BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 9.31

PRODUCTION PROCESS STANDARD

Preparation of Metal Overbraid Shield Break-Outs

Issue 4
- This standard supersedes PPS 9.31, Issue 3.
- Vertical lines in the left hand margin indicate changes over the previous issue.
- Direct PPS related questions to PPS.Group@aero.bombardier.com or (416) 375-4365.
- This PPS is effective as of the distribution date.

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	Quality	

Signed original on file. Validation of paper prints is the responsibility of the user.

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the preparation of metal overbraid shield break-outs.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS must 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. Similarly, the procedure and requirements specified in this PPS are not applicable when use of a BAPS, MPS, LES or P. Spec. is specified.

2 Hazardous Materials

2.1 Before receipt at Bombardier Toronto (de Havilland), all materials must be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto (de Havilland) 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 (de Havilland) Environment, Health and Safety Department.

3 References

3.1 PPS 9.04 - Assembly and Installation of Electrical and Electronic Wires and Cables.

3.2 PPS 10.16 - Installation of Heat Shrinkable Tubing, Tape and Identification Sleeves.

3.3 PPS 13.26 - General Subcontractor Provisions.

3.4 PPS 25.56 - Loctite Superbonder 430.

4 Materials and Equipment

4.1 Materials

4.1.1 B0816019 plastic cable ties.

4.1.2 Teflon tape to DSC 91-3.

4.1.3 Heat shrinkable sleeving to M23053/5.

4.1.4 Teflon coated flat woven glass fibre lacing tape to MIL-T-43435, Type IV, Finish D or E, Size 2 or 3. A combination of finish types C and E is also acceptable.

4.1.5 Loctite Superbonder 430 adhesive, Loctite Corp.

4.2 Equipment

4.2.1 No special equipment required.

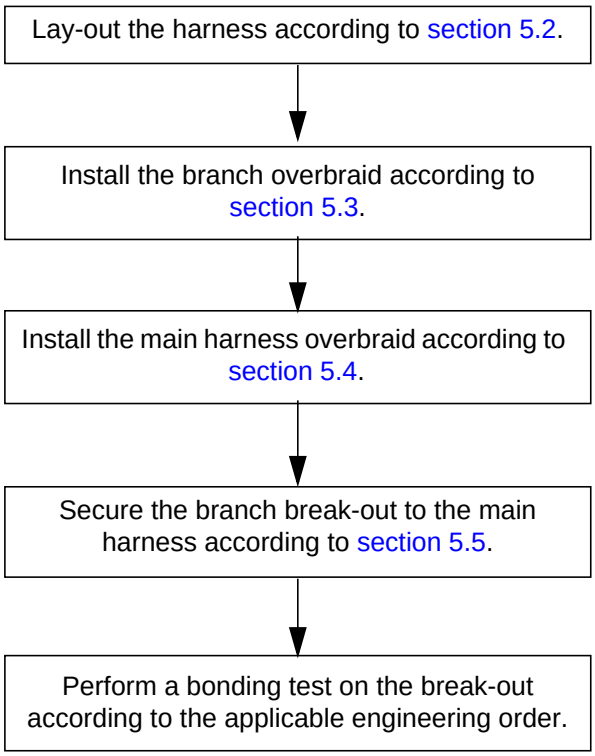
5 Procedure

5.1 General

5.1.1 Metal overbraid shields are used to protect electrical wire bundles from the effects of lightning strike. Break-out junctions exist within the metal overbraid when 2 or more branches intersect. At break-out junctions the intersecting segments of the metal overbraid must be secured mechanically and electrically.

5.1.2 Prepare overbraid break-outs using the sequence of assembly specified in Flow Chart 1.

Flow Chart 1 - Preparation of Overbraid Break-Outs



5.2 Lay-Out of Harness

5.2.1 Before assembling the overbraid over the harness, lay out the harness as specified on the formboard.

5.2.2 At break-outs secure the bundle before and after the break-out with Teflon tape (ref. para. 4.1.2) as shown in Figure 1. Wrap the Teflon tape 2 - 3 turns around the harness at each tape location to secure the bundle. If necessary, use B0816019 plastic cable ties to hold the bundle in shape before applying the Teflon tape; Install plastic cable ties according to PPS 9.04. Maintain a minimum bend radius of 3 times the outside diameter of the wire when routing wires to the break-out.

5.2.3 Route the wires in the break-out area as shown in Figure 2. Make the wire branch break-out point at least 4" from where the hole in the braided shield is going to be made.

