BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 9.21

PRODUCTION PROCESS STANDARD

Preparation of CSP 421 Jumper Assemblies

Issue 6
- This standard supersedes PPS 9.21, Issue 5.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- This PPS is effective as of the distribution date.

Approved By:	*Ken Quon*, for	(L.K. John)	February 11, 2015
	Materials Technology		
	Anthony Assivero, for	(David Dawe)	February 13, 2015
	Quality		

Prepared by Michael Wright, Bombardier Toronto (de Havilland), Core Methods.

Table of Contents

Sections **Page**

Tables

Figures

1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for preparation of CSP 421 jumper assemblies.

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) Specifications

3.2.1 EHS-OP-004 - Personal Protective Equipment - *Bombardier Toronto (de Havilland) internal Environment, Health and Safety operating procedure*.

3.2.2 EHS-OP-005 - Hazardous Materials Management - *Bombardier Toronto (de Havilland) internal Environment, Health and Safety operating procedure*.

3.2.3 PPS 13.26 - General Subcontractor Provisions.

3.2.4 PPS 20.10 - Radiographic Inspection.

3.2.5 PPS 31.06 - Cleaning Copper and Copper Alloys.

3.2.6 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 Abrasive, Scotch-Brite Pads or equivalent.

4.1.3 Flux, Activated, Organic-Rosin Base.

4.1.4 Soldering Alloy, 6/94 Silver/Tin (Manufacturing Method A) or 5/95 Silver/Tin (Manufacturing Method B).

4.2 Equipment

4.2.1 Sanding disc, fine (180 - 220 grit).

4.2.2 Soldering Iron or torch capable of heating the terminal lugs to the soldering temperature.

5 Procedure

5.1 General

5.1.1 A CSP 421 jumper assembly consists of a braided jumper lead with a terminal mounted at each end as shown in Figure 1. CSP 421 jumper assemblies are used as grounding straps.

5.2 Cleaning of Terminal Lug Slots

5.2.1 Before soldering the jumper braid strap to the terminal lugs, clean the slots of the terminal lugs by one of the following methods.

- Mechanically clean the terminal lug slots using an abrasive pad (ref. para. 4.1.2) and then solvent clean according to PPS 31.17.
- Chemically clean the terminal lug slots according to PPS 31.06.

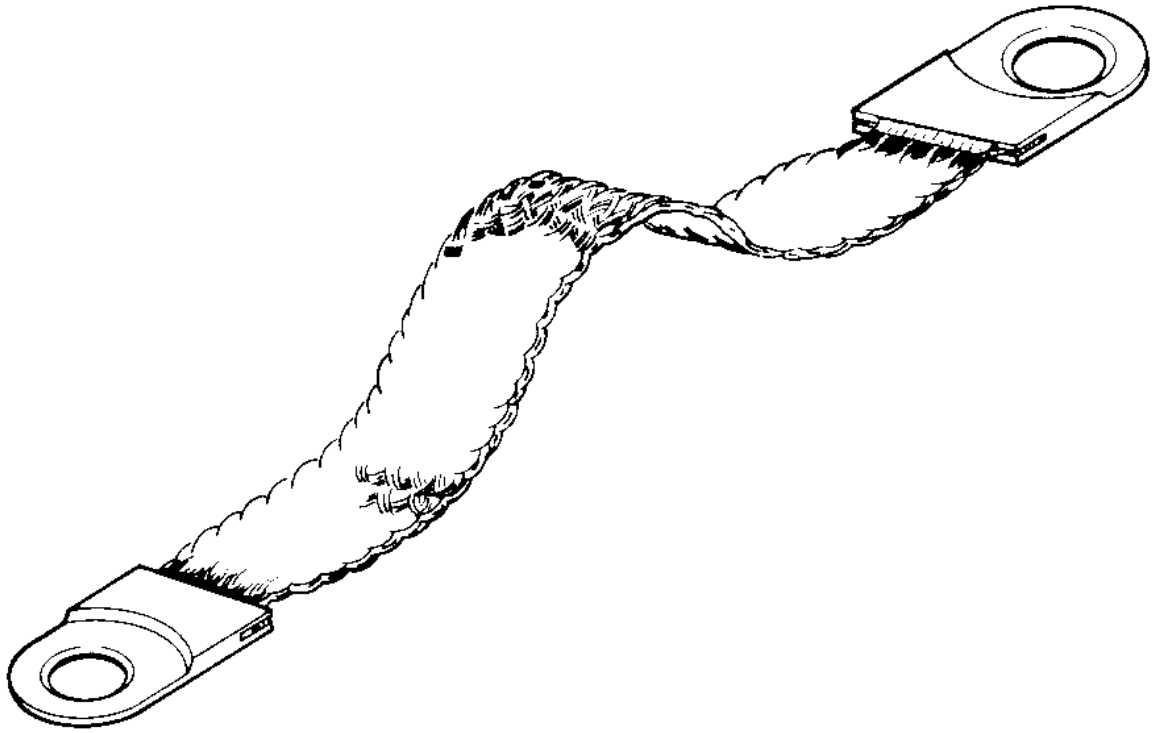

Figure 1 - General Description of the CSP 421 Jumper Assembly

5.3 Soldering of Components

5.3.1 Solder the jumper braid strap to the terminal lugs as follows:

Step 1. Mount one of the terminal lugs in a jig, vise or holder.

