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TITLE: **Dash 8 Composites Repair**

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Dash 8 Composites Repair

1 SCOPE

1.1 This document supersedes ESP 77 revision (-) dated April 3, 1987.

1.2 This document establishes typical repair schemes for wet lay up repairs using MIL-C-9084C glass fabric and epoxy resin DHMS P1.49/DHMS P1.15 on Dash 8 advanced composite components. It controls the materials, processes and equipment.

1.3 Although similar in concept, each repair should be considered as a unique case. Similar damage in different areas of a part may require significantly different repair scheme. As such, each repair should be tailored to each unique set of circumstances including damage location, and part structural criteria.

1.4 These basic repair procedures are to be used as a guideline for Liason Engineering.

1.5 All repairs are subject to approval from de Havilland Stress department for structural compliance.

1.6 All repairs involving removal or addition of lightning strike materials (Aluminized Glass fabric, Aluminum foil, aluminum screen) are subject to approval from the EMC (Electro Magnetic Compatibility) group.

1.7 Repairs beyond the scope of this document require authorization/approval from the Bombardier, de Havilland Stress department.

1.8 In the event of conflict between this document and de Havilland Engineering Drawings. The Engineering Drawings shall have precedence.

1.9 These repairs do not apply to Radomes.

1.10 For Graphite structures manufactured by Shorts Brothers,refer to Shorts Brothers Specification P. Spec. 628 for repairing procedures.

1.11 Refer to EPI 13-2 and EPI 13-2-1 for Interior repair.

1.12 Refer to R.D.8-57-062 for Wing Leading Edges repair.

2 CLASSIFICATION

2.1 This document consists of the following type of repair:

Type 1: Wet layup, vacuum bag repairs performed with MIL-C-9084C glass fabric.

3 REFERENCES

3.1 Except where a specific issue is indicated, the current issue of the following references shall be considered a part to this document to the extent indicated herein.

3.1.1 PPS 10.15 - Wet layup fabrication of Epoxy Resin/Glass Fabric Reinforced Laminates

3.1.2 PPS 10.35 - Fabrication of 250F cure, Epoxy Resin Pre impregnated Fiber Reinforced.

3.1.3 PPS 10.21 - Certification of Autoclaves.

3.1.4 PPS 10.22 - Preparation of Moulds.

3.1.5 PPS 10.40 - Repairs to Laminates And Sandwich Panels.
3.1.6 PPS 10.43 - Fabrication of 350F cure, Epoxy Resin Pre impregnated Fiber Reinforced.
3.1.7 PPS 10.51 - Certification of Oven
3.1.8 PPS 31.17 - Solvent Usage.
3.1.9 PPS 31.14 - Cleaning of Aluminum Screen for Lay-Up in Composite Parts
3.1.10 PPS 13.23 - Preparation & Use of DHMS P1.30 Resin
3.1.11 PPS15.04 - Use of Felt Tip Markers For Marking Aircraft Parts and Assemblies.
3.1.12 HR-02-03 - Certification and Qualification of Personnel.
3.1.13 PPS 13.23 - Personal Protective Respiratory Equipment
3.1.14 QDI-11-01 - Measuring and Test Equipment.

4 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 Abrasive paper, aluminum oxide, 120-180 and 180-220 grit size
4.1.2 DSC 164-21 aluminum mesh
4.1.3 DSC 234 composite manufacture expendable materials (see Table I)
4.1.4 Potting materials to DHMS P1.30
4.1.5 Adhesive, liquid shim material to DHMS A6.09
4.1.6 Epoxy resin to DHMS P1.15
4.1.7 Epoxy resin to DHMS P1.49
4.1.8 Glass fabric to MIL-C-9084C, style 181, 181-50, 181-77, 1581 or 7781
4.1.9 Lint free cotton wiping cloths (e.g. DSC 378-2)
4.1.10 Pressure sensitive tape, masking tape or equivalent.
4.1.11 Suitable non-perforated vacuum bagging film for wet lay-up repair.

TABLE 1. LIST OF EXPENDABLE MATERIALS TO DSC 234

MATERIAL DSC 234	MATERIAL TYPE
-1	2 Mil Nylon Vacuum Bagging Film
-5	1 Mil Perforated (pin prick) Release Film
-7	1 Mil Non-Perforated Release Film
-9	Breather/Bleeder Cloth, Non-Woven Polyester, 4 oz.

TABLE 1. LIST OF EXPENDABLE MATERIALS TO DSC 234

MATERIAL DSC 234	MATERIAL TYPE
-12	Peel ply
-15	High Temperature Pressure Sensitive Tape
-17	Vacuum Bag Sealant
-20	Fiberglass Tape

4.2 Equipment

4.2.1 Curing Oven, Certified according to PPS 10.51

4.2.2 DSC 422, Gloves

4.2.3 Portable Hot Bonding System, approved by de Havilland.

4.2.4 Shop Vacuum source, capable of maintaining and monitoring a minimum vacuum of 24" Hg

4.2.5 Spatula, Squeegee.

5 GENERAL REQUIREMENTS

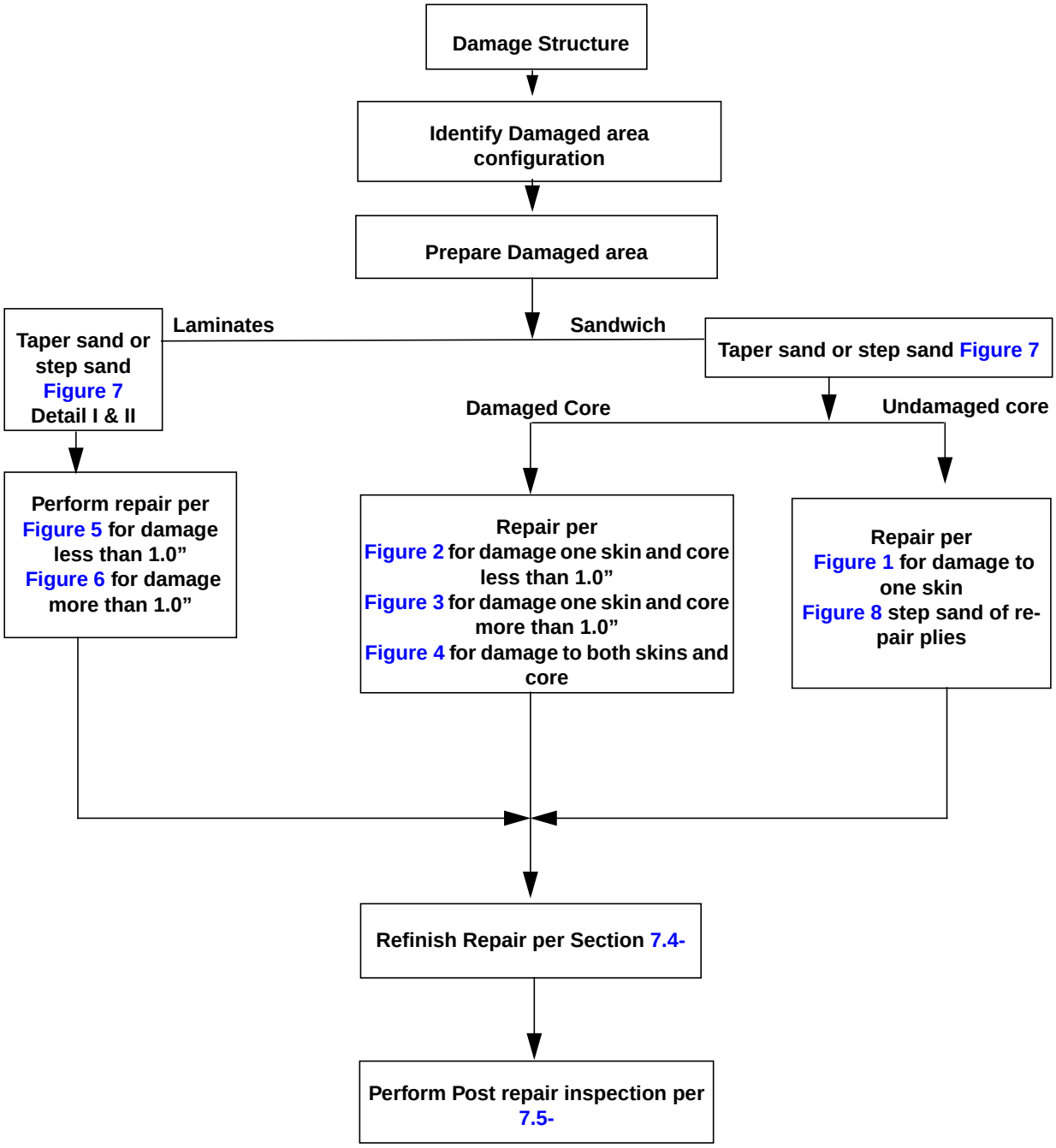
5.1 The layup shall be performed in a control environment as per PPS 10.40.