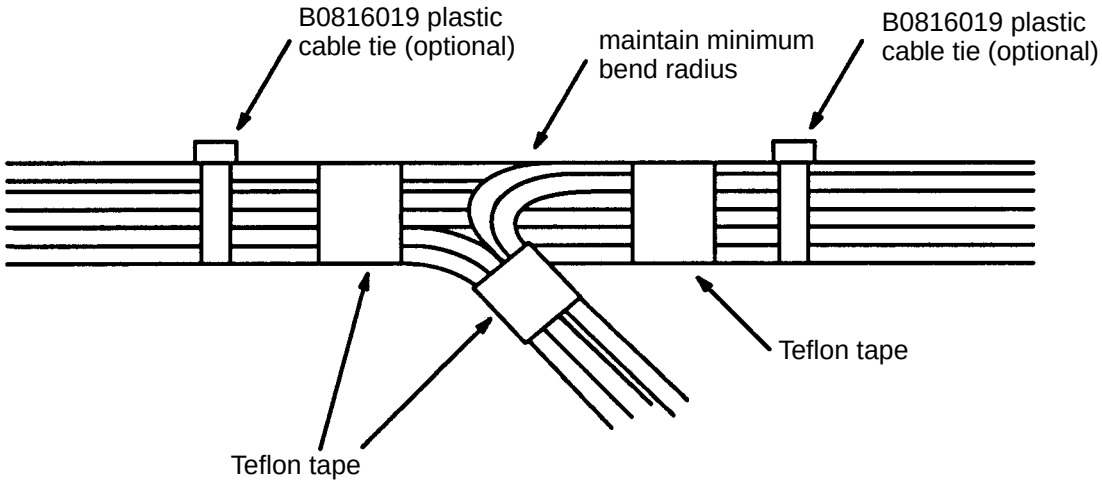


Figure 1 - Wire Branch Break-Out Point Detail

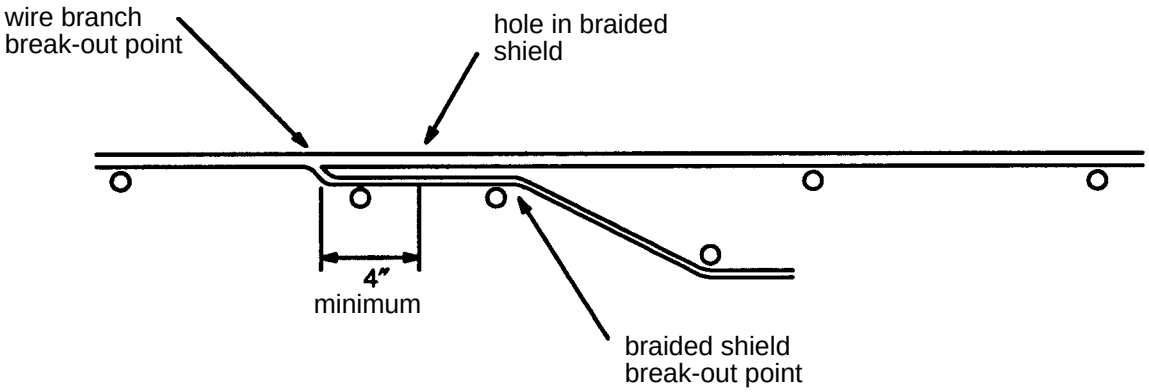


Figure 2 - Formboard Wire Lay-Up

5.3 Installation of Branch Overbraid

5.3.1 Install the branch overbraid as follows:

Step 1. Cut off any plastic cable ties that were used to hold the bundles in shape at the break-out locations.

Step 2. To make installation of the overbraid easier, wrap the bundle end with masking tape.

Step 3. Slip the overbraid onto the branching bundle and fit it up to the wire branch break-out point so that the end of the overbraid is approximately centred over the Teflon tape.

Step 4. Shrink a 2" length of heat shrinkable tubing (ref. para. 4.1.3) over the end of the overbraid and the beginning of the branching bundle (see Figure 4). Overlap the heat shrinkable tubing approximately evenly over the end of the overbraid and the beginning of the branching bundle. Shrink heat shrinkable tubing (ref. para. 4.1.3) in place according to PPS 10.16.

Step 5. Remove the masking tape from the bundle end.

