



Polyurethane Protective Boots

Technical Bulletin

October 2007

Product Description

3M™ Polyurethane Protective Boots SJ8542HS, SJ8545HS, SJ8641, SJ8663, SJ8663HS, SJ8665, SJ8667HS, SJ8671, SJ8672 and SJ8681HS are made of an abrasion-resistant polyurethane and are resistant to ultraviolet light. They can be painted or applied over painted surfaces. They are available in a variety of shapes and colors for many industrial and common aircraft applications (including radomes, wing tips, landing gear pods, etc.). The product is constructed with a long-aging, solvent-resistant, pressure-sensitive acrylic adhesive, and protected with an easy-release liner.

Typical Physical Properties and Performance Characteristics for 3M SJ8665 Boot

Notes: 1) The following technical information and data should be considered representative or typical only and should not be used for specification purposes.
2) ASTM = American Society for Testing and Materials.
3) Metric values are listed in parenthesis.

A. Dimensions

Approximate Applied Thickness:*	0.012 inch (0.30 mm) Film Total thickness 0.014 inch (0.36 mm)
Approximate Weight:	0.09 lb/ft ² (440 g/m ²)

*There is a gradual decrease in thickness, 0.009 in (0.23 mm) minimum overall, at the base of the boot.

B. Typical Physical Properties and Performance Characteristics

Property	Test Method	Units	Typical Value
Tensile Strength @ Break	ASTM D882	lb/in (N/100 mm)	94 (1646)
Elongation % @ Break	ASTM D882	%	458
Taber Abrasion	H-18, 1000g wt, 1000 cycle	Loss in grams	<0.10
Hardness	ASTM-D2240	Shore A	80
Dielectric Strength	ASTM-D1000	Volts	14,000
Dielectric Constant	@ 5.6 GHz @12.8 GHz	—	3.018 2.940
Peel Adhesion @ 70°F (21°C) to: Aluminum Glass Epoxy Primer Urethane Paint High Solids Mil Spec Paint High Solids Mil Spec Paint (w/3M™ Promoter #86)	ASTM D-1000 24 Hr. Dwell	oz/in (N/100 mm)	92.6 (101.4) 68.3 (74.8) 111.5 (122.0) 78.8 (86.3) 77.1 (84.4) 108.2 (118.4)
Solvent Resistance Motor Oil Distilled Water Hydraulic Fluid** JP-4/JP-5 Aviation Fuel Diesel Fuel	24 hour immersion		Little or no apparent effect Little or no apparent effect Little or no apparent effect Slight edge penetration Slight edge penetration

**3M Polyurethane Protective Boots are not resistant to Skydrol™ hydraulic fluid. Edge sealing with 3M™ Scotch-Weld™ Epoxy Adhesive DP190 can significantly reduce the effect of Skydrol migrating under edges of boot and tape.

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Polyurethane Protective Tape

Typical Physical Properties and Performance Characteristics	For typical physical and performance characteristics of	refer to technical data pages for 3M™ Polyurethane Protective Tape:
	SJ8542HS	8542HS
	SJ8545HS	8545HS
	SJ8641	8641
	SJ8663	8663
	SJ8663HS	8663HS
	SJ8667HS	8667HS
	SJ8671	8671
	SJ8672	8672
	SJ8681HS	8681HS