5.2 All equipment used for controlled or measurement purposes shall be calibrated and certified as per QDI-11-01.

5.3 Aluminum mesh to DSC 164. Clean aluminium mesh according to PPS 31.14 before lay-up. Ensure that the aluminum mesh is laid up and completely impregnated with resin within 24 hours of cleaning.

5.4 Handling of all hazadous materials as per PPS 10.40.

6 REPAIR FLOW SEQUENCE



6.1 DETERMINE DAMAGE

6.1.1 Examine visually for extent of damage.

6.1.2 Check part in vicinity of damage for entry of water, oil, fuel, dirt, or other foreign matter.

6.1.3 Check for delamination around the damage. Delamination can be detected by the instrumental NDT methods or by tapping the skin with a small metallic disk object such as a coin.

6.2 REMOVE AND PREPARE DAMAGED AREA

6.2.1 Trim the damaged lamination to a smooth shape with rounded corners, or a circular or oval shape. Take care not to damage the undamaged plies, core, or surrounding material.

6.2.2 Remove only damaged plies, damaged doublers, and damaged filler plies.

6.2.3 Where the core is also damaged, remove the core by trimming to the same outline as the skin. Wherever permissible,the core area should extend at least 0.50 inch further than visible core damage limits. Take care to avoid cutting into an undamaged skin on the opposite side of the core. In cores where the thickness exceeds one inch, partially remove core (atleast 0.5 inch deep) sufficiently to clean the damage.

6.2.4 When opposite inner skin is also damaged, trim out the damage to a smooth shape.

6.2.5 When core is removed from the inner surface of the opposite skin, carefully smooth core down to adhesive layer.Take care not to damage the undamaged plies.

6.2.6 Inspect cutout area to insure that all damage has been removed.

6.3 PREPARATION OF DAMAGED AREA

6.3.1 Mask off the area around the cleaned up damage allowing 1.00 inch overlap for each ply replacement (including extra reinforcing plies), 2.00 inch overlap for aluminum screen ply.Determine number of plies required by making reference to the Engineering drawing.

6.3.2 For internal surface of Part and Non aerodynamic surfaces

6.3.2.1 Remove the paint finish or tedlar film in the masked off area using no. 240 or finer Scotch-brite abrasive or no. 150 sand paper.Do not sand into fibers.

6.3.2.2 Taper sand or step sand each ply around the cleaned up damage using no. 80 sandpaper. Taper or step sand each ply a minimum of 1.0 inch per ply.

6.3.2.3 Abrade surfaces around repair using no. 240 or finer abrasive.

6.3.2.4 Wipe surfaces with a clean cloth moistened with MEK. Allow for evaporation before proceeding with the repair.

6.3.3 For External Surface of Part with Critical Aerodynamic Surfaces

6.3.3.1 Taper sand a uniform taper around the cleaned up damage using no. 80 sandpaper. The taper is to be over a minimum distance of 1.0 inch for each existing ply plus each reinforcing ply.

6.3.3.2 Remove exterior finishes, including enamel finish and conductive coating, from the surfaces around the repair using no. 150 or finer sandpaper. Do not sand into fibers.

6.3.3.3 Wipe surfaces with a clean cloth moistened with MEK. Allow for evaporation before proceeding with the repair.

6.3.4 For External Surface involving lightning strike materials

6.3.4.1 Lightly sand the existing aluminized glass or aluminum screen 2.00 inch around the periphery of the repair area using 240 or finer sandpaper to expose the bare aluminum.

6.3.4.2 Wipe surfaces with a clean cloth moistened with MEK. Allow for evaporation before proceeding with the repair.

6.3.4.3 Protect the expose bare aluminum by covering with Kraft paper prior to the repair.

6.4 PREPARATION FOR THE REPAIR

6.4.1 Preparation of plies

6.4.1.1 Refer to the specific component structure identification drawing) to determine the number, orientation, and material of plies used in the original structure.

6.4.1.2 Refer to the specific component structure repair subject for extra repair ply requirements and overlap requirements.

6.4.1.3 Consult EMC group for specific size allowable when repairs involving replacement of lightning strike materials (Aluminized Glass fabric, Aluminum foil)

TABLE 2. REPAIR PLY MATERIAL

ORIGINAL PLY MATERIAL	REPAIR PLY MATERIAL
1 Ply 220 Aramid Fabric	1 Ply Mil-C-9084-C, 181 Glass Fabric
1 Ply 285 Aramid Fabric	1 Ply Mil-C-9084-C, 181 Glass Fabric
1 Ply 281 Aramid Fabric	1 Ply Mil-C-9084-C, 181 Glass Fabric
1 Ply Aramid Unidirectional	2 Ply Mil-C-9084-C, 181 Glass Fabric
1 Ply 181 Glass Fabric	1 Ply Mil-C-9084-C, 181 Glass Fabric
1 Ply 181 Aluminized Glass Fabric	1 Layer 200 Mesh Aluminum Screen Plus 1 Ply Mil-C-9084-C, 181 Glass Fabric
1 Ply Aluminum Foil	1 Layer 200 Mesh Aluminum Screen DSC 164-21.

6.4.1.4 In skin sections or laminates which contain 1-3 plies, add 1 extra ply of Mil-C-9084-C Glass Fabric.

6.4.1.5 In skin sections or laminates which contain 4-6 plies, add two extra reinforcing plies.

6.4.1.6 Follow orientations specified on the Engineering drawing. In the case of the unidirectional material, orient the warp fiber of the MIL-C-9084-C fabric parallel to the direction of the unidirectional fiber.

6.4.1.7 Aluminum mesh is to be cleaned per PPS 31.14 and must used within 24 hours after cleaning.

6.4.2 Preparation of Core

6.4.2.1 Refer to the specific component structural identification indicated on the relevant engineering drawing.

6.4.2.2 The core plug should fit flush with original core and with ribbon direction the same as in the original. Cut the replacement core plug slightly over size such that the replacement core make intimate contact with the cell walls of the surrounding core material. The replacement core should be free of contamination, completely dry,and clean.

6.4.3 Preparation of Resin

6.4.3.1 Select the appropriate resin system listed below:

TABLE 3. RESIN SYSTEM

RESIN SYSTEM	COMPONENTS	MIXING RATIO	POT LIFE	CURE TO HANDLE $75^{O} \pm 5^{O}F$	FULL CURE $75^{O} \pm 5^{O}F$
DHMS P1.15 (Note 2)	Epocast 50-A Resin	100	90 to 80 minutes	20 to 24 hours	3 days (Note 3 & 4)
	Epocast 9816 Hardener	15			
DHMS P1.49	CG 1304 Resin	100	15 to 18 minutes	8 to 16 hours	3 days (Notes 3 & 4)
	CG 1304 Hardener	15			
DHMS P1.49 (Note 5)	FR 7127-A-Resin	100	15 to 25 minutes	1 day	7 days
	FR 7127-B- Hardener	20			
DHMS P1.49	Epocast 50-A Resin	100	15 to 20 minutes	8 to 16 hours	3 days (Note 3 & 4)
	Epocast 946 Hardener	15			
DHMS P1.49 (Note 8)	EA 9390 Resin	100	2 hour	Note 6	(Note 6 & 4)
	EA 9390 Hardener	56			
DHMS P1.49 (Note 8)	EA 9396 Resin	100	75 to 90 minutes	2 days	5 days (Note 7 & 4)
	EA9396 Hardener	15			

Note 1. The pot life is the time during which mixed adhesive remains suitable for application at $75^{o} \pm 5^{o}F$. The time indicated is for a 100 gram mix.

Note 2. This resin system is also qualified to DHMS P1.49

Note 3. Alternatively, heat cure for 2 hours at 150 to 180 ^{o}F after room temperature gel (approx. 1 hour).

Note 4. The accelerated cure schedule may be performed with a heat source (e.g. Heatcon Composite Systems heat blanket, HCS9200) calibrated to meet the requirements of QDI-11-01 and approved for use by de Havilland. Or heat lamp.

Note 5. This resin system is recommended for interior repairs.

Note 6. Alternatively, heat cure for 220 minutes at $180^{o}F$.

Note 7. Alternatively, heat cure for 3 hours at $120^{o}F$

Note 8. This resin system is recommended for repairing high temperature components (parts manufactured per PPS 10.43).

