BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 9.53

PRODUCTION PROCESS STANDARD

Installation of HTAT Heat Shrinkable Tubing

Issue 1
- This is a new standard.
- This PPS is effective as of the distribution date.
- Validation of issue status is the responsibility of the user.

Approved By: _____ (Bruce Campbell) JAN 6.2017
Materials Technology

_____ (Stephen Pitt) JAN 12 2017
Quality

Prepared By: _____ (Michael Wright) January 4, 2017
Core Methods - PPS

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Issue 1 - Summary of Changes

This is a new PPS based upon information previously specified in PPS 9.04 Issue 48.

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for installation of HTAT heat shrinkable tubing.

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.

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 General

3.1.1 Unless a specific issue is indicated, the issue of the reference documents specified in this section in effect at the time of manufacture shall form a part of this specification to the extent indicated herein.

3.2 Bombardier Toronto (de Havilland) Process Specifications

3.2.1 PPS 9.22 – Assembly of Connectors

3.2.2 PPS 13.26 - General Subcontractor Provisions.

3.2.3 PPS 31.17 – Solvent Usage.

4 Materials and Equipment

4.1 Materials

4.1.1 Unless otherwise specified in this section, use only the materials specified; use of superseding or alternative materials is not allowed.

4.1.2 Raychem HTAT semi-flexible, dual wall moisture proof, heat shrinkable tubing as specified by the engineering drawing (e.g., HTAT-48/13-0, HTAT-32/8-0, HTAT-24/6-0, etc.).

4.1.3 Abrasive paper, aluminum oxide, 120 - 180 grit.

4.2 Equipment

4.2.1 Hot air gun (e.g., Steinel STEI-HG2310-BB). For safety reasons, it is recommended that hot air guns include a power interrupt reset feature which will prevent an unattended heat gun from resuming heat (e.g., after a power failure).

5 Procedure

5.1 General

5.1.1 HTAT heat shrinkable tubing (ref. para. 4.1.2) is a semi-flexible, heat shrinkable tubing with an integrally bonded meltable inner lining designed to provide moisture proof encapsulation for a range of substrates, at elevated temperatures. Manufactured from radiation crosslinked polyolefins, the inner wall melts when heated and is forced into interstices by the shrinking of the outer wall so that when cooled the substrate is encapsulated by a tough, protective, moisture proof barrier. HTAT heat shrinkable tubing is **not** interchangeable with other types of heat shrinkable tubing specified by engineering drawings or PPS's. Use HTAT heat shrinkable tubing **only** when specified by the engineering drawing or wiring list (e.g., fwd nacelle/engine airframe wiring harness connectors).

5.2 Installation of HTAT Heat Shrinkable Tubing

5.2.1 Install HTAT heat shrinkable tubing as follows:

Step 1. If the unshrunk HTAT tubing is not already on the harness at the rear of the connector (i.e., ready for installation), disconnect the connector and slide a suitable length (see Figure 1) of HTAT heat shrinkable tubing over the connector onto the harness. To avoid splitting of the HTAT tubing during shrinking, cut the sleeve to the required length in one cut with a sharp pair of scissors. After slipping the HTAT tubing onto the harness, re-connect the connector according to PPS 9.22.

Step 2. **Lightly** scuff the area of encapsulation boots to be covered with HTAT tubing (see Figure 1) using very fine abrasive paper (ref. para. 4.1.3).

