DE HAVILLAND AIRCRAFT
OF CANADA LIMITED

PPS 9.20

PRODUCTION PROCESS STANDARD
PROPRIETARY INFORMATION

CRIMPING OF SIZE 8 - 0 ELECTRICAL CONTACTS

Issue 12
- This standard supersedes PPS 9.20, Issue 11.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- Direct PPS related questions to christie.chung@dehavilland.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

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	Quality	

Issue 12 - Summary of Changes (over the previous issue)

The following summaries are not detailed and are intended only to assist in alerting PPS users to changes which may affect them; refer to the applicable sections of this PPS for detailed procedure and requirements.

- Replaced throughout PPS where “Bombardier” is specified with “De Havilland Aircraft of Canada Limited” or “De Havilland Canada” as the DASH 8 program is under new ownership.
- Clarified the scope of this PPS is for crimping of size 8 - 0 electrical connector pin and socket contacts to electrical wires only (as per PPS title).
- For Facility Approval section, replaced Bombardier Toronto Materials Technology with De Havilland Canada Engineering.
- Specified during facilities approval, test samples should also meet the tensile testing specified in PPS 9.55 (Qualification of Crimp Tools).
- Replaced procedure and requirements for qualification of crimp tools with cross-reference to PPS 9.55.
- Specified testing for qualification of crimp tools shall be performed at a BAERD GEN-018 approved lab only.
- Added new Maintenance of Equipment section.

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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for crimping of size 8 - 0 electrical connector pin and socket contacts to electrical wires.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction. The procedure specified in this PPS shall 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.

2 HAZARDOUS MATERIALS

2.1 Before receipt at De Havilland Canada, all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the De Havilland Canada 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 De Havilland Canada Environment, Health and Safety Department.

3 REFERENCES

3.1 BAERD GEN-018 - Engineering Requirements for Laboratories.

3.2 PPS 9.24 - Wire and Cable Stripping.

3.3 PPS 9.55 - Qualification of Crimp Tools.

3.4 PPS 13.26 - General Subcontractor Provisions.

3.5 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

4 MATERIALS, EQUIPMENT AND FACILITIES

4.1 Materials

4.1.1 Crimp style electrical contacts as specified on the engineering drawing or herein.

4.2 Equipment

4.2.1 Pneumatic crimp tool with associated locators and crimp head or die assembly: Cannon CBT 600 crimp tool (see Figure 1) or M22520/23-01 crimp tool (e.g., Daniels Manufacturing Corp. WA23).

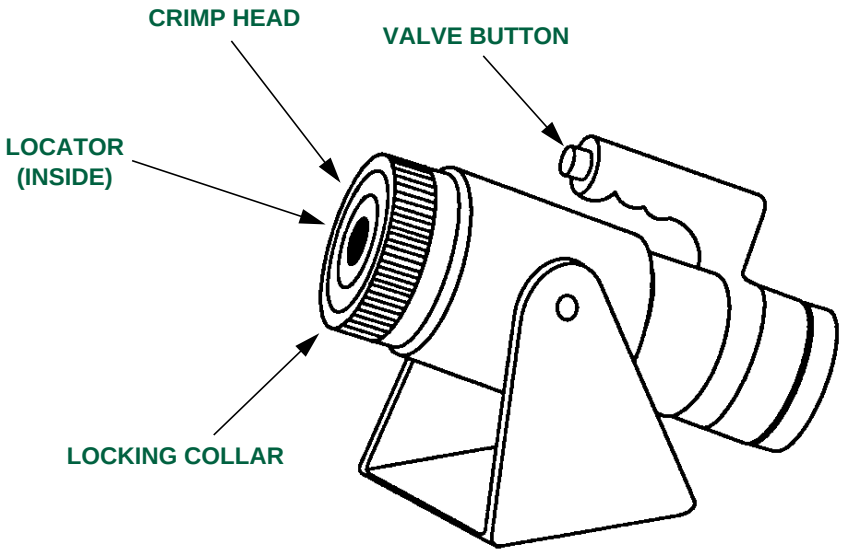

FIGURE 1 - CBT 600 PNEUMATIC CRIMP TOOL

4.3 Facilities

4.3.1 This PPS has been categorized as a Controlled Special Process according to PPS 13.39 and as such only facilities specifically approved according to PPS 13.39 are authorized to perform crimping of size 8 - 0 electrical connector pin and socket contacts to electrical wires according to this PPS.

