

3M™ Polyurethane Protective Radome Boots

Installation and Maintenance Instructions

Effective: May 6, 2024

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1.0 Introduction

1.1 Document Scope

This document provides supplemental information and instructions regarding material definition, part installation, damaged part criteria and actions, part removal, and part replacement for 3M™ Polyurethane Protective Radome Boots.

The purpose of these Instructions is to provide the owner/operator with the information necessary to ensure proper installation and maintenance of the boot. These Instructions serve as the principal manual for installation and maintenance of the 3M™ Polyurethane Protective Radome Boots.

These Instructions have been prepared in compliance with the FAA Regulations and Orders as presented in Section 1.8.

NOTE: These Instructions should be placed in the airplane operator's maintenance manual and incorporated into the operator's scheduled maintenance program.

1.2 Purpose/Rationale for Installation

The purpose of polyurethane protective radome boots is to protect and prevent damage to radome structures and coatings. The boots prevent damage caused by high velocity impacts with environmental effects such as rain, sand, dust, and smog.

1.3 Program for the Distribution of Changes to These Instructions

Changes to these Instructions are envisioned only in the event of a change to the components that comprise the boot. In the case of component changes or upgrade, the latest version of the Instructions will be distributed directly to the airplane owner/operator in hard copy and/or electronic format upon completion of the changes.



For minor typographical or grammatical changes where no functional or operational characteristics are affected, no notice of change will be made.

If document changes involve the form, fit, or function of the system, and are considered nonessential, a Provisional Service Bulletin will be issued informing the owner/operator of this change and how to go about obtaining an updated document.

If the change is of a more severe nature and is considered critical to flight safety or system operation, the FAA will be notified in accordance with 14 CFR 21.3, Reporting of Failures, Malfunctions and Defects. Upon determination by the FAA, an Airworthiness Directive may be issued describing the nature of the change, including instructions regarding document updates and any additional service requirements.

1.4 Warnings, Cautions and Notes

Warnings, cautions, and notes may be used throughout this manual to emphasize important and critical instructions as follows:

 WARNING:	An operating procedure, practice, etc., which, if not correctly followed, could result in personal injury or loss of life.
 CAUTION:	An operating procedure, practice, etc., which, if not strictly observed, could result in damage to, or destruction of equipment.
NOTE:	An operating procedure, condition, etc., which is essential to highlight.

1.5 Material Definition

3M™ Polyurethane Protective Radome Boots are comprised of an abrasion-resistant polyurethane film, formulated for long-term resistance to ultraviolet light (UV), with a durable, solvent-resistant, pressure-sensitive, acrylic adhesive protected with an easy-release liner. This tape construction is then formed into a three-dimensional shape matching the radome.

3M™ Polyurethane Protective Radome Boots can be applied to painted surfaces or can be painted after installation in accordance with FAA (or other Civil Aviation Authority) approved maintenance documentation.

1.6 Control and Operation Information

NOT APPLICABLE — This section is not applicable as the boot in no way directly, or indirectly, contributes to the control or operation of the airplane models that it is installed upon.

1.7 Servicing Information

NOT APPLICABLE — This section is not applicable as the boot installed upon the airplane does not require servicing to maintain its continued airworthiness.

1.8 Federal Aviation Administration (FAA) References

Code of Federal Regulations

- 14 CFR 21.3 Reporting of Failures, Malfunctions and Defects
- 14 CFR 21.41 Type Certificates
- 14 CFR 21.50 Instructions for Continued Airworthiness and Manufacturer's Maintenance Manuals Having Airworthiness Limitations Sections
- 14 CFR 25.1529 Instructions for Continued Airworthiness
- 14 CFR 39 Airworthiness Directives
- H25 Appendix H – Instructions for Continued Airworthiness

Federal Aviation Administration Orders

- 8110.54A Instructions for Continued Airworthiness Responsibilities, Requirements and Contents

2.0 Part Fabrication (during installation)

2.1 Removal of Excess Material at Base of Radome Shape

3M™ Polyurethane Protective Boots are designed to cover the forward-facing surface of the radome in the area most prone to damage. They typically do not cover the entire radome. Boots may be supplied trimmed to size (ready to install) or with excess material from the manufacturing process at the base of the boot shape that will need to be trimmed prior to installation.

