3M™ Polyurethane Protective Boots

Technical Data Sheet

Product Description
3M™ Polyurethane Protective Boots SJ8542HS, SJ8545HS, SJ8641, SJ8663, SJ8663HS, SJ8665, SJ8667, J8667HS, SJ8674, 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 durable, solvent-resistant, pressure-sensitive acrylic adhesive, and protected with an easy-release liner.

Typical Physical Properties and Performance Characteristics
3M SJ8665 Boots

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

<table>
<thead>
<tr>
<th>Approximate Applied Thickness:*</th>
<th>0.012 inch (0.30 mm) Film</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>0.002” (0.05 mm) Adhesive</td>
</tr>
<tr>
<td></td>
<td>0.014” (0.35 mm) Total Applied Thickness</td>
</tr>
<tr>
<td>Approximate Weight:</td>
<td>0.09 lb/ft2 (440 g/m2)</td>
</tr>
</tbody>
</table>

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

B. Typical Physical Properties and Performance Characteristics

<table>
<thead>
<tr>
<th>Property</th>
<th>Test Method</th>
<th>Units</th>
<th>Typical Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Tensile Strength @ Break</td>
<td>ASTM D882*</td>
<td>Lb/in (N/100 mm)</td>
<td>94 (1646)</td>
</tr>
<tr>
<td>Elongation % @ Break</td>
<td>ASTM D882*</td>
<td>%</td>
<td>458</td>
</tr>
<tr>
<td>Taber Abrasion</td>
<td>H-18, 1000g wt, 1000 cycle</td>
<td>Loss in grams</td>
<td>&lt;0.10</td>
</tr>
<tr>
<td>Hardness</td>
<td>ASTM-D2240*</td>
<td>Shore A</td>
<td>80</td>
</tr>
<tr>
<td>Dielectric Strength</td>
<td>ASTM-D1000*</td>
<td>Volts</td>
<td>14,000</td>
</tr>
</tbody>
</table>
Measure Dk and tan delta at 2.5 GHz and 9.4 GHz, at room temperature (23°C).

### Typical Properties and Characteristics

#### Dielectric Data

**Description**
Measure Dk and tan delta at 2.5 GHz and 9.4 GHz, at room temperature (23°C).

**Method**
Split Post Resonator Method

<table>
<thead>
<tr>
<th>Sample #</th>
<th>Sample Description</th>
<th>Frequency (MHz)</th>
<th>er</th>
<th>tan delta</th>
<th>tan delta (°)</th>
<th>thickness (mm)</th>
<th>Frequency (MHz)</th>
<th>er</th>
<th>tan delta</th>
<th>tan delta (°)</th>
<th>thickness (mm)</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>fused quartz</td>
<td>2464</td>
<td>3.783</td>
<td>47</td>
<td>&lt;0.0001</td>
<td>1.067</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td>PTFE</td>
<td>2481</td>
<td>2.047</td>
<td>206</td>
<td>0.0002</td>
<td>0.609</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

1. SJ8665 2465 3.952 46900 0.0469 1.065 9404 2.859 34400 0.0344 0.720
2. SJ8675HS 2456 3.047 49600 0.0498 1.405 9404 2.912 36800 0.0366 0.700
3. SJ8671 2463 3.015 50000 0.0500 1.105 9392 2.910 36300 0.0363 0.741
4. RP-2110 2460 3.080 115300 0.1153 1.200 9481 2.908 79700 0.0797 0.300
5. RP-2220 2465 2.953 51400 0.0514 1.045 9402 2.930 37000 0.0370 0.700

Reference: Document from the MIKON 2004 Conference, titled: 700 MHz SPLIT POST DIELECTRIC RESONATOR FOR MEASUREMENTS OF THE COMPLEX PERMITTIVITY OF MATERIAL
Suggested Surface Preparation Procedures

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. Please ensure products meet all applicable specifications, standards, and maintenance manual requirements for the platform being worked on and validate all aircraft approvals against current technical documentation.

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) before applying a boot. Paint cure can be accelerated by baking the radome at 150°F (66°C) for 8 hours. Please check with paint manufacturer for the correct cure time and conditions.

Removal of Existing Boot

Lift edge of the boot and remove by slowly, carefully peeling back the boot at 180° (back against itself).

To make the removal easier, soften the adhesive by using a wallpaper steamer or use hot water and a sponge. Warm the boot to approximately 120°F [49°C]. 3M™ Tape and Residue Remover can also be used to remove the Boot in its entirety.
**Suggested Installation Procedures**

Note: This installation procedure does not apply to 3M™ Polyurethane Protective Boot SJ8641. See SJ8641 authorizing installation documents.

**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 white powder. 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 ¼ inch above the trim line (trim line is usually 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 distance from the bottom of the boot to the base of the radome/part at several points around the circumference 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 of the radome and two on the sides approximately 90° apart) clearly establishing the top, center point, so the boot can be repositioned properly. Then mark the three index points on the boot aligned with the marks on the radome.

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.

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 radome. Reposition and reapply 3M Application Solution as needed until proper fit is achieved.

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 squeegee provided with the boot 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 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. Remove index markings.

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 6 to 8 hours at 70°F (21°C) before flight. If an edge sealer is used, please follow the TDS recommended cure time.

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, then 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™ Repair Paste RP-2110 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 --see 3M™ Technical Bulletin Polyurethane Protective Tape, Paint Instructions (70-0702-6358-0).

Erosion Protection Boots and Pre-Cut Protection Patches Information
For more information regarding 3M Solutions for Erosion Protection Boots and Pre-Cut Protection Patches, please visit our web site: https://www.3m.com/boots. If you require a custom 3M Boot or Patch, please follow the instructions in the link: "Request a custom sized boot here," located in the web page above.

Authorization to Use
Ensure products meet all applicable specifications, standards, and maintenance manual requirements for the platform being worked on and validate all aircraft approvals against current technical documentation.

Environmental Health and Safety
- 3M™ Polyurethane Protective Boots are 100% solids and contain no hazardous air pollutants (HAPs).
- This product is considered to be an article.
- Before handling any chemical products, always read the container label and the SDS.
- When using solvents, extinguish all ignition sources, including pilot lights. Read and follow manufacturer’s warnings and directions for use.
- Local air quality regulations may regulate or prohibit the use of surface preparation and cleaning materials based on solvent (VOC) content.

Shipping and Storage
No special/hazardous labeling or packaging required and no regulations for air, ground or water shipment for this product. Keep boot in a clean area, away from excessive moisture and out of direct sunlight. Store boots in the shipping carton. Return unused boots to the shipping carton. Shelf life: Two (2) years from date of manufacture.

Precautionary Information
Refer to product label and Safety Data Sheet (SDS) for health and safety information before using this product. For SDS and/or other regulatory documents visit our website https://www.3m.com/3M/en_US/company-us/SDS-search/.

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 representative.
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These products are manufactured under a 3M Quality Management System registered to the AS9100 standard

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