BOMBARDIER
Toronto (de Havilland)
PROPRIETARY INFORMATION

PPS 27.08

PRODUCTION PROCESS STANDARD

Edge Finishing Magnesium Alloy Parts

Issue 4
- This PPS supersedes PPS 27.08, Issue 3.
- 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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1 Scope

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for edge finishing of magnesium alloy parts.

1.1.1 This PPS complements the engineering drawings that specify its use as an authorized instruction and the procedure specified 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 27.05 - Manual Edge Finishing Equipment.

4 Materials and Equipment

4.1 Materials

4.1.1 All materials used for edge finishing of magnesium alloy parrs shall be as specified in PPS 27.05.

4.2 Equipment

4.2.1 All equipment used for edge finishing of magnesium alloy parrs shall be as specified in PPS 27.05.

4.2.2 Safety equipment specifically suited for use where edge finishing of magnesium is carried out, as listed below.

- Fire extinguisher for magnesium fires (Ansul Chemical Co.).
- Extinguishing powder for magnesium fires, MET-L-X Dry Powder (Ansul Chemical Co.).
- Yellow coloured metal containers with covers, filled with MET-L-X Dry Powder and Labelled “MAGNESIUM FIRES ONLY”.
- Metal powder scoop to apply extinguishing powder.
- Yellow coloured metal bins for magnesium scrap labelled “MAGNESIUM”.
- Portable “NO SMOKING” signs.

5 Procedure

5.1 General

5.1.1 For the purposes of this PPS, edge finishing shall be considered to include de-lugging, deburring, edge corner relief and edge face polishing.

- **De-lugging** includes removal of tooling lugs and the subsequent blending of the de-lugged areas into the finished part contour.
- **Deburring** consists of the removal of upset metal (burrs) resulting from cutting operations during fabrication, to prevent personal injury and to facilitate subsequent fitting and assembly. Deburring shall only include the removal of the upset metal, so as so leave a sharp, clean edge corner.
- **Edge corner relief** consists of chamfering or radiusing sharp edge corners to prevent stress cracking of aircraft parts.
- **Edge face polishing** consists of polishing edge faces to a smooth finish to smooth and blend chatter marks.
- **Chatter marks** are riblike markings caused by vibration (chattering) of the cutting tool against the surface of the work.

5.2 Applicability of Edge Finishing Methods

5.2.1 Refer to Flow Chart 1 to determine the applicability of edge finishing operations relevant to material type and thickness.

5.2.2 The presence of chatter marks on edge faces is acceptable provided that they do not exceed 0.010" in depth. Edge face polish parts with chatter marks exceeding 0.010" in depth according to section 5.3.4 to smooth and blend the chatter marks. Use of a suitable comparator reference/shop aid to evaluate the depth of chatter marks is recommended.

5.3 Selection of Edge Finishing Methods

5.3.1 De-lugging

5.3.1.1 For parts which require de-lugging, remove the lugs and then edge finish to the final part contour. Carry out the de-lugging operation according to PPS 27.05.

5.3.2 Deburring

5.3.2.1 Manually deburr all magnesium sheet material of thickness up to and including 0.125" having burrs on cut edges by hand finishing methods as specified in PPS 27.05.

5.3.3 Edge Corner Relief

5.3.3.1 Manually edge corner relieve all magnesium sheet material of thickness greater than 0.125", all plate material and all castings according to PPS 27.05 to a chamfer or radius of 0.015" ± 0.010".

5.3.4 Edge Face Polishing

5.3.4.1 On edge faces, smooth and blend chatter marks deeper than 0.010" by buffing parallel to the edge according to PPS 27.05. Note that it is not necessary to totally remove all visual indication of the chatter marks. Ensure a surface finish of 125 RMS or finer on polished edge faces. It is recommended that a suitable comparator/shop aid be used to ensure a surface finish of 125 RMS or finer.

6 Requirements

6.1 Ensure that the edge finishing operations specified in Flow Chart 1 have been carried out. Ensure that edge corner relief has resulted in a chamfer or radius of 0.015" ± 0.010".

6.2 Ensure chatter marks deeper than 0.010" have been smoothed and blended with a surface finish of 125 RMS or finer on polished edge faces.