4.3.2 Subcontractors shall direct requests for approval to De Havilland Canada Supplier Quality Management.

4.3.3 Facility approval shall be based on a facility report, a facility survey and completion of a qualification test program, if required. The facility report shall detail the materials and equipment to be used, the process sequence to be followed and the laboratory facilities used to show compliance with the requirements of this PPS. Any deviation from the procedure or requirements of this PPS shall be detailed in the facility report. Based upon the facility report, De Havilland Canada Engineering may identify additional qualification and/or process control test requirements. During the facility survey, the facility requesting qualification shall be prepared to demonstrate their capability. Once approved, no changes to subcontractor facilities may be made without prior written approval from De Havilland Canada Supplier Quality Management.

4.3.3.1 Unless otherwise specified by De Havilland Canada Supplier Quality Management, for approval of subcontractor facilities to perform crimping of size 8 - 0 electrical connector pin and socket contacts to electrical wires according to this PPS, completion of a test program and submission of suitable test samples representative of production parts is required. Test samples shall meet the requirements specified in section 6 (i.e., visual examination requirements as specified in section 6.2 **and** tensile testing as specified for qualification of crimping tools as specified in PPS 9.55).

4.3.3.2 All testing and evaluation specified herein shall only be performed by De Havilland Canada Materials Laboratory or by laboratories accredited according to BAERD GEN-018.

5 PROCEDURE

5.1 General

5.1.1 Crimp style contacts as specified herein are used as a means of terminating wires at electrical connectors and terminal junctions. Refer to Table I for a listing of M39029 contacts. Refer to Figure 2 for a general description of crimp style contacts.

TABLE I - CONTACT IDENTIFICATION

CONTACT M39029/	WIRE BARREL SIZE	BIN COLOUR BANDS			TYPE	SUPERSEDED MILITARY PART NUMBER
		1ST	2ND	3RD		
29-214	8	RED	BROWN	YELLOW	PIN	M39029/29-8-8 MS3162-8-8 M83723-29T8
29-215	4	RED	BROWN	GREEN	PIN	M39029/29-4-4 MS3162-4-4 M83723-29T4
29-216	0	RED	BROWN	BLUE	PIN	M39029/29-0-0 MS3162-0-0 M83723-29T0
30-220	8	RED	RED	BLACK	SOCKET	M39029/30-8-8 MS3163-8-8 M83723-30T8
30-221	4	RED	RED	BROWN	SOCKET	M39029/30-4-4 MS3163-4-4 M83723-30T4
30-222	0	RED	RED	RED		M39029/30-0-0 MS3163-0-0 M83723-30T0
44-291	8	RED	WHITE	BROWN	PIN	MS90453-8-8
44-292	4	RED	WHITE	RED	PIN	MS90453-4-4
44-293	0	RED	WHITE	ORANGE	PIN	MS90453-0-0
45-298	8	RED	WHITE	GRAY	SOCKET	MS90454-8-8
45-299	4	RED	WHITE	WHITE	SOCKET	MS90454-4-4
45-300	0	ORANGE	BLACK	BLACK	SOCKET	MS90454-0-0

Notes 1. All M39029 contacts are identified by a 3 digit bin code which corresponds to the last three digits in the M39029 part number. Each digit of the code is designated on the contact by a colour band as follows:

