BOMBARDIER
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PROPRIETARY INFORMATION

PPS 39.06

PRODUCTION PROCESS STANDARD

INSTALLATION OF DASH 8 AIRFRAME DE-ICER BOOTS

Issue 24
- This standard supersedes PPS 39.06, Issue 23.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- Direct PPS related questions to christie.chung@aero.bombardier.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

Prepared By:	(Christie Chung)	November 27, 2018	
	PPS Group		
Approved By:	(Mauricio Rosin)	November 28, 2018	
	Air Systems Engineering		
	(*K. Quon*, for Stephen Mabee)	November 28, 2018	
	Materials Technology		
	(Chris Schnitzler)	December 3, 2018	
	Quality		

Issue 24 - Summary of Changes (over the previous issue)

The following summaries are not detailed and are intended only to assist in alerting PPS users to changes which may affect them; refer to the applicable sections of this PPS for detailed procedure and requirements.

- Deleted reference to QDI-15-02 (Shelf Life of Aeronautical Products). Specified de-icer boots must not exceed a shelf life of nine years.
- Modified leading edge figures.
- Deleted reference to QAMTR 001 and QAMTR 007. Referred to PPS 13.28 for receipt, storage and shelf life extension requirements for sealants and adhesives.
- Added 3M SCPM-3 premasking tape option as an acceptable temporary protection for de-icer boots.
- Specified the details of 3M SCPM-3 application.
- Specified to apply the chemical conversion coating as specified by the engineering drawing (i.e., C1 or C10).
- Added additional information for personnel information in relation to new 3M SCPM-3 tape.
- Specified to always use the oldest stock of all materials first.

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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the installation of DASH 8 airframe de-icer boots.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS shall be followed to ensure compliance with all applicable specifications. In general, if this PPS conflicts with the engineering drawing, follow the engineering drawing. The requirements specified in this PPS are necessary to fulfil the engineering design and reliability objectives.

1.1.2 Refer to PPS 13.26 for the subcontractor provisions applicable to this PPS.

1.1.3 Procedure or requirements specified in a Bombardier BAPS, MPS, LES or P. Spec. do not supersede the procedure or requirements specified in this PPS.

1.2 Refer to PPS 39.07 for the installation procedures for the DASH 8 engine air intake de-icer boots.

2 HAZARDOUS MATERIALS

2.1 Before receipt at Bombardier Toronto, all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto Environment, Health and Safety Department. Refer to the manufacturer's MSDS for specific safety data on any of the materials specified in this PPS. If the MSDS is not available, contact the Bombardier Toronto Environment, Health and Safety Department.

3 REFERENCES

3.1 BAERD GEN-023 - Contamination Control for Compressed Air.

3.2 PPS 2.64 - Installation of Potting Type Sandwich Panel Fasteners.

3.3 PPS 6.05 - Closure of Fluid Lines and Fluid System Components.

3.4 PPS 10.25 - Storage and Application of Film Adhesives used in Composite Assemblies.

3.5 PPS 10.35 - Fabrication of 250°F Cure Epoxy Resin Pre-Impregnated, Fibre Reinforced Composite Parts.

3.6 PPS 13.26 - General Subcontractor Provisions.

3.7 PPS 13.28 - Storage Life of Adhesives, Sealants, Paints and Composite Products.

3.8 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

3.9 PPS 14.01 - Torquing & Tightening.

3.10 PPS 15.04 - Use of Markers for Marking Aircraft Parts and Assemblies.

3.11 PPS 19.01 - Safetying Devices.

3.12 PPS 21.20 - Mixing and Handling Two-Part Sealants.

3.13 PPS 21.21 - General Sealing Practices.

3.14 PPS 25.63 - Bonding using DHMS A6.11 Type I Class 2 Adhesive.

3.15 PPS 31.17 - Solvent Usage.

3.16 PPS 34.08 - Application of Epoxy-Polyamide Primer (F19 & F45).

3.17 PPS 34.15 - Application of Anti-Static Polyurethane Enamel (F31 & F34).

3.18 PPS 34.34 - Surface Finishing Compounds (F33).

3.19 PPS 39.07 - Installation of DASH 8 Air Intake De-Icer Boots.

3.20 PPS 39.08 - Replacement of Autoclave Bonded De-Icer Boots on DASH 8 Composite Leading Edges.

3.21 PPS 39.09 - Application of Cosmetic Treatment on De-Icer Boots.

4 MATERIALS, EQUIPMENT AND FACILITIES

4.1 Materials

4.1.1 Abrasive paper, aluminum oxide, 180 - 220 grit size.

4.1.2 DHMS A6.08 epoxy film adhesive.

4.1.3 DHMS A6.11 Type I Class 2 adhesive.

4.1.4 DHMS S3.01 A1/2 sealant.

4.1.5 DHMS S3.01 B1/2 or B2 sealant.

4.1.6 DSC 206 surface finishing compound, as specified in PPS 34.34.

4.1.7 DSC 234-7 release fabric (non-porous), Teflon coated fibreglass.

4.1.8 DSC 375-1 tack cloths.

4.1.9 Flashbreaker tape, 1" widths (e.g., DSC 234-15-1).

4.1.10 Protective wrapping, neutral Kraft paper.

4.1.11 Lint-free wiping cloth (e.g., DSC 378-3).

4.1.12 Masking tape, 1/2" and 1" widths.

4.1.13 Protective latex coating, Textile Rubber & Chemical Co. (Canada) Ltd., B-1357.

4.1.13.1 Red tint, Textile Rubber & Chemical Co. (Canada) Ltd., B-0436.

4.1.14 3M Premasking Tape, SCPM-3.

4.1.14.1 Permanent type felt tip marker, contrasting colour to SCPM-3 Tape.

4.2 Equipment

4.2.1 Bristle brush, adhesive application.

4.2.2 De-icer boot peeling tool, Tool Number 85720004-001-216.

4.2.3 Drill Jig, 85720013-053/054-248.

4.2.4 Hot air gun, blower type hair dryer, maximum temperature of 160°F.

4.2.5 Lint-free cotton gloves (e.g., DSC 422-1).

4.2.6 Permanent type felt tip marker as specified in PPS 15.04.

4.2.7 Pressure test rig (e.g., SD5454). Use clean compressed air.

4.2.7.1 Compressed air shall meet the requirements of BAERD GEN-023.

4.2.8 Putty knife, 3/4" blade width.

4.2.9 Rubber roller, approximately 3" wide X 2" diameter, (e.g., B.F. Goodrich 74-451-74).

4.2.10 Shop vacuum source, capable of maintaining and monitoring a minimum vacuum of 20" Hg.

4.2.11 Suitable spatula.

4.2.12 Trimming knife (e.g., Hyde #K-422-120) or scissors.

4.3 Facilities

4.3.1 This PPS has been categorized as a Controlled Critical Process according to PPS 13.39 and as such only facilities specifically approved according to PPS 13.39 are authorized to perform the installation of DASH 8 airframe de-icer boots according to this PPS.

4.3.2 Bombardier subcontractors shall direct requests for approval to Bombardier Aerospace Supplier Quality Management. Bombardier Aerospace facilities shall direct requests for approval to the appropriate internal Quality Manager.

4.3.3 Facility approval shall be based on a facility report, a facility survey and completion of a qualification test program, if required. The facility report shall detail the materials and equipment to be used, the process sequence to be followed and the laboratory facilities used to show compliance with the requirements of this PPS. Any deviation from the procedure or requirements of this PPS shall be detailed in the facility report. Based upon the facility report, Bombardier Toronto Engineering may identify additional qualification and/or process control test requirements. During the facility survey, the facility requesting qualification shall be prepared to demonstrate their capability. Once approved, no changes to subcontractor facilities may be made without prior written approval from Bombardier Toronto Engineering.

4.3.3.1 For approval of subcontractor facilities to perform the installation of DASH 8 airframe de-icer boots according to this PPS, completion of a test program and submission of suitable test samples representative of production parts may be required. Test samples shall meet the requirements as defined by Bombardier Toronto Engineering.

5 PROCEDURE

5.1 General

5.1.1 For the purposes of this PPS, the term “MRB” (Material Review Board) shall be considered to include Bombardier Toronto MRB and Bombardier Toronto delegated MRB.

5.1.2 Do not use protective hand cream as it may cause contamination of cleaned or adhesive coated surfaces.

5.1.3 DASH 8 airframe de-icer boots on the horizontal stabilizer and the wing are either hot bonded into composite leading edges as integral parts of the cured components or cold bonded onto the composite or metallic leading edge assembly after manufacture, as specified on the engineering drawing or Work Order.

5.1.3.1 Complete the lay-up of composite leading edges according to the engineering drawings, following the procedure specified in PPS 10.35.

5.1.4 Refer to PPS 39.08 for the procedure and requirements for removal and replacement of hot bonded de-icer boots on DASH 8 composite leading edges.

5.1.5 The vertical stabilizer de-icer boot is cold bonded to the composite leading edge assembly after manufacture.

5.1.6 Prior to de-icer boot installation, ensure all fastener heads on the bonding surface are filled with DSC 206 surface finishing compound according to PPS 34.34.

5.2 Preparation of De-Icer Boots

5.2.1 Before installation, submit all de-icer boots for inspection as specified in section 6.1.

5.2.1.1 De-icer boots are inflation tested by the manufacturer. Do not inflate de-icer boots for any reason before installing.

5.2.2 Place the de-icer boot on a clean flat surface with the inner side (bond surface) up.

5.2.3 Solvent clean the entire bond surface twice using the solvent specified in PPS 31.17. After solvent cleaning, inspect the bonding surface for evidence of dust, cloth fibres, etc. If necessary, tack rag the bonding surface to remove loose particles.

5.2.4 After cleaning, cover the de-icer boot with clean Kraft paper (see paragraph 4.1.10) until ready to apply adhesive or adhesive film, as applicable.

5.2.5 Ensure that de-icer boots meant for hot bonding are protected from shop dust and debris which could contaminate the lay-up of the leading edge. If necessary, use a cloth dampened in the solvent specified in PPS 31.17 to remove shop dust or debris from the non-bonding surface before installation.

5.2.6 It is not necessary to clean the non-bonding surface of cold bonded de-icer boots at any time during their installation. If desired, it is acceptable to use a cloth dampened in the solvent specified in PPS 31.17 to remove shop dust or debris from the non-bonding surface.

5.3 Hot Bonding of De-Icer Boots in Leading Edge Assemblies

5.3.1 Application of DHMS A6.08 Adhesive Film

5.3.1.1 Prepare adhesive film according to PPS 10.25 before use.

5.3.1.2 Remove the Kraft paper from the de-icer boot and carefully apply one layer of film adhesive to the boot surface.

5.3.1.3 Lightly press against the protective backing sheet to achieve enough tack between the adhesive and boot to permit removal of the backing sheet without peeling the adhesive from the boot.

5.3.1.4 After removing the backing sheet, inspect the film adhesive for white or translucent patches that indicate lack of contact between the film and boot.

5.3.1.4.1 Using a hot air gun, locally heat any adhesive film areas showing lack of contact. Place a piece of backing sheet on the film and press the film against the boot to improve contact.