Boots may or may not be supplied with trim lines (3-dimensional indicators formed around the perimeter of the boot to indicate the approximate location for trimming) that can be used as a guide for final boot size. Most trim lines are located approximately 0.5 inches (12 mm) above the base of the boot. Trim lines have been chosen based on in-use field experience, but it is the installer's decision as to exactly where to trim the boot. 3M recommends trimming the boot to within 0.25 inches (6 mm) above the provided trim line. See **Figure 1**.

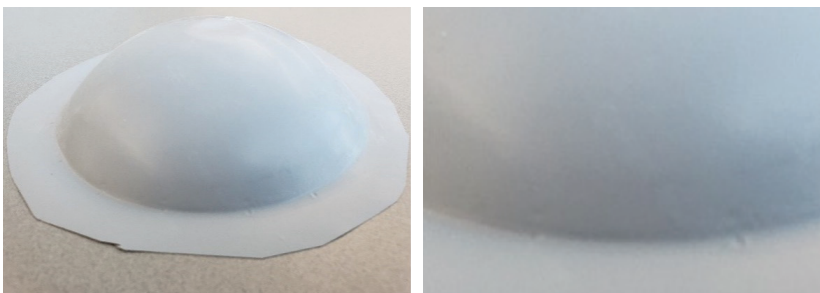
If a trim line is not present on the boot, 3M recommends trimming the boot within 1 inch (25 mm) of the base of the boot. See **Figure 2**.

Trim the boot with a pair of scissors, making clean, smooth cuts and avoid making jagged edges. See Section 3.7.

Figure 1: Representative trim lines provided on boots.



Figure 2: Representative radome boot without a trim line.



2.2 Trim Around Protruding Static Diverter Strips

If protruding static diverter strips are present in the radome, avoid covering these static diverter strips with the radome boot. The radome boot will need to be trimmed around these strips. See Section 3.15.

The edge of the trimmed boot should be within 0.5 inches (12 mm) of the edge of the diverter strip but should not touch the diverter strip.

3.0 Part Installation

The following is a list of steps to install 3M™ Polyurethane Protective Radome Boots.

To maximize the effectiveness and longevity of the protective boot, the boot should be installed without wrinkles, blisters, or other contaminants in the bond line (area of contact between the radome surface and the boot adhesive), without excessive abrasion/scuffing of the boot film surface and avoiding cuts or punctures in the film.

Please follow the instructions contained in this document and other applicable instructional documentation (such as technical data sheets, installation videos, service bulletins, etc.).

Please contact your 3M Engineering Representative prior to installation if clarification is required.

NOTE: When installing polyurethane protective boots, it is important not to contaminate the surface of the aircraft part or the adhesive on the boot. Use of clean, silicone-free and dust-free gloves and appropriate personal protective equipment is recommended.

3.1 Safety Notes

NOTE: Before handling any chemical products used for cleaning and installation of the boot, always read the container label and the Safety Data Sheet (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.

3.2 Fit Check

Overall dimensions of the boots vary based on the radome type being protected. Boots are provided in a form intended to fit a specific radome snugly. Prior to installation, confirm the boot fits the radome properly by placing the boot with the adhesive liner still attached onto the surface of the radome.

3.3 Radome Preparation

The radome (and paint, if present) must be in good condition before a boot is applied. The surface must be smooth without dirt, heavy oxidation, chips, delaminating paint, or paint "nibs". If slight, localized defects are present in the paint, lightly sand the paint with 320 grit sandpaper, otherwise it is recommended that the radome be repainted.

If there is a multicolor paint scheme on the radome ensure 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 further 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. Please check with paint manufacturer for the correct cure time and conditions.



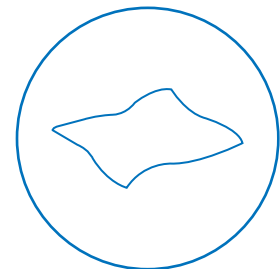
3.4 Preparation of Application Solution

3M™ Polyurethane Protective Boots may be provided with a spray bottle to be used to apply the recommended application solution. The application solution can be made by mixing 75% water and 25% isopropanol along with 3 or 4 drops of a non-ionic detergent, such as Joy® Dishwashing detergent. An example solution would be 300 grams of water mixed with 100 grams of isopropanol and 3 drops of Joy® Dishwashing detergent. Alternatively, this solution can be purchased premade from 3M as 3M™ Protective Tape Application Solution.

