

BOMBARDIER

Toronto (de Havilland)

PROPRIETARY INFORMATION

PPS 18.01

PRODUCTION PROCESS STANDARD

Limitations on Shearing, Blanking and Piercing Aluminum and Magnesium Alloy Sheet

- Issue 8
- This standard supersedes PPS 18.01, Issue 7.
 - Vertical lines in the left hand margin indicate changes over the previous issue.
 - Direct PPS related questions to PPS.Group@aero.bombardier.com or (416) 375-4365.
 - This PPS is effective as of the distribution date.

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Production Process Standards (PPS)

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Quality

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1 Scope

- 1.1 This Production Process Standard (PPS) specifies the limitations on shearing, blanking and piercing aluminum and magnesium alloy sheet.
 - 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. Similarly, the procedure and requirements specified in this PPS are not applicable when use of a BAPS, MPS, LES or P. Spec. is specified.

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 [PPS 13.26](#) - General Subcontractor Provisions.
- 3.2 [PPS 27.02](#) - Edge Finishing Aluminum Alloy Parts.
- 3.3 [PPS 27.08](#) - Edge Finishing Magnesium Alloy Parts.

4 Materials and Equipment

4.1 Materials

- 4.1.1 All aluminum and magnesium alloy sheet of thickness up to 0.249 inches.

4.2 Equipment

4.2.1 Shearing

4.2.1.1 Raw Material Stores

- Mechanical shearing presses

4.2.1.2 Fabrication Shops

- Foot operated-guillotine shears
- Hand operated shears

4.2.2 Blanking and Piercing

4.2.2.1 Press Shop

- Power punch presses, 35 to 110 ton
- Press brake (Magnetic Chuck)
- Hand operated punch presses

4.2.2.2 Fitting Shop

- Power punch presses - Strippit and Pierce-All
- Hand operated punch presses

5 Procedure

5.1 General

5.1.1 Carry out shearing, blanking and piercing on single sheet thicknesses only.

5.2 Shearing

5.2.1 For the purpose of this standard, consider SHEARING as straight edge cutting of flat sheet material or parts.

5.2.2 Material which is to be sheared to net dimensions (dead size), is limited to a maximum gauge as listed in [Table 1](#). Where the material gauge exceeds that listed in [Table 1](#) (up to sheet gauge of 0.249"), shear the material oversize to provide a minimum trimming allowance as specified in [Table 1](#) and then machine to finish size and profile. Determine gauge limitations on parts which are to be sheared oversize by machine capacities.

5.3 Blanking and Piercing

5.3.1 For the purpose of this standard, consider BLANKING as cutting a metal blank to a desired size and shape using close tolerance cutting dies.

- 5.3.2 For the purpose of this standard, consider PIERCING as producing a hole of a desired size and shape in a metal blank or part, using close tolerance punches and dies.
- 5.3.3 Except as noted in [paragraph 5.3.3.1](#), all blanking and piercing must be done to net dimensions (finish size) and must be limited to the maximum gauge as listed in [Table 1](#).
- 5.3.3.1 Pilot holes may be pierced undersize and subsequently drilled to final size on assembly.

Table 1 - Limitations on Shearing, Blanking and Piercing

METHOD		MAXIMUM MATERIAL THICKNESS	
		ALUMINUM	MAGNESIUM
Straight Edge Shearing (Note 1)		0.100"	0.063"
Blanking		0.100"	0.063"
Piercing	Full size holes	0.100"	0.063"
	Pilot holes (Note 2)	0.125"	0.125"
Note 1. Material which exceeds the maximum thickness shall be sheared oversize so as to provide a minimum trimming allowance (sheared edge distance to final required edge) equal to 1T (thickness) of material.			
Note 2. Maximum gauge in which pilot holes may be punched shall not exceed the size of the smallest hole.			

6 Requirements

- 6.1 All aluminum and magnesium alloy sheet of thickness exceeding requirements of [Table 1](#) shall be sheared to provide a minimum trimming allowance equal to 1 (one) thickness of the material.
- 6.2 Deburring of aluminum parts which have been sheared, blanked or pierced shall be carried out according to the requirements of [PPS 27.02](#).
- 6.3 Deburring of magnesium parts which have been sheared, blanked or pierced shall be carried out according to [PPS 27.08](#).

7 Safety Precautions

- 7.1 Observe general shop safety precautions when performing the procedure specified herein.**
- 7.2 Operators shall wear protective gloves when handling sheet metal.**

8 Personnel Requirements

- 8.1 Personnel responsible for shearing, blanking and piercing aluminum and magnesium alloy sheet must have a good working knowledge of the applicable procedure and requirements as specified herein and must have exhibited their competency to their supervisor.