5.3.1.5 After applying the adhesive film to the boot, locate the boot in the lay-up mould according to section 5.3.2.

5.3.2 Locating De-Icer Boots in Mould

5.3.2.1 Carefully lift the boot from the table and place it in the mould.

5.3.2.2 Ensuring that the air connector is located on the lower surface of the leading edge, position the boot in the mould according to the engineering drawing and the mould reference marks or lines.

5.3.2.3 Apply one layer of release ply (see paragraph 4.1.7) to the boot ends to prevent bonding during curing.

5.3.3 Lay-Up of the Leading Edge

5.3.3.1 Materials and procedure for leading edge lay-up shall be according to the engineering drawing and PPS 10.35.

5.3.4 Composite De-Icer Boot/Leading Edge Assembly Post Cure Procedure

5.3.4.1 General

5.3.4.1.1 Leave the release ply in place during rib installation to protect the leading edge bonding surface.

5.3.4.1.2 After curing and end rib installation, bond the boot ends to the leading edge surface at the end rib locations according to sections 5.3.4.2 through 5.3.4.4.

5.3.4.2 Preparation of Bonding Surfaces

5.3.4.2.1 Prepare the bond surfaces of the de-icer boot and leading edge as follows:

Step 1. Carefully roll the de-icer boot back onto itself at each end to expose the release ply on the leading edge.

Step 2. Remove the release ply and lightly scuff the leading edge bonding surface with 180 - 220 grit abrasive paper. Take care not to damage the Kevlar fibres.

Step 3. Solvent clean the de-icer boot and leading edge bonding surfaces according to PPS 31.17.

Step 4. Using 1/2" masking tape, mask the bonding area on the leading edge.

5.3.4.3 Application of Adhesive

5.3.4.3.1 Prepare DHMS A6.11 Type I Class 2 adhesive according to PPS 25.63 before use.

5.3.4.3.2 Do not touch adhesive coated surfaces with bare hands. Wear clean cotton gloves at all times and protect adhesive coated surfaces from contamination.

5.3.4.3.3 Apply adhesive as follows:

Step 1. After cleaning the boot and leading edge, apply the adhesive to the de-icer boot and leading edge bonding surfaces according to PPS 25.63. Distribute the adhesive evenly and cover all bonding surfaces.

Step 2. Allow the first coat of adhesive to dry a minimum of 1 hour. Do not touch the adhesive during this time.

Step 3. If the second coat of adhesive is not going to be applied right away, cover the first coat of adhesive with Kraft paper. **Do not** wait more than 48 hours between applying the first and second coats of adhesive.

Step 4. If Kraft paper was applied as specified in Step 3, remove the Kraft paper and apply the second coat of adhesive to the de-icer boot and leading edge bonding surfaces according to PPS 25.63. Distribute the adhesive evenly and cover all bonding surfaces.

Step 5. Before installing the boot, allow the second adhesive coat to dry as follows:

- If the relative humidity is 75% or less and the temperature is 50°F (10°C) or greater, dry for a minimum of 1 hour.
- If the relative humidity is greater than 75% or the temperature is less than 50°F (10°C), dry for a minimum of 2 hours.

Step 6. If the boot is not going to be installed immediately after the initial drying time, cover the adhesive with Kraft paper. **Do not** wait more than 48 hours between applying the second coat of adhesive and installing the boot.

5.3.4.4 Bonding of De-Icer Boot Ends

5.3.4.4.1 Bond boot ends to the leading edge by re-activating the adhesive coated boot end and leading edge with a cloth dampened in the solvent specified in PPS 31.17 and firmly rolling the boot down with a rubber roller.

5.3.4.4.1.1 Avoid rubbing and removing the adhesive coating from the leading edge or boot surface.

5.3.4.4.1.2 Always roll the boot towards the open end to prevent air entrapment.

5.3.4.4.1.3 Smooth boots down onto the bond surface. Ensure that the feathered edges fit flush into the cured leading edge recesses.

5.3.4.4.2 Remove masking and, when necessary, solvent clean the surface according to PPS 31.17 to remove residual masking tape adhesive.

5.3.4.4.3 Allow bonded sections to cure for at least 24 hours before inflated inspection according to paragraph 6.3.2.

5.3.4.4.4 Use a spatula to apply a thin coat of DHMS S3.01 B1/2 or B2 sealant to the de-icer boot and leading edge where the boot is trimmed flush with the edge of the assembly.

5.4 Cold Bonding of De-Icer Boot on Vertical Stabilizer Leading Edge

5.4.1 Preparation of Leading Edge

5.4.1.1 Except as noted in paragraph 5.4.1.1.1, complete all leading edge fabrication operations, including trimming to finish size, drilling and potting de-icer boot manifold holes and filling HF antenna edge seam (when applicable), before installing the de-icer boot on the vertical stabilizer leading edge.

5.4.1.1.1 Perform surface finishing of the composite leading edge assembly according to PPS 34.34 after de-icer boot installation.

5.4.1.1.2 Do not touch cleaned areas with bare hands. Wear clean cotton gloves at all times and protect cleaned surfaces from contamination.

5.4.1.2 Remove all sharp edges and burrs from around the manifold openings.

5.4.1.3 Prime the leading edge exterior surface with F19 Type 3 primer according to PPS 34.08. Allow F19 primer to cure for at least 24 hours at room temperature before preparing the leading edge for de-icer boot installation.

5.4.1.4 Solvent clean the bond surfaces twice according to PPS 31.17.

5.4.1.5 Measure off and mark the centre line of the leading edge at each end. Using a straight edge and a permanent type felt tip marker according to PPS 15.04, draw a centre line completely along the leading edge.

5.4.1.6 Place the de-icer boot on the leading edge with the manifold inserted in position and the centre line of the de-icer boot located on the centre line of the leading edge (see Figure 1). Tape the de-icer boot in place and mask off the area adjacent to the installation location using 1" masking tape.

5.4.1.7 Remove the de-icer boot from the leading edge after masking to reveal the bonding area.

5.4.2 Application of Adhesive

5.4.2.1 Prepare and apply DHMS A6.11 Type I Class 2 adhesive to the leading edge and de-icer boot bonding surfaces according to section 5.3.4.3.

5.4.2.2 Do not touch adhesive coated surfaces with bare hands. Wear clean cotton gloves at all times and protect adhesive coated surfaces from contamination.

5.4.3 Bonding of De-Icer Boot

5.4.3.1 When re-activation of the de-icer boot is specified, dampen corresponding areas of the adhesive coating on the boot and structure using a clean cloth or brush moistened with the solvent specified in PPS 31.17. Take care to prevent the solvent from contacting the outer surface of the boot. Avoid rubbing the adhesive coating as this can locally remove the adhesive from the surface of the boot or structure.

5.4.3.1.1 Wait until the re-activated adhesive is tacky (approximately 30 seconds to 1 minute) before unrolling the boot onto the leading edge.

5.4.3.2 While bonding, press down firmly on the boot to avoid air bubbles and, using the rubber roller, roll the boot spanwise to improve the bond.

5.4.3.2.1 Take special care to ensure that boot is firmly pressed down in areas where there is a slight concavity in the leading edge surface, such as the area around the air intake manifold hole.

5.4.3.3 Remove all entrapped air while bonding. Smooth out the affected area by hand or with a rubber roller or slide a thin spatula between the bonded surfaces into the air bubble and press out the bubble while simultaneously removing the spatula. If necessary, use the solvent specified in PPS 31.17 to loosen the adhesive or release the boot as far as the affected area. Re-bond the boot after loosening the adhesive.

5.4.3.4 The boot may be lightly stretched to eliminate wrinkles in the spanwise direction only.

5.4.3.5 Bond the boot as follows:

Step 1. Remove the masking tape from the leading edge.

Step 2. Place the boot in its correct position on the structure. Ensure that:

- The air connectors are concentric with the cut-outs in the leading edge (see Figure 1)
- The reference lines or marks are aligned with the corresponding marks on the structure.
- The inflatable boot area at the leading edge upper end is at least 3/4" from the final trim line at the leading edge end.

Step 3. Connect the boot to a vacuum source of 5 to 8" Hg through the connector cutouts in the leading edge to maintain the boot under vacuum during installation.

Step 4. Roll the boot back just beyond the air connectors as shown in Figure 1 and re-activate the adhesive (see paragraph 5.4.3.1) in the air connector area (see Figure 2, Area 1).

Step 5. Unroll the boot to cover Area 1, super-imposing the boot reference line on the leading edge reference line. Press the boot down firmly, taking care to avoid entrapping air. Check air connector concentricity and, if satisfactory, improve the bond by using a rubber roller to firmly roll the bonded strip lengthwise (see Figure 3).

Step 6. Making sure to match the reference line markings, progressively unroll the boot along the leading edge, re-activating the adhesive (see paragraph 5.4.3.1) and bonding a small area at a time along the centreline (first bond Areas 2 through 8, as shown in Figure 2, then bond Areas 9 through 14). Improve the bond of each section by using a rubber roller to firmly roll the bonded strip lengthwise (see Figure 3).

Step 7. Re-activate (see paragraph 5.4.3.1) and bond in the area adjacent to the air connector (see Figure 2, Area 15), removing any entrapped air and improving the bond with a rubber roller.

Step 8. Complete bonding of one boot side, re-activating 3 to 4" wide strips in sequence as shown in Figure 2. Do not stretch the boot in the chordwise direction.

Step 9. Re-activate and bond the other boot side to the structure according to Step 7 and Step 8.

5.4.3.6 Allow bonded assemblies to cure for at least 24 hours at room temperature before inflated inspection according to paragraph 6.3.2.

