| **BOMBARDIER**<br>Toronto (de Havilland)<br>**Proprietary Information** | **PPS 15.01**<br>**Production Process Standard (PPS)** |
|---|---|

# Part Marking

Issue 40

- This standard supersedes PPS 15.01, Issue 39.
- This PPS is effective as of the distribution date.
- Validation of issue status is the responsibility of the user.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
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Issue 40 - 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 section(s) of this PPS for detailed procedure and requirements.

- Revised references to "Raychem" equipment and/or materials to specify "TE Connectivity, Tyco Electronics or Raychem" equipment and/or materials.
- Revised para. 4.1.17 to remove 16-8700Q ink from the list of ink-jet inks that can be used on all parts.

**Table of Contents**

**Sections** **Page**

**Table of Contents**

**Sections** **Page**



**Tables**

## 1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for part marking of aircraft parts and assemblies as a means of providing identification during fabrication and assembly.

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.

1.1.4 Refer to PPS 15.02 for the procedure and requirements for identification coding of electrical and electronic wires and cables. Identification coding is not the same as part marking and each are independently required.

## 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 PPS 10.16 - Installation of Heat Shrinkable Tubing, Tape and Identification Sleeving.

3.2.2 PPS 13.26 - General Subcontractor Provisions.

3.2.3 PPS 13.34 – Installation of Plastic Cable Ties.

3.2.4 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

3.2.5 PPS 15.04 - Use of Felt Tip Markers for Marking Aircraft Parts and Assemblies.

3.2.6 PPS 15.06 - Electrochemical Etch Marking of Aircraft Parts.

3.2.7 PPS 16.18 - Protective Coating of Aircraft Markings, Films and Labels.

3.2.8 PPS 22.01 - Masseeley Marking of Parts and Labels.

3.2.9 PPS 22.06 - Screen Printing - Direct Process.

3.2.10 PPS 31.17 - Manual Solvent Cleaning.

3.2.11 PPS 34.01 - Application of Cellulose Nitrate Lacquer (F2 & F4).

### 3.3 Bombardier Aerospace Material Specifications

3.3.1 BAMS 516-007 - Marking Inks.

## 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 Bombardier standard serialization labels as listed below:

- Adhesive backed label: B0314001-2 or B0314004-2
- Riveted label: B0314002-2
- Rubber stamp type: B0314003-2, B0314003-2A or B0314003-2B

4.1.3 Marking tags. Marking tags may be linen, Dacron, paper or other suitable material; however, the marking tag material must be capable of resisting the conditions it will be exposed to and legibly retaining the ink stamped or hand written part mark. Do not use paper tags where the tag could be exposed to temperatures exceeding 200°F (93°C). Do not use Dacron tags where the tag could be exposed to temperatures exceeding 400°F (204°C).

4.1.4 Rate item identification tags (e.g., DH 4358).

4.1.5 TE Connectivity, Tyco Electronics or Raychem, HT-SCE heat shrinkable sleeves.

4.1.6 Metallic tags and attachment wire as specified in Table 1.

4.1.7 Disposable aluminum identification tags, 1/2" x 4 1/4" (e.g., J.J. Metals Inc.).

4.1.8 DSC 347 heat shrinkable sleeving, wrap around markers and tywrap type cable markers.

4.1.9 Seat dress cover and cushion part labels: 71130137-101, 71130138-101, 81152196-101, 81152197-101, or 81152201-101.

4.1.10 Identification tape - pressure sensitive, adhesive backed, polyvinyl fluoride (PVF), may also be identified as “Tedlar” tape:

- ASF-121 tape
- BACT19B-T tape
- Brady B-437, thermal transfer printable label stock tape

4.1.11 Labels:

- CSP 366-2 labels.
- DSC 85-5 pressure sensitive metallized polyester labels.
- DSC 471-1 metallized polyester film, matte aluminum finish, pressure sensitive acrylic adhesive.
- DSC 471-3 polyester label, white, pressure sensitive acrylic adhesive.
- EPC “V” series adhesive backed labels, polyvinyl fluoride (PVF), pressure sensitive, white.