3.5 Radome and Boot Cleaning

Using a clean, lint-free cloth or cheese cloth, clean the radome surface with the application solution prepared in section 3.5. Additionally, clean both sides of the boot with application solution to remove the white powder on the boot (used to prevent multi-pack boots from adhering to each other).

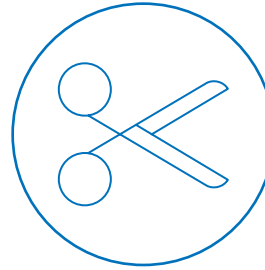
Figure 3: Representative image - Cleaning radome and boot.



3.6 Boot Trimming

Unless the boot is supplied trimmed-to-fit (ready to install), there will be excess material from the manufacturing process around the base of the boot (See Section 2.1 for guidance). See **Figure 4**.

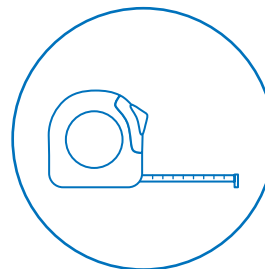
Figure 4: Representative image - Trimming of the boot.



3.7 Boot Positioning

Position the boot over the radome (adhesive liner side down against the radome). Measure the distance from the bottom of the boot to the base of the radome at several points around the circumference to ensure it is centered and properly positioned. See **Figure 5**.

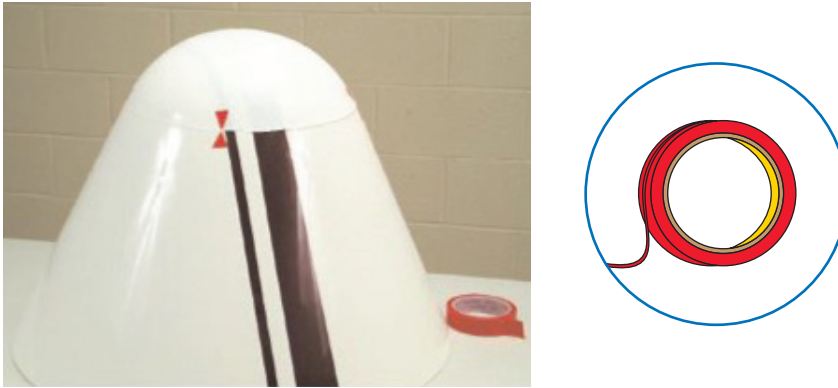
Figure 5: Representative image - Measurement of radome boot placement.



3.8 Alignment Marking

Use 3M™ Vinyl Tape 471 to mark three index points on the radome around the circumference and along the edge of the boot (one on the top of the radome and two on the sides of the radome approximately 90° from the center mark) clearly establishing the top, center point, so the boot can be repositioned properly. Then mark the three index points on the boot edge aligned with the marks on the radome. See **Figure 6**.

Figure 6: Representative image - Placement of alignment marks on radome and boot.



3.9 Preparation for Liner Removal

Remove the boot from the dome and turn the boot inside out such that the adhesive liner is facing out, taking care not to wrinkle the boot.

Liberal spray the dome and both surfaces (film and liner) of the boot with the application solution.

3.10 Liner Removal

Place the boot back on the dome (liner will be facing up), using the dome as a holder to prevent the boot from adhering to itself during liner removal (which would make the boot unusable). Lift the edge of the adhesive liner from the boot to expose a portion of the adhesive. Spray application solution on the adhesive. Carefully remove the remainder of the adhesive liner while continuously spraying application solution on the exposed adhesive. This will further prevent the boot from sticking to itself during liner removal and installation. See **Figure 7**.

Figure 7: Representative image - Removal of liner and continuously spraying adhesive surface.



3.11 Preparation for Repositioning

Remove the boot from the dome and turn it inside out such that the adhesive side is facing the dome. Heavily spray the dome and boot with the application solution, enabling easy repositioning. See **Figure 8**.

