BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 6.04

PRODUCTION PROCESS STANDARD

Identification of Fluid System Lines

Issue 18
- This standard supersedes PPS 6.04, Issue 17.
- Vertical bars in the left hand margin indicate technical changes over the previous issue.
- Direct PPS 6.04 related questions to michael.wright@aero.bombardier.com.
- This PPS is effective as of the distribution date.

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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for identifying aircraft fluid lines with regard to their respective fluid system, function, content and flow direction.

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 PPS 6.10 - Cleaning of Fluid System Components.

3.2.2 PPS 6.12 - Pressure Testing Hydraulic Components, Fuel and Bleed Air Lines.

3.2.3 PPS 13.26 - General Subcontractor Provisions.

3.2.4 PPS 15.01 - Part Marking.

3.2.5 PPS 15.04 - Use of Markers for Making Aircraft Parts and Assemblies.

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 DSC 91-16 clear solvent resistant polyester tape.

4.1.3 White blank labels, 1" wide.

4.1.4 Pressure-sensitive identification tape, laminated mylar to MIL-STD-1247. Alternatively, it is acceptable to use B0314005 or B0314009 identification tape in place of MIL-STD-1247 identification tape provided **all** the applicable provisions of this PPS are met. Discard any identification tape showing signs of deterioration.

4.2 Equipment

4.2.1 Permanent markers, black, as specified in PPS 15.04.

5 Procedure

5.1 General

5.1.1 Do not use identification tape for part marking. After pressure testing, part mark according to PPS 15.01. Identify pressure tested components according to PPS 6.12.

5.1.2 Identification tape dimensions, colour marking, wording and symbols must be according to Figure 1, Figure 3, Figure 4 and Figure 5. Generally accepted abbreviations may be used instead of the wording shown in Figure 1 and Figure 3.

5.1.3 Except for lines whose outside surfaces are normally in contact with or immersed in a liquid, identify all fluid lines according to this PPS. Do not identify in any way lines whose outside surfaces are normally in contact with or immersed in a liquid.

5.1.4 Identification tape legends must be printed in black lettering 3/32" high with a 1/32" gap between the lines of the legend and a 1/8" gap between the legend and its repetition.

5.1.5 Except for gas turbine engine compartments, do not use identification tape in the engine compartment because loose identification tapes could be drawn into the air intake.

5.1.6 Do not apply identification tape in bend areas where wrinkling of the identification tape could occur or where the identification tape would be covered by clamps, etc.

5.1.7 On lines with a protective covering, apply identification tape to the line covering.

5.1.8 Except as follows, identify pressure suction transmitter lines in the same manner as the line to which they are connected. Flow direction tape is not required on the pressure suction transmitter line.

5.1.9 Where hand printing of identification tape is specified or required, use only black permanent markers as specified in PPS 15.04.

5.2 Identification of Fluid Systems

5.2.1 Identify fluid systems using identification tapes as shown in Figure 1. Identify emergency air lines as COMPRESSED GAS lines. Fluid lines that do not belong to any of the systems shown in Figure 1 must be identified with 1" wide white tape with black lettering covered with clear solvent resistant polyester tape.

5.2.2 Identify bulkhead fittings on the firewall by applying paint bands or identification tape according to Figure 1 (for the system to which they belong) adjacent to the fitting on the forward side of the firewall.

