Temporary Maintenance Instruction
TMI109-542

Windshield – Install procedure

A109E
Helicopters

The technical content of this document is approved under the authority of DOA nr. EASA.21J.005.

The present TMI will be evaluated for its introduction in the standard set of Technical Publication.
If no further notice is received, the present document expires on October 2nd , 2024

2023-10-02

Introduction

The aim of this TMI is to provide instructions to install not reinforced windshield and reinforced windshield.

This TMI is composed by the following annexes:

- Annex 1 – Not reinforced windshield – Install procedure
- Annex 2 – Reinforced windshield – Install procedure

This information will be endorsed within A109E IETP issue 35th since it is currently missing.

Windshield – Install procedure

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Annex 1

Not reinforced windshield – Install procedure

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Table 1 References

Data Module	Title
MM - Section 00-20	HELICOPTER DESCRIPTION - Helicopter safety
MM - Section 30-41	ICE AND RAIN PROTECTION - Windshield wiper system
MM - Section 53-21	FUSELAGE - Wire strike protection system
MM - Section 56-00	WINDOWS– General
MM - Section 56-11	WINDOWS - Cockpit windows
CSRP – 51-20	STANDARD PRATICE STRUCTURE - Processes
CSRP – 51-40	STANDARD PRATICE STRUCTURE - Fasteners
09-A-00-50-00-00A-013A-D	Material data information publication – Numeric index
09-A-00-50-00-85A-074C-D	Sealing compound (C501) Data sheet for dangerous consumables and materials

Preliminary requirements

Required conditions

Table 2 Required conditions

Condition	Data Module/Technical Publication
Make helicopter safe for maintenance	MM - Section 00-20
If installed, the wire strike protection system must be removed	MM - Section 53-21
If installed, the wiper arms must be removed	MM - Section 30-41
The windshield must be removed	MM - Section 56-11

Support equipment

Table 3 Support equipment

Nomenclature	Identification No.	Qty
1. Spatula (flexible with rounded corners)	Local supply	1
2. Hi-speed cutter	Local supply	1
3. Cleco fastener with plastic extensions (or equivalent)	Local Supply	AR
4. Angular drill	Local supply	1

Supplies

Table 4 Supplies

Nomenclature	Identification No.	Qty
1. Abrasive paper (grit 100)	C055 (2)	AR
2. Abrasive paper (grit 320)	C055 (2)	AR
3. Abrasive paper (grit 1000)	C055 (2)	AR
4. Abrasive paper (grit 2000)	C055 (2)	AR
5. Mild soap	Local Supply	AR
6. Self-adhesive masking tape (3M 471, H:25.4mm) (1)	Local Supply	AR
7. Lint-free cloth	C011 (2)	AR
8. (D) Aliphatic naphtha	C059 (2)	AR
9. (D) Alcohol	C197 (2)	AR
10. (D) Sealing compound	C262 (2)	AR
11. (D) Sealing compound	C501 (2)	AR

(1) LHD Material Code: 590220203

(2) Refer to 09-A-00-50-00-00A-013A-D of the Material Data Information Publication.

Spares

Table 5 Spares

Nomenclature	Identification No.	Qty
1. Windshield, LH	109-0310-98-101	AR
2. Windshield, RH	109-0310-98-102	AR
3. Central retainer	109-0310-97-113	1
4. Upper retainer, LH	109-0310-97-207 (1)	AR
5. Lower retainer, LH	109-0310-97-209 (1)	AR
6. Lateral retainer, LH	109-0310-97-215 (1)	AR
7. Upper retainer, RH	109-0310-97-208 (1)	AR
8. Lower retainer, RH	109-0310-97-211 (1)	AR
9. Lateral retainer, RH	109-0310-97-216 (1)	AR
10. Rivet	NAS1738B5-7	AR
11. Rivet	MS20600AD4 (2)	AR
12. Rivet	MS20600AD5	AR
13. Screw	MS24694-S13 (3)	2
14. Washer	NAS1149FN832P (3)	4
15. Nut	MS21042L08 (3)	4
16. Rivet	NAS9301B-5-11 (3) (4)	AR
17. Rivet	NAS9301B-5-05 (3)	AR
18. Rivet	NAS9303B-5-02 (3)	AR
19. Rivet	NAS9303B-5-03 (3)	AR
20. Rivet	MS20470AD4 (3)	AR
21. Rivet	NAS9301B-5-03 (3)	AR
22. Rivet	NAS9303B-4	AR

(1) It's possible to realize items spares Ref. 4, 5, 6, 7, 8 and 9 by only one part on each assembly as on alternative.

(2) For the installation of the retainers you can use rivets P/N AGS4719, P/N NAS9302 or P/N NAS1738B as an alternative to rivets P/N MS20600.

(3) If installed the wire strike protection system.

(4) Before the installation, check the correct length of the rivets, otherwise use rivets P/N NAS9301B5-10 or P/N NAS19301B5-12.

Safety conditions

WARNING

THE CONSUMABLE MATERIALS IDENTIFIED BY (D) ARE DANGEROUS MATERIALS. BEFORE USE, MAKE SURE TO KNOW:

- THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS PRINTED ON THE LABEL ON THE CONTAINER THE MATERIAL WAS SUPPLIED IN.
- THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS ON THE MATERIAL SAFETY DATA SHEET.
- THE LOCAL SAFETY REGULATIONS.

ALSO MAKE SURE THAT THE APPLICABLE FIRST AID MATERIALS ARE AVAILABLE.

Procedure

CAUTION 1

Windshields are extremely sensitive to damage. Work surfaces, tools, and hands must be free of dust or debris when handling them.

CAUTION 2

When you rework the windshield, place it on a clean workbench covered with pluri-ball or similar protection; if the workbench is already protected, evaluate to add an additional layer or replace the existing one.

CAUTION 3

When you work with the windshield, protect it with a layer of paper. Reframe the paper about 50 mm long all around the perimeter.

Note 1

The new windshield is available with a pre-fit oversized dimension.

Note 2

The new windshield has a thin protective plastic layer on both faces to give protection from scratches during the handling. Do not remove the protective layer until the windshield installation is completed.

Note 3

It is important that there is no old sealant on the helicopter structure and the retainers. This can guarantee a good adhesion of the new windshield.

Note 4

The procedure that follows is applicable to both LH and RH windshields.

Note 5

Install the rivets as shown. If the condition of the hole is not correct, use an oversized rivet.

Note 6

Refer to the CSRP (Sect 51-40) for replacement of the rivet.

1. Fully remove any debris from the cockpit structure. Before the positioning of the windshield, protect all sharp edges with Self-adhesive masking tape (Supply Ref. 6) to prevent scratches to the windshield during check, installation and positioning operations (protect at least the areas indicated in Fig 1).

2. Inspect rivet-nuts and nut plates on the cockpit structure for presence of debris, excessive paint, or damage. If necessary, remove debris with compressed air, water or alcohol.

CAUTION

The windshield must be protected with the layer of paper.

Note

Verify the transparency of the windshield.

3. Temporarily put the new Windshield (Spare Ref. 1 or 2) in its position on the cockpit structure (see Fig 2) as follows:

3.1. Place the left windshield on the cockpit structure.

3.2. Put in position the lower inboard corner of windshield against the lower inboard corner of the frame.

4. Make sure that the windshield agrees with the shape of the cockpit structure and that it is centered and fully in contact with it around all the perimeter.

Note

Apply marks for reference during assembly and installation operations with a grease pencil or similar.

5. Make sure that there is a constant thermal expansion gap of 3,0 mm between the windshield edges and the cockpit structure. If you find a value less than 3,0 mm do as follows:

5.1. Mark with a grease pencil the zones where the windshield overlaps the frame. Also mark the inside edge of the windshield frame for reference.

5.2. Remove the windshield from the cockpit structure.

CAUTION 1

Perform trimming of large sections using a cutting wheel. Be careful not to let the machined area get too hot or melt the transparent protective plastic.

CAUTION 2

Cut close but not all the way through the marking made for later trimming.

5.3. Trim large section of the windshield with a cutting wheel.

5.4. Trim the windshield edges to the correct dimension with the Hi-speed cutter (Support equipment Ref. 2).

5.5. Put again the windshield in its position on the cockpit structure and make sure that there is a constant thermal expansion gap of 3,0 mm.

5.6. Do Step 5.1 thru Step 5.5 again until you get a good result.

6. Remove the windshield from the cockpit structure.

7. Rework the windshield edges to get a very smooth surface and remove possible signs of roughness that can cause defects during the helicopter operation. Do as follows:

7.1. Sand equally along the windshield edges with Abrasive paper, grit 1000 (Supply Ref. 3), at intervals wet the abrasive paper with a solution of water and Mild soap (Supply Ref. 5), until the sharp edges are removed. Make sure that the surface is wet at all times to avoid heat burns on the plastic.

7.2. Lightly touch the windshield edges with the fingers with a perimetral movement to find surface defects. If you find sharp edges or roughness, do Step 7.1 again.

CAUTION

Be careful not to overheat the windshield or melt the protective plastic.

Note

To perform sand operation use an angular drill (Support equipment Ref. 4).

7.3. Sand equally the windshield edges with Abrasive paper, grit 2000 (Supply Ref. 4), at intervals wet the abrasive paper with a solution of water and Mild soap (Supply Ref. 5). Make sure that the surface is wet at all times to avoid heat burns on the plastic.

7.4. Clean the reworked area of the windshield with water to remove remaining plastic debris and water-soap solution.

7.5. Dry the surface with a Lint-free cloth (Supply Ref. 7).

8. From the inner face of the windshield, remove the protective plastic layer from the area at a maximum distance of 20,0 mm from each edge around all the perimeter.

9. Lightly rub an area of the inner face with the maximum width of 13,0 mm from each edge with the Abrasive paper, grit 320 (Supply Ref. 2).

10. Fully remove possible debris from the windshield with Alcohol (Supply Ref. 9) and dry the surface with a Lint-free cloth (Supply Ref. 7).

11. Remove the protection applied by the part supplier. Make sure that the surface of the lens is free from debris.

11.1. Fully clean the windshield with Mild soap (Supply Ref. 5) made moist with water and dry with a Lint-free cloth (Supply Ref. 7).

12. Inspect for defects or scratches. In case of findings, please contact the LH Service Engineering (engineering.support.lhd@leonardo.com while for North, Central and South America contact AWPC.Engineering.Support@leonardocompany.us).

13. Before installing the windshields, make sure they are fully protected with the protective plastic on both the inner and outer sides.

14. From the inner face of the windshield, remove the protective plastic layer from the area at a maximum distance of 20,0 mm from each edge around all the perimeter.

15. Apply the Self-adhesive masking tape (Supply Ref. 6) at a distance of 13,0 mm from each edge, on the inner face of the windshield.

16. Apply a thin coat of Sealing compound (Supply Ref. 11) on the windshield mating surfaces with the cockpit structure (see Fig 2).

17. Put in position the lower inboard corner of windshield against the lower inboard corner of the frame. Make sure that it is centered and fully in contact with the cockpit structure all around the perimeter.

18. Make sure that there is enough sealant squeeze-out between the edge of the windshield and the cockpit structure.

Note

Make sure the bead of sealant has no air bubbles.

19. With the Spatula (flexible with rounded corners) (Support equipment Ref. 1), make the compound layer equal by smoothing around the cockpit structure contour.

20. Temporarily place clecos with plastic extensions (Support equipment Ref. 3), to apply enough pressure to windshield so movement does not occur.

21. Cure the Sealing compound (Supply Ref. 11) at ambient temperature for at least 48 hours.

22. Remove the masking tape.

23. From the outer face of the windshield, remove the protective plastic layer from the area at a maximum distance of 30,0 mm from each edge around all the perimeter.

24. Lightly rub an area of the outer face with the maximum width of 14,0 mm from each edge with the Abrasive paper, grit 320 (Supply Ref. 2).

25. Remove possible debris from the windshield with Alcohol (Supply Ref. 9) and dry the surface with a Lint-free cloth (Supply Ref. 7).

26. On the outer face of the windshield, outline an area at a distance of 14,0 mm from each edge with the Self-adhesive masking tape (Supply Ref. 6).

27. Prepare the Central retainer (Spare Ref. 3) as follows:

27.1. Lightly sand with Abrasive paper, grit 100 (Supply Ref. 1), the face of the central retainer that will be bonded to the windshield (see Fig 2). Be careful not to damage the composite surface of the central retainer.

