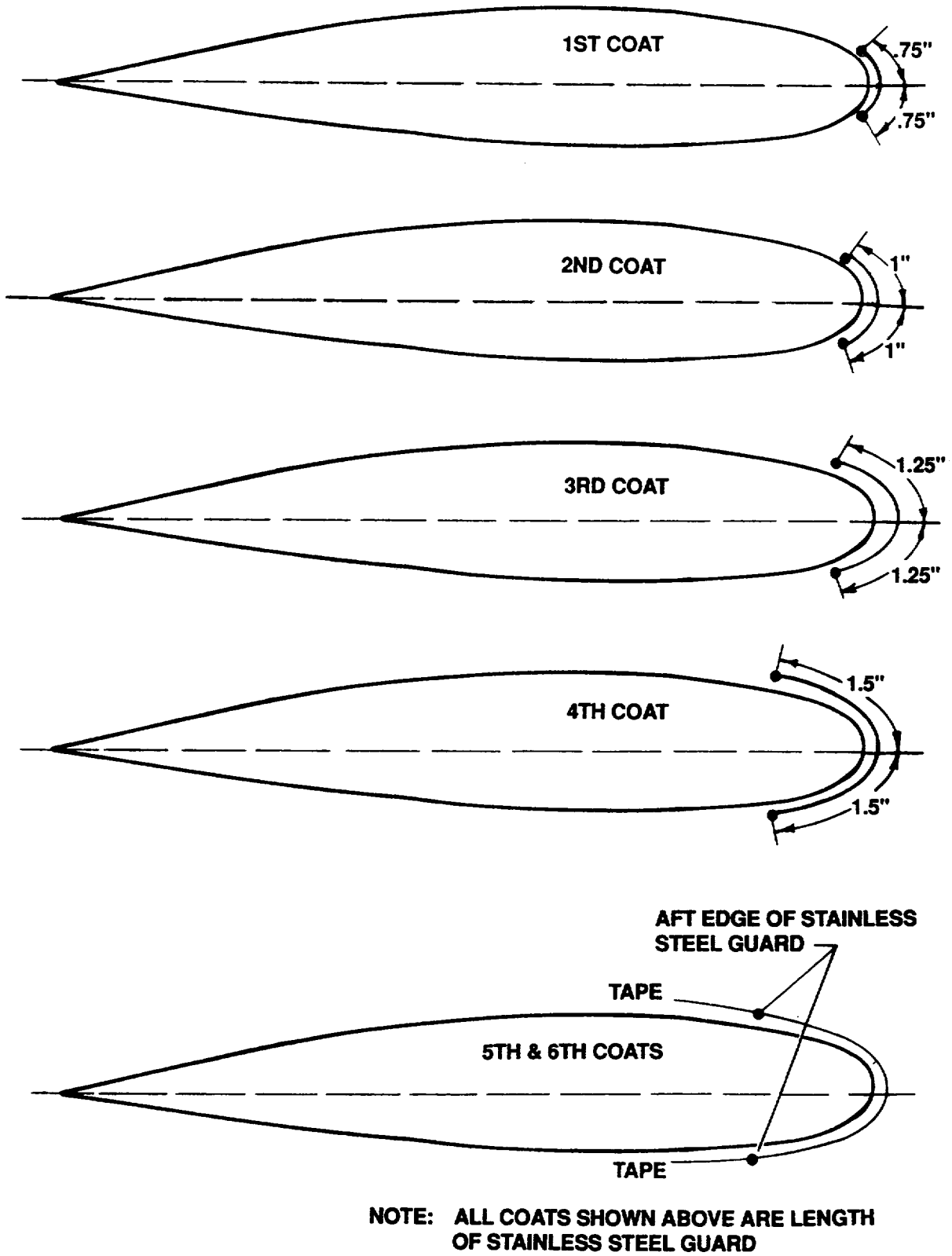


Figure 2-10. AH-1 Coating Pattern Dimensions - K747 Main Rotor (Sheet 2 of 2)

Section III. OH-58C

Refer to tables 2-7 through 2-9, and figures 2-11 through 2-14 for erosion protection data for the OH-58C aircraft blades.

NOTE

Denatured alcohol (O-E-760) or isopropyl alcohol (TT-I-735) is required for this installation and must be obtained locally. NSN 6810-00-286-5435

Table 2-7.

OH-58C Rotor Blade Erosion/Spark Guard Kit
NSN 1615-01-209-6097, Task Research P/N 25-1012-00

Kit	**Quantity**
Instruction sheets	2 each
Masking tape, 1" x 60 yd (Grade B)	1 roll
Sandpaper, 80 grit, 2 1/2 x 18" strip	4 sheets
Wiping cloth, paper cheesecloth	10 each
Gloves, disposable, large size	10 pair
Brushes, disposable, 2" wide bristles	10 each
Trash bag, small	1 each
Paper towel, folded	1/4 pkg
Task L-100 prepackage kit #25-1004-00	20 kits

Table 2-8.

OH-58C Main Rotor Application Dimensions and Quantities

First coat	1 can to 2 blades (1/2 can per blade)	3/4" wide by 24" long
Second coat	1 can to 2 blades (1/2 can per blade)	1" wide by 30" long
Third coat	1 1/2 can to 2 blades (3/4 can per blade)	1 1/2" wide by 36" long
Fourth coat	1 can to 1 blade	2" wide by 48" long
Fifth coat	1 1/2 cans to 1 blade	Total application area
Sixth coat	1 1/2 cans 1 bade	Total application area

Table 2-9.

OH-58C Tail Rotor Application Dimensions and Quantities

One coat	1/2 can to 1 blade	Total application area

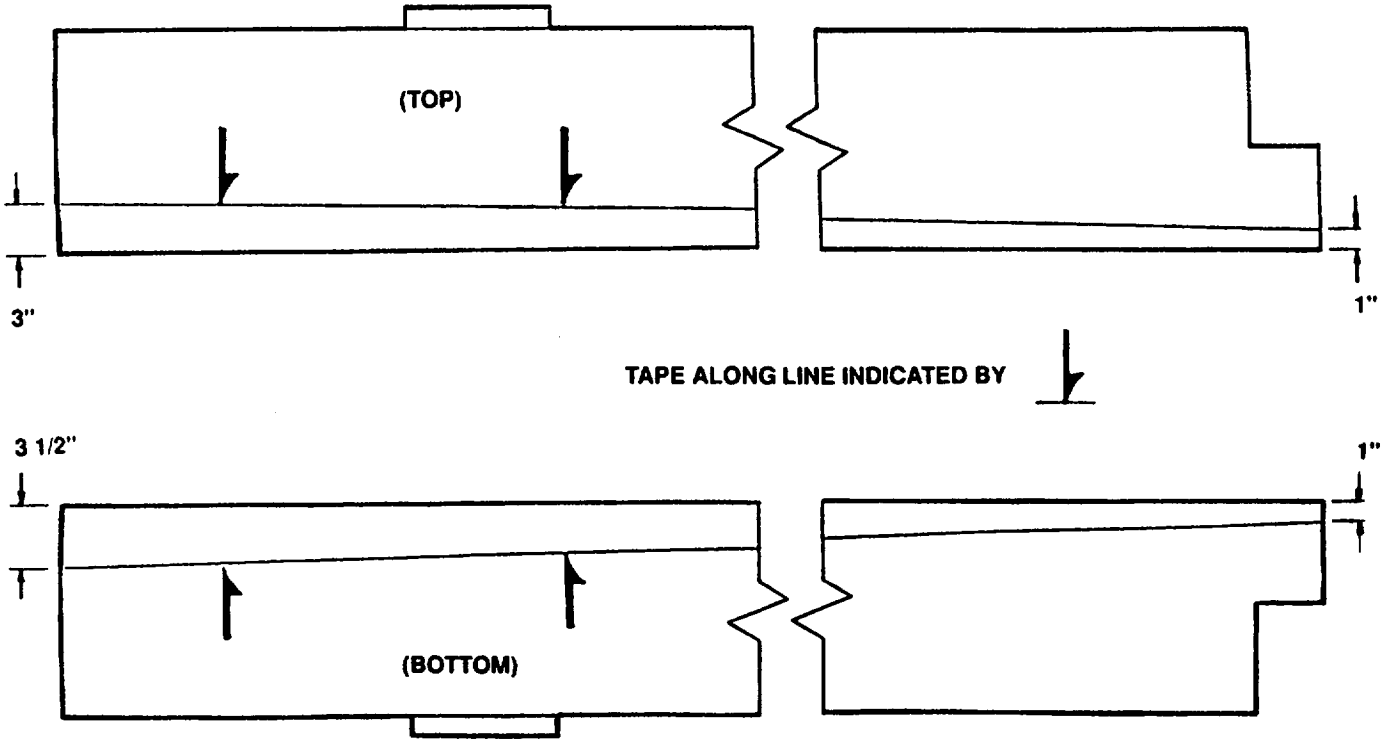


Figure 2-11. OH-58C Tape Layout, Main Rotor

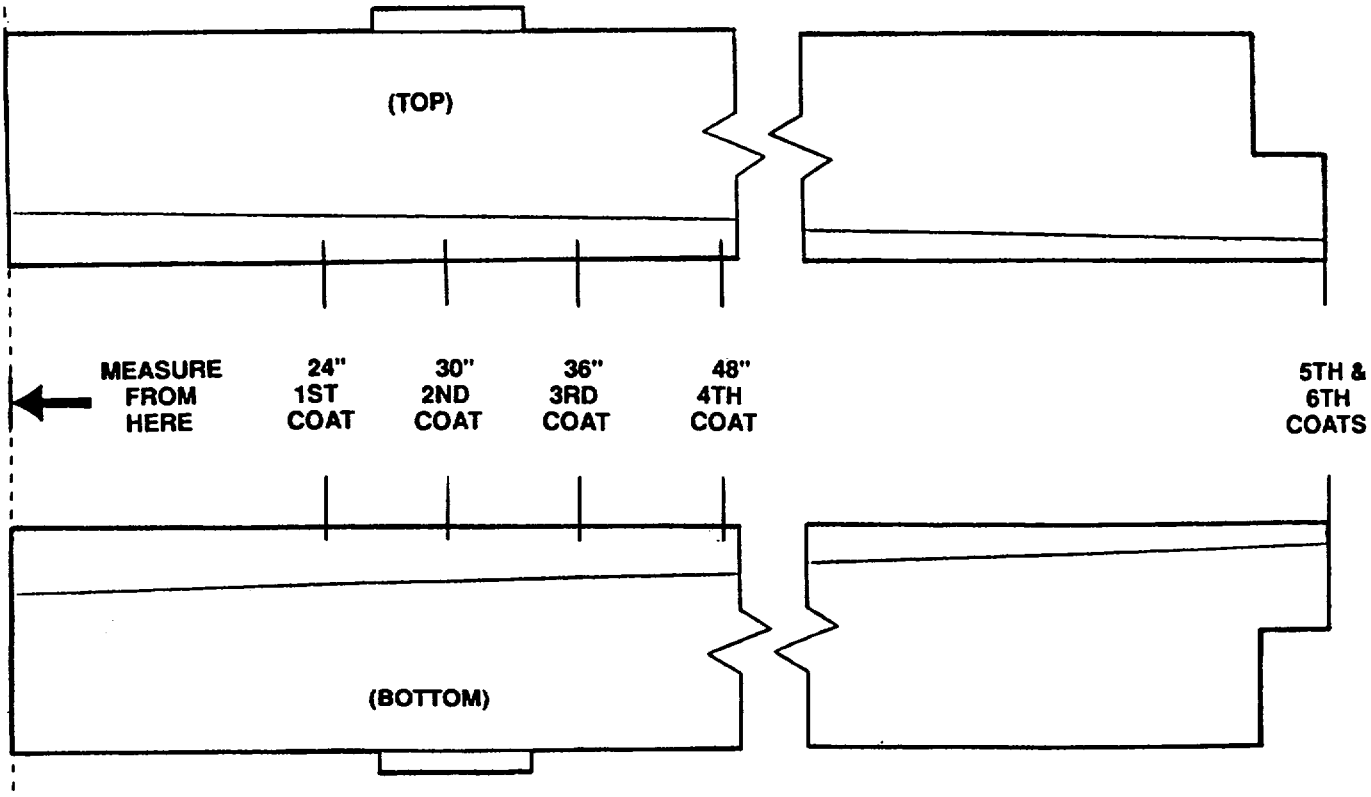


Figure 2-12. OH-58C Coating Pattern Dimensions - Main Rotor (Sheet 1 of 2)

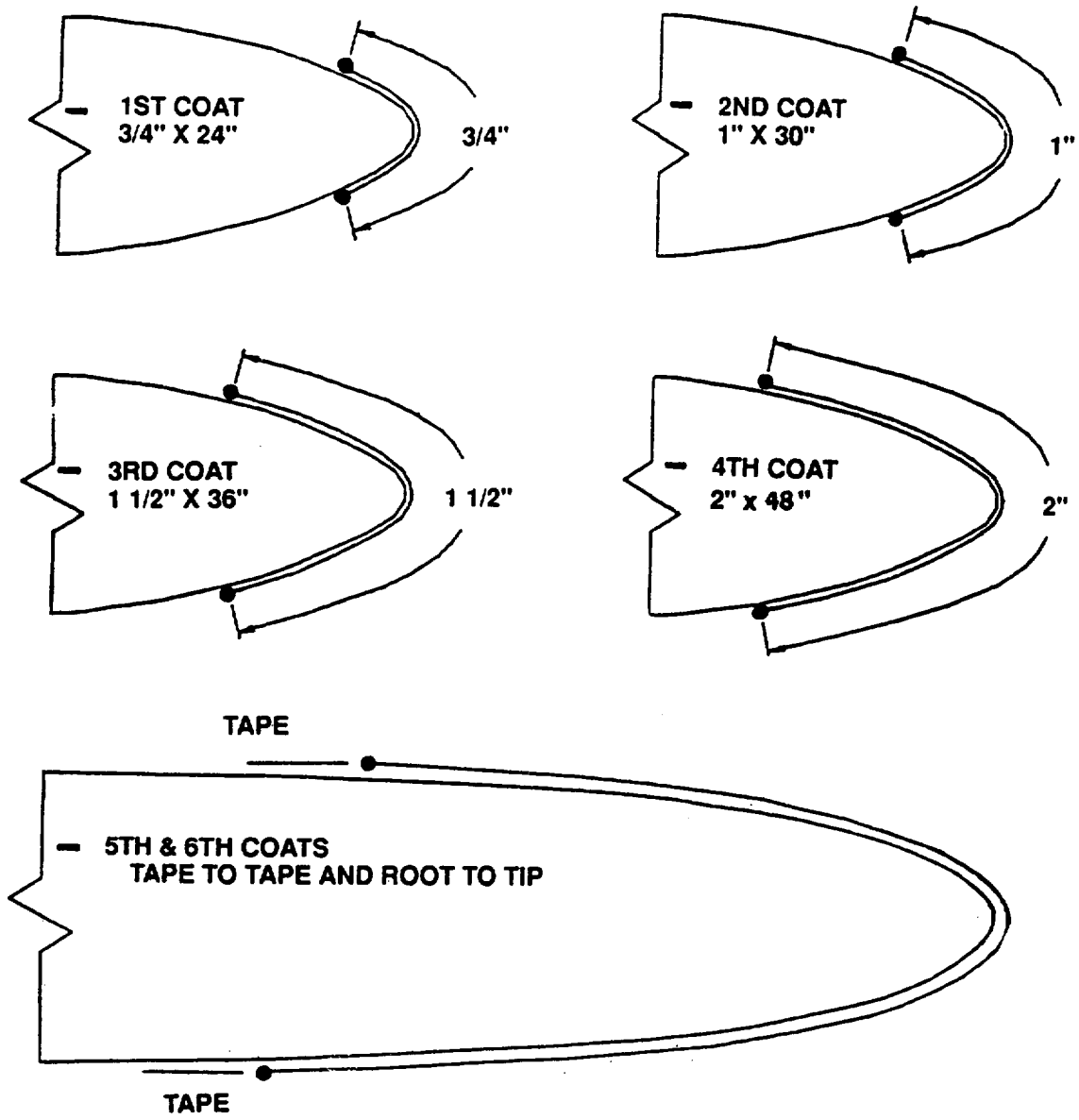


Figure 2-12. OH-58C Coating Pattern Dimensions - Main Rotor (Sheet 2 of 2)

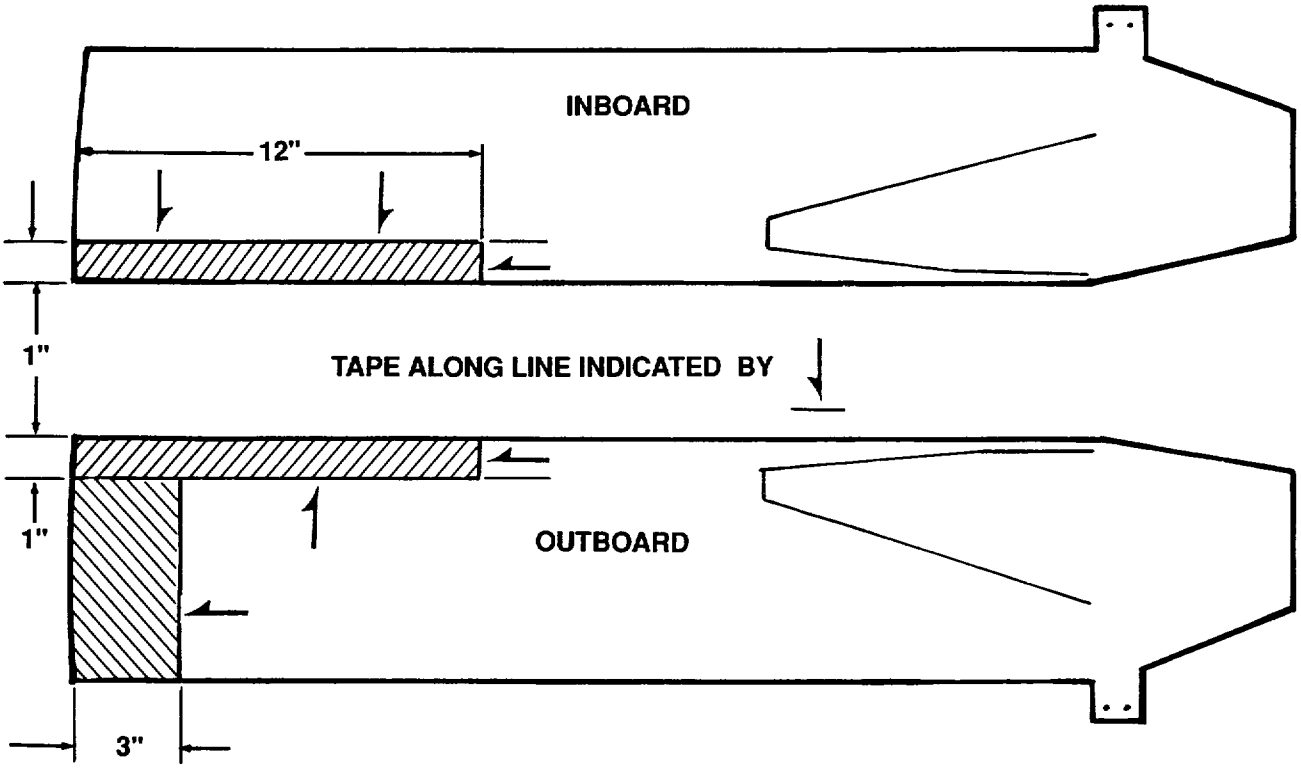


Figure 2-13. OH-58C Tape Layout, Tail Rotor

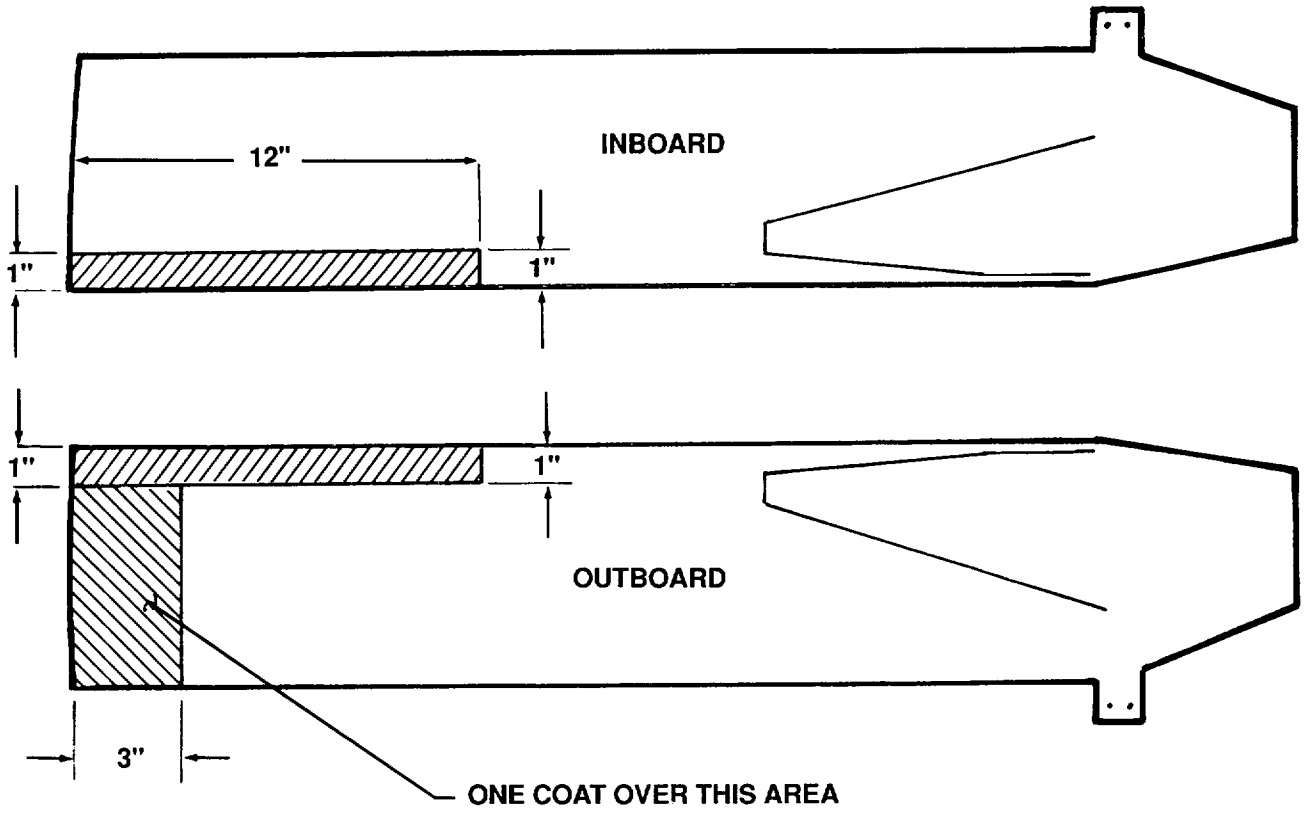


Figure 2-14. OH-58C Coating Pattern Dimensions -Tail Rotor (Sheet 1 of 2)

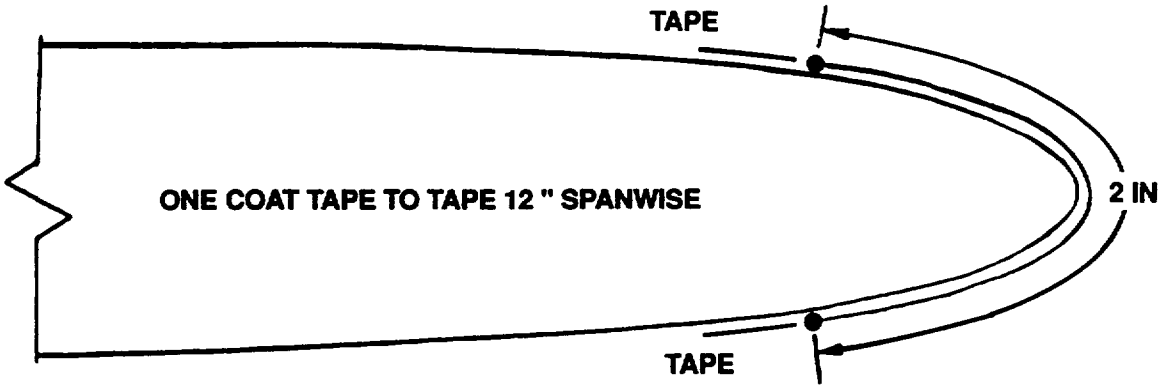


Figure 2-14. OH-58C Coating Pattern Dimensions - Tail Rotor (Sheet 2 of 2)

Section IV. OH-58D

Refer to tables 2-10 through 2-12 and figures 2-15 through 2-18 for erosion protection data for the OH-58D aircraft blades.

NOTE

Denatured alcohol (O-E-760) or isopropyl alcohol (TT-I-735) is required for this installation and must be obtained locally. NSN 6810-00-286-5435

Table 2-10.

OH-58D Rotor Blade Erosion/Spark Guard Kit
NSN 1615-01-209-6097, Task Research P/N 25-1012-00

Kit	Quantity
Instruction sheets	2 each
Masking tape, 1" x 60 yd (Grade B)	2 rolls
Sandpaper, 80 grit, 2 1/2 x18" strip	5 sheets
Wiping cloth, paper cheesecloth	8 each
Gloves, disposable, large size	12 pair
Brushes, disposable, 2" wide bristles	10 each
Trash bag, small	2 each
Paper towel, folded	1 pkg
Task L-100 prepackage kit #25-1004-00	20 kits

Table 2-11.

OH-58D Main Rotor Application Dimensions and Quantities

First coat	1 can to 4 blades (1/4 can per blade)	1" wide by 30" long
Second coat	1 1/2 can to 4 blades (3/8 can per blade)	1 1/2" wide by 42" long
Third coat	1 1/2 can to 2 blades (3/4 can per blade)	2" wide by 72" long
Fourth coat	1 can to 1 blade	Total application area

Table 2-12.

OH-58D Tail Rotor Application Dimensions and Quantities

First coat	1/2 can to 2 blades (1/4 can per blade)	1/2" wide by 12" long
Second coat	1/2 can to 2 blades (1/4 can per blade)	3/4" wide by 16" long
Third coat	1/2 can to 2 blades (1/4 can per blade)	1" wide by 20" long
Fourth coat	1 can to 1 blade	Total application area

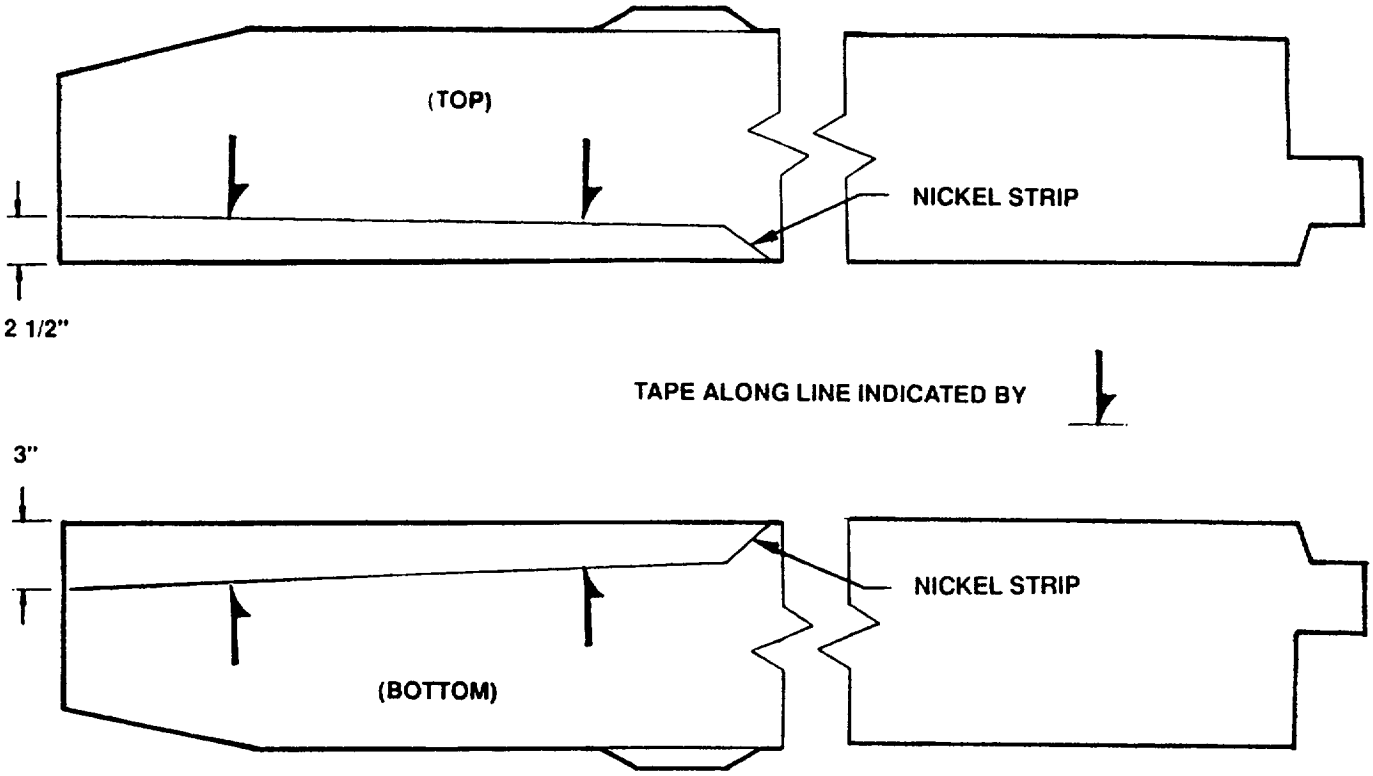


Figure 2-15. OH-58D Tape Layout, Main Rotor

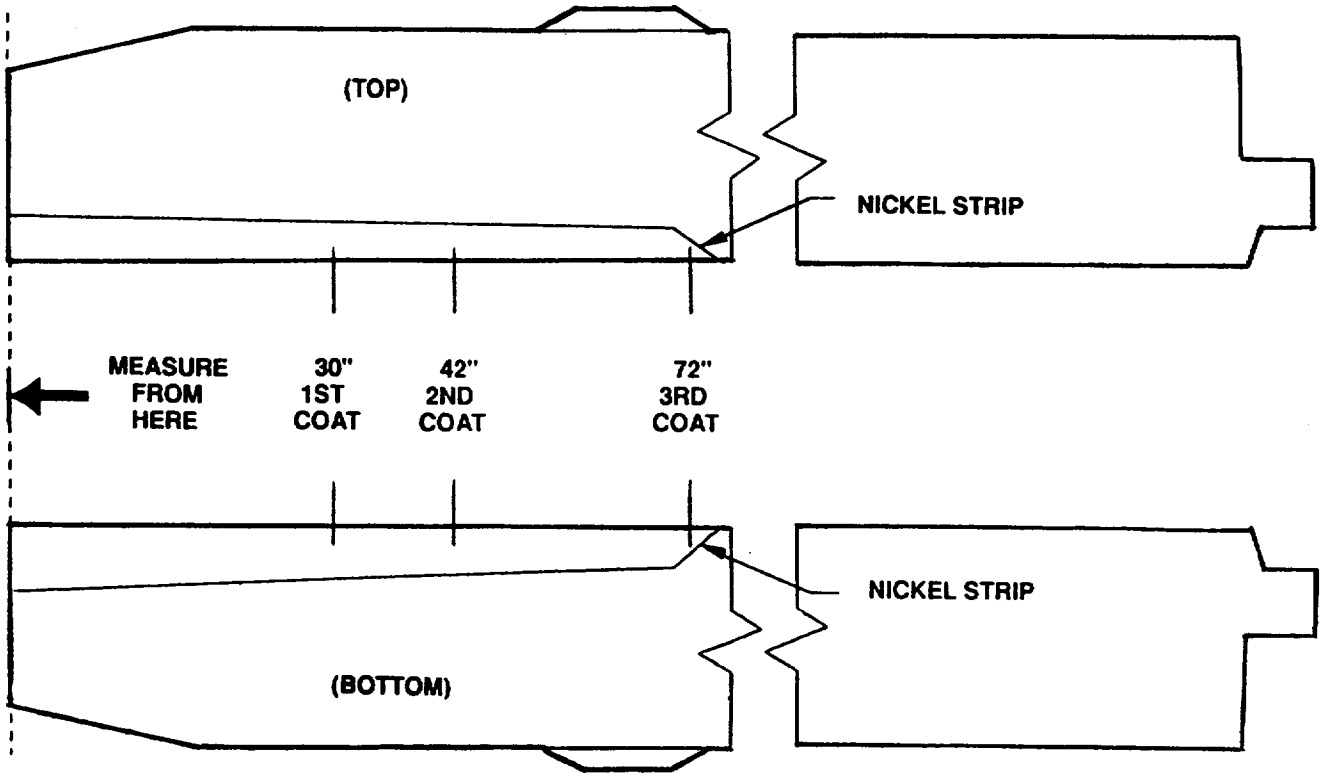


Figure 2-16. OH-58D Coating Pattern Dimensions - Main Rotor (Sheet 1 of 2)

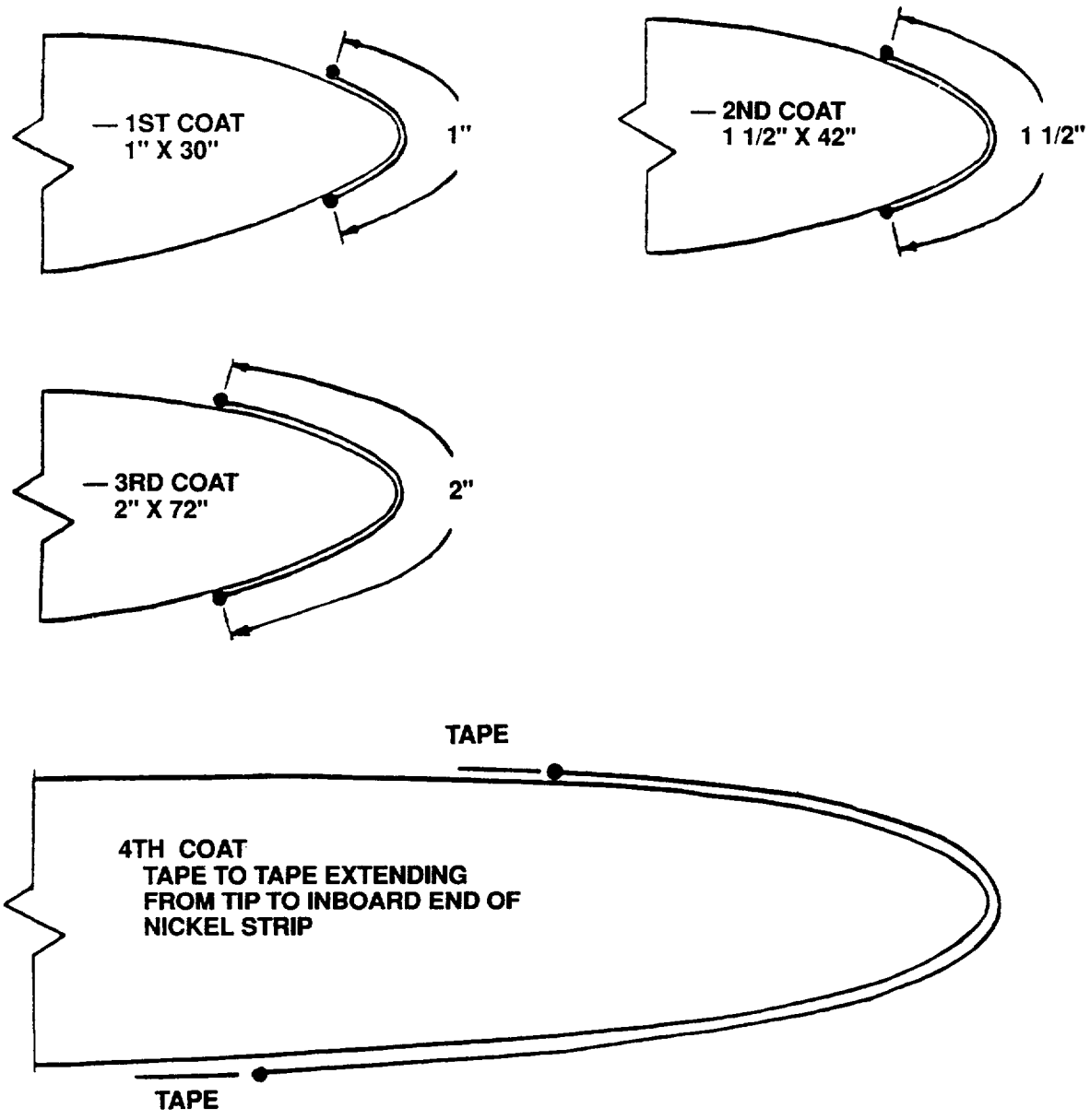


Figure 2-16. OH-58D Coating Pattern Dimensions - Main Rotor (Sheet 2 of 2)

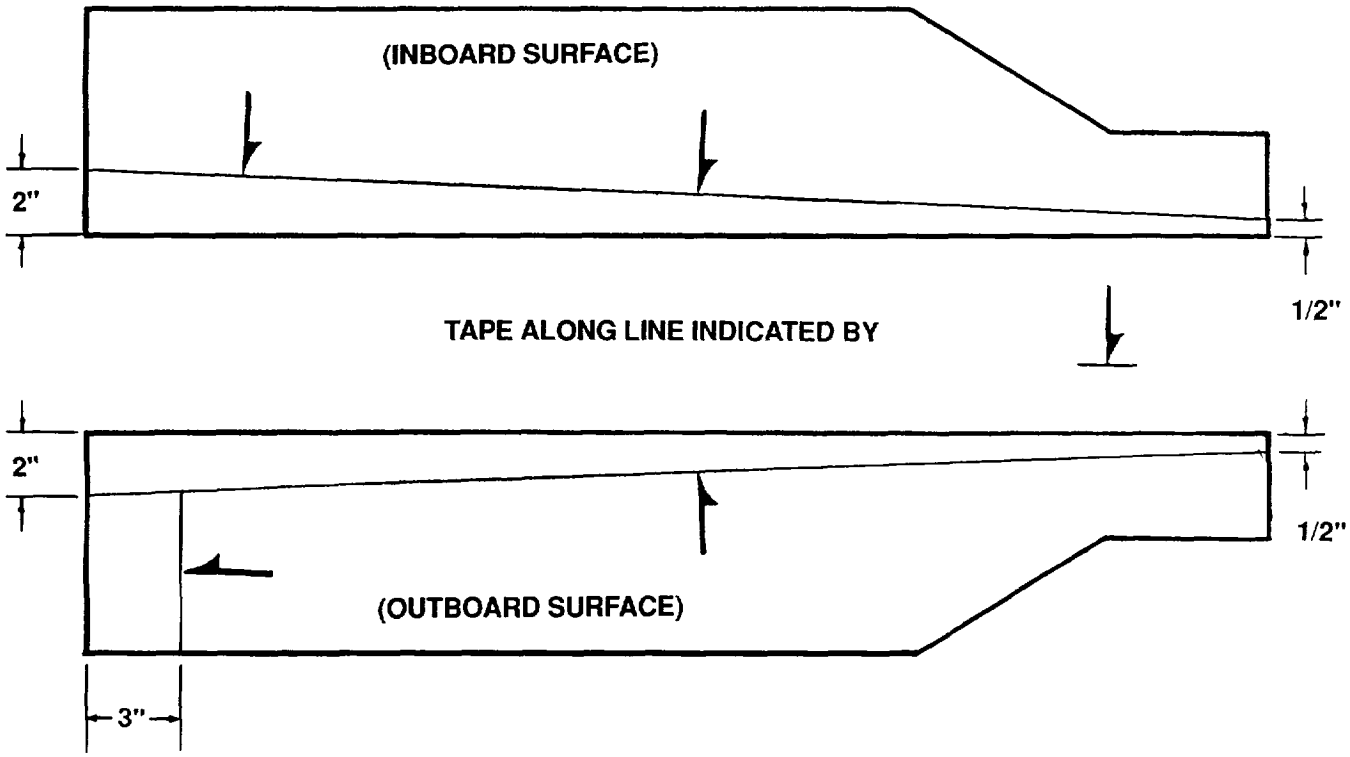


Figure 2-17. OH-58D Tape Layout, Tail Rotor

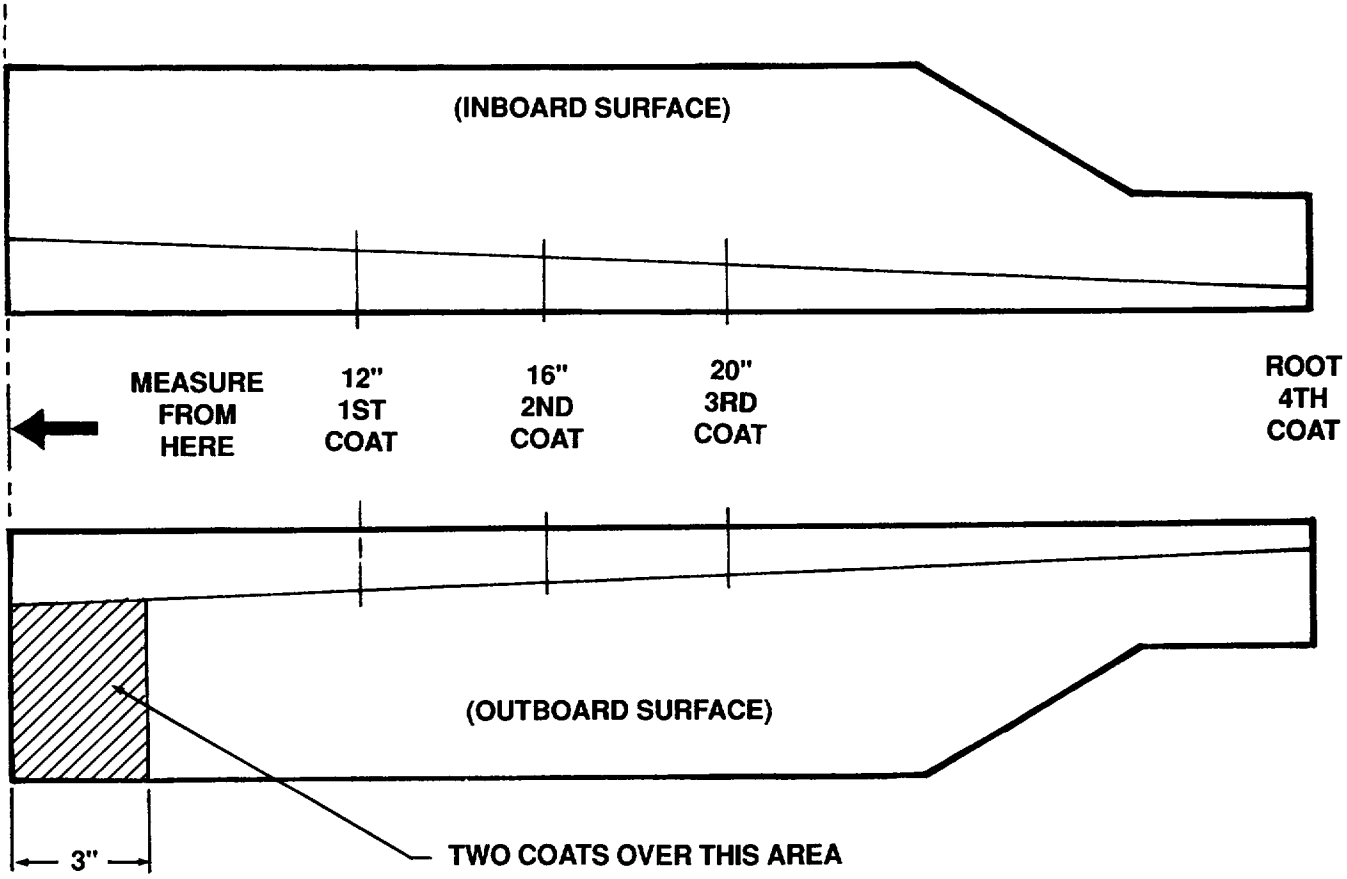


Figure 2-18. OH-58D Coating Pattern Dimensions - Tail Rotor (Sheet 1 of 2)

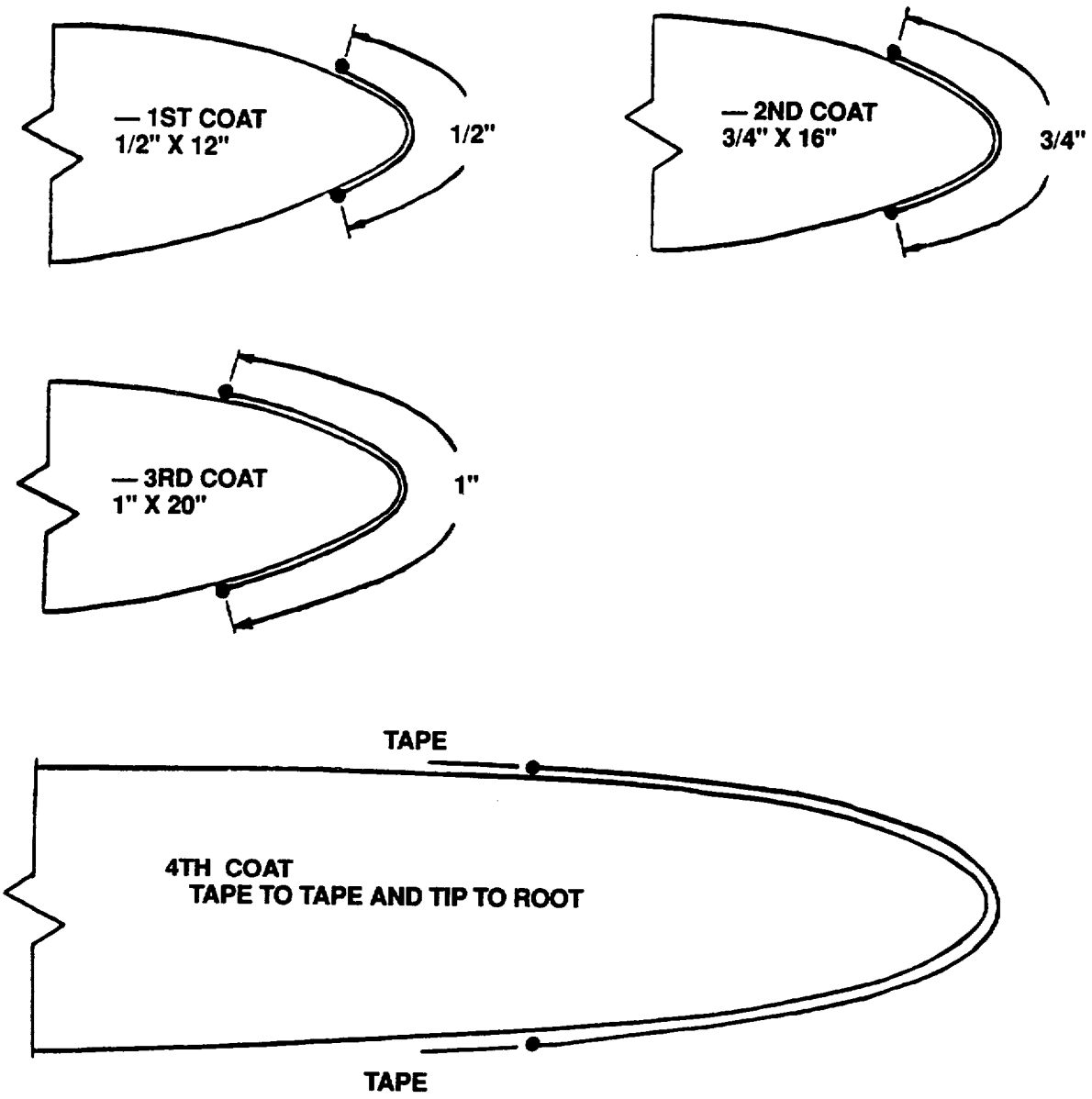


Figure 2-18. OH-58D Coating Pattern Dimensions - Tail Rotor (Sheet 2 of 2)

Section V. CH-47D

Refer to tables 2-13 and 2-14, and figures 2-19 through 2-21 for erosion protection data for the CH-47D aircraft blades.

NOTE

Denatured alcohol (O-E-760) or isopropyl alcohol (TT-I-735) is required for this installation and must be obtained locally. NSN 6810-00-286-5435

Table 2-13.

CH-47 Rotor Blade Erosion/Spark Guard Kit
NSN 1615-01-180-2624, Task Research P/N 5-1005-00

Kit	Quantity
Instruction sheets	2 each
Template, CH-47, Paint-on area, #25-1007-00	6 each
Masking tape, 1" x 60 yd (Grade B)	2 rolls
Sandpaper, 80 grit, 2 1/2 x 18" strip	9 sheet
Wiping cloth, paper cheesecloth	12 each
Gloves, disposable, large size	12 pair
Brushes, disposable, 2" wide bristles	24 each
Sponge roller, 3" wide x 1 1/4" dia. disposable	12 each
Trash bag, small	6 each
Paper towel, folded	1 pkg
Task L-100 prepackage kit #25-1004-00	90 kits

Table 2-14.

CH-47 Forward Rotor Application Dimensions and Quantities

First coat	1 can to 1 blade	2" wide by 60" long
Second coat	1 can to 1 blade	2 1/2" wide by 72" long
Third coat	2 cans to 1 blade	3" wide by 84" long
Fourth coat	3 cans to 1 blade	4 wide by 120" long
Fifth coat	4 cans to 1 blade	Total application area to within 1/2" of tape
Sixth coat	4 cans to 1 blade	Total application area

NOTE: Rollers should be used to apply coating or the large areas in the fifth and sixth coats.

NOTE

CH-47 Aft Rotor Application Dimensions and Quantities.

The aft rotor on this aircraft type is coated in accordance with the forward rotor instructions.

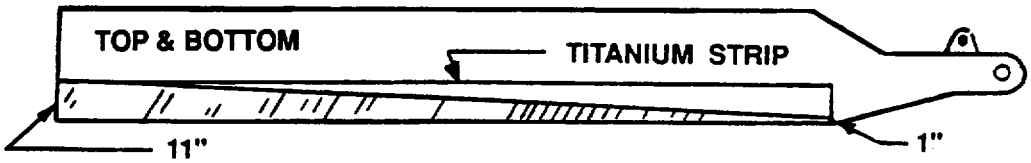


Figure 2-19. CH-47D Tape Layout

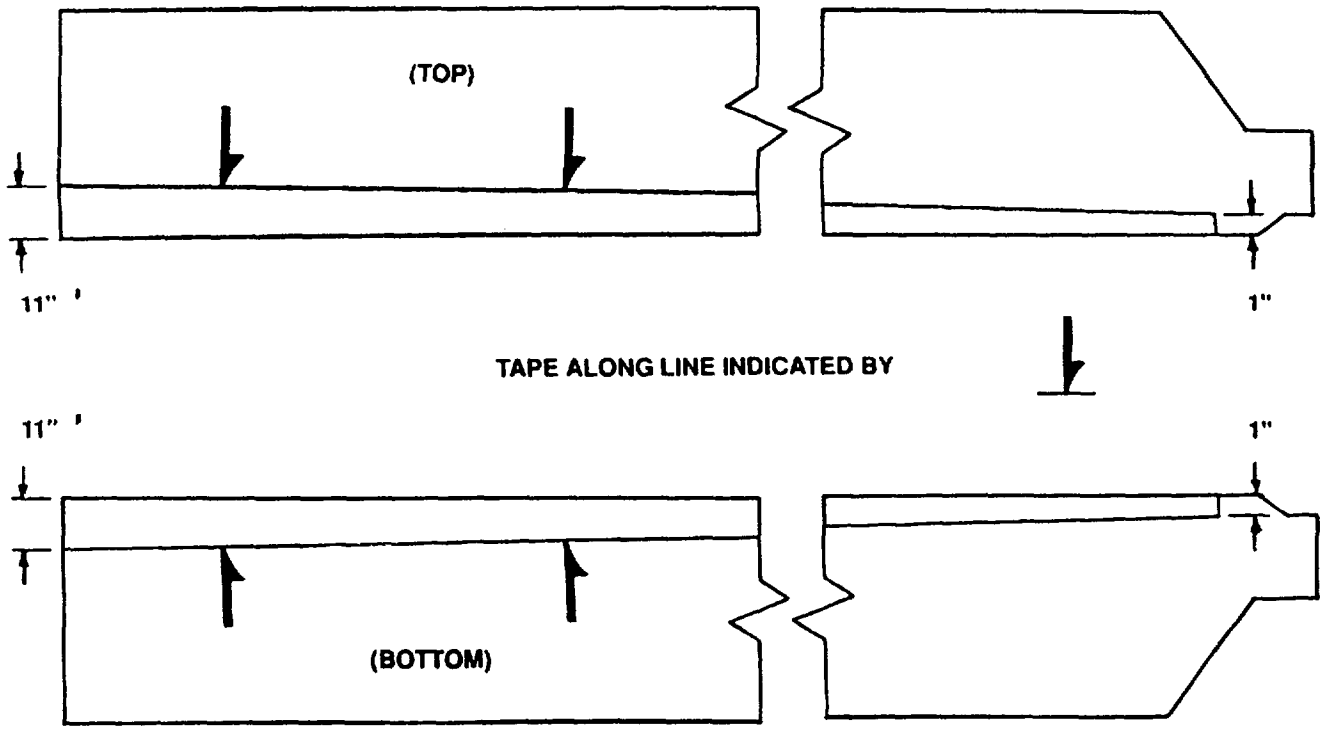


Figure 2-20. CH-47 Tape Layout, Main Rotor

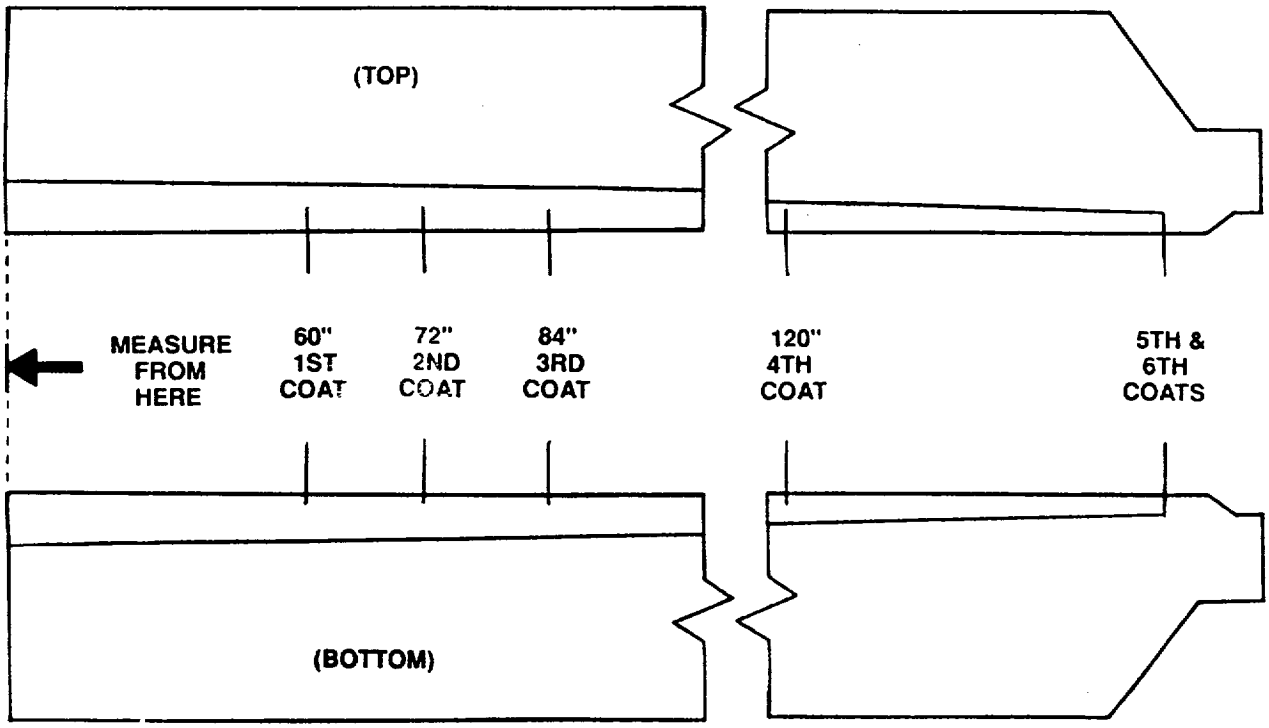


Figure 2-21. CH-47 Coating Pattern Dimensions - Main Rotor (Sheet 1 of 2)

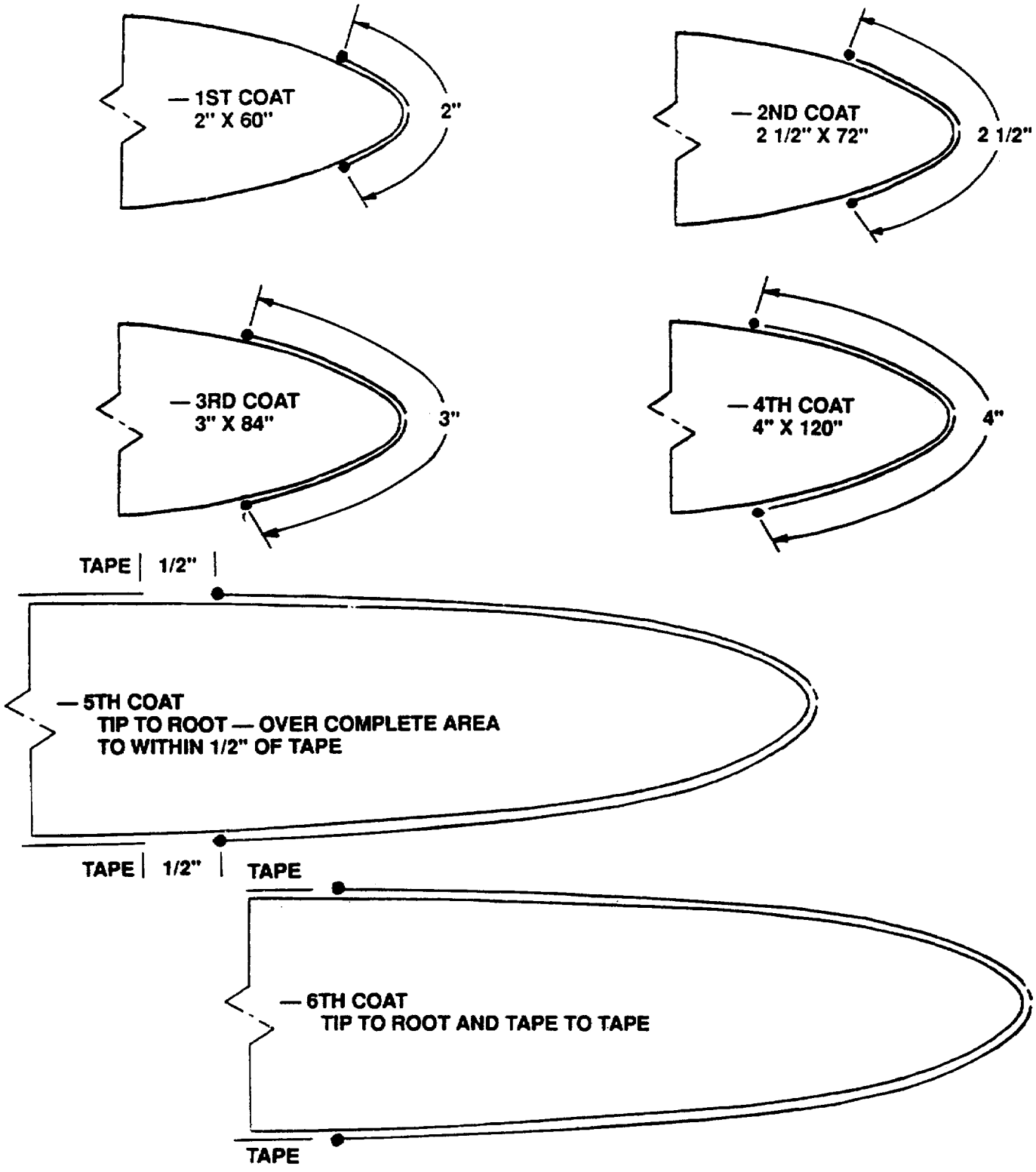


Figure 2-21. CH-47 Coating Pattern Dimensions - Main Rotor (Sheet 2 of 2)

Section VI. UH-60

Refer to tables 2-15 through 2-17 and figures 2-22 through 2-25 for erosion protection data for the UH-60 aircraft blades.

NOTE

Denatured alcohol (O-E-760) or isopropyl alcohol (TT-I-735) is required for this installation and must be obtained locally. NSN 6810-00-286-5435

Table 2-15.

UH-60 Rotor Blade Erosion/Spark Guard Kit
NSN 1615-01-209-6097, Task Research P/N 25-1012-00

Kit	Quantity
Instruction sheets	2 each
Masking tape, 1" x 60 yd (Grade B)	3 rolls
Sandpaper, 80 grit, 2 1/2 x 18" strip	10 sheet
Wiping cloth, paper cheesecloth	12 each
Gloves, disposable, large size	24 pair
Brushes, disposable, 2" wide bristles	30 each
Trash bag, small	3 each
Paper towel, folded	2 pkg
Task L-100 prepackage kit #25-1004-00	64 kit

Table 2-16.

UH-60 Main Rotor Application Dimensions and Quantities

First coat	1 can to 4 blades (1/4 can per blade)	1" wide by 48" long
Second coat	1 can to 2 blades (1/2 can per blade)	1 1/4" wide by 72" long
Third coat	1 can to 1 blade	1 1/2" wide by 108" long
Fourth coat	2 cans to 1 blade	2" wide by 144" long
Fifth coat	4 cans to 1 blade	Entire top of blade to 1" overlap on bottom plus swept tip area on the bottom as called out on illustration.
Sixth coat	5 cans to 1 blade	Entire bottom of blade to 1" overlap on top.

NOTE: If the fifth coat has produced slight runs or sags, the touch up procedure of para 1-6 i should be performed before the sixth coat is applied. If the blades were removed before painting, then the blade should be turned upside down before applying the sixth coat to the bottom. The sixth coat should not be applied until the fifth coat has set to be at least tacky to the touch.

Table 2-17.