Environmental Health and Safety	Before handling any chemical products, always read the container label and the MSDS. Local air quality regulations may regulate or prohibit the use of surface preparation and cleaning materials based on solvent (VOC) content.
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Suggested Surface Preparation Procedures	<p>Although this procedure refers to a “radome” structure, the procedure is valid for other types of structures such as wing tips, drop tanks, navigational light lens, etc.</p> <p>The radome must be in good condition before a boot is applied. The surface must be smooth without dirt or paint “nibs”. If defects are present in the paint, lightly sand the paint with 320 grit sandpaper. If there is a multicolor paint scheme on the radome insure that there are no paint edges to interfere with the adhesion of the boot in these areas. Paint lines can be minimized by the use of Scotch® Fine Line Tape 218 during the paint process. Paint lines can be reduced after paint cure by light sanding with 320 grit sandpaper. Loss of gloss during any sanding process will not be noticeable after the boot is applied. Freshly painted radomes, should be allowed to cure or dry for a minimum of 48 hours at 72°F (22°C). Paint cure can be accelerated by baking the radome at 150°F (66°C) for 8 hours.</p>
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Removal of Existing Boot	<ol style="list-style-type: none"> 1. Lift an edge of the boot by slowly, carefully peeling back the boot at 180° (back against itself). 2. To make the removal easier, soften the adhesive by using a wallpaper steamer (warm boot to 120°F [49°C]) or using hot water and a sponge. <p>3M™ Tape and Residue Remover can also be used to remove the Boot in its entirety.</p>
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Polyurethane Protective Tape

Suggested Installation Procedures

Note: This installation procedure does not apply to 3M™ Polyurethane Protective Boot SJ8641. See authorizing installation documents or 3M™ Polyurethane Protective Tape 8641 technical datasheet for installation instructions.



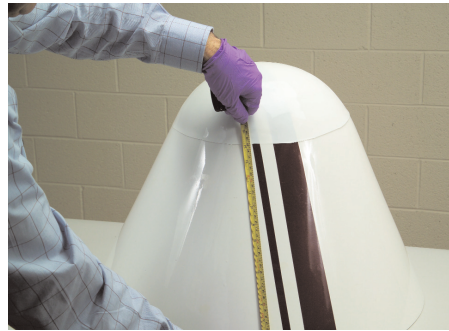
Step 1: Make sure hands are clean and free of oils and grease. Clean the radome/part and the boot (top side and bottom side) with 3M™ Protective Tape Application Solution to remove the corn starch. This will ensure maximum adhesion.

Note: Use a clean, lint-free, silicone-free cloth or cheese cloth. Do not use shop rags as they might be contaminated with silicones.



Step 2: Trim the boot with a pair of scissors about 1/4 inch above the trim line (trim line is located 1/2 inch above the base) that is found on most boots. Make clean, smooth cuts - avoid jagged edges.

Note: To document the installation in the aircraft log books, save the boot identifier tag that is on the base of the boot.



Step 3: Position the boot over the radome/part (adhesive/white liner side down against radome/part). Measure from the bottom of the boot and the base of the radome/part to ensure it is centered and properly positioned.



Step 4: Use 3M™ Vinyl Tape 471 to mark three index points on the radome/part (one on the top and two on the sides approximately 90° apart) clearly establishing the center point, so the boot can be repositioned properly. Then mark three additional index points on the boot opposite of marks currently in place.

Step 5: Remove the boot from the radome/part and turn the boot inside out taking care not to wrinkle the boot.



Step 6: Spray the radome/part and boot with 3M Application Solution. Then place the boot back on the radome (liner will be facing up). Using thumb nail, lift edge of liner from the boot to expose a small portion of adhesive. Spray 3M Application Solution on the adhesive. When removing the remainder of the liner, continuously spray 3M Application Solution on the exposed boot.

Note: Using the radome/part as a holder for the boot is important when removing the liner. This prevents the boot from sticking to itself - making it unusable.

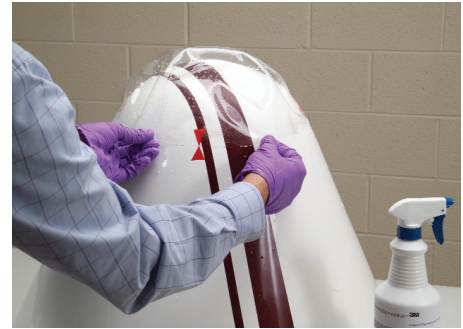
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Suggested Installation Procedures *(continued)*