TABLE 4. MATERIALS SELECTION FOR FILLING HOLES

MATERIAL	APPLICATION
DHMS A6.09, Liquid Shim	Fill holes, gaps
DHMS P1.49 or DHMS P1.15 resin with 20% by weight milled glass fiber	Fill holes, gaps
DHMS P1.30 grade 1	Edge filling of sandwich panel
DHMS P1.30 grade 2	Potting of inserts
DHMS P1.30 grade 3	Potting of inserts where high strength is required.

6.4.3.2 Epoxy Resin per DHMS P1.49 and P1.15 are to be prepared as per PPS 10.40 requirements.

6.4.3.3 Potting materials per DHMS P1.30 are to be prepared as per PPS 13.23 requirements.

6.4.3.4 Potting of inserts is to be performed as per PPS 2.64 requirements.

6.4.3.5 Liquid shim materials per DHMS A6.09 are to be prepared as per PPS 25.30 requirements.

7 REPAIR PROCEDURE

7.1 IMPREGNATE REPAIR PLIES WITH RESIN

7.1.1 Impregnation and layup of repair materials must be performed in a clean environment where the temperature and humidity is within the guideline of PPS 10.40.

7.1.2 Cut two pieces of parting film approximately 3.0 inches larger all around than the fabric and tape down to a smooth surface.

7.1.3 Lay fabric onto parting film.

7.1.4 Calculate the amount of resin required to impregnated the ply such that the resin content of the impregnated fabric should be 40 $\pm$ 5% by weight. Mix resin as per PPS 10.40.

7.1.5 Spread resin uniformly over the fabric.

7.1.6 Cover the fabric on the parting film with a second piece of parting film.

7.1.7 Work resin thoroughly and evenly into the fabric using a squeegee or a roller in order to impregnate the fabric and remove trapped air.

7.1.8 Work excess resin to the edges of the fabric.

7.1.9 Cut the impregnated fabric patch to the required sizes for each individual ply of the patch. The parting film on each side of the impregnated ply decreases fraying of the edges while cutting the required pieces.

7.1.10 The total number of plies is to be in accordance with the section 6.4.1. A minimum overlap of 1.0 inches is required between each subsequent ply. Each repair ply must have the same orientation as the original ply.

7.2 LAY UP OF REPAIR PLIES

7.2.1 Apply a coat of resin over the repair area.

7.2.2 Remove the parting film from one side of the smallest repair ply and place the exposed face to the repair area. Ensure proper orientation.

7.2.3 Use a squeegee over the parting film to smoothen and remove wrinkles and entrapped air. Do not apply excessive pressure as a patch with deficient resin content will result.

7.2.4 After removing the parting film from the contact faces, place the next larger fabric ply over the ply on the repair area. Orient the ply in the proper direction and overlap all around the area.

7.2.5 Repeat procedure 7.2.2 to 7.2.3 with all succeeding plies.

7.2.6 If the last repair ply is aluminum screen proceed as follows:

7.2.6.1 After applying the last glass repair ply, squeegee and smooth the surface before removing the parting film. Wipe the 2.0 inch area around the last glass fabric repair to remove excess resin and to expose the bare aluminum (section 6.3.4). Lay the aluminum screen in position insuring a minimum of 2.0 inch overlap with the expose bared aluminum. Brush some laminating resin on top of the screen.

7.2.7 Proceed with bagging procedure.

7.3 BAGGING PROCEDURE

7.3.1 Refer to Appendix A for detail of bagging procedure for wet lay up repair.

7.4 REFINISH AFTER REPAIR

7.4.1 Inspect the patch to ensure that it is free from pits, blisters, starved areas and excess resin deposits.

7.4.2 Lightly sand the edge of top most repair ply as necessary to fair the edge using no. 240 sand paper. Sand the surface of the repair to produce a smooth finish without damaging fibers.

7.4.3 Where the original painted surfaces have been removed, restore the original finish according the Engineering drawing. Fair the repair area with DSC 206-2 (F33) per PPS 34.34.

7.4.4 Where Tedlar film surface have been removed, apply F22 per PPS 34.41.

7.4.5 Where lightning strike materials have been replaced, consult EMC group for surface finishing.

7.5 POST REPAIR INSPECTION

7.5.1 Where aluminum screen DSC 164-21 has been used for repair, perform continuity test. Measure the resistivity from the middle of the repair patch to the main surface of the part. Consult EMC group for FTP (Funtional Test Procedure) and acceptance values.

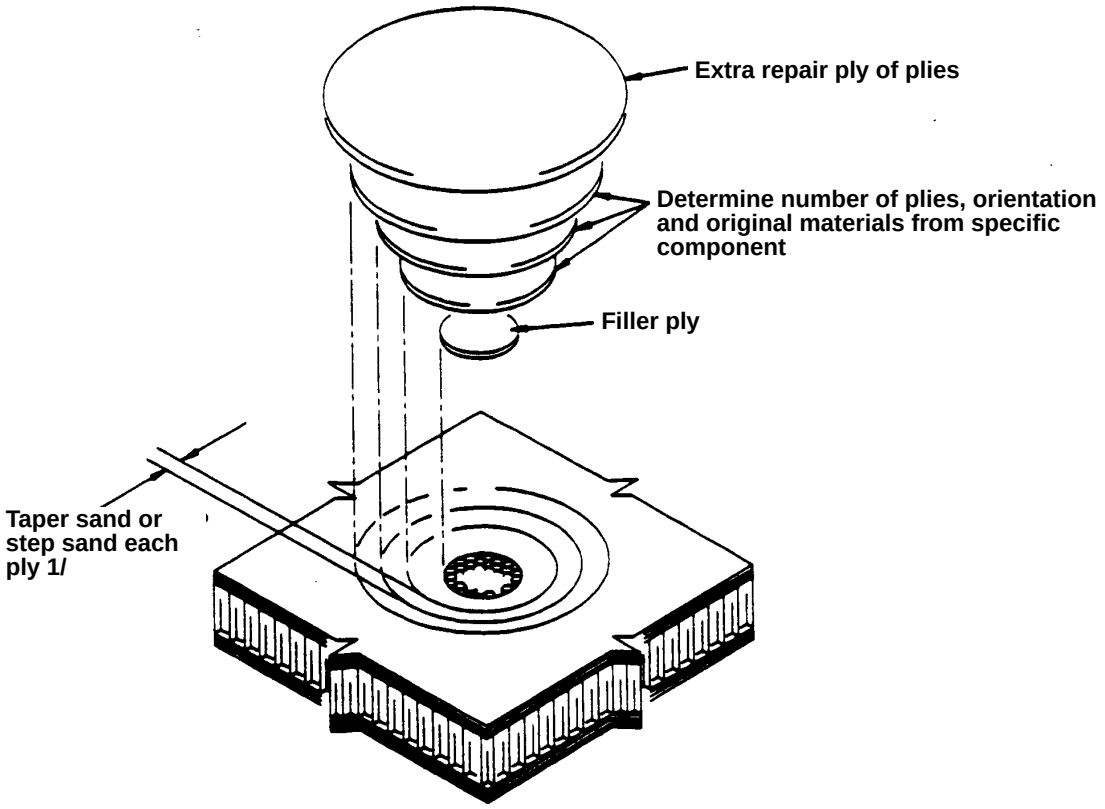
7.5.2 Visually inspect the completed repairs for voids or bonding flaws. If a defective repair is indicated by the inspection. Remove and reinstall the repair.

8 TYPICAL REPAIR SCHEME

8.1 The following are typical repair scheme. The shape or overlap sizes of the repairs may be changed to suit particular repairs.The Stress department must be consulted with regards to the strength required of a repair.