27.2. Temporarily put in position the central retainer on the cockpit structure and countermark the position of the holes where the rivets will be installed (see Fig 2).

27.3. Remove the central retainer from the cockpit structure and drill the countermarked holes at the final dimension of 3,25 to 3,35 mm and 4,06 to 4,17 mm to install the rivets (see Fig 2). Make sure of the proper alignment of the holes.

CAUTION

Do not contact the aliphatic naphtha with the surface of the windshield. The contact of aliphatic naphtha with the plastic material of the windshield may affect the transparency.

27.4. Fully clean possible debris from the surface of the central retainer with a Lint-free cloth (Supply Ref. 7) moist with Aliphatic naphtha (Supply Ref. 8) or Alcohol (Supply Ref. 9).

27.5. Let the aliphatic naphtha, or alcohol, evaporate for at least 30 minutes.

28. Put and keep in position the central retainer on the cockpit structure.

29. Protect both windshields with the Self-adhesive masking tape (Supply Ref. 6) to prevent contact of sealing compound. Apply the masking tape at a distance of approximately 2 mm from the central retainer.

30. Remove the central retainer from the cockpit structure and apply a thin layer of Sealing compound (Supply Ref. 10) to the surface of the central retainer to be bonded on the windshield (See Section E-E of Fig 2).

31. If the sealant squeeze out between the edge of the windshield and the cockpit structure is not sufficient, fill all void areas with the sealing compound (Supply Ref. 10).

Note

Make sure the bead of the sealant has no air bubbles.

32. Put and keep in position the central retainer. Apply a firm pressure to ensure a correct bond.

33. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

34. (Helicopters without the wire strike protection system) Wet install the Rivets (Spare Ref. 11 and Ref. 12) in correspondence of the drilled hole on the central retainer as shown in Fig 2 with Sealing compound (Supply Ref. 10).

34.1. Cure the Sealing compound (Supply Ref. 10) at ambient temperature for at least 48 hours.

35. (Helicopters with the wire strike protection system) Secure the central retainer as follows:

35.1. Oversize the four upper holes of the central retainer to the final dimension of 4,19 to 4,44 mm and countersink to 8,43 mm x 100° the outer side (see Fig 3, Detail A).

35.2. Put and keep in position the mounting angle and verify that all the holes match with the holes on the central retainer (see Fig 3).

35.3. Remove the mounting angle from the central retainer and apply a thin coat of Sealing compound (Supply Ref. 11) to the surface of the mounting angle to be bonded on the central retainer. Refer to 09-A-00-50-00-85A-074C-D.

35.4. Put and keep in position the mounting angle. Apply a firm pressure to ensure a correct bond.

35.5. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

35.6. Secure the mounting angle to the central retainer with the four Screws (Spare Ref. 13, the four Washers (Spare Ref. 14) and the four Nuts (Spare Ref. 15).Refer to Detail A of Fig 3. The screws must be wet installed. Refer to 09-A-00-50-00-85A-074C-D.

35.7. Wet install the Rivets (Spare Ref. 16) on the mounting angle as shown in Fig 3 (Detail A) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

35.8. Wet install the Rivets (Spare Ref. 11) on the central retainer as shown in Fig 3 (View D) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

36. Prepare the lower, the lateral and the upper retainer (Spare Ref. 4, 5 and 6 or 7, 8 and 9) as follows:

36.1. Lightly sand with Abrasive paper, grit 100 (Supply Ref. 1) the face of the retainers that will be bonded to the windshield. Be careful not to damage the composite surface of the retainers.

36.2. Place lower, lateral and upper retainer (Spare Ref. 4, 5 and 6 or 7, 8 and 9) into position and trim as necessary to achieve correct mating with the corresponding structure.

36.3. Temporarily put in position the retainers on the cockpit structure and countermark the position of the holes where the rivets will be installed (See Fig 2).

36.4. Remove the lower, the lateral and the upper retainer from the cockpit structure and drill the countermarked holes at the final dimension of 3,25 to 3,35 mm. Make sure of the proper alignment of the holes.

CAUTION

Do not contact the aliphatic naphtha with the surface of the windshield. The contact of aliphatic naphtha with the plastic material of the windshield may affect the transparency.

36.5. Fully clean possible debris from the surface of the retainers with a Lint-free cloth (Supply Ref. 7) moist with Aliphatic naphtha (Supply Ref. 8) or Alcohol (Supply Ref. 9).

36.6. Let the aliphatic naphtha, or alcohol, evaporate for at least 30 minutes.

37. Put and keep in position the retainers on the cockpit structure.

38. Protect the windshield with the Self-adhesive masking tape (Supply Ref. 6) to prevent contact of sealing compound. Apply the masking tape at a distance of approximately 2 mm from the retainers.

39. Remove the retainers from the cockpit structure and apply a thin layer of Sealing compound (Supply Ref. 10) to the surface of the lower, lateral and upper retainer to be bonded on the windshield (see Fig 2).

40. If the sealant squeeze out between the edge of the windshield and the cockpit structure is not sufficient, fill all void areas with Sealing compound (Supply Ref. 10).

Note

Make sure the bead of sealant has no air bubbles.

41. Put and keep in position the lower, the lateral and the upper retainer. Apply a firm pressure to ensure a correct bond.

42. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

43. Wet install the Rivets (Spare Ref. 10) on the lateral retainer as shown in Fig 2 with Sealing compound (Supply Ref. 10).

44. (Helicopters without the wire strike protection system) Wet install the Rivets (Spare Ref. 11) on the lower retainer and on the upper retainer as shown in Fig 2 with Sealing compound (Supply Ref. 10).

44.1. Cure the Sealing compound (Supply Ref. 10) at ambient temperature for at least 48 hours.

45. (Helicopters with the wire strike protection system and the windshield wipers kit) Secure the lower retainer and the upper retainer as follows:

45.1. Put and keep in position the doubler and the shim (see Fig 3, view B) and verify that all the holes match with the holes on the retainers and on the structure of the helicopter.

45.2. Remove the doubler and the shim and apply a thin coat of Sealing compound (Supply Ref. 11) on the contact surfaces of the doubler and the shim.

45.3. Put and keep in position the doubler and the shim. Apply a firm pressure to ensure a correct bond.

45.4. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

45.5. Wet install the rivets on the doubler as shown in Fig 3 (view B) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.6. Put and keep in position the left support and the right support (see Fig 3, view B) and verify that all the holes match with the holes on the doubler.

45.7. Remove the left support and the right support from the doubler and apply a thin coat of Sealing

compound (Supply Ref. 11) on the mating surfaces.

45.8. Put and keep in position the left and the right support. Apply a firm pressure to ensure a correct bond.

45.9. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

45.10. Wet install the rivets on the left support and on the right support as shown in Fig 3 (View B) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.11. Wet install the rivets on the upper retainer as shown in Fig 2 with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.12. Put and keep in position the internal and external supports (and the doubler, if present) (see Fig 3, view C) and verify that all the holes match with the holes on the lower retainer and the structure.

45.13. Remove the internal and external support (and the doubler, if present) and apply a thin coat of Sealing compound (Supply Ref. 11) on the contact surfaces of the deflector and the shim.

45.14. Put and keep in position the internal and external supports (and the doubler, if present). Apply a firm pressure to ensure a correct bond.

45.15. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

45.16. Wet install the rivets on the internal and external supports (and the doubler, if present) as shown in Fig 3 (View C) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.17. Wet install the rivets on the lower retainer as shown in Fig 2 with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.18. Cure the sealing compound. Refer to 09-A-00-50-00-85A-074C-D.

45.19. Fill gap between the internal and external support and the structure with Sealing compound (Supply Ref. 11).

45.20. Let the adhesive cure at ambient temperature for at least 24 hours or at a temperature between 60 and 70°C for at least 2 hours.

45.21. Install the quick disconnect plug on the deflector.

45.22. Install the upper cutter of the Wire Strike Protection System. Refer to the Maintenance Manual (Section 53-24).

46. (Helicopters with the windshield wipers kit) Countermark the position of the motor shaft of the wiper arm on the lower retainer and on the windshield (see Fig 4). Drill a hole in correspondence of the before countermarked position to the final dimension of 18,00 mm.

47. Remove the masking tape from both faces of the windshield.

48. Apply the surface finish. Refer to the CSRP (Sect. 51-20).

49. Remove the thin protective plastic layer from both faces of the windshield.

50. (Helicopters with the windshield wipers kit) Install the wiper arm. Refer to the Maintenance Manual (Section 30-41).

Requirements after job completion

1. Remove all the tools and the other items from the work area. Make sure that the work area is clean.

2. Clean the windshield. Refer to the Maintenance Manual (Section 56-00).

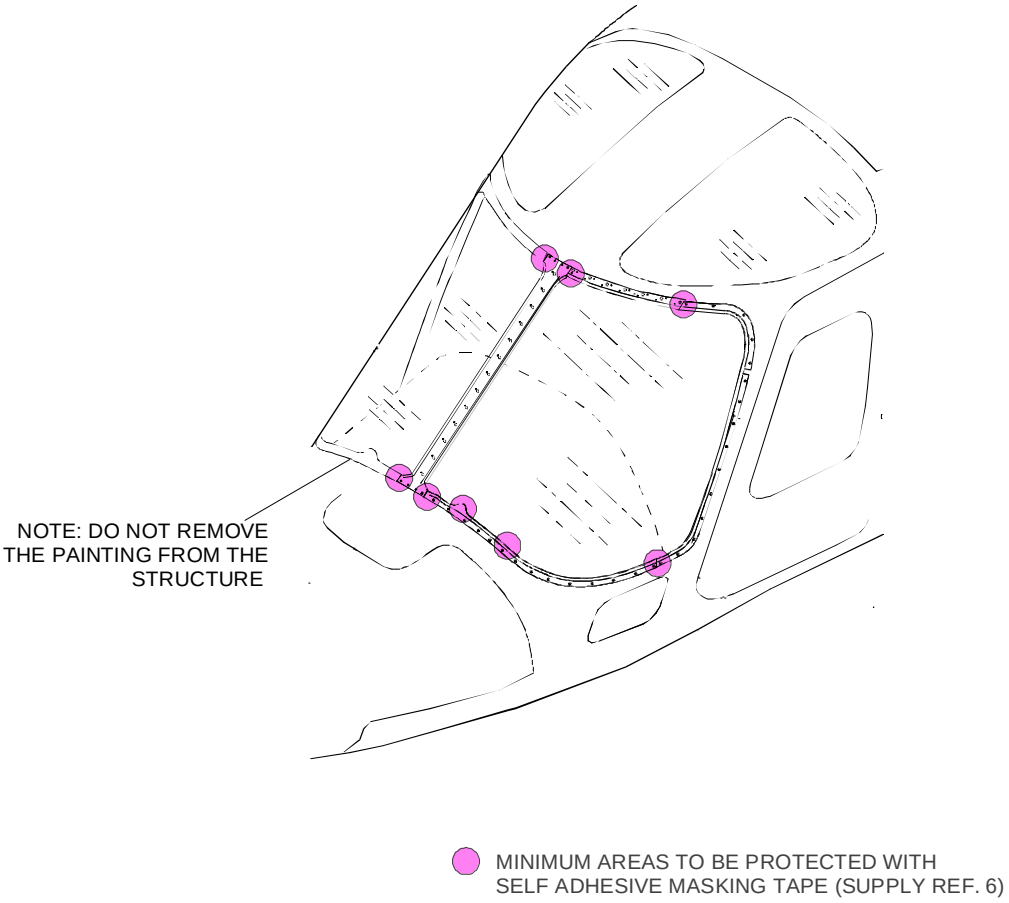

Figure 1 – Areas to be protected with tape.