UH-60 Tail Rotor Application Dimensions and Quantities

First coat	1/2 can to 2 blades	1" wide by 18" long
Second coat	1/2 can to 2 blades	1 1/2" wide by 20" long
Third coat	1/2 can to 2 blades	2" wide by 22" long
Fourth coat	1 can to 1 blade	Total application area

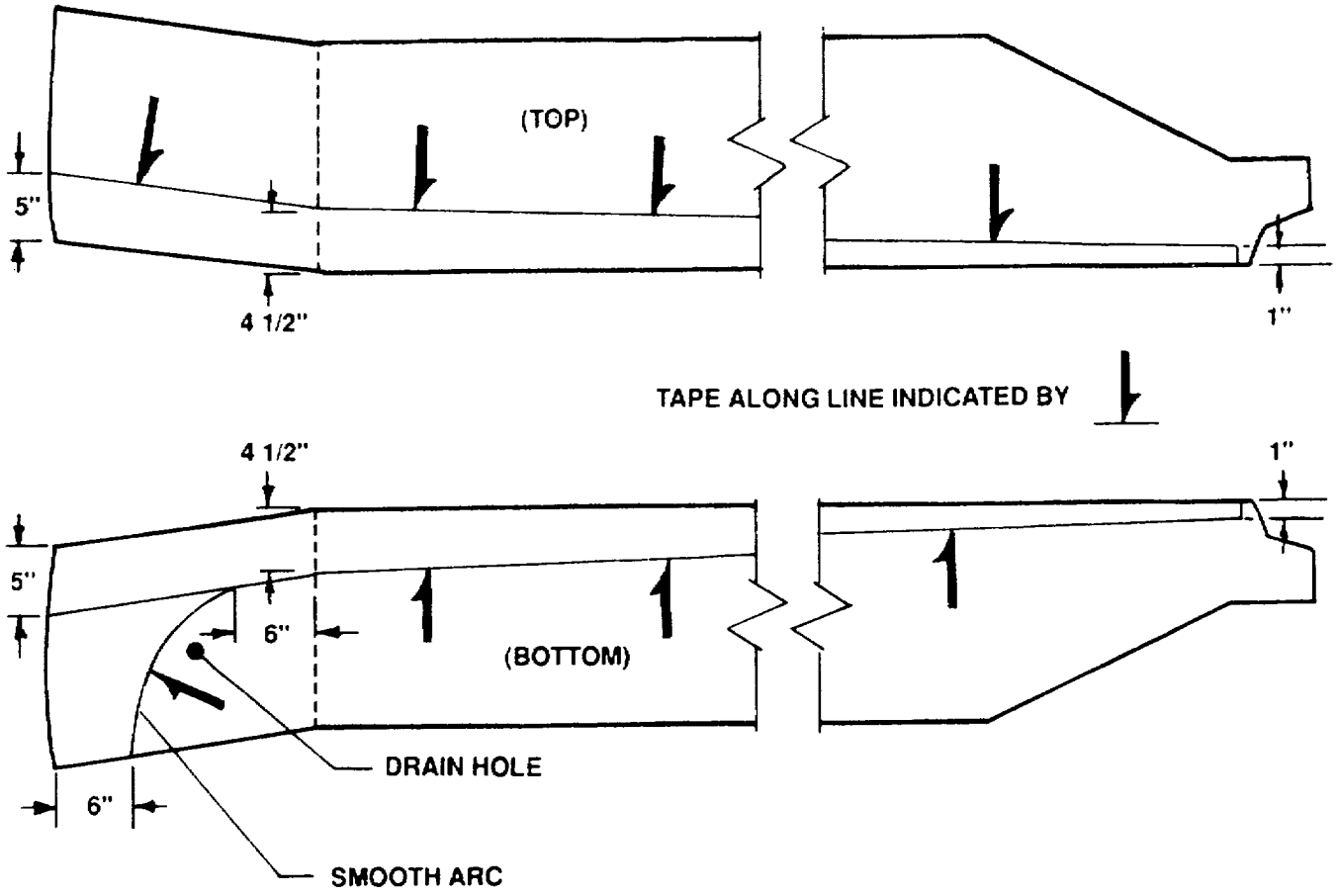


Figure 2-22. UH-60 Tape Layout, Main Rotor

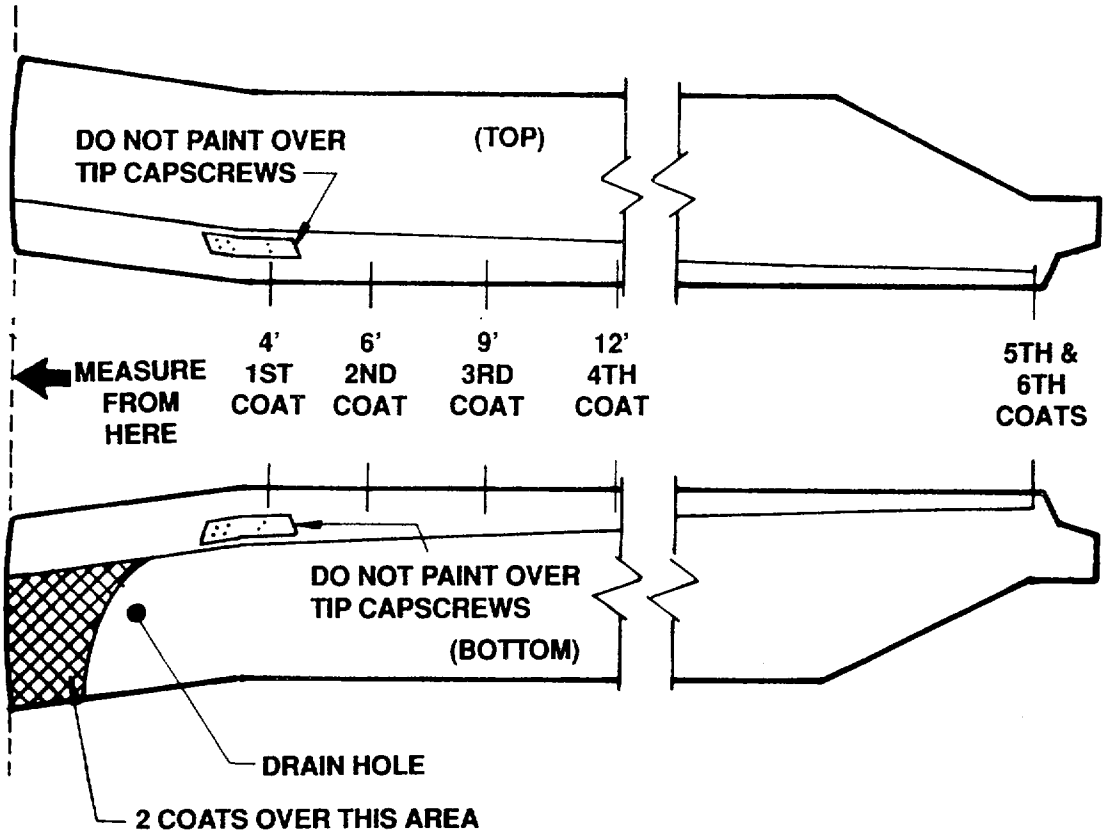


Figure 2-23. UH-60 Coating Pattern Dimensions - Main Rotor (Sheet 1 of 2)

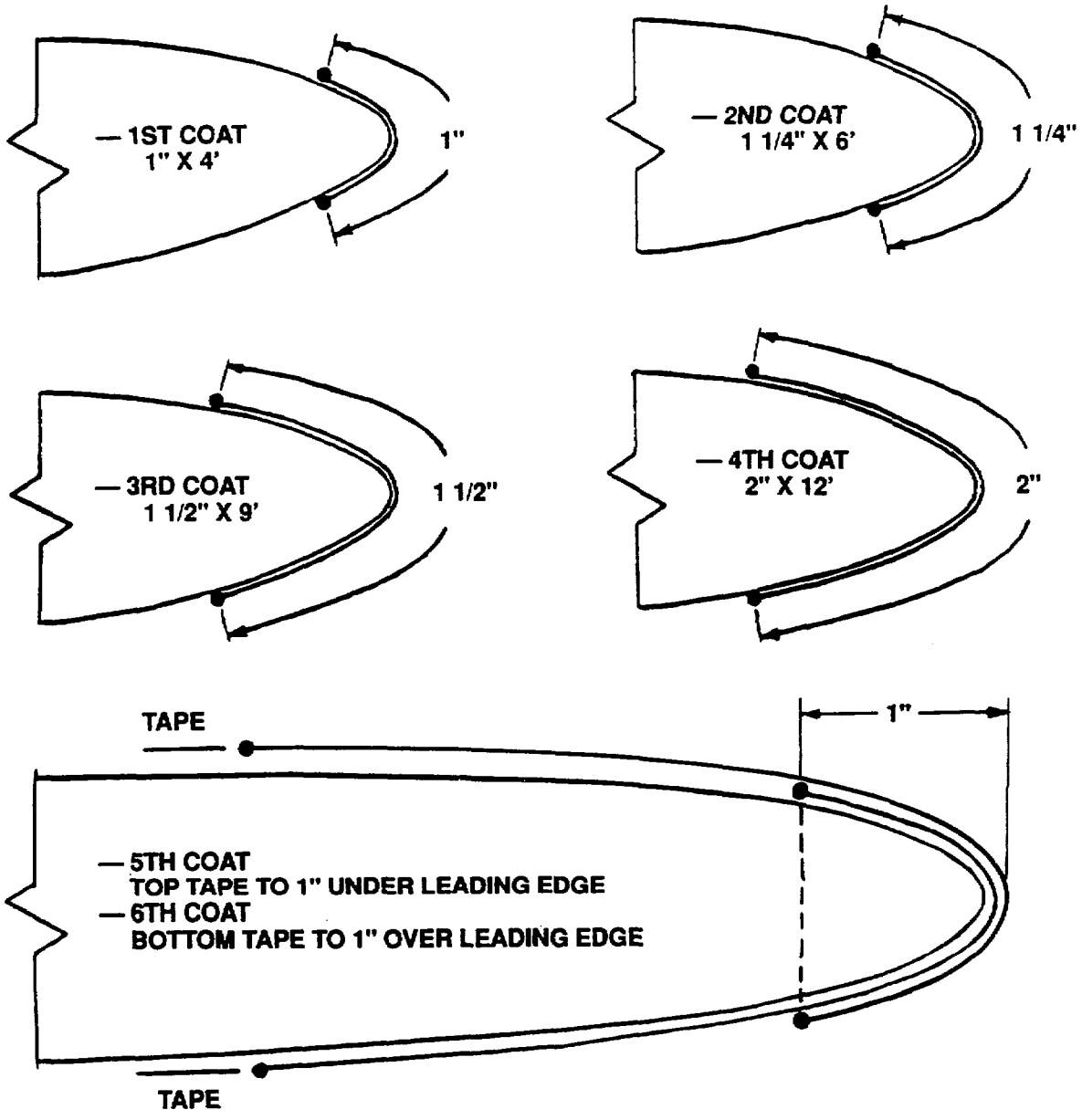


Figure 2-23. UH-60 Coating Pattern Dimensions - Main Rotor (Sheet 2 of 2)

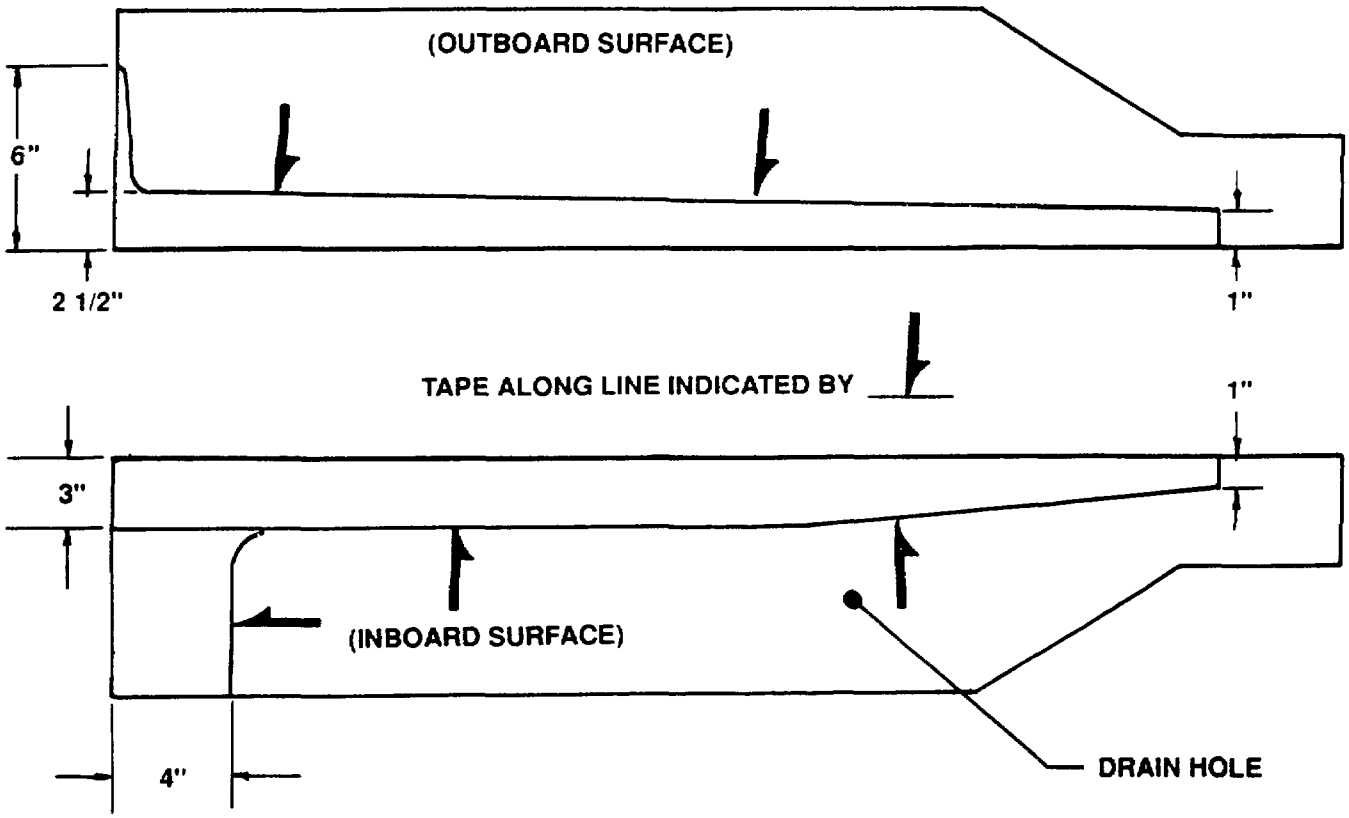


Figure 2-24. UH-60 Tape Layout, Tail Rotor

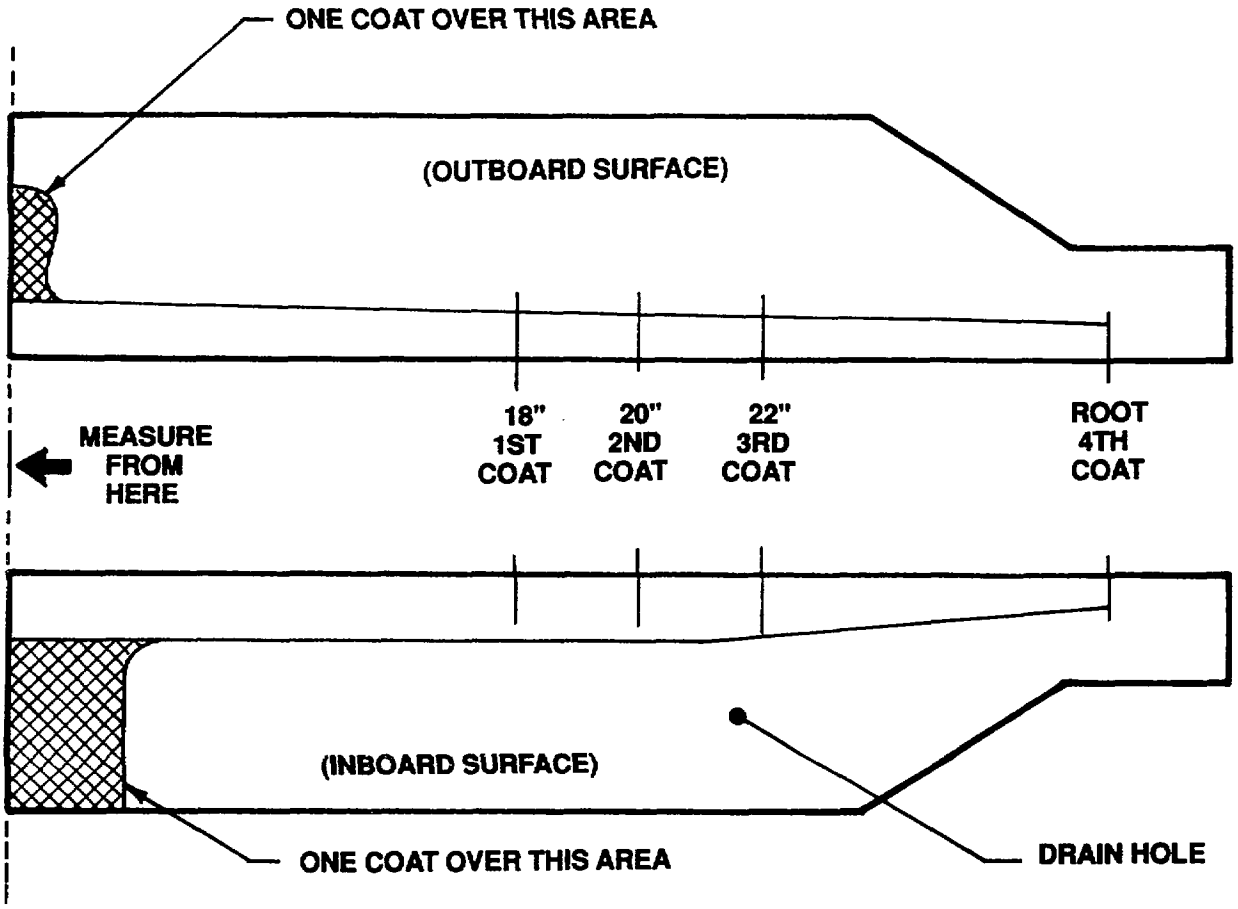


Figure 2-25. UH-60 Coating Pattern Dimensions - Tail Rotor (Sheet 1 of 2)

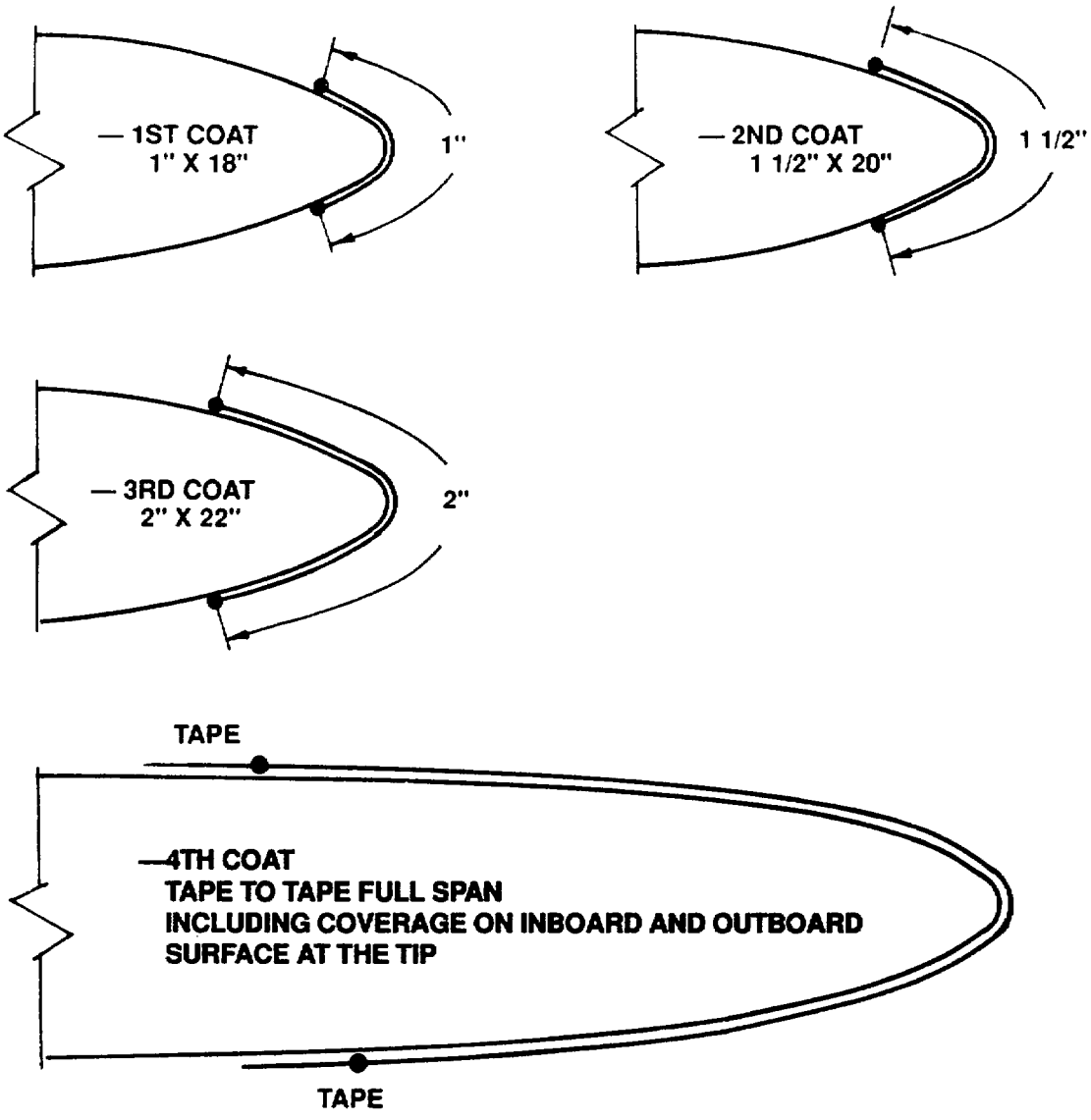


Figure 2-25. UH-60 Coating Pattern Dimensions - Tail Rotor (Sheet 2 of 2)

Section VII. MH-6

Refer to tables 2-18 and 2-19 and figure 2-26 for erosion protection data for the MH-6 aircraft blades.

NOTE

Denatured alcohol (O-E-760) or isopropyl alcohol (TT-I-735) is required for this installation and must be obtained locally. NSN 6810-00-286-5435

Table 2-18.

MH-6 Rotor Blade Erosion/Spark Guard Kit
NSN 1615-01-209-6097, Task Research P/N 25-1012-00

Kit	Quantity
Instruction sheets	2 each
Masking tape, 1" x 60 yd (Grade B)	1 roll
Sandpaper, 80 grit, 2 1/2 x 18" strip	4 sheet
Wiping cloth, paper cheesecloth	12 each
Glows, disposable, large size	10 pair
Brushes, disposable, 2" wide bristles	10 each
Trash bag, small	1 each
Paper towel, folded	1/4 pkg
Task L-100 prepackage kit #25-1004-00	20 kits

Table 2 -19.

MH-6 Main Rotor Application Dimensions and Quantities

First coat	1 can to 2 blades (1/2 can per blade)	Within 1/4" of tape for total application area
Second coat	1 can to 2 blades (1/2 can per blade)	Total application area

NOTE

The MH-6 tail rotor is not coated.

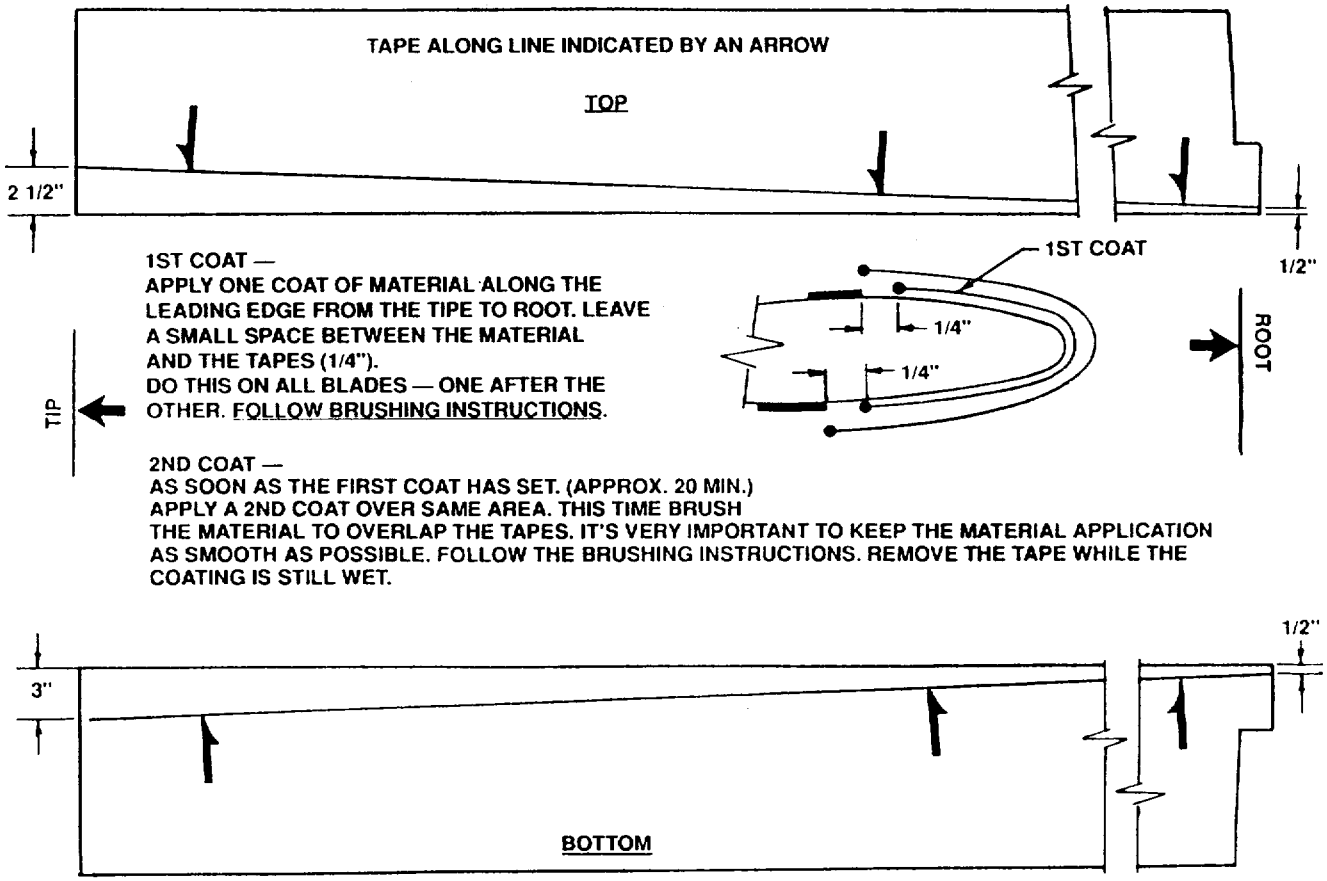


Figure 2-26. MH-6 Tape Mask Layout/Paint Pattern, Main Rotor

Section VIII. UH-1H

Refer to tables 2-20 through 2-22 and figures 2-27 through 2-30 for erosion protection data for the UH-1H aircraft blades.

NOTE

Denatured alcohol (O-E-760) or isopropyl alcohol (TT-I-735) is required for this installation and must be obtained locally. NSN 6810-00-286-5435

Table 2-20.

UH-1 H Rotor Blade Erosion/Spark Guard Kit
NSN 1615-01-209-6097, Task Research P/N 25-1012-00

Kit	Quantity
Instruction sheets	2 each
Masking tape, 1" x 60 yd (Grade B)	2 rolls
Sandpaper, 80 grit, 2 1/2 x 18" strip	6 sheets
Wiping cloth, paper cheesecloth	10 each
Gloves, disposable, large size	6 pair
Brushes, disposable, 2" wide bristles	25 each
Trash bag, small	3 each
Paper towel, folded	2 pkg
Task L-100 prepackage kit #25-1004-00	35 kits

Table 2-21.

UH-1H Main Rotor Application Dimensions and Quantities

First coat	1 can to 2 blades (1/2 can per blade)	1" wide by 48" long
Second coat	1 can to 2 blades (1/2 can per blade)	1 1/2" wide by 56" long
Third coat	3 cans to 2 blades (1 1/2 can per blade)	2" wide by 62" long
Fourth cot	3 cans to 2 blades (1 1/2 cans per blade)	2 1/2" wide by 70" long
Fifth coat	4 cans to 1 blade	Total application area
Sixth coat	4 cans to 1 blade	Total application area

NOTE: If the fifth coat has produced slight runs or sags, the touch up procedure of para 1-6 i should be performed before the sixth coat is applied. If the blades were removed before painting, then the blade should be turned upside down before applying the sixth coat to the bottom. The sixth coat should not be applied until the fifth coat has set to be at least tacky to the touch.

Table 2-22.

UH-1H Tail Rotor Application Dimensions and Quantities

First coat	1/2 can to 2 blades	1/2" wide by 6" long
Second coat	1/2 can to 2 blades	3/4" wide by 8" long
Third coat	1/2 can to 2 blades	1" wide by 10" long
Fourth coat	1 can to 1 blade	Tape to tape 16" long
Fifth coat	1 can to 1 blade	Entire application area

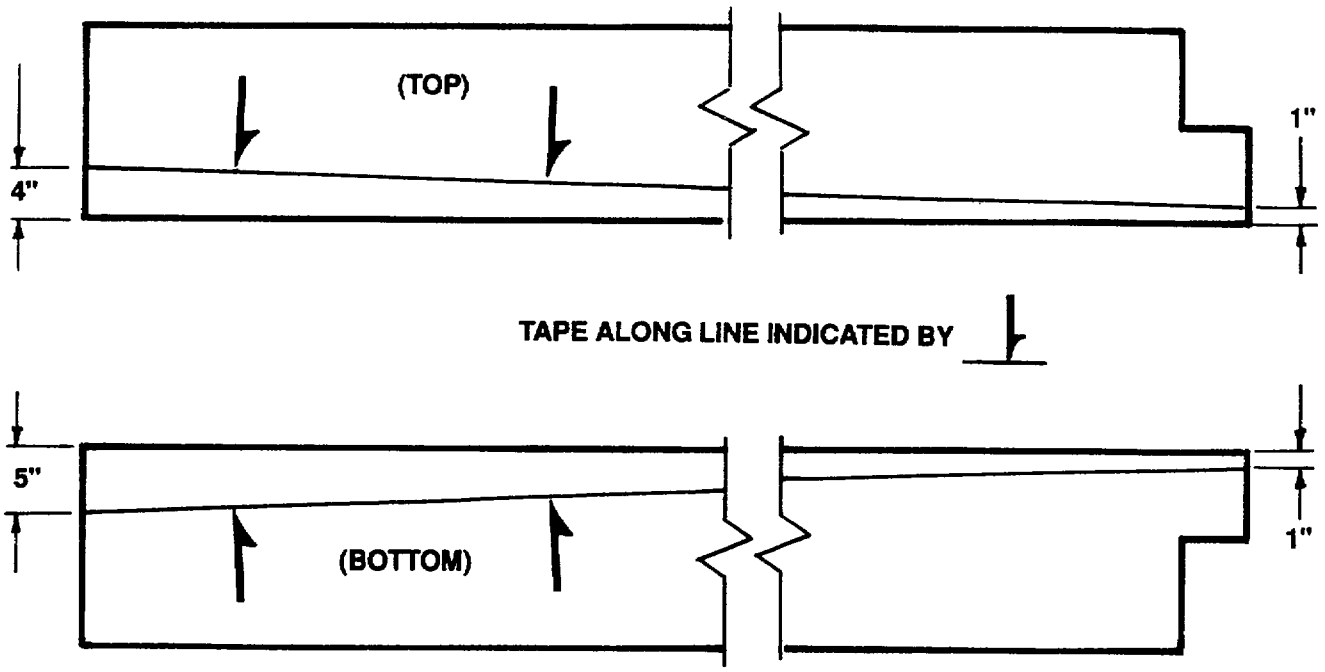


Figure 2-27. UH-1H Tape Layout, Main Rotor

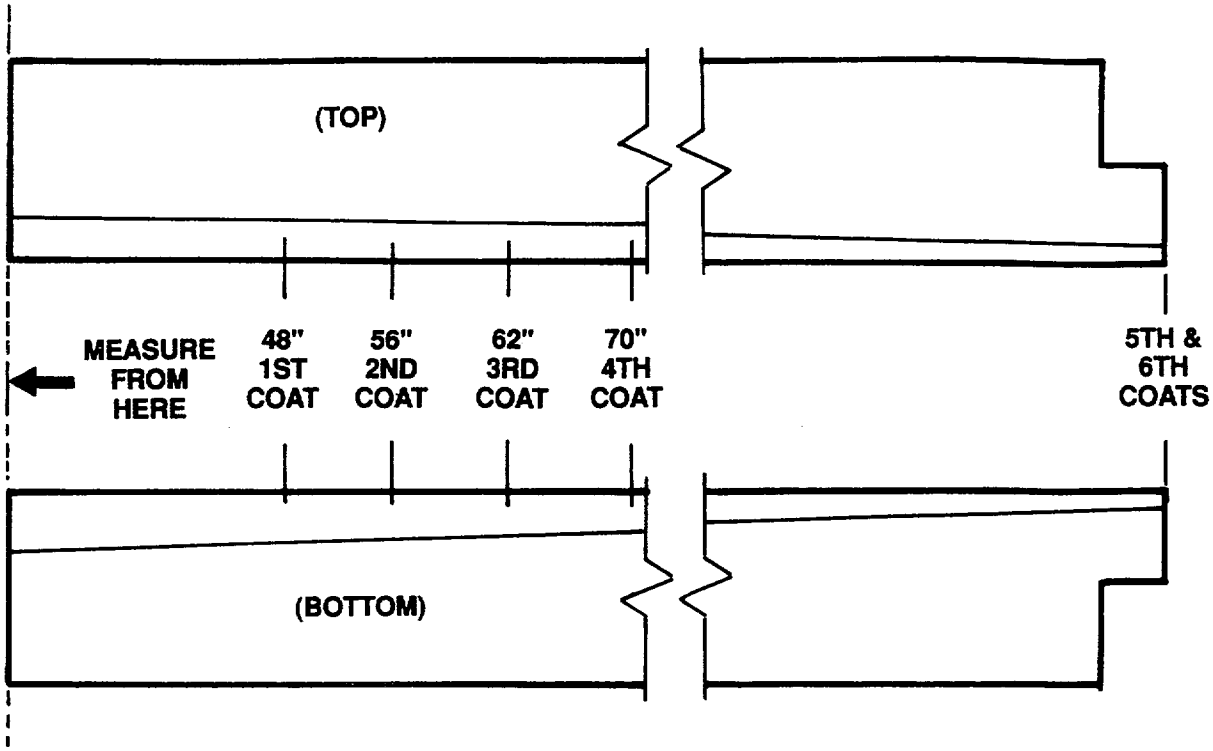


Figure 2-28. UH-1H Coating Pattern Dimensions - Main Rotor (Sheet 1 of 2)

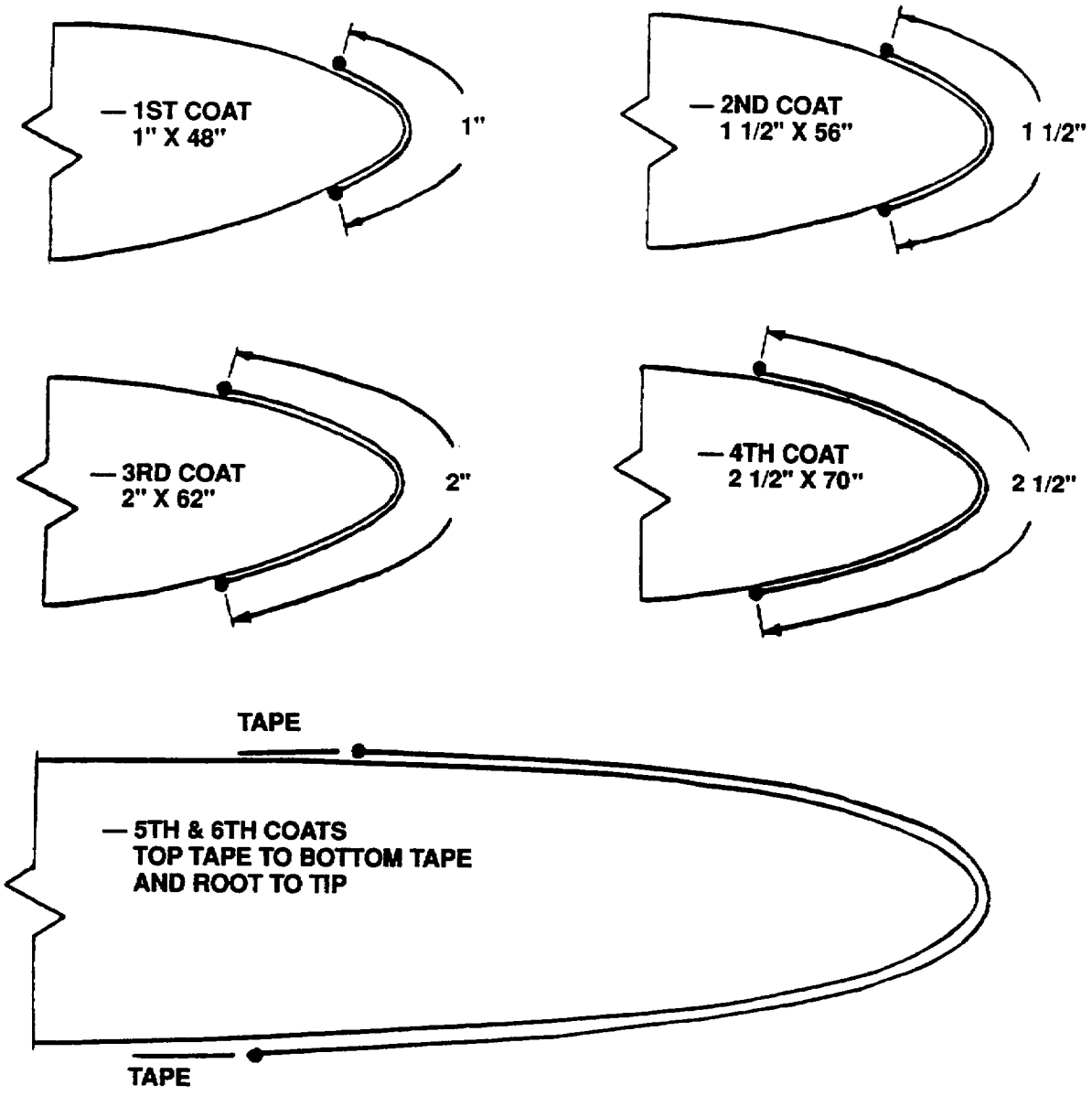


Figure 2-28. UH-1H Coating Pattern Dimensions - Main Rotor (Sheet 2 of 2)

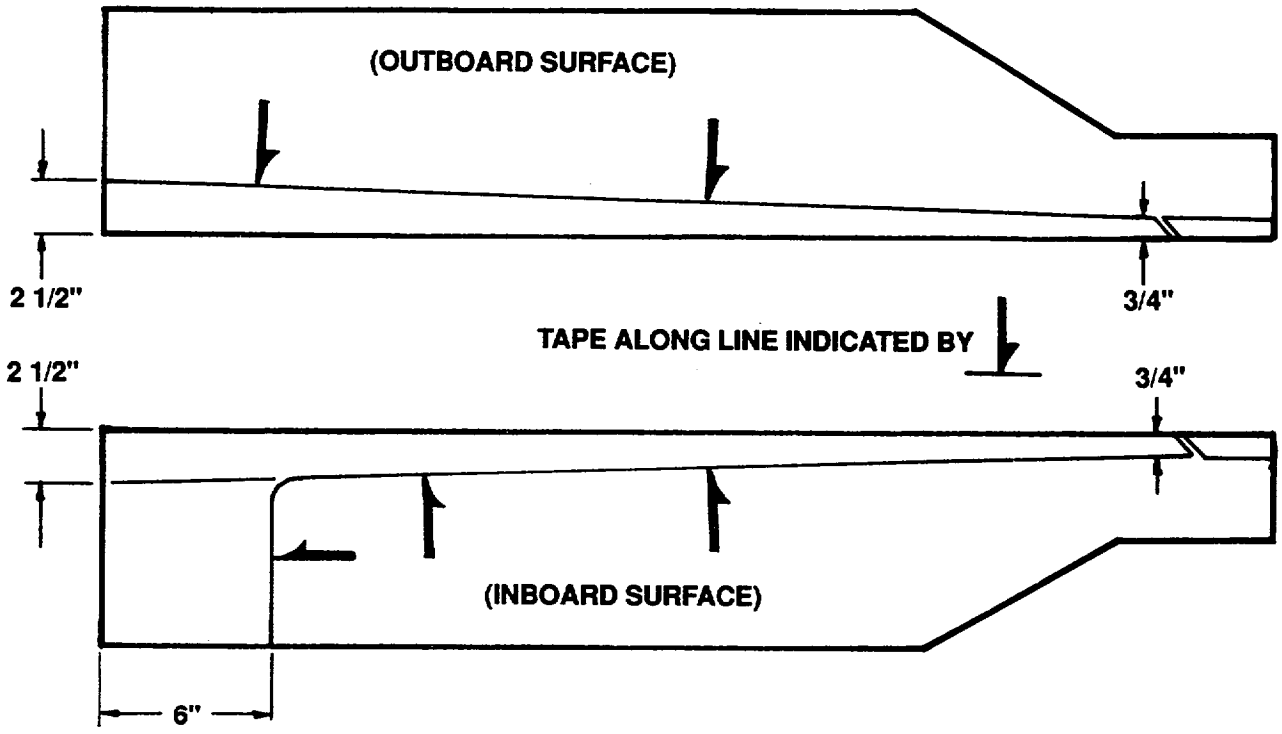


Figure 2-29. UH-1H Tape Layout, Tail Rotor

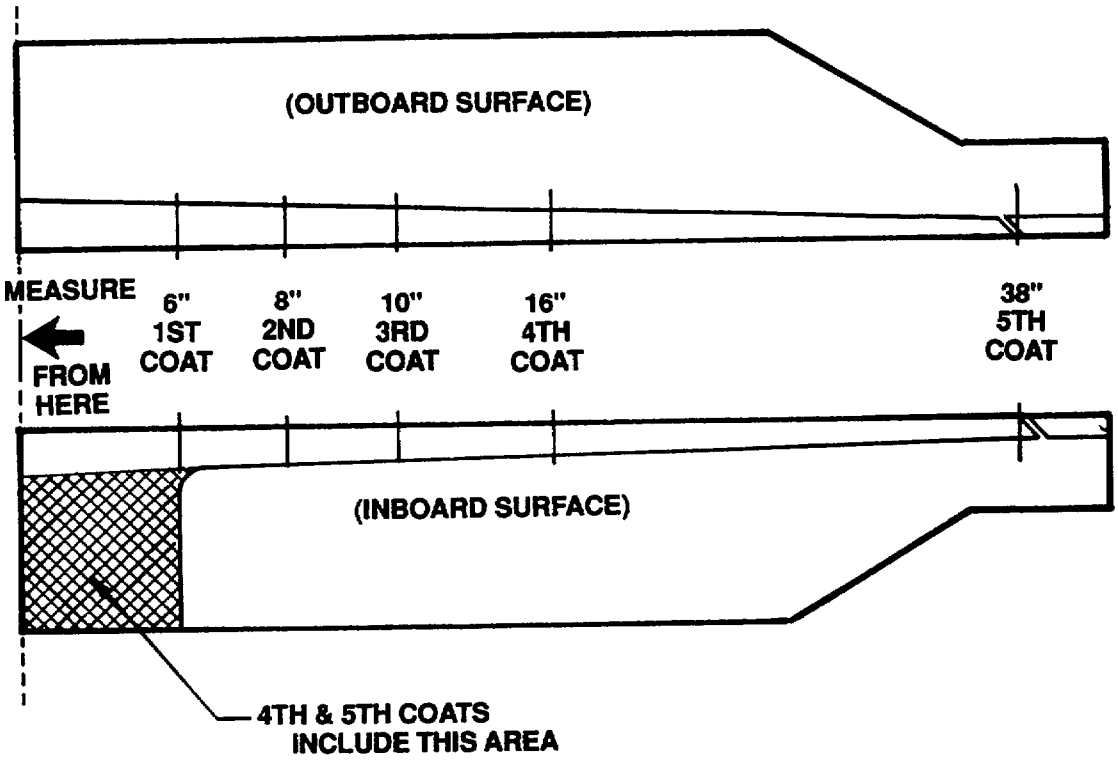


Figure 2-30. UH-1H Coating Pattern Dimensions - Tail Rotor (Sheet 1 of 2)

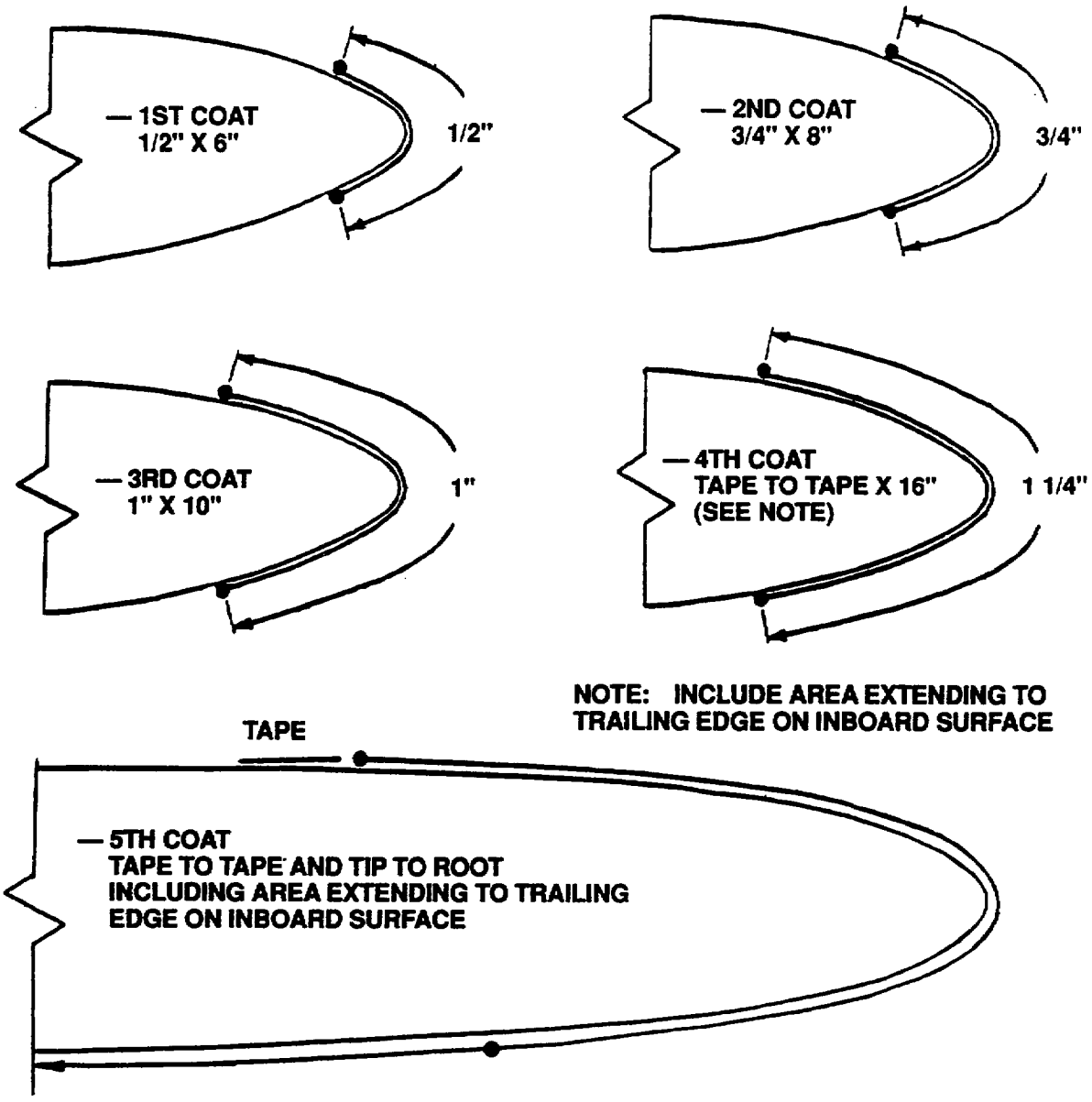


Figure 2-30. UH-1H Coating Pattern Dimensions - Tail Rotor (Sheet 2 of 2)

Section IX. UH-1H CMRB

Refer to tables 2-23 and 2-24 and figure 2-31 for erosion protection data for the UH-1H CMRB aircraft blades.

NOTE

Denatured alcohol (O-E-760) or isopropyl alcohol (TT-I-735) is required for this installation and must be obtained locally. NSN 6810-00-286-5435

Table 2-23.

UH-1H CMRB Rotor Blade Erosion/Spark Guard Kit
NSN 1615-01-209-6097, Task Research P/N 25-1012-00

Kit	Quantity
Instruction sheets	2 each
Masking tape, 1" x 60 yd (Grade B)	2 rolls
Sandpaper, 80 grit, 2 1/2 x 18" strip	5 sheets
Wiping cloth, paper cheesecloth	8 each
Gloves, disposable, large size	12 pair
Brushes, disposable, 2" wide bristles	10 each
Trash bag, small	2 each
Paper towel, folded	1 pkg
Task L-100 prepackage kit #25-1004-00	12 kits

Table 2-24.

UH-1H CMRB Main Rotor Application Dimensions and Quantities

First coat	2 cans to 2 blades 1 can per blade	1" wide by 86" long
Second coat	2 cans to 2 blades 1 can per blade	2" wide by 86" long
Third coat	4 cans to 2 blades 2 cans per blade	3" wide by 86" long

NOTE

The UH-1H tail rotor instructions may be found in UH-1H rotor blade erosion/spark guard kit section.

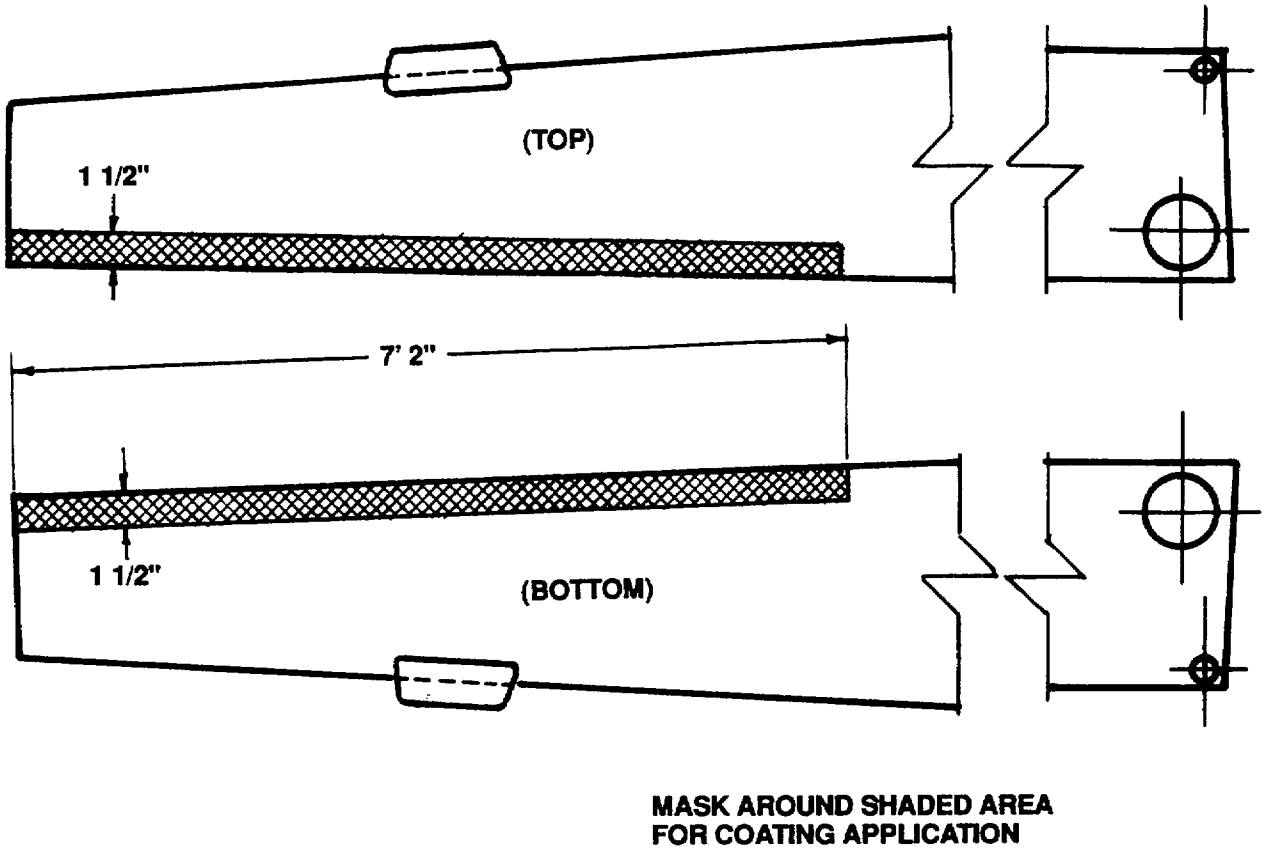
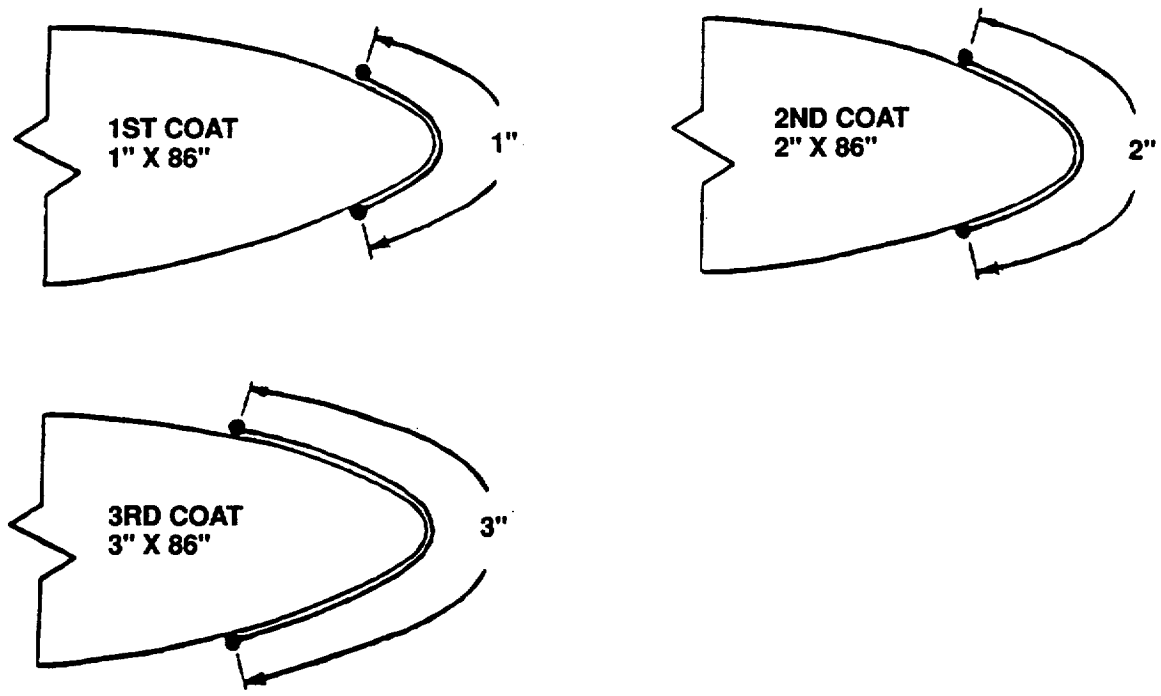


Figure 2-31. UH-H CMRB Coating Pattern Dimensions - Main Rotor (Sheet 1 of 2)



1ST COAT COVERS CENTER 1" OF NICKEL EROSION STRIP

2ND COAT COVERS NICKEL EROSION STRIP COMPLETELY

3RD COAT COVERS NICKEL EROSION STRIP AND 1/2" OF BOOT SURFACE

Figure 2-31. UH-1H CMRB Coating Pattern Dimensions - Main Rotor (Sheet 2 of 2)

CHAPTER 3

TAPING APPLICATION, ROTOR BLADE EROSION PROTECTION

Section I. GENERAL

- Figure 3-1 depicts general taping procedures applicable to all aircraft.
- Table 3-1 gives a detailed listing of item quantities, used for the individual aircraft systems, when applying tape for rotor blade erosion protection.
- Table 3-2 identifies the quantity of aircraft each kit can modify/support.

NOTE

Refer to Chapter 4 for detaping procedures of rotor blades for the AH-1, AH-64, CH-47, OH-58, UH-1 and UH-60 helicopters returning from Southwest Asia.