4.1.12 Paper envelopes of suitable size for holding/part making Scotchcal film labels.

4.1.13 Beaded security ties, polypropylene (e.g., Uline S-7746).

4.1.14 Stamp pad inks (not for use with stencils):

- BAMS 516-007 Type I, Class A or Class B, as applicable, stamp pad ink (Class A ink may be used on surfaces other than bare titanium or titanium alloy; Class B ink may be use on all surfaces, including bare titanium or titanium alloy).
- Alcosol, Matthews International Corporation
- All-Mark 66000, Weber Marking Systems
- W.E. #41 Paste Ink, Sun Chemical Corporation, General Printing Ink Division
- #73X or #73X NW, black, Independent Ink Incorporated
- DHMS F7.02 part marking inks for light coloured parts

4.1.14.1 Use black ink on light coloured parts and white or yellow ink on dark coloured parts.

4.1.15 Stencil inks (not for use on stamp pads):

- Dymo Sten-C-Labl, fast drying, black
- Dymo Sten-C-Labl, fast drying, white
- CM-50, non-porous black stencil ink, Marsh Company

4.1.16 Marking stencils, (e.g., Dymo Sten-C-Labl).

4.1.17 Ink-jet ink:

The following ink-jet inks can be used on parts **except** bare titanium or titanium alloy**.** It is imperative that the following inks are **not** used on bare titanium or titanium alloy parts, as hydrogen embrittlement and cracking of the part in service could result.

- BAMS 516-007 Type I Class A ink-jet ink
- 16-2000, black (Shell Chemical Company or Videojet Technologies Inc.)
- 16-2500, yellow (Shell Chemical Company or Videojet Technologies Inc.)

The following ink-jet inks can be used on all parts, **including** bare titanium or titanium alloy:

- BAMS 516-007 Type I Class B ink-jet ink
- V421-D, black (Videojet Technologies Inc.)
- 15i-Q (Inkjet Inc.)
- 5101 (Imaje Canada Inc.)

4.1.18 Printer and typewriter ribbons:

- Brady R2051 typewriter ribbon
- Brady R4300 or R6200 series black ribbon, for Brady THT Model 300 thermal transfer printer.
- Brady R6010 black ribbon, for Brady TLS2200 thermal print labelling system.
- Columbia 7900 typewriter ribbon
- Critchely 1330-0036-00 ribbon, for Epson FX-286 and FX-1050 impact dot matrix printers.
- Hytype II typewriter ribbon
- Nukote BM 325 ribbon, for Raven RP-9105 and Panasonic 2180 9 pin dot matrix printers.
- TE Connectivity, Tyco Electronics or Raychem, TMS-101-RIBBON-4HT, for TMS-101TT thermal transfer printer

4.1.18.1 Discard typewriter or printer ribbons that have exceeded their expiry dates. After application of the part mark allow the ink on the identification tape to air dry momentarily before applying the tape or label.

4.1.19 DSC 91-16-1 solvent resistant polyester tape (e.g., 2" wide 3M Co. -853).

4.1.20 Ink-jet printhead cleaning solution:

- 16-3500Q (Shell Chemical Company or Videojet Technologies Inc.), for use with Shell Chemical Company or Videojet Technologies Inc. inks.
- 509i (Inkjet Inc.), for use with Inkjet Inc. ink.
- 5191 (Imaje Canada Inc.) for use with Imaje Canada Inc. ink.

4.2 **Equipment**

4.2.1 Stencil applicator (e.g., Dymo Sten-C-Labl).

4.2.2 Engraving tools, air or electric driven pencil type.

4.2.3 Embossing machine (e.g., Norcom Embosser).

4.2.4 Printers:

- Brady THT Model 300X thermal transfer printer
- Brady TLS2200 thermal print labelling system
- Epson FX-286 impact dot matrix printer
- Epson FX-1050 impact dot matrix printer
- Hitachi Co. Ltd. FX-2623S inkjet printer
- Panasonic 2180 dot matrix (9 pin) printer
- Raven RP-9105 dot matrix (9 pin) printer
- TE Connectivity, Tyco Electronics or Raychem, TMS-101TT thermal transfer printer
- Videojet Excel Series 170i Coder/Printer

4.2.5 Wire marking and cutting machine (e.g., Conrac).

5 **Procedure**

5.1 **General**

5.1.1 Unless otherwise specified, all part marks must include the part or assembly number and either the MACPAC Multi Number with its suffix, the Job Card Number with its suffix or the SAP order number, as applicable.