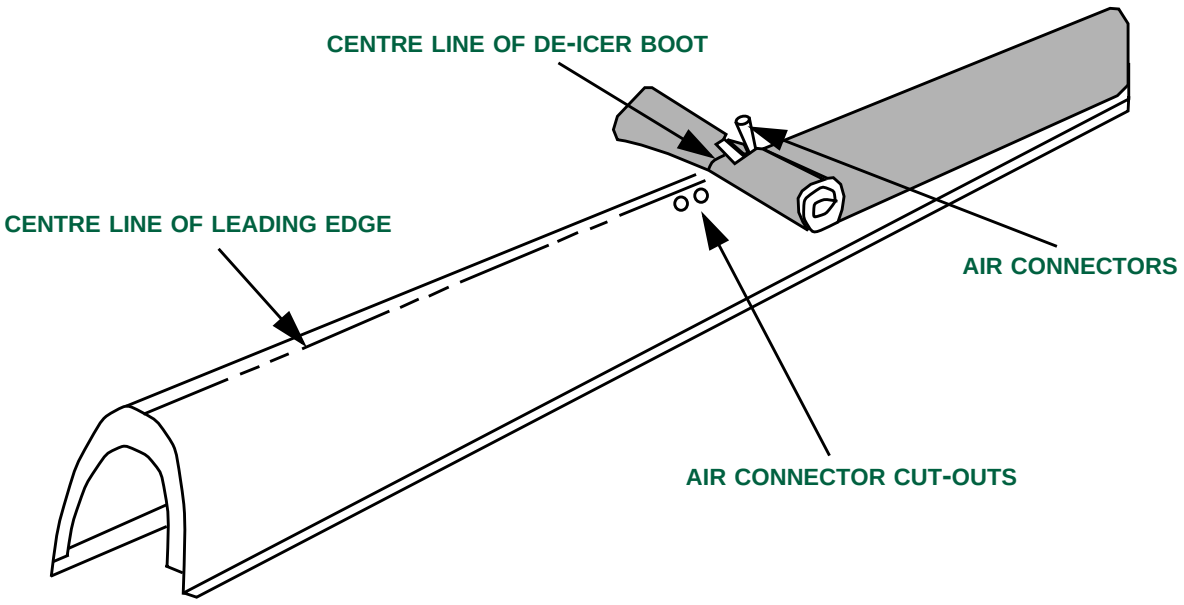


FIGURE 1 - COLD BONDING VERTICAL STABILIZER DE-ICER BOOT - 1ST STAGE

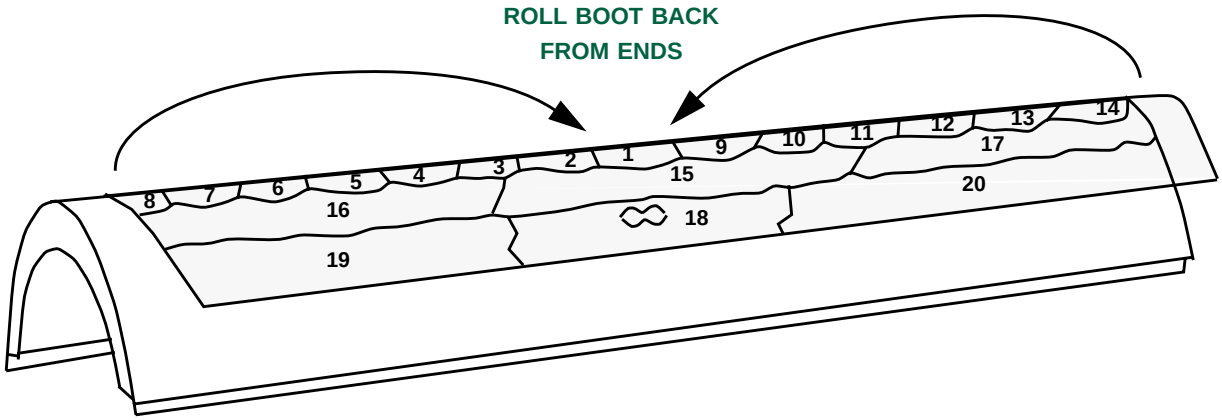


FIGURE 2 - RE-ACTIVATION SEQUENCE FOR BONDING VERTICAL STABILIZER BOOT

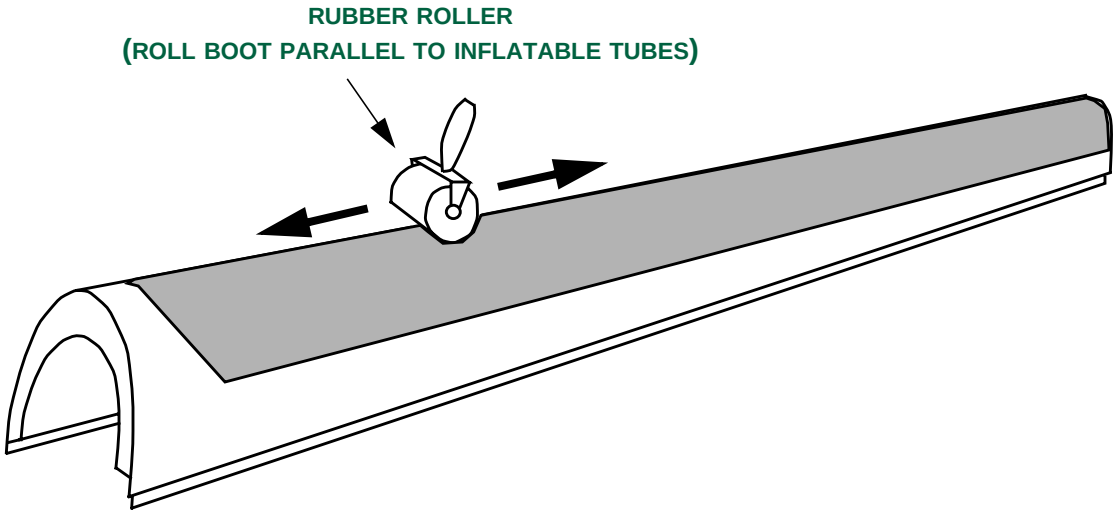


FIGURE 3 - USE OF ROLLERS TO IMPROVE BOND

5.4.4 Final Trimming and Clean-Up

5.4.4.1 Use a sharp knife to trim the de-icer boot flush with the upper end of the leading edge.

5.4.4.2 Solvent clean the excess adhesive from around the boot edges according to PPS 31.17. Take care to prevent solvent from running under the bonded boot edge.

5.4.4.3 Inspect trimmed boots for aerodynamic smoothness according to section 5.6, end seal boots according to section 5.7.1 and edge seal according to section 5.7.2.

5.5 Cold Bonding of Wing Leading Edge De-Icers

5.5.1 Preparation of Leading Edge

5.5.1.1 Complete all leading edge fabrication operations before installing the de-icer boot.

5.5.1.2 For metallic leading edge, ensure that the bonding surface has been F19 Type 2 primed. If not, prime the leading edge bonding surface with F19 Type 2 primer according to PPS 34.08. Allow F19 primer to cure for at least 24 hours at room temperature before preparing the leading edge for de-icer boot installation.

5.5.1.3 Prepare leading edge for de-icer boot installation as follows:

Step 1. If peel-ply has been incorporated into the lay-up of the composite leading edge, remove the peel-ply from the leading edge bond surface and solvent clean bond surface according to PPS 31.17.

Step 2. If peel-ply has not been incorporated into the lay-up, lightly scuff the composite leading edge bonding surface with 180 - 220 grit abrasive paper followed by solvent cleaning according to PPS 31.17. Take care not to damage the Kevlar fibres.

Step 3. For metallic leading edge, solvent clean according to PPS 31.17.

Step 4. Inspect the bonding surface for dust, cloth fibres, etc. If necessary, wipe the bonding surface with a tack rag to remove loose particles. Do not touch cleaned areas with bare hands. Wear clean cotton gloves at all times and protect cleaned surfaces from contamination.

Step 5. Measure off and mark the leading edge centre line at each end. Using a straight edge and a permanent type felt tip marker according to PPS 15.04, draw the centre line completely along the leading edge.

Step 6. Place the de-icer boot on the leading edge with the manifold inserted in position and the de-icer boot centre line located on the leading edge centre line. Tape the de-icer boot in place and mask the adjacent area using 1" wide masking tape.

Step 7. Remove the de-icer boot from the leading edge.

5.5.2 Application of Adhesive

5.5.2.1 Prepare and apply DHMS A6.11 Type I Class 2 adhesive to the leading edge and de-icer boot bonding surfaces according to section 5.3.4.3.

5.5.2.2 Do not touch adhesive coated surfaces with bare hands. Wear cotton gloves at all times and protect adhesive coated surfaces from contamination.

5.5.3 Bonding of De-Icer Boot

5.5.3.1 When re-activation of the de-icer boot is specified, dampen corresponding areas of the adhesive coating on the boot and structure using a clean cloth or brush moistened with the solvent specified in PPS 31.17. Take care to prevent the solvent from contacting the outer surface of the boot. Avoid rubbing the adhesive coating as this can locally remove the adhesive from the surface of the boot or structure

5.5.3.1.1 Wait until the re-activated adhesive is tacky (approximately 30 seconds to 1 minute) before unrolling the boot onto the leading edge.

5.5.3.2 Press down firmly to eliminate all air bubbles and, using a rubber roller, roll the boot spanwise to improve the bond (see Figure 3). If necessary, lightly stretch the boot during bonding to eliminate wrinkles.

5.5.3.2.1 Take special care to ensure that boot is firmly pressed down in areas where there is a slight concavity in the leading edge surface, such as the area around the air intake manifold hole.

5.5.3.3 Remove all entrapped air while bonding. Smooth out the affected area by hand or with a rubber roller or slide a thin spatula between the bonded surfaces into the air bubble and press out the bubble while simultaneously removing the spatula. If necessary, use the solvent specified in PPS 31.17 to loosen the adhesive or release the boot as far as the affected area. Re-bond the boot after loosening the adhesive.

5.5.3.4 Bond the boot as follows:

Step 1. Remove the masking tape from the leading edge.

Step 2. Position the boot on the structure. Concentrically locate the boot manifold tube in the leading edge cut-out and align the boot centre line with the corresponding leading edge centre line.

Step 3. Connect the boot to a vacuum source of 5 to 8" Hg to maintain the boot under vacuum during installation.

Step 4. Roll the boot back to just beyond the air intake manifold and re-activate the adhesive in the manifold area (see Figure 4).

Step 5. Unroll the boot slightly so that it covers the air intake manifold, superimposing its centre line on the leading edge centre line, and press the boot down firmly in the bond area. Take care to avoid entrapping air in the bond line.

Step 6. Check the concentricity of the manifold tube and, if satisfactory, improve the bond using a rubber roller.

Step 7. Making sure to match the centre line markings, progressively unroll the boot along the leading edge, re-activating the adhesive (see paragraph 5.5.3.1) and bonding a small area at a time along the centreline (see Figure 4, Areas 2 through 12). Improve the bond of each section by using a rubber roller to firmly roll the bonded strip lengthwise (see Figure 3).

Step 8. Continue to re-activate and bond both sides of the boot in 3 to 4" wide strips (see Figure 4, Areas 13 through 17).

Step 9. After bonding and before trimming according to section 5.5.5, ensure correct boot position and check for entrapped air in the bond line. If the boot is incorrectly positioned, completely or partially remove it according to section 5.5.4.

Step 10. Clean excess adhesive around boot edges using the solvent specified in PPS 31.17. Take care to ensure that solvent does not run under the edge of the bonded boot.

5.5.3.5 Allow installed boots to cure for at least 24 hours at room temperature before inflated inspection according to paragraph 6.3.2.