Step 2. Apply flux to the inside of the slot.

Step 3. Insert a jumper braid end into the terminal lug slot so that it is approximately centred and bottomed in the slot.

Step 4. Apply heat to the terminal lug to be soldered using a suitable soldering iron or torch.

Step 5. When the terminal lug has been heated to the temperature at which the solder will flow freely, apply the applicable solder (see Materials section, para. 4.1.4) to one side of the slot. Continue adding solder to the slot until that side of the slot is filled (the solder will flow to the other side of the slot leaving a fillet on both sides).

Step 6. Allow the joint to cool undisturbed for at least 30 seconds. While the solder is cooling, do not attempt to induce an airflow over the solder (i.e., no fanning, blowing, slinging, etc.).

Step 7. Solder the other terminal lug to the other end of the jumper braid as specified in Step 1 through Step 6.

Step 8. Remove any excess solder using a fine (180 - 220 grit) sanding disc.

Step 9. Remove residual flux by placing the jumper assembly into a container of boiling water. Allow it to remain in the boiling water until all traces of flux have been removed.

5.4 Electroplating/Tin Dip

5.4.1 If electroplating of the jumper assembly is specified by the engineering drawing, electroplate as follows:

Step 1. Clean the terminal lugs according to PPS 31.06.

Step 2. Tin plate the entire assembly 0.0003" to 0.0005" thick using standard electroplating processes.

5.4.2 If tin dipping of the jumper assembly is specified by the engineering drawing, tin dip as follows. CSP 421 jumper assemblies soldered using 5/95 silver/tin solder should not be tin dipped. If the engineering drawing specifies tin dipping of a jumper assembly soldered using 5/95 silver/tin solder, refer to Liaison Engineering.

Step 1. Clean the terminal lugs according to PPS 31.06.

Step 2. Tin dip the entire assembly. Ensure that the molten tin temperature does not exceed 460°F (238°C).

5.4.3 If the engineering drawing does not specify either electroplate or tin dip, it is acceptable to perform either procedure, provided that 5/95 silver/tin solder was not used. CSP 421 jumper assemblies soldered using 5/95 silver/tin solder must be electroplated.

6 Requirements

6.1 The jumper braid must be approximately centred in the terminal slot.

6.2 If there is any evidence of any of the defects listed in Table 1, the affected solder joint is not acceptable.

6.3 Radiographic examination of solder joints according to PPS 20.10 shall show a wetting action on a minimum of 60% of the solder area between the terminal lug and the jumper braid.

6.4 Tin plating of the jumper assembly must be smooth and uniform.

6.5 Jumper assemblies with more than 10 broken strands are not acceptable.

7 Safety Precautions

7.1 The safety precautions specified herein are specific to Bombardier Toronto 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, for example:

- **Always wear appropriate personal protective equipment (PPE), such as suitable eye protection and safety shoes, in production areas according to EHS-OP-004.**
- **Ensure equipment is undamaged (e.g., no frayed or cracked electrical cords, missing parts, etc.) and in good working order before use.**

7.3 Take care to avoid damage to equipment caused by the hot iron tip or torch. Place hot irons on the bench in the holders provided when not in use.

7.4 Take care to ensure that personnel are not burned by the hot iron, torch or hot molten solder. Never touch the hot iron tip, torch or hot solder. Personnel involved in soldering operations must wear protective clothing to prevent burns from splashing hot solder (i.e., heat resistant gloves, long sleeve shirts and pants).

7.5 Do not eat or drink in soldering areas. Always wash your hands after soldering.

7.6 Take care to avoid inhaling the fumes generated when soldering. Conduct work in a well ventilated area.

7.7 Dispose of silver soldering waste and contaminated rags in separate waste containers according to EHS-OP-005.

8 Personnel Requirements

8.1 Personnel responsible for preparation of CSP 421 jumper assemblies must have a good working knowledge of the procedure and requirements as specified herein and must have exhibited their competency to their supervisor.

Table 1 - Solder Defects

DEFECT	DESCRIPTION	USUAL CAUSE
Excessive Solder	Solder overflows beyond the confines of the area being soldered.	1. Improper flow and wetting action. 2. Insufficient heat, allowing solder to solidify too rapidly.
Fractured Solder Joint	A solder joint in which the solder has cracked or broken between the joint elements.	1. Mechanical stresses during cooling cycle. 2. Thermal stresses during cooling cycle.
Insufficient Solder	The slot in the terminal lug is not filled with solder.	1. Improper flowing and wetting action. 2. Improper application of flux, solder or heat. 3. Insufficient solder applied to joint.
Insufficient Solder Fillet	Lack of a concave junction of solder at the interface of the terminal lug and the jumper braid.	1. Excessive heat application or dwell time. 2. Insufficient solder.
Wicking	Wicking is the result of capillary action drawing the solder up between the strands of the braid. Some wicking is normal but should not extend too far up the jumper braid. Solder material extending up the jumper braid a distance of more than 1/2" from the edge of the terminal lug is an example of excessive wicking.	1. Excessive heat, dwell time and solder.