5.1.2 Unless otherwise specified, part mark after completion of all operations called out on the shop order. If the work book specifies that rate items must be part marked after jig loading, part mark the rate items right after loading the rate item in the jig. However, do not apply the final inspection stamp until after completion of all operations called out on the shop order.

5.1.3 Standard parts (i.e., AN, MS, NAS, etc.) do not require any marking other than that applied by the manufacturer. If standard parts are altered to suit a particular application, remove the original manufacturer's marking and engrave a new part number on the part using a suitable engraving tool (ref. para. 4.2.2). The depth of the marking shall be approximately 0.001" and the character size shall be 0.25" maximum.

5.1.2 Install plastic cable ties according to PPS 13.34.

## 5.2 In-Process Identification

5.2.1 For in-process identification, keep the shop order with the part during all manufacturing and transition stages. While the part is being processed, use the shop order as the primary means of identification.

5.2.2 It is the responsibility of all personnel involved in the manufacture and handling of parts to ensure that the shop orders of different parts do not become intermixed. Use boxes, bands, bags, tape or any other inexpensive means for this purpose.

5.2.3 Use the metallic tag material and attachment wire material specified in the following table for in process identification.

Table 1. **Metal Tags and Attachment Wire used for In-Process Identification**

| **Part Material** | **In-Process Attachment Wire and Tag Material** (Note 1) |
|---|---|
| Aluminum or magnesium alloy that will not be chem-milled | Any aluminum alloy |
| All other parts (including aluminum and magnesium alloy that will be chem-milled) | Any 300 series corrosion resistant steel alloy |

Note 1. Except during heat treatment or chemical processing (e.g., chemical conversion coating or anodizing) it is permissible to use beaded security ties (ref. para. 4.1.13) or self-locking plastic cable ties as specified in PPS 13.34 in place of the tag wire specified.

5.2.4 For batches of detail parts, attach metallic tags (ref. Table 1) engraved or embossed with the part number to 10% (4 minimum) of the batch. Engrave the tags using a suitable engraving tool (ref. para. 4.2.2) or emboss using an embossing machine (ref. para. 4.2.3).

5.2.5 During operations such as heat treatment, application of chemical conversion coating, anodizing and priming, attach reusable metallic number tags (ref. Table 1) to one or more, as considered necessary, of the parts in the batch and record the tag numbers on the shop order. After completion of the process requiring the tagging, return the shop order to the parts and remove the number tags (retain them for re-use).

5.3 **Subcontractor Parts Identification**

5.3.1 For subcontractors, unless otherwise specified, all part marks must include the part or assembly number as well as a number which ensures traceability of the part to the build paperwork (e.g., work instruction, batch or lot number, etc.) applied to the part with the inspection stamp and date.

5.3.2 Unless otherwise specified, all parts must be identified by the part marking method specified in this PPS.

5.3.3 Identify machine shop parts using an identification tag, engraved or embossed with the part number using a suitable engraving tool (ref. para. 4.2.2). Secure identification tags to the part using a wire of compatible material (i.e., aluminum wire for aluminum parts, steel wire for steel parts).

5.4 **Serialization**

5.4.1 If specified on the engineering drawing, identify parts with the Bombardier standard serialization label specified (ref. para. 4.1.2). Apply the label to the location specified on the engineering drawing. Record the information on the serialization label using an engraving tool (ref. para. 4.2.2).

5.4.2 Parts identified with a serialization label do not require any other part mark.

5.4.3 Assign, record and control serial numbers according to the applicable site Quality instructions.

5.5 **Part Marking of Metal Parts and Assemblies**

5.5.1 Except as noted below, part mark all metal parts (including machined parts, fluid system lines, instruments and assemblies) by ink stamping according to section 5.16.

5.5.1.1 As an alternative to ink stamping, it is acceptable to part mark metal parts using an ink-jet coder/printer according to section 5.22.

5.5.1.2 Part mark steel cable assemblies which are fitted with swaged straight shank terminals by electrochemical etching according to section 5.20. Part mark all other steel cable assemblies by tagging according to section 5.18.