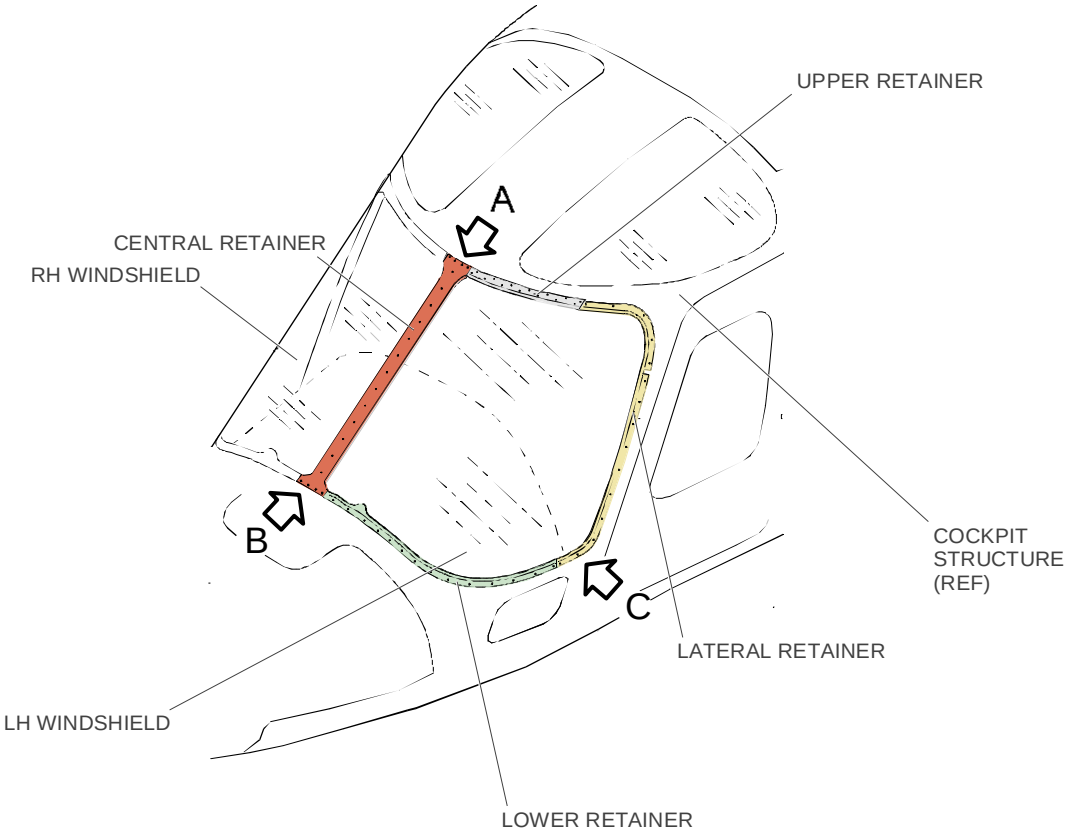

Figure 2 – Not reinforced windshield – Install procedure (Sheet 1 of 3).

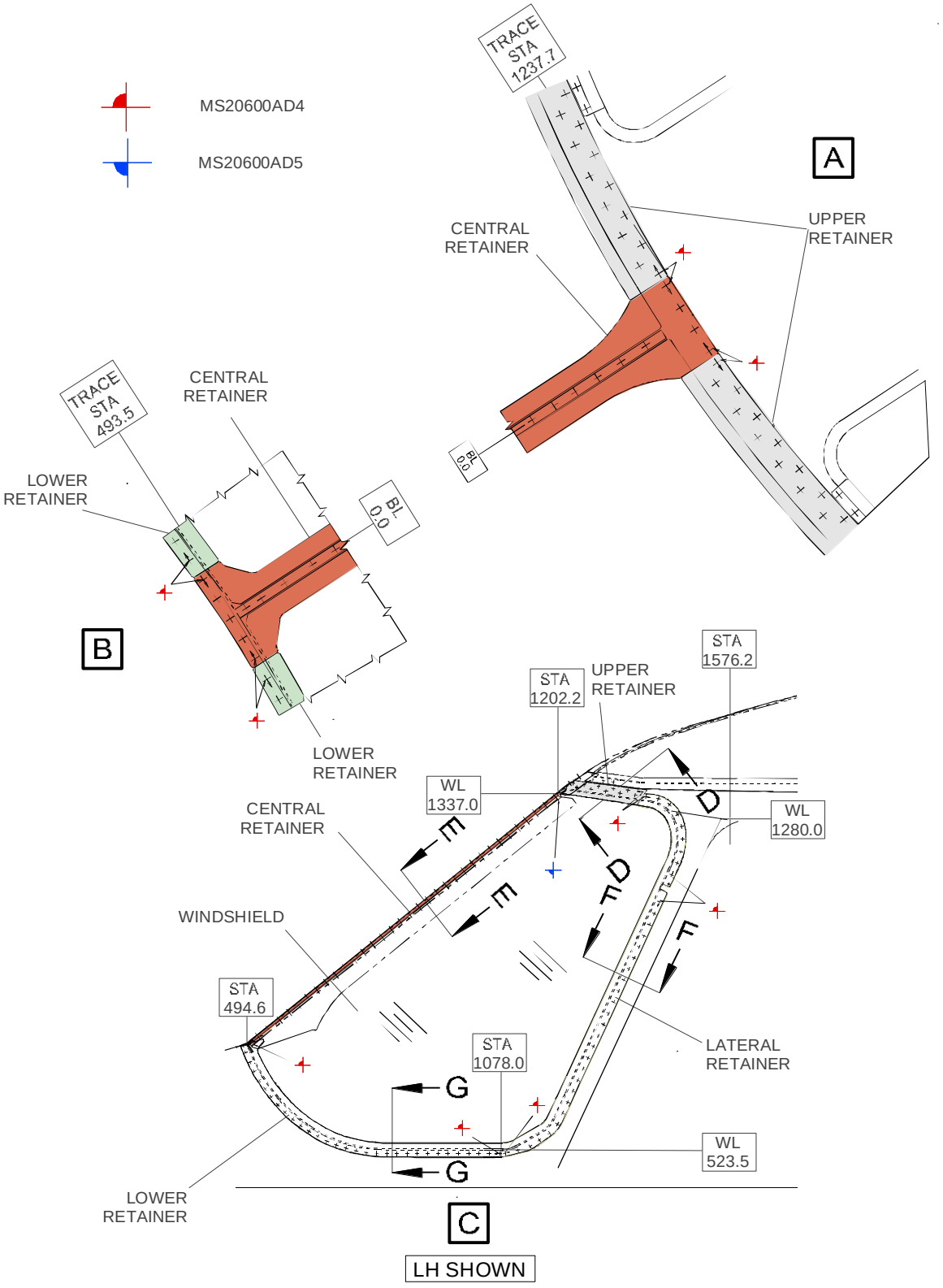

Figure 2 – Not reinforced windshield – Install procedure (Sheet 2 of 3).

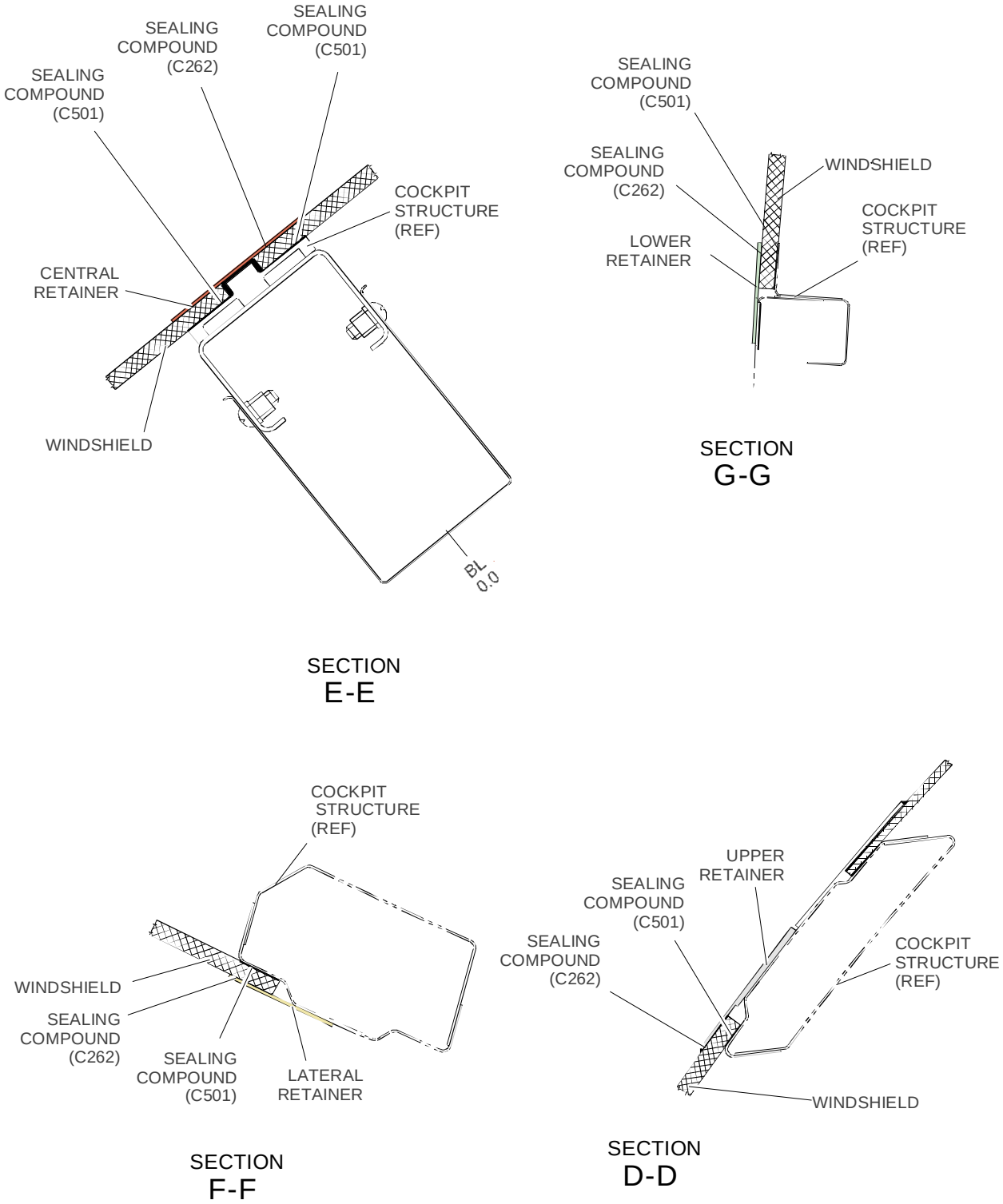

Figure 2 – Not reinforced windshield – Install procedure (Sheet 3 of 3).

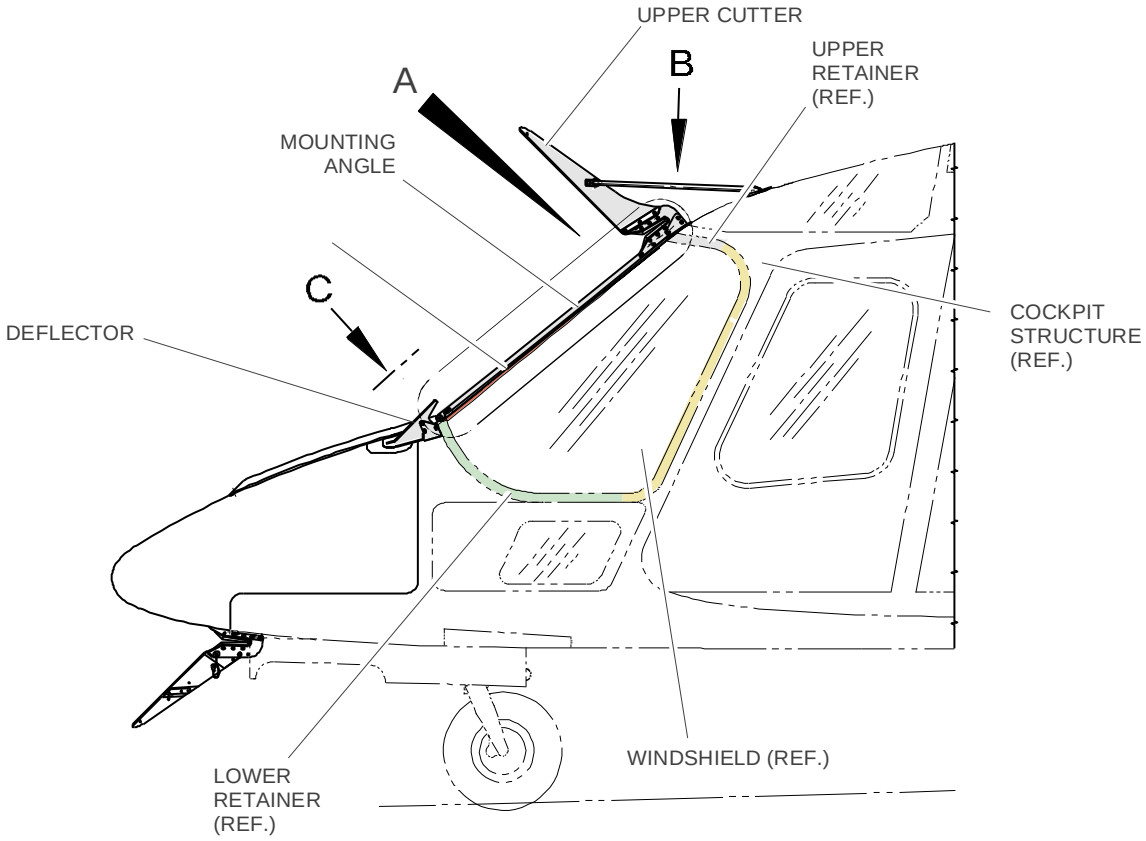

Figure 3 – Wire strike protection (If present) – Install procedure (Sheet 1 of 3).