8.2 REPAIR OF DAMAGE TO SANDWICH COMPONENTS

8.2.1 Repair of sandwich components damage to one side of skin only (core is undamaged).

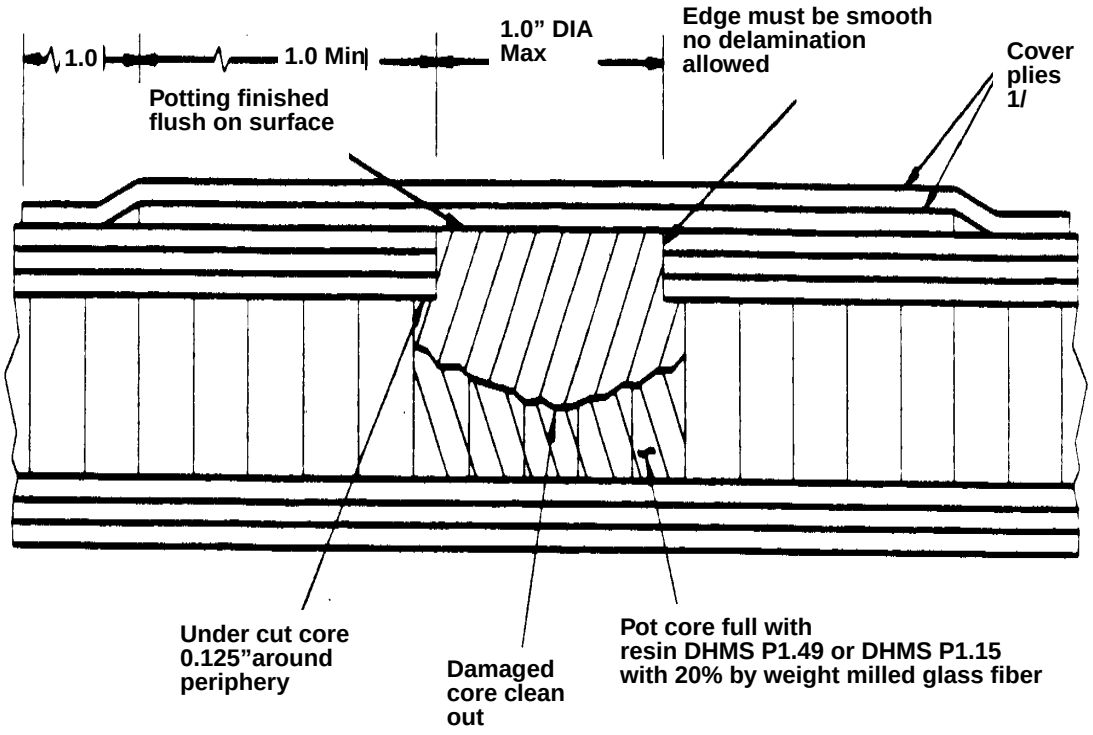


Note

1/ For external skin, taper sanding is recommended. Taper sand surfaces in areas of critical aerodynamic smoothness.

FIGURE 1 REPAIR OF DAMAGE TO ONE SKIN OF HONEYCOMB PANEL

8.2.2 Repair of Sandwich components with damage to one side of skin, and core damaged but not penetrating to the underneath ply. This repair is limited to maximum damage of 1.0" in diameter.



Note

1/ Orient cover plies in the same direction as the original outer layer. Overlap cover plies per Figure 3. Do not taper sand or step sand any plies.

FIGURE 2 REPAIR OF DAMAGE TO ONE SKIN AND HONEYCOMB CORE. MAXIMUM DAMAGE AREA 1.0" DIAMETER

8.2.3 Repair of damage to one side of skin, including core damage, and possibly damaging the underneath plies without penetrating the other side of skin. For damage area of 1.0 inch diameter or greater.

8.2.3.1 This procedure calls for the core plug installation being cured separately from the repair plies.

8.2.3.2 Apply potting resin DHMS P1.30 grade 2 or 3 around the edges of the replacement core plug and the undamaged core that will mate when the core plug is installed. If damage has occurred through only one skin and not damaging the underneath ply, apply the potting resin at the base of the core plug and on cavity where the core will be installed. Insert the plug in the core cavity. Orient the ribbon direction in the direction of the originals core ribbon. Vacuum bag the area, apply minimum 24 inches mercury and maintain during the cure cycle. Cure the potting materials as per PPS 13.23.

8.2.3.3 Upon completion of cure cycle, sand the core plug approximately flush with surrounding material. Remove all dust using oil-free compressed air.Wipe surfaces with a clean cloth moistened with MEK. Allow for evaporation.

8.2.3.4 Proceed with the wet lay-up of repair plies.

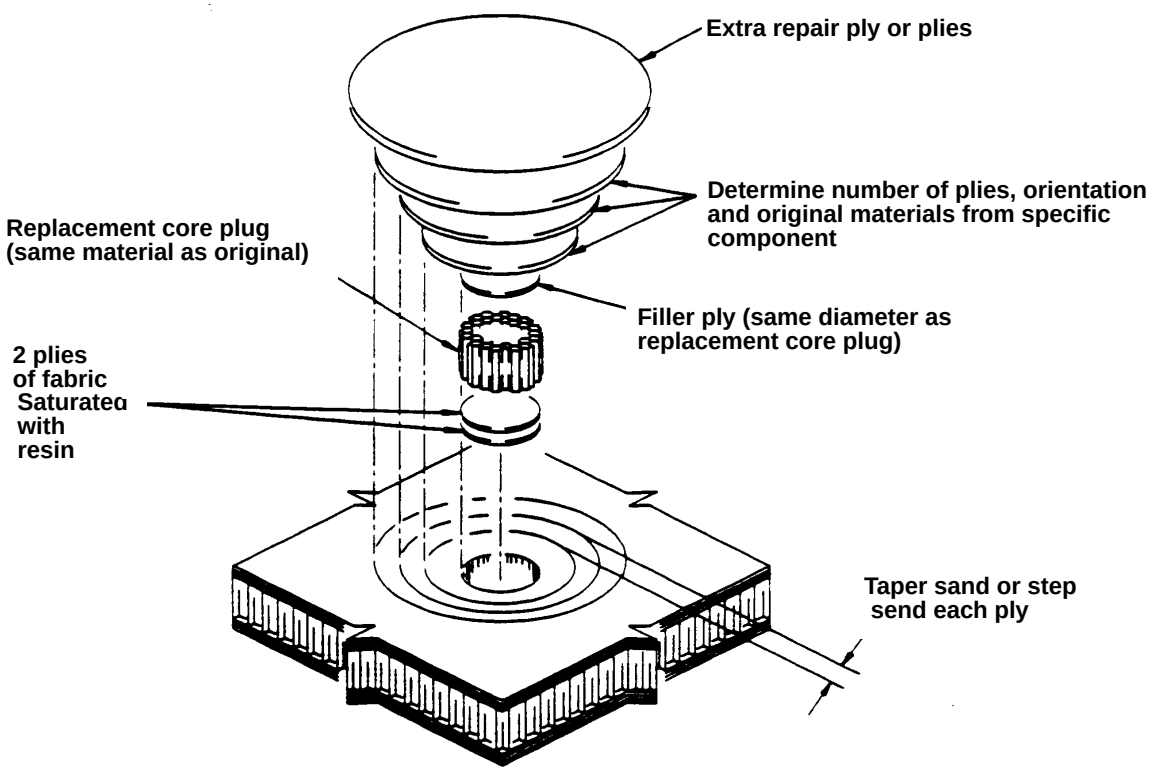
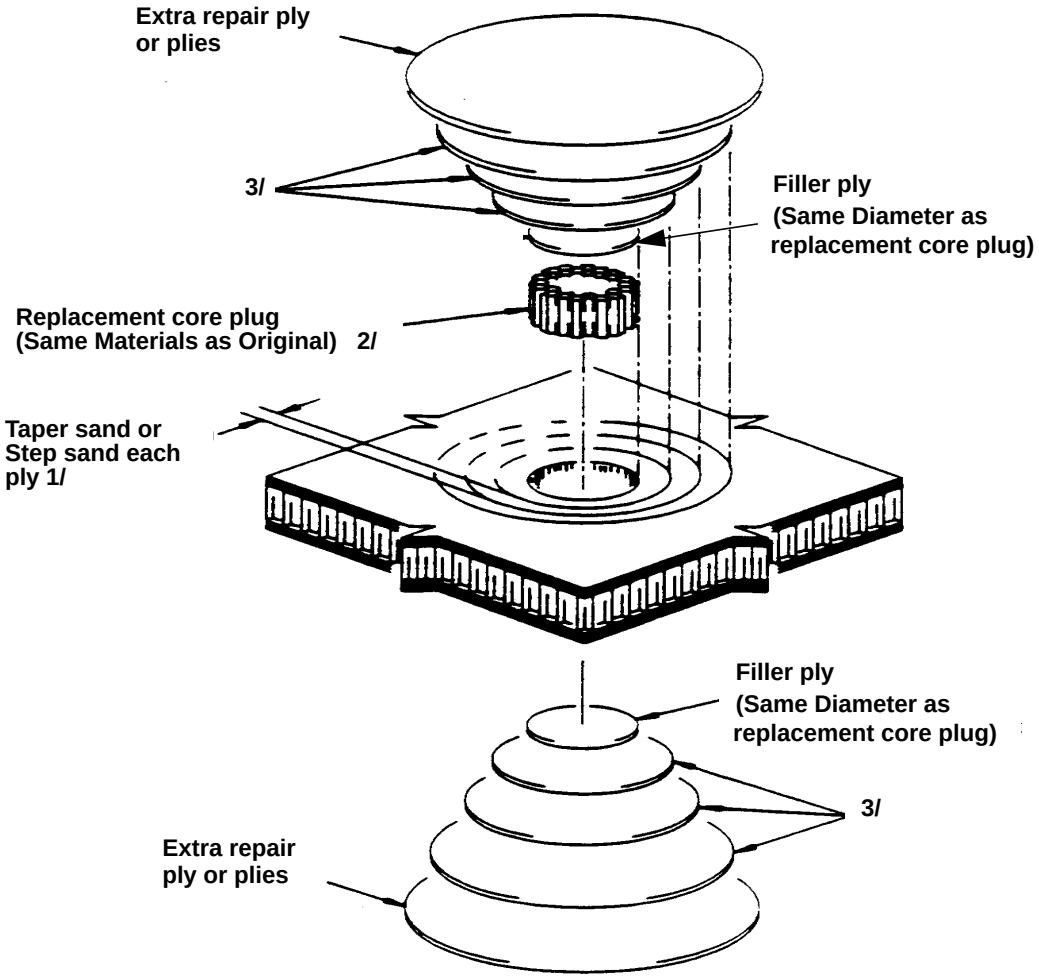