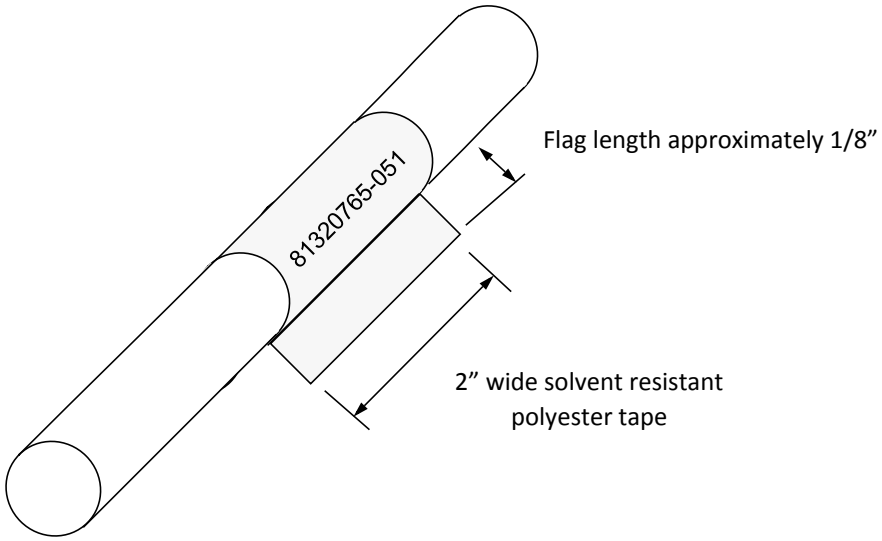
5.5.1.3 Part mark detail parts that will be assembled by fusion welding, spot welding or adhesive bonding by tagging according to section 5.18. After welding or bonding, part mark the assembly by ink stamping according to section 5.16.

5.5.1.4 Except for machined spars for Learjet Model 45 aircraft, part mark machined spars at the location specified on the engineering drawing using an engraving tool (see para. 4.2.2). The depth of the marking shall be approximately 0.001" and the character size shall be 0.25" maximum. Unless otherwise specified by the engineering drawing, for machined spars for Learjet Model 45 aircraft part mark by ink stamping according to section 5.16.

5.5.1.5 Part mark titanium fluid system lines using an ink-jet coder/printer according to section 5.22 or by electrochemical etch marking according to section 5.20.

5.5.1.6 If the size or surface of a part or assembly makes ink stamping or electrochemical etching impossible, part mark it by tagging according to section 5.18.

5.5.1.7 Except for part marks on fluid system lines in the wing fuel tanks, after ink stamp or ink-jet part marking fluid system lines cover the part mark with a 2" wide strip of solvent resistant polyester tape (ref. para. 4.1.19). Do not cover part marks on fluid system lines in the wing fuel tanks. Apply the tape so that the part mark is approximately centered with a 1/8" single wing butterfly joint as shown below:




5.5.2 Part mark component assemblies by means of either a metal identification plate or a Scotchcal type plastic identification plate, as specified on the engineering drawing. Apply the information to metal identification plates by steel impression stamping according to section 5.17. Apply the information to Scotchcal type plastic identification plates by Masseeley marking according to PPS 22.01 or by silk screening according to PPS 22.06, as specified on the engineering drawing.

## 5.6 Part Marking of Pressure Tested Tanks

5.6.1 Part mark pressure tested tanks by applying a CSP 366-2 label to a suitable surface after testing.

5.6.2 Ink stamp the following information on the CSP 366-2 label according to section 5.16:

- Drawing number
- Issue number
- Tank Serial number (e.g., according to QDI-08-02)
- the word TESTED
- Inspection stamp and the inspection date

5.6.3 After ink stamping, cover the label with a coat of F4 clear cellulose nitrate lacquer (to A-A-3165) according to PPS 34.01. As an alternative to use of F4 clear lacquer, it is acceptable to apply a protective coating to the label according to PPS 16.18.

## 5.7 Part Marking of Scotchcal Films

5.7.1 Except for identification plates, apply part marks to Scotchcal type films and labels by ink stamping on the paper backing according to section 5.16. If the label backing is of a type or size that does not permit the application of a legible stamp, place the label in an envelope and apply the part mark to the envelope. If a batch of labels of the same part number is being prepared, one identified envelope per batch is acceptable. When issuing labels from a batch in a marked envelope, identify a second envelope with the part mark and place the issued labels in that envelope.

5.7.2 Apply information to Scotchcal type plastic identification plates by either Masseeley marking according to PPS 22.01 or silk screening according to PPS 22.06, as specified on the engineering drawing.