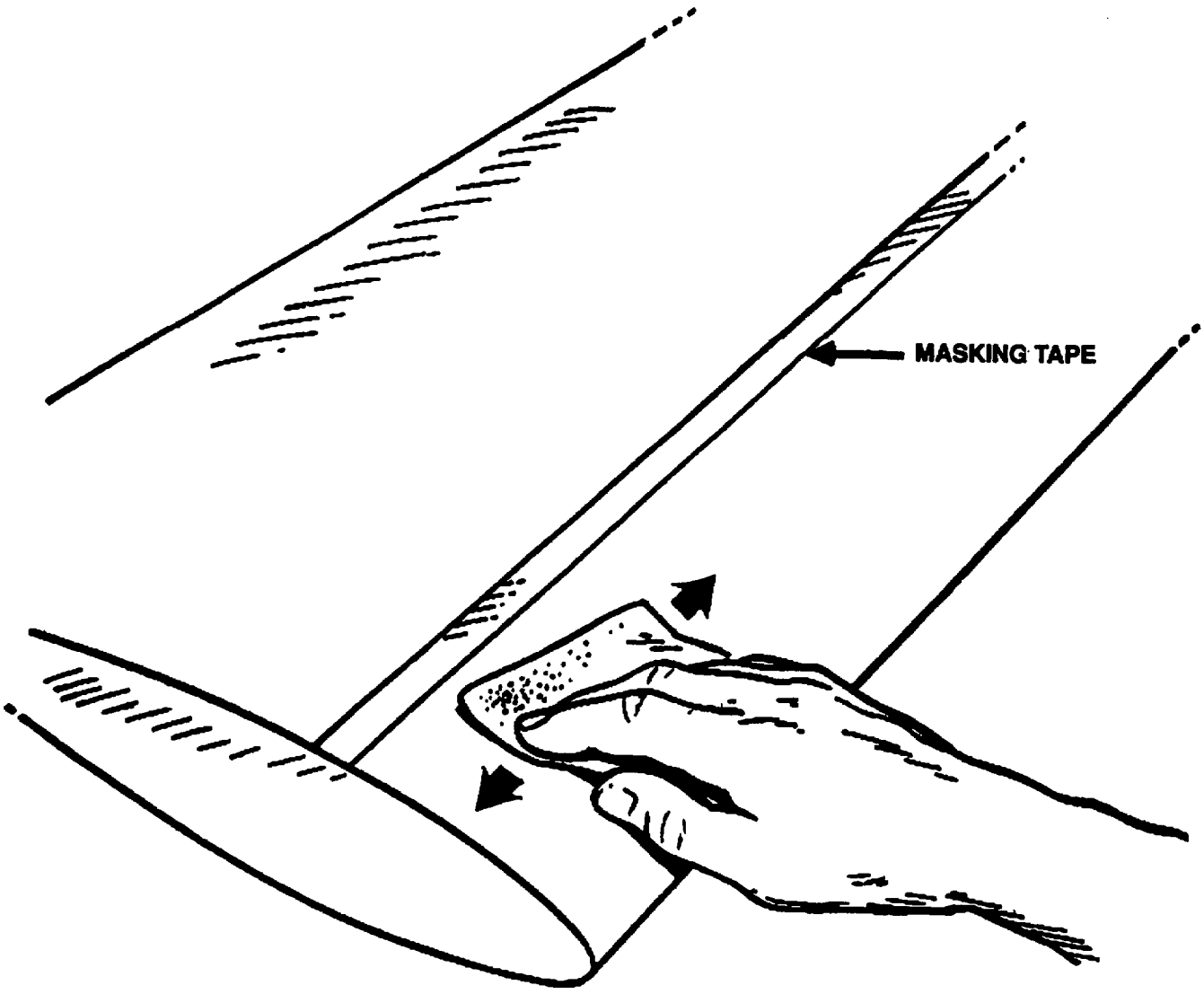


Figure 3-1. General Taping Application (Sheet 1 of 5)

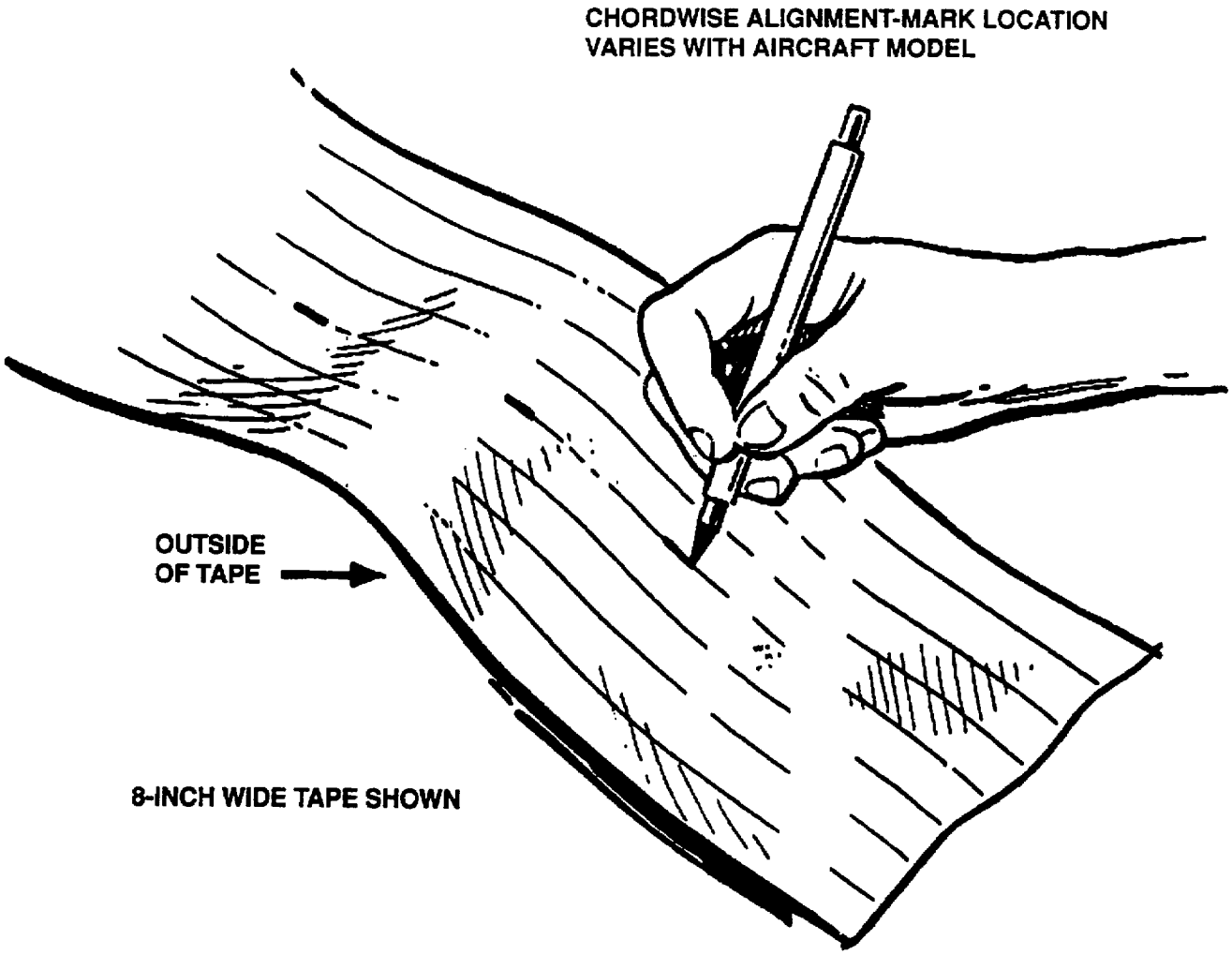


Figure 3-1. General Taping Application (Sheet 2 of 5)

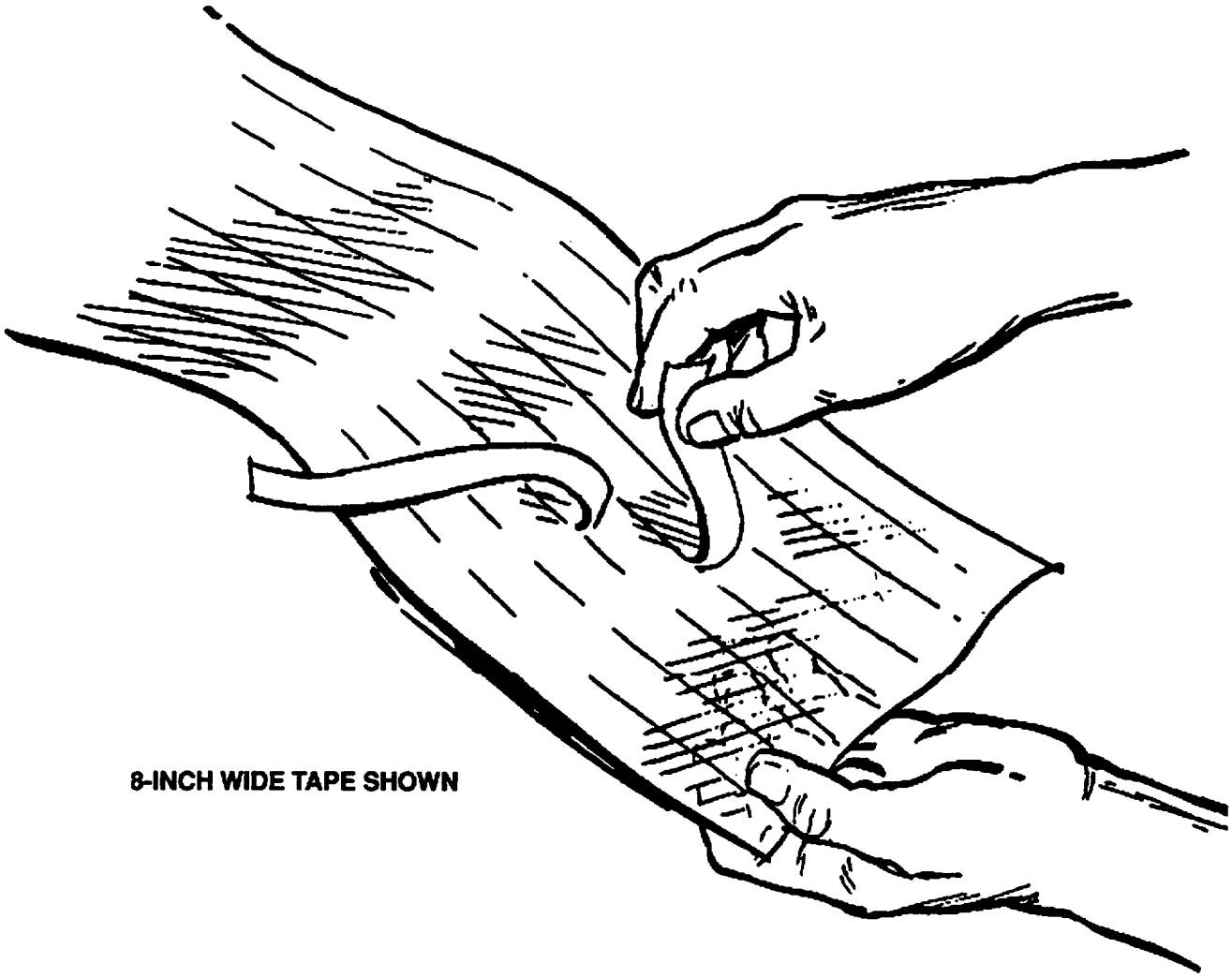


Figure 3-1. General Taping Application (Sheet 3 of 5)

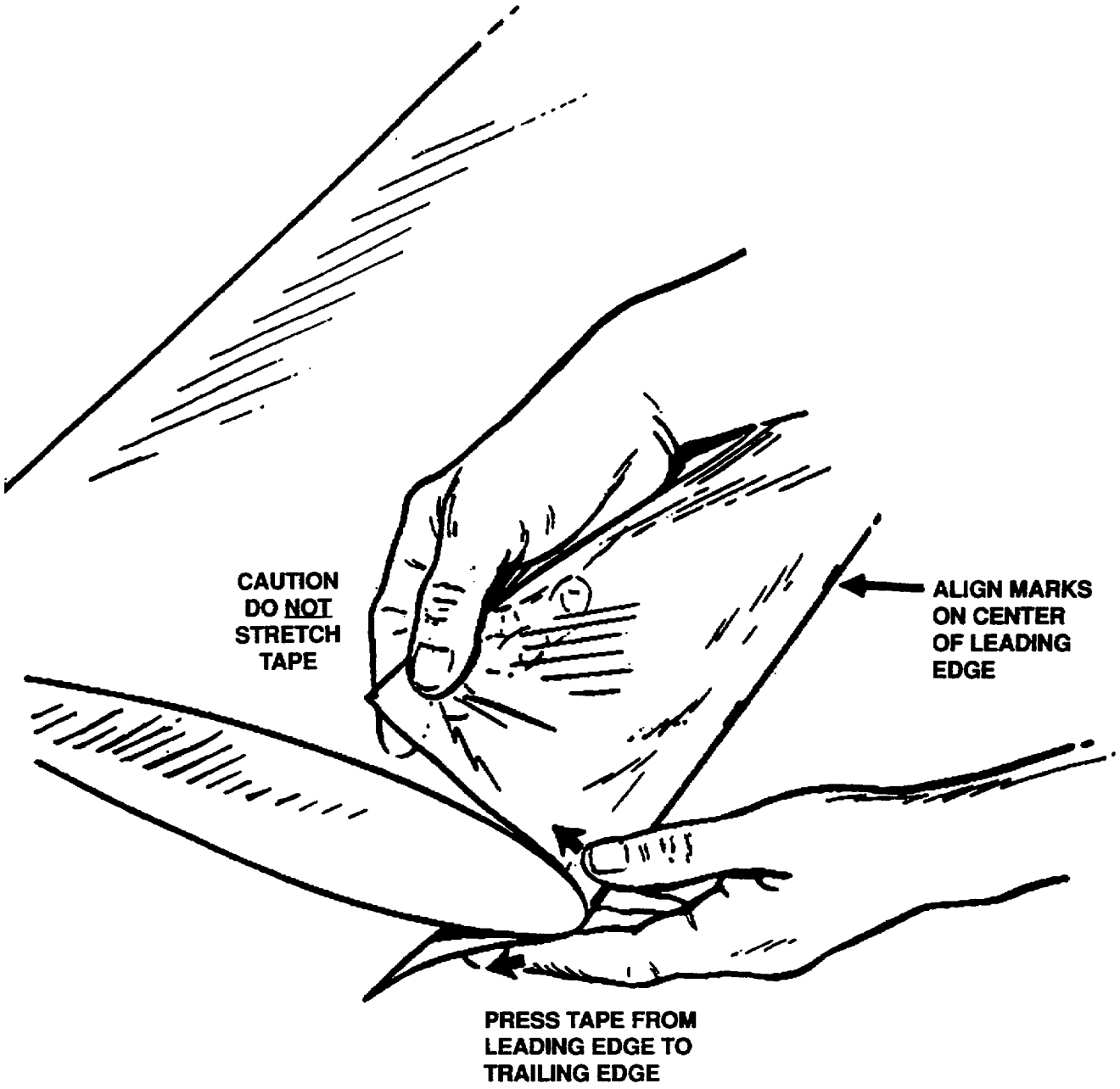


Figure 3-1. General Taping Application (Sheet 4 of 5)

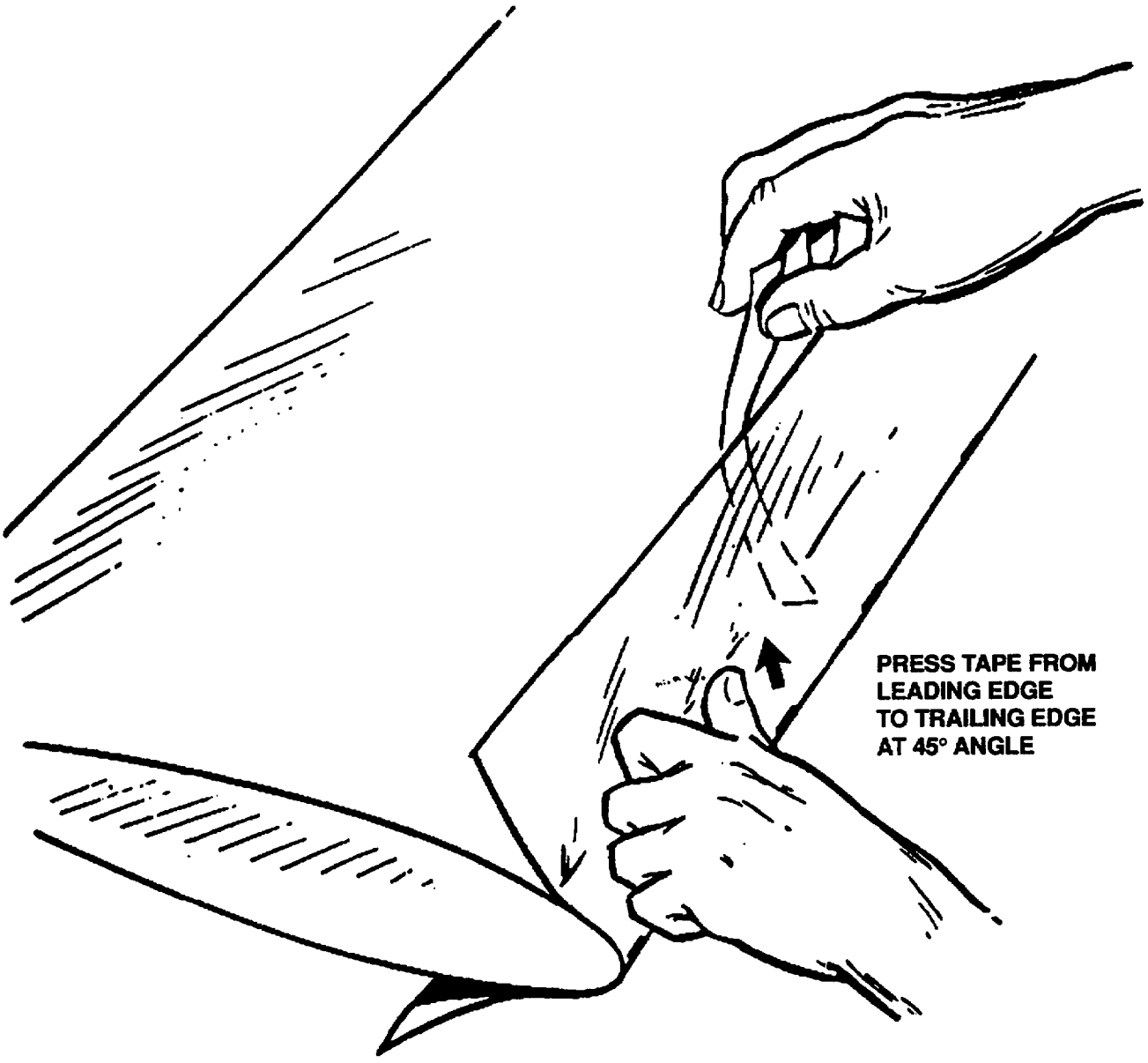


Figure 3-1. General Taping Application (Sheet 5 of 5)

Table 3-1.

Quantity of Item Application

ITEM DESCRIPTION	QUANTITY	AH-64A	UH-60	AH-1F & AH-1F (K747)	OH-58A/C	OH-58D	CH-47	UH-1H	UH-1H CMRB
SUPPLIES									
ALCOHOL, (DENATURED OR ISOPROPYL)	1 GAL	X	X	X	X	X	X	X	X
CLOTH, CLEANING	AS REQD	X	X	X	X	X	X	X	X
MACHINERY TOWEL	AS REQD	X	X	X	X	X	X	X	X
METHYL ETHYL KETONE	AS REQD	X	X	X	X	X	X	X	X
TOLUENE	AS REQD	X	X	X	X	X	X	X	X
KIT									
ABRASIVE CLOTH - 120 GRIT SANDPAPER	24 SHEETS	X	X	X	X	X	X	X	X
#86 POLYURETHANE PROTECTION ADHESION PROMOTER	1 QT	X	X	X	X	X	X	X	X
SPONGE BRUSHES (2") POLYBRUSH	8	X	X	X	X	X	X	X	X
TAPE, POLYURETHANE:									
8663-2 (2") **	72 PCS 2" X 36"	X	X	X	X	X	X	X	X
8663SS-1-4 (4") **	72 PCS 4"X 36"	X	X	X	X	X	X	X	X
8663SS-1-8 (8") **	72 PCS 8" X 36"	X	X	X	X	X	X	X	X
CHEESECLOTH	200 PC	X	X	X	X	X	X	X	X
MASKING TAPE, MYLAR, 1"	2 ROLLS	X	X	X	X	X	X	X	X
NONMETALLIC SCRAPER, 3-M, PA-1	2 EA	X	X	X	X	X	X	X	X
TOOL									
AIRFRAME REPAIRER'S TOOLKIT		X	X	X	X	X	X	X	X
MAINTENANCE STAND		X	X	X	X	X	X	X	X
SCISSORS		X	X	X	X	X	X	X	X
SPRAY BOTTLE		X	X	X	X	X	X	X	X
METAL CONTAINER, 1 QT (#1 COFFEE CAN, #10 CAN)	3 EA	X	X	X	X	X	X	X	X
EXACTO KNIFE W/BLADES		X	X	X	X	X	X	X	X
WOODEN SPATULA (PAINT STIRRER)	6 EA	X	X	X	X	X	X	X	X
SAFETY GOGGLES									
RUBBER GLOVES									
RSPRTRY PROTECT									
1/2 FACE RESPIRATOR FOR PAINT OPERATIONS:									
NOMENCLATURE: PAINT SPRAY RESPIRATOR, COMPLETE MANU. PART NO: 44849 NSN: 4140-01-231-0150		X	X	X	X	X	X	X	X

Table 3-1.

Quantity of Item Application (Con't)

ITEM DESCRIPTION	QUANTITY	AH-64A	UH-60	AH-1F	OH-58A/C	OH-58D	CH-47	UH-1H	UH-1H CMRB	AH-1F (K747)
RSPRTRY PROTECT										
CARTRIDGES (REFILL) MANU. PART NO: 464031 NSN: 4240-01-230-6892		X	X	X	X	X	X	X	X	X
PAINT PREFILTER, MANU. PART NO: 465667 NSN: 4240-01-231-0150		X	X	X	X	X	X	X	X	X
SELF CONTAINED BREATHING AIR:										
NOMENCLATURE: 30 MINUTE ULTRALIGHT II AIR MASK NSN: 4240-01-248-8035		X	X	X	X	X	X	X	X	X
COMPOSITE II CYLINDER NSN: 4240-01-252-0086		X	X	X	X	X	X	X	X	X
CUT TAPE DIMENS'NS										
** CUT POLYURETHANE TAPE PIECES										
** MAIN ROTOR										
** 8" WIDE X 36" LONG	10			X				X		
** 8" WIDE X 36" LONG	20	X	X							
** 8" WIDE X 36" LONG	42						X			
** 8" WIDE X 24" LONG	8	X								
** 8" WIDE X 16.5" LONG	4		X							
** 2" WIDE X 36" LONG	20	X	X							
** 2" WIDE X 36" LONG	8			X				X		
** 2" WIDE X 36" LONG	36						X			
** 2" WIDE X 30" LONG	4								X	
** 2" WIDE X 24" LONG	2			X				X		
** 2" WIDE X 24" LONG	4	X								
** 2" WIDE X 24" LONG	6						X			
** 2" WIDE X 12" LONG	4		X							
** 2" WIDE X 33" LONG	2									X
** 2" WIDE X 12" LONG	2									X
** 4" WIDE X 16" LONG	2								X	
** 4" WIDE X 36" LONG	4								X	
** 4" WIDE X 36" LONG	6				X					
** 4" WIDE X 36" LONG	8					X				
** 4" WIDE X 30" LONG	2				X					
** 4" WIDE X 6" LONG	2				X					
** 4" WIDE X 20" LONG	4									X
** TAIL ROTOR										
** 4" WIDE X 25" LONG	4	X								
** 4" WIDE X 27.5" LONG	4		X							
** 4" WIDE X 15.5" LONG	4		X							
** 4" WIDE X 16.5" LONG	2			X						
** 4" WIDE X 14.5" LONG	2							X		X

Table 3-2.

Tape Kit Cross Reference

AIRCRAFT TYPE	3M BLADE EROSION TAPE KIT (ALL AIRCRAFT) NSN 1615-01-328-5239
AH-64A	2 1/2 PER KIT
UH-60A	3 PER KIT
AH-1F	7 PER KIT
OH-58A/C	9 PER KIT
OH-58D	9 PER KIT
CH-47D	1 1/2 PER KIT
UH-1H	7 PER KIT
UH-1H CMRB	13 PER KIT
AH-1F K747	22 PER KIT

Section II. DESCRIPTION AND APPLICATION PROCEDURES FOR THE AH-64 AIRCRAFT

3-1. Description. This procedure provides instructions for the application of a kit which protects helicopter rotor blades against sand erosion which may occur. The steps are arranged in sequence to permit two personnel to complete installation on the entire AH-64A aircraft in sequence. If more than two personnel are available, the main rotor and tail rotor can be done simultaneously.

3-2. Personnel Requirement and Supplies.

a. Personnel: 2 required (MOS 67 Series).

b. Supplies and Dimensions: Refer to tables 3-3 through 3-5.

3-3. Installation Procedures.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**

- **Provide proper ventilation and protective clothing, including eye shield, when using solvent. Avoid breathing vapor and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**

- **Consul U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-6.**

a. Remove Blades. Removing the main rotor blades makes the installation easier, but removal is not mandatory. The tail rotor blades should not be removed.

b. Main Rotor Tape Installation.

CAUTION

Inadvertent blade deice operation with erosion strips installed can cause blade damage.

(1) Pull the blade deice control circuit breaker and leave it in that position until the blade protection kit installation strips are removed. Use wire harness tie wrap to prevent circuit breaker engagement.

NOTE

Deice circuit breaker is located on the pilot overhead circuit breaker panel (aft circuit breaker panel).

(2) Cleaning. Clean area shown in figure 3-2 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

(3) Layout and Mask. Layout and mask off main rotor blade for polyurethane tape application as shown in figure 3-2.

(4) Cut Tape. Cut tape to following dimensions. (Reference table 3-4.)

20 pieces 8" x 36"
8 pieces 8" x 24"
20 pieces 2" x 36"
4 pieces 2" x 24"

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(5) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Always sand in a spanwise direction, figure 3-1, sheet 1. Use of power polishing sander is permitted for this procedure.

(6) Cleaning. Wipe the masked area several times with cheesecloth or machinery cloth dampened with MEK, isopropyl alcohol, or denatured alcohol, then wipe once again with a clean, dry cloth.

NOTE

Perform steps (6) through (8) for one blade at a time.

(7) Application of Adhesive Promoter. Apply a thin coat of No. 86 promoter to the area covered by the first piece of tape, shown in figure 3-3. Allow to dry at least five minutes, but not more than one hour before applying tape. Promoter can extend beyond ends of tape.

(8) Tape Application, 8".

(a) Make alignment marks on outside of tape where leading edge will be located (3.5 inches from top edge), see figure 3-1, sheet 2. Remove leading edge backing strips as shown in figure 3-1, sheet 3. Apply first piece of tape to area shown in figure 3-3. When the tape is in the proper position, press it on the blade as close to the leading edge as possible. Press down on the tape, working toward the trailing edge to prevent trapping air bubbles. See figure 3-1, sheet 4. Remove the backing strips one at a time, working toward the trailing edge. See figure 3-1, sheet 5. Begin at the outboard end, 17.25 inches from the tip end.

(b) Apply 4 additional 36-inch long pieces of 8" tape and one 24-inch long piece of 8" tape with No. 86 promoter as shown in figure 3-4. Apply promoter in tape length segments to avoid contamination of coated surface.

(c) With backing strips on and against the blade, hold 24-inch long piece of 8" tape in position on the tip leading edge per figure 3-5 and mark where inboard edge mates with existing tape. Extend trim line on bottom side straight back and mark inboard edge of tape per figure 3-5. Cut tape at the mark line. Apply No. 86 promoter and place tape in position as shown in figure 3-5. Cut off tape extending past tip of blade. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of the tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(d) Remove Tuck masking tape.

(9) Tape Application, 2".

(a) Scuff the 8" wide tape surface with 120 grit sandpaper in area to be covered by 2" wide tape as shown in figure 3-6. Clean tape surface with MEK.

(b) Cut notches in 24-inch long piece of 2" wide tape as shown in figure 3-6.

(c) Apply notched piece of tape to blade with No. 86 promoter in location shown in figure 3-6.

(d) Apply 5 additional 36-inch long pieces of 2" wide tape with promoter inboard of the first piece as shown in figure 3-6.

(e) Repeat Steps (7) through (9) for each blade.

(10) Install Blades. If removed, install main rotor blades per -23 TM.

c. Tail Rotor Tape Installation .

(1) Cleaning. Clean area shown in figure 3-7 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol or denatured alcohol.

(2) Layout and Mask. Layout and mask off tail rotor for polyurethane tape application as shown in figure 3-6.

(3) Cut Tape. Cut 4 pieces of 4 inch wide polyurethane tape 25 inches long. (Reference table 3-5).

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Always sand in a spanwise direction, figure 3-1, sheet 1. Use of power polishing sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery cloth dampened with MEK, isopropyl alcohol, or denatured alcohol, then wipe once again with a clean, dry cloth.

NOTE

Perform procedural Steps (6) through (10) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a thin coat of No. 86 adhesive promoter to the masked area. Allow to dry at least five minutes, but not more than one hour before applying tape.

(7) Polyurethane Tape Preparation. Peel back one of the center (1 inch wide) backing strips from the 4 inch wide tape approximately 3 inches as shown in figure 3-1, sheet 3 for the 8 inch wide tape.

(8) Tape Alignment. Align the tape in the position shown in figure 3-8 before pressing to blade.

(9) When the tape is in proper position, press the exposed portion of the blade as close to the leading edge as possible. Press down on the tape, working toward the trailing edge to prevent trapping air bubbles. See figure 3-1, sheet 4. Peel backing strip back while keeping tape aligned and pressing down toward trailing edge. Remove the backing strips one at a time, working toward the trailing edge. See figure 3-1, sheet 5. Thoroughly press down tape. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(10) Masking Tape Removal. Remove masking tape.

NOTE

Repeat Steps (6) through (10) for each blade.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(11) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(12) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(13) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(14) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(15) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(16) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(17) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

NOTE

For a neat job, use masking tape to mask the topside of the PPT sheet 1/32 inch inside the perimeter of the edge.

NOTE

The application of edge sealant is particularly important in maintaining 3M 8663 polyurethane protective tape intergrity when applied at butt joints of adjacent PPT.

(18) Assemble a nozzle and a cartridge on the 3M EPX applicator. Squirt out a small quantity to insure that a uniform mix is attained. Using the nozzle, apply a 1/8 inch bead around the perimeter of the 3M 8663 polyurethane protective tape panel. Allow this to set up for about 10 minutes, before removing the tape. The sealant should still be liquid.

NOTE

For best results: To allow the edge of the sealant bead to blend with the 3M 8663 polyurethane protective tape and paint. Higher temperatures will require less time for the sealant to gel. Lower temperatures will require more time for the sealant to gel, so some adjustment in the 10 minutes may be necessary. The objective is to get the masking tape off while the bead of sealant is still flowable, to let it blend without a sharp edge.

(19) Inspect the edge seal application for any small air bubbles and if any are found, they can be relieved by pricking with a hypodermic needle.

(20) The rotor blade is ready to return to service after the sealant is well cured, and the 3M 8663 polyurethane protective tape has had time to reach a acceptable level of adhesion. This is achieved after 24 hours at 72 degrees.

d. Tail Rotor Agcoat Coating Installation.

NOTE

TASK L-100 polyurethane paint may be used in place of agcoat. It also may be used to repair agcoat.

(1) Tail Rotor Tip Caps. Remove tip caps.

(2) Cleaning. Clean local greasy spot around area to be masked as shown in figure 3-9 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

(3) Masking. Mask off area for polyurethane coating with Tuck tape as shown in figure 3-9.

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Always sand in a spanwise direction.

(5) Cleaning. Clean area shown in figure 3-9 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol, then wipe once with a clean, dry cloth.

(6) Mix Primer. Stir Part A primer before using. Mix equal amounts (4 oz. of each) of AGC 1201-7 primer Parts A and B in a beaker and stir well. Close can and bottle after pouring out required amount.

WARNING

Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use safety glasses, gloves, and disposable (Tyvek) coveralls. Avoid skin contact. Always apply coatings so that any spray or vapors are directed away from breathing zone of individuals. Use respirator protection components, table 3-6.

(7) Primer Application. Brush the primer on the blade in the area shown in figure 3-9 where the coating will be applied. Allow the primer to dry at least one hour at 70 degrees F or above. Do not handle the primed surface. If the primer surface becomes contaminated, lightly wipe it with denatured alcohol.

(8) Mix Coating. Stir Part A of coating before using. After the primer dries, mix 3/4 cup of AGC 1201R polyurethane coating Part A with 1/4 cup polyurethane Part B in a cup and mix well. Do not stir again after it is mixed well. If a skin forms on top of coating, remove it. Do not stir the coating. Close coating cans after pouring out required amount.

(9) Coating Application.

(a) Brush on 5 coats to the entire area shown in figure 3-9, allowing five minutes minimum drying time between recoating a specific area. Brush on heavy coats with light pressure to avoid damaging previous coats. If lumps form in the coating, discard and mix a new batch. If a skin forms on top of the coating remove it.

(b) Remove masking tape after the first 5 coats are applied and apply the remaining coats by eye.

(c) Total number of coats are shown in figure 3-10. Allow the coating to cure 24 hours a 70 degrees F or above.

NOTE

Wet primer can be cleaned up with denatured alcohol or MEK. Wet coating can be cleaned up with MEK.

(10) Tail Rotor Tip Caps. Install.

e. Polyurethane Curing. After polyurethane application, allow 24 hours curing time.

f. Tape Repair. Replace the entire damaged piece of tape. Remove with a plastic scraper. Replace per the installation instructions.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(1) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(2) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(3) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(4) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(5) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(6) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(7) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

g. Coating Repair. Local damage to the polyurethane coating can be touched up by brushing additional coating to clean with MEK. Prime the area with AGC 1201-7 primer if the blade surface is exposed. Coat the damaged area with sufficient coats of polyurethane coating to match the thickness of adjacent areas.

h. Polyurethane Coating Removal. Saturate coating surface with MEK and scrape coating off with a plastic scraper while soft. Make a final surface wipe with cloth dampened with MEK.

i. Polyurethane Tape Removal. Slowly peel back over itself. Scrape tape with plastic scrape if necessary. Remove adhesion promoter with cloth dampened with toluene.

j. Track and Balance Check. Check track and balance of the main and tail rotors per -23 TM.

k. Inspection of Main Rotor Polyurethane Tape.

(1) Inspect 2-inch tape for wear. No holes allowed.

(2) Inspect 8-inch tape for wear. No more than 1.0 inch-width hole in any spanwise or chordwise direction allowed on upper or lower side of blade.

(3) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(4) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch-spanwise or chordwise is allowed.

(5) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonds on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not tom.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim of these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

l. Inspection of Main Rotor Agcoat. Wear through to blade surface not allowed.

m. Inspection of Tail Rotor Polyurethane Tape.

(1) Inspect 4-inch tape for wear. No more than 0.5 inch wide spanwise or chordwise hole allowed on trailing edge. No holes allowed on any other surface of tape.

(2) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch cordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(3) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(4) Inspect for internal disbonding of tape segments. No more than a single disbonding larger that 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonding on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

n. Inspection of Tail Rotor Agcoat. Wear through to blade surface not allowed.

o. Tail Rotor L-100 Coating Application (Tip Caps).

(1) Remove tip caps and clean area as shown in figure 3-9.

(2) Tape off area for L-100 coating with masking tape as shown in figure 3-9.

(3) Sand the area to be coated to remove bugs, dirt and oxidized coating. As a minimum, scuff the existing paint over the total area to be protected. Always sand in a spanwise direction.

(4) Dry wipe the blade with a clean cheesecloth or towel to remove the sanding residue. Wipe the blade several times with cheesecloth dampened with denatured or isopropyl alcohol, then wipe once again with dry cheesecloth.

(5) Inspect the surface for any greasy looking areas. Sand these areas a little more vigorously to take away the sheen. Wipe the blade again with the cheesecloth. The blade should now be dry and free from sanding residue. Avoid touching or contaminating the prepared surface after it is wiped.

(6) Remove the old masking tape and replace with new as required to repair tape damaged by sanding. Mark coating application spanwise dimensions on the tape before starting to apply the coating. Make sure all screw heads are covered with masking tape. Screw heads must not be coated.

(7) Mix the coating as follows:

(a) The coating consists of individual foil packets, each of which contain Part A of the two-part coating (in a pull-top can which is about half-filled), Part B (in a syringe with a tip cap) and a stir stick to mix them. Parts A and B are pre-measured to assure proper cure.

WARNING

The coating will not wash off and can be irritating to the skin. Wear gloves and safety goggles when mixing and applying this product.

(b) To mix the coating, open Part A. Remove the tip cap from Part B and squirt the full contents into the can containing Part A. Stir the mixture for a full 60 seconds using the stick provided, being careful to scrape the sides of the can with the stick occasionally to assure total mixing of both parts. You have only 5-10 minutes to get the coating out of the can; so don't start mixing until you are ready to star the application. The coating cures faster in the can than it does on the blade.

(8) Brush on two coats as shown in figure 3-10, covering the area indicated.

(9) Use a new paint brush when the old brush starts to drag. It should take a new brush every two to three cans to do the job properly.

(10) If the blades are on the aircraft, coating the bottom will take a different technique. As you coat the bottom you must keep working the material until it starts to set. Long, smooth strokes with the brush being pulled at a low angle to the blade works best.

CAUTION

Pull the masking tape off as soon as the application is complete. Do not wait for the coating to set. After the coating sets, masking tape removal becomes very difficult and the edge of the coating will be rough and may debond slightly.

NOTE

It is more efficient for one peon to apply the coating and the second person to assist in mixing of the next can of coating, rotating blades, taking care of expended cans and brushes, etc.

NOTE

Successive coats may be applied as rapidly as practical, as long as the material can be spread smoothly and evenly with the maximum build-up at the leading edge.

NOTE

Any unused kits of the coating should be retained for touch up and repair of the coating.

(11) After the coating cures, runs and sags may be touched up using sandpaper backed by a hard sanding block.

(12) Make sure drain holes are open and free of the coating.

(13) Install tip caps per the -23 aircraft TM.

NOTE

Cure time before track and balance is 8 hours.

NOTE

Mixing of coated blades and uncoated blades is prohibited.

p. Check Track and Balance. Check track and balance of the tail rotors per the -23 aircraft Technical Manual.

q. Tail Rotor Blade Erosion/Spark Guard Coating (Repair).

(1) Peeling and Tattering. This condition is most prevalent where the material is thinnest. The blades should be inspected after flight and the loose material, if any should simply be trimmed off with a sharp knife. It is not necessary to re-coat the bare area until there is enough area to justify a coating cure cycle of six or more hours.

(2) Nicks and Cuts.

CAUTION

Be careful when using a knife for trimming. Do not cut into the blade. The safest technique is to work the knife under the loose material and cut parallel to the blade surface.

(a) This condition is caused by larger debris and will usually be found close to the leading edge and in the outboard one-third of the rotor span. If the cut is of average size the surrounding material will not be damaged and no debonding will occur. This type of damage to the coating should not be treated until it is expected that further flight would cause that area to debond and tear away. If that is the case, then cut out the debonded area with a sharp knife. Only remove the debonded area. Repair by applying fresh coating, in several applications if necessary, to restore the coating to its original thickness. Allow the coating to set for at least six hours before bringing the rotor up to speed or flying the aircraft.

(b) If mission requirements will not permit the proper time for repair and curing, simply cut away the loosened material and fly.

r. Tail Rotor - Erosion/Spark Guard Coating (Removal).

CAUTION

Do not cut the rotor blade structure. Use extra caution when removing the material from rotor blades made from composite materials.

This coating is relatively immune to most solvents and to abrasive cleaning techniques. The recommended removal procedure is by scraping in a direction along the surface of the blade.

Table 3-3.

AH-64 Rotor Blade Erosion Protection Kit/Tools/Consumables
NSN 1615-01-328-5239

Kit

1. Cheesecloth	CCC-C-440	200 Sheets 8 x 9"
2. 120 Grit Sandpaper	NSN 5350-00-721-8115	24 Sheets
3. Adhesive Promoter #86	70-0701-8275-6	1 Qt
4. 2-inch Wide Paint Brush or Sponge Brush	NSN 8020-01-126-1437 P/N PP-2	8 Each
5. Plastic Scraper	NSN 5120-00-628-5569 P/N PA-1	2 Each
6. Masking Tape	NSN 7510-00-685-4963 P/N 231-1-IN	4 Rolls
7. Poly Tape 2 Inch	8663 MB	72 pcs, 2" x 36"
8. Poly Tape 4 Inch	8663 MB-SS	72 pcs, 4" x 36"
9. Poly Tape 8 Inch	8663 MB-SS	72 pcs, 8" x 36"

Supplies

1. Alcohol (Denatured or Isopropyl)	NSN 6810-00-264-5906	2 Qt
2. Methyl Ethyl Ketone (MEK)	NSN 6810-00-281-2785	2 Gal
3. Toluene	NSN 6810-00-579-8431	1 Qt
4. Cleaning Cloth	NSN 7920-00-044-9281	10 Lb Bag
5. Machinery Towel		As Req
6. L-100 Coating	NSN 1615-01-205-6138	9 Kits
7. Adhesion Promoter, 3M # 86A	NSN 8040-01-450-9187	Pt (as req)
8. Applicator Nozzle, 3M	NSN 5120-01-425-1023	1 Box
9. Edge Sealant Cartridge, 3M DP-190	NSN 1680-01-431-3607	

Tools

1. Airframe Repairer's Tool Kit
2. Maintenance Stand
3. Scissors
4. Spray Bottle
5. Metal containers, 1 qt (#1 coffee can, No. 10 can)
6. Exacto knife w/blades
7. Safety Goggles
8. Rubber Gloves
9. Tape Measure
10. Wooden Spatula (Paint Stirrer)
11. EPX Applicator NSN 1680-01-431-3606

Table 3-4.

AH-64 Main Rotor Application Dimensions and Quantities

20	pcs polyurethane tape	8" wide x 36" long
8	pcs polyurethane tape	8" wide x 24" long
20	pcs polyurethane tape	2" wide x 36" long
4	pcs polyurethane tape	2" wide x 24' long

Table 3-5.

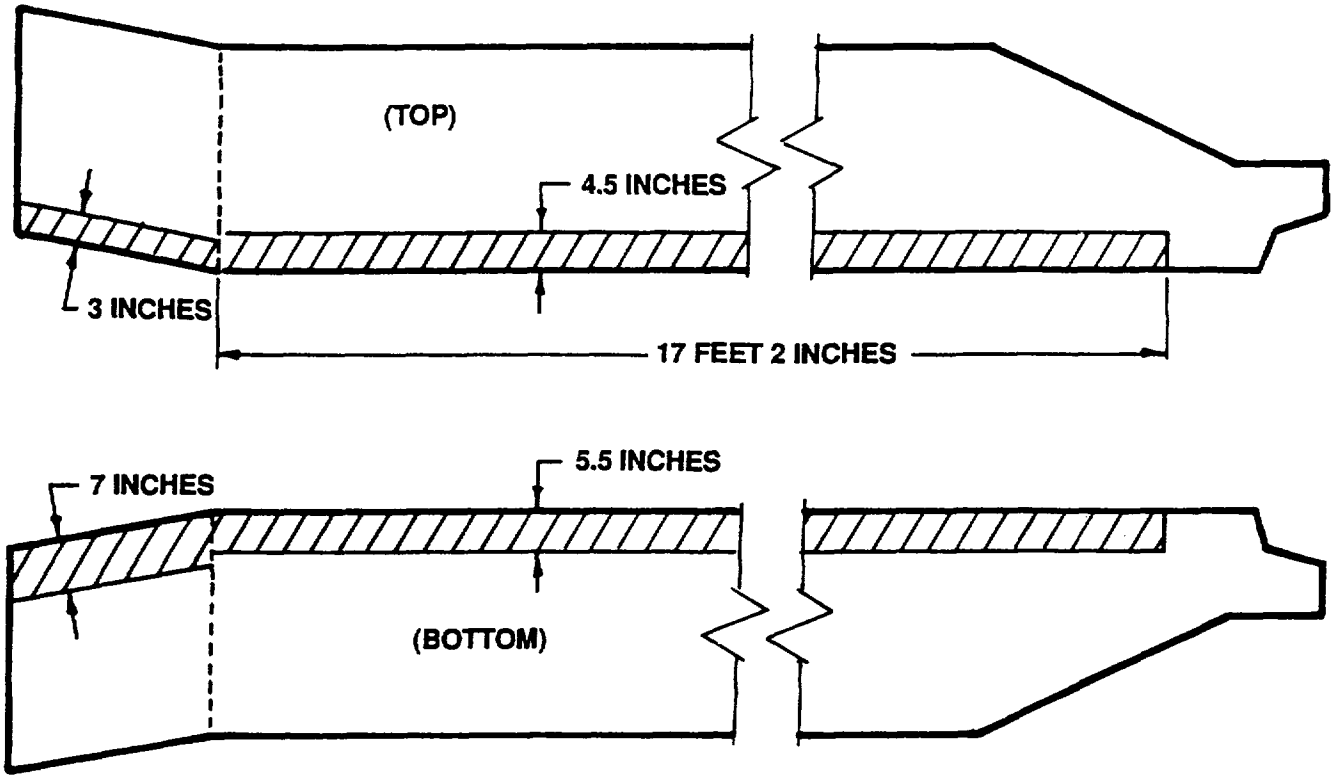
AH-64 Tail Rotor Application Dimensions and Quantities

4	pcs polyurethane tape	4" wide x 25" long

Table 3-6.

Respiratory Protection Components

- 1/2 face respirator for paint operations:
- Nomenclature: Paint Spray respirator, complete Part No: 44849
  NSN: 4140-01-231-0150
- Cartridges (refill) Part No: 464031
  NSN: 4240-01-230-6892
- Paint prefilter, Part No: 465667
  NSN: 4240-01-231-0150
- Self Contained Breathing Air:
- Nomenclature: 30 minute Ultra light II air mask
  NSN: 4240-01-248-8035
- Composite II Cylinder
  NSN: 4240-01-252-0086



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-2. Layout and Masking Main Rotor (AH-64)

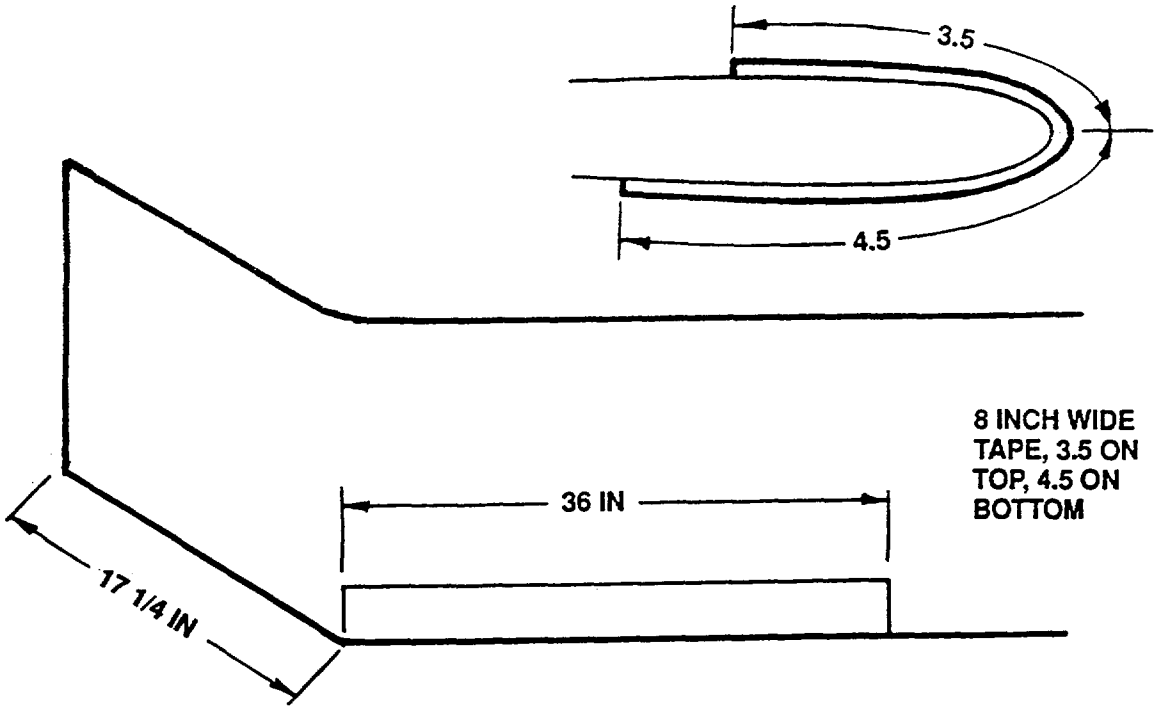


Figure 3-3. Tape Application, Main Rotor (AH-64)

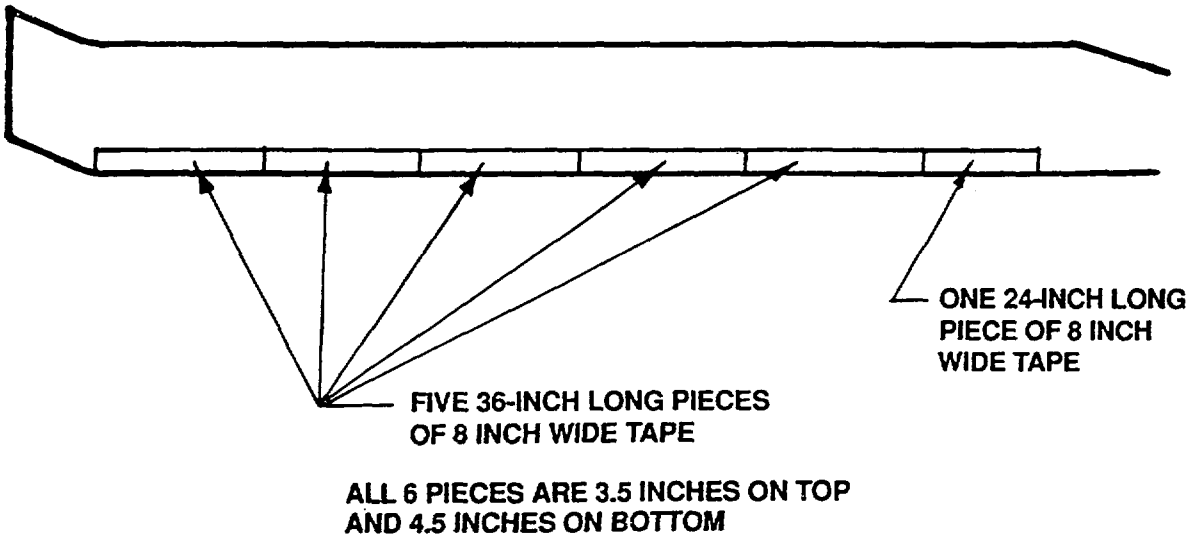


Figure 3-4. Additional Tape Application, Main Rotor (AH-64)

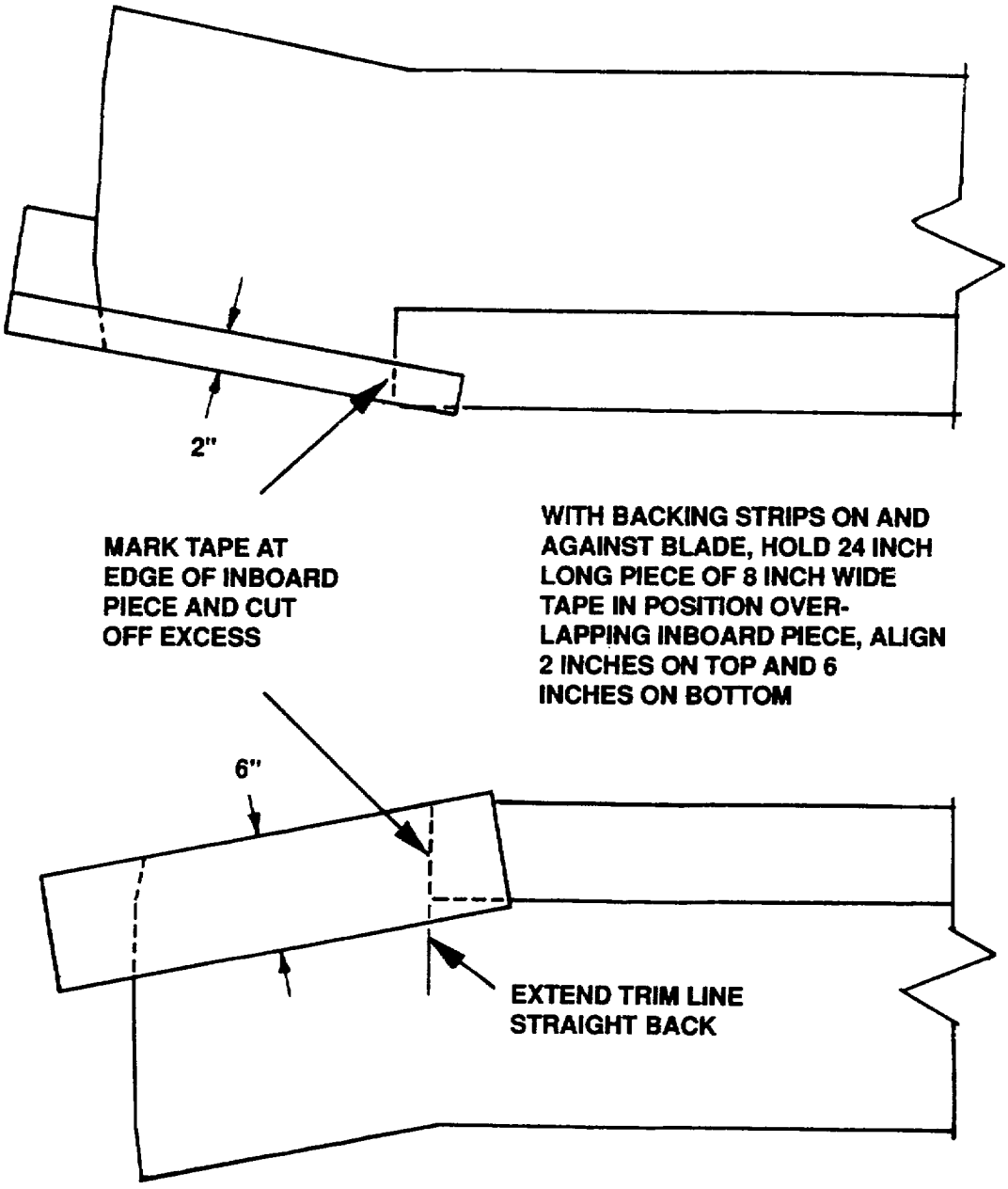


Figure 3-5. Tape Positioning/Application, Main Rotor (AH-64)

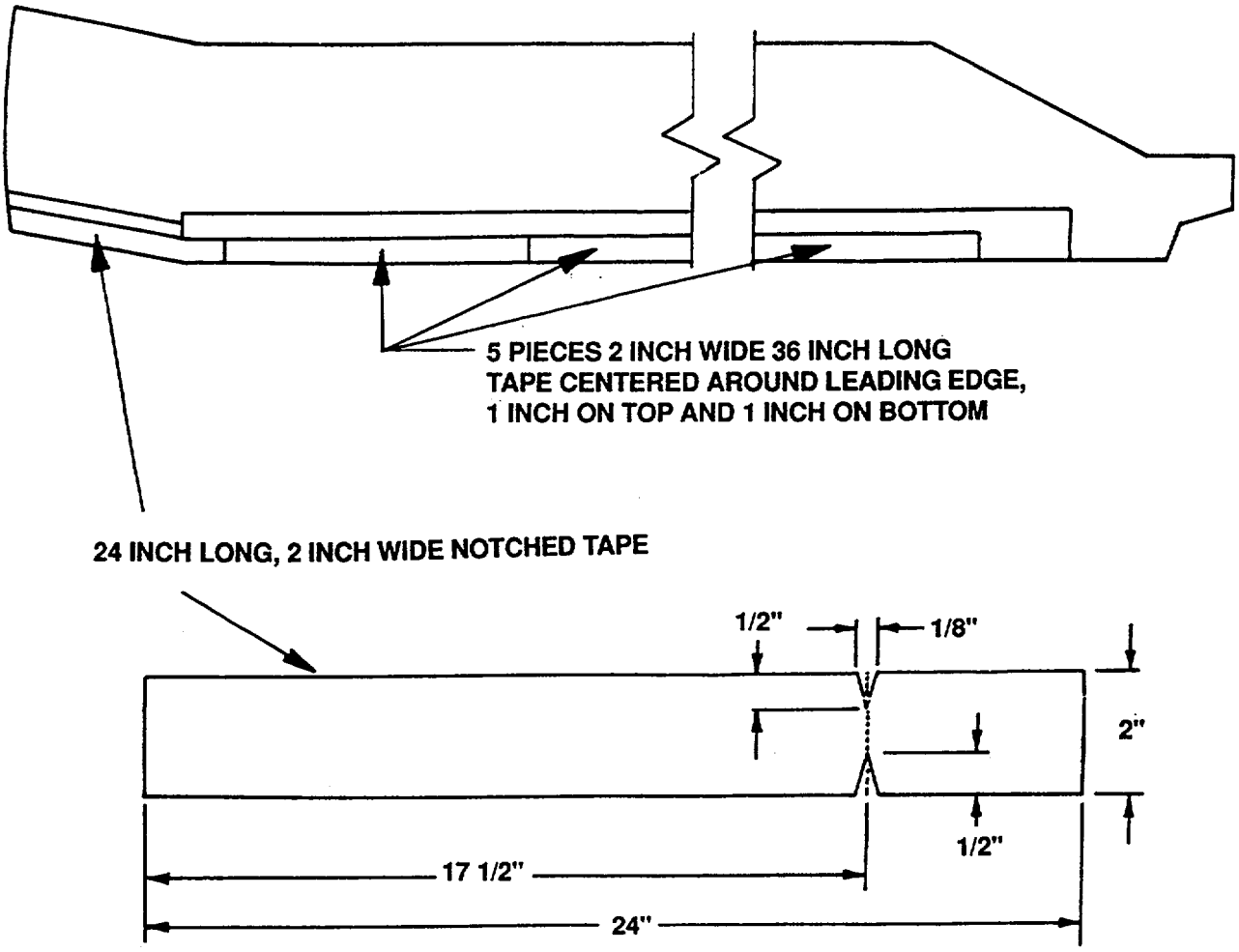
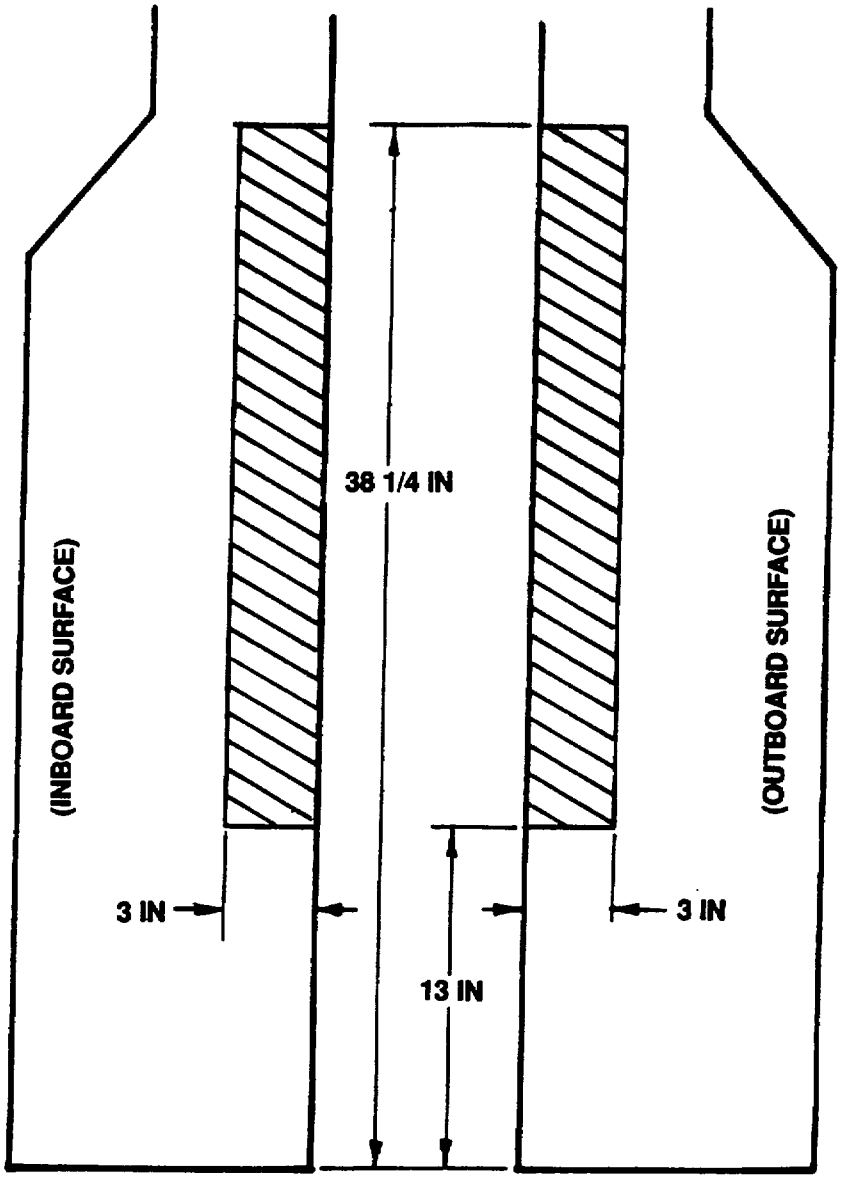


Figure 3-6. Tape Application, Leading Edge, Main Rotor (AH-64)



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-7. Masking Area for Tape Application, Tail Rotor (AH-64)

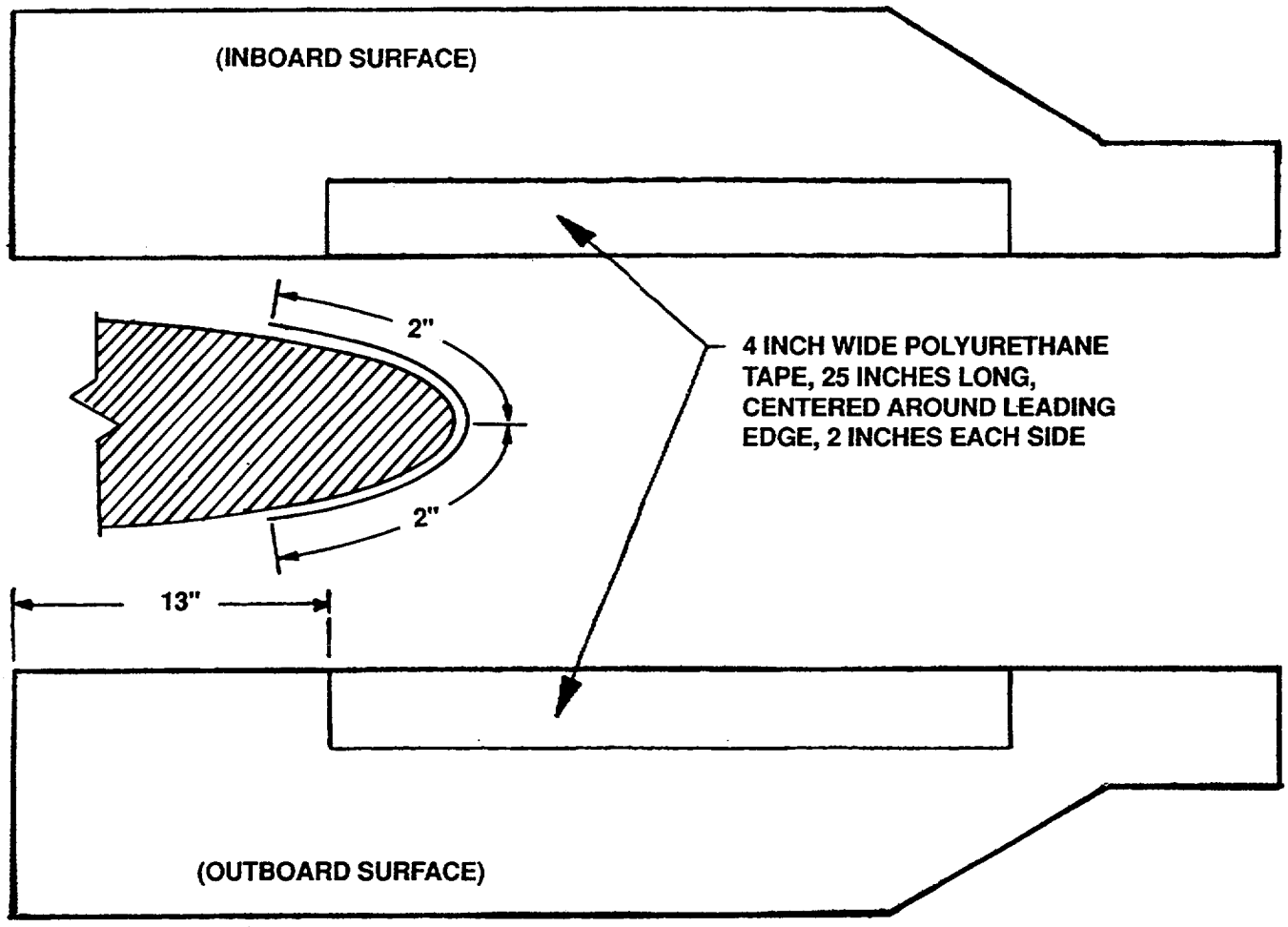


Figure 3-8. Tape Alignment, Tail Rotor (AH-64)

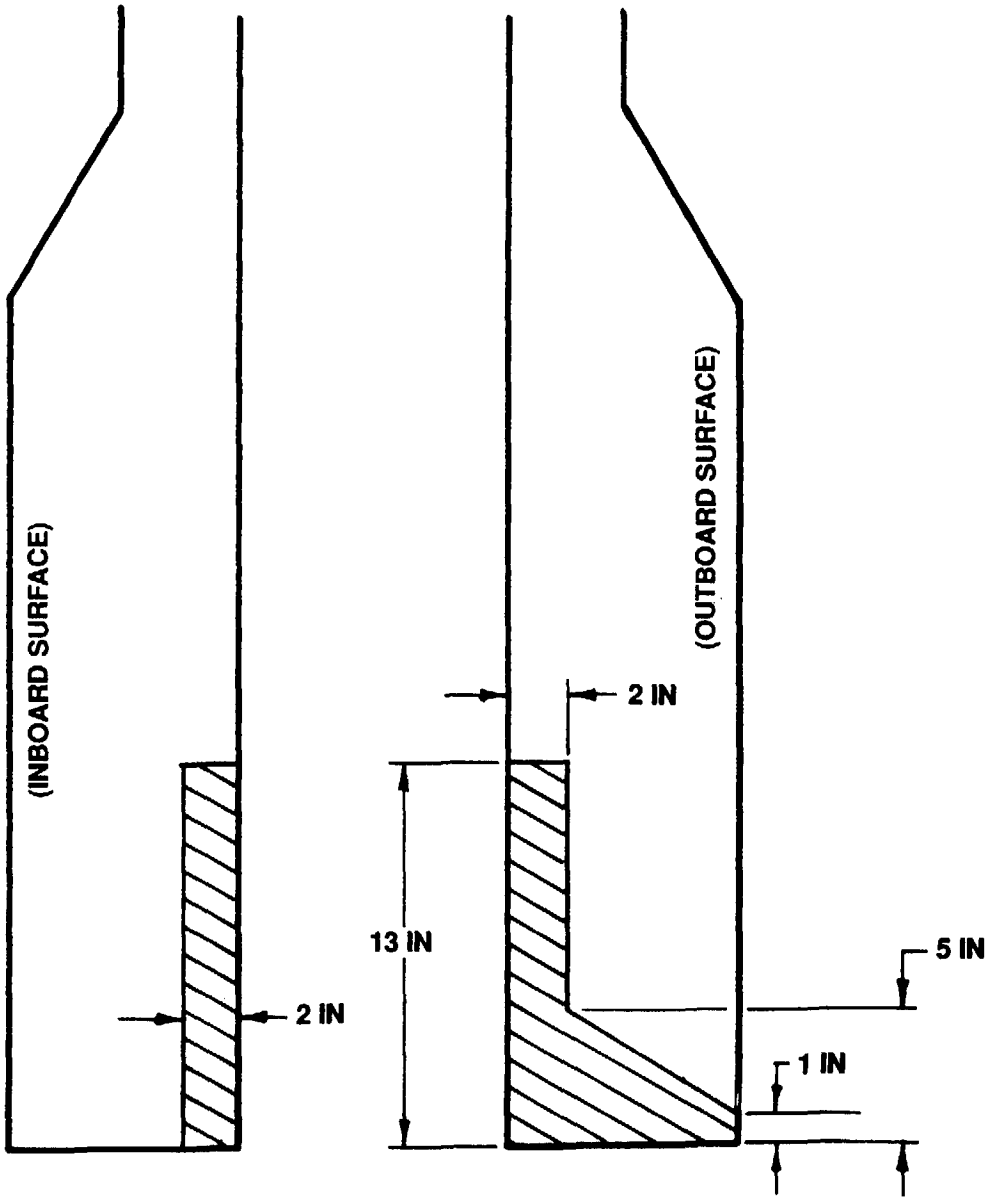


Figure 3-9. Masking Area, Coating/Cleaning Application, Tail Rotor (AH-64)

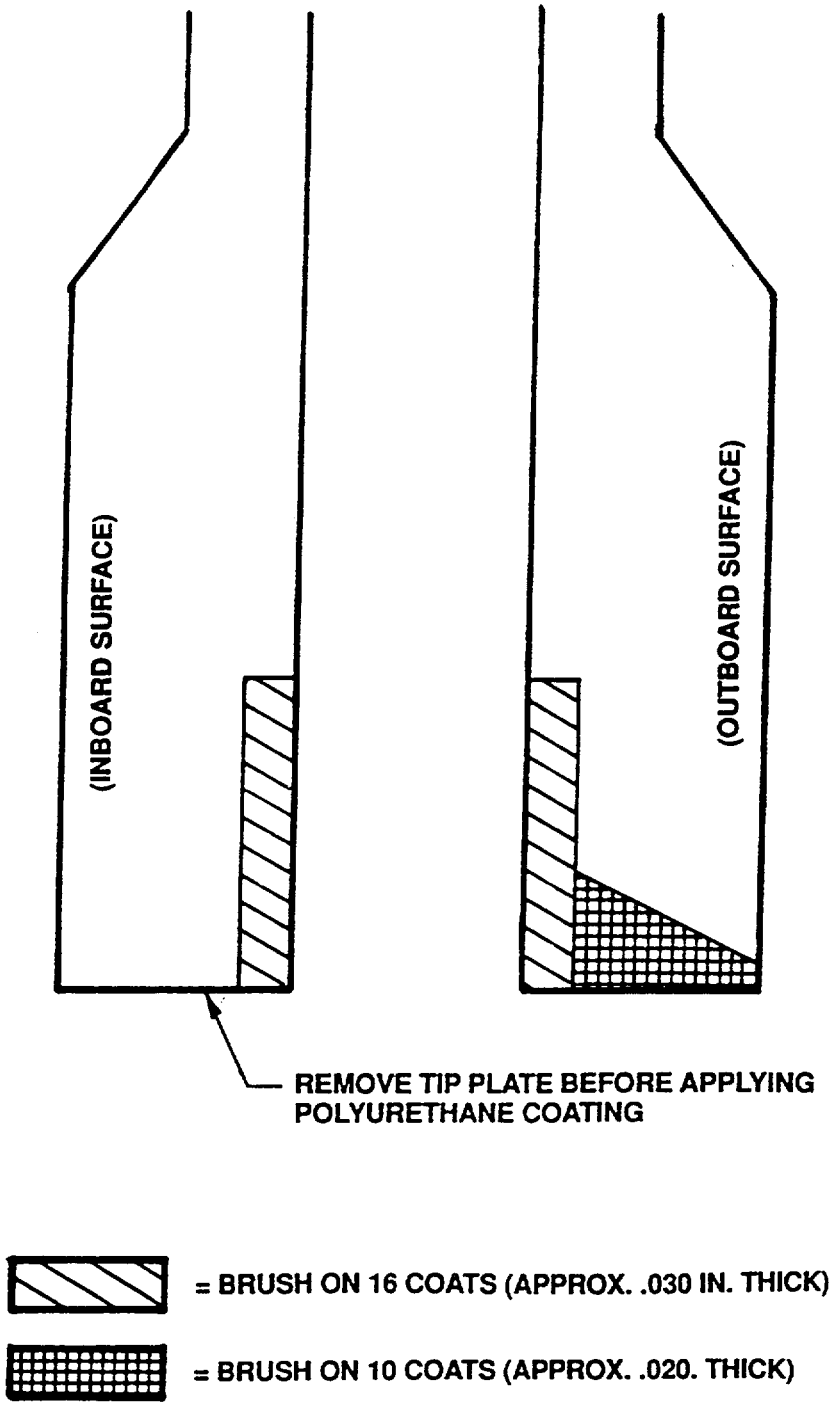


Figure 3-10. Coating Application, Tail Rotor (AH-64)

Section III. DESCRIPTION AND APPLICATION PROCEDURES FOR THE AH-1F AIRCRAFT

3-4. Description. This procedure provided instructions for the application of a kit which protects helicopter rotor blades against sand erosion which may occur. The steps are arranged in sequence to permit two personnel to complete installation on the entire AH-1F aircraft in sequence. If more than two personnel are available, the main rotor and tail rotor can be done simultaneously.