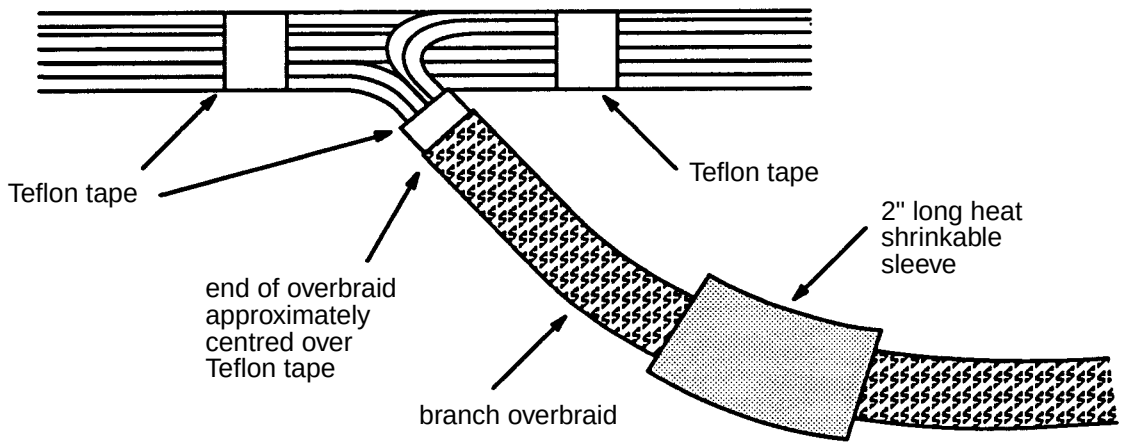


Figure 3 - Installation of Branch Overbraid

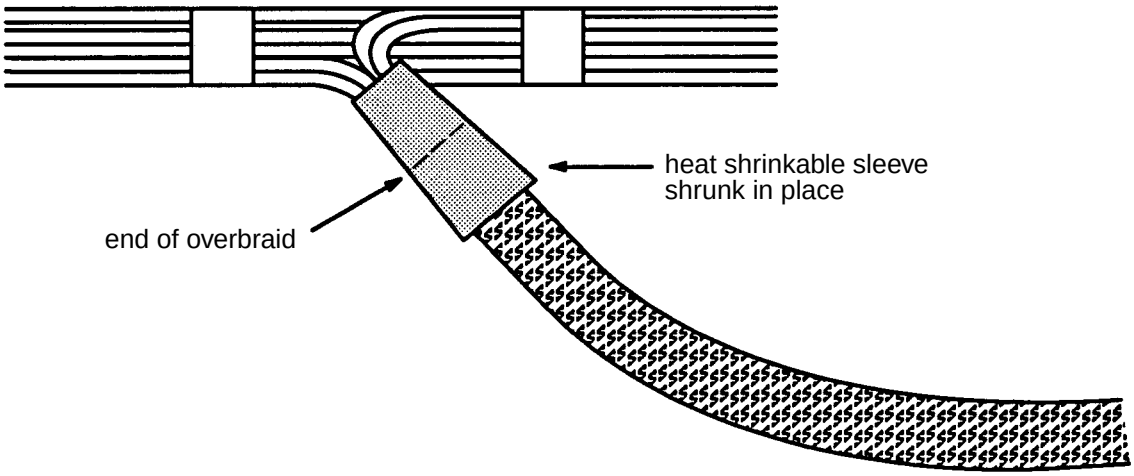


Figure 4 - Securing of Branch Overbraid

5.4 Installation of the Main Harness Overbraid

5.4.1 Install the main harness overbraid as follows:

Step 1. Slide the main bundle overbraid over the entire bundle including the break-out branch.

Step 2. Separate the weave of the main harness overbraid to make a hole at the braided shield break-out point. Position the hole at least 4" from the wire branch break-out point as shown in Figure 2. Make the hole by inserting a suitable probe (e.g., a pen or marker) into the weave and slowly pulling the weave apart until a large enough hole is created.

Step 3. Pull the break-out branch through the hole. Route separate break-out branches through separate holes. Do not route multiple break-outs through the same hole.