## 5.8 Part Marking of Plastic and Composite Parts

5.8.1 Apply part marks to polycarbonate and acrylic plastic parts by tagging according to section 5.18.

5.8.2 Part mark Ultem parts and plastic parts other than polycarbonate or acrylic plastic by ink stamping according to section 5.16.

5.8.3 Part mark fibre reinforced composite parts by either ink stamping according to section 5.16 or labelling according to section 5.21.

5.8.4 For phenolic resin fibre reinforced composite parts on which the outer ply is composed of DHMS P1.44 Type 2 or DHMS P1.59 Type 2 material, part mark by ink stamping according to section 5.16. If a piece of DHMS P1.44 Type 1 material or DHMS P1.59 Type 1 material, approximately 1/4" wider and longer than the label, has been laid up between the label and the DHMS P1.44 Type 2 or DHMS P1.59 Type 2 material to prevent contact, it is acceptable to part mark by labelling according to section 5.21.

5.9 **Part Marking of Upholstery Panels and Fabrics**

5.9.1 Except as noted below, part mark upholstery panels and fabrics by ink stamping according to section 5.16:

- Part mark upholstery panels and fabrics with a coarse weave that would not permit the application of a legible stamp by tagging according to section 5.18.
- Part mark Fireblock seat covers and cushions using seat dress cover and cushion part labels (ref. para. 4.1.9). Apply information to the labels by ink stamping. Include the following information on the label: Cover Assembly Part Number, Dress Material Number and Bombardier Toronto (de Havilland) Seat Cushion Part Number.

5.9.2 Apply the part mark to the non-visible side of the fabric or panel.

5.9.3 Allow ink stamped part marks on fabrics to air dry for a minimum of 5 minutes before stacking parts.

5.10 **Part Marking of Electrical and Electronic Wiring**

5.10.1 Except as noted below, part mark electrical and electronic wires and cables using **identification tape** (ref. para. 4.1.9) according to section 5.19:

- Part mark wires or cables that will be completely enclosed within a junction box, or which will form a permanent part of a panel assembly, by tagging according to section 5.18.
- If specified on the engineering drawing or wiring list, part mark electrical or electronic wires and cables using **sleeves** according to section 5.19.

5.10.2 Part mark electrical panels and junction boxes by ink stamping according to section 5.16 or by labelling according to section 5.21.

5.11 **Part Marking of Elastic Cord Assemblies**

5.11.1 Part mark elastic cord assemblies by tagging according to section 5.18.

5.12 **Part Marking of Castings and Forgings**

5.12.1 Except as noted below, part mark castings and forgings with the Part Number, Lot Number, Particle/Penetrant Inspection number, Radiographic Serial number and if applicable, vendor name or trademark by ink stamping according to section 5.16:

- Part mark titanium forgings by electrochemical etching according to section 5.20.
- It is acceptable to neatly print Radiograph serial numbers on the part using permanent ink instead of ink stamping.

5.12.2 Do not remove the letter “C” or “F” from castings or forgings.

5.13 **Part Marking of Major Structure Sub-Assemblies**

5.13.1 Part mark all major structure sub-assemblies by ink stamping a marking block on the assembly and filling in the information by ink stamping according to section 5.16.

5.14 **Part Marking of Rate Item Assemblies**

5.14.1 Part mark rate item assemblies by ink stamping according to section 5.16, using rate item tags (ref. para. 4.1.2) filled out in ink, or by hand printing the information on the part using a permanent felt tip marker according to PPS 15.04. Apply rate item assembly markings in a visible place. Include the following information on rate item assembly markings: part number, work order number, unit number, part name, serial number and airplane line number.

5.14.1.1 If a re-allocation letter for a rate item assembly is initiated, mark the Airplane Line Number to which the part has been re-allocated and the re-allocation letter number on the appropriate spaces on the rate item ink stamp or rate item tag.

5.14.1.2 Ensure that the Airplane Line Number on the assembly agrees with the number of the airplane on which the rate item will be installed.

5.15 **Location of Part Marks**

5.15.1 If practical, locate the part mark so that it will be visible after installation. For closed assemblies, locate the part mark so that it is visible from inspection panels or hand holes.

5.15.2 Except for identification plates, do not locate part marks on aircraft exterior surfaces or on interior surfaces visible in the passenger or crew compartment.