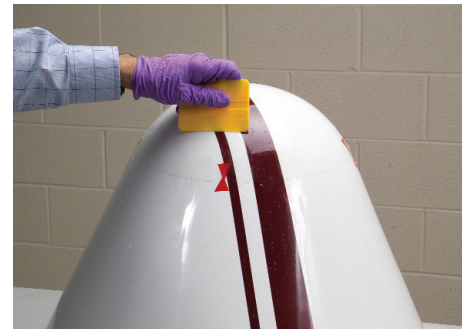
Step 7: Remove the 3M™ Polyurethane Protective Boot from the radome/part, turn inside out again. The adhesive side should be facing the radome/part. Heavily spray radome/part and boot with 3M™ Protective Tape Application Solution allowing for easy repositioning. The more 3M Application Solution used, the easier the application will be.



Step 8: Apply the boot to the radome/part taking care to match the index points at the top and sides of the boot. Reposition and reapply 3M Application Solution as needed until proper fit is achieved. Remove index marks.



Step 9: Reapply 3M Application Solution to the outside of the boot. Starting at the center of the radome/part, use 1-2 inch strokes with the yellow squeegee to smooth out the boot - removing the trapped 3M Application Solution and air bubbles. Apply only light pressure to squeegee.



Step 10: Continue using short strokes working your way down to the base. If a bubble is trapped, carefully peel boot back, reapply 3M Application Solution and use yellow squeegee to re-adhere. Use a clean, lint-free, silicone-free cloth to absorb the liquid at the edges of the boot. This helps the edge of the boot to stay attached to the surface of the radome/part.

Note: Small bubbles (>1/8 inch) will evaporate by themselves in less than one week. These small bubbles can be removed by using a small 1 cc syringe if necessary; however, this procedure should be kept to an absolute minimum and should not be used in the center, blunt frontal area of the boot.



Step 11: Dry the surface of the boot with a clean cloth. If the boot is installed on an aircraft, allow to dwell one hour at 70°F (21°C) before flight.

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Special Note for Treatment of Diverter Strips on Aircraft Radomes



If static diverters are present on the radome, either segmented or solid diverters, you must **not** cover them with the 3M™ Polyurethane Protective Boot. Apply the 3M Boot as described on pages 3 & 4, carefully trim the material of the 3M Boot from the edge of the diverter strip using small scissors. Take extreme caution not to score or cut or otherwise damage the paint on the radome. When this trimming operation is complete, finish by neatly applying 3M™ Scotch-Weld™ Epoxy Adhesive DP-190 to seal the edges of the 3M boot to the radome around the cutout for the diverter. Masking tape works well to insure a neat application of the edge sealant.

Painting

3M Polyurethane Protective Boots may be painted per 3M™ Technical Bulletin Polyurethane Protective Tape, Paint Instructions (70-0702-6358-0).

Authorization to Use

The FAA has classified the installation of a 3M Boot as a minor modification. It is considered to be similar to a thick coat of paint. See FAA letter as follows:

 U.S. Department of Transportation Federal Aviation Administration	Small Airplane Directorate Chicago Aircraft Certification Office 2300 East Devon Avenue Des Plaines, IL 60018
OCT 17 1991	
Mr. Gene Bergh Technical Service Specialist ISD/Protective Products Laboratory 3M Center - Building 230-2F-12 St. Paul, MN 55144-1000	
Dear Mr. Bergh:	
This letter is in response to your letter of August 5, 1991, requesting authorization to use the 3M line of radome protective boots on Type Certificated aircraft. We have looked at the information enclosed with your letter and have determined that the installation of the 3M radome boot is a minor modification similar to applying a thick coat of paint. The radome transmission test conducted at the Norton Company indicate a minimum of loss in transmission efficiency when the 3M radome boot is properly installed. Therefore, no further action is needed by our office. The 3M line of radome protective boots can be installed and the aircraft returned to service in the same manner as if it was just painted.	
If you have any questions, please call Mr. Gregory J. Michalik at (312) 694-7135.	
Sincerely,	
 Donald P. Michalik Manager, Chicago Aircraft Certification Office	

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Polyurethane Protective Tape