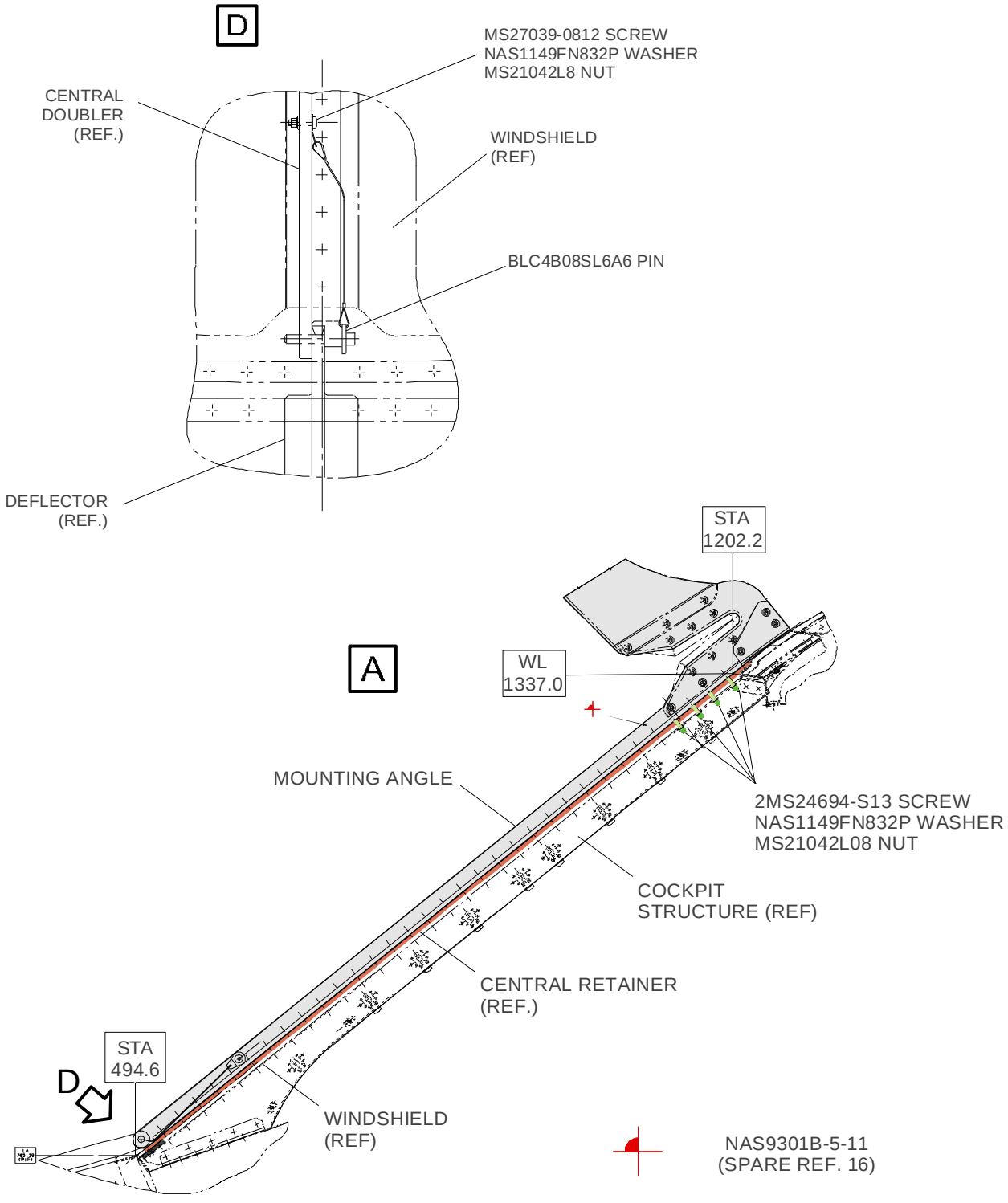

Figure 3 – Wire strike protection (If present) – Install procedure (Sheet 2 of 3).

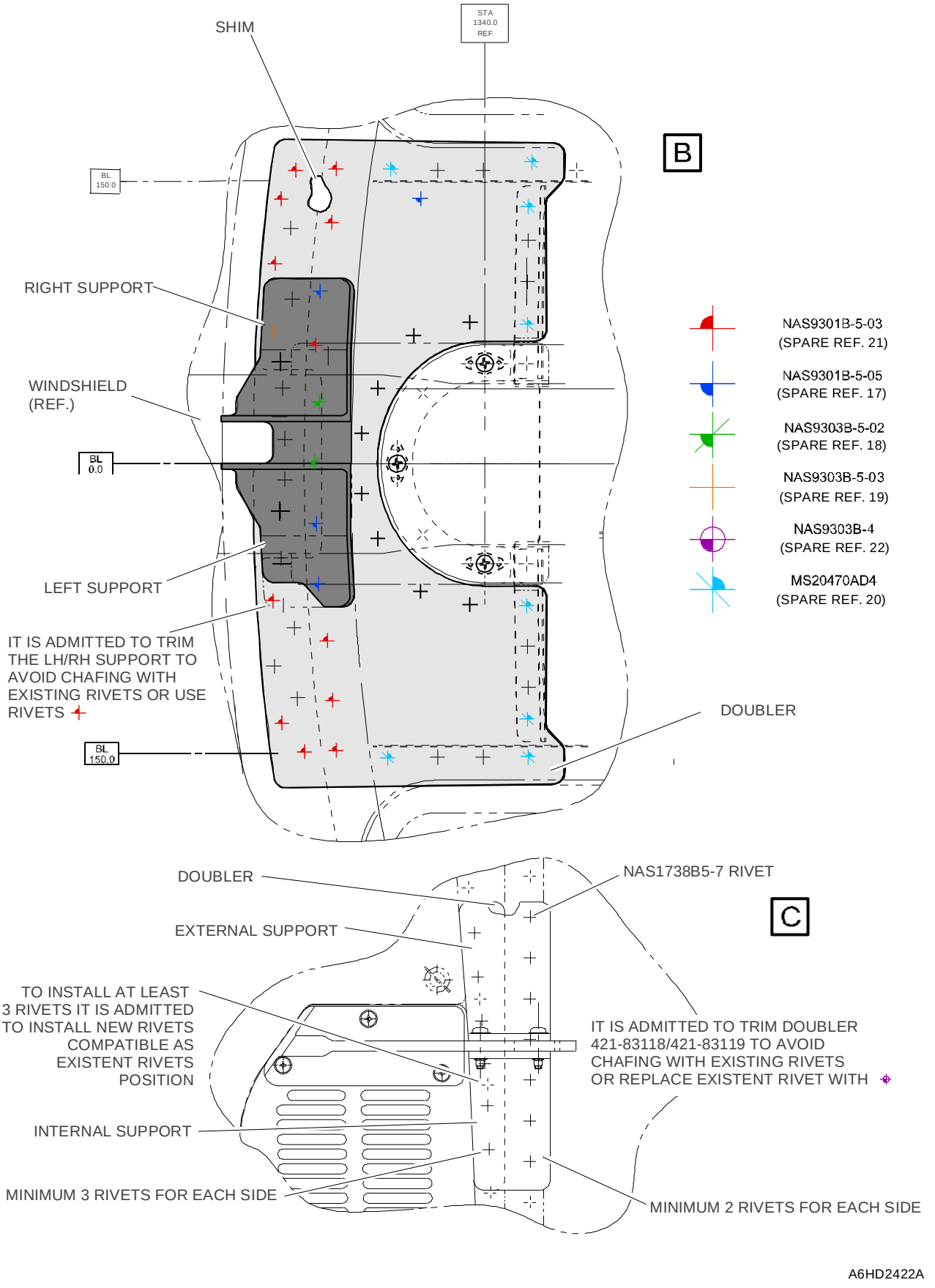

Figure 3 – Wire strike protection (If present) – Install procedure (Sheet 3 of 3).

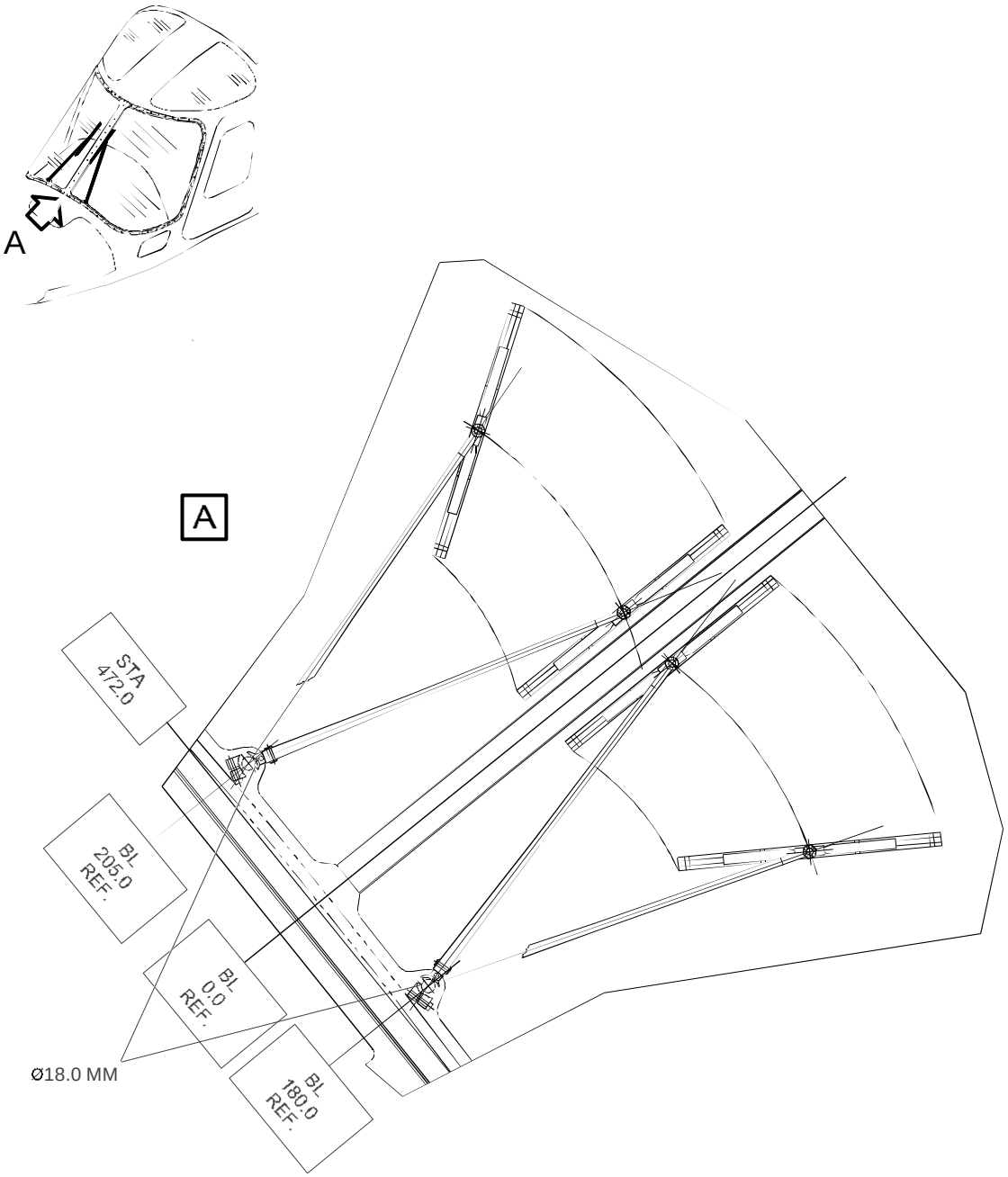

Figure 4 – Wiper arm (If present) – Motor shaft holes

Annex 2

Reinforced windshield – Install procedure

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References

Table 1 References

Data Module	Title
MM - Section 00-20	HELICOPTER GENERAL - Helicopter safety
MM - Section 30-41	ICE AND RAIN PROTECTION - Windshield wiper system
MM - Section 53-21	FUSELAGE - Wire strike protection system
MM - Section 56-00	WINDOWS AND CANOPIES – General
MM - Section 56-11	WINDOWS AND CANOPIES - Cockpit windows
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Preliminary requirements