7 Safety Precautions

7.1 Observe general shop safety precautions when performing the procedure specified herein.

7.2 Ensure that a Bombardier approved magnesium type fire extinguisher and a supply of magnesium fire extinguishing powder in a clearly labelled metal container (ref. para. 4.2.2) is located in each shop area where magnesium is being worked so that the fire extinguishers and powder are within easy reach of each operator working with magnesium. Also ensure that operators are familiar with the use of the fire extinguishing equipment. Under no circumstances should water be used to extinguish magnesium fires.

7.3 Magnesium shavings, ribbons, chips and dust represent a significant fire hazard and it is imperative that all personnel involved in deburring magnesium according to this PPS be aware of the safe handling practices.

7.4 To prevent magnesium dust from settling on the workers' clothing (particularly the lap area), wear a full apron while performing the deburring operation.

7.5 Utilize separate working areas when deburring magnesium.

7.6 Sweep work benches and surrounding areas clean before working with magnesium.

7.7 If the shop floor is made of wood, place metal sheet specifically provided for this purpose on the floor.

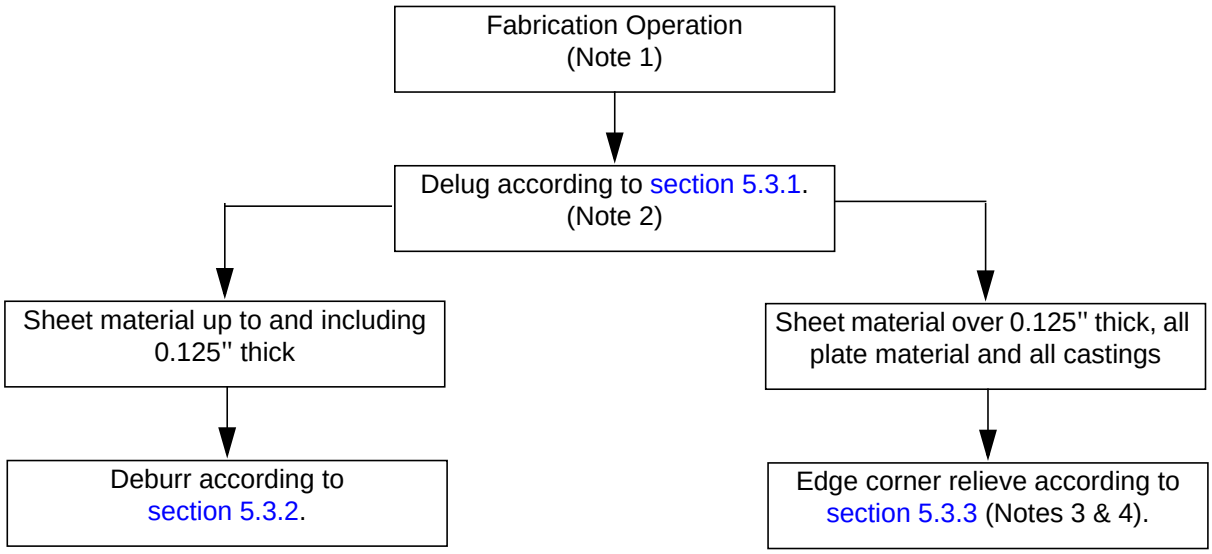
7.8 Smoking is prohibited in the immediate area where magnesium is being deburred. Place portable “NO SMOKING” signs in front of the area where magnesium is being deburred.

7.9 Sweep work benches and surrounding areas clean of the resultant magnesium fines (shavings, chips, dust, etc.) immediately after the deburring operation. Place all magnesium fines in the covered, clearly labelled “MAGNESIUM” bins provided for this purpose, immediately after they have been swept up.

8 Personnel Requirements

8.1 Personnel responsible for edge finishing of magnesium alloy parts must have a good working knowledge of the procedure and requirements as specified herein and must have exhibited their competency to their supervisor.

Flow Chart 1 - Applicability of Deburring and Edge Finishing Methods



Note 1. For the purpose of this PPS, fabrication includes machining, routing, drilling, shearing, blanking, piercing, sawing etc.

Note 2. Tooling lugs shall be cropped prior to deburring or edge finishing, except where such lugs are required in order so carry out a subsequent fabrication or forming operation.

Note 3. Deburring is not required on parts to be edge corner relieved, as the edge relief operation will remove all burrs.

Note 4. Fastener holes shall only be edge relived where specified on the relevant engineering drawing or fastener PPS.