0 - BLACK	1 - BROWN	2 - RED	3 - ORANGE	4 - YELLOW
5 - GREEN	6 - BLUE	7 - VIOLET	8 - GREY	9 - WHITE

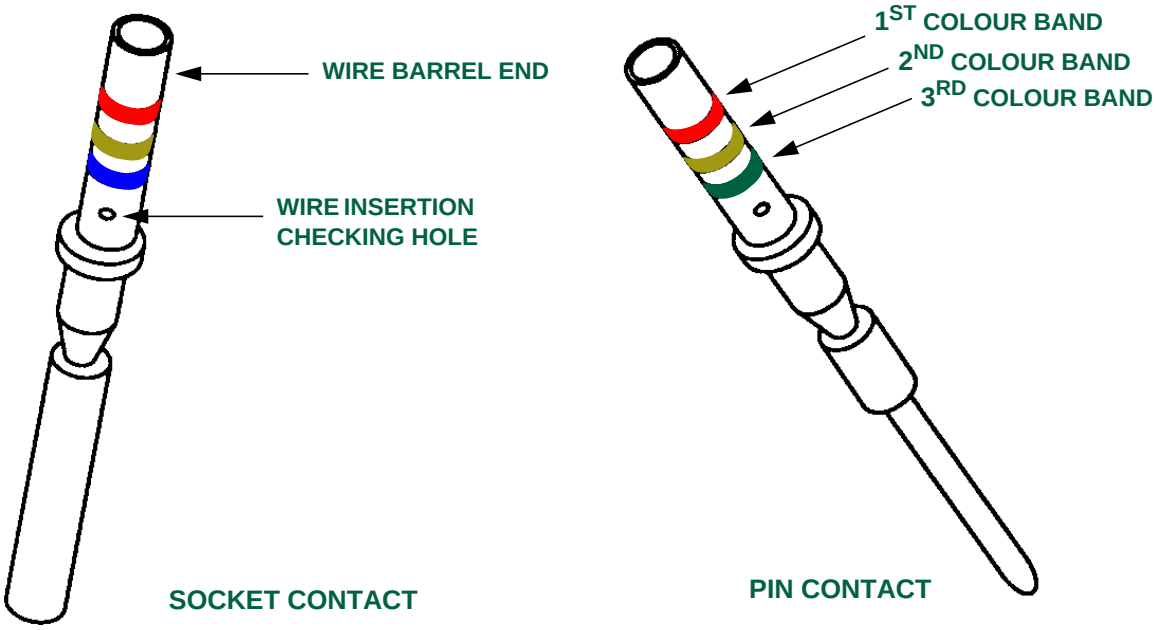

FIGURE 2 - GENERAL DESCRIPTION OF CRIMP TYPE CONTACTS

5.1.2 Crimping tools shall be qualified according to PPS 9.55 before use on Production parts. For additional details regarding tool operation, refer to the manufacturers' instructions.

5.2 Stripping of Wire Insulation

5.2.1 Before crimping, strip the wire insulation from the end of the wire to expose the bare conductor according to PPS 9.24.

5.3 Step Down Adapters

5.3.1 If specified by Table II, assemble an MS3348 adapter onto the stripped end of the wire before inserting the wire into the contact.

TABLE II - STEP DOWN ADAPTERS

WIRE BARREL GAUGE	WIRE GAUGE	ADAPTER NEEDED
8	8	None
	10	MS3348
4	4	None
	6	MS3348
0	0	None
	1	MS3348
	2	

5.4 Crimping of Contacts

5.4.1 Crimp contacts using a CBT 600 crimping tool or a pneumatic crimp tool to M22520/23-01.

5.4.1.1 When using a pneumatic crimp tool to M22520/23-01, operate the crimp tool according to the manufacturers instructions and use the appropriate M22520/23 locator and M22520/23 crimp head (die assembly) for the contact being crimped.

5.4.1.2 Use the CBT 600 crimping tool to crimp contacts as follows:

Step 1. Insert the stripped wire end (along with adapter, if necessary) into the contact wire barrel until the insulation butts against the end of the barrel or the wire strands bottom inside the wire barrel.

Step 2. Ensure that the wire strands are visible through the contact verification hole and that the gap between the wire insulation and the end of the barrel does not exceed 1/16".

Step 3. Disconnect the power unit of the crimping tool from the shop air line.

Step 4. Unscrew the knurled locking collar from the end of the crimping tool and assemble the locator and crimp head specified in Table III into the tool. Ensure that the alignment pin in the locator housing engages one of the notches in the locator flange to properly seat the locator.

Step 5. Screw the locking collar fully onto the tool and hand tighten firmly.

Step 6. Connect the power unit to a shop air line and cycle the tool twice, tightening the locking collar after each cycle to ensure that the head is in the proper position for crimping.

Step 7. Insert the wire/contact assembly into the crimp head until the contact butts against the locator.

Step 8. Depress the valve button on the power unit handle to cycle the tool and crimp the contact to the wire.

Step 9. Remove the crimped assembly from the tool. Check the first off crimped contact to verify that the locator/crimp head being used produces a visually acceptable crimp as specified in section 6.2.