Required conditions

Table 2 Required conditions

Condition	Data Module/Technical Publication
Make helicopter safe for maintenance	MM - Section 00-20
If installed, the wire strike protection system must be removed	MM - Section 53-21
If installed, the wiper arms must be removed	MM - Section 30-41
The windshield must be removed	MM - Section 56-11

Support equipment

Table 3 Support equipment

Nomenclature	Identification No.	Qty
1. Spatula (flexible with rounded corners)	Local supply	1
2. Hi-speed cutter	Local supply	1
3. Cleco fastener with plastic extensions (or equivalent)	Local Supply	AR
4. Angular drill	Local supply	1

Supplies

Table 4 Supplies

Nomenclature	Identification No.	Qty
1. Abrasive paper (grit 100)	C055 (2)	AR
2. Abrasive paper (grit 320)	C055 (2)	AR
3. Abrasive paper (grit 1000)	C055 (2)	AR
4. Abrasive paper (grit 2000)	C055 (2)	AR
5. Mild soap	Local Supply	AR
6. Self-adhesive masking tape (3M 471, H:25.4mm) (1)	Local Supply	AR
7. Lint-free cloth	C011 (2)	AR
8. (D) Aliphatic naphtha	C059 (2)	AR
9. (D) Alcohol	C197 (2)	AR
10. (D) Sealing compound	C262 (2)	AR
11. (D) Sealing compound	C501 (2)	AR

(1) LHD Material Code: 590220203

(2) Refer to 09-A-00-50-00-00A-013A-D of the Material Data Information Publication.

Spares

Table 5 Spares

Nomenclature	Identification No.	Qty
1. Windshield, LH	109-0310-93-105	AR
2. Windshield, RH	109-0310-93-106	AR
3. Central retainer	109-0310-97-113	1
4. Upper retainer, LH	109-0310-97-107 (1)	AR
5. Lower retainer, LH	109-0310-97-109 (1)	AR
6. Lateral retainer, LH	109-0310-97-115 (1)	AR
7. Upper retainer, RH	109-0310-97-108 (2)	AR
8. Lower retainer, RH	109-0310-97-111 (2)	AR
9. Lateral retainer, RH	109-0310-97-116 (2)	AR
10. Doubler	109-0310-97-123	1
11. Rivet	MS20600AD4 (3)	AR
12. Rivet	MS20600AD5	AR
13. Screw	MS24694-S13 (4)	2
14. Washer	NAS1149FN832P (4)	4
15. Nut	MS21042L08 (4)	4
16. Rivet	NAS9301B-5-11 (4) (5)	AR
17. Rivet	NAS9301B-5-05 (4)	AR
18. Rivet	NAS9303B-5-02 (4)	AR
19. Rivet	NAS9303B-5-03 (4)	AR
20. Rivet	MS20470AD4 (3)	AR
21. Rivet	NAS9301B-5-03 (3)	AR
22. Rivet	NAS1738B5-7 (3)	AR
23. Rivet	NAS9303B-4	AR

(1) As an alternative, it's possible that spares Ref. 4, 5 and 6 are part of an assembly spare replacement P/N 109-0310-97-103A1 or 109-0310-97-103A2, or individual spare replacements P/N 109-0310-97-107M01, 109-0310-97-109M01 and 109-0310-97-115M01.

(2) As an alternative, it's possible that spares Ref.2, 7, 8 and 9 are part an assembly spare replacement P/N 109-0310-97-105A1 or 109-0310-97-105A2 or individual spare replacements P/N 109-0310-97-108M01, 109-0310-97-111M01 and 109-0310-97-116M01.

(3) When installing the retainers, where necessary due to ovalized hole, use rivets M7885/6-4-02.

(4) If installed the wire strike protection system.

(5) Before the installation, check the correct length of the rivets, otherwise use rivets P/N NAS9301B5-10 or P/N NAS19301B5-12.

Safety conditions

WARNING

THE CONSUMABLE MATERIALS IDENTIFIED BY (D) ARE DANGEROUS MATERIALS. BEFORE USE, MAKE SURE TO KNOW:

- THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS PRINTED ON THE LABEL ON THE CONTAINER THE MATERIAL WAS SUPPLIED IN.
- THE SAFETY PRECAUTIONS AND FIRST AID INSTRUCTIONS ON THE MATERIAL SAFETY DATA SHEET.
- THE LOCAL SAFETY REGULATIONS.

ALSO MAKE SURE THAT THE APPLICABLE FIRST AID MATERIALS ARE AVAILABLE.

Procedure

CAUTION 1

Windshields are extremely sensitive to damage. Work surfaces, tools, and hands must be free of dust or debris when handling them.

CAUTION 2

When you rework the windshield, place it on a clean workbench covered with pluri-ball or similar protection; if the workbench is already protected, evaluate to add an additional layer or replace the existing one.

CAUTION 3

When you work with the windshield, protect it with a layer of paper. Reframe the paper about 50 mm long all around the perimeter.

Note 1

The new windshield is available with a pre-fit oversized dimension.

Note 2

The new windshield has a thin protective plastic layer on both faces to give protection from scratches during the handling. Do not remove the protective layer until the windshield installation is completed.

Note 3

It is important that there is no old sealant on the helicopter structure and the retainers. This can guarantee a good adhesion of the new windshield.

Note 4

The procedure that follows is applicable to both LH and RH windshields.

Note 5

Install the rivets as shown. If the condition of the hole is not correct, use an oversized rivet.

Note 6

Refer to the CSRP (Sect. 51-40) for replacement of the rivet.

1. Fully remove any debris from the cockpit structure. Before the positioning of the windshield, protect all sharp edges with Self-adhesive masking tape (Supply Ref. 6) to prevent scratches to the windshield during check, installation and positioning operations (protect at least the areas indicated in Fig 1).

2. Inspect rivet-nuts and nut plates on the cockpit structure for presence of debris, excessive paint, or damage. If necessary, remove debris with compressed air, water or alcohol.

CAUTION

The windshield must be protected with the layer of paper.

Note

Verify the transparency of the windshield.

3. Temporarily put the new Windshield (Spare Ref. 1 or 2) in its position on the cockpit structure (see Fig 2) as follows:

3.1.1. Place the left windshield on the cockpit structure.

3.1.2. Put in position the lower inboard corner of windshield against the lower inboard corner of the frame.

4. Make sure that the windshield agrees with the shape of the cockpit structure and that it is centered and fully in contact with it around all the perimeter.

Note

Apply marks for reference during assembly and installation operations with a grease pencil or similar.

5. Make sure that there is a constant thermal expansion gap of 3,0 mm between the windshield edges and the cockpit structure. If you find a value less than 3,0 mm do as follows:

5.1. Mark with a grease pencil the zones where the windshield overlaps the frame. Also mark the inside edge of the windshield frame for reference.

5.2. Remove the windshield from the cockpit structure.

CAUTION 1

Perform trimming of large sections using a cutting wheel. Be careful not to let the machined area get too hot or melt the transparent protective plastic.

CAUTION 2

Cut close but not all the way through the marking made for later trimming.

5.3. Trim large section of the windshield with a cutting wheel.

5.4. Trim the windshield edges to the correct dimension with the Hi-speed cutter (Support equipment Ref. 2).

5.5. Put again the windshield in its position on the cockpit structure and make sure that there is a constant thermal expansion gap of 3,0 mm.

5.6. Do Step 5.1 thru Step 5.5 again until you get a good result.

6. Remove the windshield from the cockpit structure.

7. Rework the windshield edges to get a very smooth surface and remove possible signs of roughness that can cause defects during the helicopter operation. Do as follows:

7.1. Sand equally along the windshield edges with Abrasive paper, grit 1000 (Supply Ref. 3), at intervals wet the abrasive paper with a solution of water and Mild soap (Supply Ref. 5), until the sharp edges are removed. Make sure that the surface is wet at all times to avoid heat burns on the plastic.

7.2. Lightly touch the windshield edges with the fingers with a perimetral movement to find surface defects. If you find sharp edges or roughness, do Step 7.1 again.

CAUTION

Be careful not to overheat the windshield or melt the protective plastic.

Note

To perform sand operation use an angular drill (Support equipment Ref. 4).

7.3. Sand equally the windshield edges with Abrasive paper, grit 2000 (Supply Ref. 4), at intervals wet the abrasive paper with a solution of water and Mild soap (Supply Ref. 5). Make sure that the surface is wet at all times to avoid heat burns on the plastic.

7.4. Clean the reworked area of the windshield with water to remove remaining plastic debris and water-soap solution.

7.5. Dry the surface with a Lint-free cloth (Supply Ref. 7).

8. From the inner face of the windshield, remove the protective plastic layer from the area at a maximum distance of 20,0 mm from each edge around all the perimeter.

9. Lightly rub an area of the inner face with the maximum width of 13,0 mm from each edge with the Abrasive paper, grit 320 (Supply Ref. 2).

10. Fully remove possible debris from the windshield with Alcohol (Supply Ref. 9) and dry the surface with a Lint-free cloth (Supply Ref. 7).

11. Remove the protection applied by the part supplier. Make sure that the surface of the lens is free from debris.

11.1. Fully clean the windshield with Mild soap (Supply Ref. 5) made moist with water and dry with a Lint-free cloth (Supply Ref. 7).

12. Inspect for defects or scratches. If defects or scratches are found contact TC holder.

13. Before installing the windshields, make sure they are fully protected with the protective plastic on both the inner and outer sides.

14. From the inner face of the windshield, remove the protective plastic layer from the area at a maximum distance of 20,0 mm from each edge around all the perimeter.

15. Apply the Self-adhesive masking tape (Supply Ref. 6) at a distance of 13,0 mm from each edge, on the inner face of the windshield.

16. Apply a thin coat of Sealing compound (Supply Ref. 10) on the windshield mating surfaces with the cockpit structure (see Fig 2).

17. Put in position the lower inboard corner of windshield against the lower inboard corner of the frame. Make sure that it is centered and fully in contact with the cockpit structure all around the perimeter.

18. Make sure that there is enough sealant squeeze-out between the edge of the windshield and the

cockpit structure.

Note

Make sure the bead of sealant has no air bubbles.

19. With the Spatula (flexible with rounded corners) (Support equipment Ref. 1), make the compound layer equal by smoothing around the cockpit structure contour.

20. Temporarily place clecos with plastic extensions (Support equipment Ref. 3), to apply enough pressure to windshield so movement does not occur.

21. Cure the Sealing compound (Supply Ref. 10) at ambient temperature for at least 48 hours.

22. Remove the masking tape.

23. From the outer face of the windshield, remove the protective plastic layer from the area at a maximum distance of 30,0 mm from each edge around all the perimeter.

24. Lightly rub an area of the outer face with the maximum width of 14,0 mm from each edge with the Abrasive paper, grit 320 (Supply Ref. 2).

25. Remove possible debris from the windshield with Alcohol (Supply Ref. 9) and dry the surface with a Lint-free cloth (Supply Ref. 7).

26. On the outer face of the windshield, outline an area at a distance of 14,0 mm from each edge with the Self-adhesive masking tape (Supply Ref. 6).

27. Prepare the Central retainer (Spare Ref. 3) as follows:

27.1. Lightly sand with Abrasive paper, grit 100 (Supply Ref. 1), the face of the central retainer that will be bonded to the windshield (see Fig 2). Be careful not to damage the composite surface of the central retainer.

27.2. Temporarily put in position the central retainer and the Doubler (Spare Ref. 10) on the cockpit structure and countermark the position of the holes where the rivets will be installed (see Fig 2).

27.3. Remove the central retainer and the doubler from the cockpit structure and drill the countermarked holes at the final dimension of 3,25 to 3,35 mm and 4,06 to 4,17 mm to install the rivets (see Fig 2). Make sure of the proper alignment of the holes.

CAUTION

Do not contact the aliphatic naphtha with the surface of the windshield. The contact of aliphatic naphtha with the plastic material of the windshield may affect the transparency.