FIGURE 3 REPAIR OF DAMAGE TO ONE SKIN AND HONEYCOMB CORE. DAMAGE AREA GREATER THAN 1.0” DIAMETER

8.2.4 Repair of damage to both skins and core.

8.2.4.5 This procedure calls for the core plug installation being cured separately from the repair plies.

8.2.4.6 Carry out procedure as per sections 8.2.3.1 to 8.2.3.4.



Note

1/ For external skin, taper sanding is recommended. Taper sand surfaces in areas of critical aerodynamic smoothness.

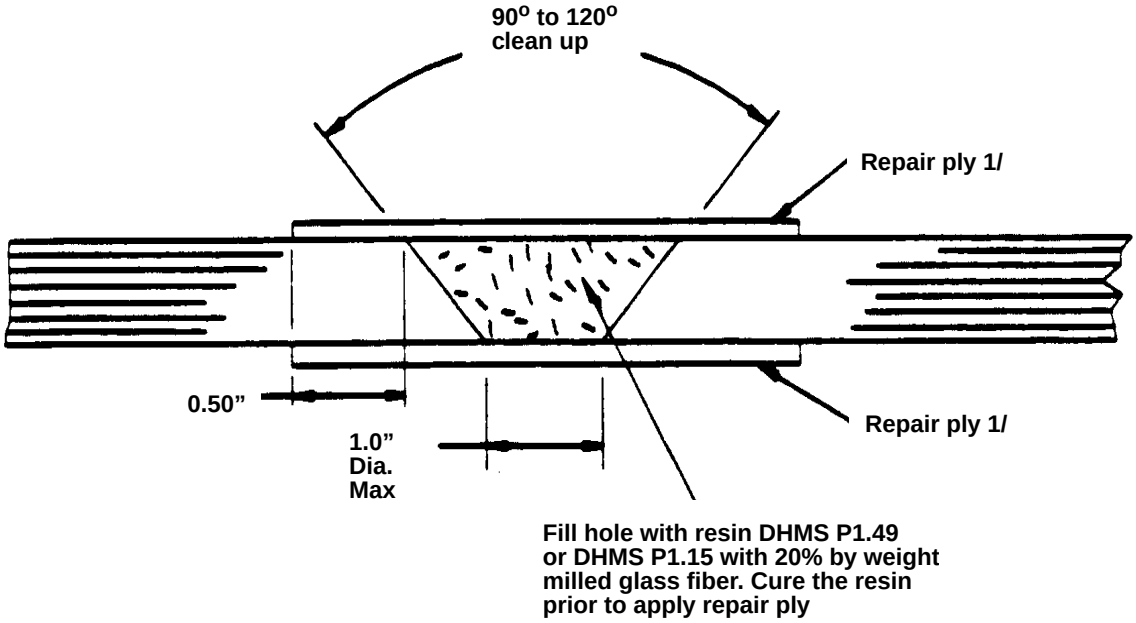
2/ Apply DHMS P1.30 grade 2 or 3 around replacement core plug or original core

3/ Determine number of plies, orientation, and original material from specific component structure identification.

FIGURE 4 REPAIR OF DAMAGE TO BOTH SKINS AND HONEYCOMB CORE

8.3 REPAIR OF DAMAGE TO SOLID LAMINATES

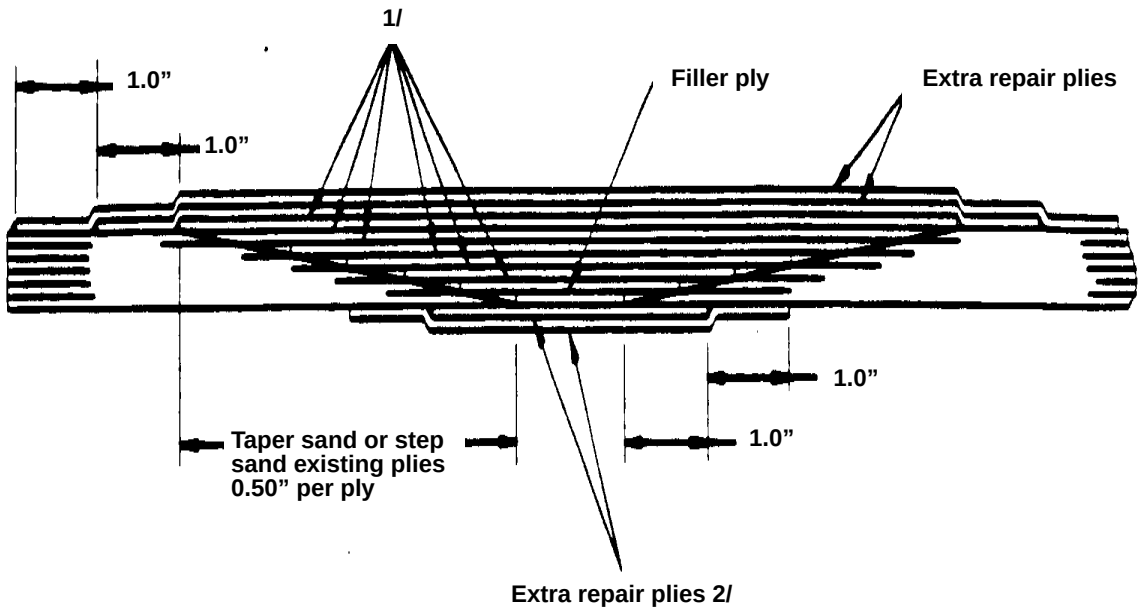
8.3.1 Repair of damage to solid laminates. Damage penetrates both surfaces with maximum damage diameter of 1.0 inch.



Note:
1/ Prepare and apply one ply of glass fabric orientation is to be the same as the original surface ply.