TABLE III - LOCATOR AND CRIMP HEAD SELECTION FOR CBT 600 CRIMP TOOL (NOTE 1)

M39029 CONTACT	LOCATOR	CRIMP HEAD
29-214	CCHP8-7	CCH-8-1
29-215	CCHP4-7	CCH-4-1
29-216	CCHP0-7	CCH-0-1
30-220	CCHP8-7	CCH-8-1
30-221	CCHP4-7	CCH-4-1
30-222	CCHP0-7	CCH-0-1
44-291	CCHP8-7	CCH-8-1
44-292	CCHP4-7	CCH-4-1
44-293	CCHP0-7	CCH-0-1
45-298	CCHP8-7	CCH-8-1
45-299	CCHP4-7	CCH-4-1
45-300	CCHP0-7	CCH-0-1

Note 1. If using a pneumatic crimp tool to M22520/23-01, use the appropriate M22520/23 locator and M22520/23 crimp head (die assembly) for the contact being crimped.

6 REQUIREMENTS

6.1 General

6.1.1 All testing and evaluation specified herein shall only be performed by De Havilland Canada Materials Laboratory or by laboratories accredited according to BAERD GEN-018.

6.2 Visual Examination

6.2.1 Crimped contacts shall be subjected to periodic visual examination as follows (see Figure 3):

- Ensure that the wire strands are visible through the wire barrel verification hole.
- Ensure that the insulation gap is no more than 1/16".
- Ensure that the crimp indentations are equally spaced, uniform in appearance, approximately centered on the wire barrel and are no closer than 0.030" from the contact shoulder or the end of the wire barrel.
- Ensure that no more than 2 splayed or bird-caged wire strands. Trim off splayed or bird-caged wire strands.

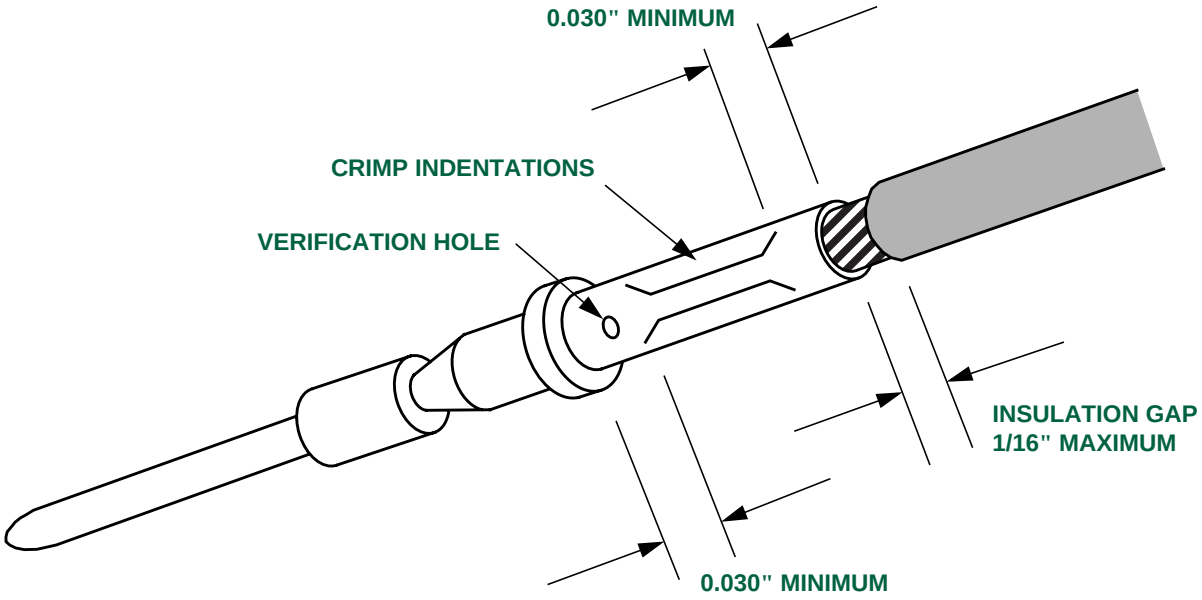

FIGURE 3 - VISUAL EXAMINATION OF CRIMPED CONTACTS

7 SAFETY PRECAUTIONS

7.1 The safety precautions specified herein are specific to De Havilland Canada 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 standard plant safety precautions when performing the procedure specified herein.

7.3 Ensure that the crimp tool power unit is disconnected from the shop air line at all times when changing the crimp tool locator and crimp head or die assembly.

8 PERSONNEL REQUIREMENTS

8.1 This PPS has been categorized as a Controlled Special Process by PPS 13.39. Refer to PPS 13.39 for personnel requirements.

9 MAINTENANCE OF EQUIPMENT

9.1 Adjustment or repair of crimping tools shall be carried out by authorized personnel only.