27.4. Fully clean possible debris from the surface of the central retainer and the doubler with a Lint-free cloth (Supply Ref. 7) moist with Aliphatic naphtha (Supply Ref. 8) or Alcohol (Supply Ref. 9).

27.5. Let the aliphatic naphtha, or alcohol, evaporate for at least 30 minutes.

28. Put and keep in position the central retainer and the doubler on the cockpit structure.

29. Protect both windshields with the Self-adhesive masking tape (Supply Ref. 6) to prevent contact of sealing compound. Apply the masking tape at a distance of approximately 2 mm from the central retainer.

30. Remove the central retainer from the cockpit structure and apply a thin layer of Sealing compound

(Supply Ref. 10) to the surface of the central retainer to be bonded on the windshield (See Section E-E of Fig 2).

31. If the sealant squeeze out between the edge of the windshield and the cockpit structure is not sufficient, fill all void areas with the Sealing compound (Supply Ref. 10).

Note

Make sure the bead of the sealant has no air bubbles.

32. Put and keep in position the central retainer. Apply a firm pressure to ensure a correct bond.

33. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

34. (Helicopters without the wire strike protection system) Wet install the Rivets (Spare Ref. 11 and Ref. 12) in correspondence of the drilled hole on the central retainer as shown in Fig 2 with Sealing compound (Supply Ref. 10).

34.1. Cure the Sealing compound (Supply Ref. 10) at ambient temperature for at least 48 hours.

35. (Helicopters with the wire strike protection system) Secure the central retainer as follows:

35.1. Oversize the four upper holes of the central retainer to the final dimension of 4,19 to 4,44 mm and countersink to 8,43 mm x 100° the outer side (see Fig 3, Detail A).

35.2. Put and keep in position the mounting angle and verify that all the holes match with the holes on the central retainer (see Fig 3).

35.3. Remove the mounting angle from the central retainer and apply a thin coat of Sealing compound (Supply Ref. 11) to the surface of the mounting angle to be bonded on the central retainer.

35.4. Put and keep in position the mounting angle. Apply a firm pressure to ensure a correct bond.

35.5. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

35.6. Secure the mounting angle to the central retainer with the four Screws (Spare Ref. 13), the four Washers (Spare Ref. 14) and the four Nuts (Spare Ref. 15).Refer to Detail A of Fig 3. The screws must be wet installed. Refer to 09-A-00-50-00-85A-074C-D.

35.7. Wet install the Rivets (Spare Ref. 16) on the mounting angle as shown in Fig 3 (Detail A) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

35.8. Wet install the Rivets (Spare Ref. 11) on the central retainer as shown in Fig 3 (View D) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

36. Prepare the lower, the lateral and the upper retainer (Spare Ref. 4, 5 and 6 or 7, 8 and 9) as follows:

36.1. Lightly sand with Abrasive paper, grit 100 (Supply Ref. 1) the face of the retainers that will be bonded to the windshield. Be careful not to damage the composite surface of the retainers.

36.2. Place lower, lateral and upper retainer (Spare Ref. 4, 5 and 6 or 7, 8 and 9) into position and trim as necessary to achieve correct mating with the corresponding structure.

36.3. Temporarily put in position the retainers on the cockpit structure and countermark the position of the holes where the rivets will be installed (See Fig 2).

36.4. Remove the lower, the lateral and the upper retainer from the cockpit structure and drill the countermarked holes at the final dimension of 3,25 to 3,35 mm. Make sure of the proper alignment

of the holes.

CAUTION

Do not contact the aliphatic naphtha with the surface of the windshield. The contact of aliphatic naphtha with the plastic material of the windshield may affect the transparency.

36.5. Fully clean possible debris from the surface of the retainers with a Lint-free cloth (Supply Ref. 7) moist with Aliphatic naphtha (Supply Ref. 8) or Alcohol (Supply Ref. 9).

36.6. Let the aliphatic naphtha, or alcohol, evaporate for at least 30 minutes.

37. Put and keep in position the retainers on the cockpit structure.

38. Protect the windshield with the Self-adhesive masking tape (Supply Ref. 6) to prevent contact of sealing compound. Apply the masking tape at a distance of approximately 2 mm from the retainers.

39. Remove the retainers from the cockpit structure and apply a thin layer of Sealing compound (Supply Ref. 10) to the surface of the lower, lateral and upper retainer to be bonded on the windshield (see Fig 2).

40. If the sealant squeeze out between the edge of the windshield and the cockpit structure is not sufficient, fill all void areas with Sealing compound (Supply Ref. 10).

Note

Make sure the bead of sealant has no air bubbles.

41. Put and keep in position the lower, the lateral and the upper retainer. Apply a firm pressure to ensure a correct bond.

42. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

43. Wet install the Rivets (Spare Ref. 11) on the lateral retainer as shown in Fig 2 with Sealing compound (Supply Ref. 11).

44. (Helicopters without the wire strike protection system) Wet install the Rivets (Spare Ref. 11) on the lower retainer and on the upper retainer as shown in Fig 2 with Sealing compound (Supply Ref. 10).

44.1. Cure the Sealing compound (Supply Ref. 10) at ambient temperature for at least 48 hours.

45. (Helicopters with the wire strike protection system and the windshield wipers kit) Secure the lower retainer and the upper retainer as follows:

45.1. Put and keep in position the doubler and the shim (see Fig 3, view B) and verify that all the holes match with the holes on the retainers and on the structure of the helicopter.

45.2. Remove the doubler and the shim and apply a thin coat of Sealing compound (Supply Ref. 11) on the contact surfaces of the doubler and the shim.

45.3. Put and keep in position the doubler and the shim. Apply a firm pressure to ensure a correct bond.

45.4. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

Note

Use countersink rivet, if necessary to avoid interference with the left mounting clip and the right mounting clip.

45.5. Wet install the rivets on the doubler as shown in Fig 3 (view B) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.6. Put and keep in position the left support and the right support (see Fig 3, view B) and verify that all the holes match with the holes on the doubler.

45.7. Remove the left support and the right support from the doubler and apply a thin coat of Sealing compound (Supply Ref. 11) on the mating surfaces.

45.8. Put and keep in position the left and the right support. Apply a firm pressure to ensure a correct bond.

45.9. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

45.10. Wet install the rivets on the left support and on the right support as shown in Fig 3 (View B) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.11. Wet install the rivets on the upper retainer as shown in Fig 2 with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.12. Put and keep in position the internal and external support (and the doubler, if present) (see Fig 3, view C) and verify that all the holes match with the holes on the lower retainer and the structure.

45.13. Remove the internal and external support (and the doubler, if present) and apply a thin coat of Sealing compound (Supply Ref. 11) on the contact surfaces of the deflector and the shim.

45.14. Put and keep in position the internal and external support (and the doubler, if present). Apply a firm pressure to ensure a correct bond.

45.15. Spread equally the sealing compound with the Spatula (flexible with rounded corners) (Support equipment Ref. 1) or with a finger protected with gloves. Remove the unwanted sealing compound.

45.16. Wet install the rivets on the internal and external support (and the doubler, if present) as shown in Fig 3 (View C) with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.17. Wet install the rivets on the lower retainer as shown in Fig 2 with Sealing compound (Supply Ref. 11). Refer to 09-A-00-50-00-85A-074C-D.

45.18. Cure the sealing compound. Refer to 09-A-00-50-00-85A-074C-D.

45.19. Fill gap between the internal and external support (and the doubler, if present) and the structure with Adhesive (Supply Ref. 11).

45.20. Let the adhesive cure at ambient temperature for at least 24 hours or at a temperature between 60 and 70°C for at least 2 hours.

45.21. Install the quick disconnect plug on the deflector.

45.22. Install the upper cutter of the Wire Strike Protection System. Refer to the Maintenance Manual (Section 53-24).

46. (Helicopters with the windshield wipers kit) Countermark the position of the motor shaft of the wiper arm on the lower retainer and on the windshield (see Fig 4). Drill a hole in correspondence of the before countermarked position to the final dimension of 18,00 mm.

47. Remove the masking tape from both faces of the windshield.

48. Apply the surface finish. Refer to the CSRP (Sect. 51-20).

49. Remove the thin protective plastic layer from both faces of the windshield.

50. (Helicopters with the windshield wipers kit) Install the wiper arm. Refer to the Maintenance Manual (Section 30-41).

Requirements after job completion

1. Remove all the tools and the other items from the work area. Make sure that the work area is clean.

2. Clean the windshield. Refer to the Maintenance Manual (Section 56-00).

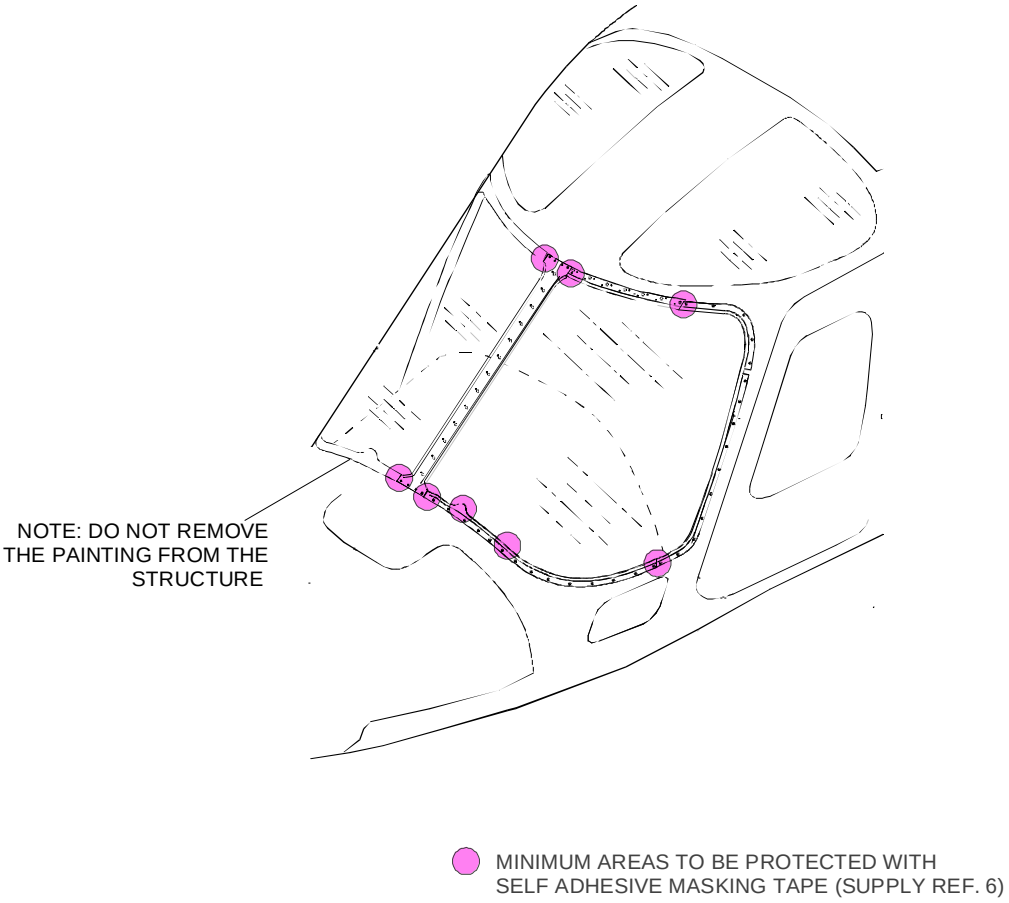

Figure 1 – Areas to be protected with tape.