3-5. Personnel Requirements and Supplies.

a. Personnel: 2 required (MOS 67 Series).

b. Supplies and Dimensions: Refer to tables 3-7 through 3-9.

3-6. Installation Procedures.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**

- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**

- **Consul U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-10.**

a. Remove Blades. Removing the main rotor blades makes the installation easier, but removal is not mandatory. The tail rotor blades should not be removed.

b. Main Rotor Tape Installation.

(1) Cleaning. Clean area shown in figure 3-11 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Layout and Mask. Layout and mask off main rotor blades for polyurethane tape application as shown in figure 3-11.

(3) Cut Tape. Cut tape to the dimensions in table 3-8.

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(4) Surface Preparation. Remove dark green paint down to light green primer in the area shown in figure 3-11 with MEK or sandpaper. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction as shown in figure 3-1, sheet 1. Use of a power polishing sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin of helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with isopropyl alcohol or denatured alcohol, then wipe with a clean, dry cloth.

NOTE

Perform Steps (6) through (8) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a thin coat of No. 86 adhesive promoter to the area covered by the first piece of tape, shown in figure 3-12. Allow to dry least five minutes, but not more than one hour before applying tape. Promoter can extend beyond end of tape. Apply promoter in tape length segments to avoid contamination of coated surface.

(7) Tape Application, 8 in. Apply alignment marks to outside of tape in the appropriate position obtained from figure 3-13 (2 inches from top leading edge or 3 inches from top leading edge). See figure 3-1, sheet 2. Apply first piece of tape to area shown in figure 3-11 per tail rotor procedures.

(a) Apply 4 additional 36-inch long pieces of 8 in. tape as shown in figure 3-13.

(b) Remove Tuck masking tape.

(8) Tape Application, 2 in. Scuff the 8" wide tape surface with 120 grit sandpaper in area to be covered by 2-inch wide tape as shown in figure 3-14. Clean tape surface with MEK. Apply tape to blade with No. 86 promoter as in Step (6).

(9) Install Blades. If removed, install per aircraft -23 TM.

c. Tail Rotor Tape Installation .

(1) Cleaning. Clean area shown in figure 3-15 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can Adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Layout and Mask. Layout and mask off tail rotor for polyurethane tape application as shown in figure 3-15.

(3) Cut Tape. Cut 4 pieces of 4 inch wide polyurethane tape 16.5 inches long. (Reference table 3-9).

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction, figure 3-1, sheet 1. Use of a power sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin of helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with isopropyl alcohol or denatured alcohol, then wipe once again with a clean, dry cloth.

NOTE

Perform procedural Steps (6) through (10) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a thin coat of No. 86 adhesive promoter to the masked area. Allow to dry as least five minutes, but not more than one hour before applying tape. Promoter can extend beyond ends of tape.

(7) Polyurethane Tape Preparation. Peel back one of the center (1 inch wide) backing strips from the 4" wide tape approximately 3 inches a shown in figure 3-1, sheet 3.

(8) Tape Alignment. Align the tape in the position shown in figure 3-16 before pressing to blade. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(9) Tape Application. When the tape is in proper position, press the exposed portion on the blade as close to the leading edge as possible. Press down on the tape, working toward the trailing edge to prevent trapping air bubbles. See figure 3-1, sheet 4. Peel backing strip back while keeping tape aligned and pressing down toward the trailing edge. Remove the backing strips one at a time, working toward the trailing edge. See figure 3-1, sheet 5. Thoroughly press down tape. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(10) Masking Tape Removal. Remove masking tape.

NOTE

Repeat Steps (6) to (10) for each blade.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(11) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(12) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(13) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(14) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(15) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(16) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(17) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

NOTE

For a neat job, use masking tape to mask the topside of the PPT sheet 1/32 inch inside the perimeter of the edge.

NOTE

The application of edge sealant is particularly important in maintaining 3M 8663 polyurethane protective tape integrity when applied at butt joints of adjacent PPT.

(18) Assemble a nozzle and a cartridge on the 3M EPX applicator. Squirt out a small quantity to insure that a uniform mix is attained. Using the nozzle, apply a 1/8 inch bead around the perimeter of the 3M 8663 polyurethane protective tape panel. Allow this to set up for about 10 minutes, before removing the tape. The sealant should still be liquid.

NOTE

For best results: To allow the edge of the sealant bead to blend with the 3M 8663 polyurethane protective tape and paint. Higher temperatures will require less time for the sealant to gel. Lower temperatures will require more time for the sealant to gel, so some adjustment in the 10 minutes may be necessary. The objective is to get the masking tape off while the bead of sealant is still flow able, to let it blend without a sharp edge.

(19) Inspect the edge seal application for any small air bubbles and if any are found, they can be relieved by pricking with a hypodermic needle.

(20) The rotor blade is ready to return to service after the sealant is well cured, and the 3M 8663 polyurethane protective tape has had time to reach an acceptable level of adhesion. This is achieved after 24 hours at 72 degrees.

d. Tail Rotor Agcoat Application.

NOTE

TASK L-100 polyurethane paint may be used in place of agcoat. TASK L-100 may also be utilized to repair agcoat.

(1) Cleaning. Clean area shown in figure 3-17 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Masking. Mask off area for polyurethane coating with Duck tape as shown in figure 3-17.

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(3) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction, figure 3-1, sheet 1.

(4) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with MEK.

(5) Mix Primer. Stir Part A of primer before using. Mix equal amounts (4 oz. of each) of AGC 1201-7 primer parts A and B in a beaker and stir well. Close can and bottle after pouring out required amounts.

WARNING

Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use safe glasses, gloves, and disposable (Tyvek) coveralls. Avoid skin contact. Always apply coatings so that any spray or vapors are directed away from breathing zone of individuals. Use respirator protection components, table 3-10.

(6) Primer Application. Brush the primer on the blade in the area shown in figure 3-17 where the coating will be applied. Allow the primer to dry at least one hour at 70 degrees F or above. Do not handle the primed surface. If the primer surface becomes contaminated, lightly wipe it with denatured alcohol.

(7) Mix Coating. Stir Part A of coating before using. After the primer dries, mix 3/4 beaker of AGC 1201-1R polyurethane coating Part A with 1/4 beaker AGC 1201-3R Part B in a can and mix well. Do no stir again after it is mixed well. If a skin forms on top of the coating, remove it.

(8) Coating Application.

(a) Brush on 5 coats to the entire area shown in figure 3-17, allowing five minutes minimum drying time between recoating a specific area. Brush on heavy coats with light pressure to avoid damaging previous coats. If lumps form in the coating, discard and mix a new batch.

(b) Remove masking tape after the first 5 coats are applied and apply the remaining coats by eye. Total number of coats are show in figure 3-18. Allow the coating to cure 24 hours at 70 degrees F or above.

NOTE

Wet primer can be cleaned up with denatured alcohol or MEK. Wet coating can be cleaned up with MEK.

e. Polyurethane Curing. After polyurethane application, allow 24 hours curing time.

f. Tape Repair. Replace the entire damaged piece of tape. Remove with a plastic scraper. Replace per the installation instructions.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(1) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(2) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(3) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(4) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(5) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(6) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(7) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

g. Coating Repair. Local damage to the polyurethane coating can be touched up by brushing additional coating to the damaged area. Carefully remove the disbonded material. Scuff the damaged area with 120 grit sandpaper. Wipe clean with MEK. Prime the area with AGC 1201-7 primer if the blade surface is exposed. Coat the damaged area with sufficient coats of polyurethane coating to match the thickness of adjacent areas. Application of TASK L-100 polyurethane paint to repair minor damage an agcoat material is authorized for this procedure.

h. Polyurethane Coating Removal. Saturate coating surface with MEK and scrape coating off with a plastic scraper while so. Make a final surface wipe with cloth dampened with MEK.

i. Polyurethane Tape Removal. Slowly peel back over itself. Scrape tape with plastic scraper, if necessary. Remove adhesion promoter with cloth dampened with toluene.

j. Track and Balance Check. Check track and balance of the main and tail rotors per -23 TM.

k. Inspection of Main Rotor Polyurethane Tape.

(1) Inspect 2-inch tape for wear. No holes allowed.

(2) Inspect 8-inch tape for wear. No more than 1.0 inch-width hole in any spanwise or chordwise direction allowed on upper or lower side of blade.

(3) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(4) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(5) Inspect for internal disbonding of tape segment. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonds on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

l. Inspection of Main Rotor Agcoat. Wear through to blade surface not allowed.

m. Inspection of Tail Rotor Polyurethane Tape.

(1) Inspect 4-inch tape for wear. No more than 0.5 inch wide spanwise or chordwise hole allowed on trailing edge. No holes allowed on any other surface of tape.

(2) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(3) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(4) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonding on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged area creates an increasingly lighter blade and may cause an out of balance condition.

n. Inspection of Tail Rotor Agcoat. Wear through to blade surface not allowed.

Table 3-7.

AH-1F Rotor Blade Erosion Protection Kit/Tools/Consumables
NSN 1615-01-328-5239

Kit

1. Cheesecloth	CCC-C-440	200 Sheets 8 x 9"
2. 120 Grit Sandpaper	NSN 5350-00-721-8115	24 Sheets
3. Adhesive Promoter #86	70-0701-8275-6	1 Qt
4. 2-inch Wide Paint Brush or Sponge Brush	NSN 8020-01-126-1437 P/N PP-2	8 Each
5. Plastic Scraper	NSN 5120-00-628-5569 P/N PA-1	2 Each
6. Masking Tape	NSN 7510-00-685-4963 P/N 231-1-IN	4 Rolls
7. Poly Tape 2 Inch	8663 MB	72 pcs, 2" x 36"
8. Poly Tape 4 Inch	8663 MB-SS	72 pcs, 4" x 36"
9. Poly Tape 8 Inch	8663 MB-SS	72 pcs, 8" x 36"

Supplies

1. Alcohol (Denatured or Isopropyl)	NSN 6810-00-264-5906	2 Qt
2. Methyl Ethyl Ketone (MEK)	NSN 6810-00-281-2785	2 Gal
3. Toluene	NSN 6810-00-579-8431	1 Qt
4. Cleaning Cloth	NSN 7920-00-044-9281	10 Lb Bag
5. Machinery Towel		As Req
6. L-100 Coating	NSN 1615-01-205-6138	9 Kits
7. Adhesion Promoter, 3M # 86A	NSN 8040-01-450-9187	Pt (as req)
8. Applicator Nozzle, 3M	NSN 5120-01-425-1023	1 Box
9. Edge Sealant Cartridge, 3M DP-190	NSN 1680-01-431-3607	

Tools

1. Airframe Repairer's Tool Kit
2. Maintenance Stand
3. Scissors
4. Spray Bottle
5. Metal containers, 1 qt. (#1 coffee can, No. 10 can)
6. Exacto knife w/blades
7. Safety Goggles
8. Rubber Gloves
9. Tape Measure
10. Wooden Spatula (Paint Stirrer)
11. EPX Applicator NSN 1680-01-431-3606

Table 3-8.

AH-1F Main Rotor Application Dimensions and Quantities

10	pcs polyurethane tape	8" wide x 36" long
8	pcs polyurethane tape	2" wide x 36" long
2	pcs polyurethane tape	2" wide x 24" long

Table 3-9.

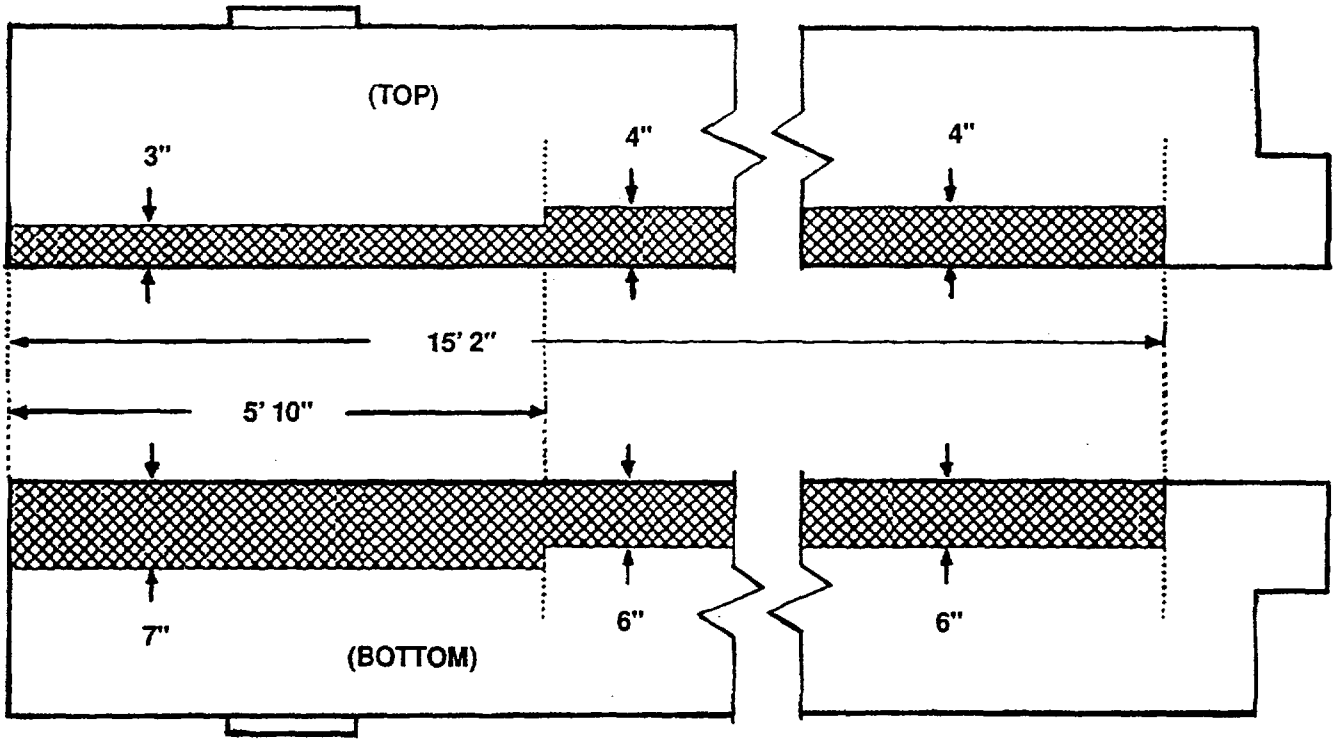
AH-1F Tail Rotor Application Dimensions and Quantities

2	pcs polyurethane tape	4" wide x 16.5" long

Table 3-10.

Respiratory Protection Components

- 1/2 face respirator for paint operations:
- Nomenclature: Paint Spray respirator, complete Part No: 44849
  NSN: 4140-01-231-0150
- Cartridges (refill) Part No: 464031
  NSN: 4240-01-230-6892
- Paint prefilter, Part No: 465667
  NSN: 4240-01-231-0150
- Self Contained Breathing Air:
- Nomenclature: 30 minute Ultralight II air mask
  NSN: 4240-01-24-8035
- Composite II Cylinder
  NSN: 4240-01-252-0086



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-11. Layout and Masking, Main Rotor (AH-1F)

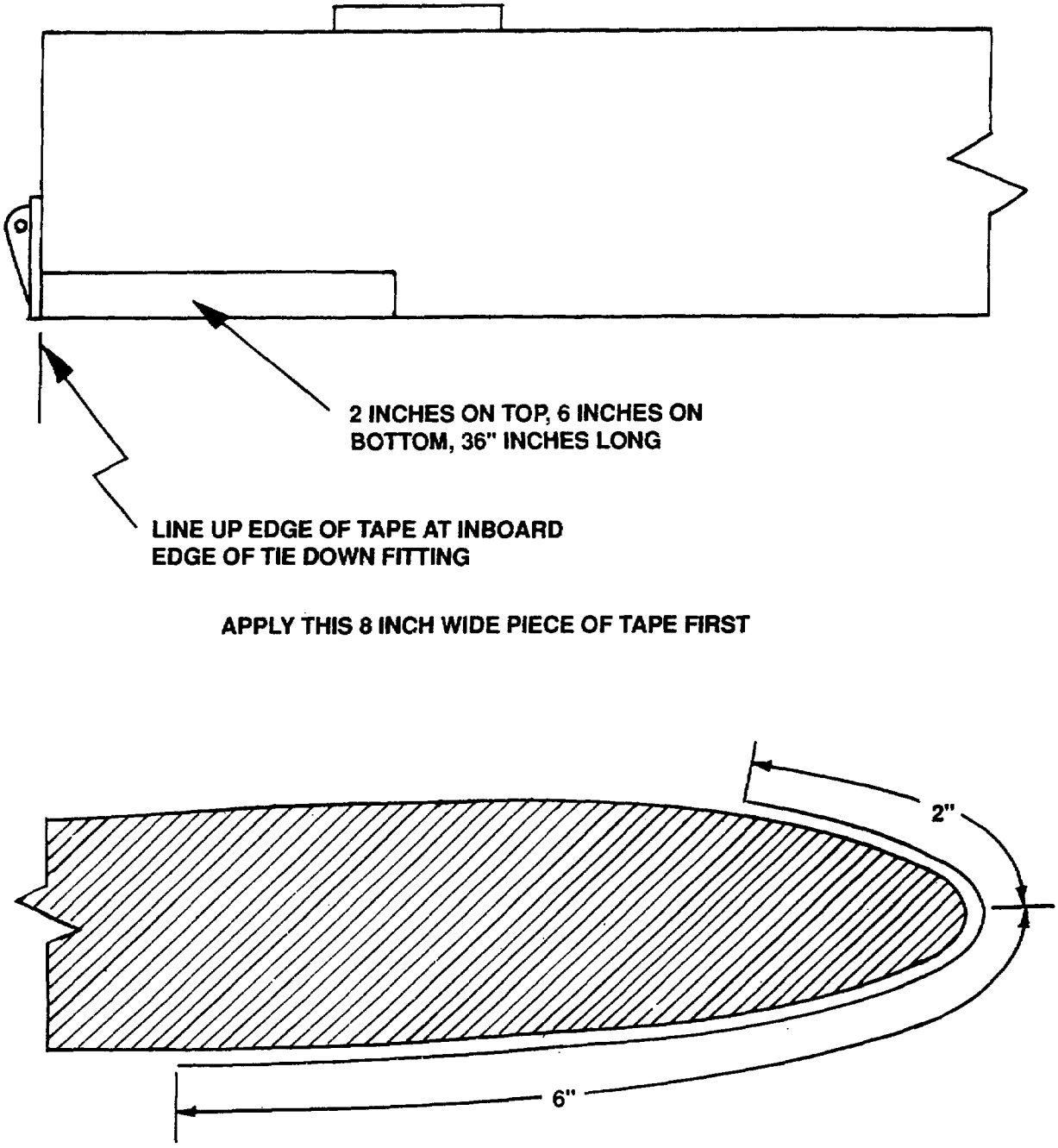


Figure 3-12. Tape Application, Main Rotor (AH-1F)

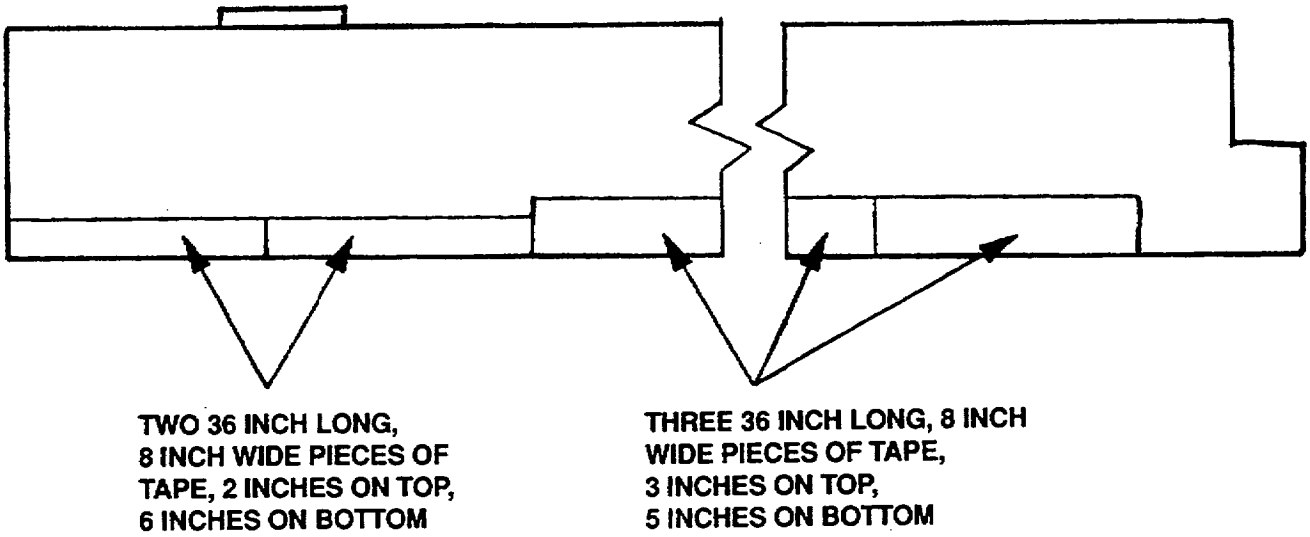
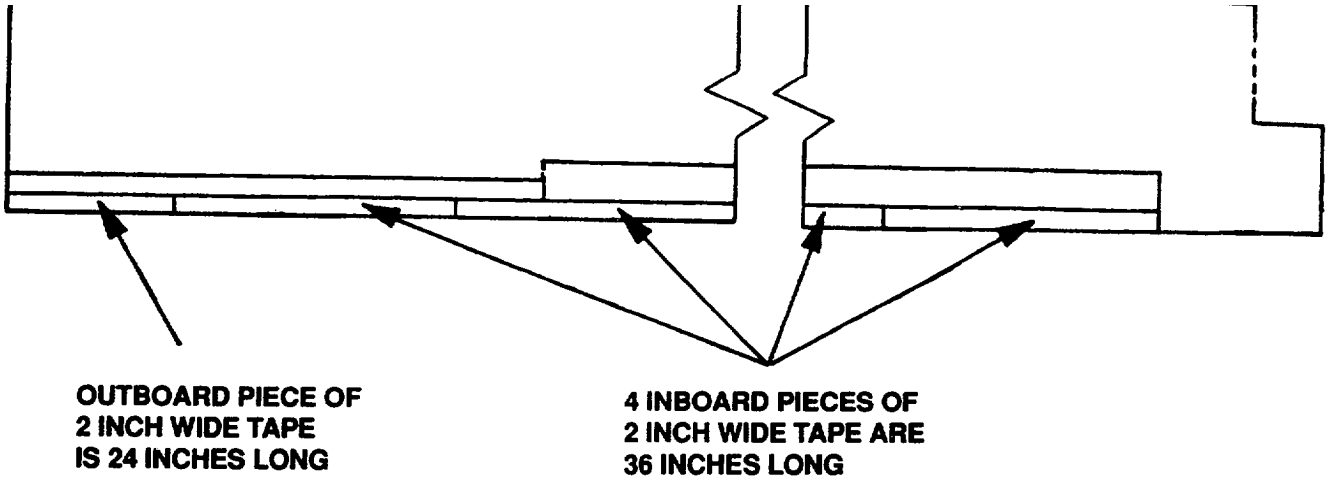


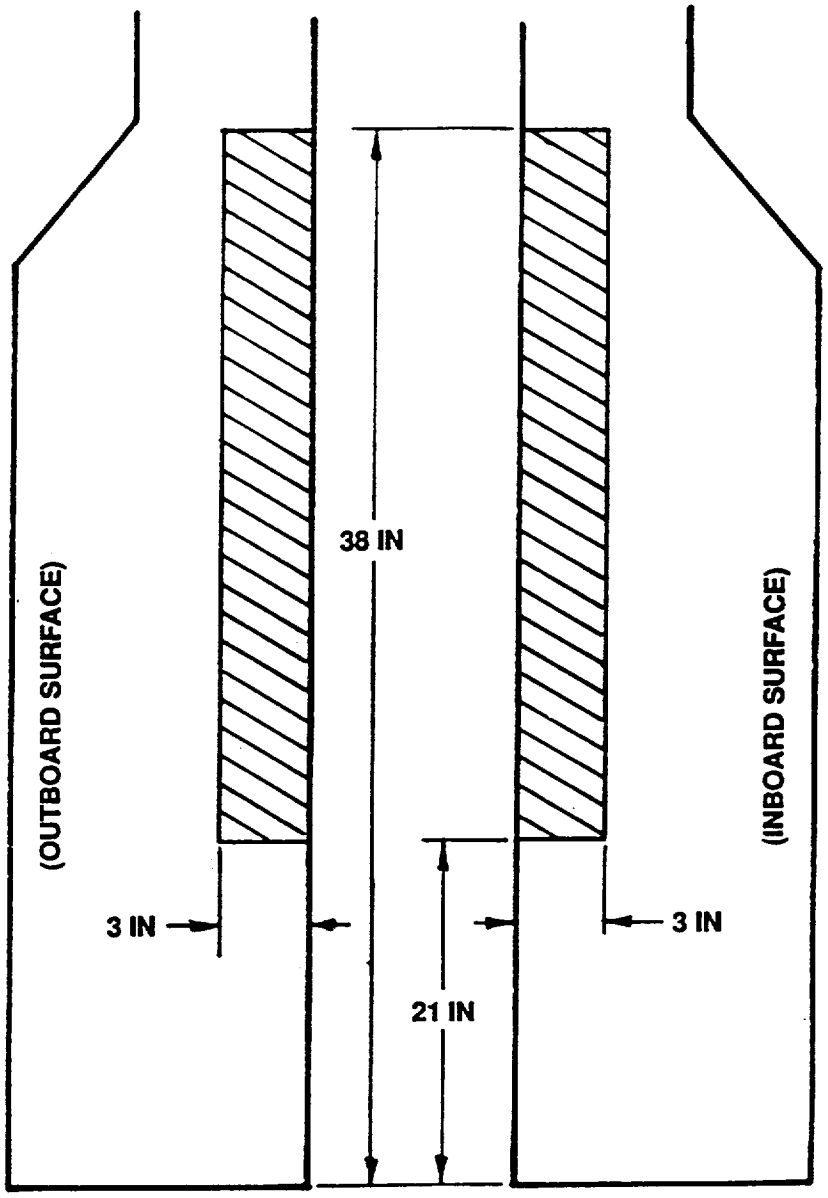
Figure 3-13. Additional Tape Application, Main Rotor (AH-1F)



**ALL 2 INCH WIDE TAPE IS 1 INCH ON TOP
AND 1 INCH ON BOTTOM, OVER 8 INCH WIDE TAPE**

APPLY OUTBOARD PIECE OF TAPE FIRST

Figure 3-14. Taping Application, Main Rotor (AH-1F)



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-15. Masking Area for Tape Application, Tail Rotor (AH-1F)

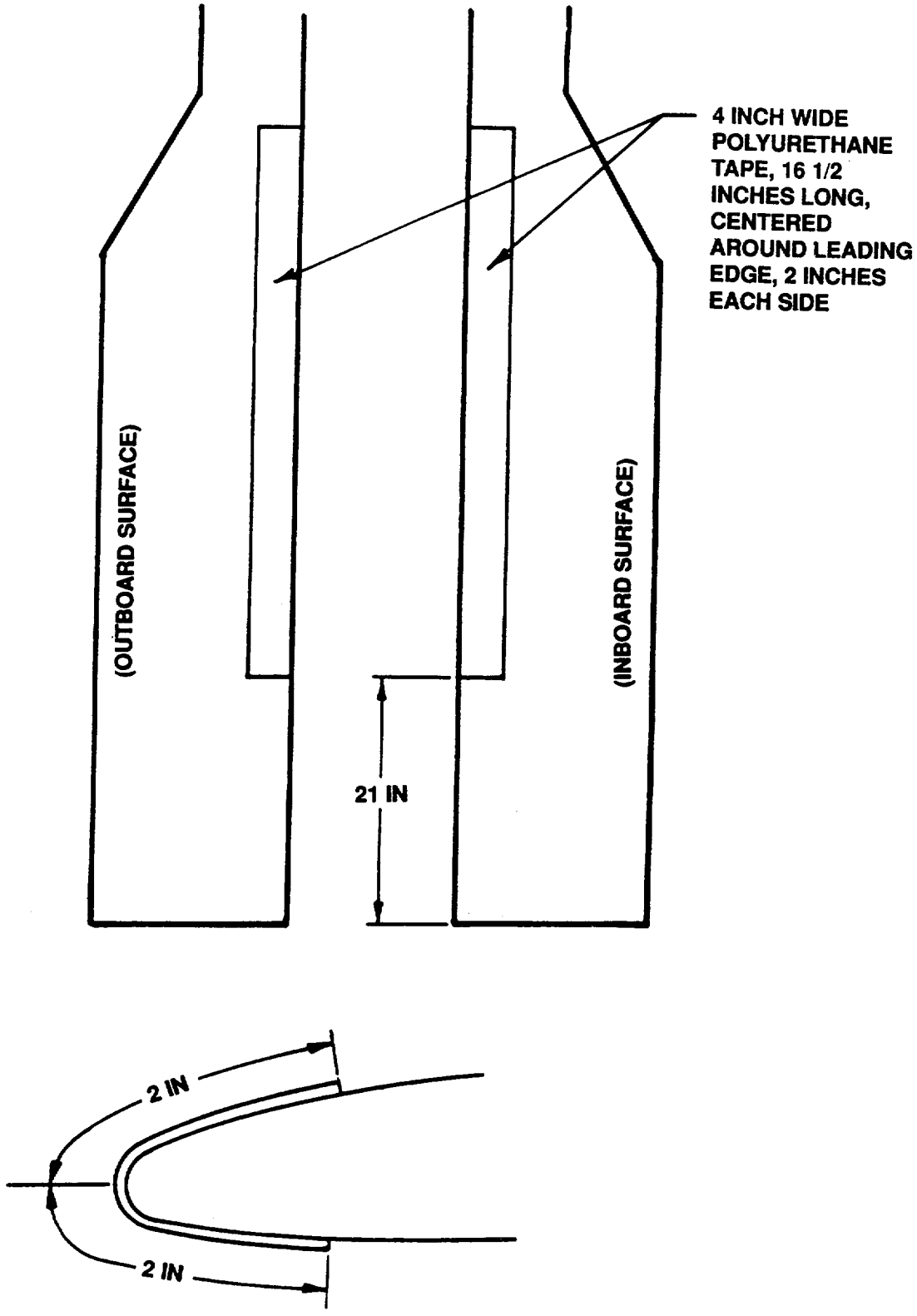
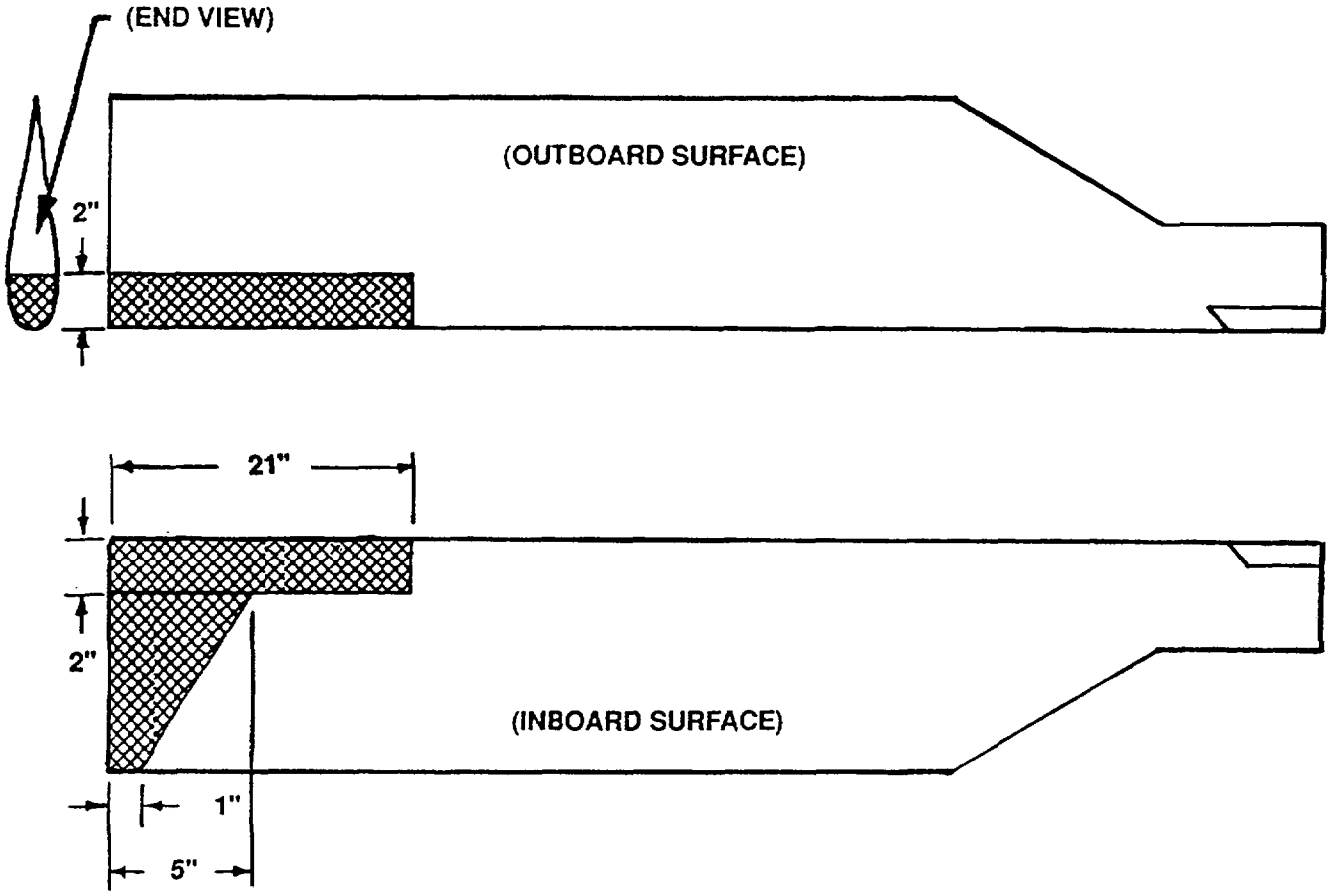


Figure 3-16. Tape Alignment, Tail Rotor (AH-1F)



MASK AROUND SHADED AREA FOR POLYURETHANE COATING APPLICATION USING TUCK TAPE

Figure 3-17. Masking Area, Coating/Cleaning Application, Tail Rotor (AH-1F)

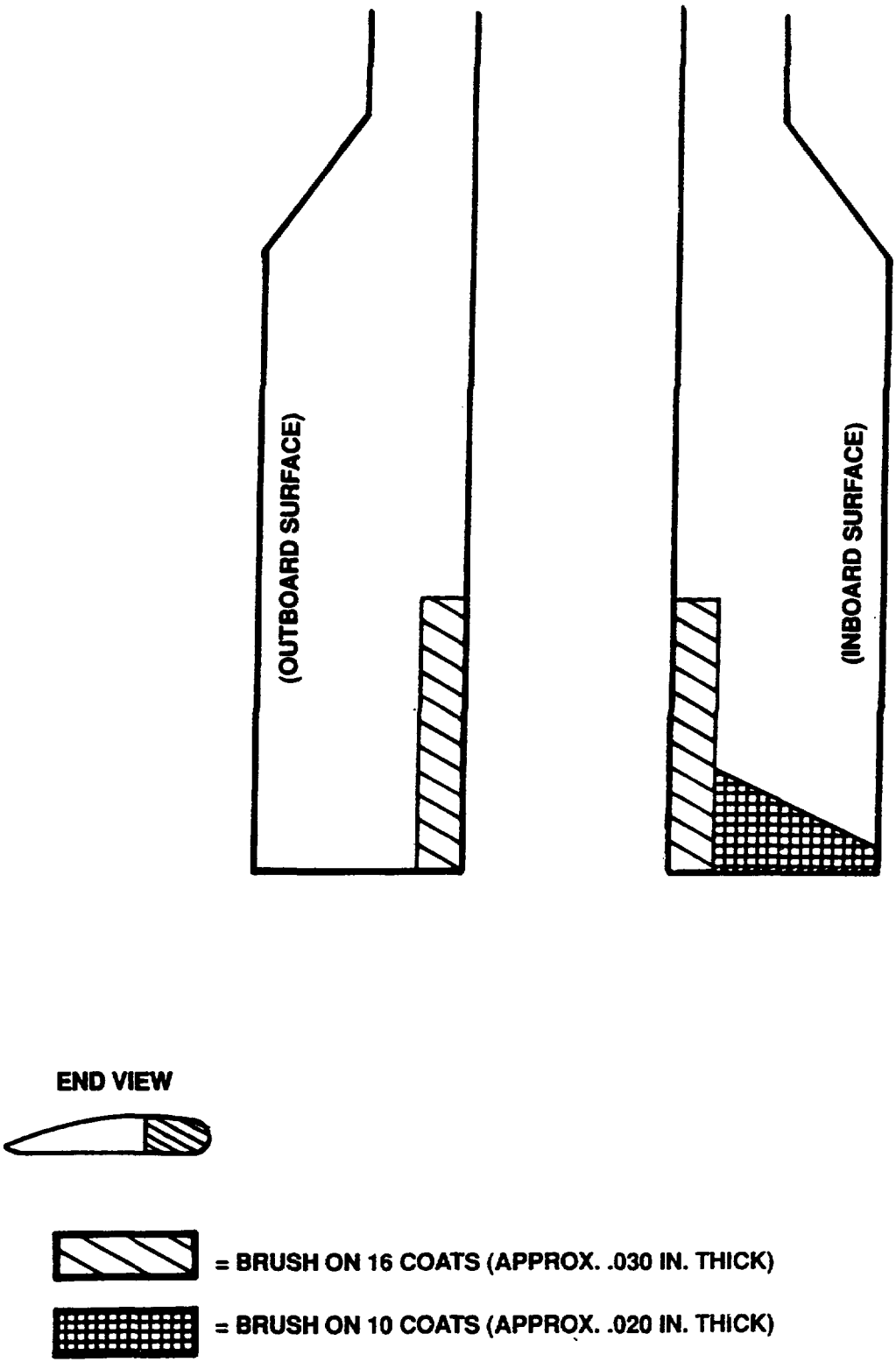


Figure 3-18. Coating Application, Tail Rotor (AH-1F)

Section IV. DESCRIPTION AND APPLICATION PROCEDURES FOR THE OH-58A/C AIRCRAFT

3-7. Description. This procedure provides instructions for the application of a kit which protects helicopter rotor blades against sand erosion which may occur. The steps are arranged in sequence to permit two personnel to complete installation on the entire OH-58A/C aircraft in sequence. This instruction applies to the main rotor only. If more than two personnel are available, both blades can be done simultaneously.

3-8. Personnel Requirements and Supplies.

a. Personnel: 2 required and one assistant (MOS 67 Series).

b. Supplies and Dimensions: Refer to tables 3-11 and 3-12.

3-9. Installation Procedures.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**

- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**

- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-13.**

a. Remove blades. Removing the main rotor blades makes the installation easier, but removal is not mandatory.

b. Main Rotor Tip Agcoat Coating Installation.

NOTE

TASK L-100 polyurethane paint may be used in placed of agcoat. TASK L-100 may also be utilized to repair agcoat.

(1) Tip Caps. DELETED.

(2) Cleaning. Clean area shown in figure 3-19 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(3) Masking. Mask off area for polyurethane coating with Tuck tape as shown in figure 3-19.

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction, figure 3-1, sheet 1.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with isopropyl or denatured alcohol, then wipe once again with a clean, dry cloth.

(6) Mix Primer. Stir primer Part A before using. Mix equal amounts (4 oz of each) of AGC 1201-7 primer parts A and B in a beaker and stir well. Close can and bottle after pouring out required amounts.

WARNING

Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use safety glasses, gloves, and disposable (Tyvek) coveralls. Avoid skin contact. Always apply coatings so that any spray or vapors are directed away from breathing zone of individuals. Use respirator protection components, table 3-13.

(7) Primer Application. Brush the primer on the blade in the area shown in figure 3-19 where the coating will be applied. Allow the primer to dry at least one hour at 70 degrees F or above. Do not handle the primed surface. If the primer surface becomes contaminated, lightly wipe it with denatured alcohol.

(8) Mix Coating. Stir coating Part A before using. After the primer dries, mix 3/4 beaker of AGC 1201-1R polyurethane coating Part A with 1/4 beaker AGC1201-3R Part B in a can and mix well. Do not stir again after it is mixed well. If a skin forms on top of the coating, remove it.

(9) Coating Application.

(a) Brush on 5 coats to the entire area shown in figure 3-19, allowing five minutes minimum drying time between recoating a specific area. Brush on heavy coats with light pressure to avoid damaging previous coats. If lumps form in the coating, discard and mix a new batch.

(b) Remove masking tape after the first 5 coats are applied and apply the remaining coats by eye. Total number of coats are shown in figure 3-19. Allow the coating to cure 24 hours at 70 degrees F or above.

NOTE

Wet primer can be cleaned up with denatured alcohol or MEK. Wet coating can be cleaned up with MEK.

(10) Tip Cap Installation. DELETED.

c. Main Rotor Tape Installation.

(1) Cleaning. Clean area shown in figure 3-19 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Layout and Mask. Layout and mask off main rotor for polyurethane tape application as shown in figure 3-20.

(3) Cut Tape. Refer below and table 3-12.

Cut 6 pieces of 4-inch wide polyurethane tape 36 inches long.
Cut 2 pieces of 4-inch wide polyurethane tape 30 inches long.
Cut 2 pieces of 4-inch wide polyurethane tape 6 inches long.

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction, figure 3-1, sheet 1. Use of power sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with isopropyl alcohol or denatured alcohol, then wipe once again with a clean, dry cloth.

NOTE

Perform Steps (6) trough (9) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a thin coat of No. 86 adhesive promoter to the masked area where the first 6-inch long piece will cover, as shown in figure 3-21. Allow to dry at least five minutes, but not more than one hour before applying tape.

(7) Polyurethane Tape Preparation. Apply alignment marks to outside surface of tape at the center. See figure 3-1, sheet 2. Peel back one of the center (1-inch wide) backing strips from the 4” wide tape approximately 3 inches. See figure 3-1, sheet 3.

(8) Tape Alignment. Align the tape in the position shown in figure 3-21 before pressing to blade.

(9) Tape Application. When the tape is in proper position, press the exposed portion on the blade as close to the leading edge as possible. Press down on the tape, working toward the trailing edge to prevent trapping air bubbles. See figure 3-1, sheet 4. Peel backing strip back while keeping tape aligned and pressing down toward the trailing edge. Remove the backing strips one at a time, working toward the trailing edge. See figure 3-1, sheet 5. Thoroughly press down tape. Apply the remaining pieces of tape shown in figure 3-22 in the same manner. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(10) Remove masking tape.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to Be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(11) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(12) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(13) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(14) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(15) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(16) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(17) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

NOTE

For a neat job, use masking tape to mask the topside of the PPT sheet 1/32 inch inside the perimeter of the edge.

NOTE

The application of edge sealant is particularly important in maintaining 3M 8663 polyurethane protective tape integrity when applied at butt joints of adjacent PPT.

(18) Assemble a nozzle and a cartridge on the 3M EPX applicator. Squirt out a small quantity to insure that a uniform mix is attained. Using the nozzle, apply a 1/8 inch bead around the perimeter of the 3M 8663 polyurethane protective tape panel. Allow this to set up for about 10 minutes, before removing the tape. The sealant should still be liquid.

NOTE

For best results: To allow the edge of the sealant bead to blend with the 3M 8663 polyurethane protective tape and paint. Higher temperatures will require less time for the sealant to gel. Lower temperatures will require more time for the sealant to gel, so some adjustment in the 10 minutes may be necessary. The objective is to get the masking tape off while the bead of sealant is still flowable, to let it blend without a sharp edge.

(19) Inspect the edge seal application for any small air bubbles and if any are found, they can be relieved by pricking with a hypodermic needle.

(20) The rotor blade is ready to return to service after the sealant is well cured, and the 3M 8663 polyurethane protective tape has had time to reach a acceptable level of adhesion. This is achieved after 24 hours at 72 degrees.

d. Blade Installation. If necessary, install main rotor blades per -23 TM.

e. Polyurethane Curing. After polyurethane application, allow 24 hours curing time.

f. Tape Repair. Replace the entire damaged piece of tape. Remove with a plastic scraper. Replace per the installation instructions.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(1) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(2) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(3) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(4) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(5) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(6) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(7) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

g. Coating Repair. Local damage to the polyurethane coating can be touched up by brushing additional coating to the damaged area. Carefully remove the disbonded material. Scuff the damaged area with 120 grit sandpaper. Wipe clean with MEK. Prime the area with AGC 1201-7 primer if the blade surface is exposed. Coat the damaged area with sufficient coats of polyurethane coating to match the thickness of adjacent areas. Application of TASK L-100 polyurethane paint to repair minor damage on agcoat material is authorized for this procedure.

h. Polyurethane Coating Removal. Saturate coating surface with MEK and scrape coating off with a plastic scraper while soft. Make a final surface wipe with cloth dampened with MEK.

i. Polyurethane Tape Removal. Slowly peel back over itself. Scrape tape with plastic scraper if necessary. Remove adhesion promoter with cloth dampened with toluene.

j. Track and Balance Check. Check track and balance of main rotor blade per -23 TM.

k. Inspection of Main Rotor Polyurethane Tape.

(1) Inspect 4-inch tape for wear. No more than 0.5 inch wide spanwise or chordwise hole allowed on trailing edge. No holes allowed on any other surface of tape.

(2) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(3) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch-spanwise or chordwise is allowed.

(4) Inspect for internal disbonding of tape segment. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonds on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

l. Inspection of Main Rotor Agcoat. Wear through to blade surface not allowed.

Table 3-11.

OH-58A/C Rotor Blade Erosion Protection Kit/Tools/Consumables
NSN 1615-01-328-5239

Kit

1. Cheesecloth	CCC-C-440	200 Sheets 8 x 9"
2. 120 Grit Sandpaper	NSN 5350-00-721-8115	24 Sheets
3. Adhesive Promoter #86	70-0701-8275-6	1 Qt
4. 2-inch Wide Paint Brush or Sponge Brush	NSN 8020-01-126-1437 P/N PP-2	8 Each
5. Plastic Scraper	NSN 5120-00-628-5569 P/N PA-1	2 Each
6. Masking Tape	NSN 7510-00-685-4963 P/N 231-1-IN	4 Rolls
7. Poly Tape 2 Inch	8663 MB	72 pcs, 2" x 36"
8. Poly Tape 4 Inch	8663 MB-SS	72 pcs, 4" x 36"
9. Poly Tape 8 Inch	8663 MB-SS	72 pcs, 8" x 36"

Supplies

1. Alcohol (Denatured or Isopropyl)	NSN 6810-00-264-5906	2 Qt
2. Methyl Ethyl Ketone (MEK)	NSN 6810-00-281-2785	2 Gal
3. Toluene	NSN 6810-00-579-8431	1 Qt
4. Cleaning Cloth	NSN 7920-00-044-9281	10 Lb Bag
5. Machinery Towel		As Req
6. Adhesion Promoter, 3M # 86A	NSN 8040-01-450-9187	Pt (as req)
7. Applicator Nozzle, 3M	NSN 5120-01-425-1023	1 Box
8. Edge Sealant Cartridge, 3M DP-190	NSN 1680-01-431-3607	

Tools

1. Airframe Repairer's Tool Kit
2. Maintenance Stand
3. Scissors
4. Spray Bottle
5. Metal containers, 1 qt. (#1 coffee can, No. 10 can)
6. Exacto knife w/blades
7. Safety Goggles
8. Rubber Gloves
9. Tape Measure
10. Wooden Spatula (Paint Stirrer)
11. EPX Applicator, 3M — NSN 1680-01-431-3606

Table 3-12.

OH-58A/C Main Rotor Application Dimensions and Quantities

6 pcs polyurethane tape	4” wide x 36" long
2 pcs polyurethane tape	4” wide x 30" long
2 pcs polyurethane tape	4" wide x 6" long

Table 3-13.

Respiratory Protection Components (OH-58A/C)

- 1/2 face respirator for paint operations:
- Nomenclature: Paint Spray respirator, complete Part No: 44849
  NSN: 4140-01-231-0150
- Cartridges (refill) Part No: 464031
  NSN: 4240-01-230-6892
- Paint prefilter, Part No: 465667
  NSN: 4240-01-231-0150
- Self Contained Breathing Air:
- Nomenclature: 30 minute Ultralight II air mask
  NSN: 4240-01-248-8035
- Composite II Cylinder
  NSN: 4240-01-252-0086

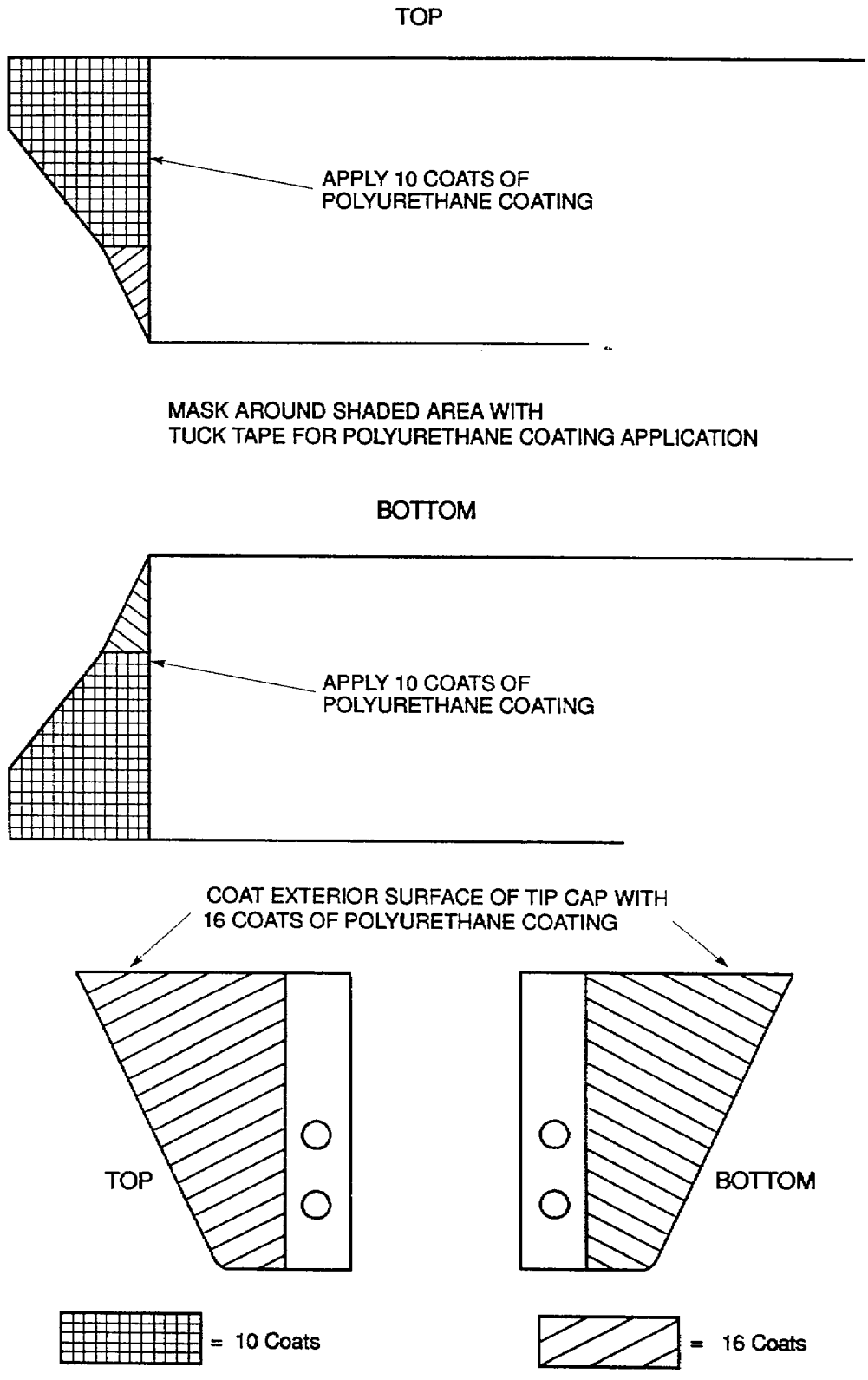
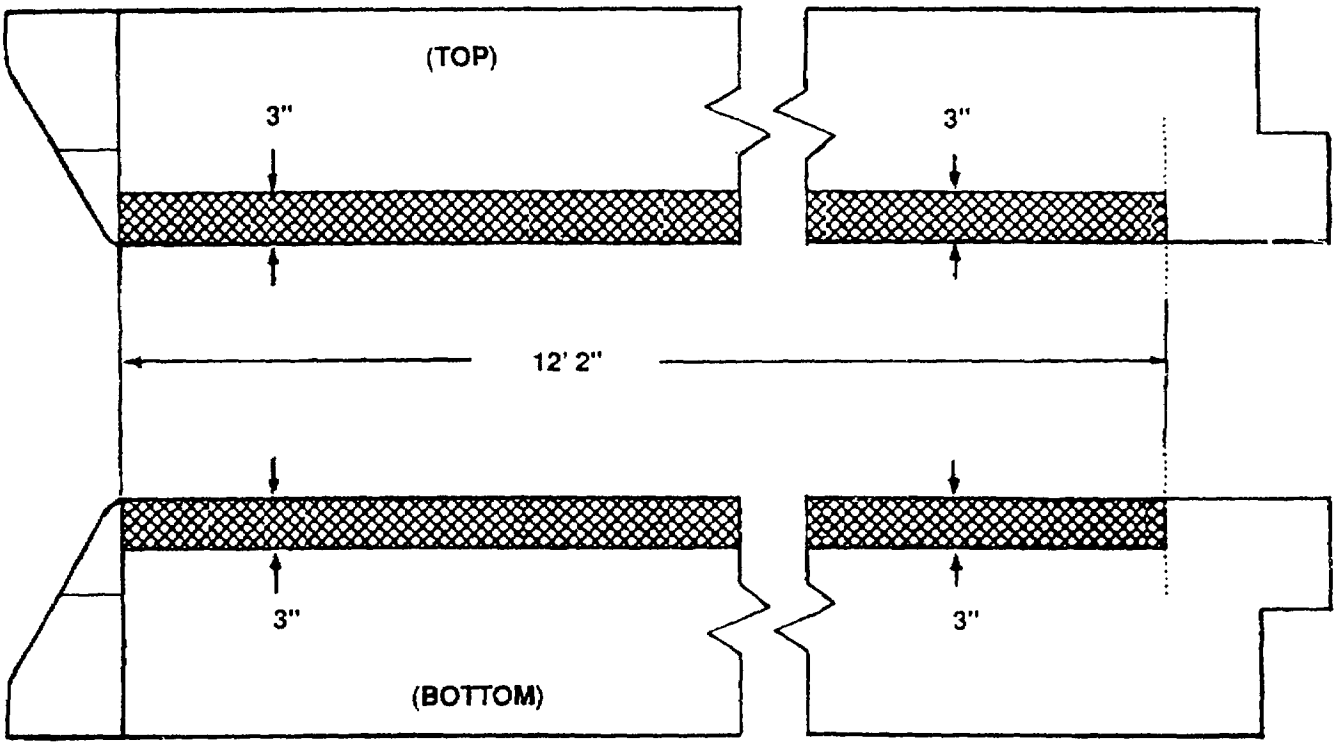
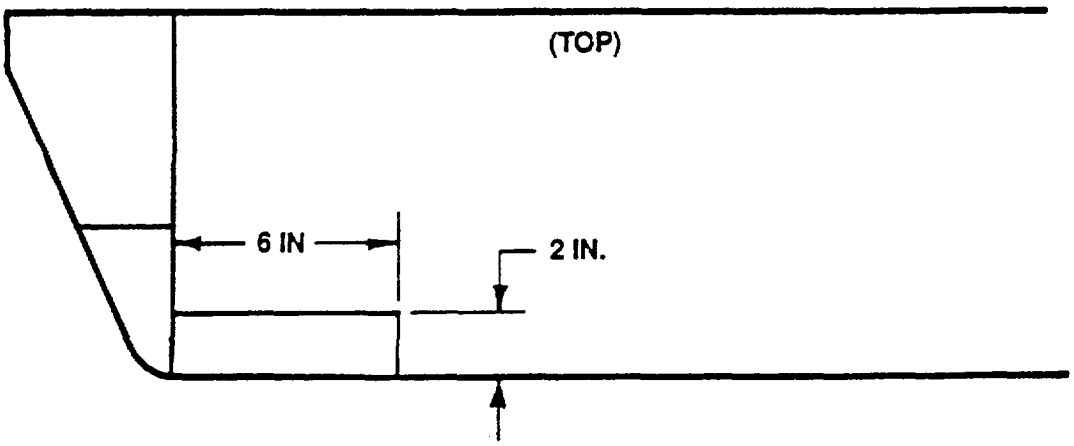


Figure 3-19. Coating Application, Main Rotor (OH-58A/C).



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3 -20. Tape Alignment, Main Rotor (OH-58A/C)



FIRST PIECE OF TAPE IS 6-INCH LONG PIECE

ALIGN WITH EDGE OF TIP CAP, 2 INCHES ON TOP AND 2 INCHES ON BOTTOM

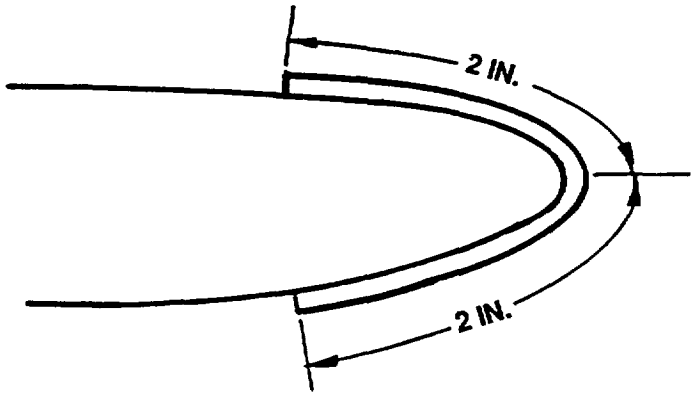
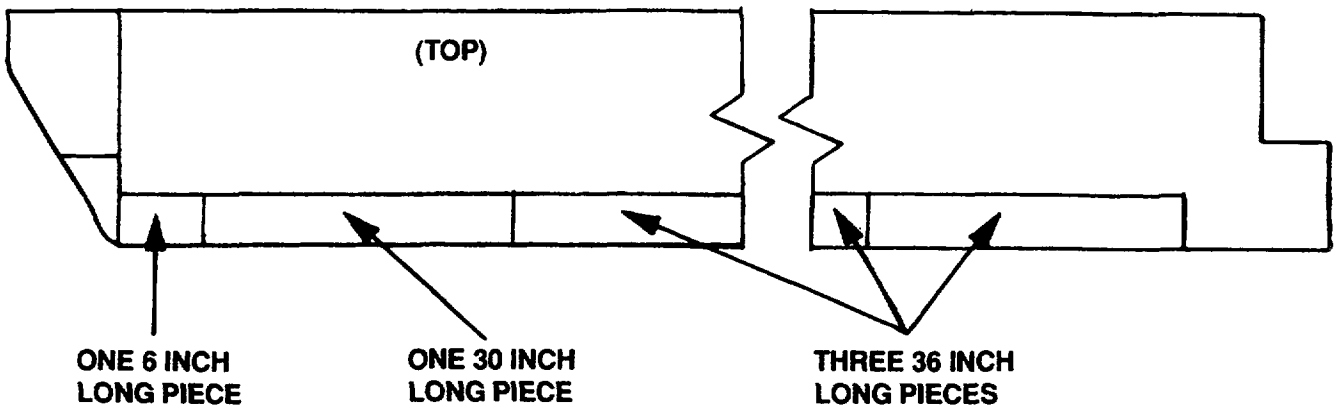


Figure 3-21. Tape Alignment, Main Rotor (OH-58A/C)



**ALL TAPE PIECES ARE 2 INCHES
ON TOP AND 2 INCHES ON BOTTOM**

Figure 3-22. Tape Application, Main Rotor (OH-58A/C)

Section V. DESCRIPTION AND APPLICATION PROCEDURES FOR THE OH-58D AIRCRAFT

3-10. Description. This procedure provides instructions for the application of a kit which protects helicopter rotor blades against sand erosion which may occur. The steps are arranged in sequence to permit two personnel to complete installation on the entire OH-58D aircraft in sequence. This instruction applies to the main rotor only. If more than two personnel are available, both blades can be done simultaneously.

3-11. Personnel Requirements and Supplies.

a. Personnel: 2 required and one assistant (MOS 67 Series).

b. Supplies and Dimensions. Refer to tables 3-14 and 3-15.

3-12. Installation Procedures.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**

- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**

- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-16.**

a. Remove Blades. Removing the main rotor blades makes the installation easier, but removal is not mandatory.

b. Main Rotor Tape Installation.

(1) Cleaning. Clean area shown in figure 3-23 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Layout and Mask. Layout and mask off main rotor for polyurethane tape application as shown in figure 3-23.

(3) Cut Tape. Refer to table 3-15 and cut 8 pieces of 4-inch wide polyurethane tape 36 inches long:

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction, figure 3-1, sheet 1. Use of a power polishing sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin reduces the structural integrity and fatigue life of the blade.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with isopropyl alcohol or denatured alcohol, then wipe once again with a clean, dry cloth.

NOTE

Perform Steps (6) through (10) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a thin coat of No. 86 adhesive promoter to the area covered by the first piece of tape, shown in figure 3-24. Allow to dry at least five minutes, but not more than one hour before applying tape. Promoter can extend beyond end of tape. Apply promoter in tape length segments to avoid contamination of coated surface. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(7) Polyurethane Tape Preparation. Peel back one of the center (1 inch wide) backing strips from the 4 inch wide tape approximately 3 inches as shown in figure 3-1, sheet 3 for the 8" wide tape.

(8) Tape Alignment. Align the tape in the position shown in figure 3-24 before pressing to blade.

(9) Tape Application. When the tape is in proper position, press the exposed portion on the blade as close to the leading edge as possible. Press down on the tape, working toward the trailing edge to prevent trapping air bubbles. See figure 3-1, sheet 4. Peel backing strip back while keeping tape aligned and pressing down toward the trailing edge. Remove the backing strips one at a time, working toward the trailing edge. See figure 3-1, sheet 5. Thoroughly press down tape. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(10) Polyurethane Tape Application. Apply inboard piece of tape with No. 86 promoter as with the first piece, figure 3-24. Remove masking tape.