5.15.3 Locate identification plates as shown on the engineering drawing.

5.15.4 For electrical panels, junction boxes, and other major assemblies, locate the part mark on the main body of the item, not on covers or other removable parts.

5.15.5 For an assembly which includes electrical/electronic wires or cables enclosed within an overbraid shield or non-conductive conduit (e.g., S8021), place the identification tape or sleeve with the part mark on the outside of the assembly (i.e., on the overbraid shield or non-conductive conduit).

5.15.6 Locate the part mark on all identical parts in approximately the same area.

5.15.7 Locate sleeving and identification tape on the main body or component of the part or assembly.

5.15.8 Apply electrochemical etched part marks to one terminal on cable assemblies, approximately in the center of the swaged portion of the barrel.

5.16 **Ink Stamping/Stenciling - Type 1 Marking**

5.16.1 Before ink stamping or stenciling, remove shop soil or grease in the area to which the marking is to be applied by solvent cleaning according to PPS 31.17.

5.16.2 Unless a stencil is supplied with a batch of parts to be part marked, use rubber stamps for all ink stamping. If a stencil (ref. para. 4.1.16) is supplied with a batch of parts to be marked, use the stencil to apply the part mark if possible.

5.16.3 Unless otherwise specified, use blue or black stamp pad ink on light coloured parts and silver or white stamp pad ink on dark parts. Use only the inks specified in para. 4.1.2 for stamp pad marking. **Do not use stencil ink for stamp pad marking.** Use stamp pad inks as received. Do not thin stamp pad inks at any time. Discard stamp pad inks which have become too thick to use. Shake all stamp pad inks thoroughly before use. Avoid over-saturation of ink pads and excessive pick-up of ink on rubber stamps. Clean rubber stamps frequently with a cloth moistened with ink cleaner to maintain clear, legible impressions. Apply rubber stamps squarely onto the surface of the parts to provide a clear complete impression.

5.16.4 Part mark detail parts and sub-assemblies with 3/16" characters and assemblies and major sub-assemblies with 1/4" characters. Use smaller characters if the surface does not allow the use of the above sizes.

5.16.5 For stencil marking, use only the stencil inks specified in para. 4.1.15. Choose the appropriate ink for the shade of the part (e.g., use white stencil ink for part marking interior furnishings components manufactured from black epoxy resin). **Do not use stamp pad ink for stenciling.** Stencil ink comes in 4 oz. bottles that thread directly onto the applicator head and serve as the applicator handle and ink reservoir. Thread the bottles of stencil ink tightly into the applicator to prevent leakage around the head.

5.16.6 For parts which have been proof loaded, stamp the word “TESTED” on the stencil after successful completion of testing the order batch.

5.16.7 Apply part marks using stencils as follows:

Step 1. Peel the stencil carefully off the backing and carbon paper and lay it face up on a scrap piece of paper or card.

Step 2. Place the applicator pad squarely and centrally on the stencil. The stencil will adhere to a properly inked applicator pad. When not in use, store the stencil applicator on a suitable tray with the applicator facing down. Leave the last stencil used in place on the applicator to prevent the pad from drying out.

Step 3. Just before marking the parts, apply the stencil several times to a piece of scrap paper or card to verify that the stencil impression is clear and complete, including any inspection or process stamps.

5.16.8 In place of ink stamping or stenciling, it is acceptable to apply the part mark using a permanent felt tip marker according to PPS 15.04. However, ink stamping or stenciling is the preferred method.

5.17 **Steel Impression Stamping - Type 2 Marking**

5.17.1 Unless otherwise specified on the engineering drawing, use steel impression stamping for marking metal identification plates only.

5.17.2 Use aluminum plates on aluminum alloy assemblies and brass plates on steel assemblies.

5.17.3 Impression stamp the information on the plate in 1/16" - 3/16" characters (depending on the size of plate being stamped) before installation of the plate.

5.17.4 Attach identification plates to the structure using the method specified on the engineering drawing.

5.18 **Tagging - Type 3 Marking**

5.18.1 Unless otherwise specified on the engineering drawing, use marking tags (ref. para. 4.1.3) for tag marking of aircraft parts and assemblies.

5.18.2 Mark the information clearly on the marking tags by either ink stamping or hand printing using an ink or ball point pen.