Figure 8: Representative image - Spraying radome surface with 3M™ Protective Tape Application Solution.



3.12 Boot Repositioning on Radome

Apply the boot to the dome, aligning the index points at the top and sides of the dome. Reposition and reapply the application solution as needed until proper fit is achieved. See **Figure 9**.

Figure 9: Representative image - Application of boot to surface of radome and alignment with index points.



3.13 Boot Adhesion to Radome

Apply additional application solution to the outside of the boot. Using the 3M Aerospace Yellow Squeegee provided with the boot, press the boot down at the center of the dome and use one to two-inch strokes outward to smooth out the boot. This will remove trapped application solution and air bubbles. Apply only light pressure to squeegee and use a clean, lint-free cloth to absorb excess application solution as it is pressed out. See **Figure 10**.

Firmly press the squeegee down in short strokes, working away from the center of the polyurethane protective boot and toward the trailing edge, removing excess application solution. If a bubble is trapped, carefully peel the boot back, reapply the application solution and use the squeegee to re-adhere.

Remove index markings if they have been applied.

Figure 10: Representative image - Process of smoothing out boot with the provided squeegee.



3.14 Static Diverter Strip Trimming (if present in radome)

If protruding static diverters are present on the radome, either segmented or solid diverters, carefully trim the boot material from the edge of the diverter strips using small scissors. Follow the clearance criteria called out in Section 2.2.



CAUTION:

Take extreme caution not to score, 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-2220 to seal the edges of the boot to the radome around the cutout for the diverter strip. Use of RP-2220 should be limited to the cutout edges of the boot around the static diverter. Masking the area with 3M™ Vinyl Tape 471 may help to ensure a neat application of the edge sealant.

3.15 Final Step

Dry the surface of the polyurethane protective boot with a clean cloth. If the boot is installed on an aircraft, allow it to dwell 6 to 8 hours at 70°F (21°C) before flight.



NOTE: If 3M™ Scotch-Weld™ Repair Paste RP-2220 is used to seal the edges of the boot around the static diverters, allow to cure for a minimum of two hours at 70°F (21°C) before flight.



4.0 Maintenance Instructions

4.1 Scheduling Information

The boot does not require periodic inspection, cleaning, adjustment, test, etc., to maintain its continued airworthiness. Replacement may occur as determined necessary during the course of ordinary airplane maintenance activities.

4.2 Recommended Overhaul Periods

As with any product, environmental factors, age and use affect the materials and performance of boots. Accordingly, the manufacturer recommends replacing the airplane's boot at approximately 5 (five) year intervals. Use in harsh environments may necessitate more frequent replacement.

This replacement interval, however, is optional, at the owner/operator's discretion, and is in no way mandatory as a means to achieve the continued operational safety of the airplane. This overhaul period, therefore, is not included in Section 15.0, Airworthiness Limitations.

4.3 Inspection Program

NOT APPLICABLE — This section is not applicable as the boot does not require a periodic inspection to maintain its continued airworthiness.

5.0 Troubleshooting/Damaged Part Criteria

5.1 Damage Types and Actions

Recommendations to replace the boot for any of the damage types below apply before, during, and after installation.

Torn/Cut/ Punctured Boot	<p>If there is a tear, cut, or puncture in the boot above the trim line, in the area that will be installed on the radome, the boot should not be used and should be replaced.</p> <p>If the tear, cut, or puncture is located in the area at the base of the boot, that will get trimmed off, the boot can be used and installed as recommended.</p>
Wrinkles (non-permanent)	<p>Wrinkles in the boot are acceptable if the wrinkle is a non-permanent deformation. If the boot with the adhered adhesive liner can be smoothed out and laid flat upon the radome, this would be considered a non-permanent deformation. If the boot contains wrinkle(s) that are considered non-permanent deformations, the boot can be used and installed as recommended.</p>
Wrinkles (permanent)	<p>If the wrinkle is such that the boot film cannot be laid flat on the radome, e.g., the adhesive is adhered to itself or the urethane film has a fold-over or inherent wrinkle, this would be considered a permanent deformation.</p> <p>If a permanent deformation exists above the trim line, in the area that will be installed on the radome, the boot should not be used and should be replaced.</p> <p>If there is a permanent deformation located in the area at the base of the boot, that will get trimmed off, the boot can be used and installed as recommended.</p>
Surface Abrasions/ Scuff Marks	<p>If the boot has abrasions or scuff marks that do not wash off when cleaning with 3M™ Protective Tape Application Solution above the trim line, in the area that will be installed on the radome, the boot should not be used and should be replaced.</p> <p>If surface abrasions or scuff marks are located in the area at the base of the boot, that will get trimmed off, the boot can be used and installed as recommended.</p> <p>The aircraft owner/operator should make the final decision on accepting or rejecting a part. 3M Engineering Representatives will provide aid or guidance upon request.</p>