FIGURE 5 REPAIR OF DAMAGE, 1.0"DIAMETER OR LESS TO SOLID LAMINATES

8.3.2 Repair of damage to solid laminates with damage area exceeds 1.0 inch diameter.



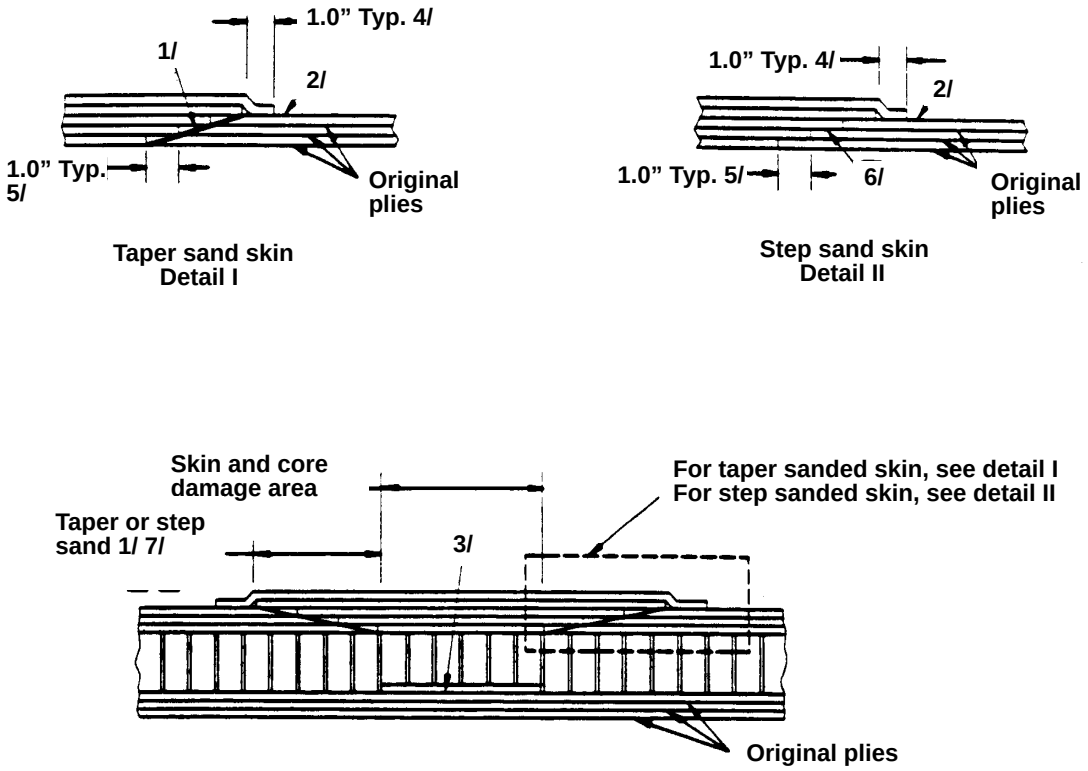
Note:

1/ Determine number of plies, orientation, and original material from specific component structure.

2/ Extra repair plies at this location are required only if the damage penetrates this surface.

FIGURE 6 REPAIR OF DAMAGE, 1.0” DIA. OR MORE TO SOLID LAMINATES

8.4 TYPICAL SANDING AND OVERLAPING REQUIREMENTS FOR LAMINATES AND SANDWICH PANELS



Note

1/ Taper sand or step sand existing plies around repair area a minimum of 1.0" for each existing ply

2/ Do not expose or damage filaments in untapered or unstepped area when sanding.

3/ Sanding must not expose or damage the filaments in bond ply (ply bonded to original core)

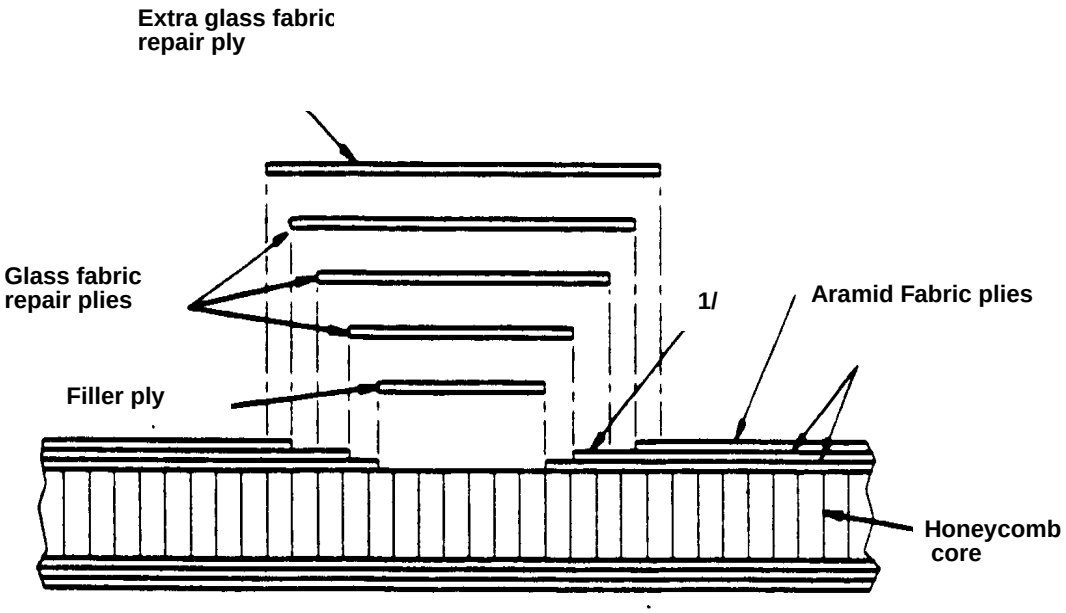
4/ First extra repair ply must overlap at least 1.0" past edge of last repair ply. Each succeeding extra repair ply must overlap at least 1.0: past edge of preceding extra repair ply.

5/ Each repair ply must overlap at least 1.0" past edge of preceding repair ply.

6/ Remove damaged plies in steps. Do not expose or damage filaments in stepped area.

7/ Taper sand surfaces in areas of critical aerodynamic smoothness.

FIGURE 7 SANDING AND OVERLAP REQUIREMENTS



Note:
1/ The existing outer ply of aramid fabric must be step or taper sanded to allow an additional overlap of 1.0” for each extra glass fabric repair ply

FIGURE 8 STEP SAND OF REPAIR PLIES

Appendix A

BAGGING PROCEDURE FOR WET LAYUP REPAIR

INDEX

1 GENERAL BAGGING PROCEDURE

1.1 Place a layer of perforated release film (DSC 234-5) over the repair. Cut the release film so that the edges extend 3 inches beyond the edges of the repair patch.

1.2 Place a layer of dry peel ply (DSC 234-12) over the perforated release film as a surface bleeder. Cut the bleeder so that the edges extend 2 inches beyond the edges of the perforated release film.

1.3 Place a layer of solid release film (DSC 234-7) over the peel ply. Cut the solid release film so that its edges extend to the edges of the bleeder.

1.4 Place a layer of surface breather (DSC 234-9).

1.5 Lay a piece a vacuum bagging material (DSC 234-1) over the entire repair area. Seal the edges with the vacuum sealant tape (DSC 234-17). Pleat the bag where needed to prevent bridging of the bag and possible bag failure.

1.6 Apply a minimum 24 inches mercury. Maintain for the entire cure cycle.

1.7 Check the bag for leak paths.

1.8 Cure the repair per PPS 10.40. If heat lamp is used to accelerate cure, refer to Figure 5 to achieve the temperature requirement to cure the epoxy resin.

1.9 Remove bagging and parting films after curing.

2 BAGGING PROCEDURE FOR CURE USING HEAT BLANKET.

2.1 Place a layer of perforated release film (DSC 234-5) over the repair. Cut the release film so that the edges extend 3 inches beyond the edges of the repair patch.

2.2 Place a layer of dry peel ply (DSC 234-12) over the perforated release film as a surface bleeder. Cut the bleeder so that the edges extend 2 inches beyond the edges of the perforated release film.

2.3 Place a layer of solid release film (DSC 234-7) over the peel ply. Cut the solid release film so that its edges extend to the edges of the bleeder.

2.4 Place a layer of surface breather (DSC 234-9) .

2.4.1 Place the heating blanket over the surface breather. The edges of the blanket should extend 2 inches beyond the repair patch edges. When using a heating blanket larger than 12 inches on one side, an aluminum caul plate (0.016”) can be used to minimize localized heating. The plate should be slightly smaller the surface breather.

2.4.2 The heat blanket should not make contact with the part.

2.4.3 Place the controlling thermocouple over the center of the heating blanket. Place 4-6 layers of glass fabric over the heating blanket for insulation and to prevent bagging film damage.

2.5 Apply vacuum sealant tape (DSC 234-17)around the entire repair area, approximately 6 inches outside the edge of the heating blanket.

2.6 Caution: For repairs to hollow assemblies (e.g. Flap trailing edges) do not vacuum the entire part. Full atmospheric pressure must be maintained inside the hollow assembly or the assembly may collapse. Locally bag the repair only.

2.7 Lay a piece of vacuum bagging material (DSC 234-1) over the entire repair area. Seal the edges with vacuum sealant tape. Pleat the bag where needed to prevent bridging of the bag and possible bag failure.