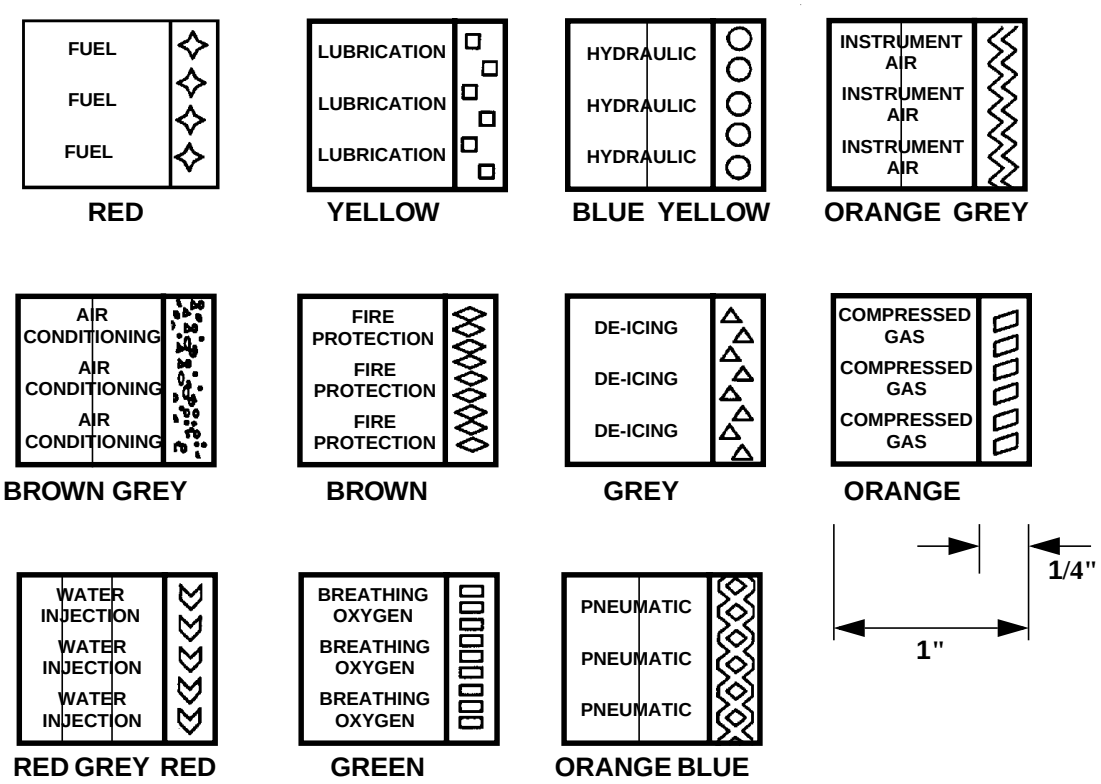


Figure 1 - Fluid System Identification Tapes

5.2.3 Except as noted in paragraph 5.1.3, if the use of identification tape is prohibited, use paint bands conforming to the same colour code as that of the identification tape.

5.2.4 Identify filler, vent and drain lines using identification tapes or paint bands similar to those on the main function line. Do not use the words “filler”, “vent” or “drain” on the line.

5.2.5 For line segments up to 24" long with both ends in the same compartment, apply the identification tape in a conspicuous location near the centre of the line. For line segments longer than 24", apply identification tape at each end of the line.

5.2.6 If line segments pass through more than one compartment or bulkhead, apply additional identification tape or paint bands so that at least one identification mark will be visible in each compartment.

5.2.7 For beaded tubing longer than 24", locate the identification tape 2 5/8" from the bead inner edge if one hose clamp is used or 3 1/2" from the bead inner edge if two hose clamps are used (see Figure 2).