NOTE

Repeat Steps (6) through (10) for each blade.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(11) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(12) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(13) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(14) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(15) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(16) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(17) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

NOTE

For a neat job, use masking tape to mask the topside of the PPT sheet 1/32 inch inside the perimeter of the edge.

NOTE

The application of edge sealant is particularly important in maintaining 3M 8663 polyurethane protective tape integrity when applied at butt joints of adjacent PPT.

(18) Assemble a nozzle and a cartridge on the 3M EPX applicator. Squirt out a small quantity to insure that a uniform mix is attained. Using the nozzle, apply a 1/8 inch bead around the perimeter of the 3M 8663 polyurethane protective tape panel. Allow this to set up for about 10 minutes, before removing the tape. The sealant should still be liquid.

NOTE

For best results: To allow the edge of the sealant bead to blend with the 3M 8663 polyurethane protective tape and paint. Higher temperatures will require less time for the sealant to gel. Lower temperatures will require more time for the sealant to gel, so some adjustment in the 10 minutes may be necessary. The objective is to get the masking tape off while the bead of sealant is still flowable, to let it blend without a sharp edge.

(19) Inspect the edge seal application for any small air bubbles and if any are found, they can be relieved by pricking with a hypodermic needle.

(20) The rotor blade is ready to return to service after the sealant is well cured, and the 3M 8663 polyurethane protective tape has had time to reach an acceptable level of adhesion. This is achieved after 24 hours at 72 degrees.

c. Blade Installation. If removed, install blade per -23 aircraft manual.

d. Polyurethane Curing. After polyurethane application, allow 24 hours curing time.

e. Tape Repair. Replace the entire damaged piece of tape. Remove with a plastic scraper. Replace per the installation instructions.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(1) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(2) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(3) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(4) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(5) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(6) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(7) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

f. Coating Repair. Local damage to the polyurethane coating can be touched up by brushing additional coating to the damaged area. Carefully remove the disbonded material. Scuff the damaged area with 120 grit sandpaper. Wipe clean with MEK. Prime the area with AGC 1201-7 primer if the blade surface is exposed. Coat the damaged area with sufficient coats of polyurethane coating to match the thickness of adjacent areas. Application of TASK L-100 polyurethane paint to repair minor damage on agcoat material is authorized for this procedure.

g. Polyurethane Coating Removal. Saturate coating surface with MEK and scrape coating off with a plastic scraper while soft. Make a final surface wipe with cloth dampened with MEK.

h. Polyurethane Tape Removal. Slowly peel back over itself. Scrape tape with plastic scraper, if necessary. Remove adhesion promoter with cloth dampened with toluene.

i. Track and Balance Check. Check track and balance of main rotor blade per -23 TM.

j. Inspection of Main Rotor Polyurethane Tape.

(1) Inspect 4-inch tape for wear. No more than 0.5 inch wide spanwise or chordwise hole allowed on trailing edge. No holes allowed on any other surface of tape.

(2) Inspect upper and lower trailing edge of tape for disbonding. No mo re than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(3) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(4) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonds on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

k. Inspection of Main Rotor Agcoat. Wear through to blade surface not allowed.

Table 3-14.

OH-58D Rotor Blade Erosion Protection Kit/Tools/Consumables
NSN 1615-01-328-5239

Kit

1. Cheesecloth	CCC-C-440	200 Sheets 8 x 9"
2. 120 Grit Sandpaper	NSN 5350-00-721-8115	24 Sheets
3. Adhesive Promoter #86	70-0701-8275-6	1 Qt
4. 2-inch Wide Paint Brush or Sponge Brush P/N PP-2	NSN 8020-01-126-1437	8 Each
5. Plastic Scraper	NSN 5120-00-628-5569 P/N PA-1	2 Each
6. Masking Tape	NSN 7510-00-685-4963 P/N 231-1-IN	4 Rolls
7. Poly Tape 2 Inch	8663 MB	72 pcs, 2" x 36"
8. Poly Tape 4 Inch	8663 MB-SS	72 pcs, 4" x 36"
9. Poly Tape 8 Inch	8663 MB-SS	72 pcs, 8" x 36"

Supplies

1. Alcohol (Denatured or Isopropyl)	NSN 6810-00-264-5906	2 Qt
2. Methyl Ethyl Ketone (MEK)	NSN 6810-00-281-2785	2 Gal
3. Toluene	NSN 6810-00-579-8431	1 Qt
4. Cleaning Cloth	NSN 7920-00-044-9281	10 Lb Bag
5. Machinery Towel		As Req
6. Adhesion Promoter, 3M # 86A	NSN 8040-01-450-9187	Pt (as req)
7. Applicator Nozzle, 3M	NSN 5120-01-425-1023	1 Box
8. Edge Sealant Cartridge, 3M DP-190	NSN 1680-01-431-3607	

Tools

1. Airframe Repairer's Tool Kit	
2. Maintenance Stand	
3. Scissors	
4. Spray Bottle	
5. Metal containers, 1 qt. (#1 coffee can, No. 10 can)	
6. Exacto knife w/blades	
7. Safety Goggles	
8. Rubber Gloves	
9. Tape Measure	
10. Wooden Spatula (Paint Stirrer)	
11. EPX Applicator, 3M	NSN 1680-01-431-3606

Table 3-15.

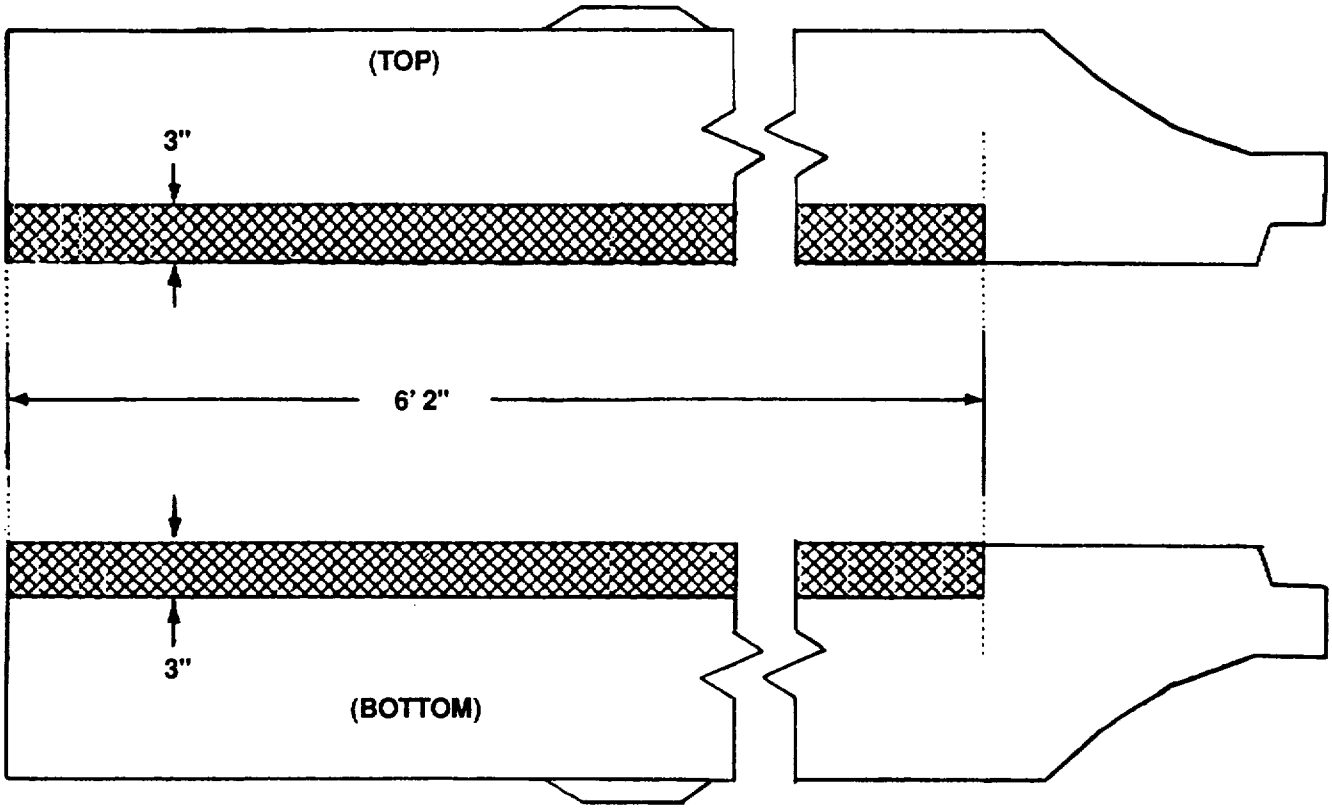
OH-58D Man Rotor Application Dimensions and Quantities

8 pcs polyurethane tape	4" wide x 36" long

Table 3-16.

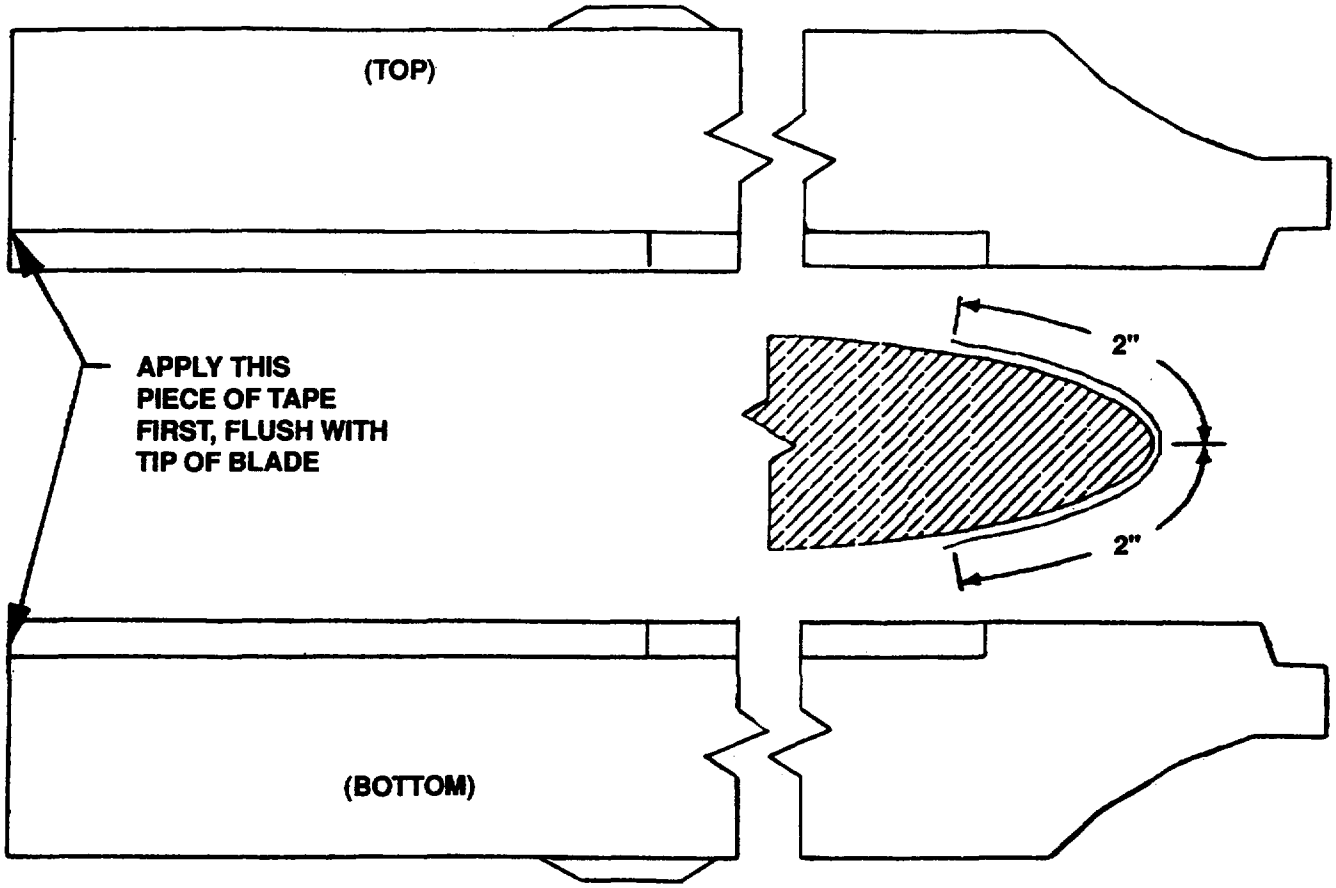
Respiratory Protection Components (OH-58D)

- 1/2 face respirator for paint operations:
- Nomenclature: Paint Spray respirator, complete Part No: 44849
  NSN: 4140-01-231-0150
- Cartridges (refill) Part No: 464031
  NSN: 4240-01-230-6892
- Paint prefilter, Part No: 465667
  NSN: 4240-01-231-0150
- Self Contained Breathing Air:
- Nomenclature: 30 minute Ultralight II air mask
  NSN: 4240-01-248-8035
- Composite II Cylinder
  NSN: 4240-01-252-0086



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-23. Layout and Masking, Main Rotor (OH-58D)



2 PIECES OF 4 INCH WIDE, 36 INCH LONG TAPE
2 INCHES ON TOP AND 2 INCHES ON BOTTOM

Figure 3-24. Tape Alignment, Main Rotor (OH-58D)

Section VI. DESCRIPTION AND APPLICATION PROCEDURES FOR THE CH-47 AIRCRAFT

3-13. Description. This procedure provides instructions for the application of a kit which protects helicopter rotor blades against sand erosion which may occur. The steps are arranged in sequence to permit two personnel to complete installation on the entire CH-47 aircraft in sequence. This instruction applies to the main rotor. If more personnel are available, two rotors can be done simultaneously but the same personnel should do one rotor to assure same technique is used on blades on each rotor.

3-14. Personnel Requirements and Supplies.

a. Personnel: 2 required and one assistant (MOS 67 Series).

b. Supplies and Dimensions. Refer to tables 3-17 and 3-18.

3-15. Installation Procedures.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**

- **Provide proper ventilation and protective thing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**

- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-19.**

a. Remove Blades. Removing the main rotor blades makes the installation easier, but removal is not mandatory.

b. Forward and Aft Rotor Tape Installation.

NOTE

Same for both rotors.

(1) Cleaning. Clean area shown in figure 3-25 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Layout and Mask. Layout and mask off main rotor for polyurethane tape application as shown in figure 3-25.

(3) Cut Tape. Refer to table 3-18 and cut tape per below.

Cut 42 pieces of 8-inch wide polyurethane tape 36 inches long.
Cut 36 pieces of 2-inch wide polyurethane tape 36 inches long.
Cut 6 pieces of 2-inch wide polyurethane tape 24 inches long.

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(4) Surface Preparation. Remove paint from blade, figure 3-25, with MEK or sandpaper. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction, figure 3-1, sheet 1. Use of power polishing sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin on helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with isopropyl alcohol or denatured alcohol, then wipe once again with a clean, dry cloth.

(6) Application of Adhesive Promoter. Apply a thin coat No. 86 adhesive promoter to the area covered by the first piece of tape, shown in figure 3-26. Allow to dry at least five minutes, but not more than one hour before applying tape. Promoter can extend beyond end of tape. Apply promoter in tape length segments to avoid contamination of coated surface.

(7) Polyurethane Tape Preparation. Apply alignment marks to outside of tape at the center as shown in figure 3-1, sheet 2. Peel back one of the center (1-inch wide) backing strips from the 8" wide tape approximately 3 inches. Make sure tape does not come in contact with promoter until tape is properly aligned.

(8) Tape Alignment. Align the tape in the position shown in figure 3-26 before pressing to blade.

(9) Polyurethane Tape Application, 8 in. Remove leading edge backing strips as shown in figure 3-1, sheet 3. Apply first piece of tape to area shown in figure 3-25. When the tape is in proper position, press the exposed portion on the blade as close to the leading edge as possible. Press down on the tape, working toward the trailing edge to prevent trapping air bubbles. See figure 3-1, sheet 4. Peel backing strip back while keeping tape signed and pressing down toward the trailing edge. Remove the backing strips one at a time, working toward the trailing edge. See figure 3-1, sheet 5. Thoroughly press down tape. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(10) Remove masking tape.

(11) Polyurethane Tape Application, 2 in. Scuff the 8 inch wide tape surface with 120 grit sandpaper in area to be covered by 2 inch wide tape as shown in figure 3-27. Clean tape surface with MEK. Apply No. 86 promoter as in Step (6). When dry, apply tape as before.

NOTE

Repeat Steps (6) through (11) for each blade.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(12) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(13) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(14) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(15) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(16) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(17) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(18) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

NOTE

For a neat job, use masking tape to mask the topside of the PPT sheet 1/32 inch inside the perimeter of the edge.

NOTE

The application of edge sealant is particularly important in maintaining 3M 8663 polyurethane protective tape integrity when applied at butt joints of adjacent PPT.

(19) Assemble a nozzle and a cartridge on the 3M EPX applicator. Squirt out a small quantity to insure that a uniform mix is attained. Using the nozzle, apply a 1/8 inch bead around the perimeter of the 3M 8663 polyurethane protective tape panel. Allow this to set up for about 10 minutes, before removing the tape. The sealant should still be liquid.

NOTE

For best results: To allow the edge of the sealant bead to blend with the 3M 8663 polyurethane protective tape and paint. Higher temperatures will require less time for the sealant to gel. Lower temperatures will require more time for the sealant to gel, so some adjustment in the 10 minutes may be necessary. The objective is to get the masking tape off while the bead of sealant is still flowable, to let it blend without a sharp edge.

(20) Inspect the edge seal application for any small air bubbles and if any are found, they can be relieved by pricking with a hypodermic needle.

(21) The rotor blade is ready to return to service after the sealant is well cured, and the 3M 8663 polyurethane protective tape has had time to reach a acceptable level of adhesion. This is achieved after 24 hours at 72 degrees.

e. Tape Repair. Replace the entire damaged piece of tape. Remove with a plastic scraper. Replace per the installation instructions.

c. Blade Installation. If removed, install rotor blades per -23 aircraft TM.

d. Polyurethane Curing. After polyurethane application, allow 24 hours curing time.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(1) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(2) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(3) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(4) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(5) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(6) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(7) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

f. Coating Repair. Local damage to the polyurethane coating can be touched up by brushing additional coating to the damaged area. Carefully remove the disbonded material. Scuff the damaged area with 120 grit sandpaper. Wipe clean with MEK. Prime the area with AGC 1201-7 primer if the blade surface is exposed. Coat the damaged area with sufficient coats of polyurethane coating to match the thickness of adjacent areas. Application of TASK L-100 polyurethane paint to repair minor damage on agcoat material is authorized for this procedure.

g. Polyurethane Coating Removal. Saturate coating surface with MEK and scrape coating off with a plastic scraper while soft. Make a final surface wipe with cloth dampened with MEK.

h. Polyurethane Tape Removal. Slowly peel back over itself. Scrape tape with plastic scraper, if necessary. Remove adhesion promoter with cloth dampened with toluene.

i. Track and Balance Check. Check track and balance of the main and tail rotors per -23 TM.

j. Inspection of Main Rotor Polyurethane Tape.

(1) Inspect 2-inch tape for wear. No holes allowed.

(2) Inspect 8-inch tape for wear. No more than 1.0 inch-width hole in any spanwise or chordwise direction allowed on upper or lower side of blade.

(3) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(4) Inspect for board and outboard ends of tape segment for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(5) Inspect for internal disbonding of tape segment. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonds on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not tom.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

Table 3-17.

CH-47 Rotor Blade Erosion Protection Kit/Tools Consumables
NSN 1615-01-328-5239

Kit

1. Cheesecloth	CCC-C-440	200 Sheets 8 x 9"
2. 120 Grit Sandpaper	NSN 5350-00-721-8115	24 Sheets
3. Adhesive Promoter #86	70-0701-8275-6	1 Qt
4. 2-inch Wide Paint Brush or Sponge Brush	NSN 8020-01-126-1437 P/N PP-2	8 Each
5. Plastic Scraper	NSN 5120-00-628-5569 P/N PA-1	2 Each
6. Masking Tape	NSN 7510-00-685-4963 P/N 231-1-IN	4 Rolls
7. Poly Tape 2 Inch	8663 MB	72 pcs, 2" x 36"
8. Poly Tape 4 Inch	8663 MB-SS	72 pcs, 4" x 36"
9. Poly Tape 8 Inch	8663 MB-SS	72 pcs, 8" x 36"

Supplies

1. Alcohol (Denatured or Isopropyl)	NSN 6810-00-264-5906	2 Qt
2. Methyl Ethyl Ketone (MEK)	NSN 6810-00-281-2785	2 Gal
3. Toluene	NSN 6810-00-579-8431	1 Qt
4. Cleaning Cloth	NSN 7920-00-044-9281	10 Lb Bag
5. Machinery Towel		As Req
6. Adhesion Promoter, 3M # 86A	NSN 8040-01-450-9187	Pt (as req)
7. Applicator Nozzle, 3M	NSN 5120-01-425-1023	1 Box
8. Edge Sealant Cartridge, 3M DP-190	NSN 1680-01-431-3607	

Tools

1. Airframe Repairer's Tool Kit
2. Maintenance Stand
3. Scissors
4. Spray Bottle
5. Metal containers, 1 qt. (#1 coffee can, No. 10 can)
6. Exacto knife w/blades
7. Safety Goggles
8. Rubber Gloves
9. Tape Measure
10. Wooden Spatula (Paint Stirrer)
11. EPX Applicator, 3M — NSN 1680-01-431-3606

Table 3-18.

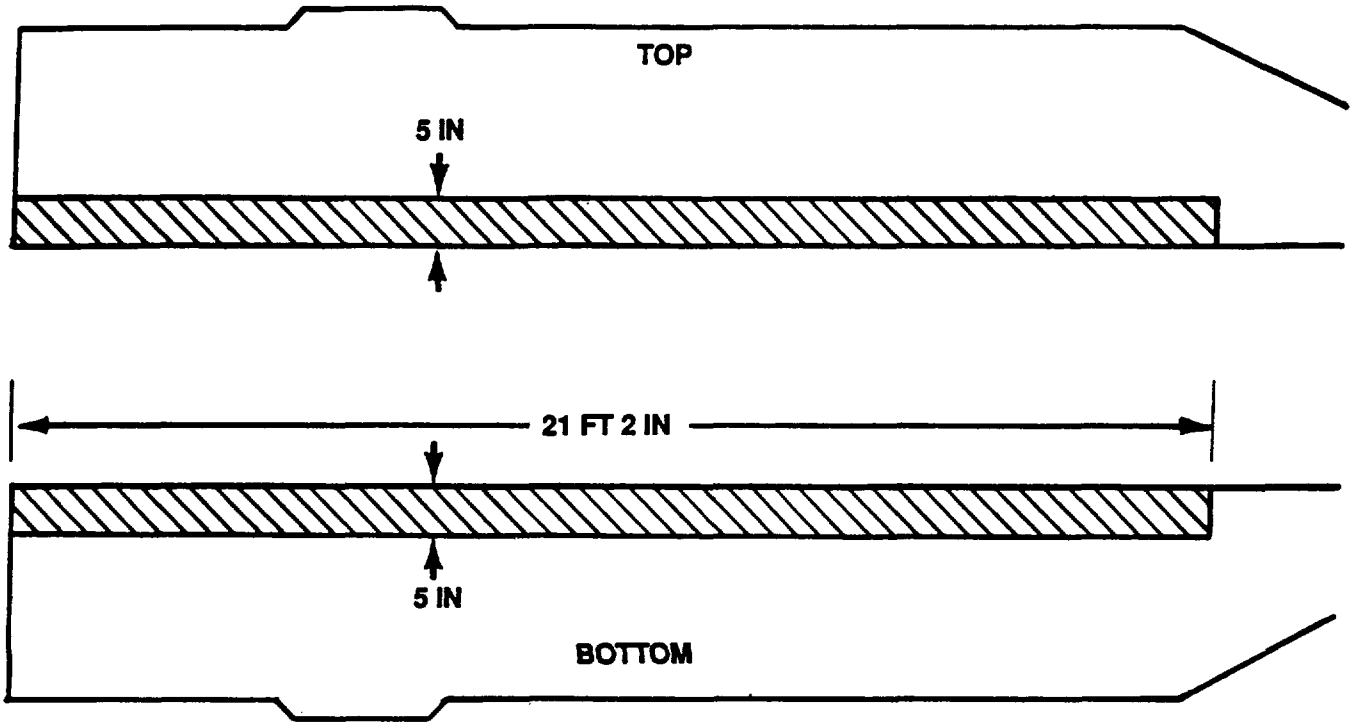
CH-47 Main Rotor Application Dimensions and Quantities

42 pcs polyurethane tape	8" wide x 36" long
36 pcs polyurethane tape	2" wide x 36" long
6 pcs polyurethane tape	2" wide x 24" long

Table 3-19.

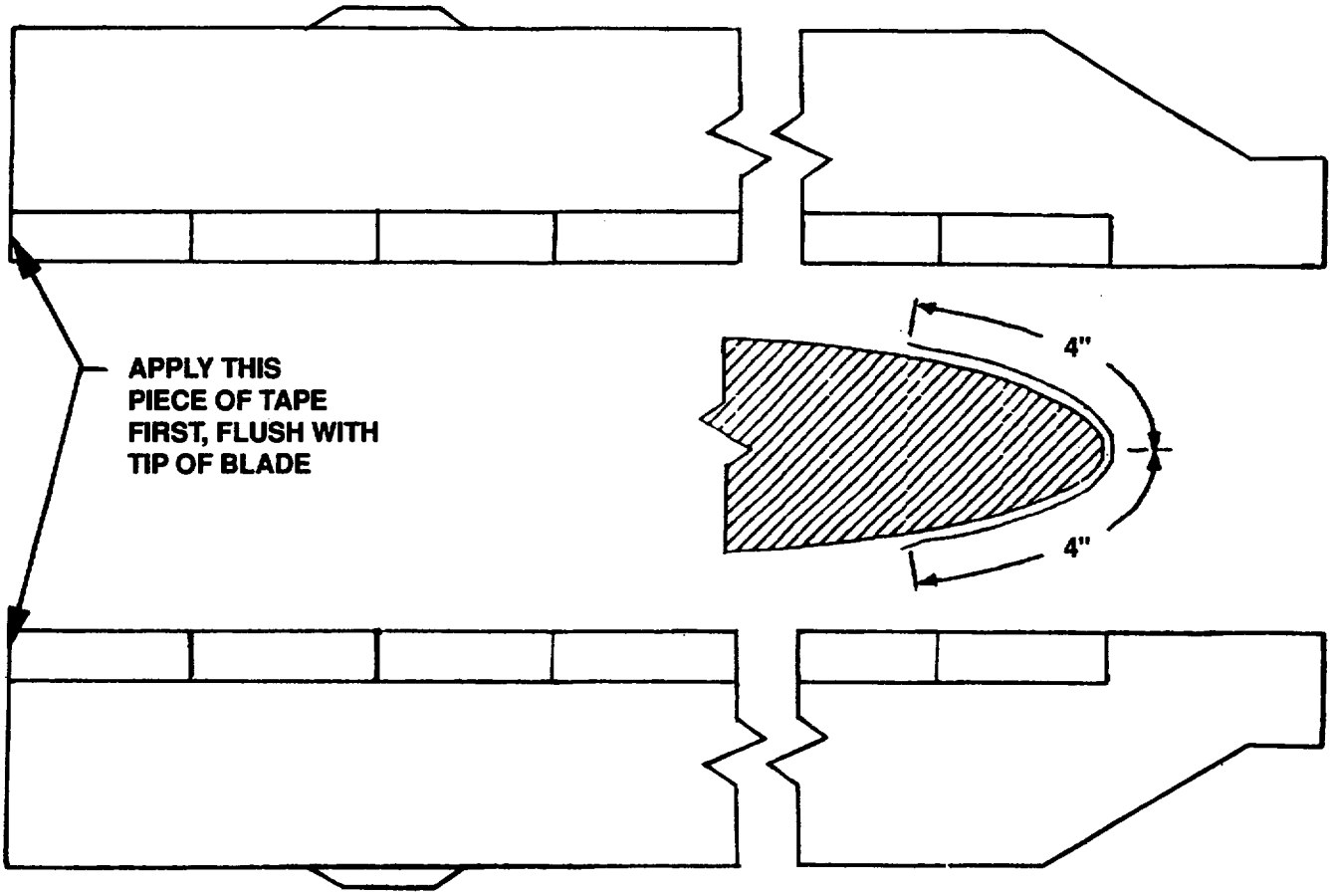
Respiratory Protection Components (CH-47)

- 1/2 face respirator for paint operations:
- Nomenclature: Paint Spray respirator, complete Part No: 44849
  NSN: 4140-01-231-0150
- Cartridges (refill) Part No: 464031
  NSN: 4240-01-230-6892
- Paint prefilter, Part No: 465667
  NSN: 4240-01-231-0150
- Self Contained Breathing Air:
- Nomenclature: 30 minute Ultralight II air mask
  NSN: 4240-01-248-8035
- Composite II Cylinder
  NSN: 4240-01-252-0086



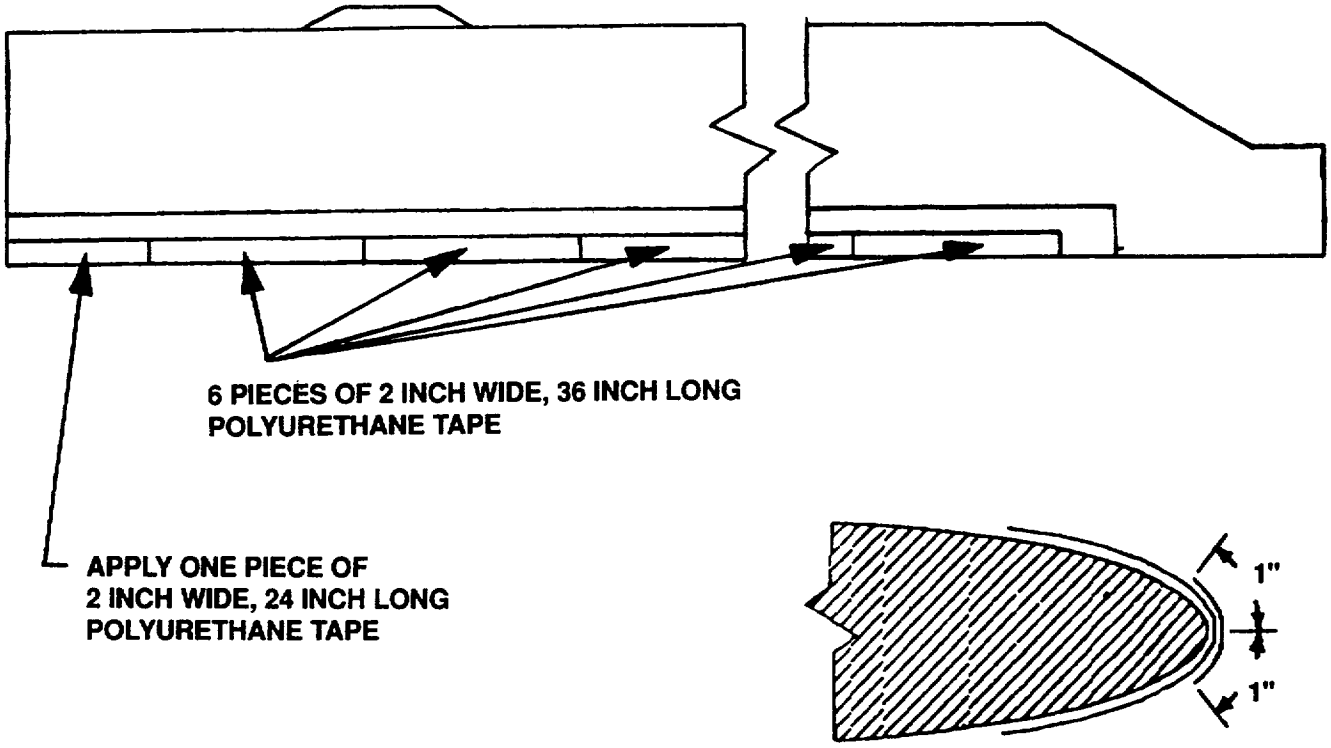
MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-25. Layout and Masking, Main Rotor (CH-47)



7 PIECES OF 8 INCH WIDE POLYURETHANE TAPE
ALIGN 4 INCHES ON TOP AND 4 INCHES ON BOTTOM

Figure 3-26. Tape Alignment, Main Rotor (CH-47)



**ALL 7 PIECES OF 2 INCH WIDE TAPE ARE
1 INCH ON TOP AND 1 INCH ON BOTTOM**

Figure 3-27. Tape Application, Main Rotor (CH-47)

Section VII. DESCRIPTION AND APPLICATION PROCEDURES FOR THE UH-60 AIRCRAFT

3-16. Description. This procedure provides instructions for the application of a kit which protects helicopter rotor blades against sand erosion which may occur. The steps are arranged in sequence to permit two personnel to complete installation on the entire UH-60 aircraft in sequence. If more than two personnel are available, the main rotor and tail rotor can be done simultaneously.

3-17. Personnel Requirement and Supplies.

a. Personnel: 2 required (MOS 67 Series).

b. Supplies and Dimensions. Refer to table 3-20.

3-18. Installation Procedures.

a. Remove Blades. Removing the main rotor blades makes the installation easier, but removal is not mandatory. The tail rotor blades should not be removed.

b. Main Rotor Blade Tape Installation (Figure 3-28).

CAUTION

Inadvertent blade deice with erosion strips installed can cause blade damage.

(1) Pull the blade deice control circuit breaker and leave it in that position until the blade protection lit installation strips are removed. Use wire harness tie wrap to prevent circuit breaker engagement.

NOTE

The deice circuit breaker is located on the No. 2 Primary Bus of the Mission Readiness Circuit Breaker Panel.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**

- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**

- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-21.**

(2) Cleaning. Clean area on blade to be covered with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer and MEK can adversely affect this pant and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(3) Scuff area on blade to be covered using abrasive paper, and clean surface using cheesecloth or machinery towel dampened with isopropyl or denatured alcohol, then wipe once again with a clean, dry cloth. Use of a power polishing sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(4) Cut polyurethane tape, in the following manner:

(a) For 2-inch wide tape strip, cut five pieces 36-inches long and one piece 12-inches long.

(b) For 8-inch wide tape strip, cut five pieces 36-inches long and one piece 16.5-inches long.

(c) To apply 8-inch wide tape to leading edge of main rotor blade do this: Make alignment marks on outside of 8-inch wide tape 4.5 inches from edge as shown in Figure 3-1 (sheet 2 of 5), where leading edge will be located.

(d) Apply thin coat to area to be covered by tape using paint brush. Minimum drying time 5 minutes. Tape must be applied a maximum of 1 hour after promoter application.

NOTE

Application of all tape segments is the same.

(e) Peel fifth backing strip on 16.5-inch-long tape back 3-inches.

NOTE

Make sure tape does not come in contact with adhesive promoter until tape is properly aligned.

(f) Beginning at station 299.0, apply tape to main rotor blade starting at leading edge and work towards trailing edge. Work out gaps, air and strained areas under tape. Bubbles greater than 0.2 square-inch area within 2-inches of each other is not allowed.

NOTE

- **Removal and installation of polyurethane tape is the same for all main rotor blades.**

- **Removal and installation of 2-inch and 8-inch polyurethane tape is the same.**

(g) Apply tape to main rotor blade. Work out gaps, air, strained areas excess fluid and bubbles from under tape. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**

- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**

- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-21.**

(2) Cleaning. Clean area on blade to be covered with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(3) Scuff area on blade to be covered using abrasive paper, and clean surface using cheesecloth or machinery towel dampened with isopropyl or denatured alcohol, then wipe once again with a clean, dry cloth. Use of a power polishing sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(4) Cut polyurethane tape, in the following manner:

(a) For 2-inch wide tape strip, cut five pieces 36-inches long and one piece 12-inches long.

(b) For 8-inch wide tape strip, cut five pieces 36-inches long and one piece 16.5-inches long.

(c) To apply 8-inch wide tape to leading edge of main rotor blade do this:

1 Position 16.5-inch tape along leading edge and mark end of tape where tip cap will overlap.

2 Notch tape where tip cap overlaps tape.

3 Mix abrasion film promoter diluted in equal parts with toluene, using wooden spatula and 1-quart container.

(d) Apply thin coat area to be covered by tape using paint brush. Minimum drying time 5 minutes. Tape must be applied a maximum of 1 hour after promoter application.

NOTE

Application of all tape segments is the same.

(e) Peel fifth backing strip on 16.5-inch-long tape back 3-inches.

NOTE

Make sure tape does not come in contact with adhesive promoter until tape is properly aligned.

(f) Apply tape to main rotor blade starting at leading edge and working towards trailing edge. Work out gaps, air and strained areas under tape. Bubbles greater than 0.2 square-inch area within 2-inches of each other not allowed.

NOTE

- **Removal and installation of polyurethane tape is the same for all main rotor blades.**

- **Removal and installation of 2-inch and 8-inch polyurethane tape is the same.**

(g) Apply tape to main rotor blade. Work out gaps, air, strained areas excess fluid and bubbles from under tape. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(h) Tape edges of polyurethane tape using masking tape. Minimum drying time 24-hours.

(i) Carefully remove masking tape.

(5) Clean off excess adhesive using machinery towel, lightly moistened with toluene. Then wipe dry using cleaning cloth.

(6) Install main rotor blade, if removed.

c. Applying Polyurethane Coating to Tip Cap Main Rotor.

- Reference WARNINGS, b, above.

(1) Cleaning. Clean area on blade to be covered with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Scuff area of tip cap to be covered by coating using abrasive paper. Clean surface using cheesecloth or machinery towel dampened with isopropyl or denatured alcohol, then wipe once again and dry with a clean, dry cloth.

(3) Cut excess polyurethane tape in 1-inch-wide strips. Use to mask area not being coated. Make sure to use 2 layers of tape on masked area.

NOTE

Use equal amounts of primer and coating on all blades to minimize balance adjustments to main rotor.

(4) To apply polyurethane coating to main rotor tip cap do this:

(a) Primer, may be brushed on or sprayed on. If brushed on using paint brush, no thinning is required. If sprayed on, primer must be thinned to 2 parts primer, 1 part methyl ethyl ketone. Mix primer part A and part B in equal parts. Apply to area to be coated. Allow 1-hour drying time at 70°F (21°C) or above. Do not handle primed surface. If surface is contaminated, lightly wipe using cleaning cloth, moistened with alcohol.

NOTE

- **Brushed coats tend to result in 0.002-0.003-inch thickness.**

- **Sprayed coats tend to result in 0.0007-0.001-inch thickness.**

(b) Mix polyurethane coating, with polyurethane curing agent in 1-quart container (3 parts A to 1 part B) and using paint brush, apply first layer of tip cap. Allow 2 minutes drying time between coats when sprayed and 5minutes when brushed until desired thickness is reached. (figure 3-29). Allow 24 hours curing time, accelerated curing time hours a 140° -160°F.

CAUTION

Damage to main rotor blade can occur while removing tape from masked area of blade. Hold cutting knife parallel to blade surface when removing tape.

(c) Remove masking by slitting coating at ridge created by the double layer of tape. Do not scratch or gouge blade surface.

d. Applying L-100 Coating to Main Rotor Blade Tip Caps.

(1) Layout and mask as follows:

(a) Local greasy spots should be cleaned using denatured or isopropyl alcohol.

(b) Layout and mask the total area of the main rotor blades to be protected with the coating per Figure 3-29. It is important that all blades in a set be masked the same.

(2) Prepare surface as follows:

(a) Sand the area to be coated to remove bugs, dirt and oxidized coating. As a minimum, scuff the existing paint over the total area to be protected. Always sand in a spanwise direction.

(b) Dry wipe the blade with a clean cheesecloth or towel to remove the sanding residue. Wipe the blade several times with cheesecloth dampened with denatured or isopropyl alcohol, then wipe once again with dry cheesecloth.

(c) Inspect the surface for any greasy looking areas. Sand these areas a little more vigorously to take away the sheen. Wipe the blade again with the cheesecloth. The blade should now be dry and free from sanding residue. Avoid touching or contaminating the prepared surface after it is wiped.

(d) Remove the old masking tape and replace with new as required to repair tape damaged by sanding. Mark coming application spanwise dimensions on the tape before starting to apply the coating. Make sure all screw heads are covered with masking tape. Screw heads must not be coated.

(3) Mix the coating as follows:

(a) The coating consists of individual foil packets, each of which contain Part A of the two-part coating (in a pull-top can which is about half-filled), Part B (in a syringe with a tip cap) and a stir stick to mix them. Parts A and B are pre-measured to assure proper cure.

WARNING

The coating will not wash off and can be irritating to the skin. Wear gloves and safety goggles when mixing and applying this product.

(b) To mix the coating, open Part A. Remove the tip cap from Part B and squirt the full contents into the can containing Part A. Stir the mixture for a full 60 seconds using the stick provided, being careful to scrape the sides of the can with the stick occasionally to assure total mixing of both parts. You have only 5-10 minutes to get the coating out of the can, so don't start mixing until you are ready to start the application. The coating cures faster in the can than it does on the blade.

(4) Coat as follows:

(a) Brush on two coats as shown in Figure 3-29.

(b) Use a new paint brush when the old brush starts to drag. It should take a new brush every two to three cans to do the job properly.

(c) If the blades are on the aircraft, coating the bottom will take a different technique. As you coat the bottom you must keep working the material until it starts to set. Long, smooth strokes with the brush being pulled at a low angle to the blade works best.

CAUTION

Pull the masking tape off as soon as the application is complete. Do not wait for the coating to set. After the coating sets, masking tape removal becomes very difficult and the edge of the coating will be rough and may debond slightly.

NOTE

It is more efficient or one person to apply the coating and the second person to assist in mixing of the next can of coating, rotating blades, taking care of expended cans and brushes, etc.

NOTE

Successive coats may be applied as rapidly as practical, as long as the material can be spread smoothly and evenly with the maximum build-up at the leading edge.

e. Applying L-100 Coating to Tail Rotor Blade Tip Caps.

(1) Position the tail rotor vertically.

(2) Apply 2 coats as illustrated on Figure 3-31 and the techniques described for the main rotor. Rotate the tail rotor to apply the coating to the next blade and repeat until the coating has been applied to all blades for the required number of coats.

NOTE

Any unused kits of the coating should be retained for touch up and repair of the coating.

(3) Touch up as follows:

(a) After the coating cures, runs and sags may be touched up using sandpaper backed by a hard sanding block.

(b) Make sure drain holes are open and free of the coating.

(4) Install rotor blades per the -23 aircraft TM.

NOTE

Cure time before track and balance is 8 hours.

f. Rotor Blades - Erosion/Spark Guard Coating. (Repair).

(1) Peeling and Tattering. This condition is most prevalent where the material is thinnest. The blades should be inspected after flight and the loose material, if any, should simply be trimmed off with a sharp knife. It is not necessary to re-coat the bare area until there is enough area to justify a coating cure cycle of six or more hours.

(2) Nicks and Cuts.

CAUTION

Be careful when using a knife for trimming. Do not cut into the blade. The safest technique is to work the knife under the loose material and cut parallel to the blade surface.

(a) This condition is caused by larger debris and will usually be found close to the leading edge and in the outboard one-third of the rotor span. If the cut of average size the surrounding material will not be damaged and no debonding will occur. This type of damage to the coating should not be treated until it is expected that further flight would cause that area to debond and tear away. If that is the case, then cut out the debonded area with a sharp knife. Only remove the debonded area. Repair by applying fresh coating, in several applications if necessary, to restore the coating thickness. Allow the coating to set for at least six hours before grinding the rotor up to speed or flying the aircraft. Application of TASK L-100 polyurethane paint to repair minor damage on agcoat material is authorized for this procedure.

(b) If mission requirements will not permit the proper time for repair and curing, simply cut away the loosened material and fly.

g. Rotor Blades - Erosion/Spark Guard Coating (Removal).

CAUTION

Do not cut the rotor blade structure. Use extra caution when removing the material from rotor blades made from composite materials.

This coating is relatively immune to most solvent and to abrasive cleaning techniques. The recommended removal procedure is by scraping in a direction along the surface of the blade.

CAUTION

Rotor Blade Erosion Protection should be removed from the AH-64A and UH-60A aircraft before operation in icing conditions.

h. Track and Balance. Track and balance in accordance with -23 aircraft TM.

i. Tail Rotor Blade Tape Installation.

- Reference WARNINGS, b. above.
- Reference Figure 3-30.

(1) Cleaning. Clean area on blade to be covered with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Scuff area on blade to be covered using abrasive paper. Clean surface using cheesecloth or machinery towel dampened with isopropyl or denatured alcohol, then wipe once again with a clean, dry cloth.

(3) Cut 2 pieces of 4-inch polyurethane tape, one piece 27.5-inch long and one piece 15.5-inch long per blade.

(4) Mix abrasion adhesive promoter, diluted in equal parts with toluene, using wooden spatula, and 1-quart container.

(5) Apply thin coat to area to be covered by tape using paint brush. Minimum drying time 5 minutes. Tape must be applied maximum 1-hour after promoter application.

NOTE

- **Application of all tape segments is the same.**

- **Make sure tape does not contact adhesive promoter, until properly aligned.**

(6) Peel center backing strip on 15.5-inch-long polyurethane tape back 3-inches. Align with leading edge of blade.

(7) Apply tape to tail rotor blade starting at leading edge and working toward trailing edge. Work out gaps, air, and strained areas under tape. Bubbles greater than 0.2 square-inch area within 2-inches of each other not allowed. No curing time required. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

j. Applying Polyurethane Coating to Tip Cap. Tail Rotor.

- Reference WARNINGS, b, above.

(1) Cleaning. Clean area on blade to be covered with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Scuff area on tip cap to be covered by coating using abrasive paper. Clean surface using cheesecloth or machinery towel dampened with isopropyl or denatured alcohol, then wipe once again with a clean, dry cloth.

(3) Cut excess polyurethane tape in 1-inch-wide strips. Use to mask area not being coated. Make sure to use 2 layers of tape on masked area.

NOTE

Use equal amounts of primer and coating on all blades to minimize balance adjustments to tail rotor.

(4) To apply polyurethane coating to tail rotor tip cap do this:

(a) Primer may be brushed on or sprayed on. If brushed on using paint brush, no thinning is required. If sprayed on, primer must be thinned to 2 part methyl ethyl ketone. Mix primer, part A and part B in equal parts. Apply to area to be coated. Allow 1-hour drying time at 70°F (21°C) or above. Do not handle primed surface. If surface is contaminated, lightly wipe using cleaning cloth, moistened with alcohol.

NOTE

- **Brushed coats tend to result in 0.002-.003-inch thickness.**
- **Sprayed coats tend to result in 0.0007-.001-inch thickness.**

(b) Mix polyurethane coating with polyurethane curing agent, in 1-quart container (3 parts A, 1 part B) and using paint brush, apply first layer to tip cap. Allow 2 minutes drying time between coats when sprayed and 5 minutes when brushed until desired thickness is reached. (Figure 3-31). If spraying thin coating using methyl ethyl ketone, (2 parts coating to 1 part MEK). Allow 24 hours curing time. Accelerated curing time 4-hours at 140° -160°F (60°-71°C).

CAUTION

Damage to tail rotor blade can occur while removing tape from masked area of blade. Hold cutting knife parallel to blade surface when removing tape.

(c) Remove masking tape by slitting coating at ridge created by the double layer of tape. Do not scratch or gouge blade surface.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(5) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(6) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(7) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(8) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(9) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(10) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(11) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

NOTE

For a neat job, use masking tape to mask the topside of the PPT sheet 1/32 inch inside the perimeter of the edge.

NOTE

The application of edge sealant is particularly important in maintaining 3M 8663 polyurethane protective tape integrity when applied at butt joints of adjacent PPT.

(12) Assemble a nozzle and a cartridge on the 3M EPX applicator. Squirt out a small quantity to insure that a uniform mix is attained. Using the nozzle, apply a 1/8 inch bead around the perimeter of the 3M 8663 polyurethane protective tape panel. Allow this to set up for about 10 minutes, before removing the tape. The sealant should still be liquid.

NOTE

For best results: To allow the edge of the sealant bead to blend with the 3M 8663 polyurethane protective tape and paint. Higher temperatures will require less time for the sealant to gel. Lower temperatures will require more time for the sealant to gel, so some adjustment in the 10 minutes may be necessary. The objective is to get the masking tape off while the bead of sealant is still flowable, to let it blend without a sharp edge.

(13) Inspect the edge seal application for any small air bubbles and if any are found, they can be relieved by pricking with a hypodermic needle.

(14) The rotor blade is ready to return to service after the sealant is well cured, and the 3M 8663 polyurethane protective tape has had time to reach a acceptable level of adhesion. This is achieved after 24 hours at 72 degrees.

k. Inspection of Main Rotor Polyurethane Tape.

(1) Inspect 2-inch tape for wear. No holes allowed.

(2) Inspect 8-inch tape for wear. No more than 1.0 inch-width hole in any spanwise or chordwise direction allowed on upper or lower side of blade.

(3) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(4) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(5) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonds on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

l. Inspection of Main Rotor Agcoat. Wear through to blade surface not allowed.

m. Inspection of Tail Rotor Polyurethane Tape.

(1) Inspect 4-inch tape for wear. No more than 0.5 inch wide spanwise or chordwise hole allowed on trailing edge. No holes allowed on any other surface of tape.

(2) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(3) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(4) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonding on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

n. Inspection of Tail Rotor Agcoat. Wear through to blade surface not allowed.

o. Tape Repair. Replace the entire damaged piece of tape. Remove with a plastic scraper. Replace per the installation instructions.

NOTE

TASK L-100 polyurethane paint may be utilized to repair damaged areas of 3M 8663 polyurethane tape. The damaged tape areas must not be larger than three inches in diameter. No more than a single damaged area may be repaired per each thirty-six inch length of tape.

NOTE

All TASK L-100 polyurethane paint and 3M 8663 polyurethane tape Applications to the aircraft must be maintained in accordance with Technical Bulletin 1-1615-351-23.

(1) Scuff sand the damaged area with 80 grit sand paper to remove any dirt and debonded edges.

(2) Clean the damaged tape area with a clean piece of cheesecloth dampened with Isopropyl Alcohol.

(3) Wipe the damaged tape area completely dry with a clean, dry piece of cheesecloth.

(4) Mix and apply TASK L-100 POLYURETHANE PAINT to the damaged tape area per the instructions in TB 1-1615-351-23 until the damage is repaired.

(5) Allow the TASK L-100 polyurethane paint application to cure six hours before operating the rotor blades.

Table 3-20.

UH-60 Rotor Blade Erosion Protection Kit/Tools/Consumables
NSN 1615-01-328-5239

Kit

1. Cheesecloth	CCC-C-440	200 Sheets 8 x 9"
2. 120 Grit Sandpaper	NSN 5350-00-721-8115	24 Sheets
3. Adhesive Promoter #86	70-0701-8275-6	1 Qt
4. 2-inch Wide Paint Brush or Sponge Brush	NSN 8020-01-126-1437 P/N PP-2	8 Each
5. Plastic Scraper	NSN 5120-00-628-5569 P/N PA-1	2 Each
6. Masking Tape	NSN 7510-00-685-4963 P/N 231-1-IN	4 Rolls
7. Poly Tape 2 Inch	8663 MB	72 pcs, 2" x 36"
8. Poly Tape 4 Inch	8663 MB-SS	72 pcs, 4" x 36"
9. Poly Tape 8 Inch	8663 MB-SS	72 pcs, 8" x 36"

Supplies

1. Alcohol (Denatured or Isopropyl)	NSN 6810-00-264-5906	2 Qt
2. Methyl Ethyl Ketone (MEK)	NSN 6810-00-281-2785	2 Gal
3. Toluene	NSN 6810-00-579-8431	1 Qt
4. Cleaning Cloth	NSN 7920-00-044-9281	10 Lb Bag
5. Machinery Towel		As Req
6. L-100 Coating	NSN 1615-01-205-6138	9 Kits
7. Adhesion Promoter, 3M # 86A	NSN 8040-01-450-9187	Pt (as req)
8. Applicator Nozzle, 3M	NSN 5120-01-425-1023	1 Box
9. Edge Sealant Cartridge, 3M DP-190	NSN 1680-01-431-3607	

Tools

1. Airframe Repairer's Tool Kit
2. Maintenance Stand
3. Scissors
4. Spray Bottle
5. Metal containers, 1 qt. (#1 coffee can, No. 10 can)
6. Exacto knife w/blades
7. Safety Goggles
8. Rubber Gloves
9. Tape Measure
10. Wooden Spatula (Paint Stirrer)
11. EPX Applicator, 3M — NSN 1680-01-431-3606

Table 3-21.

Respiratory Protection Components

- 1/2 face respirator for paint operations:
- Nomenclature: Paint Spray respirator, complete Part No: 44849
  NSN: 4140-01-231-0150
- Cartridges (refill) Part No: 464031
  NSN: 4240-01-230-6892
- Paint prefilter, Part No: 465667
  NSN: 4240-01-231-0150
- Self Contained Breathing Air:
- Nomenclature: 30 minute Ultralight II air mask
  NSN: 4240-01-248-8035
- Composite II Cylinder
  NSN: 4240-01-252-0086

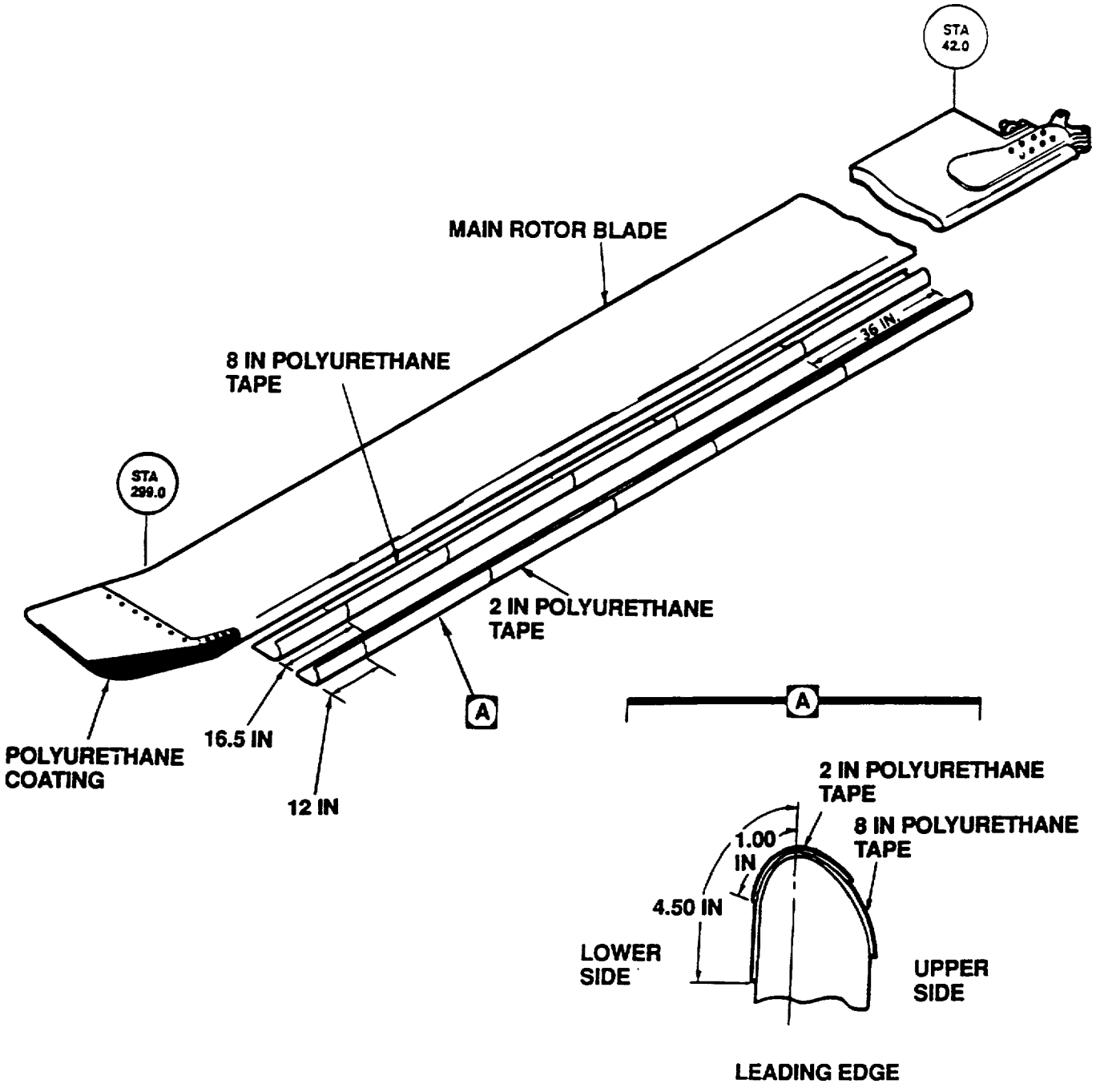


Figure 3-28. Tape Application, Main Rotor (UH--60)

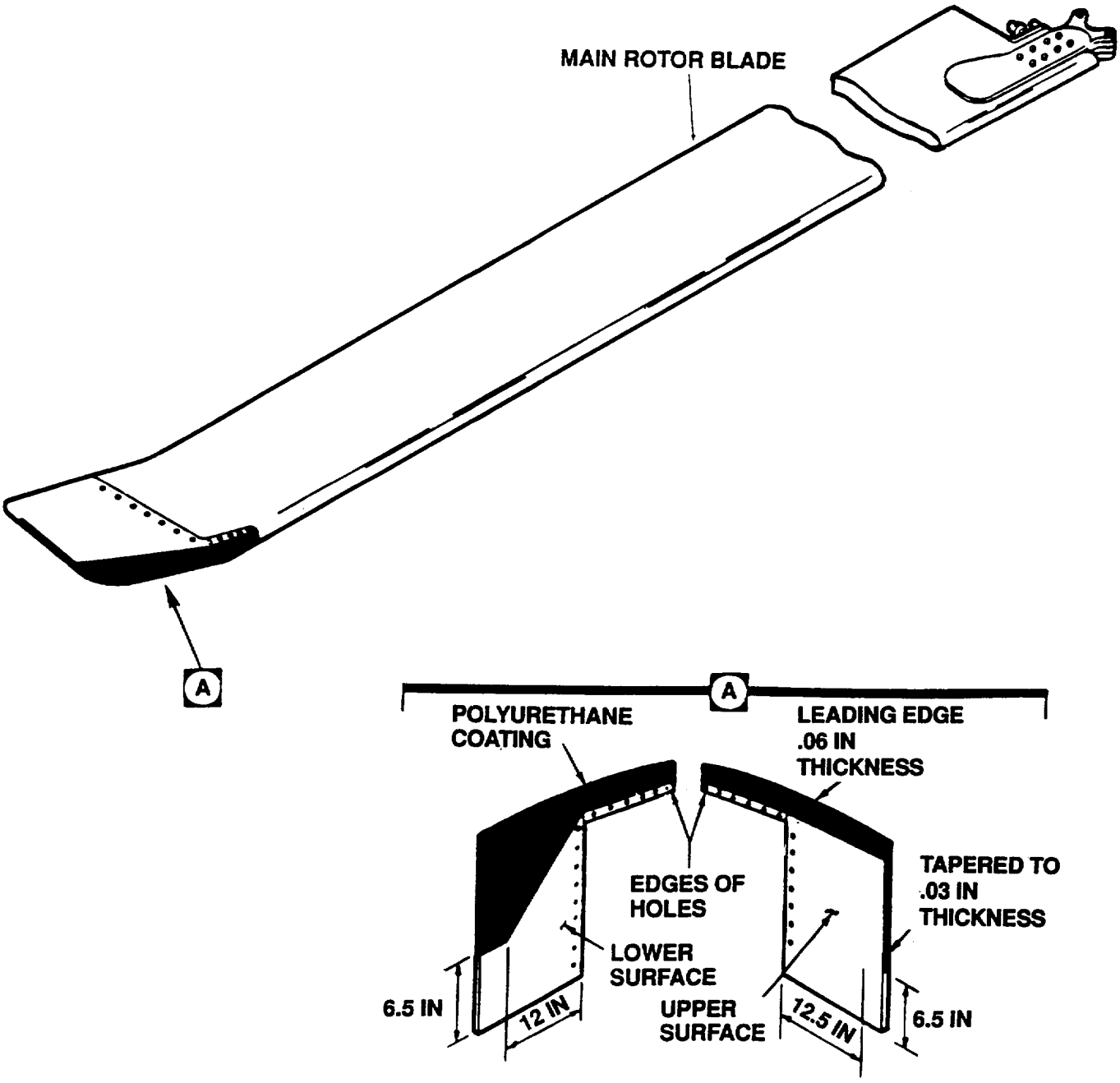


Figure 3-29. Polyurethane Coating Tip Cap, Main Rotor (UH-60)

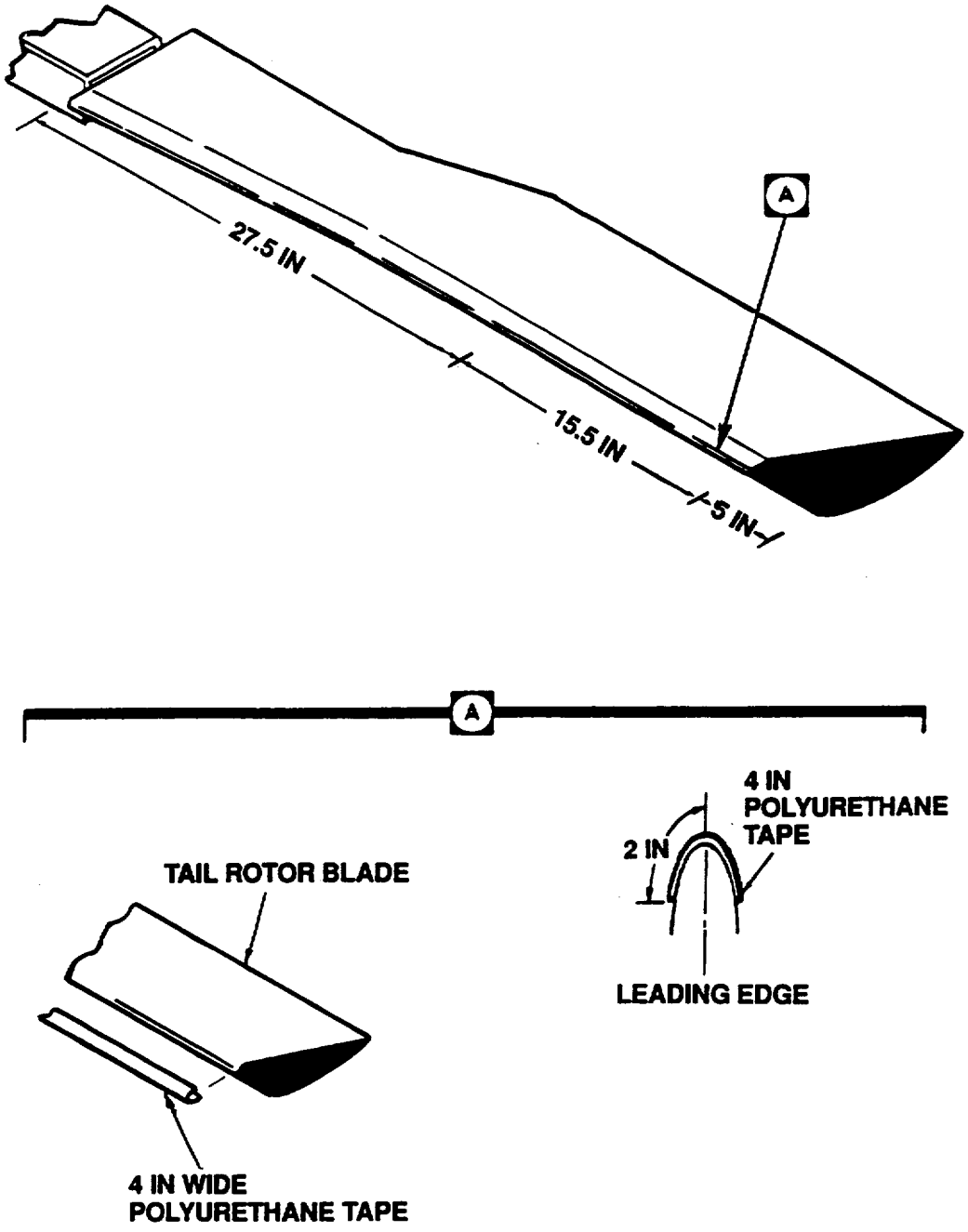


Figure 3-30. Tape Application, Tail Rotor (UH-60)

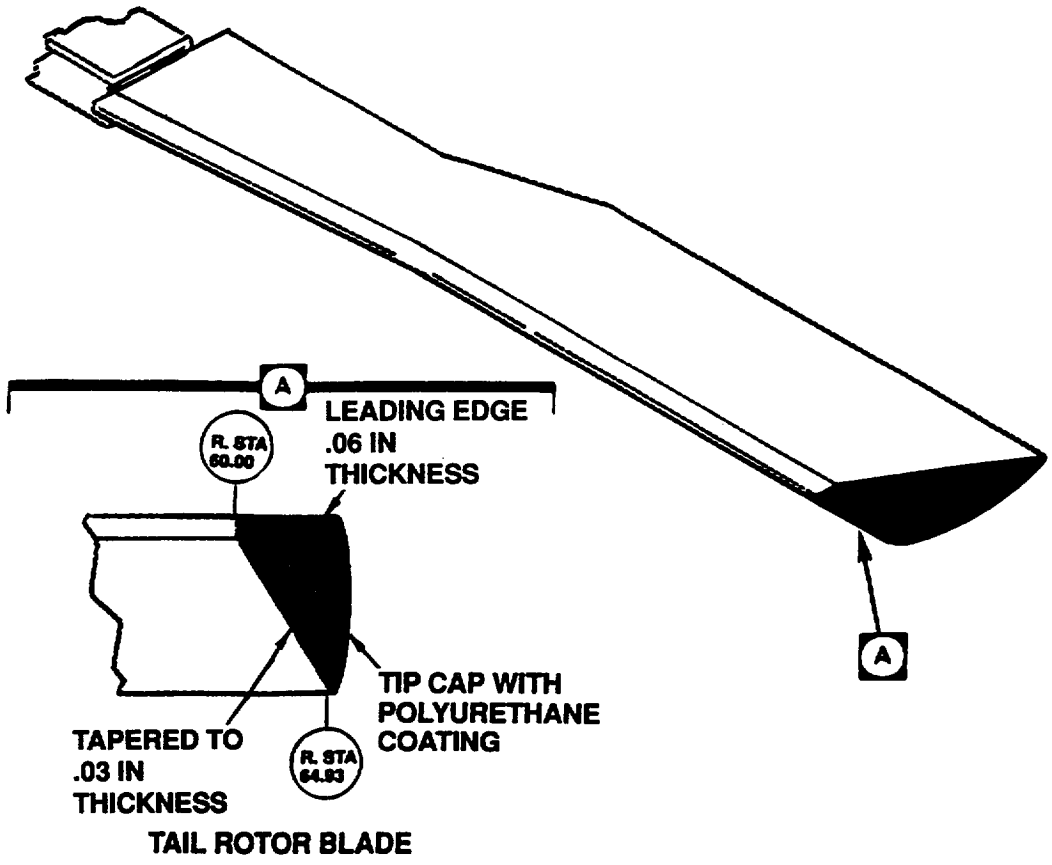


Figure 3-31. Polyurethane Coating Tip Cap, Tail Rotor (UH-60)

Section VIII. DESCRIPTION AND APPLICATION PROCEDURES FOR THE UH-1 AIRCRAFT

3-19. Description. This procedure provides instructions for the application of a kit which protects helicopter rotor blades against sand erosion which may occur. The steps are arranged in sequence to permit two personnel to complete installation on the entire UH-1H aircraft in sequence. If more than two personnel are available, the main rotor and tail rotor can be done simultaneously.