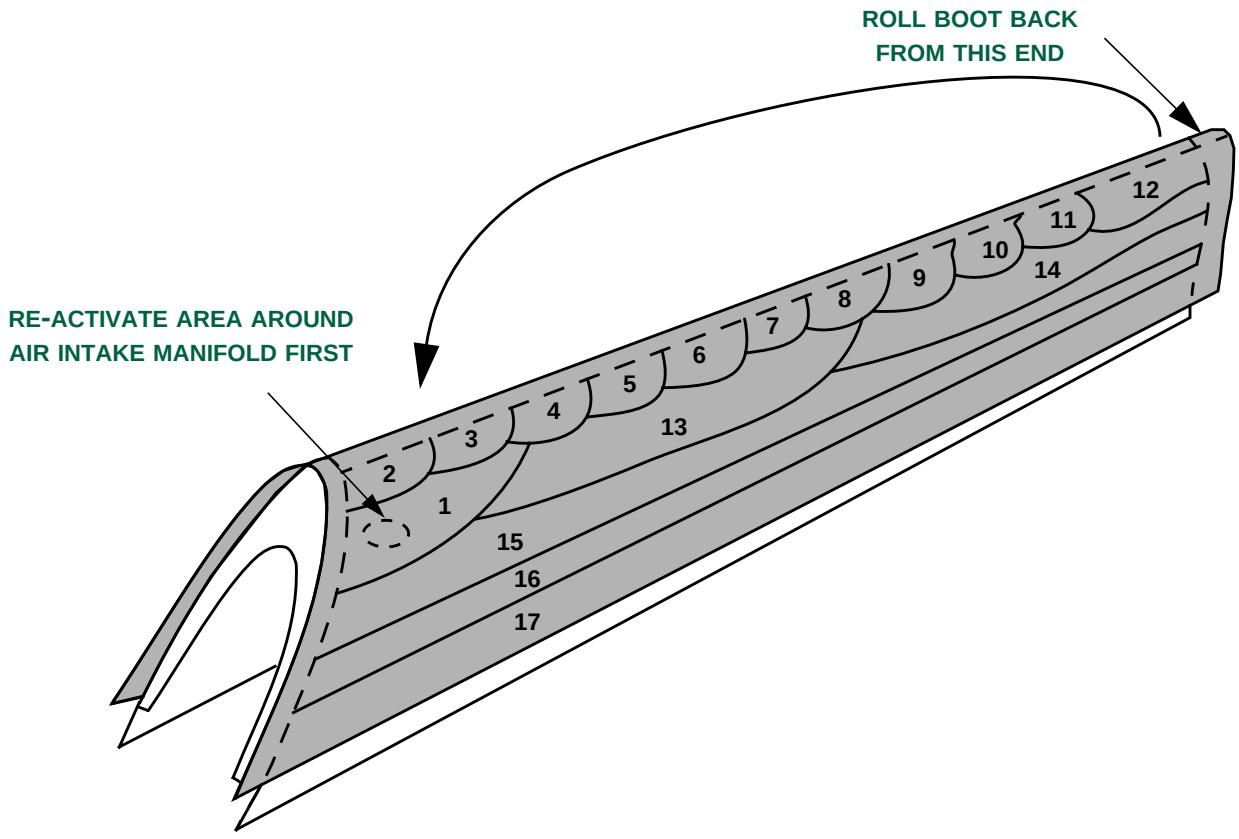


FIGURE 4 - RE-ACTIVATION SEQUENCE FOR COLD BONDING WING DE-ICERS

5.5.4 Removal or Re-Positioning of Bonded Boots

5.5.4.1 If removing a boot and re-using it, release the bond by applying the solvent specified in PPS 31.17 between the boot and structure as follows:

Step 1. Peel back one section of the boot edge from the structure and apply solvent to the glue line while applying tension to peel the boot back. To aid peeling, insert the solvent de-bonded boot edge in the shank slot of a de-icer boot peeling tool (see paragraph 4.2.2) and rotate the tool, while applying solvent, to roll the boot back on itself.

Step 2. If re-installing the de-icer within 48 hours of applying the original second adhesive coat, touch-up all bare areas on the bonding surfaces with DHMS A6.11 Type I Class 2. If more than 48 hours has elapsed, remove all traces of adhesive from the boot and leading edge structure, by solvent cleaning according to PPS 31.17, before re-installation.

5.5.4.2 Any attempt to de-bond DHMS A6.11 Type I Class 2 bonded areas of the boot without using solvent may result in interply delamination of the leading edge itself.

5.5.4.3 Peel off boots being discarded in sections parallel to the inflatable tubes. Remove adhesive from the leading edge by solvent cleaning according to PPS 31.17.

5.5.4.4 If partially removing a boot to correct its position or to free entrapped air, release bonds by applying the solvent specified in PPS 31.17 between the boot and leading edge. After making adjustments, immediately re-bond the boot in place, applying DHMS A6.11 Type I Class 2 adhesive to bare areas before re-bonding.

5.5.5 Trimming Installed Boot

5.5.5.1 Taking care to avoid cutting or scoring the outer layer of Kevlar fabric on the leading edge, trim the inboard and outboard boot ends to fit the structure using scissors or a suitable trimming knife.

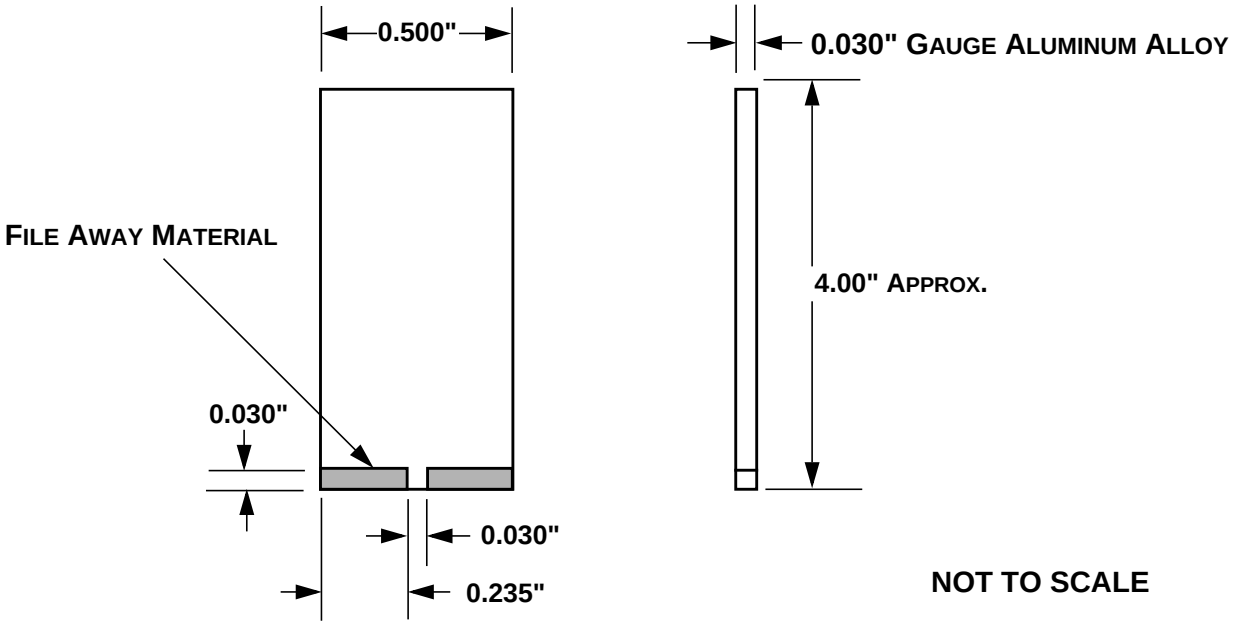
5.5.5.2 Inspect trimmed boots for aerodynamic smoothness according to section 5.6, end seal boots according to section 5.7.1 and edge seal according to section 5.7.2.

5.6 Measuring Aerodynamic Smoothness

5.6.1 Use the shop aid shown in Figure 5 to measure the difference in height between the de-icer boot and the structure as shown in Figure 7. Ensure that the 0.030" gauge tool tip butts against the de-icer boot edge.

5.6.2 Measure the height difference on each side of the boot in the 3 locations shown in Figure 7.

5.6.3 If the height difference is greater than 0.030" (i.e., a gap exists below the tool tip) at any measured point, seal the entire boot edge according to section 5.7.2.2. If the height difference is less than 0.030", seal the edges according to section 5.7.2.3.



Note: Shop aid shown is for measuring aerodynamic smoothness requirement for aft facing steps.

FIGURE 5 - SHOP AID FOR MEASURING AERODYNAMIC SMOOTHNESS

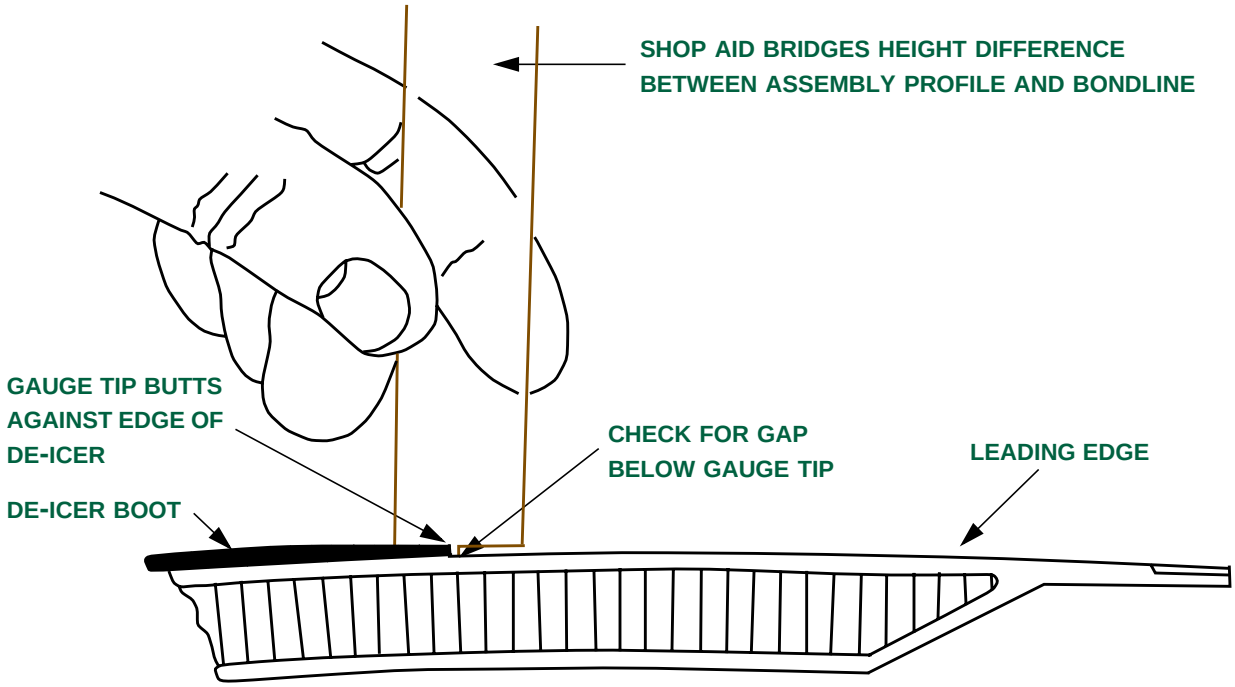


FIGURE 6 - MEASURING AERODYNAMIC SMOOTHNESS USING SHOP AID

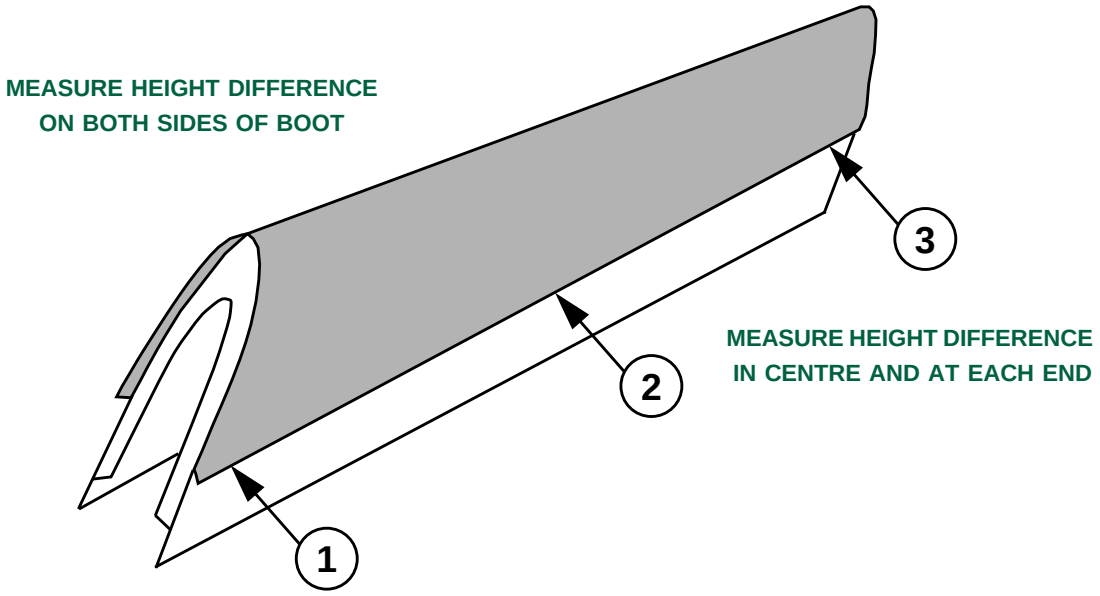


FIGURE 7 - AERODYNAMIC SMOOTHNESS MEASUREMENT LOCATIONS

5.7 Sealing Cold Bonded De-Icer Boots

5.7.1 Sealing De-Icer Boot Ends

5.7.1.1 Apply a thin coat of DHMS S3.01 B1/2 or B2 sealant to de-icer boot ends and leading edges where the boots are trimmed flush with the assembly ends.