2.8 Apply a minimum 24 inches mercury. Maintain for the entire cure cycle.

2.9 Check the bag for leak paths.

2.10 Cure the repair per PPS 10.40. Heat up at a maximum rate of 5 degree F/minute.

2.11 Remove bagging and parting films after curing.

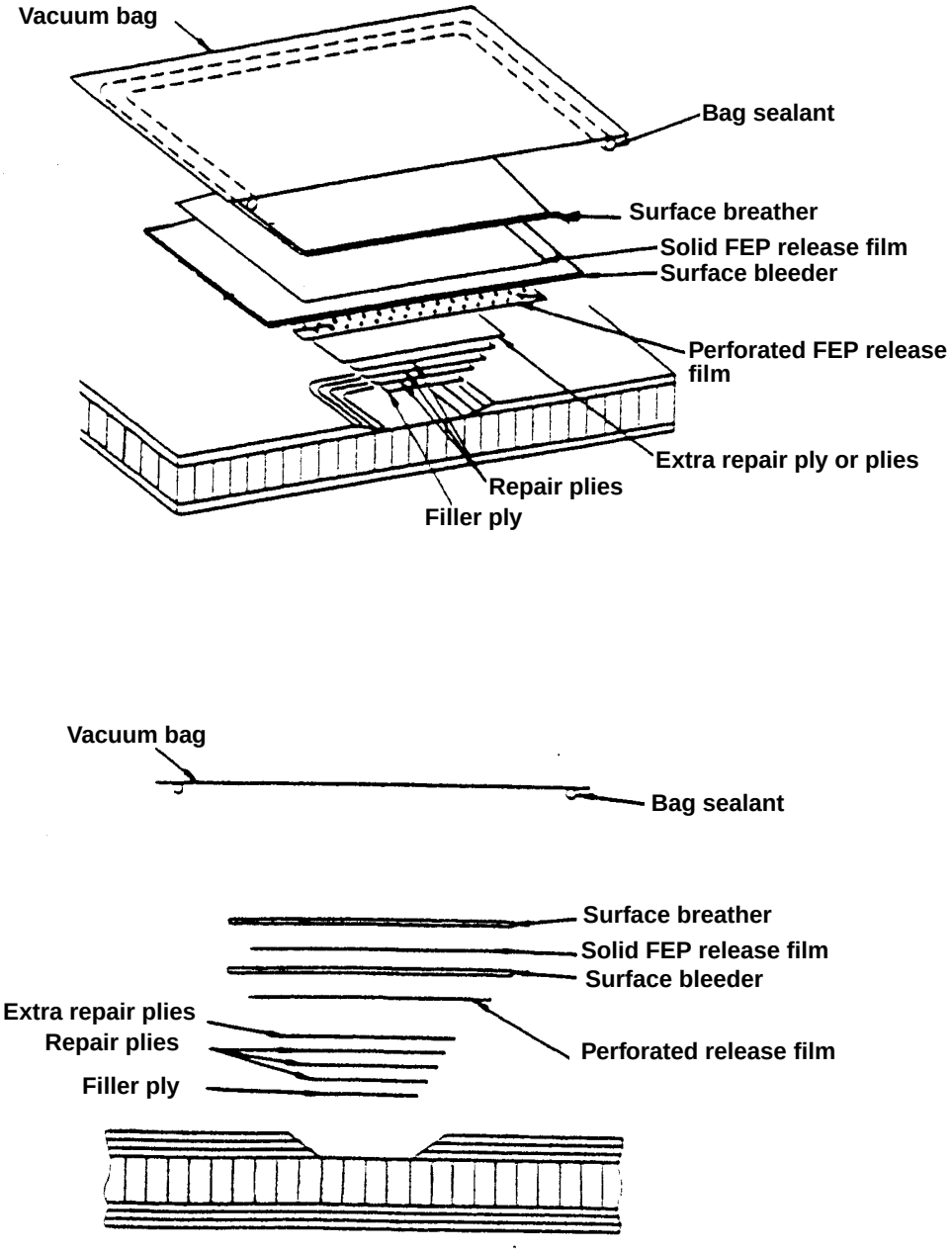


FIGURE A1 BAGGING SEQUENCE FOR SKIN PLY REPAIR

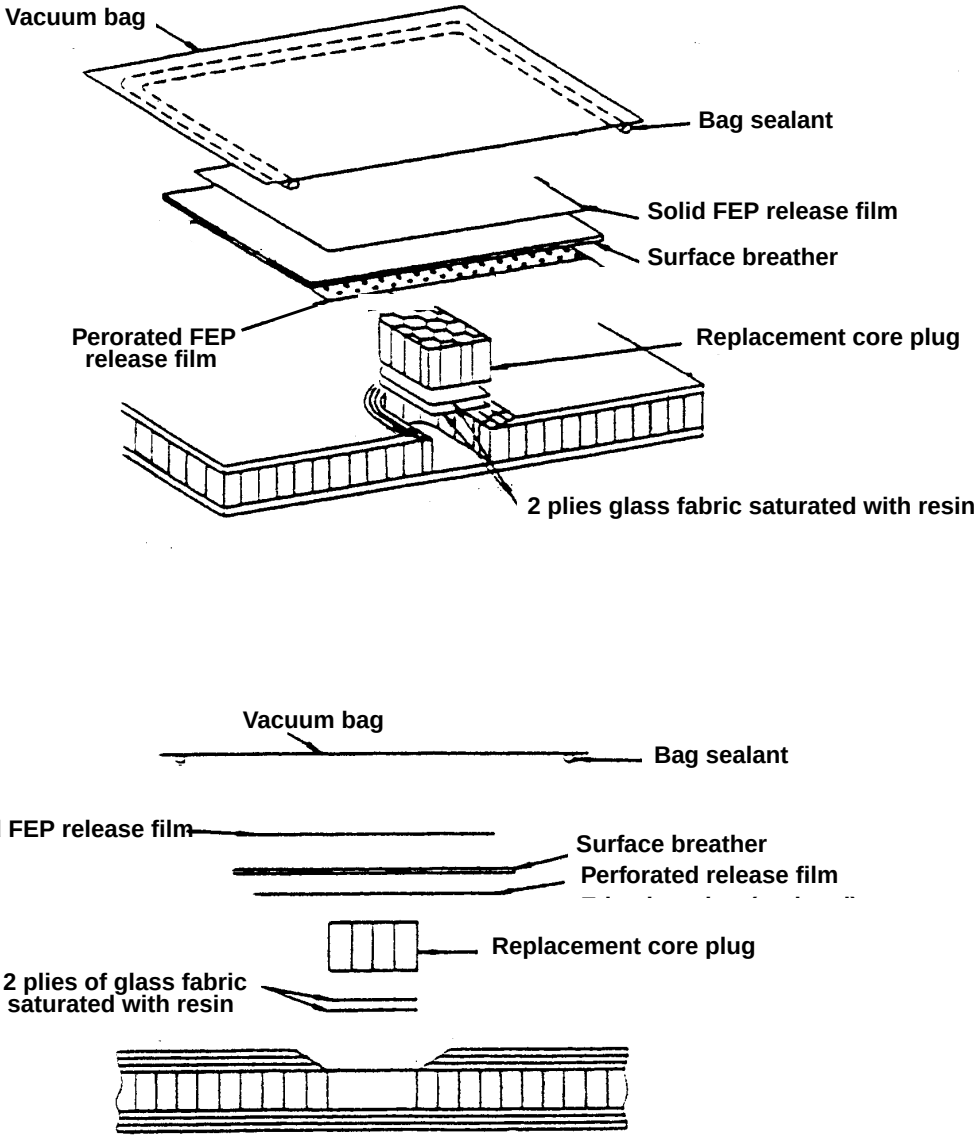


FIGURE A2 BAGGING SEQUENCE FOR CORE REPLACEMENT REPAIR