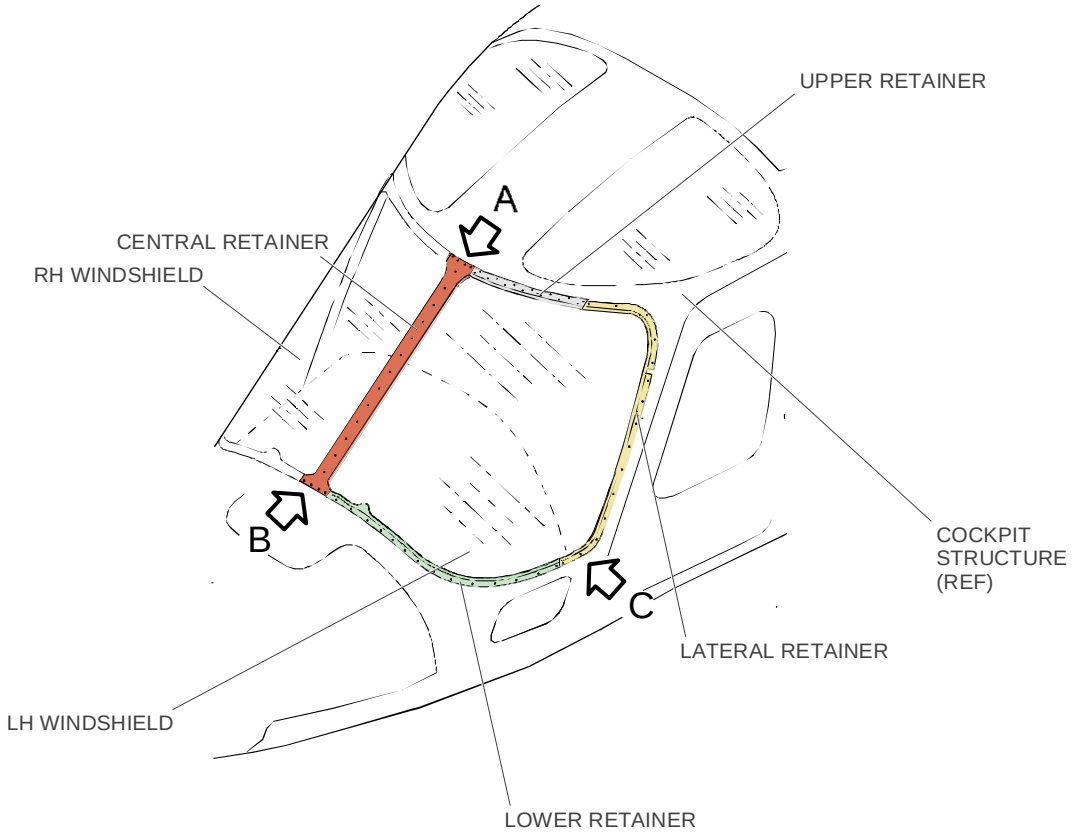

Figure 2 – Reinforced windshield – Install procedure (Sheet 1 of 3).

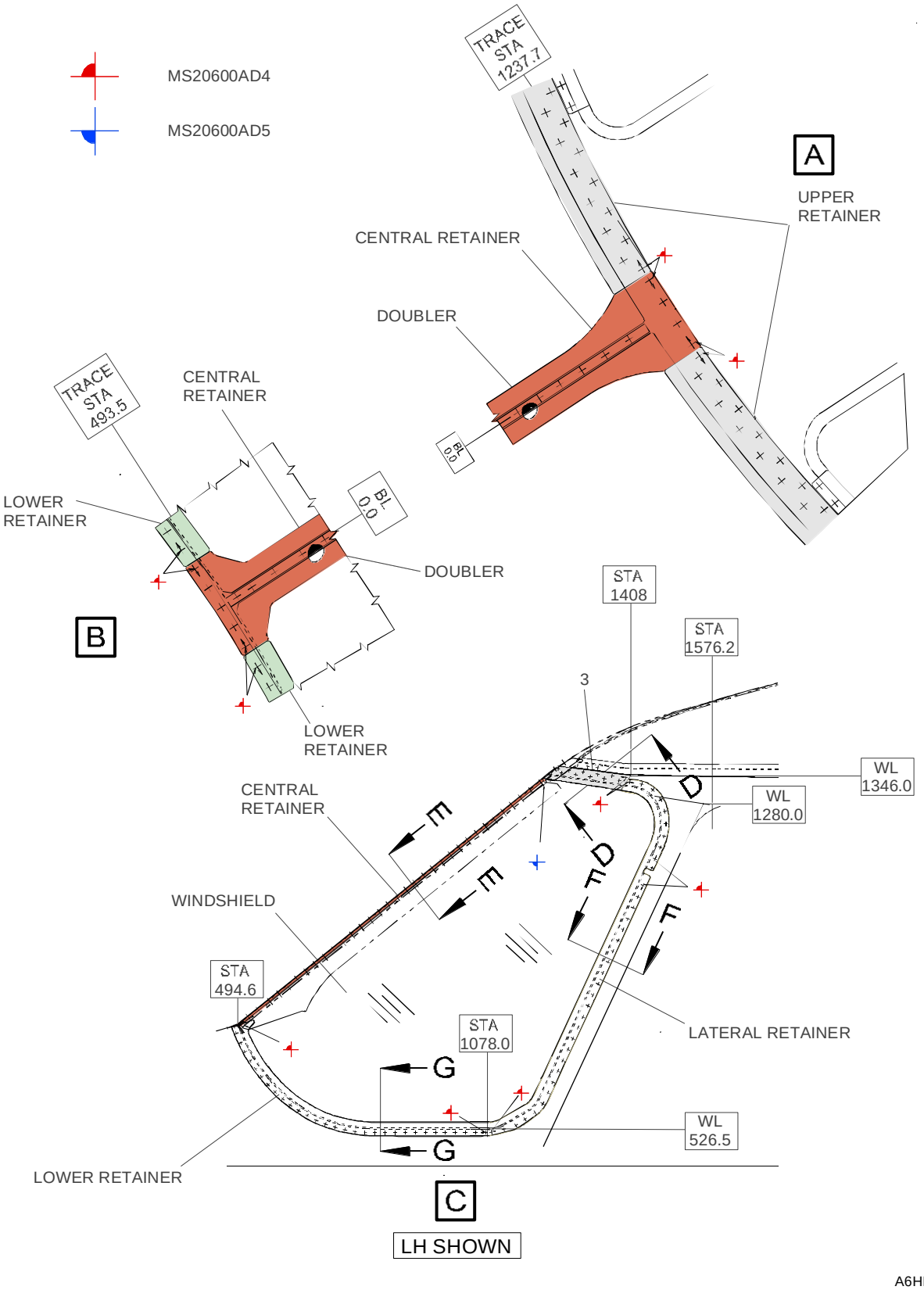

Figure 2 – Reinforced windshield – Install procedure (Sheet 2 of 3).

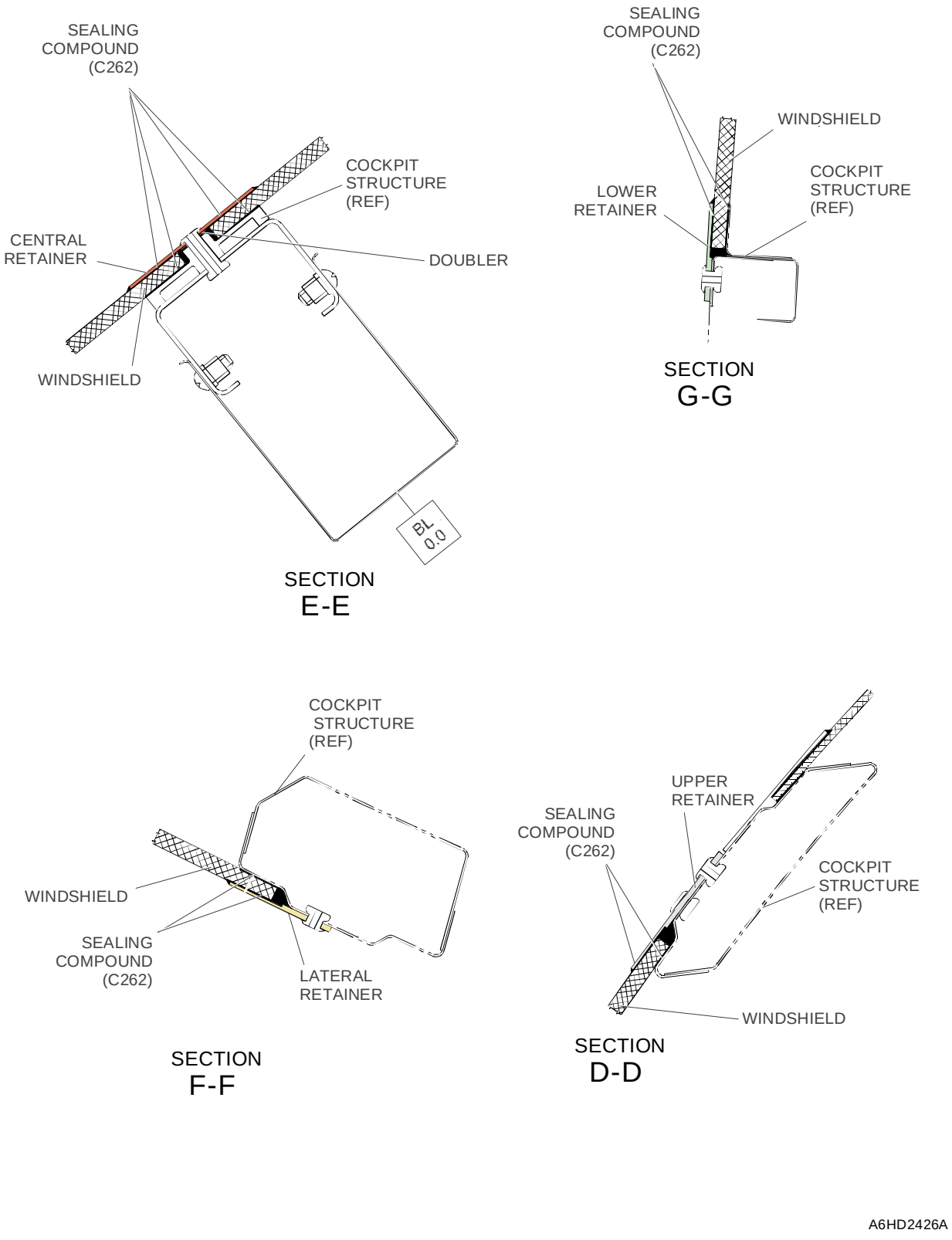

Figure 2 – Reinforced windshield – Install procedure (Sheet 3 of 3).

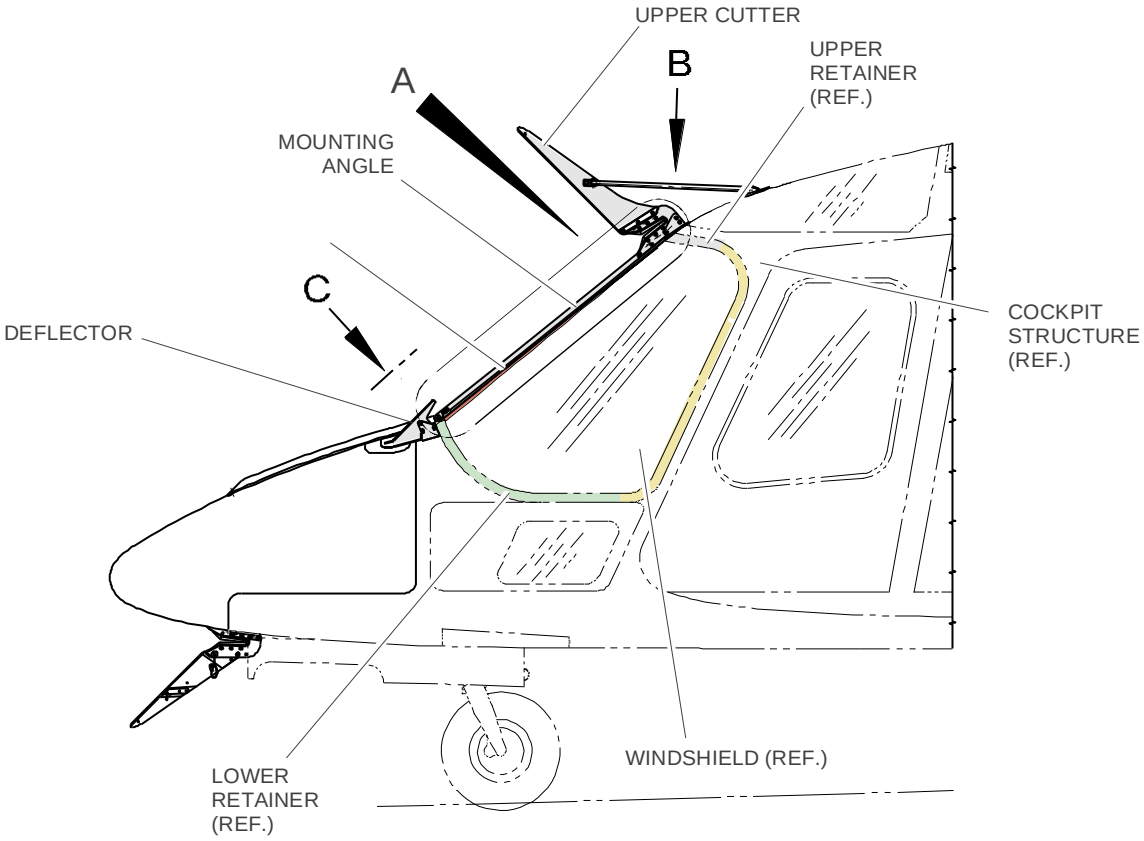

Figure 3 – Wire strike protection (If present) – Install procedure (Sheet 1 of 3).