5.7.1.1.1 Allow DHMS S3.01 B2 sealant to cure at least 24 hours before inflated inspection according to paragraph 6.3.2 or further handling or working the assembly. Allow DHMS S3.01 B2 sealant to cure at least 36 hours before functional or pressure testing or subjecting the boot to flight conditions.

5.7.1.1.2 Allow DHMS S3.01 B1/2 sealant to cure at least 8 hours before inflated inspection according to paragraph 6.3.2 or further handling or working the assembly. Allow DHMS S3.01 B1/2 sealant to cure at least 24 hours before functional or pressure testing or subjecting the boot to flight conditions.

5.7.2 Edge Sealing of De-Icer Boots

5.7.2.1 General

5.7.2.1.1 If the assembly fails to meet the aerodynamic smoothness requirements specified in section 5.6, seal the de-icer boot edges according to section 5.7.2.2.

5.7.2.1.2 Seal assemblies that meet the aerodynamic smoothness requirements according to section 5.7.2.3.

5.7.2.2 Aerodynamic Smoothing (Edge Sealing) Using DHMS S3.01 Class B Sealant

Step 1. Apply a strip of flashbreaker tape (see paragraph 4.1.9), 1/4" from the bottom edge, along the full length of the de-icer boot on each side. Apply a similar flashbreaker tape strip on each side of the leading edge structure, 1/4" away from the boot trailing edge (see Figure 8).

Step 2. Solvent clean the area between the tape strips according to PPS 31.17.

Step 3. After cleaning, lightly scuff the sealing area of the de-icer boot and leading edge using 180 - 220 grit abrasive paper. Take care not to damage the Kevlar fibres in the composite leading edge.

Step 4. Dust off the scuffed area with a clean cloth and tack rag to remove any loose particles.

Step 5. Apply a bead of DHMS S3.01 B1/2 or B2 sealant, prepared according to PPS 21.20, between the tape strips. Using a 3/4" wide putty knife held at a 45° angle, smooth the sealant along the full length of the de-icer boot edge, maintaining consistent pressure. Make one pass only. Hold the putty knife firmly upon, and close to the lower edge of the tape strip on the composite structure (see Figure 8). Ensure that the edges of the putty knife overlap the tape, not the de-icer boot or composite structure.

Step 6. If making a second pass with the putty knife to fill voids or improve the seal appearance, apply another bead of sealant along the full length of the sealing area before smoothing according to Step 5. This prevents removing too much sealant by another pass with the putty knife.

Step 7. After smoothing the sealant, remove all flash-breaker tape and, using a water-moistened finger, smooth out the sealant ridges left by the tape.

Step 8. Allow sealant to cure.

- Allow DHMS S3.01 B2 sealant to cure at least 24 hours before inflated inspection according to paragraph 6.3.2 or further handling or working the assembly.
- Allow DHMS S3.01 B2 sealant to cure at least 36 hours before functional or pressure testing or subjecting the boot to flight conditions.
- Allow DHMS S3.01 B1/2 sealant to cure at least 8 hours before inflated inspection according to paragraph 6.3.2 or further handling or working the assembly.
- Allow DHMS S3.01 B1/2 sealant to cure at least 24 hours before functional or pressure testing or subjecting the boot to flight conditions.

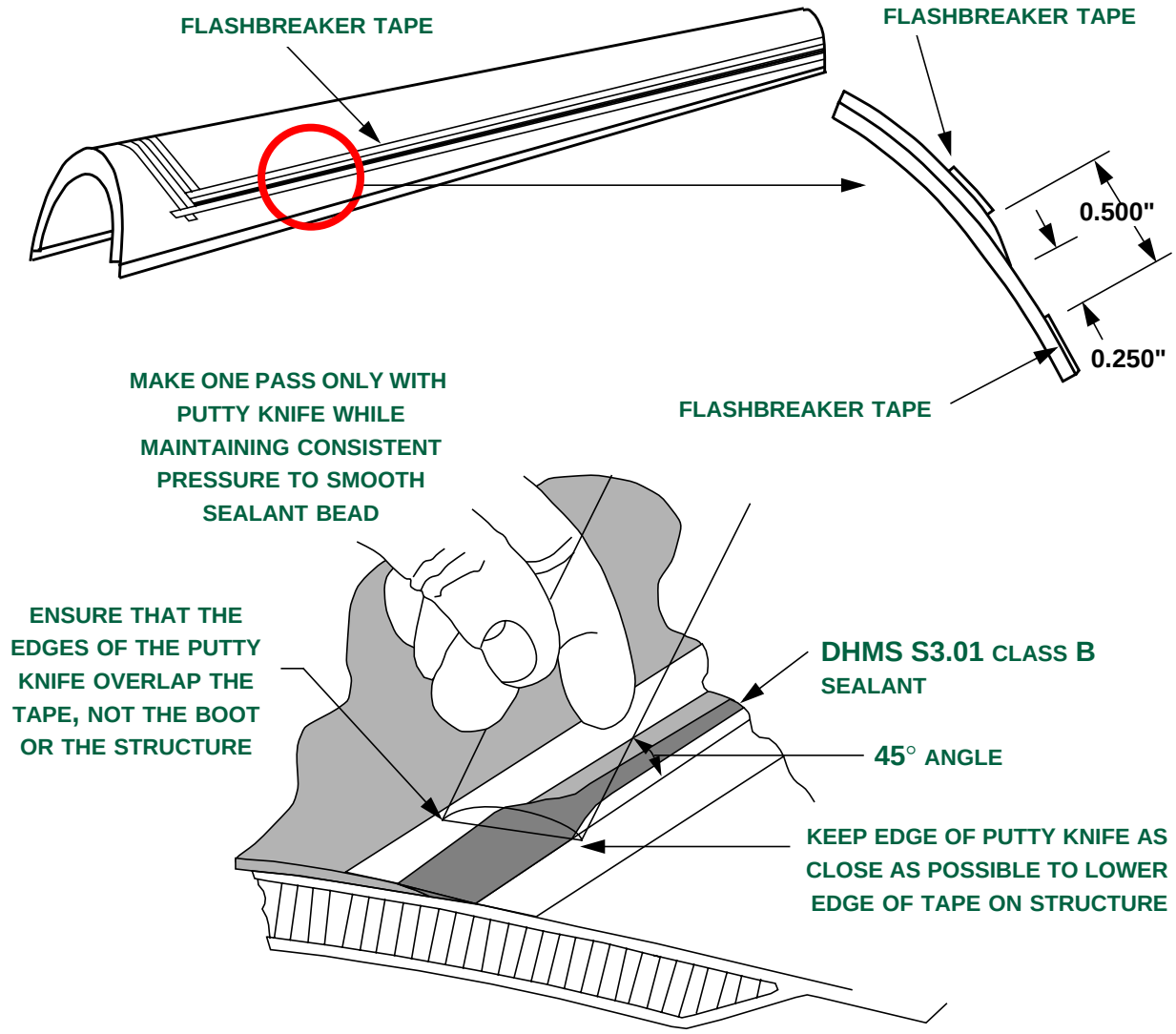


FIGURE 8 - EDGE SEALING COLD BONDED DE-ICER BOOTS

5.7.2.3 Edge Sealing Using DHMS S3.01 Class A1/2 Sealant

Step 1. Apply a strip of flashbreaker tape (see paragraph 4.1.9), 1/4" from the bottom edge, along the full length of the de-icer boot on each side. Apply a similar flashbreaker tape strip on each side of the leading edge structure, 1/4" away from the boot trailing edge (see Figure 8).

Step 2. Solvent clean the area between the tape strips according to PPS 31.17.

Step 3. After cleaning, lightly scuff the sealing area of the de-icer boot and leading edge using 180 - 220 grit abrasive paper. Take care not to damage the Kevlar fibres in the composite leading edge.

Step 4. Dust off the scuffed area with a clean cloth and tack rag to remove any loose particles.

Step 5. Apply a thin brush coat of DHMS S3.01 A1/2 sealant along the boot edges between the tape strips.

Step 6. After applying the sealant, remove all flashbreaker tape and, using a water-moistened finger, smooth out the sealant ridges left by the tape.

Step 7. Allow DHMS S3.01 A1/2 sealant to cure at least 8 hours at room temperature before inflated inspection according to paragraph 6.3.2 or further handling or working the assembly. Allow DHMS S3.01 A1/2 sealant to cure at least 24 hours before functional or pressure testing or subjecting the boot to flight conditions.

5.8 Sealing Gap Around De-Icer Boot Manifold Tube

5.8.1 After sealing boots according to section 5.7, fill the gap between the honeycomb core/skin and the de-icer boot manifold tube with either DHMS S3.01 B1/2 or B2 sealant (see Figure 9).

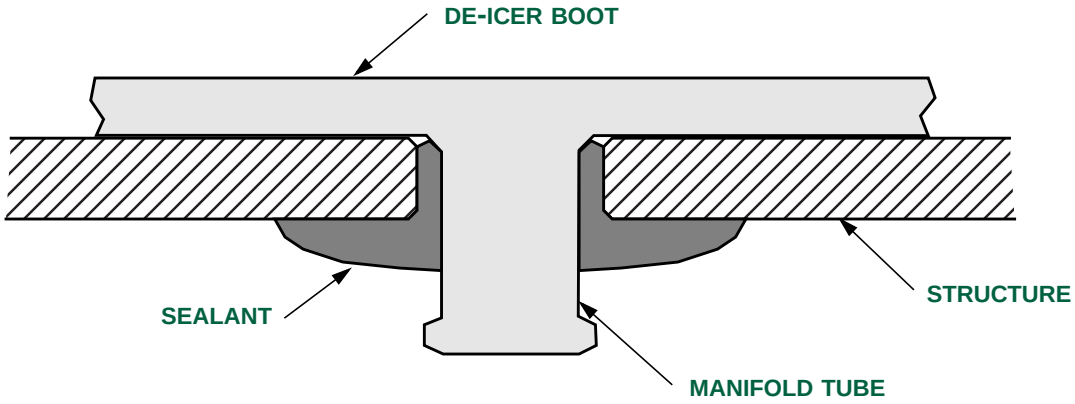


FIGURE 9 - CROSS SECTION OF SEALANT AROUND MANIFOLD TUBE

5.9 Stall Bar Installation

Step 1. Use the drill jig specified in paragraph 4.2.3 to drill 4 holes in the leading edge assembly for stall bar installation.