3-20. Personnel Requirements and Supplies.

a. Personnel: 2 required (MOS 67 Series).

b. Supplies and Dimensions. Refer to tables 3-22 through 3-24.

3-21. Installation Procedures.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**
- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid brushing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**
- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-25.**

a. Remove Blades. Removing the main rotor blades makes the installation easier, but removal is not mandatory. The tail rotor blades should not be removed.

b. Main Rotor Tape Installation.

(1) Cleaning. Clean area shown in figure 3-32 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Layout and Mask. Layout and mask off main rotor blades for polyurethane tape application as shown in figure 3-32.

(3) Cut Tape. Cut tape to dimensions stated in table 3-24.

NOTE

Surface preparation and cleaning are the most important steps to ensure proper adhesion.

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction a shown in figure 3-1, sheet 1. Use a power polishing sander is permitted for this procedure.

CAUTION

Do not sand the bare meal skin of helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(5) Cleaning. Clean area on blade to be covered with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol, then wipe once again with a clean, dry cloth.

NOTE

Perform Steps (6) through (8) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a thin coat of No. 86 adhesive promoter to the area covered by the first piece of tape, shown in figure 3-33. Allow to dry at least five minutes, but no more than one hour before applying tape. Promoter can extend beyond end of tape. Apply promoter in tape length segments to avoid contamination of coated surface.

(7) Tape Application, 8 in. Apply alignment marks to outside of tape in the appropriate position obtained from figure 3-34 (2 inches from leading edge or 3 inches from leading edge). See figure 3-1, sheet 2. Apply first piece of tape to area shown in figure 3-33 per tail rotor procedure. Apply 4 additional 36-inch long pieces of 8" tape as shown in figure 3-34.

NOTE

Remove masking tape.

(8) Tape Application, 2 in. Scuff the 8" wide tape surface with 120 grit sandpaper in area to be covered by 2" wide tape as shown in figure 3-35. Clean tape surface with MEK. Apply tape to blade with No. 86 adhesion promoter as before in Step (6).

NOTE

Repeat Steps (6) through (8) for each blade.

(9) Blade Installation. Install main rotor blades, if removed per -23 TM.

c. Tail Rotor Tape Installation.

(1) Cleaning. Clean area shown in figure 3-36 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Layout and Mask. Layout and mask off tail rotor with Tuck masking tape for polyurethane tape application as shown in figure 3-36.

(3) Cut Tape. Cut 2 pieces of 4" wide polyurethane tape 14.5 inches long.

NOTE

Surface preparation and cleaning are the most important steps to ensure proper adhesion.

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction as shown in figure 3-1, sheet 1.

(5) Cleaning. Clean area on blade to be covered with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol or denatured alcohol, then wipe once again with a clean, dry cloth.

NOTE

Perform Steps (6) to (10) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a thin coat of No. 86 adhesive promoter to the area. Allow to dry at least five minutes, but not more than one hour before applying tape. Any bubbles encountered dung the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(7) Masking Tape Removal. Remove masking tape.

(8) Polyurethane Tape Preparation. Peel back one of the center (1 inch wide) backing strips from the 4" wide tape approximately 3 inches as shown in figure 3-1, sheet 3 for 8" tape.

(9) Tape Alignment. Align the tape in the position shown in figure 3-37.

(10) Tape Application. When the tape is in proper position, press the exposed portion on the blade as close to the leading edge as possible. Press down on the tape, working toward the trailing edge to prevent trapping air bubbles. See figure 3-1, sheet 4. Peel backing strip back while keeping tap aligned and pressing down toward the trailing edge. Remove the backing strips one at a time, working toward the trailing edge. See figure 3-1, sheet 5. Thoroughly press down tape.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(11) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(12) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(13) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(14) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(15) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(16) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(17) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

NOTE

For a neat job, use masking tape to mask the topside of the PPT sheet 1/32 inch inside the perimeter of the edge.

NOTE

The application of edge sealant is particularly important in maintaining 3M 8663 polyurethane protective tape integrity when applied at butt joints of adjacent PPT.

(18) Assemble a nozzle and a cartridge on the 3M EPX applicator. Squirt out a small quantity to insure that a uniform mix is attained. Using the nozzle, apply a 1/8 inch bead around the perimeter of the 3M 8663 polyurethane protective tape panel. Allow this to set up for about 10 minutes, before removing the tape. The sealant should still be liquid.

NOTE

For best results: To allow the edge of the sealant bead to blend with the 3M 8663 polyurethane protective tape and paint. Higher temperatures will require less time for the sealant to gel. Lower temperatures will require more time for the sealant to gel, so some adjustment in the 10 minutes may be necessary. The objective is to get the masking tape off while the bead of sealant is still flowable, to let it blend without a sharp edge.

(19) Inspect the edge seal application for any small air bubbles and if any are found, they can be relieved by pricking with a hypodermic needle.

(20) The rotor blade is ready to return to service after the sealant is well cured, and the 3M 8663 polyurethane protective tape has had time to reach a acceptable level of adhesion. This is achieved after 24 hours at 72 degrees.

d. Tail Rotor Agcoat Application.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(1) Cleaning. Clean area shown in figure 3-38 with cheesecloth or machinery towel damped with MEK, isopropyl alcohol, or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Masking. Mask off are a for polyurethane coating with Tuck tape as shown in figure 3-38.

NOTE

Surface preparation and cleaning are the most important steps to ensure proper adhesion.

(3) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction as shown in figure 3-1, sheet 1.

(4) Cleaning. Clean area on blade to be covered with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol or denatured alcohol, then wipe once again with a clean, dry cloth.

(5) Mix Primer. Stir Part A of primer before using. Mix equal amounts of AGC 1201-7 primer parts A and B (4 oz. of each) in a beaker and stir well. Close can and bottle after pouring out required amount.

(6) Primer Application. Brush the primer on the blade in the area shown in figure 3-38 where the coating will be applied. Allow the primer to dry a least one hour at 70 degrees F or above. Do not handle the primed surface. If the primed surface becomes contaminated, lightly wipe it with denatured alcohol.

(7) Mix Coating. Stir Part A of the coating before using. After the primer dries, mix 3/4 beaker of AGC1201-1R polyurethane coating Part A with 1/4 beaker AGC1201-3R Part B in a can and mix well. Do not stir again after it is mixed well. If a skin forms on top of the coating, remove it.

(8) Coating Application.

(a) Brush on 5 coats to the entire area shown in figure 3-38, allowing five minutes minimum drying time between recoating a specific area. Brush on heavy coats with light pressure to avoid damaging previous coats. If lumps form in the coating, discard and mix a new batch.

(b) Remove masking tape after the first 5 coats are applied and apply the remaining coats by eye. Total number of coats are shown in figure 3-39. Allow the coating to cure 24 hours a 70 degrees F or above.

NOTE

Wet primer can be cleaned up with denature alcohol or MEK. Wet coating can be cleaned up with MEK.

e. Polyurethane Curing. After polyurethane application, allow 24 hours curing time.

f. Tape Repair. Replace the entire damaged piece of tape. Remove with a plastic scraper. Replace per the installation instructions.

NOTE

TASK L-100 polyurethane paint may be utilized to repair damaged areas of 3M 8663 polyurethane tape. The damaged tape areas must not be larger than three inches in diameter. No more than a single damaged area may be repaired per each thirty-six inch length of tape.

NOTE

All TASK L-100 polyurethane paint and 3M 8663 polyurethane tape Applications to the aircraft must be maintained in accordance with Technical Bulletin 1-1615-351-23.

(1) Scuff sand the damaged area with 80 grit sand paper to remove any dirt and debonded edges.

(2) Clean the damaged tape area with a clean piece of cheesecloth dampened with Isopropyl Alcohol.

(3) Wipe the damaged tape area completely dry with a clean, dry piece of cheesecloth.

(4) Mix and apply TASK L-100 POLYURETHANE PAINT to the damaged tape area per the instructions in TB 1-1615-351-23 until the damage is repaired.

(5) Allow the TASK L-100 polyurethane paint application to cure six hours before operating the rotor blades.

g. Coating Repair. Local damage to the polyurethane coating can be touched up by brushing additional coating to the damaged area. Carefully remove the disbonded material. Scuff the damaged area with 120 grit sandpaper. Wipe clean with MEK. Prime the area with AGC 1201-7 primer if the blade surface is exposed. Coat the damaged area with sufficient coats of polyurethane coating to match the thickness of adjacent areas. Application of TASK L-100 polyurethane paint to repair minor damage on agcoat material is authorized for this procedure.

h. Polyurethane Coating Removal. Saturate coating surface with MEK and scrape coating off with a plastic scraper while soft. Make a final surface wipe with cloth dampened with MEK.

i. Polyurethane Tape Removal. Slowly peel back over itself. Scrape tape with plastic scraper, if necessary. Remove adhesion promoter with cloth dampened with toluene.

j. Track and Balance Check. Check track and balance of main and tail rotors per -23 TM.

k. Inspection of Main Rotor Polyuretane Tape.

(1) Inspect 2-inch tape for wear. No holes allowed.

(2) Inspect 8-inch tape for wear. No more than 1.0 inch-width hole in any spanwise or chordwise direction allowed on upper or lower side of blade.

(3) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(4) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(5) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonds of a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

l. Inspection of Main Rotor Agcoat. Wear through to blade surface not allowed.

m. Inspection of Tail Rotor Polyurethane Tape.

(1) Inspect 4-inch tape for wear. No more than 0.5 inch wide spanwise or chordwise hole allowed on trailing edge. No holes allowed on any other surface of tape.

(2) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(3) Inspect for inboard and outboard ends of tape segment for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(4) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonding on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim of these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

n. Inspection of Tail Rotor Agcoat. Wear through to blade surface not allowed.

Table 3-22.

UH-1H Rotor Blade Erosion Protection Kit/Tools/Consumables
NSN 1615-01-328-5239

Kit

1. Cheesecloth	CCC-C-440	200 Sheets 8 x 9"
2. 120 Grit Sandpaper	NSN 5350-00-721-8115	24 Sheets
3. Adhesive Promoter #86	70-0701-8275-6	1 Qt
4. 2-inch Wide Paint Brush or Sponge Brush	NSN 8020-01-126-1437 P/N PP-2	8 Each
5. Plastic Scraper	NSN 5120-00-628-5569 P/N PA-1	2 Each
6. Masking Tape	NSN 7510-00-685-4963 P/N 231-1-IN	4 Rolls
7. Poly Tape 2 Inch	8663 MB	72 pcs, 2" x 36"
8. Poly Tape 4 Inch	8663 MB-SS	72 pcs, 4" x 36"
9. Poly Tape 8 Inch	8663 MB-SS	72 pcs, 8" x 36"

Supplies

1. Alcohol (Denatured or Isopropyl)	NSN 6810-00-264-5906	2 Qt
2. Methyl Ethyl Ketone (MEK)	NSN 6810-00-281-2785	2 Gal
3. Toluene	NSN 6810-00-579-8431	1 Qt
4. Cleaning Cloth	NSN 7920-00-044-9281	10 Lb Bag
5. Machinery Towel		As Req
6. Adhesion Promoter, 3M #86A	NSN 8040-01-450-9187	Pt (as req)
7. Applicator Nozzle, 3M	NSN 1520-01-425-1023	1 Box
8. Edge Sealant Cartridge, 3M DP-190	NSN 1680-01-431-3607	

Tools

1. Airframe Repairer's Tool Kit
2. Maintenance Stand
3. Scissors
4. Spray Bottle
5. Metal containers, 1 qt. (#1 coffee can, No. 10 can)
6. Exacto knife w/blades
7. Safety Goggles
8. Rubber Gloves
9. Tape Measure
10. Wooden Spatula (Paint Stirrer)
11. EPX Applicator, 3M — NSN 1680-01-431-3606

Table 3-23.

UH-1H Main Rotor Application Dimensions and Quantities

10 pcs polyurethane tape	8" wide x 36" long
8 pcs polyurethane tape	2" wide x 36" long
2 pcs polyurethane tape	2" wide x 24" long

Table 3-24.

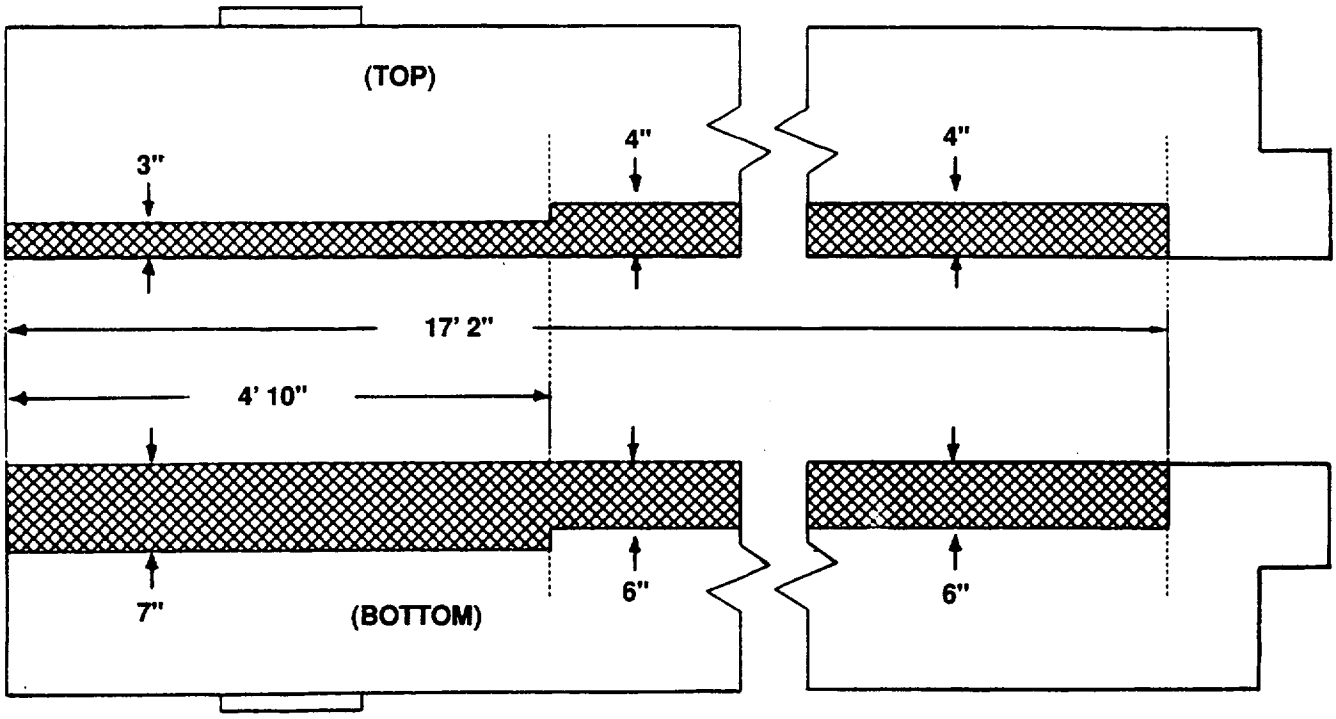
UH-1H Tail Rotor Application Dimensions and Quantities

2 pcs polyurethane tape	wide 4” x 14.5" long

Table 3-25.

Respiratory Protection Components (UH-1H)

- 1/2 face respirator for paint operations:
- Nomenclature: Paint Spray respirator, complete Part No: 44849
  NSN: 4140-01-231-0150
- Cartridges (refill) Part No: 464031
  NSN: 4240-01-230-6892
- Paint prefilter, Part No: 465667
  NSN: 4240-01-231-0150
- Self Contained Breathing Air:
- Nomenclature: 30 minute Ultralight II air mask
  NSN: 4240-01-248-8035
- Composite II Cylinder
  NSN: 4240-01-252-0086



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-32. Layout and Masking, Main Rotor (UH-1)

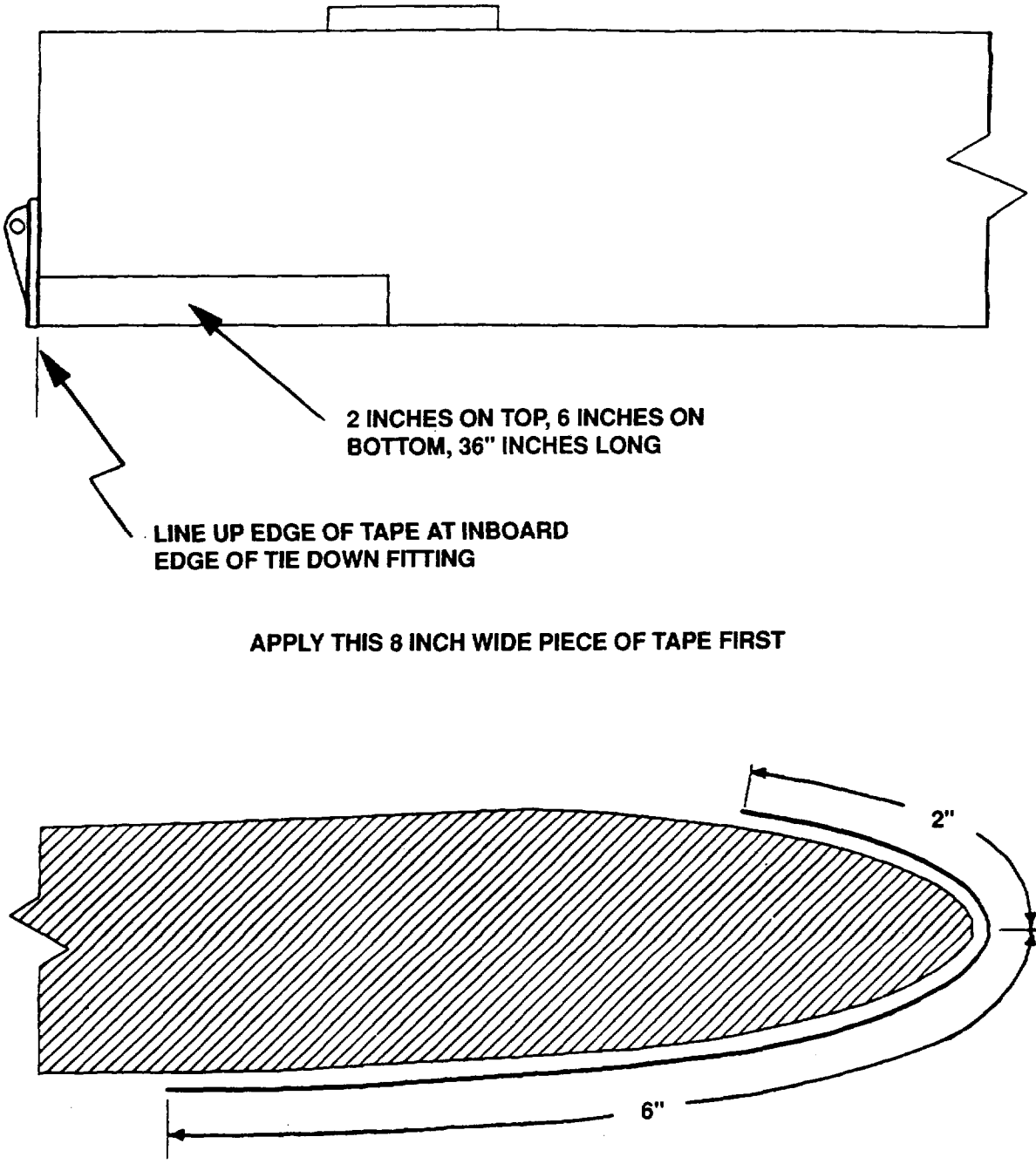


Figure 3-33. Tape Application, Main Rotor (UH-1)

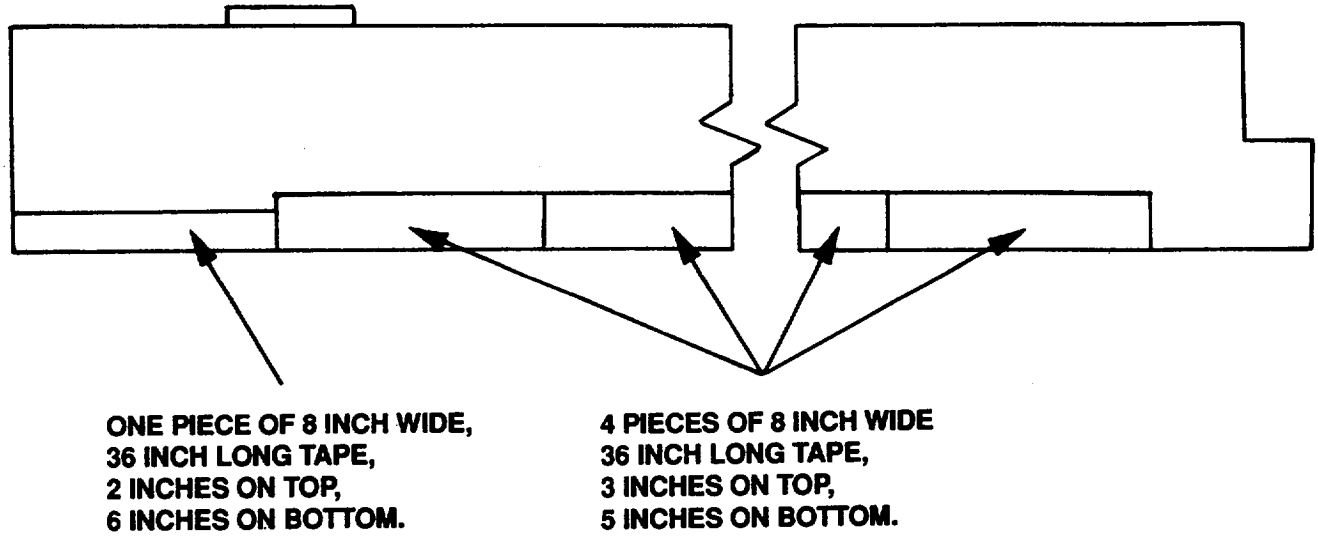
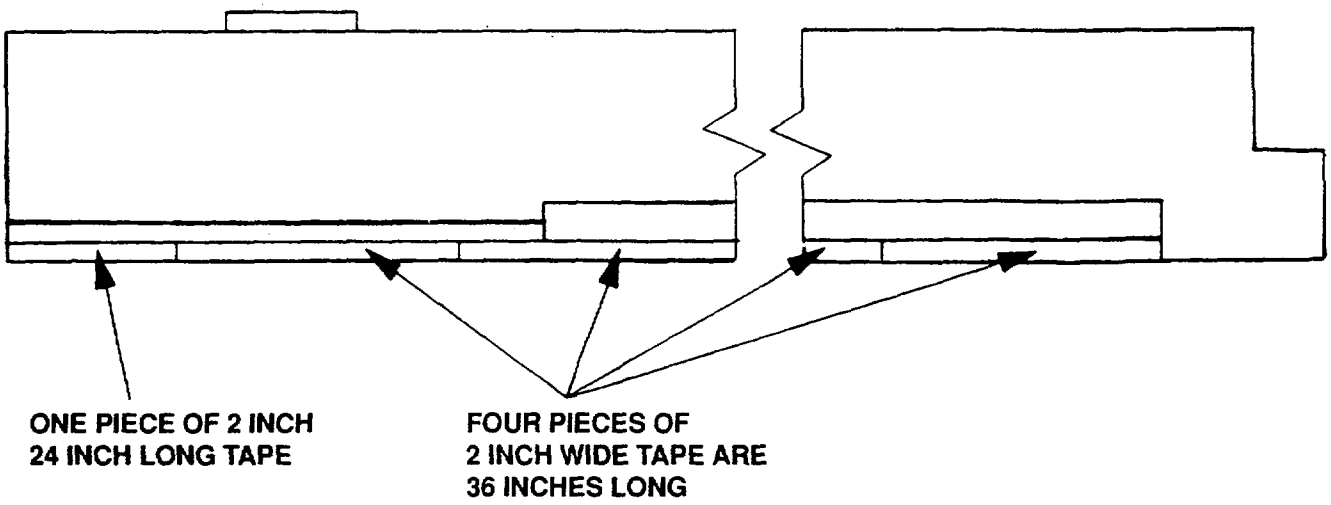


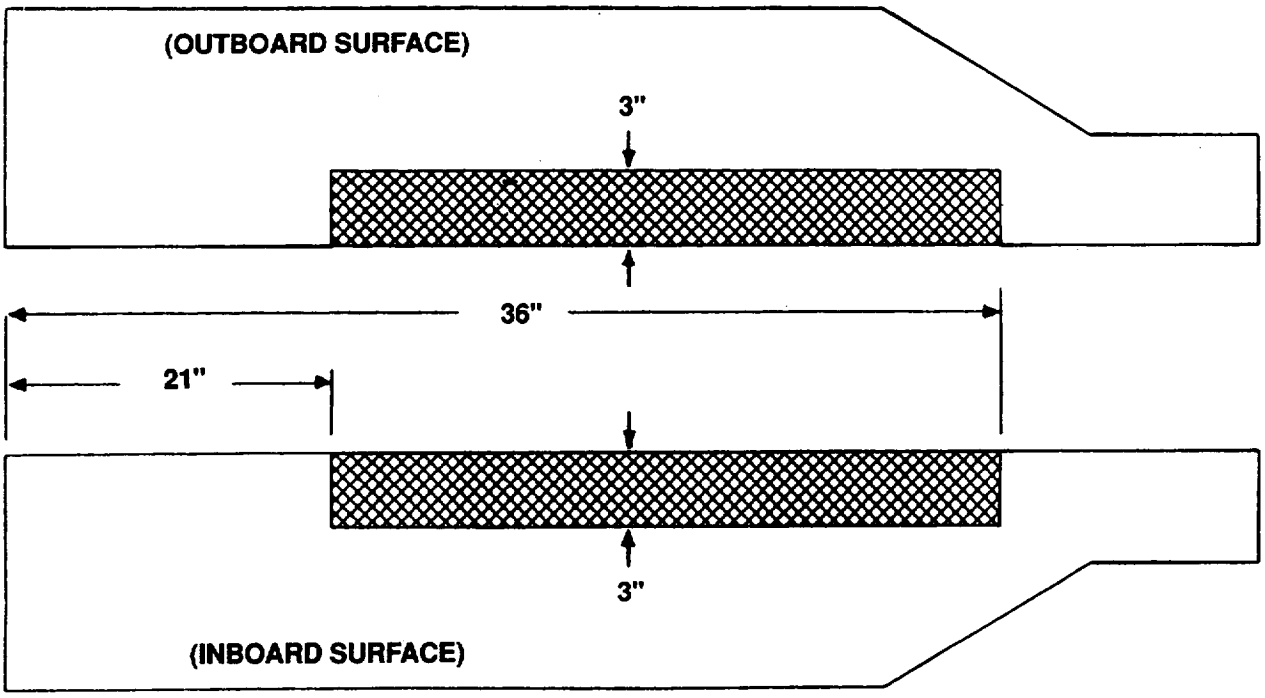
Figure 3-34. Additional Tape Application, Main Rotor (UH-1)



ALL 2 INCH WIDE TAPE IS 1 INCH ON TOP
AND 1 INCH ON BOTTOM, OVER 8 INCH WIDE TAPE

APPLY OUTBOARD PIECE OF TAPE FIRST

Figure 3-35. Taping Application, Main Rotor (UH-1)



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-36. Masking Area for Taping Application, Tail Rotor (UH-1)

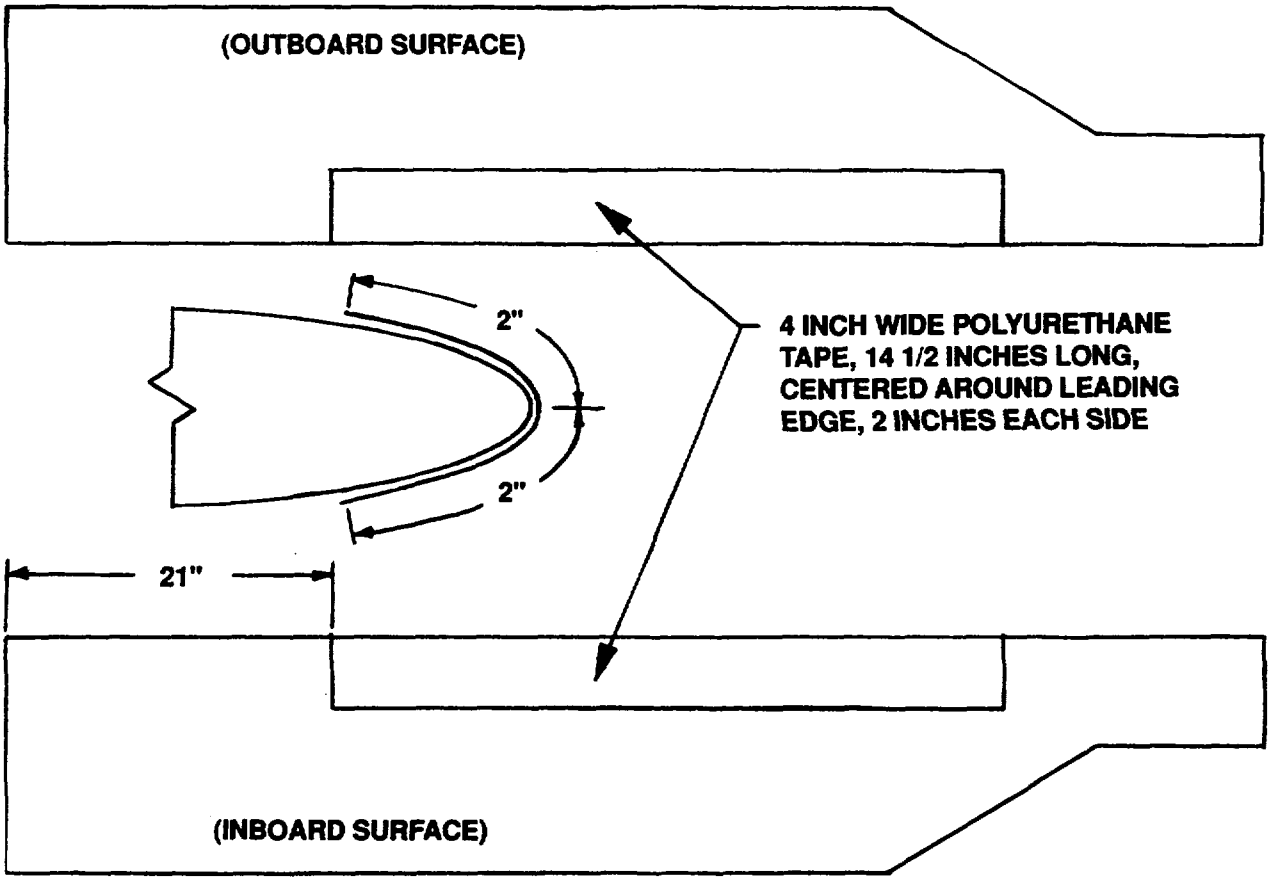
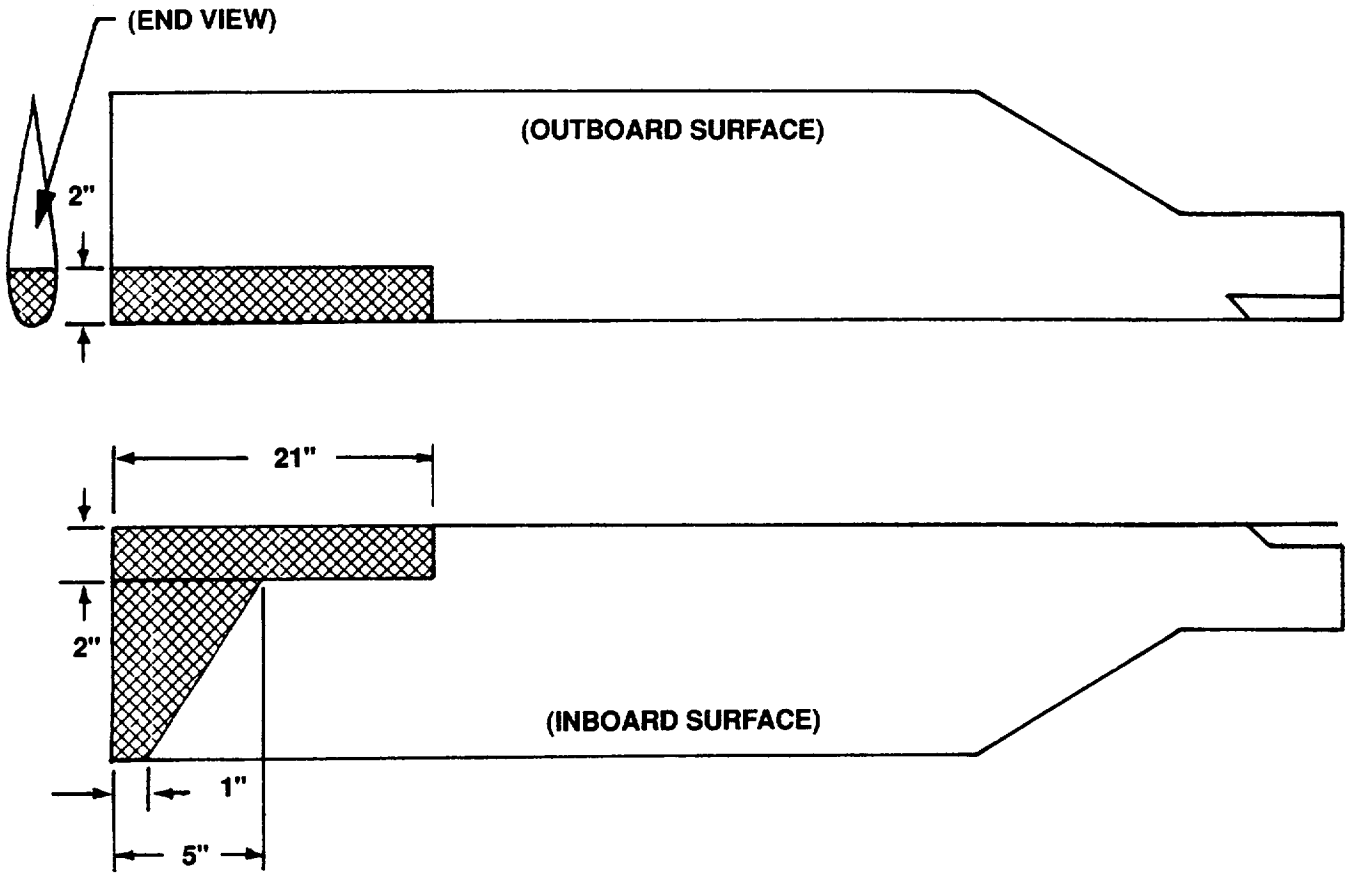


Figure 3-37. Tape Alignment, Tail Rotor (UH-1)



MASK AROUND SHADED AREA FOR POLYURETHANE COATING APPLICATION USING TUCK TAPE

Figure 3-38. Masking Area, Coating/Cleaning Application, Tail Rotor (UH-1)

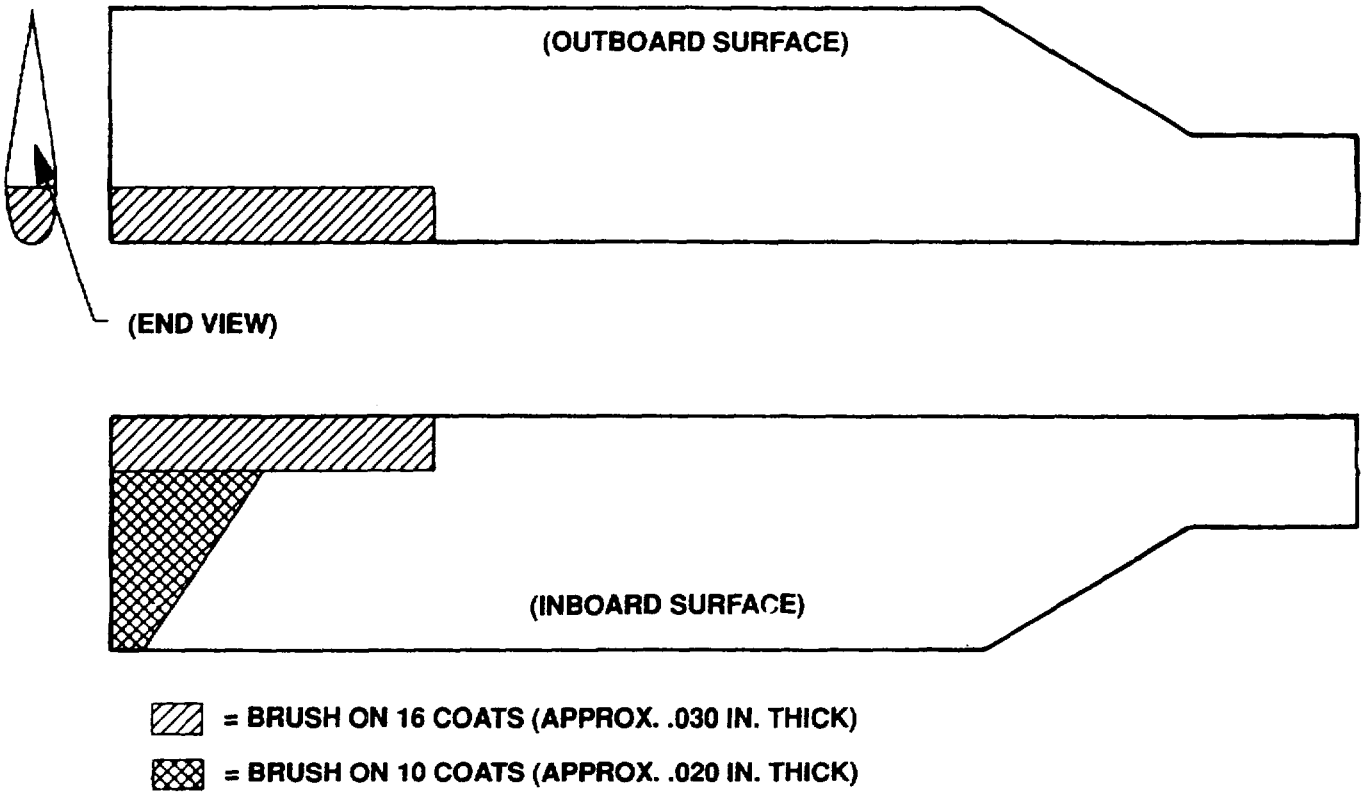


Figure 3-39. Coating Application, Tail Rotor (UH-1)

Section IX. DESCRIPTION AND APPLICATION PROCEDURES FOR THE UH-1H AIRCRAFT WITH COMPOSITE MAIN ROTOR BLADES (CMRB)

3-22. Description. This procedure provides instructions for the application of a kit which protects helicopter rotor blades against sand erosion which may occur. The steps are arranged in sequence to permit two personnel to complete installation on the entire UH-1H CMRB aircraft in sequence. This instruction applies to the main rotor only. If more than two personnel are available, both blades can be done simultaneously.

3-23. Personnel Requirements and Supplies.

a. Personnel: 2 required (MOS 67 Series).

b. Supplies and Dimensions. Refer to tables 3-26 and 3-27.

3-24. Installation Procedures.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and health hazard.**
- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**
- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-28.**

a. Remove Blades. Removing the main rotor blades makes the installation easier, but removal is not mandatory.

b. Main Rotor Tape Installation.

(1) Cleaning. Clean area shown in figure 3-40 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

(2) Layout and Mask. Layout and mask off main rotor for polyurethane tape application as shown in figure 3-40.

(3) Cut Tape. Refer below and table 3-27.

Cut 4 pieces of 4" wide polyurethane tape 36 inches long.
Cut 2 pieces of 4" wide polyurethane tape 16 inches long.
Cut 4 pieces of 2" wide polyurethane tape 30 inches long.

NOTE

Surface preparation and cleaning are the most important steps to ensure proper adhesion.

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction, figure 3-41. Use of power polishing sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin reduces the structural integrity and fatigue life of the blade.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with isopropyl alcohol, or denatured alcohol, then wipe once again with a clean, dry cloth.

NOTE

Perform Steps (6) through (10) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a THIN coat of No. 86 adhesive promoter to the masked area where the first 16-inch long piece will cover, as shown in figure 3-42. Allow to dry at least five minutes, but not more than one hour before applying tape. Promoter can extend beyond end of tape. Apply promoter in tape length segments to avoid contamination of coated surface.

(7) Polyurethane Tape Preparation. Apply alignment marks to outside surface of tape at the center. Peel back one of the center (1-inch wide) backing strips from the 4" wide tape approximately 3 inches as shown in figure 3-43 for the 8" wide tape.

(8) Tape Alignment. Align the tape in the position shown in figure 3- 42 before pressing to blade.

(9) Tape Application. When the tape is in proper position, press the exposed portion on the blade as close to the leading edge as possible. Press down on the tape, working toward the trailing edge to prevent trapping air bubbles. See figure 3-44. Peel backing strip back while keeping tape aligned and pressing down toward the trailing edge. Remove the backing strips one at a time, working toward the trailing edge. See figure 3-45. Thoroughly press down tape. Apply 2 additional 36 inch long inboard pieces of tape using No. 86 promoter as with the first piece. See figure 3-42. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(10) Remove masking tape.

(11) 2 Inch Tape Application. Scuff the 4" wide tape surface with 120 grit sandpaper in area to be covered by 2 inch wide tape as shown in figure 3-46. Clean tape surface with MEK. Apply tape to blade with No. 86 adhesive promoter as before.

(12) Repeat Steps (6) through (11) for each blade.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(13) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(14) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(15) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(16) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(17) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(18) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(19) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

NOTE

For a neat job, use masking tape to mask the topside of the PPT sheet 1/32 inch inside the perimeter of the edge.

NOTE

The application of edge sealant is particularly important in maintaining 3M 8663 polyurethane protective tape integrity when applied at butt joints of adjacent PPT.

(20) Assemble a nozzle and a cartridge on the 3M EPX applicator. Squirt out a small quantity to insure that a uniform mix is attained. Using the nozzle, apply a 1/8 inch bead around the perimeter of the 3M 8663 polyurethane protective tape panel. Allow this to set up for about 10 minutes, before removing the tape. The sealant should still be liquid.

NOTE

For best results: To allow the edge of the sealant bead to blend with the 3M 8663 polyurethane protective tape and paint. Higher temperatures will require less time for the sealant to gel. Lower temperatures will require more time for the sealant to gel, so some adjustment in the 10 minutes may be necessary. The objective is to get the masking tape off while the bead of sealant is still flowable, to let it blend without a sharp edge.

(21) Inspect the edge seal application for any small air bubbles and if any are found, they can be relieved by pricking with a hypodermic needle.

(22) The rotor blade is ready to return to service after the sealant is well cured, and the 3M 8663 polyurethane protective tape has had time to reach a acceptable level of adhesion. This is achieved after 24 hours at 72 degrees.

c. Blade Installation. If necessary, install main rotor blades per -23 TM.

d. Polyurethane Curing. After polyurethane application, allow 24 hours curing time.

e. Tape Repair. Replace the entire damaged piece of tape. Remove with a plastic scraper. Replace per the installation instructions.

NOTE

3M 8663 polyurethane tape. The damaged tape areas must not be larger than three inches in diameter. No more than a single damaged area may be repaired per each thirty-six inch length of tape.

NOTE

All TASK L-100 polyurethane paint and 3M 8663 polyurethane tape applications to the aircraft must be maintained in accordance with Technical Bulletin 1-1615-351-23.

(1) Scuff sand the damaged area with 80 grit sand paper to remove any dirt and debonded edges.

(2) Clean the damaged tape area with a clean piece of cheesecloth dampened with Isopropyl Alcohol.

(3) Wipe the damaged tape area completely dry with a clean, dry piece of cheesecloth.

(4) Mix and apply TASK L-100 POLYURETHANE PAINT to the damaged tape area per the instructions in TB 1-1615-351-23 until the damage is repaired.

(5) Allow the TASK L-100 polyurethane paint application to cure six hours before operating the rotor blades.

f. Coating Repair. Local damage to the polyurethane coating can be touched up by brushing additional coating to the damaged area. Carefully remove the disbonded material. Scuff the damaged area with 120 grit sandpaper. Wipe clean with MEK. Prime the area with AGC 1201-7 primer if the blade surface is exposed. Coat the damaged area with sufficient coats of polyurethane coating to match the thickness of adjacent areas. Application of TASK -100 polyurethane paint to repair minor damage on agcoat material is authorized for this procedure.

g. Polyurethane Tape Removal. Slowly peel back over itself. Scrape tape with plastic scraper, if necessary.

h. Track and Balance Check. Check track and balance of main rotor blade per -23 TM. Remove adhesive promoter with cloth dampened with toluene.

i. Inspection Procedures.

(1) Inspection Of Main Rotor Polyurethane Tape.

(a) Inspect 2-inch tape for wear. No holes allowed.

(b) Inspect 4-inch tape for wear. No more than 0.5 inch wide spanwise or chordwise hole allowed on trailing edge. No holes allowed on any other surface of tape.

(c) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(d) Inspect for inboard and outboard ends of tape segments for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(e) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonds on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not tom.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

(2) Inspection of Main Rotor Agcoat. Wear through to blade surface not allowed.

(3) Inspection of Tail Rotor Polyurethane Tape.

NOTE

Inspection procedures for the tail rotor may be found in UH-1H Inspection Procedures.

(4) Inspection of Tail Rotor Agcoat.

NOTE

Inspection procedures for the tail rotor may be found in UH-1H Inspection Procedures.

Table 3-26.

UH-1H CMRB Rotor Blade Erosion Protection Kit/Tools/Consumables
NSN 1615-01-328-5239 P/N 70-0703-2971-2

Kit

1. Cheesecloth	CCC-C-440	200 Sheets 8 x 9"
2. 120 Grit Sandpaper	NSN 5350-00-721-8115	24 Sheets
3. Adhesive Promoter #86	70-0701-8275-6	1 Qt
4. 2-inch Wide Paint Brush or Sponge Brush	NSN 8020-01-126-1437 P/N PP-2	8 Each
5. Plastic Scraper	NSN 5120-00-628-5569 P/N PA-1	2 Each
6. Masking Tape	NSN 7510-00-685-4963 P/N 231-1-IN	4 Rolls
7. Poly Tape 2 Inch	8663 MB	72 pcs, 2" x 36"
8. Poly Tape 4 Inch	8663 MB-SS	72 pcs, 4” x 36’”
9. Poly Tape 8 Inch	8663 MB-SS	72 pcs, 8" x 36"

Supplies

1. Alcohol (Denatured or Isopropyl)	NSN 6810-00-264-5906	2 Qt
2. Methyl Ethyl Ketone (MEK)	NSN 6810-00-281-2785	2 Gal
3. Toluene	NSN 6810-00-579-8431	1 Qt
4. Cleaning Cloth	NSN 7920-00-044-9281	10 Lb Bag
5. Machinery Towel		As Req
6. Adhesion Promoter, 3M # 86A	NSN 8040-01-450-9187	Pt (as req)
7. Applicator Nozzle, 3M	NSN 5120-01-425-1023	1 Box
8. Edge Sealant Cartridge, 3M DP-190	NSN 1680-01-431-3607	

Tools

1. Airframe Repairer's Tool Kit		
2. Maintenance Stand		
3. Scissors		
4. Spray Bottle		
5. Metal containers, 1 qt. (#1 coffee can, No. 10 can)		
6. Exacto knife w/blades		
7. Safety Goggles		
8. Rubber Gloves		
9. Tape Measure		
10. Wooden Spatula (Paint Stirrer)		
11. EPX Applicator	NSN 1680-01-431-3606	

Table 3-27.

UH-1H CMRB Application Dimensions and Quantities

4 pieces of 4” wide polyurethane tape 36 inches long.
2 pieces of 4" wide polyurethane tape 16 inches long.
4 pieces of 2" wide polyurethane tape 30 inches long.

Table 3-28.

Respiratory Protection Components

- 1/2 face respirator for paint operations:

- Nomenclature: Paint Spray respirator, complete manu.
  Part No: 44849
  NSN: 4140-01-231-0150

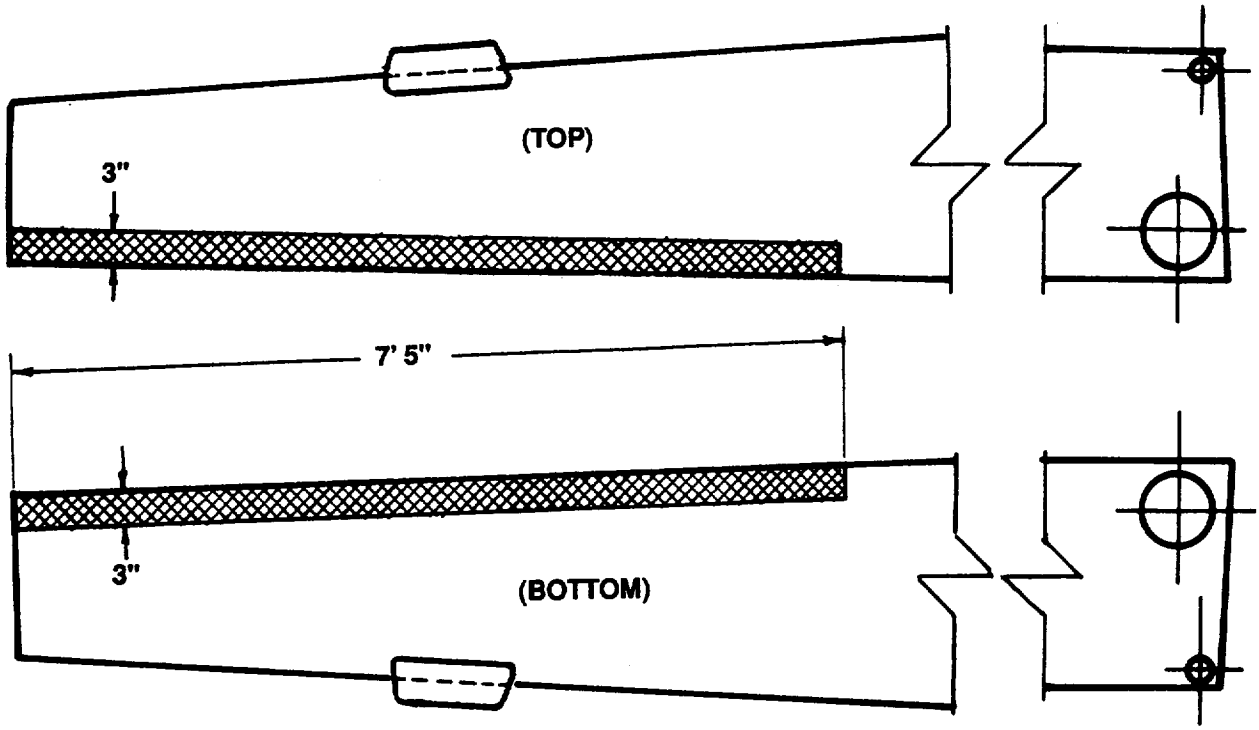
- Cartridges (refill) manu.
  Part No: 464031
  NSN: 4240-01-230-6892

- Paint prefilter, manu.
  Part No: 465667
  NSN: 4240-01-231-0150

- Self Contained Breathing Air:

- Nomenclature: 30 minute Ultralight air mask
  NSN: 4240-01-248-8035

- Composite II Cylinder
  NSN: 4240-01-252-0086



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-40. UH-1H CMRB Layout and Masking, Main Rotor

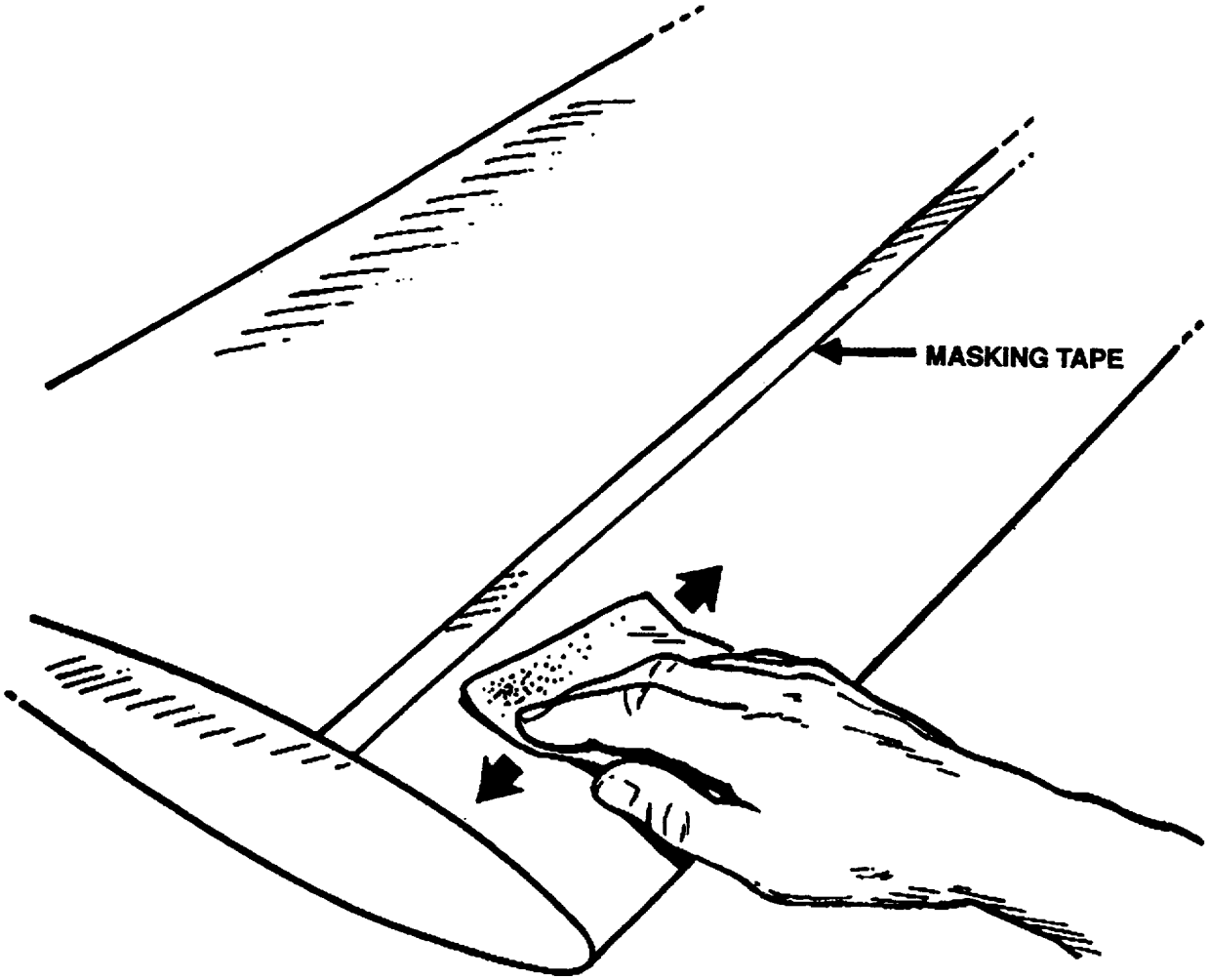
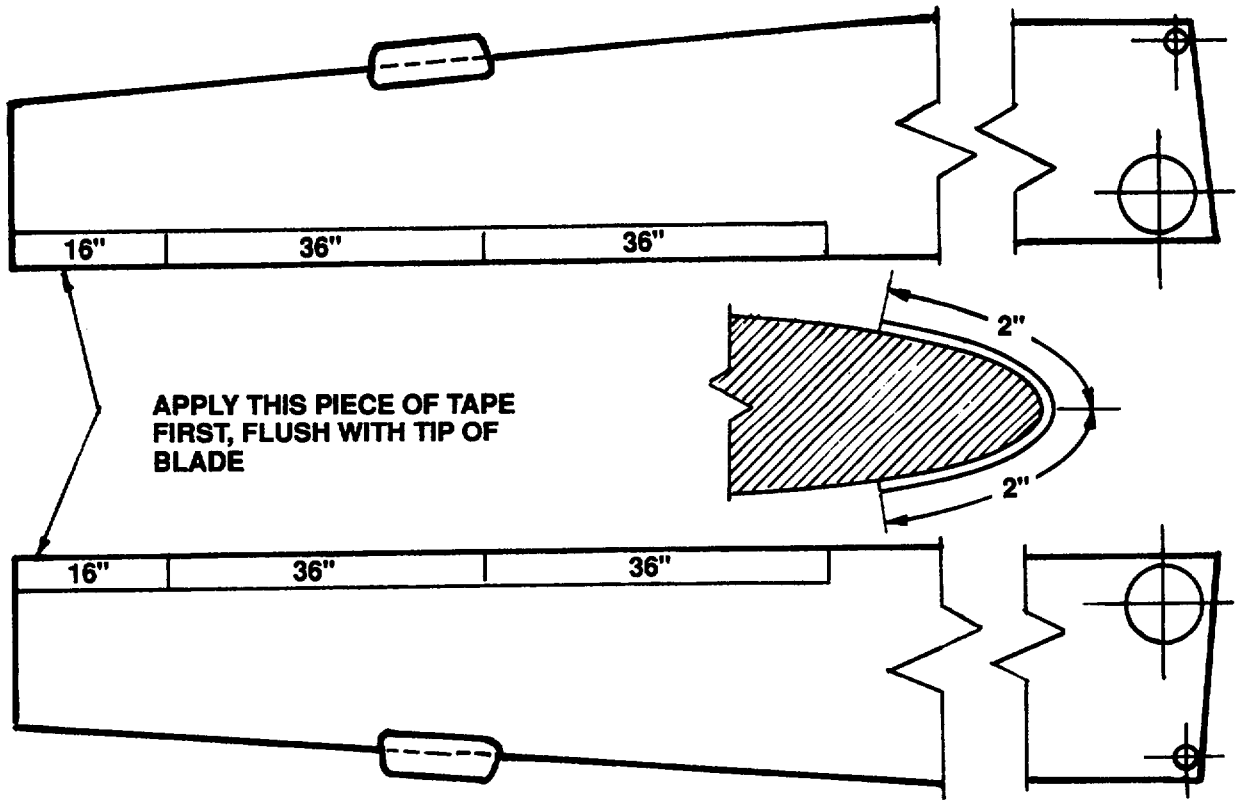


Figure 3-41. Sanding in a Spanwise Direction



1 PIECE OF 4 INCH WIDE, 16 INCH LONG TAPE
2 PIECES OF 4 INCH WIDE, 36 INCH LONG TAPE
2 INCHES ON TOP AND 2 INCHES ON BOTTOM