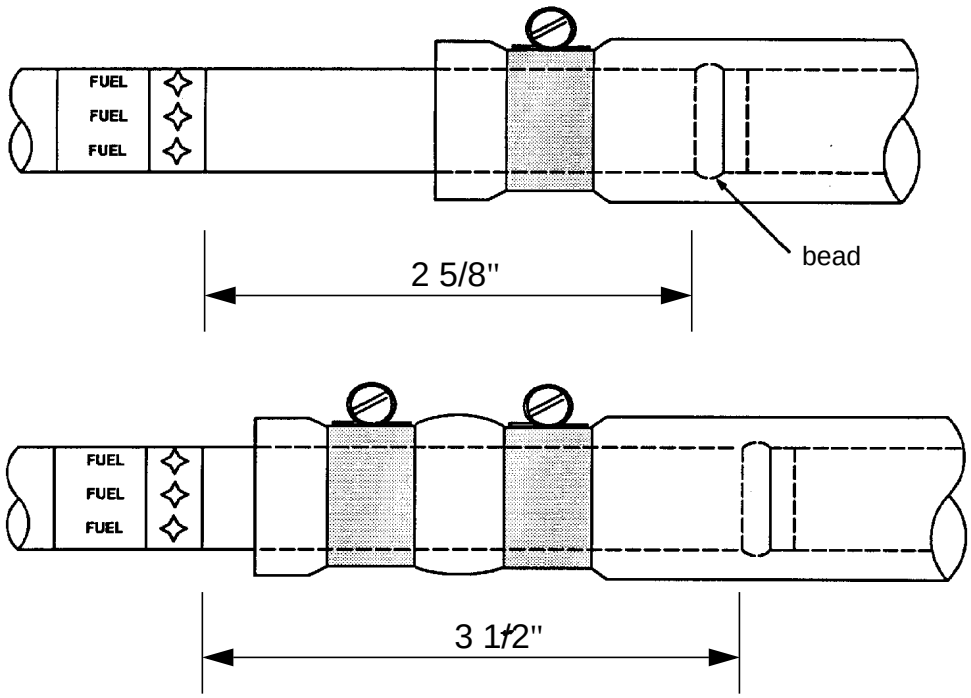


Figure 2 - Applying Identification Tape to Beaded Tubing

5.3 Identification of Line Content

5.3.1 If specified by the engineering drawing, apply additional identification to lines and bulkhead fittings which serve different functions with the same fluid system as follows:

- Identify line content by applying coloured tape that has the line content or function and the system description printed on it (see Figure 3).
- Instead of coloured tape, a 1" wide white tape indicating the line content or function in black lettering may be applied adjacent to the coloured tape identifying the system.
- When **hydraulic** line function and content tape is not available, it is acceptable to use identification tape showing hydraulic content only.