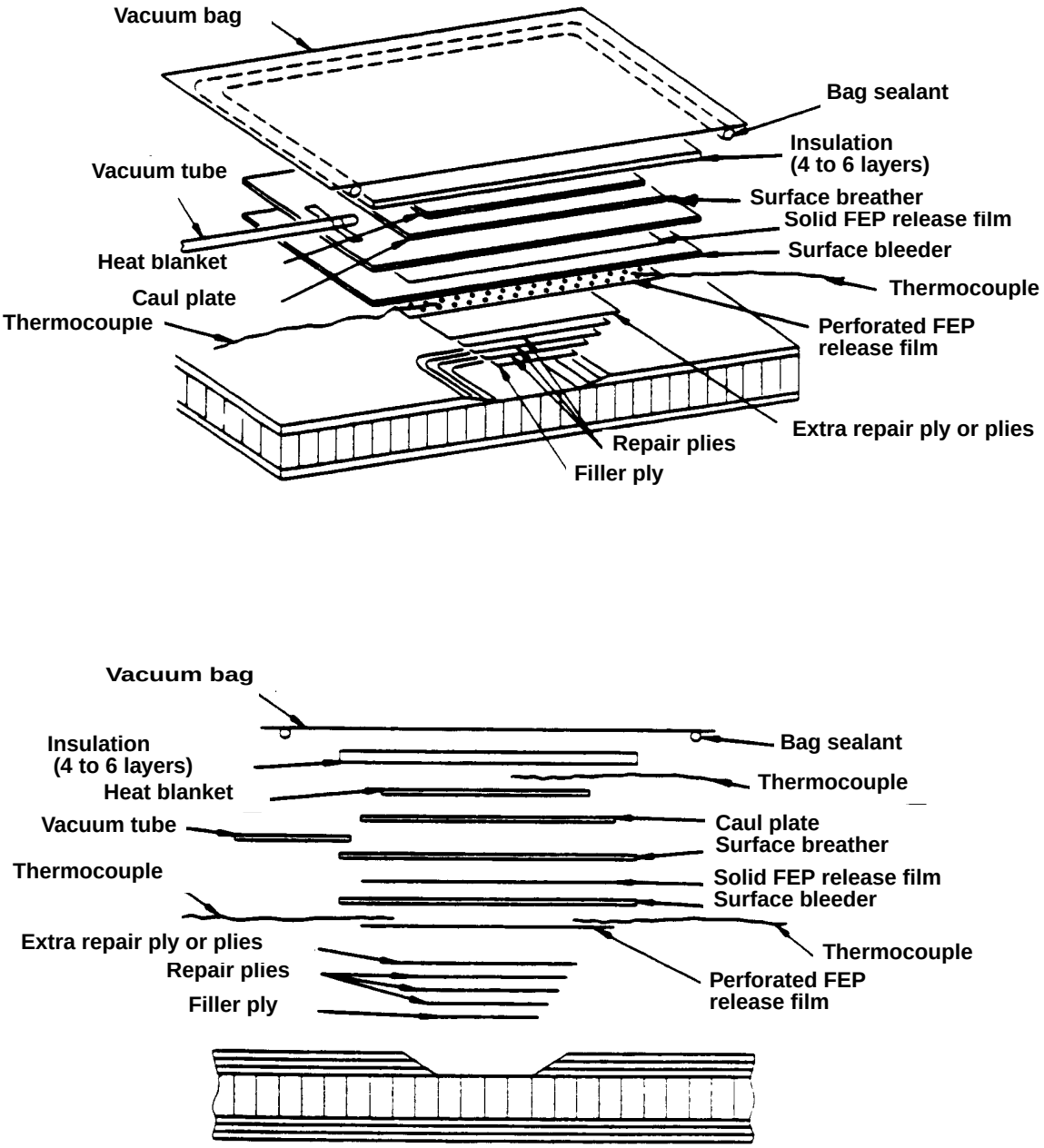


FIGURE A3 BAGGING SEQUENCE FOR SKIN PLY REPAIR USING HEAT BLANKET

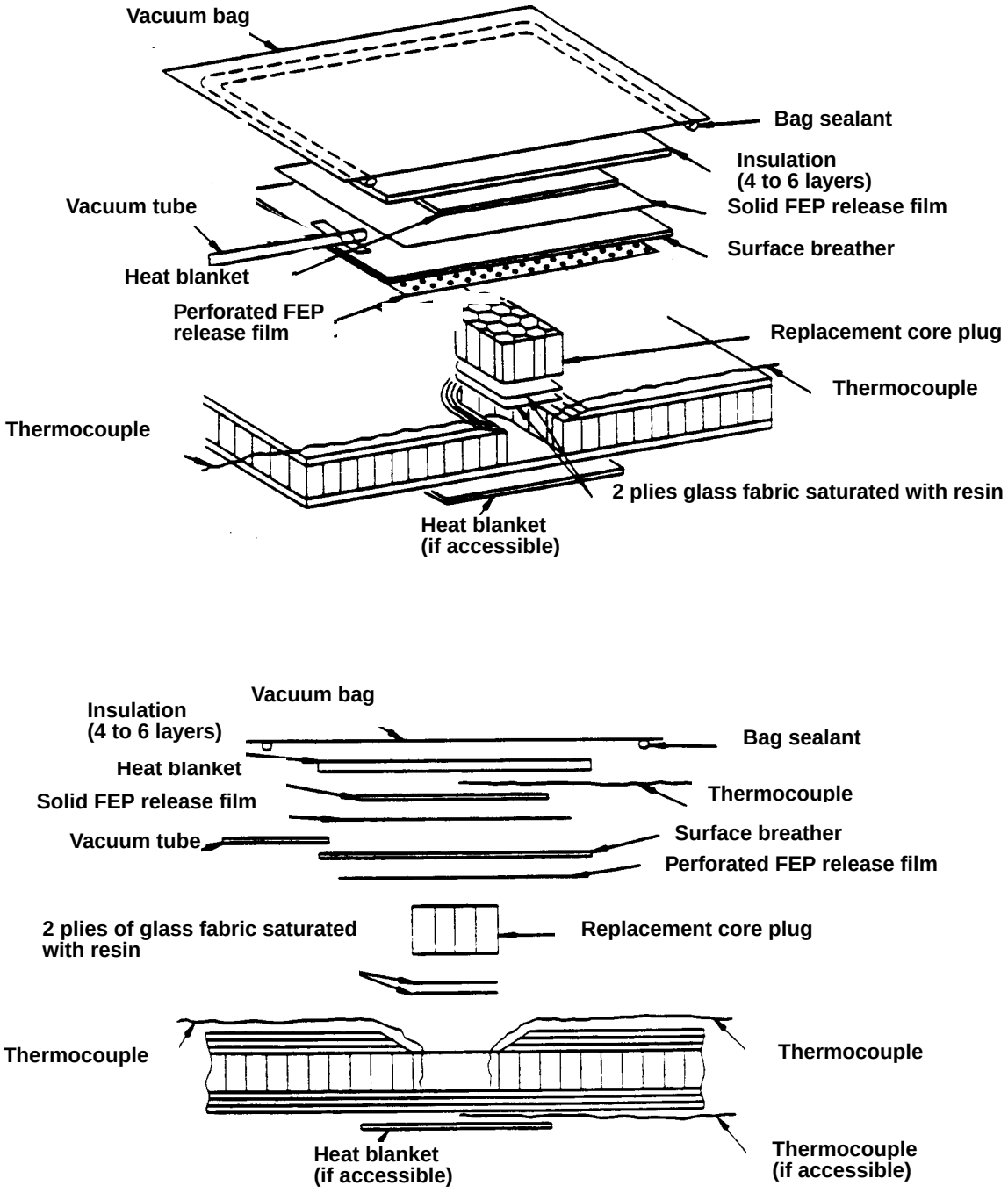
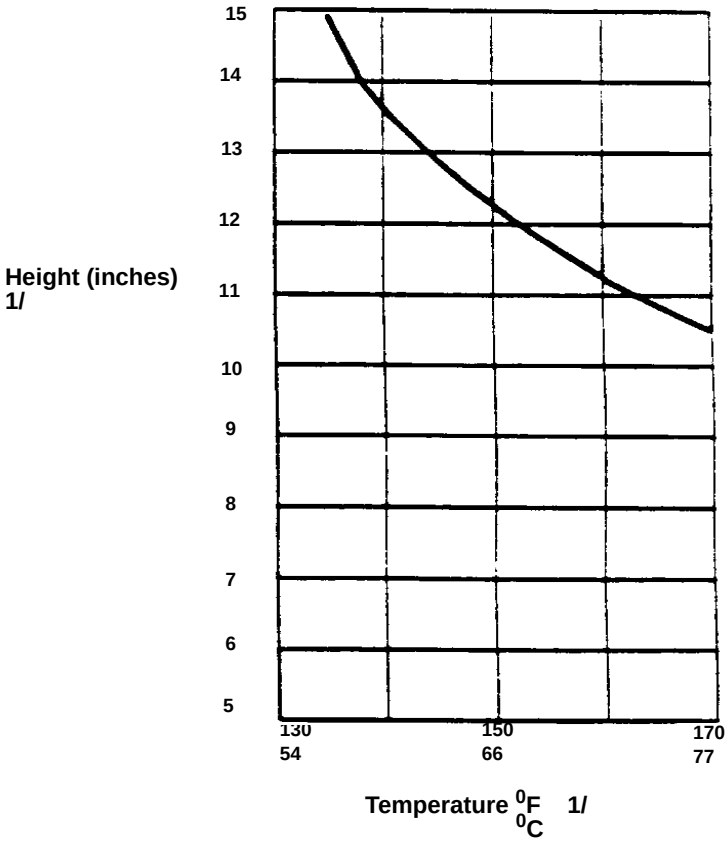


FIGURE A4 BAGGING SEQUENCE FOR CORE REPLACEMENT USING HEAT BLANKET



Note

1/ The height in inches of 250 Watt heat lamp from the surfaces of the patch vs. Temperature at surface of part.

FIGURE A5 HEAT LAMP TEMPERATURE vs. DISTANCE