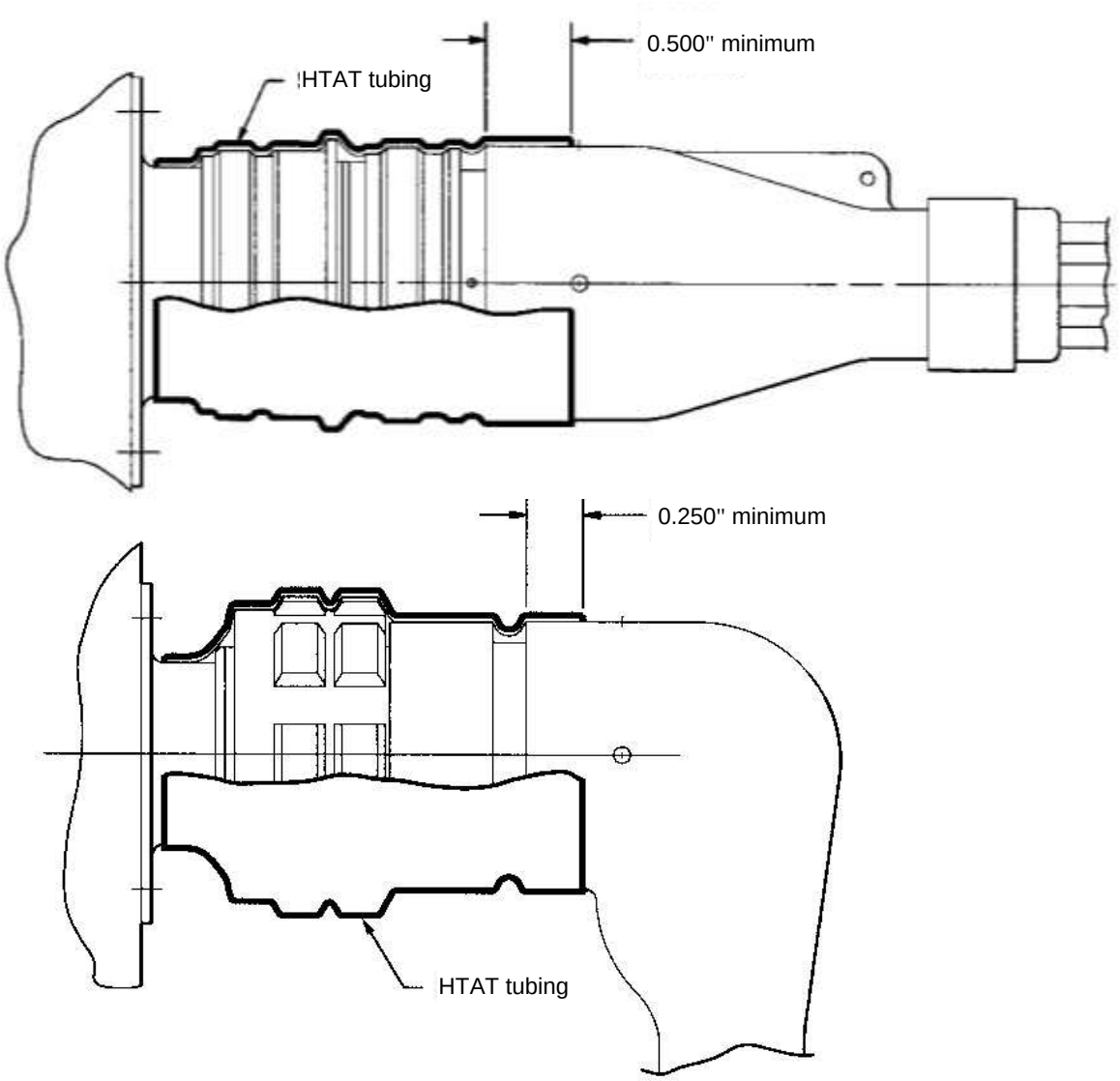

Figure 1. Installation of HTAT Heat Shrinkable Tubing

Step 3. Solvent clean areas for HTAT tubing installation according to PPS 31.17 to ensure the area is free of contaminants.

Step 4. Pull the HTAT tubing up over the connector into the installation position as shown in Figure 1.

Step 5. Using a heat gun (ref. para. 4.2.1), shrink the tubing in place. If necessary, use a reflector on the heat gun. The adhesive should form a bead or fillet between the connector and tubing when fully melted. Begin shrinking the tubing from the middle and then work towards each end in turn.

5.3 **Removal of Installed HTAT Heat Shrinkable Tubing**

5.3.1 If it is ever necessary to remove installed HTAT tubing, lightly score the tubing down the centre with a knife and then reheat with a heat gun. Take care not to cut or nick the boot on the connector backshell. The tubing should split with the application of the required heat. Once the tubing has split, remove the tubing using a pair of pliers while the tubing is still hot. For re-installation of a new section of HTAT tubing, solvent clean locally to remove contaminants, if any; however it is not necessary to remove traces of residual adhesive.

6 Requirements

6.1 HTAT heat shrinkable tubing shall be installed **only** when specified by the engineering drawing or wiring list (e.g., fwd nacelle/engine airframe wiring harness connectors).

6.2 Ensure installed HTAT heat shrinkable tubing exhibits an adhesive bead or fillet between the connector and tubing.

6.3 Shrunk HTAT heat shrinkable tubing must be free of cracks, looseness, edge peeling or signs of over-heating.

7 Safety Precautions

7.1 **The safety precautions specified herein are specific to Bombardier Toronto (de Havilland) to meet Canadian Federal and Provincial government environmental, health and safety regulations. It is recommended that other facilities consider these safety precautions; however, suppliers, subcontractors and partners are responsible for ensuring that their own environmental, health and safety precautions satisfy the appropriate local government regulations.**

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

7.3 **Hot air guns develop extremely high temperatures at the screen nozzle. Exercise caution during handling to avoid burns. After the completion of operations, cool the heat gun by activating the switch to the cold position until the nozzle is cool enough to handle.**

8 Personnel Requirements

8.1 Personnel must have a good working knowledge of the applicable procedure and requirements as specified herein and must have exhibited their competency to their supervisor.