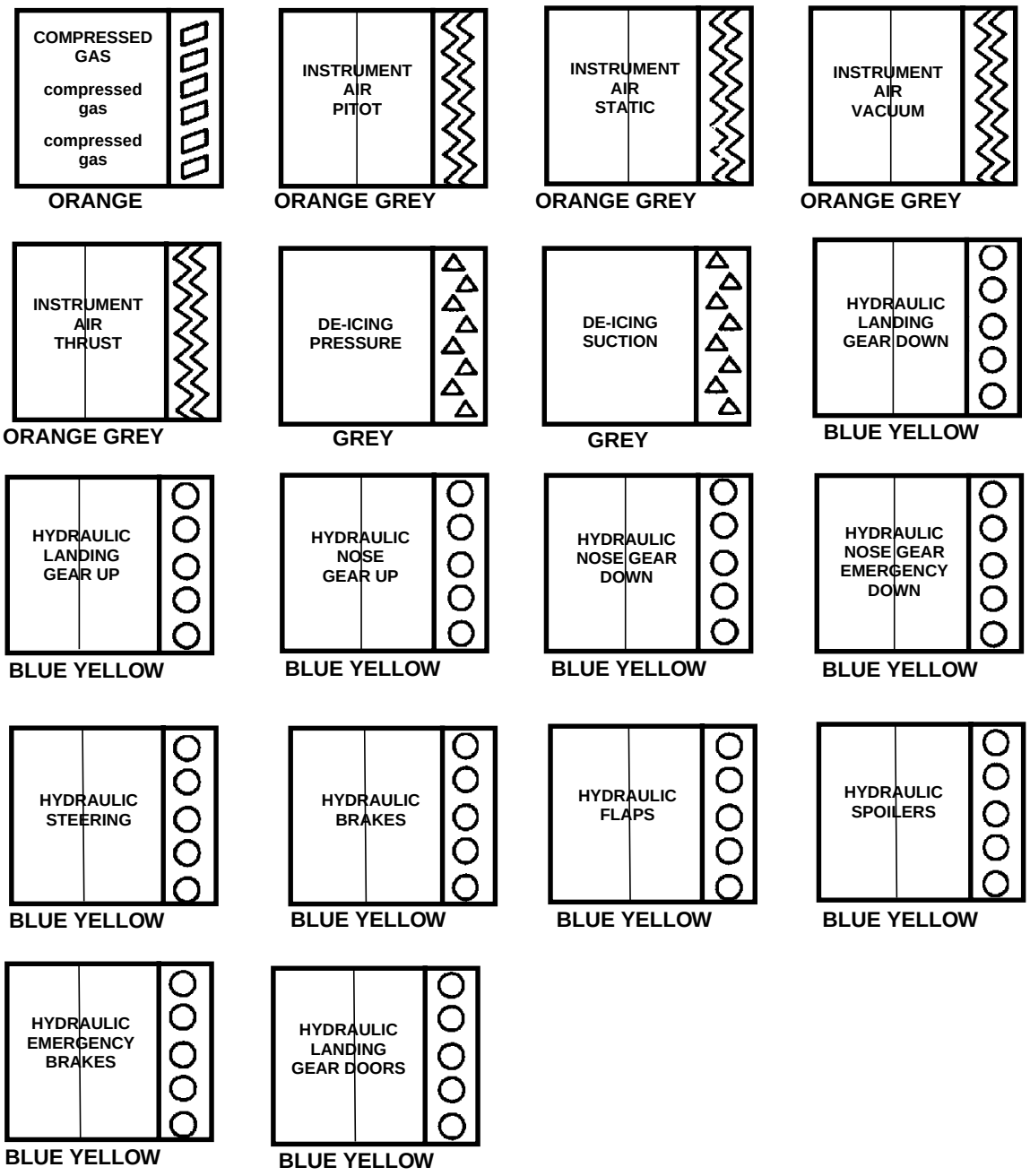


Figure 3 - Line Content and Function Identification Tapes

5.4 Identification of Flow Direction

5.4.1 Except as noted below, use the appropriate identification tape shown in Figure 4 to indicate the flow direction in hydraulic and emergency air lines. If the flow direction is reversible, it is also acceptable to identify the flow direction in the line with two single direction flow tapes back-to-back.

5.4.2 Apply flow direction tape in a conspicuous location and at least once on each individual line in each compartment.

5.4.3 If, and only if, the tube is too short to accommodate the part mark, line content tape and flow direction tape, identify the line as follows:

- it is acceptable to omit the flow direction tape on reversible flow lines
- it is acceptable to omit the line content tape on single direction flow lines

5.4.4 On lines leading to and from check valves, apply flow direction tape close to the check valve. If this is not possible, apply the flow direction tape to the structure immediately adjacent to the check valve.

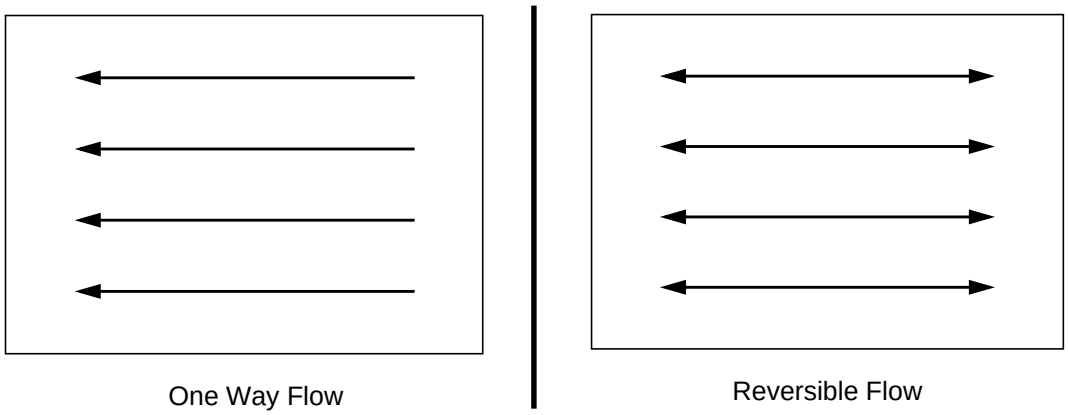


Figure 4 - Flow Direction Tape

5.5 Identification of Dangerous Content Lines

5.5.1 On lines containing fluids that are dangerous to personnel, in addition to the above requirements, identify such lines with warning symbol tape (see Figure 5). Compressed gas, oxygen, fire protection or lines continuously pressurized over 30 psi are considered to be dangerous in content.