Step 2. Install inserts, using tooling pins to ensure correct alignment with stall bar insert, and pot with DHMS P1.30 Grade 2 according to PPS 2.64.

Step 3. After curing and trimming of excess potting compound according to PPS 2.64, pre-fit the stall bar and mask the de-icer boot area for bonding the stall bar.

Step 4. Solvent clean the stall bar and de-icer boot bond surfaces according to PPS 31.17.

Step 5. After cleaning, lightly scuff the stall bar and de-icer boot bonding surfaces with 180 - 220 grit abrasive paper.

Step 6. Dust off the boot and stall bar bonding surfaces with a clean cloth and tack rag to remove loose particles.

Step 7. Apply 2 coats of DHMS A6.11 Type I Class 2 adhesive to the bond surfaces according to section 5.3.4.3.

Step 8. After allowing the adhesive to dry, re-activate the bond surfaces with a cloth dampened in the solvent specified in PPS 31.17 and bolt the stall bar to the leading edge using the hardware specified on the engineering drawing. Torque and wire lock bolts according to the engineering drawing and PPS 14.01 and PPS 19.01, respectively.

Step 9. Remove excess adhesive by solvent cleaning according to PPS 31.17.

5.10 Application of Removable De-Icer Boot Protective Coating

5.10.1 General

5.10.1.1 After inflated inspection according to paragraph 6.3.2, apply removable protection by applying 3M SCPM-3 tape according to section 5.10.2 or protective latex coating according to section 5.10.3.

5.10.1.2 Leave the temporary protective coating/tape on the de-icer boot for all further fabrication, assembly, functional test and pressure test operations and do not remove it until immediately before flying the aircraft.

5.10.1.3 Remove latex coating by lifting the flashbreaker tape and peeling the coating.

5.10.1.4 Remove stubborn residue using a soft cloth and warm, mild soapy water. Do not scrub de-icer boot surfaces or use sharp or pointed objects to clean the de-icer boot.

5.10.1.5 For de-icer boots which have not been installed onto the aircraft, do not store or expose de-icer boots with the applied latex coating or 3M tape to ultraviolet (UV) radiation (e.g., direct or indirect sunlight).

5.10.1.6 For de-icer boots that have been installed onto the aircraft, remove the applied protection if the UV exposure exceeds the following requirements.

- Remove the latex coating if the aircraft has been, or is expected to be, exposed to UV radiation (e.g., sunlight) for longer than normal periods of time before engine runs or flight testing as the tinted latex will degrade in UV radiation (e.g., sunlight) and possibly transfer the latex to the de-icer boot.
- Remove applied 3M SCPM-3 tape, if the aircraft accumulated time of exposure to UV radiation (e.g., sunlight) exceeds 24 hours as the UV radiation will degrade the adhesive and may transfer onto the de-icer boot.

5.10.1.7 For de-icer boots that have been exposed to high temperatures (above 100°F), allow the protective coating/tape to cool down to room temperature (60 to 80°F) before attempting to remove according to paragraph 5.10.1.3.

5.10.1.8 If the protective latex coating or tape has been removed and further fabrication, assembly, functional test and/or pressure test operations is still to be performed that would expose the pneumatic de-icer boots to possible damage, re-apply SCPM-3 tape according to section 5.10.2 before performing such operations.

5.10.2 Application of 3M SCPM-3 Premasking Tape

5.10.2.1 Apply SCPM-3 protective tape (see paragraph 4.1.14) to the boot surfaces as follows:

Step 1. Apply SCPM-3 tape covering the entire de-icer boot up to 0.25" to 0.50" away from the edge of the boot edge sealant (see Figure 10).

Step 2. Place a strip of flashbreaker tape (see paragraph 4.1.9) around the entire edge of the SCPM-3 tape, overlapping slightly onto the tape, to ensure the edge of the SCPM-3 tape does not lift and cause entrapment of detrimental debris under the tape.

Step 3. Using a permanent marker specified in PPS 15.04, apply the following note to a visible surface of the tape.

“REMOVE PROTECTIVE TAPE BEFORE FLIGHT”

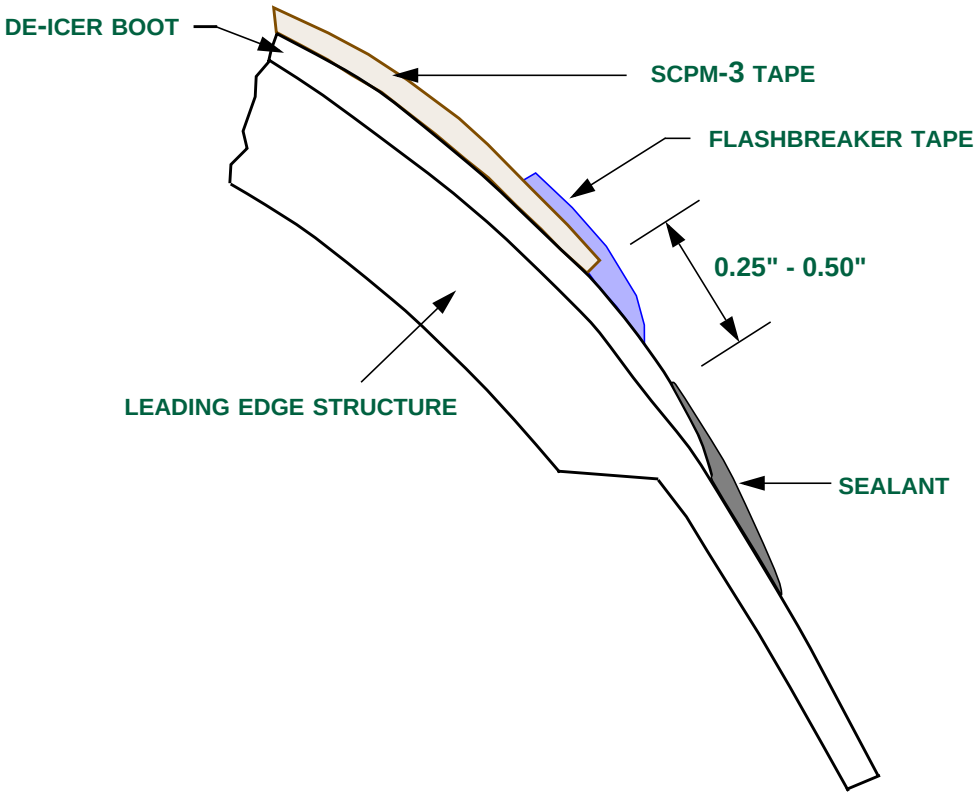


FIGURE 10 - APPLICATION OF PROTECTIVE 3M SCPM-3 TAPE

5.10.3 Application of Removable Red Protective Latex Coating

5.10.3.1 Apply protective latex coating (see Materials section, paragraph 4.1.13) to the boot surfaces as follows:

Step 1. Apply a strip of 1" wide flashbreaker tape around the entire de-icer boot perimeter, 0.25 to 0.50" away from the edge of the boot edge sealant (see Figure 10). Leave the flashbreaker tape on the assembly until removing the latex coating.

Step 2. Using 1" wide masking tape, mask the outer half of the flashbreaker tape to permit the latex to cover the inner half of the flashbreaker tape (see Figure 10).

Step 3. Thoroughly mix 4 to 5 grams of red tint (see paragraph 4.1.13.1) per 500 grams of latex coating. The mixture shall not exceed the 1% ratio as stated (i.e., 5 grams of the red tint), as excessive amount of red tint will stain the de-icer boot.

Step 4. Use a brush to apply one coat of red latex to the unmasked de-icer boot surface, overlapping the unmasked flashbreaker tape.

Step 5. Remove the masking tape immediately after applying the latex coat.

Step 6. Allow the latex to dry for 20 to 30 minutes at room temperature or 5 minutes at 100 to 110°F.

Step 7. Re-apply masking tape to the same area as specified in Step 2.

Step 8. Use a brush to apply a second coat of red latex.

Step 9. Remove the masking tape immediately after applying the second latex coat.

Step 10. Allow the latex to dry according to Step 6.

Step 11. Re-apply masking tape to the same area as specified in Step 2.

Step 12. Use a brush to apply a third coat of red latex.

Step 13. Remove the masking tape immediately after applying the third latex coat.

Step 14. Allow the latex to cure for a minimum of 8 hours at room temperature, or for 1 hour at 100 to 110°F, before further working the assembly.

Step 15. Place a second strip of flashbreaker tape around the entire edge of the cured latex, overlapping slightly onto the first strip of flashbreaker tape, to aid in removal of the latex coating.

Step 16. Using a permanent marker specified in PPS 15.04, apply the following note to a visible surface of the cured latex coating.

“REMOVE LATEX COATING BEFORE FLIGHT”

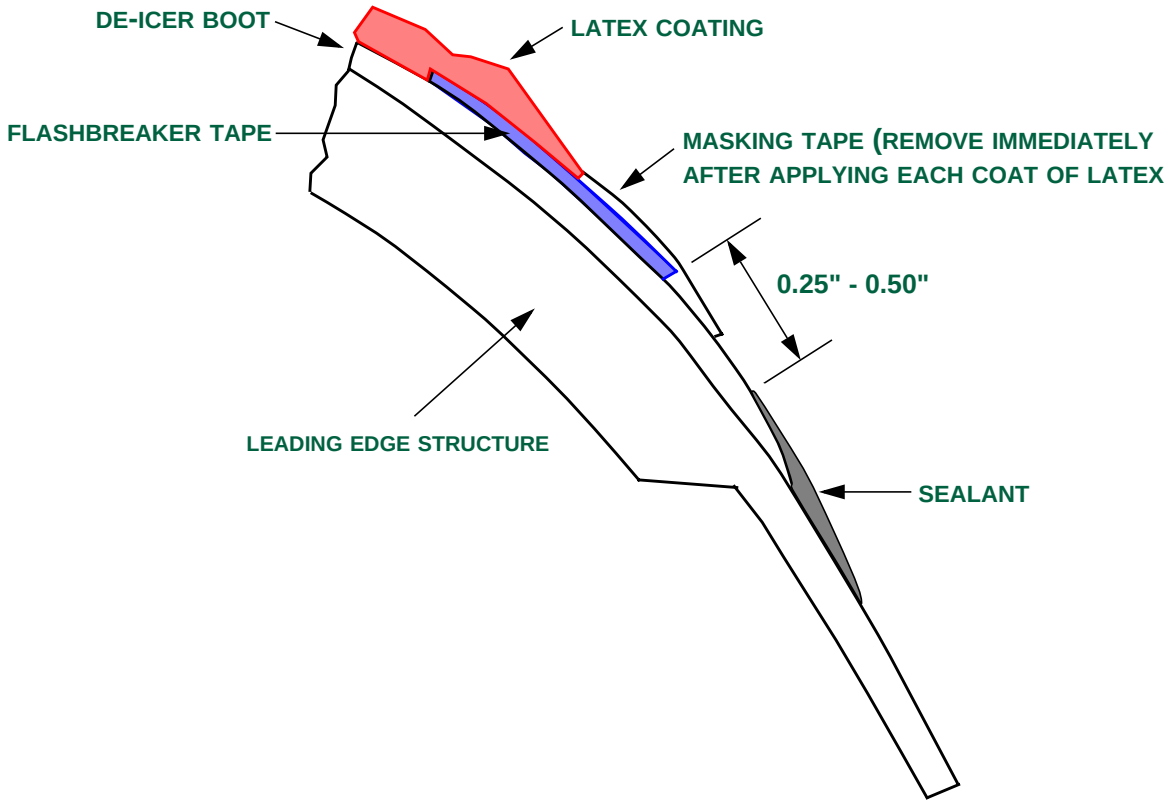


FIGURE 11 - APPLICATION OF PROTECTIVE LATEX COATING

5.11 Application of Conductive Paint Coating

5.11.1 After the application of temporary de-icer boot protective coating (i.e., either fully cured latex coating or SCPM-3 tape), apply F31 black conductive paint to the leading edge/de-icer boot assembly according to the engineering drawing and PPS 34.15.