5.5 Securing Break-Out Branches to Main Bundle

5.5.1 Secure break-out branches to the main bundle as follows:

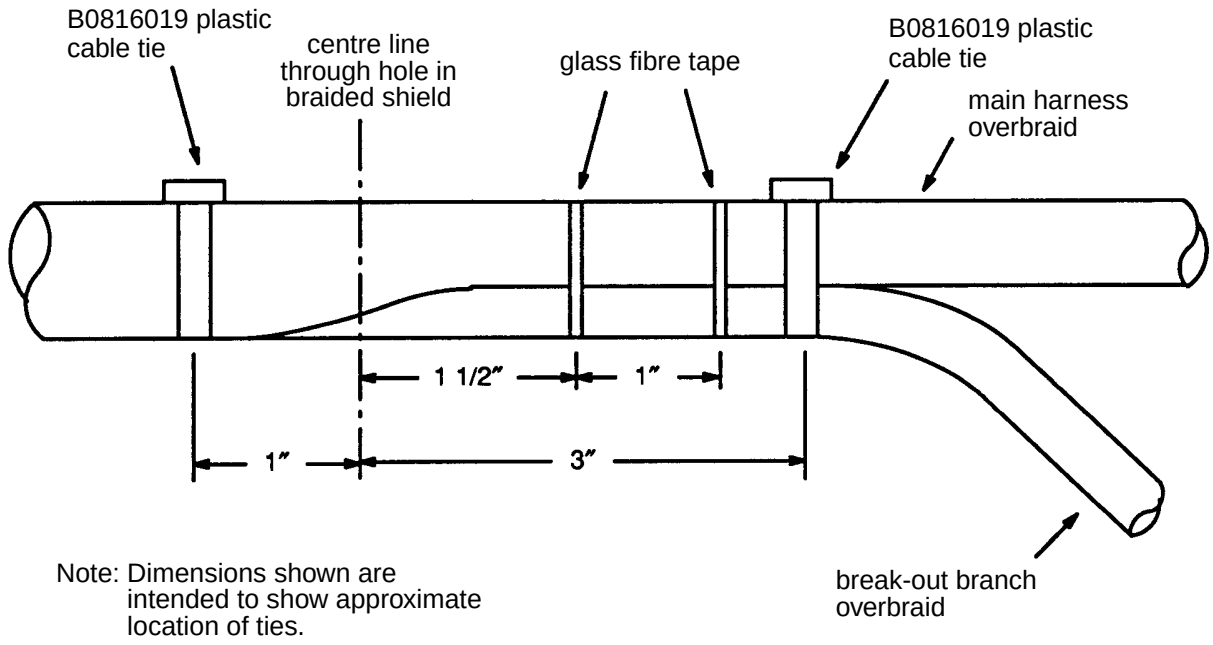
Step 1. Install 2 B0816019 plastic cable ties as shown in Figure 5. Place the first plastic cable tie approximately 1" behind the hole. Place the second plastic cable tie approximately 3" in front of the hole. Install the plastic cable ties according to PPS 9.04.

Step 2. After installing the plastic cable ties, install 2 glass fibre tape ties (ref. para. 4.1.4) as shown in Figure 5. Tie glass fibre tape ties using a clove hitch followed by a square knot (see Figure 6). Place the first glass fibre tape tie approximately 1 1/2" in front of the hole. Place the second glass fibre tape tie approximately 2 1/2" in front of the hole.

Step 3. After tying, secure the knots of glass fibre tape ties with a few drops of Loctite Superbonder 430 (ref. para. 4.1.5). Apply and handle Loctite Superbonder 430 according to PPS 25.56

Step 4. Shrink a 2" length of heat shrinkable tubing over the glass fibre tape ties with the heat shrinkable tubing extending to but not covering the second plastic cable tie (see Figure 7). Do not cover the hole with the heat shrinkable tubing. Shrink heat shrinkable tubing (ref. para. 4.1.3) in place according to PPS 10.16.

Step 5. Install another 2 plastic cable ties, approximately 1/4" from each of the ends of the heat shrinkable sleeve, to secure it in place (see Figure 7). Install the plastic cable ties according to PPS 9.04.



Note: Dimensions shown are intended to show approximate location of ties.