Figure 3-42. UH-1H CMRB Tape Application, Main Rotor

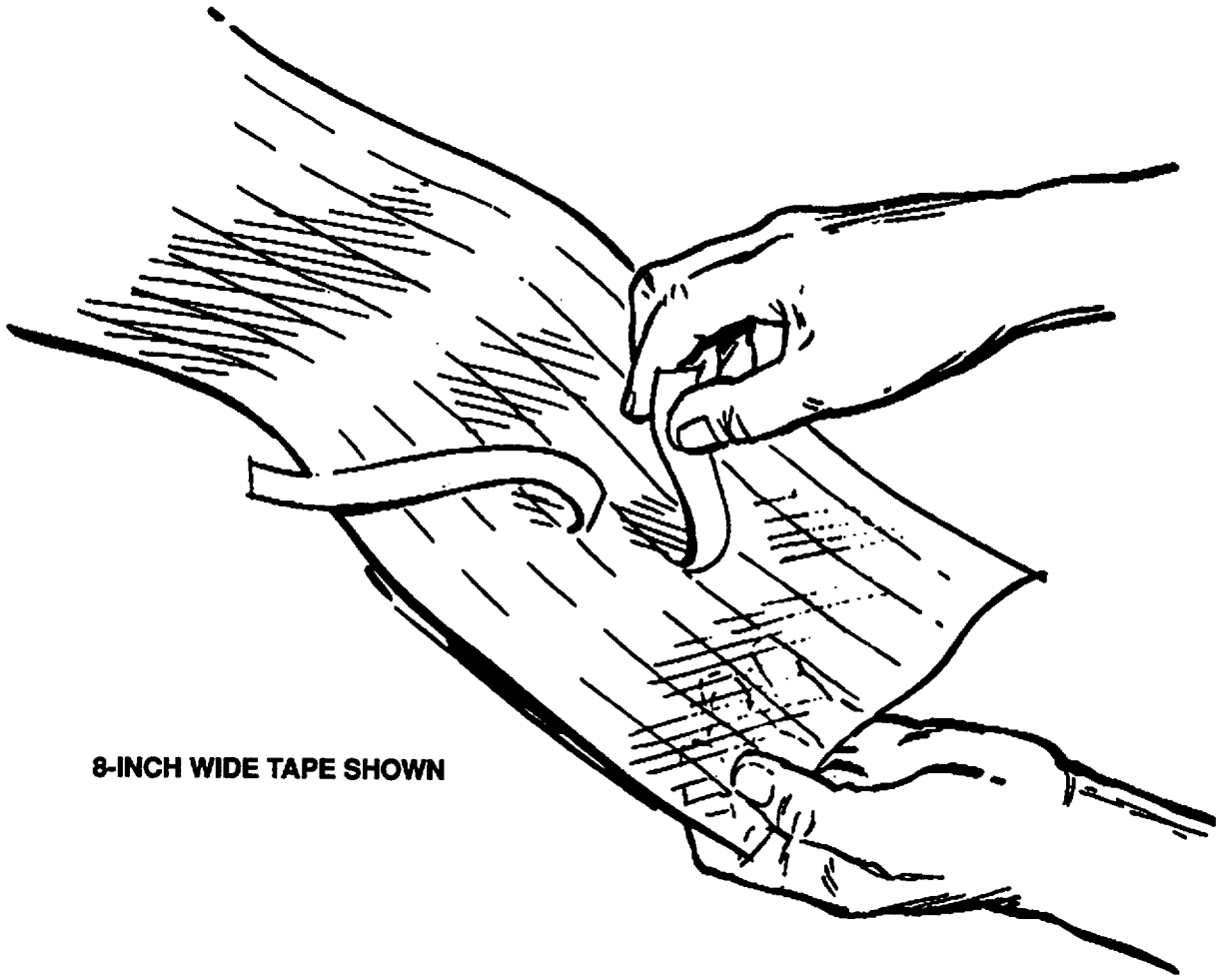


Figure 3-43. Peeling Back Procedures

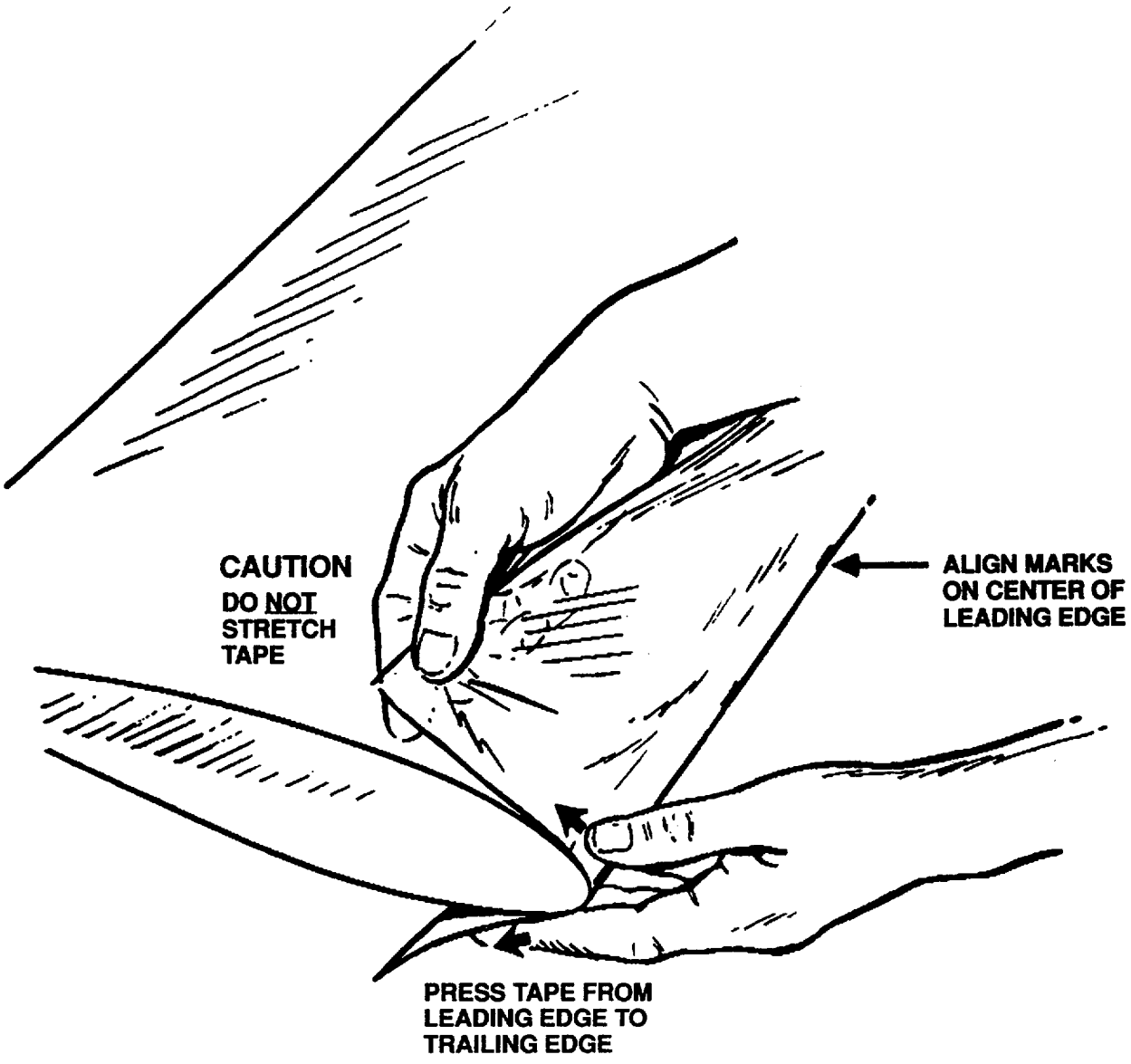


Figure 3-44. Pressing Tape to Prevent Air Bubbles

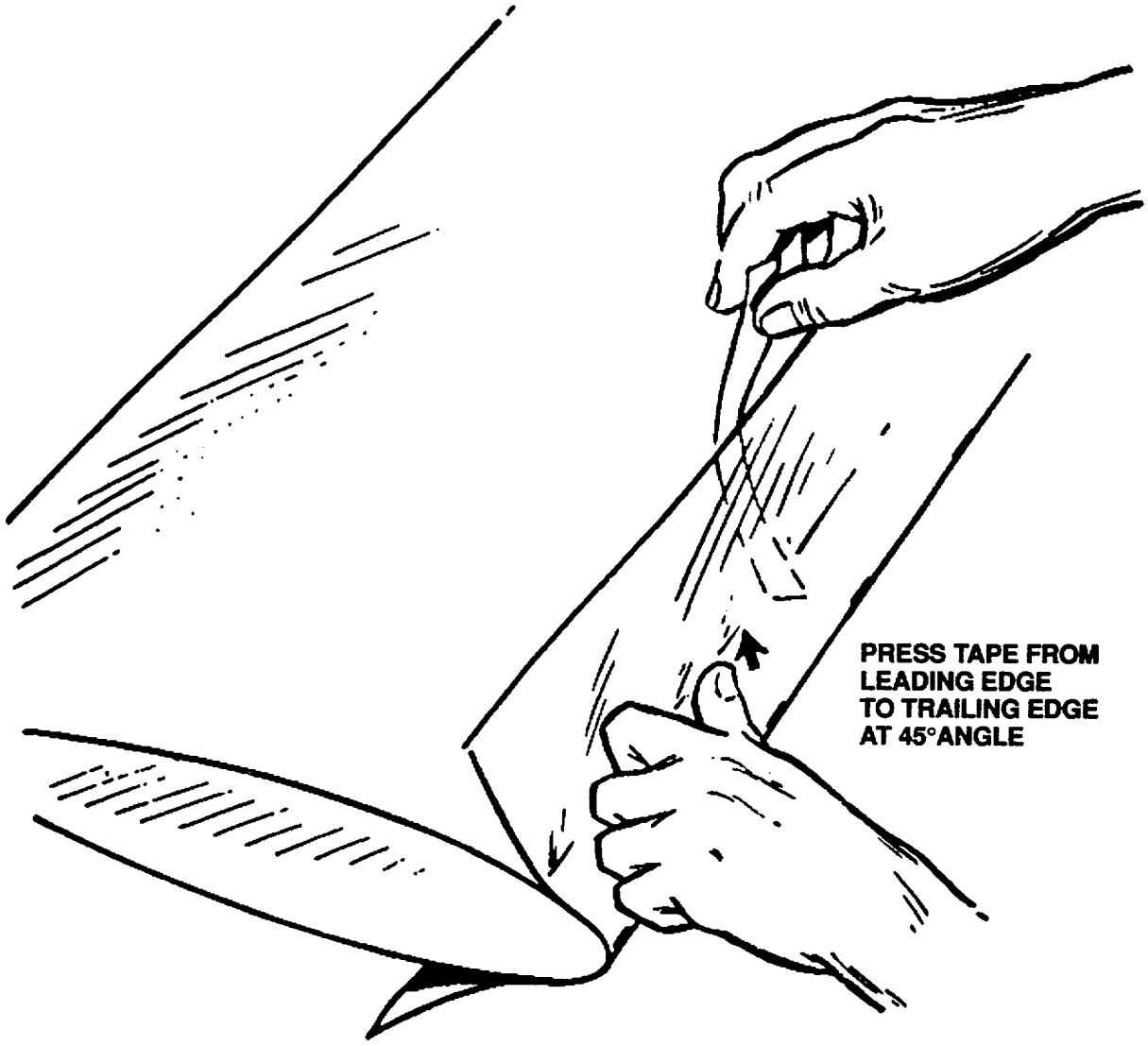
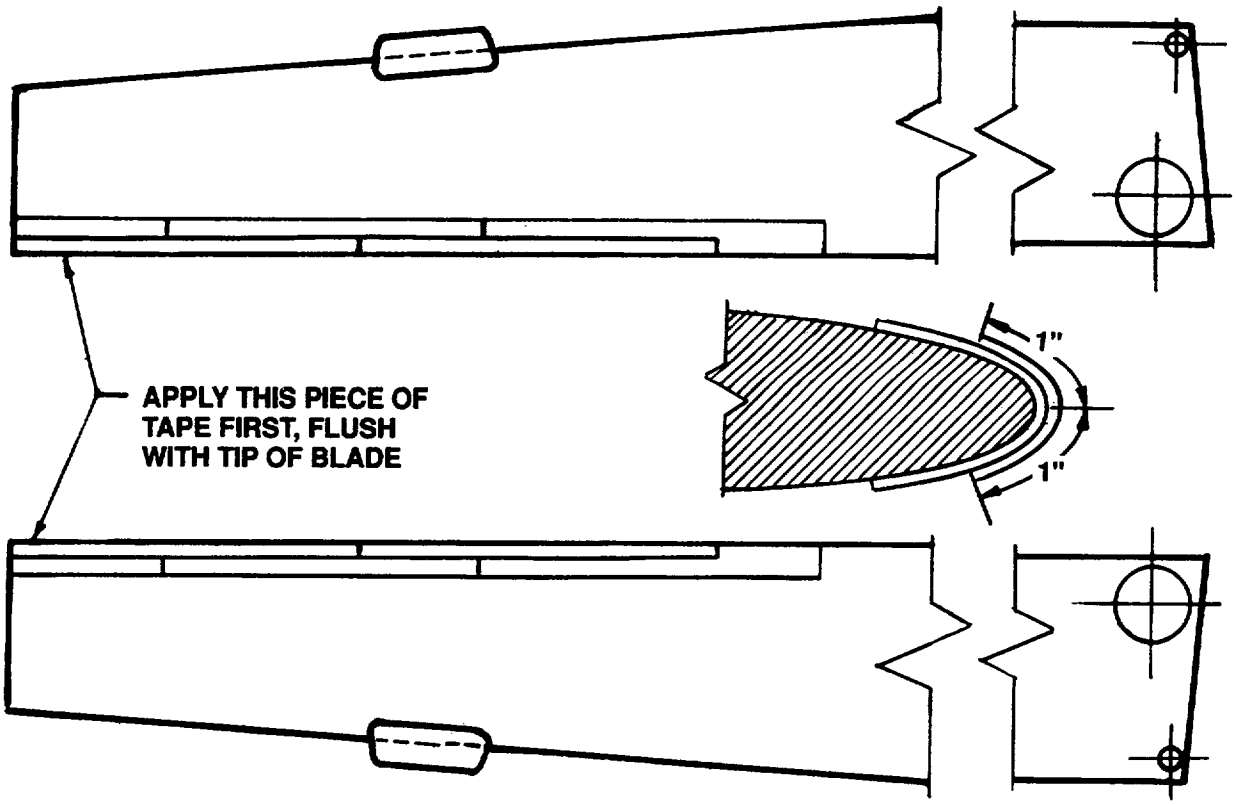


Figure 3-45. Peeling Backing Strip Back



2 PIECES OF 2 INCH WIDE, 30 INCH LONG TAPE
1 INCH ON TOP AND INCH ON BOTTOM

Figure 3-46. UH-1H CMRB 2 inch wide Tape Application, Main Rotor

Section X. DESCRIPTION AND APPLICATION PROCEDURES FOR THE AH-1F AIRCRAFT WITH K747 MAIN ROTOR BLADES

3-25. Description. This procedure provides instructions for the application of a kit which protects helicopter rotor blades against sand erosion which may occur. The steps are arranged in sequence to permit two personnel to complete installation on the entire AH-1F aircraft in sequence. If more than two personnel are available, the main rotor and tail rotor can be done simultaneously.

3-26. Personnel Requirements and Supplies.

a. Personnel: 2 required, MOS 67G.

b. Supplies and Dimensions: Refer to tables 3-29 through 3-31.

3-27. Installation Procedures.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**

- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**

- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respirator protection components, table 3-32.**

a. Remove Blades. Removing the main rotor blades makes the installation easier, but removal is not mandatory. The tail rotor blades should not be removed.

b. Main Rotor Tape Installation.

(1) Cleaning. Clean area shown in figure 3-47 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol, or denatured alcohol.

(2) Layout and Mask. Layout and mask off main rotor blades for polyurethane tape application as shown in figure 3-47. Ensure that masking tape is applied over screw holes (see figure 3-47).

(3) Cut tape. Cut tape to the dimensions in table 3-30.

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(4) Surface Preparation. Remove dark green paint down to light green primer in the area shown in figure 3-47 with MEK or sandpaper. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction as shown in figure 3-1, sheet 1. Use of a power polishing sander is permitted for this procedure.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with isopropyl alcohol or denatured alcohol, then wipe with a clean, dry cloth.

NOTE

Perform Steps (6) through (8) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a thin coat of No. 86 adhesive promotor to the area covered by the first piece of tape, shown in figure 3-48. Allow to dry at least five minutes, but not more than one hour before applying tape. Promoter can extend beyond end of tape. Apply promoter in tape length segments to avoid contamination of coated surface.

(7) Tape Application, 4 in. Apply alignment marks to outside of tape in the appropriate position obtained from figure 3-48. See figure 3-1, sheet 2. Remove leading edge backing strips as shown in figure 3-1, sheet 3. Apply first piece of tape to area shown in figure 3-48 per tail rotor procedures. Trim tape to outline of stainless steel guard and remove tape from over inboard attachment screw holes (see figure 3-49). With backing strips on and against the blade, hold 20 inch long piece of 4 inch wide tape in position on the tip leading edge per figure 3-50 and mark where tip and bottom inboard edge mates with existing tape. Repeat this procedure with a second piece of 20 inch long piece of 4 inch wide tape for the outboard edge (see figure 3-50). Cut tape at the mark lines. Apply No. 86 promoter and place tape in position as shown in figure 3-50. Any bubbles encountered during the application process may be removed by continuous squeegee stroking towards the edge of tape or by puncturing the bubbles with a needle and applying pressure to wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(a) Remove tape from over outboard attachment screw holes.

(b) Remove tuck masking tape.

(8) Tape Application, 2 in. Scuff the 4" wide tape surface with 120 grit sandpaper in area to be covered by 2" wide tape as shown in figure 3-51. Clean tape surface with MEK. Apply tape to blade with No. 86 promoter as in Step (6).

(a) Apply 12 inch long piece of 2" wide tape on outboard end of guard as shown in figure 3-51. Trim tape from over attachment screw holes.

(b) Apply 33 inch long piece of 2" wide tape on inboard end of guard as shown in figure 3-51. Trim tape at inboard end of guard and from over attachment screw holes.

(9) Install Blades. If removed, install per aircraft -23 TM.

c. Tail Rotor Tape Installation.

(1) Cleaning. Clean area shown in figure 3-52 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this paint and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Layout and Mask. Layout and mask off tail rotor for polyurethane tape application as shown in figure 3-52.

(3) Cut Tape. Cut 4 pieces of 4 inch wide polyurethane tape 16.5 inches long. (Reference table 3-31).

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(4) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction, figure 3-1, sheet 1.

(5) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with isopropyl alcohol or denatured alcohol, then wipe once again with a clean, dry cloth.

NOTE

Perform procedural Steps (6) through (10) for one blade at a time.

(6) Application of Adhesive Promoter. Apply a thin coat of No. 86 adhesive promoter to the masked area. Allow to dry at least five minutes, but not more than one hour before applying tape. Promoter can extend beyond ends of tape.

(7) Polyurethane Tape Preparation. Peel back one of the center (1 inch wide) backing strips from the 4" wide tape approximately 3 inches as shown in figure 3-1, sheet 3.

(8) Tape Alignment. Align the tape in the position shown in figure 3-53 before pressing to blade.

(9) Tape Application. When the tape is in proper position, press the exposed portion on the blade as close to the leading edge as possible. Press down on the tape, working toward the trailing edge to prevent trapping air bubbles. See figure 3-1, sheet 4. Peel backing strip back while keeping tape aligned and pressing down toward the trailing edge. Remove the backing strips one at a time, working toward the trailing edge. See figure 3-1, sheet 5. Thoroughly press down tape. Any bubbles encountered during application process may be removed by continuous squeegee stroking toward the edge of tape or by puncturing the bubbles with a needle and applying pressure to the wet adhesive.

CAUTION

Do not puncture bubbles after the adhesive has dried.

(10) Masking Tape Removal. Remove masking tape.

NOTE

The structure to which the polyurethane protective tape, 3M 8663, is to be applied should be in recent overhaul or new condition. This means that repairs have been made and the part has been primed and painted in accordance with the appropriate technical directive for that part.

NOTE

The rotor blade must be smooth. Any dirt inclusions or paint roughness must be sanded off the surface using 400 grit sandpaper. Simply, the surface should be at least as smooth as you can get it by sanding with 400 grit sandpaper.

(11) Clean the surface by rinsing with isopropyl alcohol and wiping dry with clean untreated paper towels or rags.

(12) Using a small clean rag, apply a thin coat of #86A adhesion promoter to the entire area of the rotor blade that is to be covered with 3M 8663 PPT film. Let the 86A dry 15 minutes, prior to application of 3M 8663 PPT film.

(13) Cut a sheet of 8663 polyurethane protective tape (PPT) to the size of the area to be covered leaving a margin of 1/8 inch around the perimeter. This margin will later be used for application of the edge sealant around the perimeter of the PPT sheet.

(14) Prepare a "wetting" solution as follows: To a pint sized spray bottle, add 2 drops of liquid dishwashing detergent and 1/2 cup of isopropyl alcohol and fill the bottle with clean water. (The actual mixture is: 75% water, 25% isopropyl alcohol and 2 drops of liquid dishwashing detergent per one liter of solution.)

(15) Remove the liner from the sheet of PPT. Liberally spray the adhesive side with "wetting solution" that was prepared in step #4 above. Also spray the surface of the part to which the PPT is to be applied.

(16) Carefully position the PPT on the part. Use a plastic squeegee, starting at the middle of the sheet, and remove the wetting solution from beneath the PPT sheet, by using long overlapping strokes. If you should trap an air bubble, lift an edge to allow the bubble to be removed. When the edge is lifted, respray with more "wetting solution" to insure that no air is trapped under the PPT. Use a clean rag to mop up the excess water solution at the edges to prevent the water solution from "wicking" back under the tape.

(17) Inspect the installation for lack or air or water bubbles. It is permissible to remove a few small "blisters" by piercing them with a hypodermic needle, and pressing on the bubble to exclude the air/water.

NOTE

Repeat Steps (6) to (10) for each blade.

NOTE

For a neat job, use masking tape to mask the topside of the PPT sheet 1/32 inch inside the perimeter of the edge.

NOTE

The application of edge sealant is particularly important in maintaining 3M 8663 polyurethane protective tape integrity when applied at butt joints of adjacent PPT.

(18) Assemble a nozzle and a cartridge on the 3M EPX applicator. Squirt out a small quantity to insure that a uniform mix is attained. Using the nozzle, apply a 1/8 inch bead around the perimeter of the 3M 8663 polyurethane protective tape panel. Allow this to set up for about 10 minutes, before removing the tape. The sealant should still be liquid.

NOTE

For best results: To allow the edge of the sealant bead to blend with the 3M 8663 polyurethane protective tape and paint. Higher temperatures will require less time for the sealant to gel. Lower temperatures will require more time for the sealant to gel, so some adjustment in the 10 minutes may be necessary. The objective is to get the masking tape off while the bead of sealant is still flowable, to let it blend without a sharp edge.

(19) Inspect the edge seal application for any small air bubbles and if any are found, they can be relieved by pricking with a hypodermic needle.

(20) The rotor blade is ready to return to service after the sealant is well cured, and the 3M 8663 polyurethane protective tape has had time to reach a acceptable level of adhesion. This is achieved after 24 hours at 72 degrees.

d. Tail Rotor Agcoat Coating Application.

NOTE

TASK L-100 polyurethane pain may be used in place of agcoat. TASK L-100 may also be used to repair agcoat.

(1) Cleaning. Clean area shown in figure 3-54 with cheesecloth or machinery towel dampened with MEK, isopropyl alcohol or denatured alcohol.

CAUTION

Some rotor blades may be painted with acrylic lacquer, and MEK can adversely affect this pain and the subsequent quality of the erosion protection. In this case, MEK should not be used as a cleaning agent.

(2) Masking. Mask off area for polyurethane coating with Tuck tape as shown in figure 3-54.

NOTE

Surface preparation and cleaning are the most important steps to insure proper adhesion.

(3) Surface Preparation. Scuff the masked off area with 120 grit sandpaper. Only sand in a spanwise direction, figure 3-1, sheet 1.

(4) Cleaning. Wipe the masked area several times with cheesecloth or machinery towel dampened with MEK.

(5) Mix Primer. Stir Part A of primer before using. Mix equal amounts (4 oz of each) of AGC 1201-7 primer Parts A and B in a beaker and stir well. Close can and bottle after pouring out required amounts.

WARNING

Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide 144 Guidelines for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use safety glasses, gloves, and disposable (Tyvek) coveralls. Avoid skin contact. Always apply coatings so that any spray or vapors are directed away from breathing zone individuals. Use respirator protection components, table 3-32.

(6) Primer Application. Brush the primer on the blade in the area shown in figure 3-54 where the coating will be applied. Allow the primer to dry a least one hour at 70 degrees F or above. Do not handle the primed surface. If the primer surface becomes contaminated, lightly wipe it with denatured alcohol.

(7) Mix Coating. Stir Part A of coating before using. After the primer dries, mix 3/4 beaker of AGC 1201-1R polyurethane coating Part A with 1/4 beaker AGC1201-3R Part B in a can and mix well. Do not stir again after it is mixed well. If a skin forms on top of the coating, remove it.

(8) Coating Application.

(a) Brush on 5 coats to the entire area shown in figure 3-54, allowing five minutes minimum drying time between recoating a specific area. Brush on heavy coats with light pressure to avoid damaging previous coats. If lumps form in the coating, discard and mix a new batch.

(b) Remove masking tape after the first 5 coats are applied and apply the remaining coats by eye. Total number coats are shown in figure 3-55. Allow the coating to cure 24 hours at 70 degrees F or above.

NOTE

Wet primer can be cleaned up with denatured alcohol or MEK. Wet coating can be cleaned up with MEK.

e. Polyurethane Curing. After polyurethane application, allow 24 hours curing time.

f. Tape Repair. Replace the entire damaged piece of tape. Remove with a plastic scraper. Replace per the installation instructions.

NOTE

TASK L-100 polyurethane paint may be utilized to repair damaged areas of 3M 8663 polyurethane tape. The damaged tape areas must not be larger than three inches in diameter. No more than a single damaged area may be repaired per each thirty-six inch length of tape.

NOTE

All TASK L-100 polyurethane paint and 3M 8663 polyurethane tape applications to the aircraft must be maintained in accordance with Technical Bulletin 1-1615-351-23.

(1) Scuff sand the damaged area with 80 grit sand paper to remove any dirt and debonded edges.

(2) Clean the damaged tape area with a clean piece of cheesecloth dampened with Isopropyl Alcohol.

(3) Wipe the damaged tape area completely dry with a clean, dry piece of cheesecloth.

(4) Mix and apply TASK L-100 POLYURETHANE PAINT to the damaged tape area per the instructions in TB 1-1615-351-23 until the damage is repaired.

(5) Allow the TASK L-100 polyurethane paint application to cure six hours before operating the rotor blades.

g. Coating Repair. Local damage to the polyurethane coating can be touched up by brushing additional coating to the damaged area. Carefully remove the disbonded material. Scuff the damaged area with 120 grit sandpaper. Wipe clean with MEK. Prime the area with AGC 1201-7 primer if the blade surface is exposed. Coat the damaged area with sufficient coats polyurethane coating to match the thickness of adjacent areas. Application of TASK L-100 polyurethane paint to repair minor damage on Agcoat material is authorized for this procedure.

h. Polyurethane Coating Removal. Saturate coating surface with MEK and scrape costing off with a plastic scraper while soft. Make a final surface wipe with cloth dampened with MEK.

i. Polyurethane Tape Removal. Slowly peel back over self. Scrape tape with plastic scraper, if necessary. Remove adhesion promoter with cloth dampened with toluene.

j. Track and Balance Check. Check track and balance of the main and tail rotors per -23 TM.

k. Inspection of Main Rotor Polyurethane Tape.

(1) Inspect 2-inch tape for wear. No holes allowed.

(2) Inspect 4-inch tape for wear. No more than 0.5 inch wide spanwise or chordwise hole allowed on trailing edge. No holes Slowed on any other surface of tape.

(3) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(4) Inspect for inboard and outboard ends of tape segments for disbanding. No more than 0.5 inch spanwise or chordwise Is allowed.

(5) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonds on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not torn.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

l. Inspection of Main Rotor Agcoat. Wear through to blade surface not allowed.

m. Inspection of Tail Rotor Polyurethane Tape.

(1) Inspect 4-inch tape for wear. No more than 0.5 inch wide spanwise or chordwise hole allowed on trailing edge. No holes allowed on any other surface of tape.

(2) Inspect upper and lower trailing edge of tape for disbonding. No more than 0.25 inch chordwise width for any spanwise length of tape or 0.5 inch chordwise width for 6 inches spanwise length along a single piece of tape is allowed.

(3) Inspect for inboard and outboard ends of tape segment for disbonding. No more than 0.5 inch spanwise or chordwise is allowed.

(4) Inspect for internal disbonding of tape segments. No more than a single disbonding larger than 3.0 inches spanwise and/or 2.0 inches chordwise is allowed. In addition, no more than a total of 6 square inches is allowed for multiple disbonding on a single tape segment. There is no limit to the number of disbonds per tape segment providing material is not tom.

CAUTION

If damage is discovered and found to be within the above limitations, do not trim off these damaged areas. Trimming off these damaged areas creates an increasingly lighter blade and may cause an out of balance condition.

n. Inspection of Tail Rotor Agcoat. Wear through to blade surface not allowed.

Table 3-29.

AH-1F (K747) Rotor Blade Erosion Protection Kit/Tools/Consumables
NSN 1615-01-328-5239

Kit

1. Cheesecloth	CCC-C-440	200 Sheets 8 x 9"
2. 120 Grit Sandpaper	NSN 5350-00-721-8115	24 Sheet
3. Adhesive Promoter #86	70-0701-8275-6	1 Qt
4. 2-inch Wide Paint Brush or Sponge Brush	NSN 8020-01-126-1437 P/N PP-2	8 Each
5. Plastic Scraper	NSN 5120-00-628-5569 P/N PA-1	2 Each
6. Masking Tape	NSN 7510-00-685-4963 P/N 231-1-IN	4 Rolls
7. Poly Tape 2 Inch	8663 MB	72 pcs, 2" x 36"
8. Poly Tape 4 Inch	8663 MB-SS	72 pcs, 4" x 36"
9. Poly Tape 8 Inch	8663 MB-SS	72 pcs, 8" x 36"

Supplies

1. Alcohol (Denatured or Isopropyl)	NSN 6810-00-264-5906	2 Qt
2. Methyl Ethyl Ketone (MEK)	NSN 6810-00-281-2785	2 Gal
3. Toluene	NSN 6810-00-579-8431	1 Qt
4. Cleaning Cloth	NSN 7920-00-044-9281	10 Lb Bag
5. Machinery Towel		As Req
6. Adhesion Promoter, 3M # 86A	NSN 8040-01-450-9187	Pt (as req)
7. Applicator Nozzle, 3M	NSN 5120-01-425-1023	1 Box
8. Edge Sealant Cartridge, 3M DP-190	NSN 1680-01-431-3607	

Tools

1. Airframe Repairer's Tool Kit
2. Maintenance Stand
3. Scissors
4. Spray Bottle
5. Metal containers, 1 qt. (#1 coffee can, No. 10 can)
6. Exacto knife w/blades
7. Safety Goggles
8. Rubber Gloves
9. Tape Measure
10. Wooden Spatula (Paint Stirrer)
11. EPX Applicator, 3M — NSN 1680-01-431-3606

Table 3-30.

AH-1F (K747) Main Rotor Application Dimensions and Quantifies

4 pcs polyurethane tape	4" wide x 20" long
2 pcs polyurethane tape	2" wide x 33" long
2 pcs polyurethane tape	2" wide x 12" long

Table 3-31.

AH-1F (K747) Tail Rotor Application Dimensions and Quantities

2 pcs polyurethane tape 4" wide x 16.5" long

Table 3-32.

Respiratory Protection Components (AH-1F, K747)

- 1/2 face respirator for paint operations:
- Nomenclature: Paint Spray respirator, complete Part No: 44849
  NSN: 4140-01-231-0150
- Cartridges (refill) Part No: 464031
  NSN: 4240-01-230-6892
- Paint prefilter, Part No: 465667
  NSN: 4240-01-231-0150
- Self Contained Breathing Air:
- Nomenclature: 30 minute Ultralight II air mask
  NSN: 4240-01-248-8035
- Composite II Cylinder
  NSN: 4240-01-252-0086

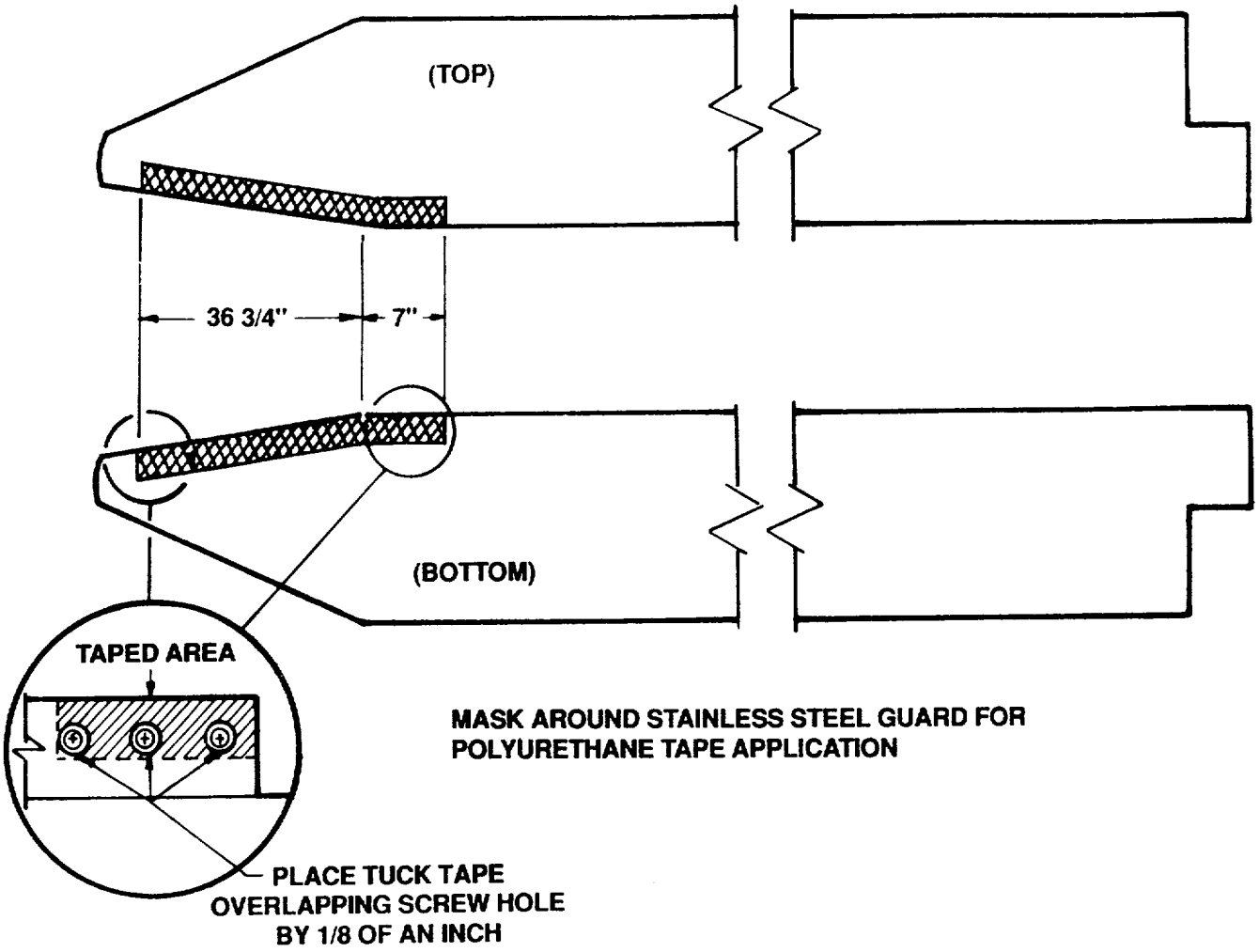
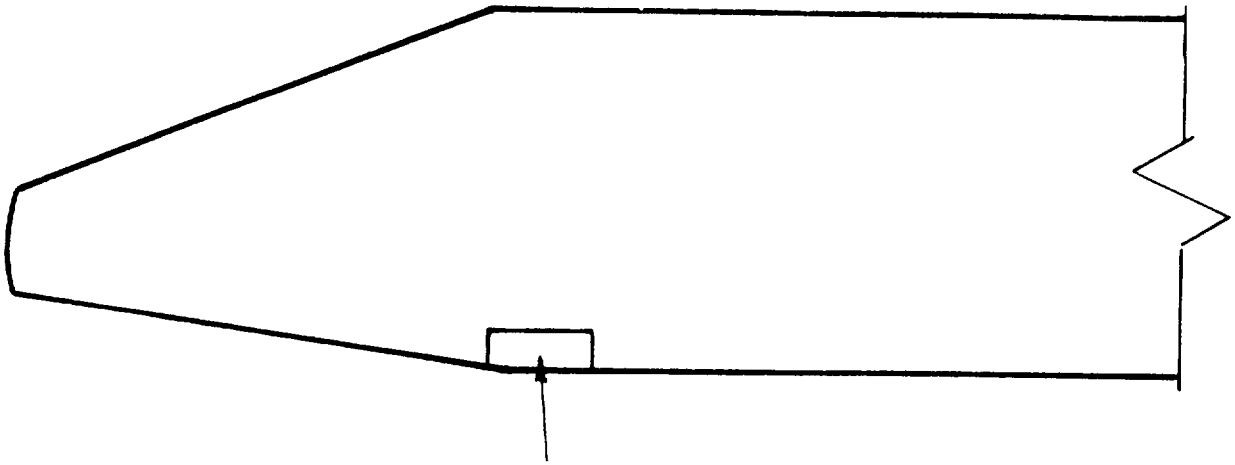


Figure 3-47. Layout and Masking, Main Rotor (AH-1F/K747)



APPROX. 2 INCHES ON TOP, 2 INCHES ON BOTTOM,
7 INCHES LONG

APPLY THIS 4 INCH WIDE PIECE OF TAPE FIRST
(*THIS DIMENSION CHANGES ALONG THE LEADING EDGE)

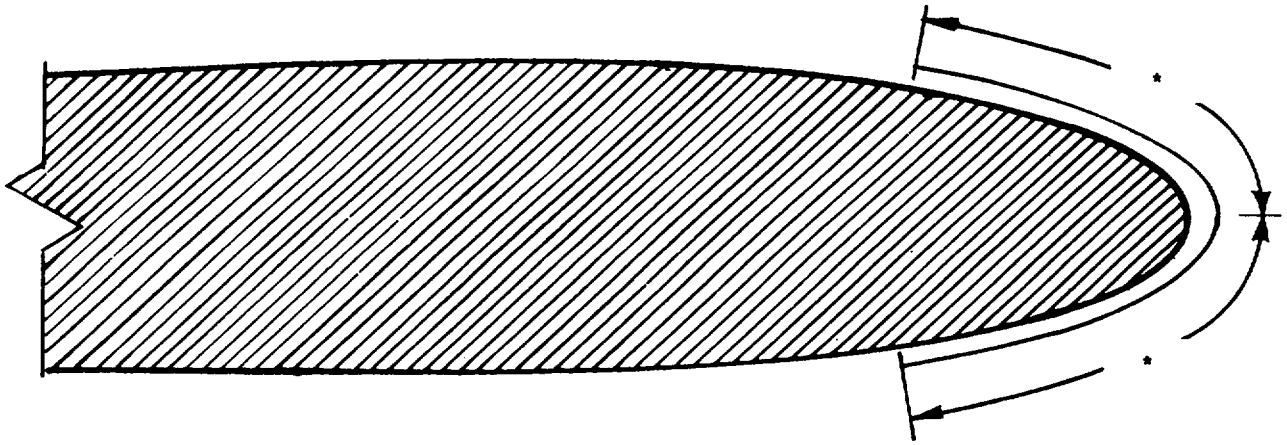


Figure 3-48. Tape Application, Main Rotor (AH-1F/K747)

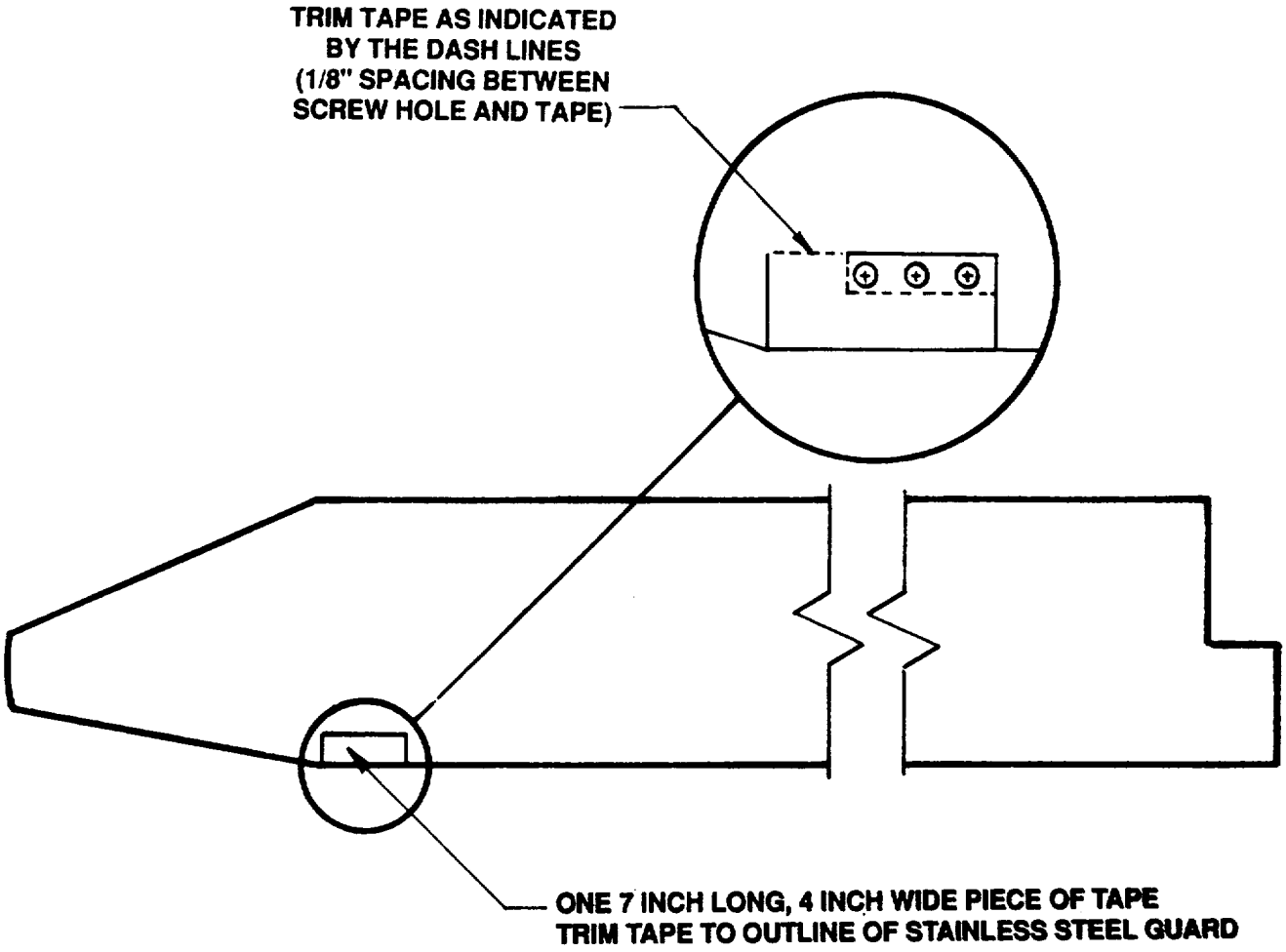


Figure 3-49. Trimming Tape to Outline of Stainless Steel Guard, Main Rotor (AH-1F/K747)

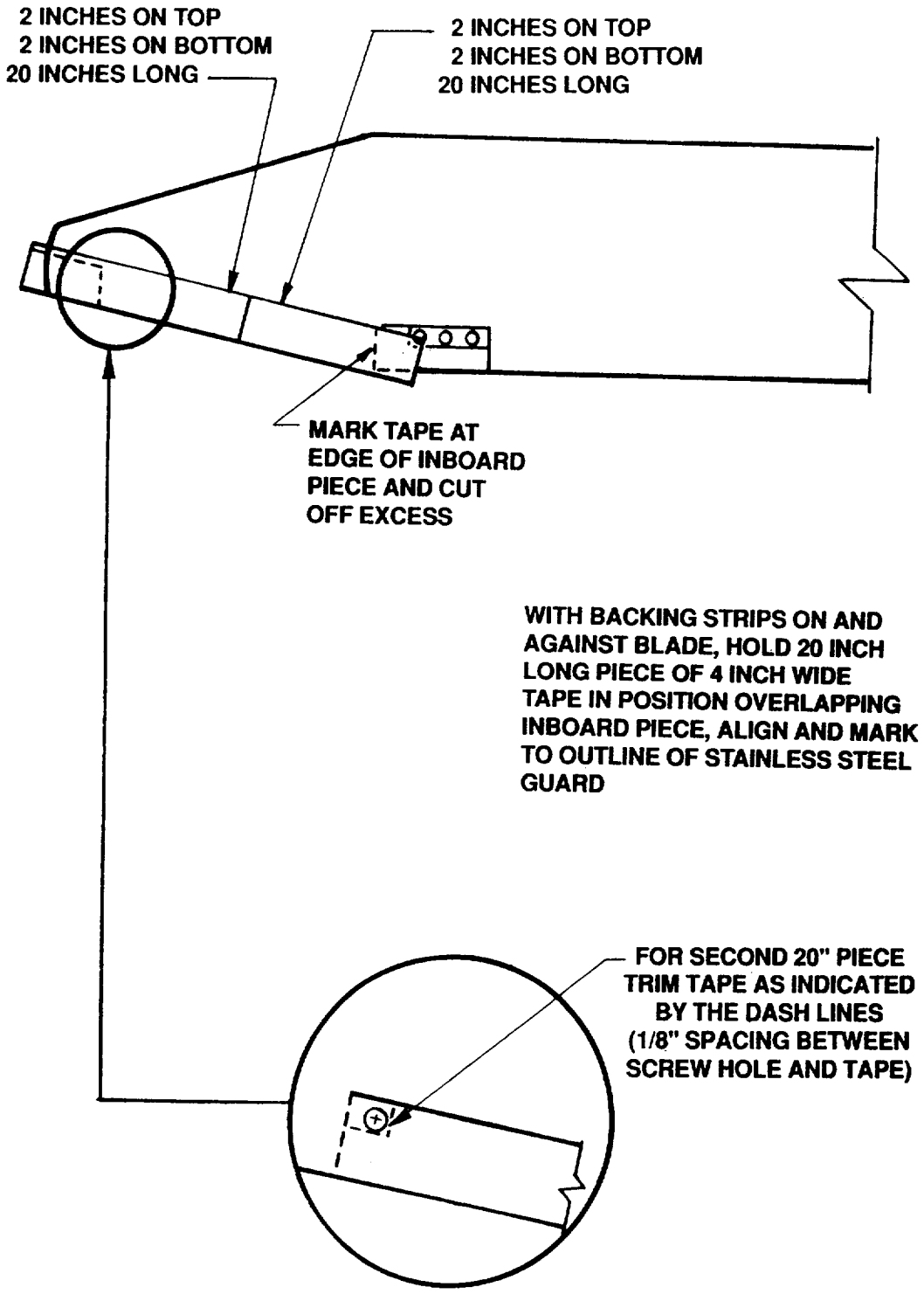
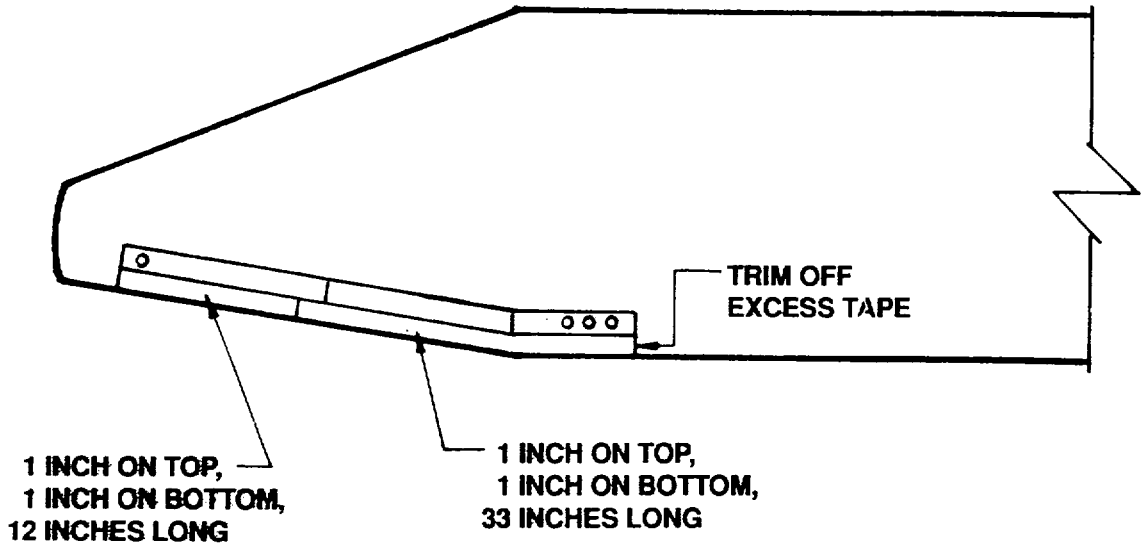
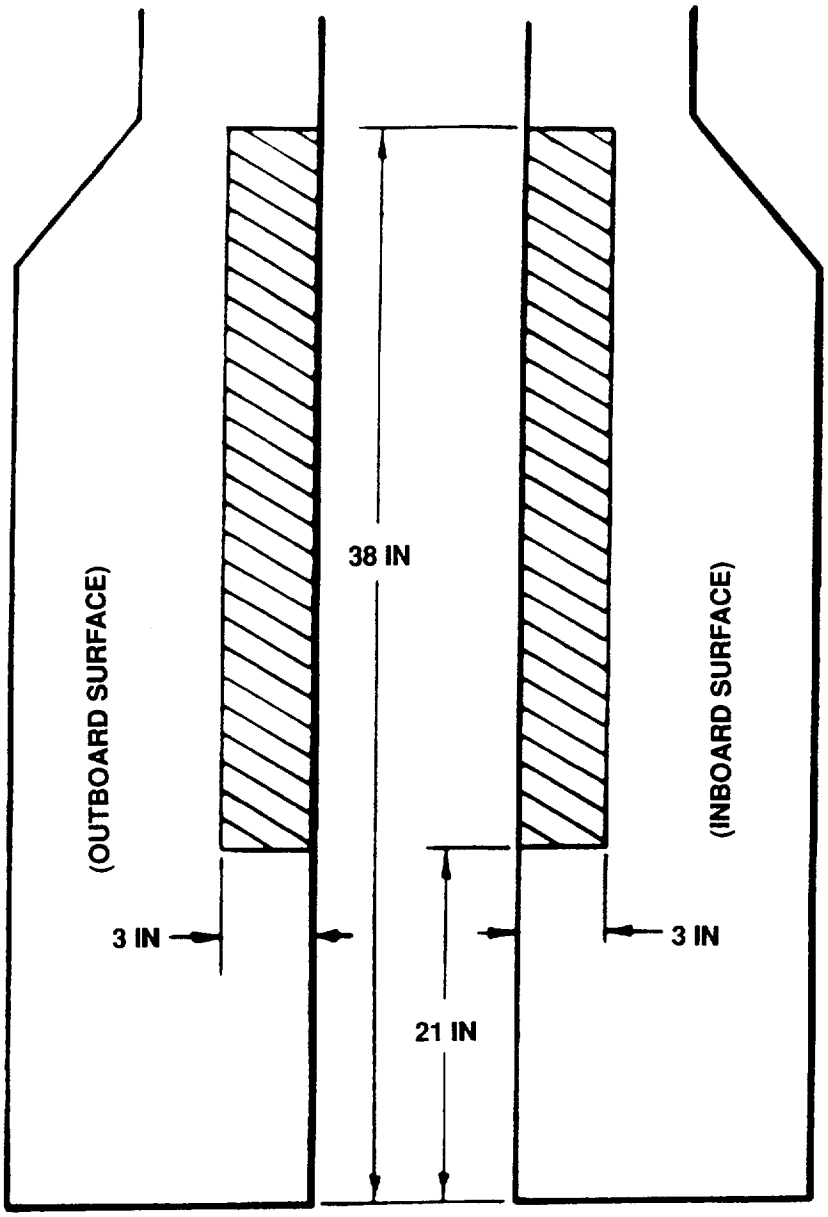


Figure 3-50. Applying Tape to Inboard/Outboard and Leading Edge, Main Rotor (AH-1F/K747)



NOTE: DO NOT COVER SCREWS WHEN APPLYING TAPE, TRIM TAPE TO PROVIDE 1/8" SPACING BETWEEN SCREW HOLE AND TAPE EDGE

Figure 3-51. Tape and Trim Application, Main Rotor (AH-1F/K747)



MASK AROUND SHADED AREA FOR POLYURETHANE TAPE APPLICATION

Figure 3-52. Masking Area for Tape Application, Tail Rotor (AH-1F/K747)

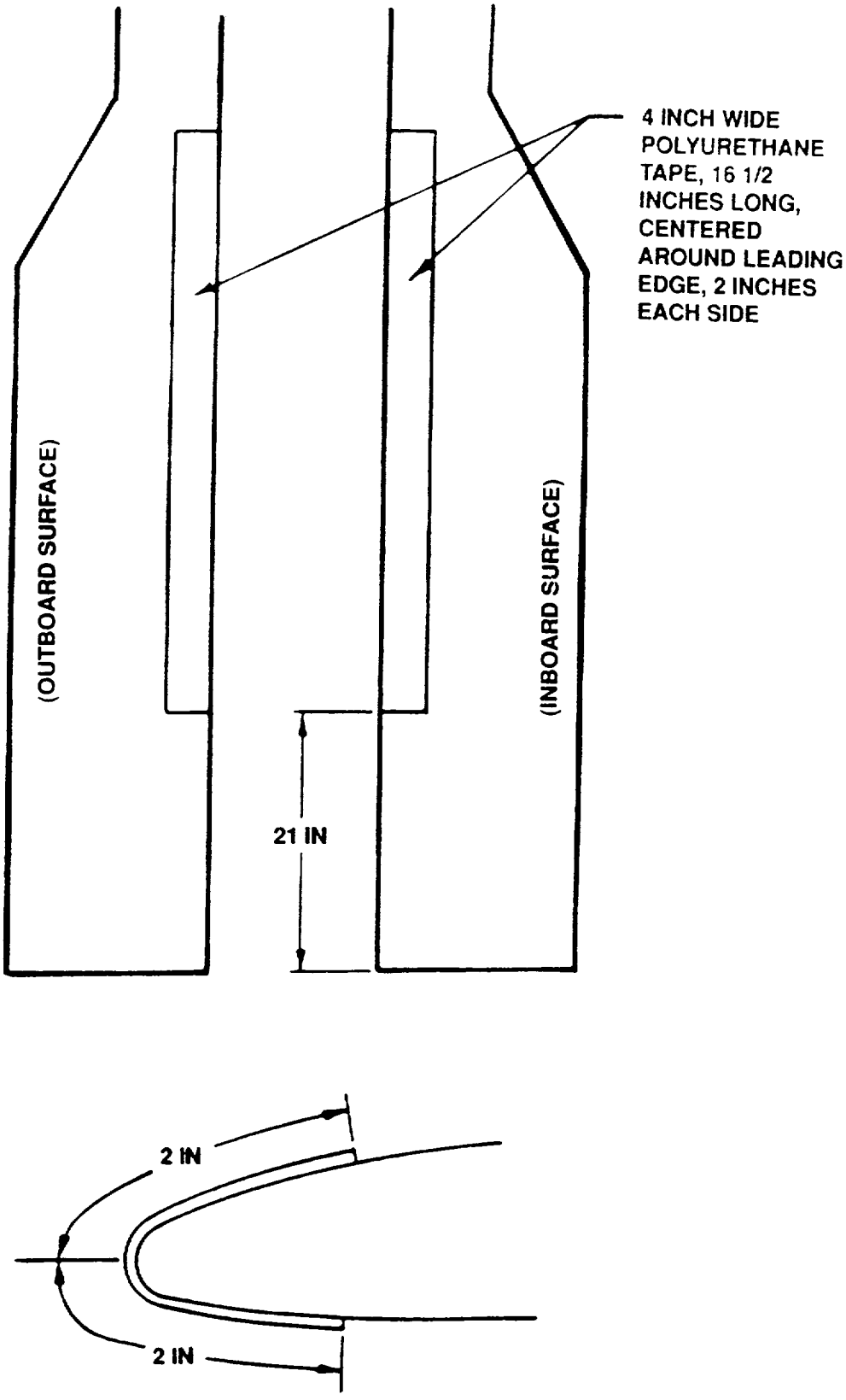
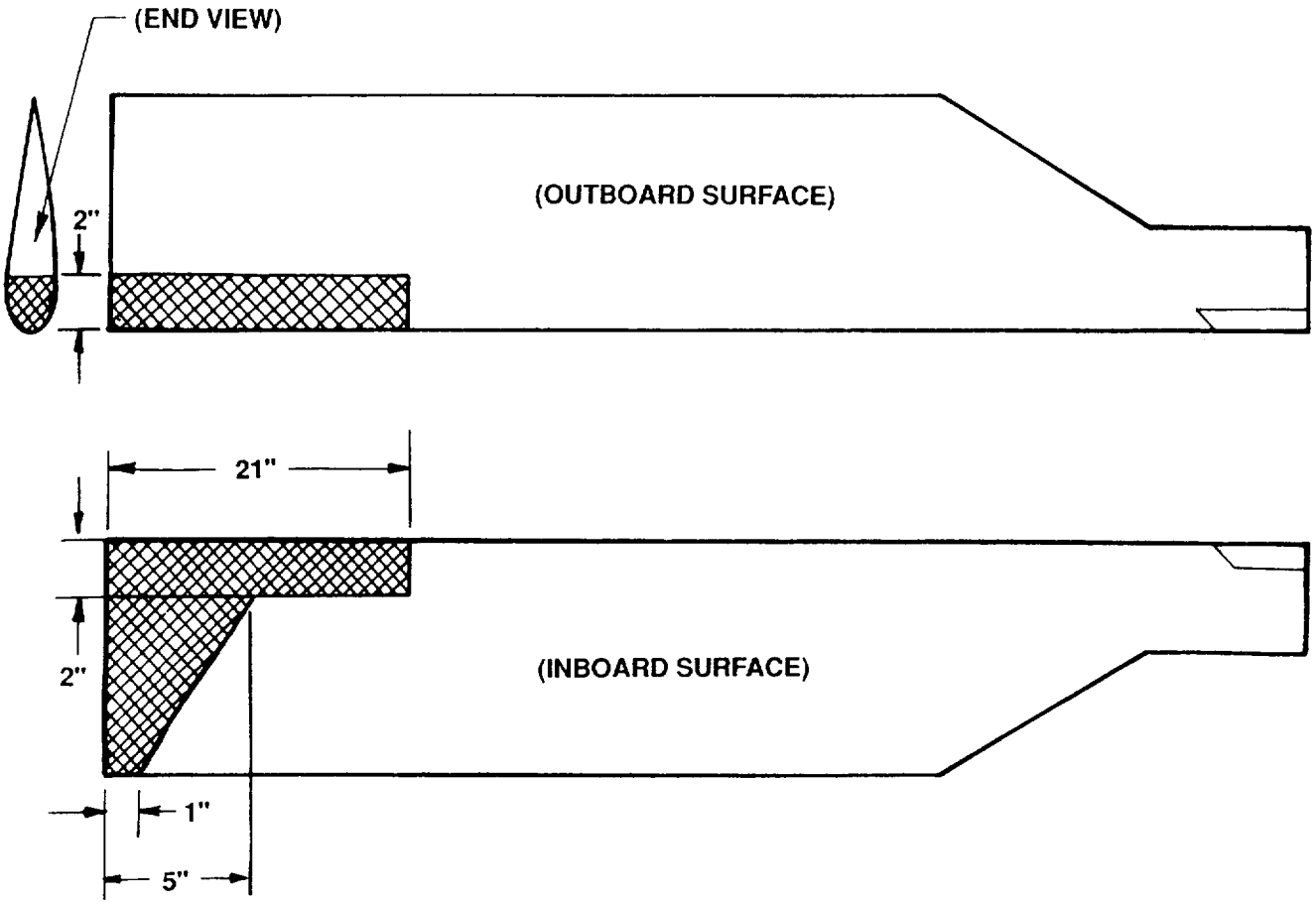


Figure 3-53. Tape Alignment, Tail Rotor (AH-1F/K747)



MASK AROUND SHADED AREA FOR POLYURETHANE COATING APPLICATION USING TUCK TAPE

Figure 3-54. Masking Area, Coating/Cleaning Application, Tail Rotor (AH-1F/K747)

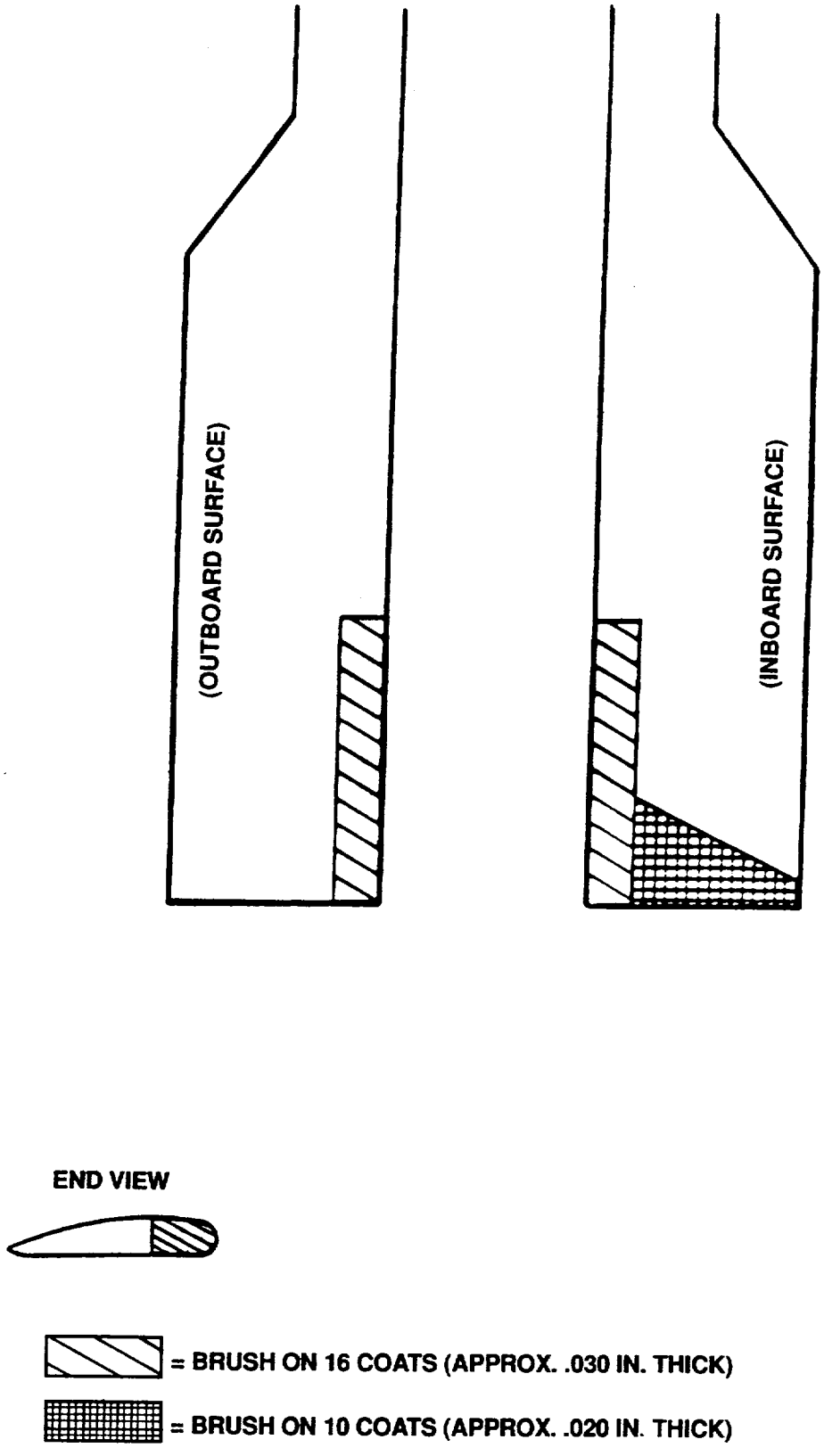


Figure 3-55. Coating Application, Tail Rotor (AH-1F/ K747)

CHAPTER 4

DETAPING OF ROTOR BLADES FOR AH-1, AH-64, CH-47, OH-58, UH-1 AND UH-60 HELICOPTERS

Section I. GENERAL

a. Detaping Rotor Blades. Erosion protection should be removed from rotor blades when the aircraft is no longer operating within an erosive environment.

b. Application.

(1) Level of Maintenance: AVUM.

(2) Applied by AVUM.