5.11.2 Except as noted in paragraph 5.11.2.1, chemical conversion coating (C1 or C10, as specified by the engineering drawing) shall be the only finish in the countersinks on 85720011, 85720062, and 85720220 leading edge assemblies.

5.11.2.1 The four countersinks located top and bottom, centre and spanwise along the aft edge need to be F19 and F31 primed following application of chemical conversion coating. If the countersinks are already F31 primed, use a brush to touch-up the coating as required. If the countersinks are not primed, apply F19 primer according to PPS 34.08 and F31 enamel according to PPS 34.15 to the countersinks.

5.12 Pre-Delivery Procedure

5.12.1 Apply cosmetic treatment to all de-icer boots according to PPS 39.09 immediately before final delivery of the aircraft.

6 REQUIREMENTS

6.1 Inspection of Boot Before Installation

6.1.1 Ensure that the boot has not exceeded the maximum shelf life storage period of 9 years.

6.1.2 Before installation, inspect boots for damage and evidence of deterioration as specified in paragraph 6.1.2.1, paragraph 6.1.2.2 and paragraph 6.1.2.3.

6.1.2.1 With the exception of wrinkles inspection, place the de-icer boot on a clean flat surface and connect the boot to a vacuum source of 5 to 8" Hg and inspect the de-icer boot according to Table I. For wrinkle inspection, inspect for wrinkles according to Table I without applying a vacuum to the de-icer boot. If the defects magnitude exceeds the limits as specified in Table I, reject the boot and take corrective action as specified in paragraph 6.1.3.

6.1.2.2 Reject boots with deformation in the air connection. Check air connectors for cracks by squeezing between the thumb and forefinger.

6.1.2.3 Reject boots having any separation and/or evidence of brittleness.

6.1.3 Return boots which fail to meet all the above requirements to their original boxes and refer to MRB for disposition.

6.1.4 De-icer boots shall be installed within 48 hours of the application of the second coat of adhesive.

6.2 Composite Surfaces

6.2.1 The Kevlar fibres in the composite part to which the boot is being bonded shall not be exposed. The adhesive used to bond the boots in place can damage exposed fibres and compromise the structural integrity of the composite part.

6.2.2 Verify that the Kevlar fibres are not exposed before installation of the boot.

6.3 Inspection of Installed Boots

6.3.1 After fabrication (including assembly of end ribs when applicable) and all bonding, check all de-icer boots for evidence of entrapped air or unbonded areas.

6.3.1.1 Reject hot bonded assemblies having evidence of entrapped air or unbonded areas. Repair unbonded areas at the boot ends by peeling the boot back to the void, loosening the bond with solvent as necessary, and re-bonding according to section 5.3.4.4.

6.3.1.2 If required, completely or partially remove cold bonded boots according to section 5.5.4. Remove any entrapped air by sliding a thin spatula between the bonded surfaces into the air bubble and pressing out the bubble while simultaneously removing the spatula.

6.3.2 After fully curing the sealant, use a suitable regulator (see Equipment section, paragraph 4.2.7) to inflate the installed and sealed de-icer boots to 15 psi and hold for 1 minute while visually checking the boots as follows:

- Inspect boots according to Table I. If the defects magnitude exceeds the limits as specified in Table I, refer the part to MRB for disposition. Perform all removal of the de-icer boot according to section 5.5.4.
- There shall be no lack of adhesion over the entire bonded area of the de-icer boot.
- The pressure drop during the 15 psi pressure test shall be less than 1 psi/minute. Remove and discard boots with a pressure drop greater than 1 psi/minute according to section 5.5.4.
- A narrow inflation strip may occur outside the last active inflation tube. The narrow strip is approximately 3/16" wide and is located between the last (upper or lower side) stitch line and the tapered fillet in the de-icer tapered edge. This condition is not a construction defect, does not affect the form, fit or function of the de-icer, and is acceptable.
- Reject boots with deformation in the air connection.
- Reject boots having evidence of brittleness.

6.3.2.1 Before and after the inflated boot pressure test as specified in paragraph 6.3.2, with the exception of wrinkle inspection, connect the boot to a vacuum source of 5 to 8" Hg and while maintaining the boot under vacuum, inspect the de-icer boot according to Table I. When performing this test after the inflation test, allow the boot to deflate naturally before connecting the boot to the vacuum source. For wrinkle and inspection, inspect for wrinkles according to Table I without applying a vacuum to the de-icer boot, both before and after the inflated boot pressure test as specified in paragraph 6.3.2. If the defects magnitude exceeds the limits as specified in Table I, refer the part to MRB for disposition.

6.3.3 After edge sealing according to section 5.7.2.2 or section 5.7.2.3, the cured sealant shall form a flat or slightly concave profile. Also, the forward facing step shall not exceed 0.015" and the aft facing step shall not exceed 0.030" (refer to Figure 12 for a pictorial description of forward and aft facing steps). The cured sealant shall not form a convex profile.

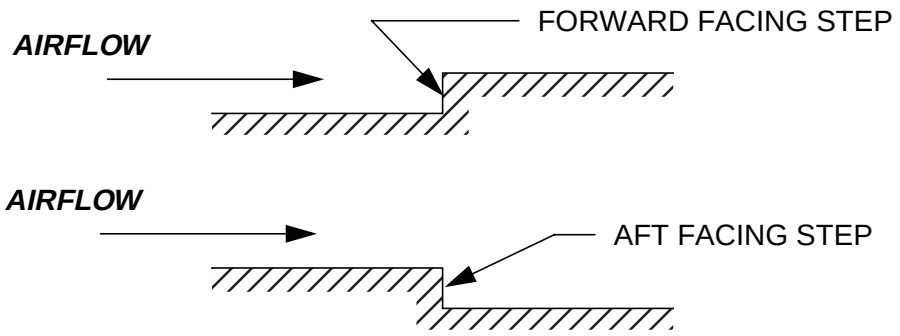


FIGURE 12 - STEP DISCONTINUITIES

6.4 Stall Bars

6.4.1 Stall bars shall be correctly located on the leading edge according to the engineering drawing and shall be visually checked for complete adhesion around the edges.

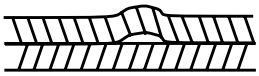
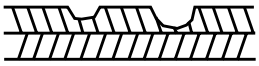
6.4.1.1 If there is any lack of adhesion, remove the stall bar by loosening the bond with solvent. Re-install the stall bar according to section 5.9.

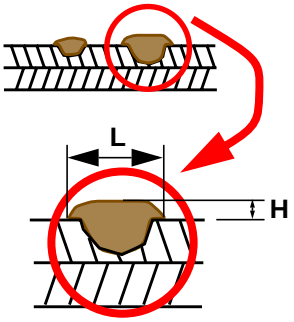
6.5 Receipt Testing and Shelf Life Extension

6.5.1 Perform receipt and shelf life extension testing of DHMS A6.08 epoxy film adhesive and DHMS A6.11 Type I Class 2 adhesive as specified in PPS 13.28.

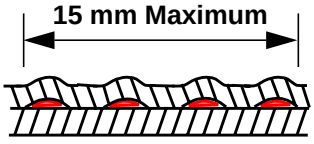
6.5.2 Perform receipt and shelf life extension testing of DHMS S3.01 sealants as specified in PPS 13.28.

TABLE I - DEFECTS IN DE-ICER BOOTS

DEFECT	DESCRIPTION (NOTES 1 AND 2)	ILLUSTRATION
Blisters	• Air pockets • Maximum size of 0.006 square inch (4 mm^2) • No more than 2 such defects per square meter	
Craters, Voids or Impressions (Note 3)	• First ply only • Maximum size of 0.008 square inch (5 mm^2) • Maximum depth of 0.008 inch (0.20 mm) • Density ≤ 0.002 in^2/ft^2 (14 mm^2/m^2)	

Filled Craters, Voids or Impressions	• These are acceptable “filled” craters, voids or impressions performed by the de-icer boot manufacturer not exceeding the following limits:
	  • Length (L) ≤ 0.118 inch (3 mm)
	  • Height (H) ≤ 0.008 inch (0.20 mm)
	  • Density ≤ 5 “filled” reworks (i.e., craters, voids, or impressions) per square meter
		

Cuts	• Refer to MRB for disposition	
Hard Foreign Body (Stationary)	• Unknown embedded impurity (e.g., dirt) slight bump in the outer layer • Height (H) ≤ 0.008 inch (0.20 mm) • Maximum size of 0.003 square inch (2 mm^2) • Density ≤ 0.002 in^2/ft^2 (14 mm^2/m^2)	

	• Embedded “loose weave” from thread (indicated by multiple sequential bumps) in the outer layer is acceptable provided it does not exceed the following limits:
	  • Height (H) ≤ 0.008 inch (0.20 mm)
	  • Maximum size of each bump shall be 0.003 square inch (2 mm^2)
	  • Maximum length of 0.6 inch (15 mm)
		

Foreign Body (Moving)	• Refer to MRB for disposition	
Surface Scratches	• First ply only • Maximum length of 0.39 inch (10 mm) • Maximum depth of 0.004 inch (0.1 mm) • Surface scratches shall not exceed 10% per square foot of boot surface	
Linear Marks	• Hairline marks on the external ply (Note 3) • Linear marks shall not exceed 10% per square foot of boot surface	
Matt Finish (Note 4)	• First ply only • Differences in the shiny appearance of the outer surface, however, first ply is still intact (i.e., no Tear Offs) • Areas of dull finish shall not exceed 10% per square foot of boot surface • Matt finish caused by solvents are unacceptable as a brittle surface will result	

TABLE I - DEFECTS IN DE-ICER BOOTS

DEFECT	DESCRIPTION (NOTES 1 AND 2)	ILLUSTRATION
Stitch	• No more than 1 skipped stitch per single length of stitching • No skipped stitches along the centre line tube stitching • No broken threads • Slight bump caused by "loose thread" (see Note 5) allowed. No more than one "loose thread" bump per single length of stitching allowed	