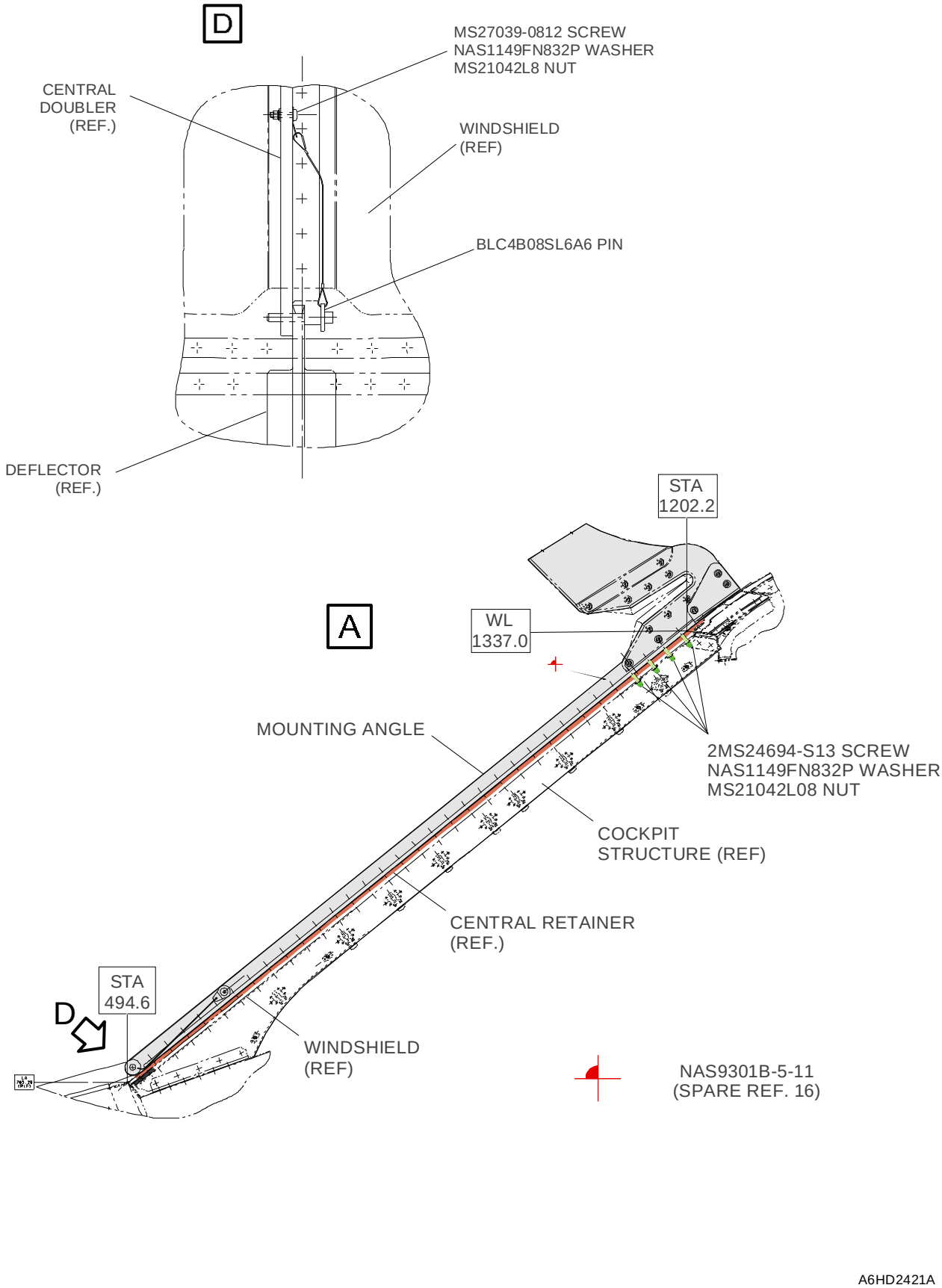

Figure 3 – Wire strike protection (If present) – Install procedure (Sheet 2 of 3).

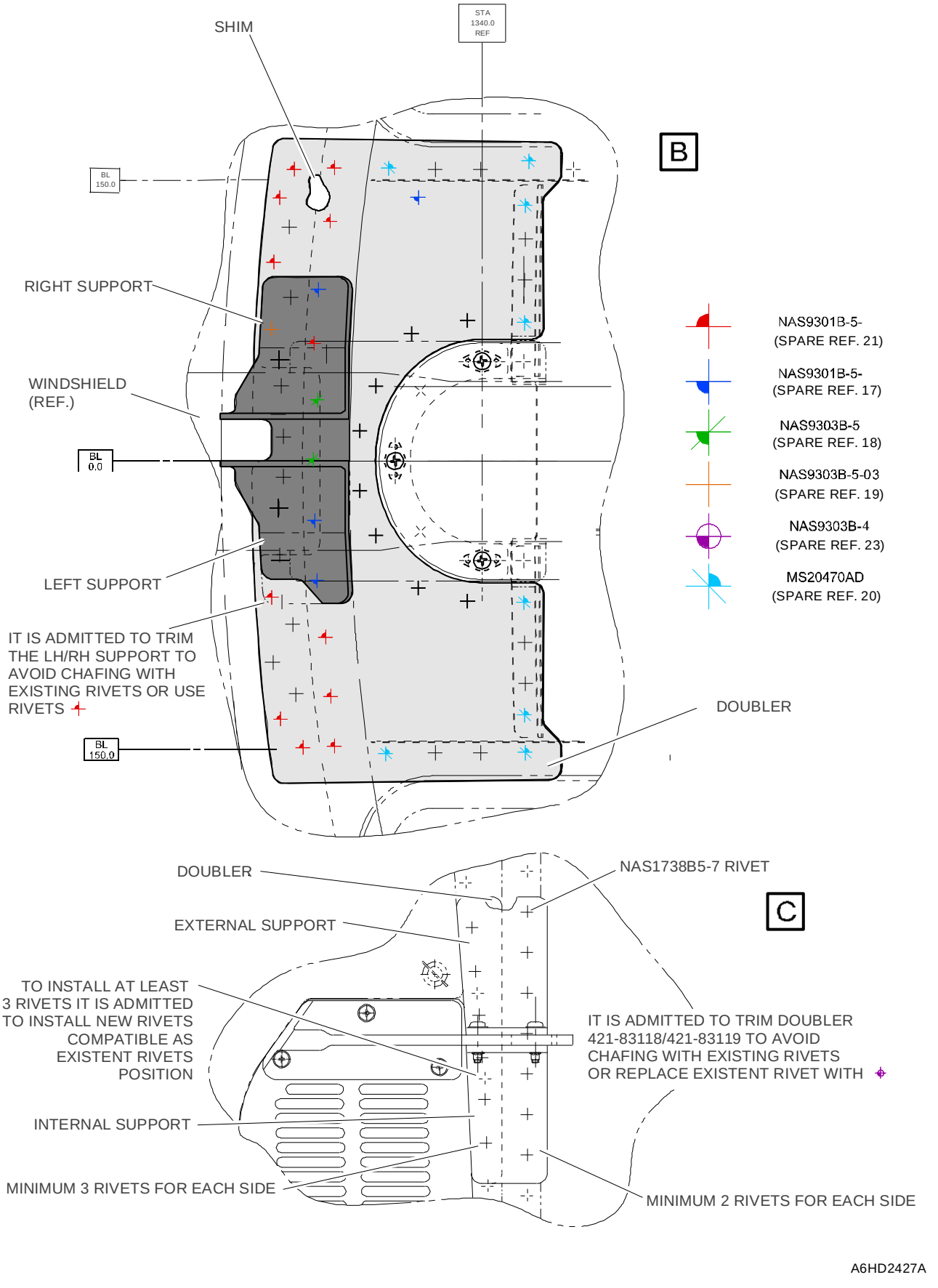

Figure 3 – Wire strike protection (If present) – Install procedure (Sheet 3 of 3).

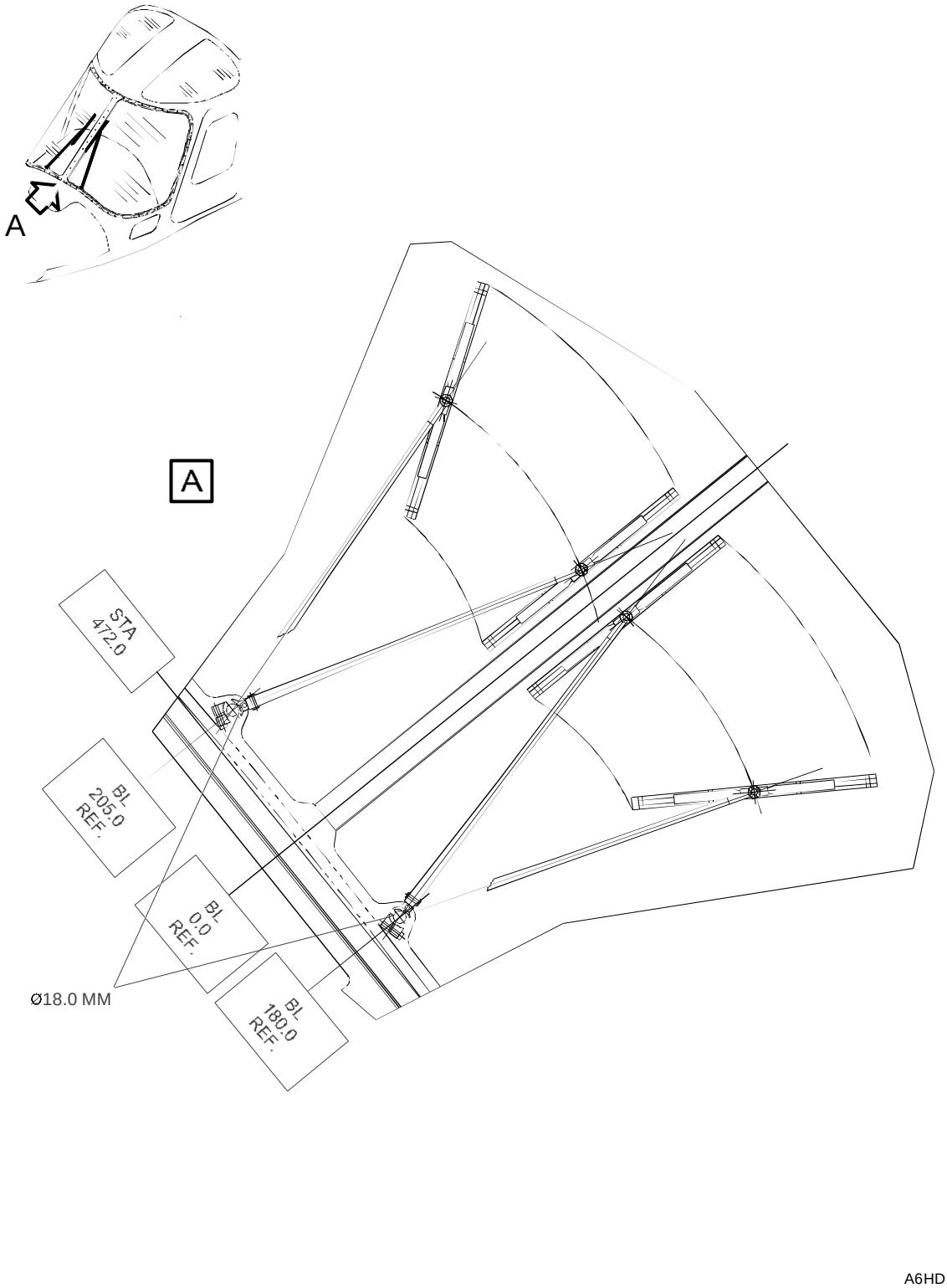

Figure 4 – Wiper arm (If present) – Motor shaft holes.