6.0 Part Repair

NOT APPLICABLE — 3M does not recommend repair for damaged boots. Damaged boots should be replaced.

7.0 Part Removal Instructions

3M™ Polyurethane Protective Boots should be removed carefully to prevent damage to the radome.

The boot can be removed by peeling up the edge of the boot and pulling it toward the center of the boot, carefully peeling back the boot at 180° (back against itself).

If the boot leaves adhesive residue on the aircraft surface, this can be removed with a 50/50 mixture of isopropanol and water and a cheese cloth. 3M™ Tape and Residue Remover can also be used to remove the boot and/or adhesive residue.

8.0 Part Replacement

Replacement boots (and the following items to assist in the installation of the boots) can be ordered directly from 3M Company.

Name	3M Product #	3M ID #
3M™ Protective Tape Application Solution	56800	70202272194
3M™ Polyurethane Protective Tape Applicator Squeegee, Yellow, 5 each/pack	(no product #)	87330002301
3M™ Vinyl Tape 471	471	70006747672
Scotch® Fine Line Tape 218	218	multiple sizes available
3M™ Scotch-Weld™ Repair Paste RP-2220	2220	70202281112
3M™ Tape and Residue Remover, 16 oz. tub, 6 per case	35975	60430050793

Please contact a 3M customer service or sales representative for ordering information. See Section 16.0.

9.0 Other General Procedural Instructions

NOT APPLICABLE — This section is not applicable as the boot does not require system testing, symmetry checks, does not affect the center of gravity, lifting and shoring, nor storage limitations.

10.0 Radome Boot Access

The boot is installed on the exterior surface of the radome (exterior surface of the airplane). No modification of the airplane is required to gain access for inspection.

11.0 Special Inspection Techniques

NOT APPLICABLE — This section is not applicable as the boot does not require any special inspection techniques to determine suitability for continued use or replacement.

12.0 Protective Treatments

NOT APPLICABLE — This section is not applicable as the boot does not require any protective treatments be applied to the airplane due to its installation, maintenance, removal or replacement.

13.0 Fasteners

NOT APPLICABLE — This section is not applicable as the boot does not involve the use of fasteners of any type.

14.0 Special Tools

It is recommended that a 3M Aerospace Yellow Squeegee be used for the installation of boots (See **Figure 12** and Section 3.13). These may be provided with the boots as delivered or can be ordered directly from 3M Company. See Section 8.0.

Figure 12: 3M Aerospace Yellow Squeegee.



15.0 Airworthiness Limitations

“The Airworthiness Limitations section is FAA-approved and specifies maintenance required under Sec. 43.16 and 91.403 of the Federal Aviation Regulations, unless an alternative program has been FAA approved.”

No additional airworthiness limitations are imposed as a consequence of installing the boot upon the airplane.

The repair or alteration of any aircraft using the boot and procedures described in this document does not constitute an Airworthiness Authority installation approval which is the responsibility of the aircraft owner/operator to obtain prior to an aircraft's return to service.

16.0 Manufacturer Contact Information

Airplane owner/operators may contact the manufacturer at:

3M Company

3M Corporate Headquarters

3M Center

St. Paul, MN 55144-1000

3M Aerospace Customer Service

1-800-235-2376 Call Monday – Friday

8AM to 5PM Central Time

Website

3M.com/Aerospace



3M Company
3M Corporate Headquarters
3M Center
St. Paul, MN 55144-1000

Phone: 1-800-235-2376
Website: 3M.com/Aerospace

**3M Aerospace Customer Service: 1-800-235-2376
Call Monday – Friday 8AM to 5PM Central Time**

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