Tear Offs	• Lack of material in the inner or outer ply
	• Not allowed for outer surface. Refer to MRB for disposition
	• Inner surface, first ply only, is allowed provided that the following limits are not exceeded:
	  • Maximum size of 0.05 square inch (30 mm^2)
	  • Maximum depth of 0.008 inch (0.2 mm). Internal plies shall be intact.
	  • No more than 1 such defect per square meter	

Wrinkles/Waves	• Outer surface (Allowed in De-icing Area B only - see Figure 13)
	  • Maximum length of 0.8 inch (20 mm) per wrinkle/wave
	  • Maximum height of 0.016 inch (0.4 mm) per wrinkle/wave
	  • No more than 3 such defects per each end of the de-icer boot (i.e., maximum of 6 such defects per de-icer boot)
	• Inner surface (Allowed in De-icing Area A and B - see Figure 13)
	  • This is only acceptable prior to bonding the de-icer boot. After bonding, these wrinkles/waves shall not be visible	

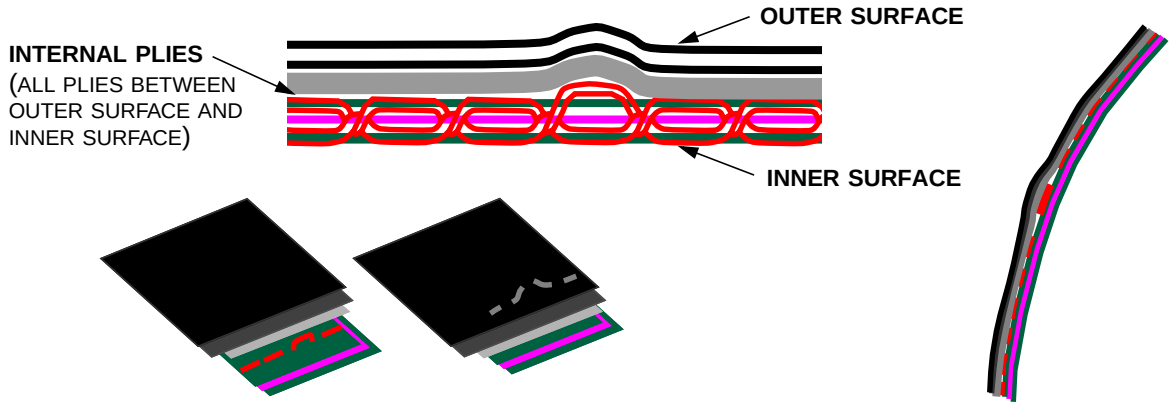
Note 1. These are the limitations to which these defects do not require MRB disposition. All defects exceeding the limitations specified shall be referred to MRB for disposition.

Note 2. Any defects which appear at the edges of the de-icer boot where it will be trimmed off after bonding shall not be cause for rejection.

Note 3. During the de-icer boot manufacturing process, dust or hairline scratches on the tool may cause impressions and/or linear marks.

Note 4. This requirement applies to de-icer boots that are cold bonded onto leading edges only as hot bonded de-icer boots may appear matt due to the heat applied during the bonding process. However, ensure hot bonded de-icer boots sheen appearance is consistent throughout (i.e., areas of inconsistency shall not exceed 10% per square foot of boot surface).

Note 5. See below for depictions of "LOOSE THREAD". During the de-icing boot manufacturing process, the "loose thread" is compressed down and forms a bump under the three plies of protective rubber.



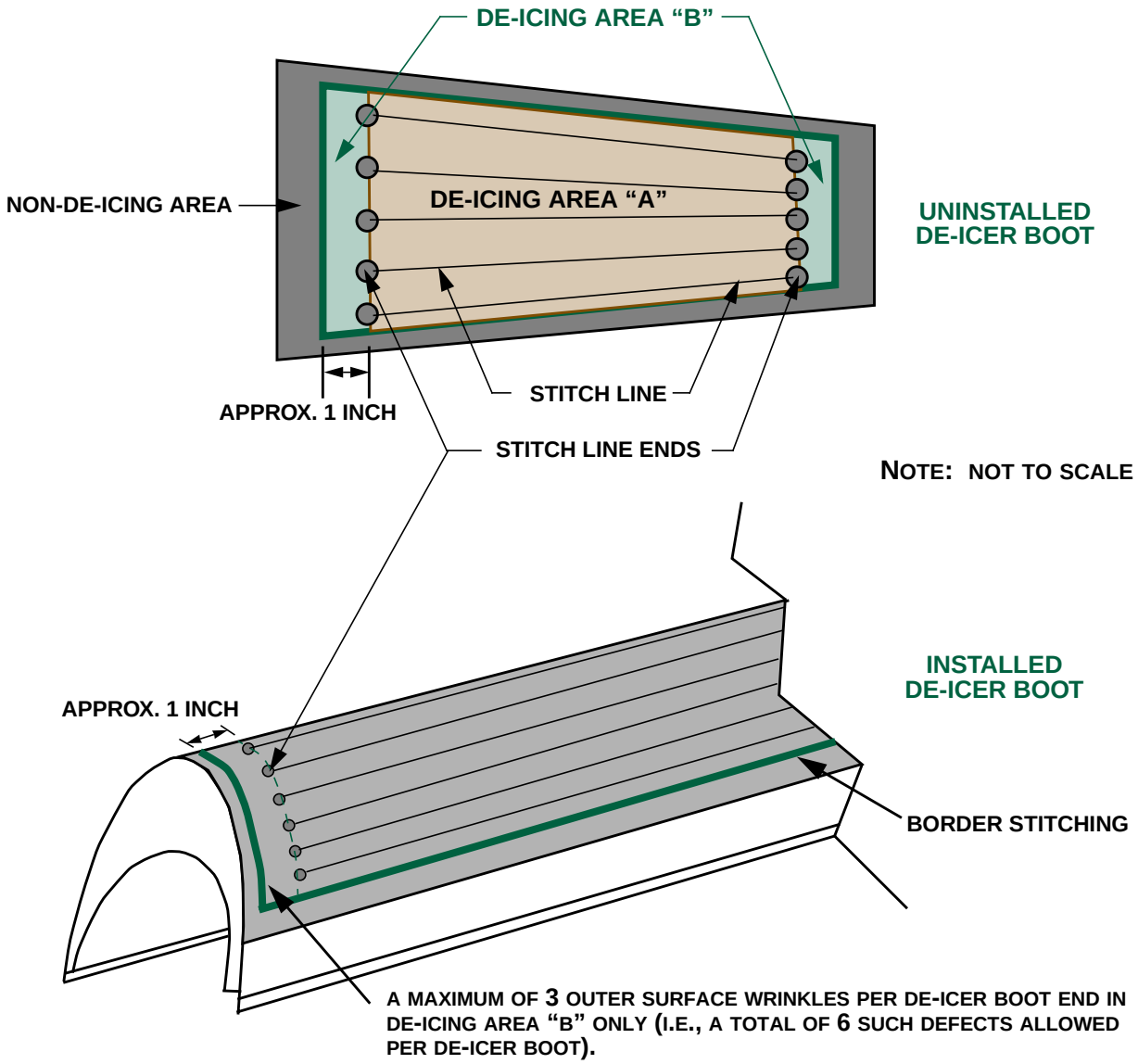


FIGURE 13 - DE-ICING BOOT WRINKLE INSPECTION AREAS

7 SAFETY PRECAUTIONS

7.1 Safety precautions applicable to the materials and procedures specified herein shall be defined by the subcontractor performing the work for Bombardier Toronto.

8 PERSONNEL REQUIREMENTS

8.1 This PPS has been categorized as a Controlled Critical Process according to PPS 13.39. Refer to PPS 13.39 for additional personnel requirements. Certified and/or qualified personnel shall have a good working knowledge of the following, as applicable:

- know the function of de-icer boots
- know how de-icer boots work
- know the differences between hot and cold bonding of de-icer boots
- know the advantages and disadvantages of hot bonding and cold bonding
- know why not to inflate de-icer boots before installation
- know why vertical stabilizer de-icers are always cold bonded
- know the procedure for laying-up, vacuum bagging and curing composite leading edge/de-icer boot assemblies (hot bonding)
- know the procedure for the bonding of de-icer boots to cured composite leading edges (cold bonding)
- know the differences between cold bonding de-icer boots to wing leading edges and the vertical stabilizer leading edge
- know how to install stall bars
- know the procedure for removal and/or repositioning of de-icer boots
- know how to trim installed boots.
- know how to measure installed boots for aerodynamic smoothness
- know the procedure for sealing de-icer boot ends and edges
- know how to apply temporary protective coating/tape (i.e., the latex coating or 3M SCPM-3 tape) to installed de-icer boots
- know the importance of the detrimental effects on the de-icer boot when the temporary protective coating/tape is exposed to heat and UV for an extended period of time
- know how to apply F31 conductive paint coating
- know the procedure for inflated inspection of installed de-icers
- know the Engineering and Quality requirements for de-icer boots, before and after installation
- know the Engineering and Quality requirements for installed stall bars
- know the safety precautions to observe when installing DASH 8 airframe de-icer boots
- know how to attach de-icers to a vacuum source and hold them under vacuum during installation
- know how to use the 85720013-053/054-248 drill jig to produce fastener holes for stall bar installation
- know how to use rubber rollers to improve de-icer boot bonds

9 STORAGE

9.1 Solvents, Sealants and Adhesives

9.1.1 Store sealant according to PPS 21.20.

9.1.2 Store solvents according to PPS 31.17.

9.1.3 Store DHMS A6.11 Type I Class 2 adhesive according to PPS 25.63.

9.1.4 Clearly mark the contents on all containers of solvents, adhesives and sealants.

9.1.5 Keep containers of solvents, adhesives and sealants tightly closed when not in use.

9.1.6 Always use the oldest stock first (i.e., first in/first out (FIFO) basis).

9.1.7 Storage life of sealants and adhesive shall be as specified in PPS 13.28.

9.2 De-Icer Boots

9.2.1 Do not leave boots unrolled for more than 48 hours. If installing boots or storing for short periods, lay boots on a clean flat surface with the air connectors capped according to PPS 6.05.

9.2.2 If shipping boots or storing them for longer than 48 hours, roll them as follows:

9.2.2.1 Lay the boot on a clean flat surface with the shiny side up. Ensure both sides are free of metal chips or other contamination. Ensure air connectors are open (uncapped) to the atmosphere.

9.2.2.2 Interleaf with paper and roll the boot, with the shiny side facing in, onto a 3" minimum diameter cardboard shell.

9.2.2.3 Roll each boot individually, never roll 2 or more together.

9.2.2.4 Always start rolling at the end away from the air connector and roll toward the air connector.

9.2.2.5 Re-cap the air connector according to PPS 6.05.

9.2.2.6 Place the rolled boot in a polyethylene bag and seal the bag.

9.2.2.7 For shipping, place the sealed de-icer boot in a shipping carton.

9.2.3 For de-icer boots which have not been installed onto the aircraft, do not store or expose de-icer boots with the applied temporary protective coating (i.e, either latex or SCPM-3 tape) to UV radiation (e.g., direct or indirect sunlight).