5.18.3 Except for large un-drilled parts (such as polycarbonate and acrylic plastic parts), attach marking tags to the applicable parts by means of beaded security ties (ref. para. 4.1.13), self-locking plastic cable ties as specified in PPS 13.34, tag wire (ref. para. 4.1.6) or lacing cord. Pass the tie through a suitably convenient hole or, for small un-drilled parts wrap the ties around the part, taking care to ensure that the tag cannot slip off the part. For large un-drilled parts, such as polycarbonate and acrylic plastic parts, secure marking tags to the parts with masking tape.

5.18.4 Except for very small parts that cannot be ink stamp or tagged, tag all parts in each batch covered by the Shop Order. For very small parts that cannot be ink stamped or are not practical to be individually tagged, place the parts in a suitable box or bag and fill out a tag for that part or batch and include the tag in the box or bag. When issuing small parts from tagged batches to the shop or spares, make out another tag and attach it to one of the parts being issued; use the original tag only when issuing the last of the batch. Alternatively, in place of using tags, it is acceptable to mark boxes or bags with printed, self-adhesive paper labels.

5.18.5 When issuing tagged parts against a spares order, it is the responsibility of Finished Part Stores to stamp the new tag to indicate the part has been drawn from Finished Part Stores. If the part is drawn from the line cribs for spares, the new tag must be stamped by an inspector as evidence of previous inspection.

5.18.6 Do not keep marking tags for use on a different batch of identical parts.

5.18.7 Once the parts are installed on the next assembly, remove and discard the marking tags.

## 5.19 Part Marking using Identification Tape, Sleeves or Cable Markers - Type 4 Marking

### 5.19.1 General

5.19.1.1 Unless otherwise specified on the engineering drawing or wiring list, use identification tape (ref. para. 4.1.10) for type 4 part marking. Apply part marks to identification tape and install on wires, cable or bundles according to section 5.19.2.

5.19.1.2 If the engineering drawing or wiring list specifies part marking using DSC 347 sleeves or cable markers, apply part marks to the DSC 347 sleeves or cable markers and install the DSC 347 sleeves or cable markers according to section 5.19.3.

5.19.1.3 For the purposes of identification coding of electrical and electronic wires and cables, use of Kynar (M23053/8) heat shrink tubing has been replaced by HT-SCE sleeves. If the engineering drawing or wiring list specifies identification coding using M23053/8 or HT-SCE heat shrinkable sleeves, apply identification code marks to HT-SCE heat shrinkable sleeves and install the heat shrinkable sleeves according to section 5.19.4.

### 5.19.2 Part Marking using Identification Tape

5.19.2.1 Apply the part mark to BACT19B-T and ASF-121 identification tape using a suitable typewriter (e.g., computer driven) equipped with a Hytype II, Columbia 7900 or Brady R2051 ribbon or an Epson FX 1050 printer equipped with a Critchely 1330-0036-00 ribbon. As an alternative, if necessary it is acceptable to part mark BACT19B-T and ASF-121 tape using a permanent felt tip marker according to PPS 15.04; however use of a typewriter or printer is preferred.

Apply the part mark to Brady B-437 identification tape, using a Brady THT Model 300 thermal printer equipped with a Brady Series R4300 or R6200 black ribbon. It is not acceptable to use a permanent felt tip marker to mark B-437 identification tape.

5.19.2.2 For wires, cables or bundles with an outside diameter of up to 3/16", apply the identification tape by attaching the center of the tape strip to the wire, cable or bundle and pressing the two ends of the tape firmly together to form a flag approximately 1/2" high. If the outside diameter of the wire, cable or bundle is greater than 3/16", apply the identification tape by attaching the bottom end of the strip to the wire, cable or bundle and wrapping the strip around, ensuring that the ends overlap at least one-half revolution without obscuring the part mark.

5.19.2.3 Locate the identification tape such that ties, clamps, supporting devices, shielding and terminals will not have to be removed to read the part mark after installation.

5.19.2.4 If possible, orient identification tape so that the wire, cable or bundle does not have to be twisted to read the part mark after installation.

5.19.3 **Part Marking using DSC 347 Sleeves or Cable Markers**

5.19.3.1 If the wire, cable or bundle size, end fittings or connectors prevent slipping a DSC 347 heat shrinkable sleeve onto the bundle, it is acceptable to use a DSC 347 wrap-around cable marker or, if the bundle diameter exceeds 1 1/2", a DSC 347 tie-wrap cable marker in place of a DSC 347 heat shrinkable sleeve.