5.5.2 Apply warning tape adjacent to the tape which identifies the fluid system, line content or function.

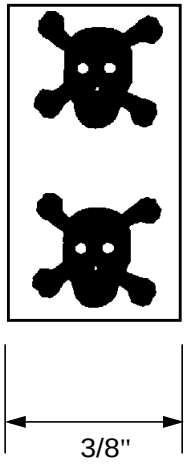


Figure 5 - Warning Symbol Tape

5.6 Application of Tape

5.6.1 Except as noted, apply identification tape after all processing operations, including testing and painting, are completed and wherever practical, before installation of the lines into the aircraft. If pressure testing will not cause contamination of fluid lines and no further cleaning after the pressure test is required, identify such lines before pressure testing using tape.

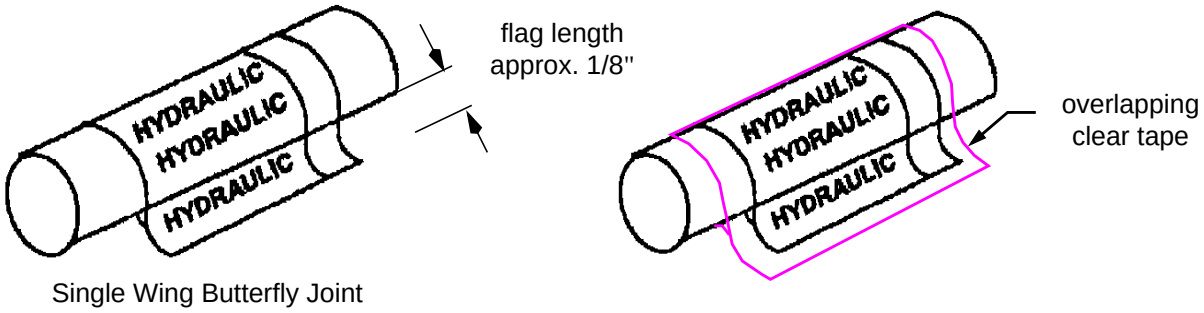
5.6.2 Clean line surfaces according to PPS 31.17 before applying any identification tape. Take care to ensure that hydraulic fluid lines and hydraulic system components used with MIL-H-5606 hydraulic fluid do not come into contact with solvent blends containing isopropyl alcohol, also known as isopropanol and 2-propanol . Hydraulic fluid lines and hydraulic system components used with MIL-H-5606 hydraulic fluid which have been contaminated with solvents blends containing isopropyl alcohol must be cleaned according to PPS 6.10.

5.6.3 Use the single wing butterfly method with a flag length of approximately 1/8" to apply identification tape or clear solvent resistant polyester tape (see Figure 6-A). The wrap around, double wing and combination butterfly wrap around methods are not acceptable because the tape surface has a release agent to which the adhesive will not stick well. If application of clear solvent resistant polyester tape is specified, ensure that the tape overlaps the underlying label by at least 1/8" in every direction (see Figure 6-B).

5.6.4 Do not unroll or cut more tape than is required for a single application. Cut the tape to a length approximately twice the tube outer diameter and to obtain a label showing the complete designation of the system.

5.6.5 Avoid unnecessary handling of the adhesive side of the tape and prevent any contact with oil or grease.

5.6.6 Firmly press the tape down onto the cleaned area and wind it around the line or attach it to the surface of the structure, whichever is applicable.



Single Wing Butterfly Joint

Figure 6-A

Figure 6-B

Figure 6 - Application of Identification Tape

6 Requirements

6.1 The types of tape used and their application shall be according to this PPS.

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.

8 Personnel Requirements

8.1 Personnel responsible for identifying aircraft fluid lines must have a good working knowledge of the procedure and requirements specified herein and shall have exhibited their competency to their supervisor.

9 Storage

9.1 Store identification tape in cool locations protected from sunlight.

9.2 Stamp the receiving date on the tape; issue oldest stock first.