(3) Time required (per aircraft):

Two (2) Bladed Rotor System	2 - 3 hours
Four (4) Bladed Rotor System	3 - 5 hours
Six (6) Bladed Rotor System	4 - 6 hours

c. Support Items and Material:

Item	NSN
360 Grit Sandpaper	5350-00-224-7202
Plastic Scraper	5120-00-628-5569
Masking Tape	7810-00-685-4963
Toluene	6810-00-579-8431
Cleaning Clot	7920-00-044-9281
Adhesive Remover	3M Part # 08908
Airframe Repair's Tool KR	
Maintenance Stand	
Scissors	
Safety Goggles	
Rubber Gloves	
Tape Measure, 100 ft	
Soldering Iron, 100 watt	Local Purchase
Brass Soldering Tip	Local Purchase
Metal Container, 1 Qt	
1/2 Face Respiration	4140-01-231-0150
Mat, Abrasive, Fine	5350-00-967-5093
Triclorethylene, III (alternate for Toluene)	6810-00-292-9625
Methyl Ethyl Ketone (MEK)	6810-00-281-2785
Single Edge Razor Blade with Holder	
Pen Knife	

d. Partial Removed. If rotor blade erosion protection is to be partially removed, use the removal procedures listed in the below sections for the particular erosion protection material to be removed. In addition, the following applies:

(1) Maintain blade erosion protection materials not removed in accordance with (lAW) this technical bulletin. It should be noted that TASK L-100 and AGCOAT must be periodically touched if their applications remain on the aircraft. These materials cannot be allowed to simply wear off the blades. Otherwise, unacceptable blade track and balance problems will result from allowing that TASK L-100 and AGCOAT to wear without periodic touch-ups.

(2) Blade erosion protection materials and quantities removed from rotor blades shall be identical on all rotor blades for each main rotor or tail rotor group. When a single type of erosion material is to be removed it must be removed in its entirety from the rotor blades. Partial removal of a single type of blade erosion protection material is unacceptable.

e. Blades on Aircraft. If all rotor blade erosion protection is to remain on the aircraft the rotor blades shall be maintained lAW the TB and normal -23 TM maintenance instructions. It should be noted that maintaining blade erosion protection materials includes periodic inspections, touch-ups, and repairs.

f. Final Inspection. Any removal procedure of blade erosion protection material should be accompanied by a final inspection for blade damage. Discovered damage must be treated per -23 TM before flight.

WARNING

Rotor Blade Erosion Protection must be removed from the AH-64 and UH-60A aircraft before operating in icing conditions.

CAUTION

The application of erosion protection material required track and balance of the respective main and tail rotor blades. Any complete or partial removal will require a similar effort to maintain proper track and balance.

Section II. DETAPING PROCEDURES

a. Detailed Procedures.

(1) Aircraft returning with deteriorated, voided, or other defects with the protective tape, or requiring use of the device system should give priority to removing the protective tape from these aircraft.

(2) Removal of the rotor blades from the aircraft is not mandatory, however it is easier with blades removed.

(3) Tape removal is made easier by dividing the protective strip into three or more span length sections.

CAUTION

Moving the soldering iron too slowly along the span length of the blade can create hot spots within the blade, weakening the adhesive bond, resulting in delamination.

(4) Using a 100 watt hot soldering iron with a modified tip per Figure 4-1, cut the tape by carefully moving the hot iron along the span length of the blade. The soldering iron and tip should be of the type commonly used in roof flashing and stain glass work. No specific brand is required as long as it is a 100 watt iron.

NOTE

If the plastic scraper is not available through the supply system, it can be either procured locally or locally manufactured. Locally manufacture using a piece of plexiglass with a blade width of approximately one inch. Sharpen the blade to an angled point of approximately 30 degrees (chisel point) (See View B, Figure 4-1).

(5) Peel the tape protection off the blade, using a plastic scraper as necessary. Recommend starting at the tip cap and working inward to the root. If difficulty is encountered in peeling off the tape, use a small pen knife or a single edge razor blade with holder to separate the protective tape and the blade, using extreme care not to damage the blade.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and health hazard.**
- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**
- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guideline for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respiration protective equipment.**

(6) Remove residual adhesive with toluene, applying with a clean cloth. The amount to be used is an amount sufficient to dampen the cloth and interact with the adhesive. Under no circumstances is the solvent to be used in a quantity that is excessive. Excessive is when the solvent is applied and runs on or dips off the blade. The amount of adhesive will vary from blade to blade. Therefore, more than one application of solvent might be necessary. Before applying additional applications of solvent/cleaner, insure the blade is dry. For heavy amounts of adhesive, assistance might be necessary in removing the adhesive by using a mat, abrasive, fine.

NOTE

Use of the mat, abrasive, fine can damage/scratch the composite blade. Exercise care in use.

(7) Inspect rotor blades for damage. Inspection criteria will be per the appropriate aircraft maintenance manual.

(8) Repair blades as necessary, within guidelines as per the appropriate aircraft maintenance manuals and/or other special repair procedures published by AVSCOM.

b. Other Inspections.

(1) Aircraft equipped with deice systems, return system to operative condition and test for proper operation in accordance with the appropriate aircraft maintenance manual.

(2) Confirm track and balance of the rotor system after removing the protective tape. Use procedures for track and balance per the appropriate aircraft maintenance manual.

Section III. AGCOAT POLYURETHANE COATING

NOTE

AGCOAT is distinguished from TASK L-100 by color. AGCOAT is black, whereas TASK L-100 is coffee colored.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and health hazard.**
- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**
- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 Guideline for Controlling Health Hazards in Paint Operations and the Material Safety Data Sheet (MSDS) for guidance. Use respiration protective equipment.**

a. Removal:

(1) Saturate coating surface with methyl-ethyl-ketone (MEK) and scrape coating off with a plastic scraper while soft. (See view B of figure 4-1 for local manufacturing of scraper.)

(2) Make final surface wipe with a clean cloth dampened with MEK.

CAUTION

To prevent damage to blade bonding, do not allow solvent to seep into bonded joints. Cloths wet with MEK should not be left lying on blade.

CAUTION

MEK will remove lacquer paint. Blades originally painted with lacquer paint may be touched up with aliphatic polyurethane aircraft black (MIL-C-46168), provided area is first primed with epoxy primer (MIL-P-23377).

b. Restortion of Rotor Blade After Removal of Coming.

(1) Inspect area where AGCOAT coating was applied and look for possible damage on the blade surface, which might have occurred during removal of AGCOAT coating.

(2) Repair/restore damage area in accordance with applicable TM.

(3) Lightly sand surface to be pained using abrasive paper (360 grit) or equivalent.

CAUTION

Heavy sanding will damage blade skin.

(4) Wipe surface to be painted with MEK wetted cloth and wipe dry before solvent evaporates.

CAUTION

To prevent damage to blade bonding, do not allow solvent to seep into bonded joints. Cloths wet with MEK should not be left lying on blade.

(5) Mask around area requiring paint touchup using masking tape and heavy paper or equivalent protective covering.

(6) Prime repaired area with epoxy primer (ML-P-23377).

(7) Paint repaired area with aircraft black aliphatic polyurethane (MIL-C46168).

WARNING

Use eye, skin and breathing protection when spraying paint. Have proper ventilation in panting area.

(8) Remove masking tape and paper/protective covering from repaired paint touchup area.

c. Track and Balance. Perform track and balance in accordance with -23 aircraft TM.

Section IV. TASK L-100

a. Removal of TASK L-100.

(1) TASK L-100 is unaffected from the use of chemical solutions and abrasive cleaning techniques. The recommended removal procedure is by scraping in a parallel direction along the surface of the blade. Use of a plastic scraper with a sharp edge is highly recommended for this procedure. (See view B, figure 4-1 for local manufacturing of scraper.)

CAUTION

Use of knives and razor blades on rotor blades surfaces should be kept to a minimum. Rotor blade surfaces are extremely susceptible to cutting, scratching, and gouging damage from the sharp edges of these instruments.

(2) If difficulty is encountered in peeling off the TASK 1-100, use a small pen knife or single edge razor blade with holder to separate the TASK L-100 from the blade.

(a) Remove a one inch long strip of TASK L-100 from the leading edge of the rotor blade where the coating is thickest utilizing a plastic scraper and/or pen knife.

(b) Carefully peel up a corner of the TASK L-100 coating where the one inch long strip was removed using a plastic scraper.

(c) Grasp the peeled corner with a pair of plies and strip the TASK L-100 coating off by pulling towards the aft of the blade. Repeat this process as necessary until full removal of TASK L-100 coating is completed.

b. Restoration of Rotor Blade After Removal of TASK L-100.

(1) Inspect area where L-100 coating was applied and look for possible damage to blade surface which might have occurred during removal of L-100 coating.

(2) Repair/restore damage area in accordance with applicable TM.

(3) Lightly sand surface to be painted using abrasive paper (360 grit) or equivalent.

CAUTION

Heavy sanding will damage blade skin.

(4) Wipe sanded area with a clean towel.

(5) Mask around area requiring paint touchup using masking tape and heavy paper or equivalent protective covering.

(6) Prime repaired area with epoxy primer (MIL-P-23377).

(7) Paint repaired area with aircraft black aliphatic polyurethane (MIL-C-46168).

WARNING

Use eye, skin and breathing protection when spraying paint. Have proper ventilation in painting area.

(8) Remove masking tape and paper/protective covering from repaired paint touchup area.

c. Track and Balance. Perform track and balance in accordance with the appropriate aircraft technical manual.

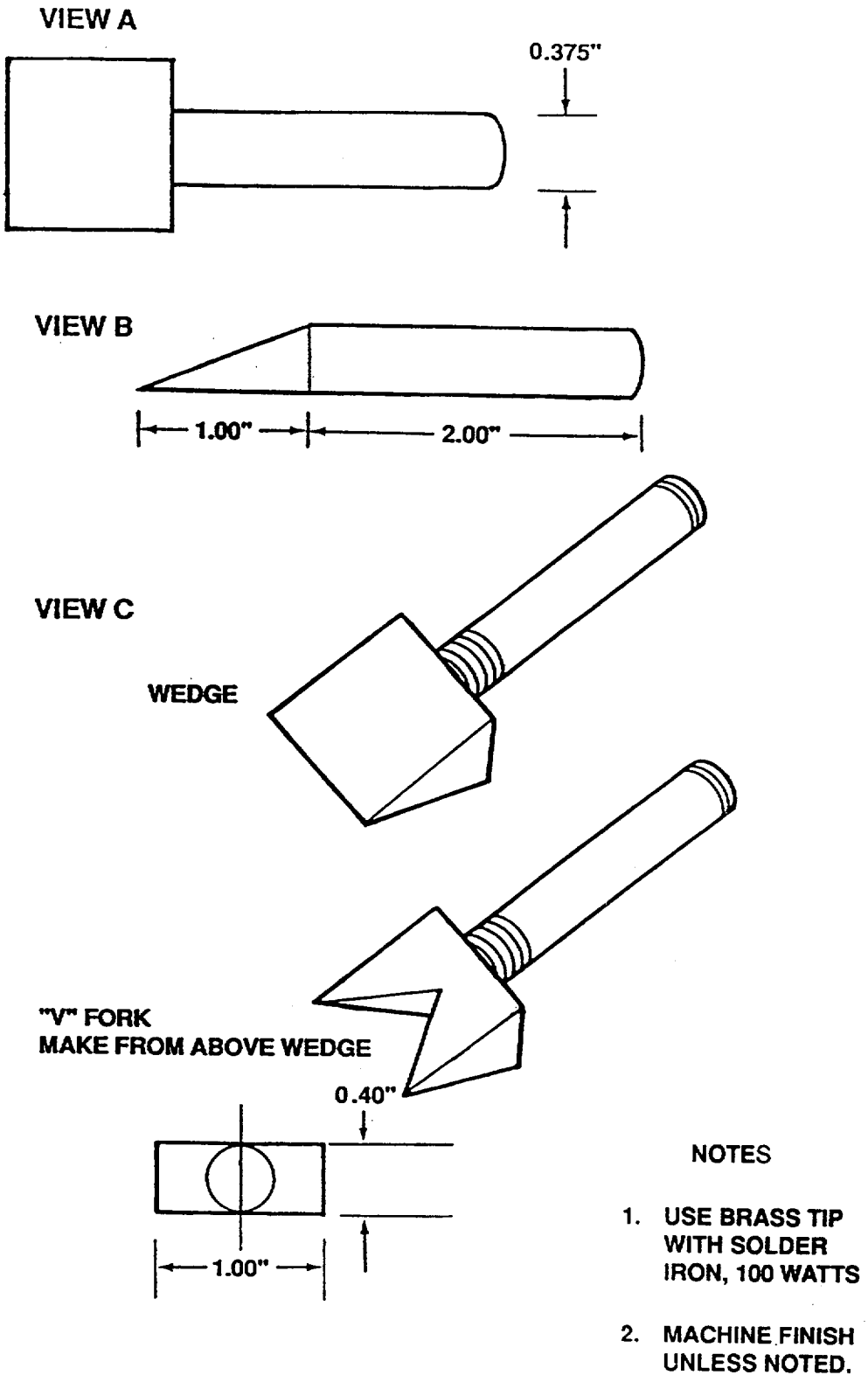


Figure 4-1. Brass Tip Solder Iron

CHAPTER 5

AVIM PROCEDURES FOR MAIN ROTOR BLADE EROSION PROTECTION, TASK L-101 TIP CAP BOOT INSTALLATION, UH-60 AND AH-64 AIRCRAFT

Section I. GENERAL

5-1. Personnel Requirements, Supplies and Dimensions.

a. Personnel Requirements. Two people (MOS 68G) and six manhours are required to install four tip cap boots after blades have been removed.

b. Supplies and Dimensions. Refer to Table 5-1 for UH-60 applications and Table 5-2 for AH-64 applications.

Section II. MAIN ROTOR BLADE TIP CAP BOOT INSTALLATION

CAUTION

Exposure of the TASK L-101 tip cap boots to rain while in flight will gradually deteriorate boot creating pin-head size pits in the leading edge surface. Boot damage sustained during flight in rain may be repaired using the procedures described in the repairs section.

5-2. Installation Procedures.

WARNING

- **Volatile and toxic fumes occur when using solvents, causing both a fire and a health hazard.**
- **Provide proper ventilation and protective clothing, including eye shield, when using solvents. Avoid breathing vapors and skin contact as much as possible. Wash contacted skin with soap and water. If solvent contacts eyes, flush them with clean water and get immediate medical help.**
- **Consult U.S. Army Environmental Hygiene Agency (U.S. AEHA) Technical Guide Operations 144 guidelines for controlling health hazards in paint operations and the material safety data sheet (MSDS) for guidance.**

a. Remove Blades.

(1) Removing the main rotor blades. If removed blades are expected to be reinstalled on the same aircraft, blades and grips should be marked so that blades can be reinstalled at the same location. This will greatly reduce track and balance time.

(2) Remove main rotor blades per the applicable aircraft TM. Position blades on table or blade rack in close proximity to each other. If blade racks are used place the blade with the railing edge down. If tables or saw horses are used, lay the blades horizontally, bottom side up. Allow the tip cap to stick out over the edge of the rack or table.

NOTE

Any previously applied erosion protection system to the tip cap must be removed before installing the TASK L-101 tip cap boot. Erosion tape may be removed by manually peeling the tape off. Agcoat coating (black colored coating) may be removed by brush applying MEK over the agcoat, allowing time for the agcoat to soften, and manually scraping the blade surface. TASK L-100 coating (coffee colored coating) may only be removed by manually scraping and peeling. Use of a hard plastic scraper with a sharp edge (such as a windshield scraper) is recommended for all blade scraping operations to preclude scratching or gouging blade surfaces.

b. Layout and Mask.

(1) Lay out vacuum lines and manifolds near the blade tips per figure 5-1 and assure yourself that you have sufficient hose to reach each blade tip from the selected pump location.

(2) Lay out the application materials next to each blade tip and assure yourself that you have all applicable items listed in tables 5-1 or 5-2.

(3) Put rubber gloves over hands to prevent direct contact between skin and kit chemicals. Use of gloves also prevents skin oil from contaminating bonding surfaces.

(4) Wipe the tip cap area off with a clean cheesecloth. Remove local greasy spots with denatured/isopropyl alcohol.

(5) Trial fit the TASK-L101 boot onto the tip cap. With the boot placed on the tip cap, apply masking tape to the blade tip cap approximately 1/4 inch from the edge of the boot per the applicable illustrations in figures 5-2 and 5-4. Transfer the location of any drain holes to the boot. Punch out a corresponding drain hole in the boot if required. Seal off all drain holes in and around the blade tip cap area with masking tape. Seal off with masking tape the tip cap seams that will be under the vacuum bag, but not under the boot area, to prevent vacuum leaks. Seal off weight and balance access areas with masking tape to prevent leaks and coating seepage in these areas. The only masking tape applied under the boot should only be a 1/2 inch square piece of masking tape on the drain hole (s).

c. Surface Preparation and Cleaning. Surface preparation is the most critical step in ensuring an adequate bond.

CAUTION

Before sanding and application of the protective boot, ensure all rotor blades are either primed and/or painted with lacquer or carc paint per the applicable aircraft technical manual. The lacquer or carc paint must be allowed to dry 24 hours before application of blade erosion protection.

CAUTION

Do not sand the bare metal skin of helicopter rotor blades. Sanding bare metal skin on helicopter rotor blades reduces the structural integrity and fatigue life of the blade.

(1) Remove the tip cap boot and sand the masked off bonding area of the rotor blade tip cap using 80 grit sandpaper until primer is visible on all surfaces. Sand in a spanwise direction. It is necessary to expose the primer by removing any previously installed tip cap erosion protection material, all exterior paint, and any foreign material such as bugs, dirt.

(2) Dry wipe the blade with a clean cheesecloth or towel to remove the sanding residue. Wipe the blade several times with a dry cheesecloth.

CAUTION

Do not touch or contaminate the prepared surface after it is wiped.

(3) Inspect the surface for any greasy locking areas. Sand these areas a little more vigorously to take away the sheen. Wipe the blade again with the cheesecloth. The blade should now be dry and free from sanding residue.

(4) Remove the old masking tape and replace with new as required to repair tape damaged by sanding. Make sure drain holes are covered with masking tape. The only masking tape applied under the boot should only be a 1/2 inch square piece of masking tape on the drain hole(s).

(5) Thoroughly wipe the entire TASK L-101 boot Interior using a clean piece of cheesecloth wetted with acetone.

(6) Heavily sand the entire interior of the TASK L-101 boot with 80 grit sandpaper. Imbedded grooves from the sanding process substantially improve the bonding grip.

(7) Wipe the sanded boot with a clean dry piece of cheesecloth.

(8) Inspect boot interior for any shiny areas. Sand these shiny areas again and wipe clean.

d. Vacuum Set Up. Wrap sufficient strip(s) of sealant tape around the blade chordwise to ensure a good seal for the vacuum bag. Make sure that 4 inches of excess sealant is left hanging off the leading and trailing edges. Leave the adhesive backing strip on the outside of the sealant tape until vacuum bag application. Apply sealant tape around the vacuum hose manifold per the applicable illustration in figures 5-3 and 5-5. Ensure "T" fittings are positioned on the masking tape surrounding the bond area. Tape hose into position with masking tape. Connect vacuum lines to the pump and manifolds. Check pump for operation.

NOTE

If more than one tip cap boot is being installed, disconnect vacuum lines leading to all additional tip caps. The only vacuum line connected should only be on the first tip cap to be worked on. Seal off the end of the additional vacuum lines with pieces of sealant tape. The disconnected tip cap vacuum lines may be reconnected as their respective tip cap boots are being installed.

e. Mixing Primer.

(1) The TASK L-100CP primer part number 25-1058-00, is contained in a single individual foil packet which contains Part A, Part B, and a stir stick to mix them. Parts A and B are pre-measured to assure proper cure.

(2) Prepare two part primer, part number 25-1058-00, by mixing all of Part A and Part B together in the half filled pull top can. Mix thoroughly for one minute with a stir stick scraping the sides of can frequently. When properly mixed together the primer has a dull green color.

f. Primer Application. Using a folded, clean piece of cheesecloth, wipe a thin coat of primer evenly on the masked off bonding area of the blade tip cap. Allow the primer to dry 5 minutes or until dry to the touch. There should be no visible build-up of primer.

g. Mixing Adhesive Coating.

(1) The adhesive coating for the TASK L-101 boot is TASK L-100 polyurethane coating, part number 25-1004-00, contained in individual foil packets, each of which contain Part A of the two-part coating (in a half filled pull-top can), Part B (in a syringe with a tip cap) and a stir stick to mix them. Parts A and B are pre-measured to assure proper cure.

WARNING

The adhesive coating will not wash off and can be irritating to the skin. Wear gloves and safety goggles when mixing and applying this product.

(2) To mix the coating, open Part A. Remove the tip cap from Part B and squirt the full contents into the can containing Part A. Stir the mixture for a full two minutes using the stick provided, being careful to scrape the sides of the can with the stick occasionally to assure total mixing of both parts. You have only 5 to 10 minutes to get the coating out of the can, so don't start mixing until you have read the instructions in step h. and i. Below and are ready to start the application. The coating cures faster in the can than it does on the blade.

h. Adhesive Coating Application.

NOTE

One can of L-100 coating is just enough material to bond on one tip cap.

NOTE

It is normal for some of the hairs from the brush to come off the brush and remain in the coating.

(1) First coat the interior of the TASK L-101 tip cap boot with TASK L-100 polyurethane coating and set the boot aside.

(2) Coat the masked off blade tip cap area with the remaining TASK L-100 polyurethane coating and paint brush.

i. Tip Cap Boot Application.

(1) Immediately insert the TASK L-101 boot onto the tip cap per the applicable illustration in figures 5-2 and 5-4. Using the palms of your hands or a squeegee work out the air bubbles from under the tip cap boot by smoothing on alternating sides of the boot from the leading edge to the aft edge and from the outboard tip to the inboard tip moving slowly enough to allow air to be removed in front of the hand or squeegee. If TASK L-100 adhesive coating oozes out from under the boot during smoothing. Then too much pressure is being applied to the squeegee.

(2) Lay the woven scrim cloth illustrated in figure 5-6 or 5-7 over the tip cap in the position per the applicable illustration in figures 5-3 and 5-5 and tape into position. Position the vacuum bag over the scrim cloth and booted tip cap by pulling the bag firmly against the tip cap boot leading edge and affixing the bag to the adhesive sealant strips. Remove the outside adhesive backing strip from the sealant tape as you progress. Pay special attention to the seal around the leading and trailing edges and vacuum hose manifold system. Vacuum bag wrinkles over the sealant tape are sources of vacuum leaks and must be pulled flat.

(3) Apply power to the vacuum using 6-10 lbs of negative pressure and continue to work the air bubbles out to the edges of the boot until you are confident that surface contact between the tip cap and boot will be retained. Soft areas indicate that air is still trapped between the boot and the blade. If needed, release the vacuum and work air bubbles to the closest edge and re-apply vacuum. Inspect for and seal any vacuum bag air leaks found. If multiple tip cap boots are being installed, keep vacuum applied to first tip cap while installing boot on the next tip cap.

(4) Turn off the vacuum pump and remove vacuum bag and hoses after 60 minutes cure time. Remove masking tape from tip cap.

(5) Inspect the boot installation visually for any obvious bubbles or unbonded edges and repair as necessary (see repairs, step m.). Clear away all masking tape from all drain holes and seams. Inspect boot once again after 12 hour cure time.

j. Install Blades. Install rotor blades per the applicable technical manual.

NOTE

Cure time before track and balance is 12 hours a 77 degrees Fahrenheit and above or 24 hours at temperatures below 77 degrees Fahrenheit.

NOTE

Mixing of blades with boot covered tip caps and uncovered tip caps is prohibited.

k. Check Track and Balance. Check track and balance of the main rotors per the applicable technical manual.

l. Recording and Reporting Requirements. The following form is applicable and is to be completed in accordance with DA PAM 738-751: DA Form 2408-13, Aircraft Inspection and Maintenance Record.

m. Repairs. Inspect the boot after each flight.

(1) Bubbles. Air bubbles less than two inches in diameter can be repaired by making a small incision at the aft edge of the bubble and injecting the unbonded area with a syringe and additional TASK L-100 polyurethane coating.

(2) Debonded Edges. Debonded edges of any size occurring during installation can be repaired by forcing a small amount of TASK L-100 polyurethane coating under the edge with a paint brush or syringe and pressing the debonded area flat. Excess TASK L-100 coating should be wiped off with cheesecloth from the repair area to restore airfoil shape. However, if the edges debonded during flight, edges of any size that have not torn away from the original boot shape must be rebonded by utilizing the boot installation, cleaning, and bonding procedures.

(3) Peeling and Tattering. If loose material that has tom away from the original boot shape and the area is less than thirty-six square inches on the trailing edge area or fifteen square inches on the leading edge are, then it should simply be trimmed off with a sharp knife and the missing or worn boot areas re-coated with TASK L-100 until the new coating reaches the level of the boot in the immediate vicinity. It is not necessary to re-coat area until enough wear area is present (2" square area) to justify a coating cure cycle of six of more hours.

(4) Nicks and Cuts.

CAUTION

Be careful when using a knife for trimming. Do not cut into the blade. The safest technique is to work the knife under the loose material and cut parallel to the blade surface.

This condition is caused by larger debris and will usually be found close to the leading edge. Cuts where the surrounding materials are not damaged and no debonding has occurred are average size cuts. This type of damage to the boot should not be treated until it is expected that air flow in flight would cause the area to debond and tear away. If that is the case, and the debonded area is less than thirty-six square inches on the trailing edge are or fifteen square inches on the leading edge are, then cut out the debonded area with a sharp knife. Only remove the debonded area. Repair by applying fresh coats of TASK L-100 polyurethane coating to restore the boot to its original thickness. Allow the new coating to set for a least six hours at 77 degrees Fahrenheit (lower temperatures require longer cure time) before bringing the rotor up to speed or flying the aircraft.

(5) Boot Replacement. If it is determined that a damaged boot may not be repaired by the previous stated methods the boot must be removed. The boot is impervious to chemical removal and must be removed manually by scraping parallel to the blade surface and peeling. Use of a hard plastic scraper with a sharp edge, such as a windshield scraper, is highly recommended for this procedure. Replace the boot per the installation instructions and track and balance the blade when finished.

(6) If mission requirements will not permit the proper time for repair and curing. Simply cut away the loosened material and fly.

(7) If the blade has been damaged enough to warrant depot repair, the tip cap boot must be removed before turning the blade in for rework

n. Boot Removal. Removal of boot may be accomplished with the blades on or off the aircraft. All boots must be removed from the aircraft if boots are to be removed. Flight operations wit a partially removed boot or boots is not allowed. Removal procedures include the following:

(1) The boots are relatively immune solvents and abrasive cleaning techniques. The recommended removal procedure is by scraping in a parallel direction along the surface of the blade. Use of a thick plastic scraper with a sharp edge is highly recommended for this procedure.

(2) Perform a final inspection of blade tip cap for damage. Discovered damage must be treated per -23 TM before aircraft operation. Clean and paint the blade tip per the applicable -23 TM.

(3) Check track and balance of the main rotors per -23 TM after all erosion protection is removed.

CAUTION

Care should be taken to prevent cutting of the rotor blade structure. Use extra caution when removing the material from rotor blades made from composite materials.

Table 5-1.

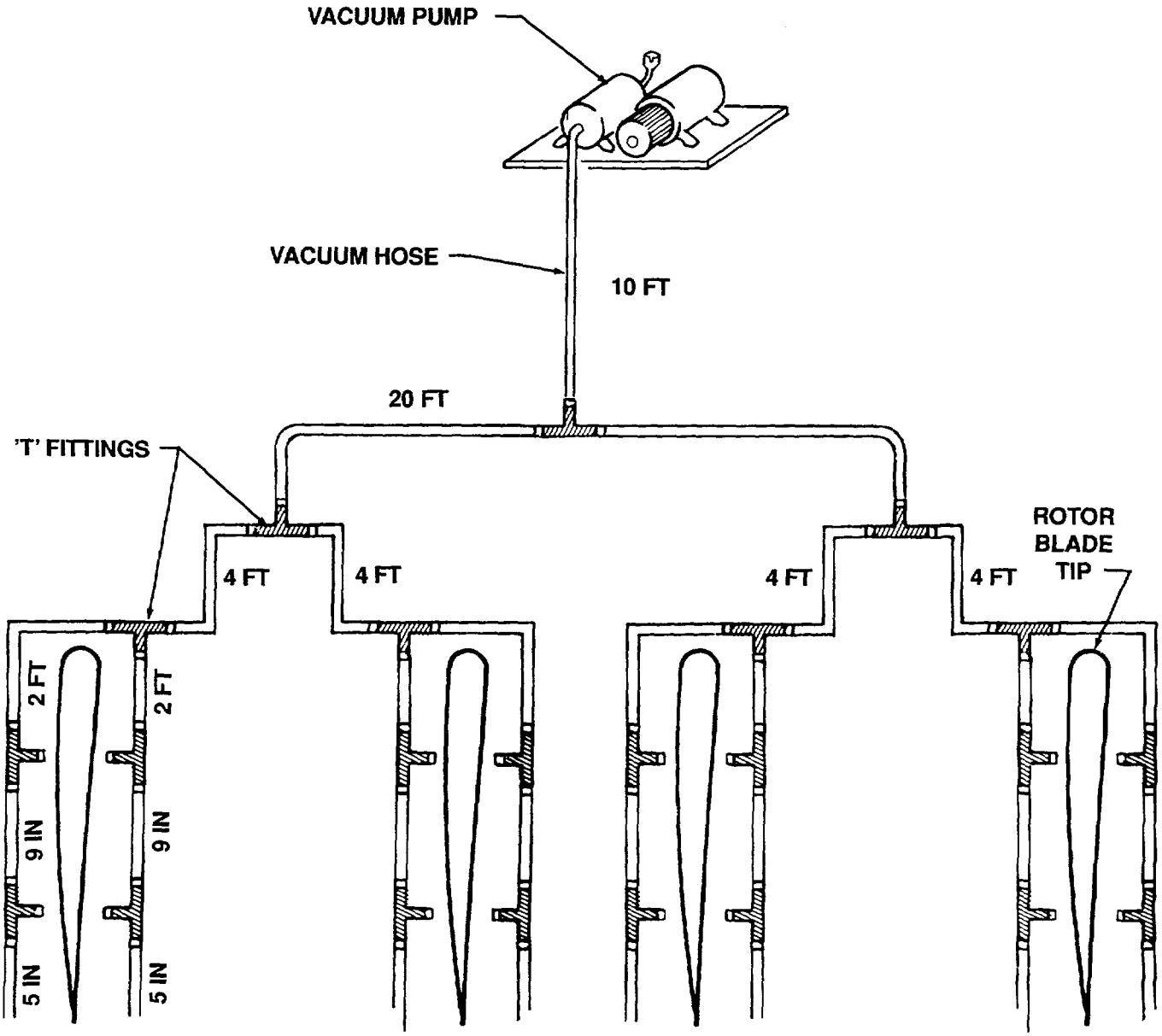
UH-60 Blade Erosion Protection, TASK L-101 Tip Cap Boot
Supplies to Install Four Tip Cap Boots

	DESCRIPTION	P/N	NSN	QTY
Maintenance Kit, Aircraft		25-1082-00	4920-01-334-8449	1 Ea.
1.	UH-60 TASK L-101 Boot	25-1055-00	1615-01-337-5687	4 Ea.
2.	TASK L-100C Primer	25-1058-00	8010-01-340-4739	1 Ea.
3.	TASK L-100 Coat	25-1004-00	1615-01-205-6138	4 Kits
4.	Masking Tape		7510-00-685-4963	1 Roll
5.	80 Grit Sandpaper		5350-00-619-9167	12 Pcs
6.	Cheesecloth/Paper Towel		8305-00-205-3496	1 Roll
7.	Rubber Gloves		8415-00-753-6552	8 PR
8.	Custom Peel Ply Scrim Cloth UH-60		8305-00-082-2373	4 Ea.
9.	Vacuum Bag		8105-01-175-5532	4 Ea.
10.	Sealant Tape		7510-00-680-2450	25 FT.
11.	Plastic Squeegee		5120-00-628-5569	1 Ea.
Supplies				
1.	Denatured/Isopropyl Alcohol		6810-00-286-5435	1 Gal.
2.	Acetone		6810-00-223-2739	1 Pt.
Tools				
1.	2" Wide Bristle Brush		8020-01-126-1437	4 Ea.
2.	Hypodermic Needle		6515-00-226-7688	1 Ea.
3.	Scissors		5110-00-203-9642	1 Pr.
4.	Knife		5110-00-240-5943	1 Ea.
5.	Vacuum Hose "T" Fitting		4730-01-195-3821	24 Ea.
6.	Vacuum Hose		4720-01-037-6268	100 Ft.
7.	Vacuum Pump		4310-01-336-6173	1 Ea.

Table 5-2.

AH-64 Blade Erosion Protection, TASK L-101 Tip Cap Boot
Supplies to Install Four Tip Cap Boots

	DESCRIPTION	P/N	NSN	QTY
Maintenance Kit, Aircraft		25-1083-00	4920-01-335-9380	1 Ea.
1.	AH-64 TASK L-101 Boot	25-1057-00	5340-01-333-8430	4 Ea.
2.	TASK L-100-C Primer	25-1058-00	8010-01-340-4739	1 Ea.
3.	TASK L-100 Coat	25-1004-00	1615-01-205-6138	4 Kits
4.	Masking Tape		7510-00-685-4963	1 Roll
5.	80 Grit Sandpaper		5350-00-619-9167	12 Pcs.
6.	Cheesecloth/Paper Towel		8305-00-205-3496	1 Roll
7.	Rubber Gloves		8415-00-753-6552	8 PR
8.	Custom Peel Ply Scrim Cloth UH-60		8305-00-082-2373	4 Ea.
9.	Vacuum Bag		8105-01-175-5532	4 Ea.
10.	Sealant Tape		7510-00-680-2450	25 Ft.
11.	Plastic Squeegee		5120-00-628-5569	1 Ea.
Supplies				
1.	Denatured/Isopropyl Alcohol		6810-00-286-5435	1 Gal.
2.	Acetone		6810-00-223-2739	1 Pt.
Tools				
1.	2" Wide Bristle Brush		8020-01-126-1437	4 Ea.
2.	Hypodermic Needle		6515-00-226-7688	1 Ea.
3.	Scissors		5110-00-203-9642	1 Pr.
4.	Knife		5110-00-240-5943	1 Ea.
5.	Vacuum Hose "T" Fitting		4730-01-195-3821	24 Ea.
6.	Vacuum Hose		4720-01-037-6268	100 Ft.
7.	Vacuum Pump		4310-01-336-6173	1 Ea.



**TO INSTALL TIP CAP BOOTS;
VACUUM LINES PLACED ON TOPS
AND BOTTOMS OF 4 TIP CAPS**

Figure 5-1. Vacuum Line and Manifold

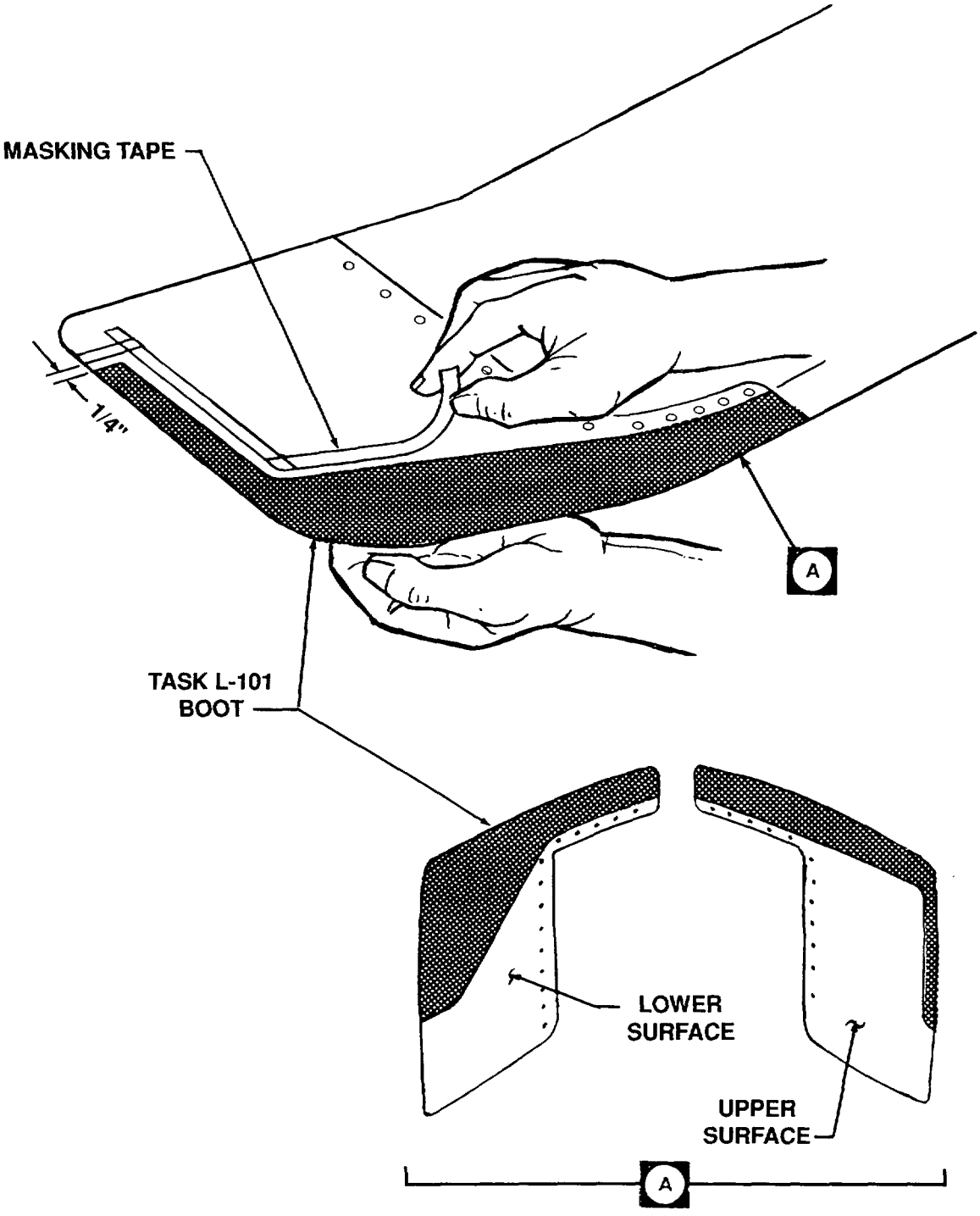


Figure 5-2. UH-60 Tip Cap, Tape Layout

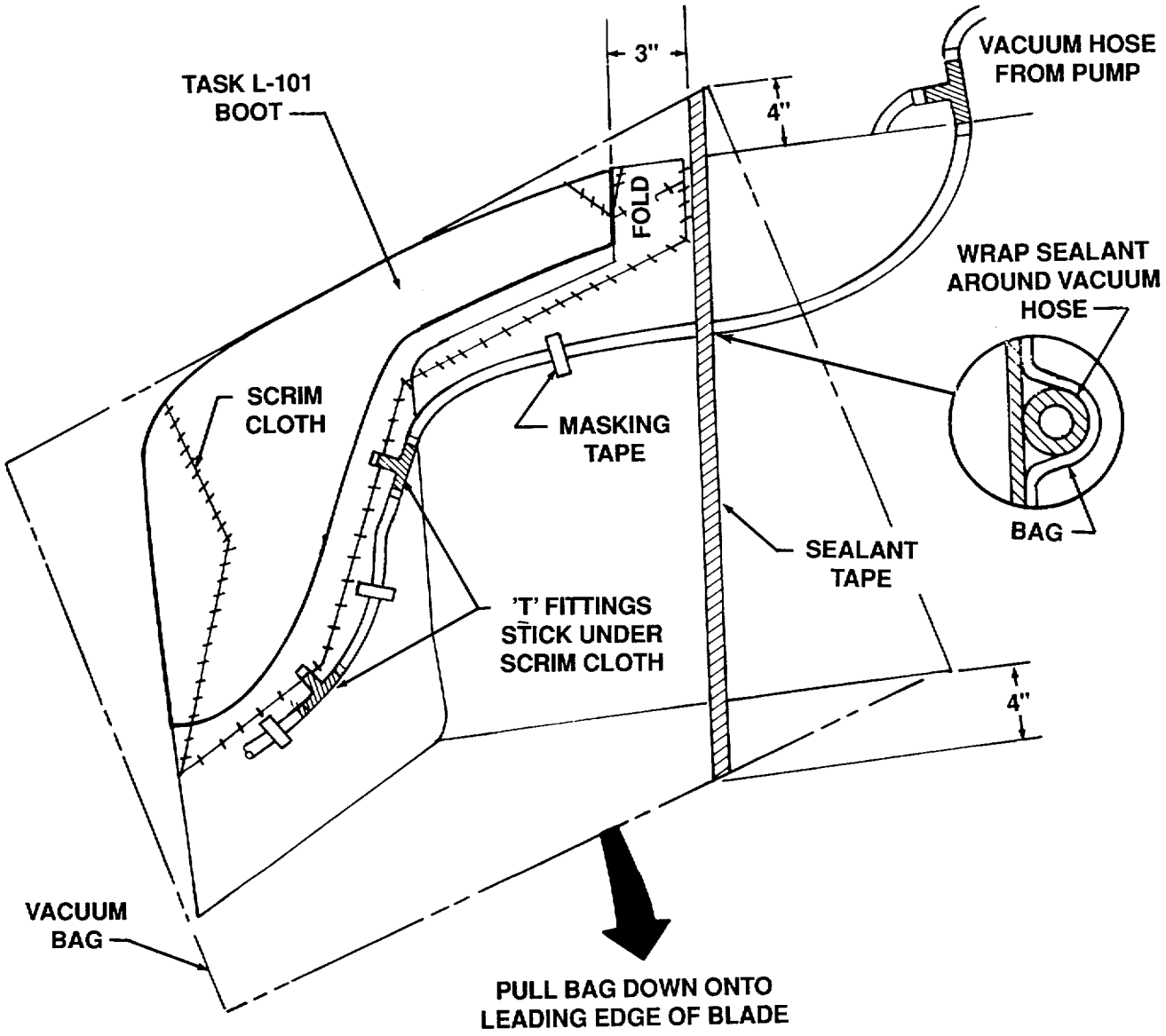


Figure 5-3. UH-60 Vacuum Bag and Hose Application

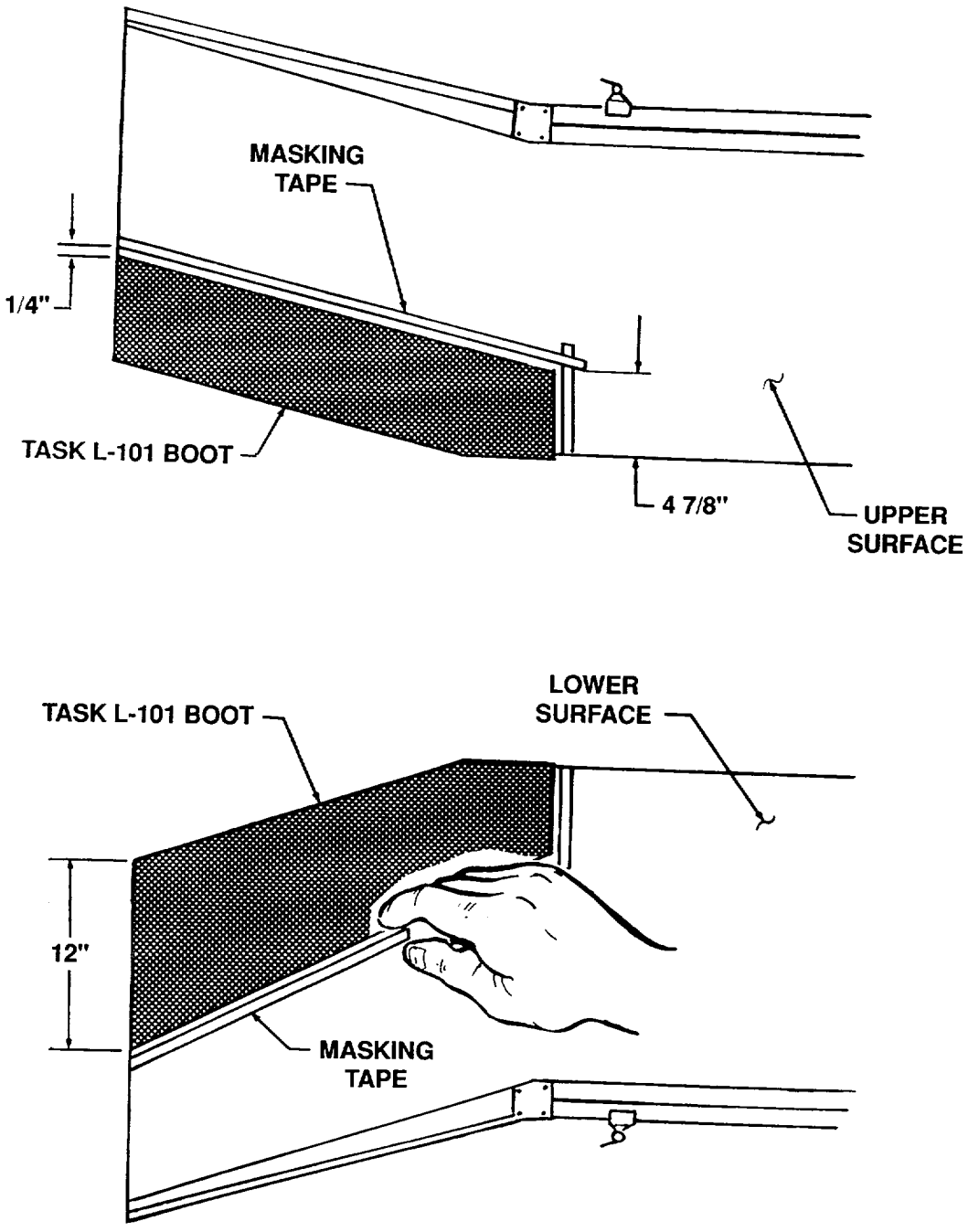


Figure 5-4. AH-64 Tip Cap, Masking Tape Layout

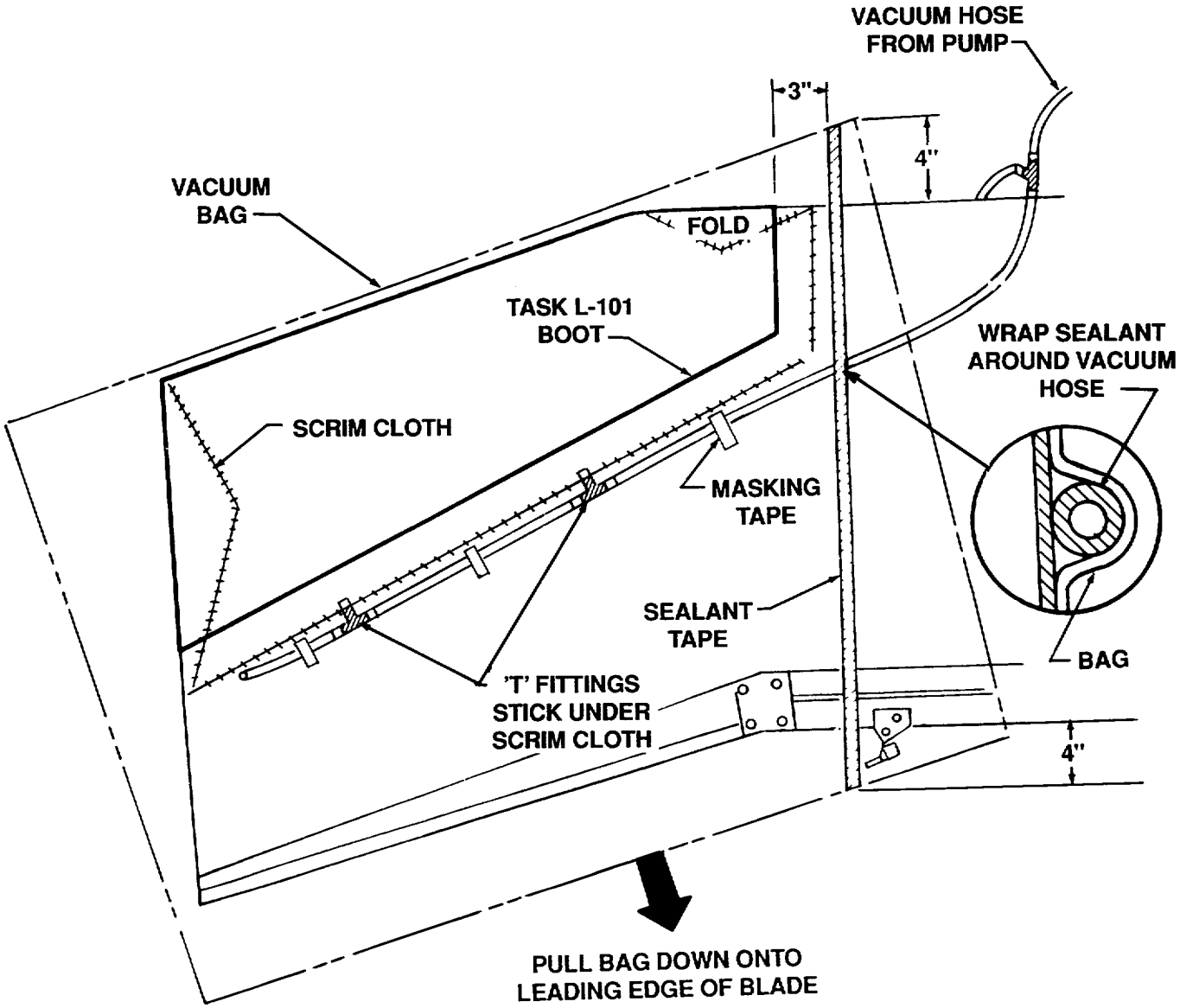


Figure 5-5. AH-64 Vacuum Bag and Hose Application

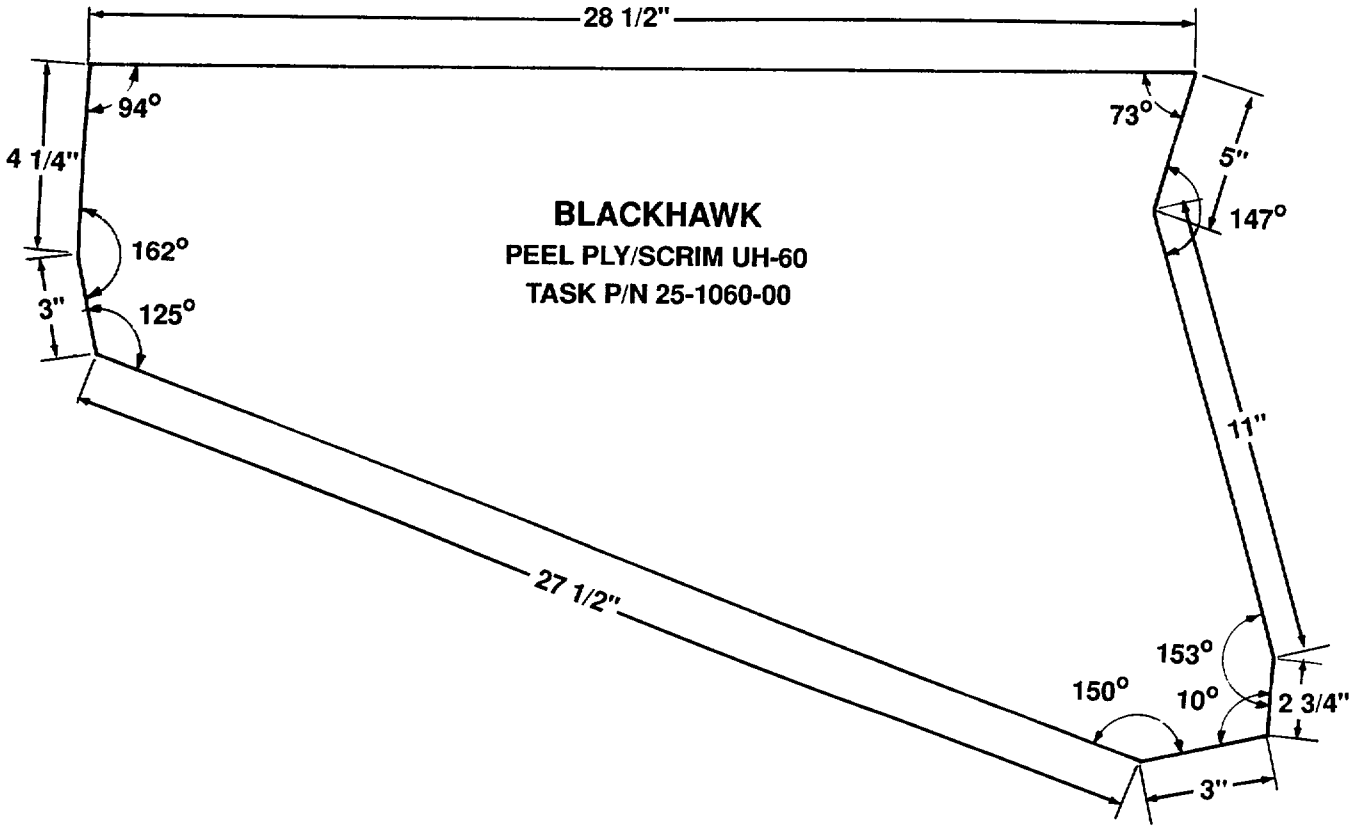


Figure 5-6. UH-60 Scrim Cloth Dimensions

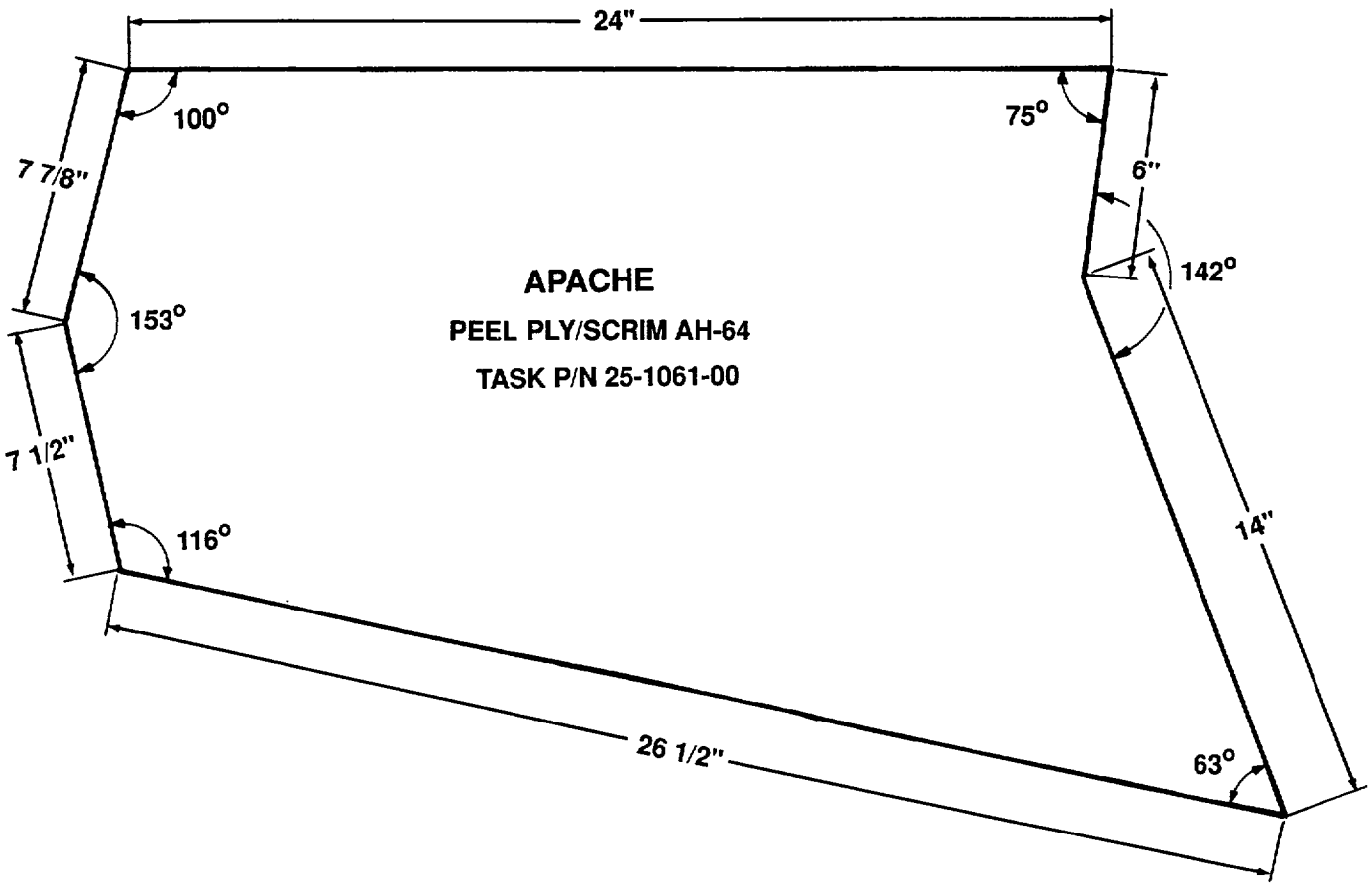


Figure 5-7. AH-64 Scrim Cloth Dimensions

By Order of the Secretary of the Army:

GORDON R. SULLIVAN
General, United States Army
Chief of Staff

Official:

MILTON H. HAMILTON
Administrative Assistant to the
Secretary of the Army
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7. ***Date Sent:*** 19−OCT−93
8. ***Pub no:*** 55−2840−229−23
9. ***Pub Title:*** TM
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17. ***Problem:*** **1**
18. *Page:* 2
19. *Paragraph:* 3
20. *Line:* 4
21. *NSN:* 5
22. *Reference:* 6
23. *Figure:* 7
24. *Table:* 8
25. *Item:* 9
26. *Total:* 123
27. ***Text:***

This is the text for the problem below line 27.

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25–30; the proponent agency is ODISC4.	Use Part II (*reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/ Supply Manuals (SC/SM)	DATE 8/30/02
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PUBLICATION/FORM NUMBER	DATE	TITLE
TM 9–1005–433–24	16 Sep 2002	Organizational, Direct Support, And General Support Maintenance Manual for Machine Gun, .50 Caliber M3P and M3P Machine Gun Electrical Test Set Used On Avenger Air Defense Weapon System

ITEM NO.	PAGE NO.	PARA–GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON
1	WP0005 PG 3		2			Test or Corrective Action column should identify a different WP number.

** Reference to line numbers within the paragraph or subparagraph.*

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PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

TYPED NAME, GRADE OR TITLE	TELEPHONE EXCHANGE/AUTOVON, PLUS EXTENSION	SIGNATURE
MSG, Jane Q. Doe, SFC	788−1234	

RECOMMENDED CHANGES TO PUBLICATIONS AND BLANK FORMS For use of this form, see AR 25–30; the proponent agency is ODISC4.	Use Part II (*reverse)* for Repair Parts and Special Tool Lists (RPSTL) and Supply Catalogs/ Supply Manuals (SC/SM)	DATE
TO: (*Forward to proponent of publication or form)(Include ZIP Code)* Commander, U.S. Army Aviation and Missile Command ATTN: AMSAM-MMC-MA-NP Redstone Arsenal, AL 35898	FROM: (*Activity and location)(Include ZIP Code)*	

PART 1 – ALL PUBLICATIONS (EXCEPT RPSTL AND SC/SM) AND BLANK FORMS

PUBLICATION/FORM NUMBER	DATE	TITLE
TB 1-1615-351-23	31 DEC 1991	Technical Bulletin Rotor Blade Erosion Protection

ITEM NO.	PAGE NO.	PARA–GRAPH	LINE NO. *	FIGURE NO.	TABLE NO.	RECOMMENDED CHANGES AND REASON

** Reference to line numbers within the paragraph or subparagraph.*

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PART II – REPAIR PARTS AND SPECIAL TOOL LISTS AND SUPPLY CATALOGS/SUPPLY MANUALS

PUBLICATION NUMBER	DATE	TITLE
TB 1-1615-351-23	31 DEC 1991	Tecnical Bulletin Rotor Blade Erosion Protection

PAGE NO.	COLM NO.	LINE NO.	NATIONAL STOCK NUMBER	REFERENCE NO.	FIGURE NO.	ITEM NO.	TOTAL NO. OF MAJOR ITEMS SUPPORTED	RECOMMENDED ACTION

PART III – REMARKS (*Any general remarks or recommendations, or suggestions for improvement of publications and blank forms. Additional blank sheets may be used if more space is needed.)*

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The Metric System and Equivalents

Linear Measure

1 centimeter = 10 millimeters = .39 inch
1 decimeter = 10 centimeters = 3.94 inches
1 meter = 10 decimeters = 39.37 inches
1 dekameter = 10 meters = 32.8 feet
1 hectometer = 10 dekameters = 328.08 feet
1 kilometer = 10 hectometers = 3,280.8 feet

Weights

1 centigram = 10 milligrams = .15 grain
1 decigram = 10 centigrams = 1.54 grains
1 gram = 10 decigram = .035 ounce
1 decagram = 10 grams = .35 ounce
1 hectogram = 10 decagrams = 3.52 ounces
1 kilogram = 10 hectograms = 2.2 pounds
1 quintal = 100 kilograms = 220.46 pounds
1 metric ton = 10 quintals = 1.1 short tons

Liquid Measure

1 centiliter = 10 milliters = .34 fl. ounce
1 deciliter = 10 centiliters = 3.38 fl. ounces
1 liter = 10 deciliters = 33.81 fl. ounces
1 dekaliter = 10 liters = 2.64 gallons
1 hectoliter = 10 dekaliters = 26.42 gallons
1 kiloliter = 10 hectoliters = 264.18 gallons

Square Measure

1 sq. centimeter = 100 sq. millimeters = .155 sq. inch
1 sq. decimeter = 100 sq. centimeters = 15.5 sq. inches
1 sq. meter (centare) = 100 sq. decimeters = 10.76 sq. feet
1 sq. dekameter (are) = 100 sq. meters = 1,076.4 sq. feet
1 sq. hectometer (hectare) = 100 sq. dekameters = 2.47 acres
1 sq. kilometer = 100 sq. hectometers = .386 sq. mile

Cubic Measure

1 cu. centimeter = 1000 cu. millimeters = .06 cu. inch
1 cu. decimeter = 1000 cu. centimeters = 61.02 cu. inches
1 cu. meter = 1000 cu. decimeters = 35.31 cu. feet

Approximate Conversion Factors

To change	*To*	*Multiply by*	*To change*	*To*	*Multiply by*
inches	centimeters	2.540	ounce-inches	Newton-meters	.007062
feet	meters	.305	centimeters	inches	.394
yards	meters	.914	meters	feet	3.280
miles	kilometers	1.609	meters	yards	1.094
square inches	square centimeters	6.451	kilometers	miles	.621
square feet	square meters	.093	square centimeters	square inches	.155
square yards	square meters	.836	square meters	square feet	10.764
square miles	square kilometers	2.590	square meters	square yards	1.196
acres	square hectometers	.405	square kilometers	square miles	.386
cubic feet	cubic meters	.028	square hectometers	acres	2.471
cubic yards	cubic meters	.765	cubic meters	cubic feet	35.315
fluid ounces	milliliters	29,573	cubic meters	cubic yards	1.308
pints	liters	.473	milliliters	fluid ounces	.034
quarts	liters	.946	liters	pints	2.113
gallons	liters	3.785	liters	quarts	1.057
ounces	grams	28.349	liters	gallons	.264
pounds	kilograms	.454	grams	ounces	.035
short tons	metric tons	.907	kilograms	pounds	2.205
pound-feet	Newton-meters	1.356	metric tons	short tons	1.102
pound-inches	Newton-meters	.11296			

Temperature (Exact)

°F	Fahrenheit temperature	5/9 (after subtracting 32)	Celsius temperature	°C