5.19.3.2 Imprint the part mark on DSC 347 heat shrinkable sleeves, wrap around cable markers and tie-wrap type cable markers using a Raven RP-9105 or Panasonic 2180 dot matrix 9 pin printer equipped with a Nukote BM 325 ribbon.

5.19.3.3 Shrink part marked sleeves in place according to PPS 10.16 before assembly of wires, cables or bundles to connectors, terminal lugs, etc. Ensure that the shrunk sleeves fit closely without being tight or binding.

5.19.3.4 Shrink part marked wrap-around cable markers onto the wire, cable or bundle according to PPS 10.16.

5.19.3.5 Secure part marked tie wrap type cable markers by tying both ends with self-locking plastic cable ties as specified in PPS 13.34. Use tie-wrap cable markers only to identify multi-conductor cables and wire bundles 1 1/2" in diameter and greater.

5.19.4 **Part Marking using HT-SCE Sleeves**

5.19.4.1 Apply the part mark to HT-SCE sleeves using a TMS-101TT thermal transfer printer equipped with a TMS-101-RIBBON-4HT ribbon. As an alternative, it is acceptable (but not recommended) to apply the part mark to HT-SCE sleeves using a Raven RP-9105 or Panasonic 2180 dot matrix 9 pin printer equipped with a Nukote BM 325 ribbon; however, after such application the part mark must be allowed to “dry” for a minimum of 24 hours undisturbed.

5.19.4.2 Install HT-SCE sleeves before assembly of wires to connectors, terminal lugs, etc. according to PPS 10.16. Ensure that installed sleeves fit closely without being tight or binding.

5.20 **Electrochemical Etch Marking - Type 5 Marking**

5.20.1 When specified, electrochemical etch mark according to PPS 15.06.

5.20.2 Do not use this type of marking on surfaces that are to be primed, plated or resistance welded.

5.21 **Labelling - Type 6 Marking**

5.21.1 Unless otherwise specified or as noted below, use EPC "V" series labels for labelling of parts.

- Label non-transparent plastic parts (including Ultem) and fibre reinforced composite parts using DSC 85-5 labels instead of EPC "V" series labels. Label fibre reinforced composite parts after lay-up and before vacuum bagging and curing.
- Label electrical panels and junction boxes using DSC 471-1 or DSC 471-3 labels instead of EPC "V" series labels.

5.21.2 Apply permanent markings to EPC "V" series labels, DSC 85-5 labels and DSC 471-1 labels using an Epson FX-286 dot matrix printer equipped with a Critchely 1330-0036-00 ribbon.

For DSC 471-3 labels, use the Brady TLS2200 thermal print labelling system equipped with a Brady R6010 black ribbon to apply permanent markings.

5.22 **Ink-Jet - Type 7 Marking**

5.22.1 Part mark using an ink-jet coder/printer (e.g., Videojet Excel Series 170i Coder/Printer or Hitachi Co. Ltd. FX-2623S inkjet printer) according to the manufacturer's recommendations.

5.22.2 Use **only** ink-jet inks as specified in para. 4.1.17 when part marking using an ink-jet coder/printer. Use dark coloured inks on light coloured parts and yellow ink on dark coloured parts.

## 6 Requirements

6.1 Aircraft parts and assemblies shall be part marked using the methods of marking and materials specified in this PPS.

6.2 Part marks must be clear and legible.

## 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 Avoid skin contact with the inks specified in this PPS. If skin contact does occur, wash the affected area immediately with clean water. If skin irritation persists after washing, obtain medical attention. If eye contact occurs, immediately flush the eye with a stream of clean water for a least 15 minutes and then obtain medical attention.

7.4 Avoid swallowing any of the inks specified in this PPS. Always wash your hands before smoking or eating. If any of these inks are accidentally swallowed, obtain medical attention immediately.

## 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.

## 9 Maintenance of Equipment

9.1 In order to prevent the ink from drying in the tubes, the ink-jet coder/printer must be used at least once every 4 days.

9.2 Always clean the ink-jet print head when starting up the machine. Do not clean the ink-jet print head right after, or just before, shutdown of the machine when the ink is still wet. Clean the print head using ink-jet print head cleaning solution (ref. para. 4.1.20).