Figure 5 - Tie Spacing when Securing the Break-Out Branch to the Main Harness

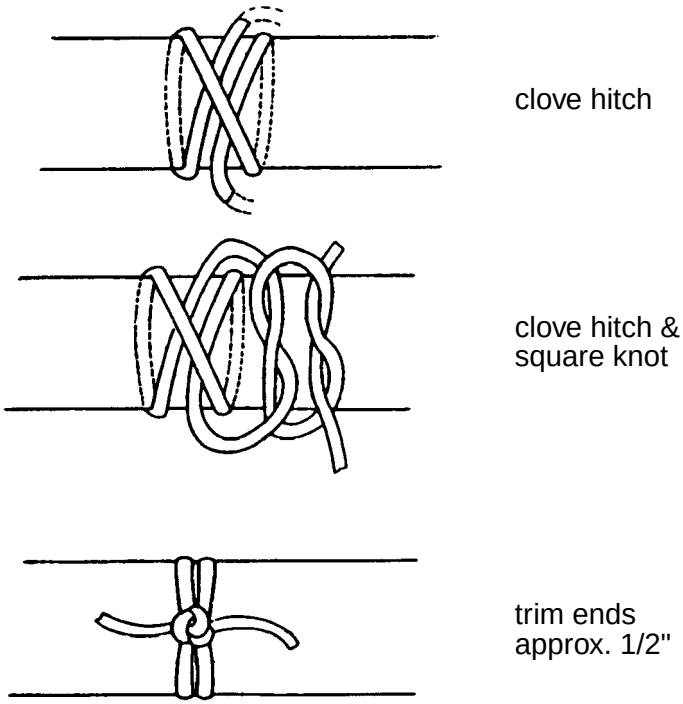


Figure 6 - Tying Glass Fibre Tape Ties

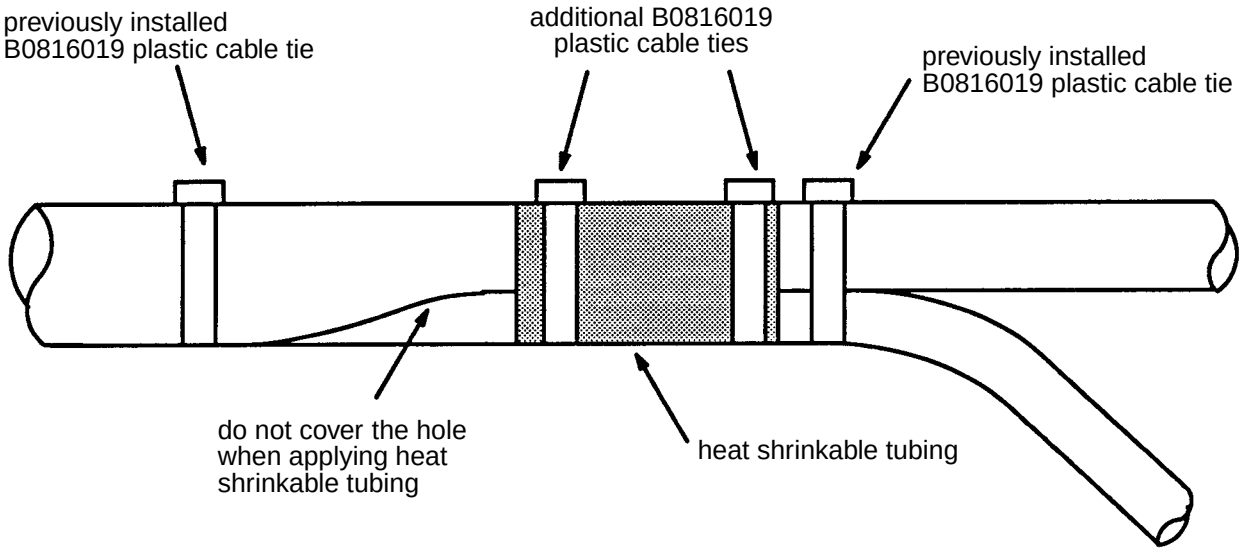


Figure 7 - Securing the Break-Out Branch to the Main Harness

6 Requirements

6.1 Overbraid break-outs shall be prepared using the materials and procedure specified herein.

6.2 Separate branch break-outs shall be made through separate openings.

6.3 Plastic cable ties shall be installed according to PPS 9.04.

6.4 Heat shrinkable tubing shall be shrunk in place according to PPS 10.16.

6.5 Loctite Superbonder 430 shall be applied and handled according to PPS 25.56

7 Safety Precautions

7.1 Observe general shop safety precautions when performing the procedure specified herein.

7.2 Refer to PPS 25.56 for the safety requirements regarding the application and handling of Loctite Superbonder 430.

8 Personnel Requirements

8.1 Personnel responsible for the preparation of metal overbraid shield break-outs must have a good working knowledge of the procedure and requirements as specified herein and must have exhibited their competency to their supervisor.