Safety and Regulatory

- 3M™ Polyurethane Protective Boots are **100%** solids and contain no hazardous air pollutants (HAPs), volatile organic components (VOCs) or materials restricted by regulations or law.
- Polyurethane Protective Boots meet US Federal and California regulations for landfillable materials. The product is potentially recyclable.
- Packaging materials meet US Federal and California regulations for landfillable materials and are recyclable or reusable.
- This product is considered to be an article that does not release or otherwise result in exposure to a hazardous chemical under normal use conditions.
- When using solvents, extinguish all ignition sources, including pilot lights. Read and follow manufacturer's warnings and directions for use.
- Before using solvents, consult local air quality rules and regulations which may regulate solvent use.

Shipping and Storage

No special/hazardous labeling or packaging required and no regulations for air, ground or water shipment for this product.

Keep film in a clean area, away from excessive moisture and out of direct sunlight. Store rolls in the shipping carton. Return partially used rolls to the shipping carton.

Shelf life: Two (2) years from date of manufacture.

Precautionary Information

Refer to Product Label and Material Safety Data Sheet for health and safety information before using this product. For additional health and safety information, visit www.3M.com/msds or call 1-800-364-3577 or (651) 737-6501.

For Additional Information

In the U.S., call toll free 1-800-235-2376 or fax 1-800-435-3082 or 651-737-2171. For U.S. Military, call 1-866-556-5714. If you are outside of the U.S., please contact your nearest 3M office or one of the following branches:

Australia 61-2-498-9711 tel 61-2-498-9710 fax	Austria 01-86686-298 tel 01-86686-229 fax	Brazil 55 19 3838-7876 tel 55 19 3838-6892 fax	Canada 800-410-6880 ext. 6018 tel 800-263-3489 fax
China 86-21-62753535 tel 86-21-62190698 fax	Denmark 45-43-480100 tel 45-43-968596 fax	France 0810-331-300 tel 30-31-6195 fax	Germany 02131-14-2344 tel 02131-14-3647 fax
Italy 02-7035-2177 tel 02-7035-2125 fax	Japan 03-3709-8245 tel 03-3709-8743 fax	Korea 02-3771-4114 tel 02-786-7429 fax	Netherlands 31-71-5-450-272 tel 31-71-5-450-280 fax
South Africa 11-922-9111 tel 11-922-2116 fax	Spain 34-91-321-6000 tel 34-91-321-6002 fax	Switzerland 01-724-9114 tel 01-724-9068 fax	United Kingdom (0) 161-237-6174 tel (0) 161-237-3371 fax

Important Notice

3M MAKES NO WARRANTIES, EXPRESS OR IMPLIED, INCLUDING, BUT NOT LIMITED TO, ANY IMPLIED WARRANTY OF MERCHANTABILITY OR FITNESS FOR A PARTICULAR PURPOSE. User is responsible for determining whether the 3M product is fit for a particular purpose and suitable for user's method of application. Please remember that many factors can affect the use and performance of a 3M product in a particular application. The materials to be bonded with the product, the surface preparation of those materials, the product selected for use, the conditions in which the product is used, and the time and environmental conditions in which the product is expected to perform are among the many factors that can affect the use and performance of a 3M product. Given the variety of factors that can affect the use and performance of a 3M product, some of which are uniquely within the user's knowledge and control, it is essential that the user evaluate the 3M product to determine whether it is fit for a particular purpose and suitable for the user's method of application.

Limitation of Remedies and Liability

If the 3M product is proved to be defective, THE EXCLUSIVE REMEDY, AT 3M'S OPTION, SHALL BE TO REFUND THE PURCHASE PRICE OF OR TO REPAIR OR REPLACE THE DEFECTIVE 3M PRODUCT. 3M shall not otherwise be liable for loss or damages, whether direct, indirect, special, incidental, or consequential, regardless of the legal theory asserted, including, but not limited to, contract, negligence, warranty, or strict liability.

This product was manufactured under a 3M quality standard registered under AS9100 standards.



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