

# BOMBARDIER

Toronto Site

PROPRIETARY INFORMATION

# PPS 35.01

## PRODUCTION PROCESS STANDARD

### MACRO ETCH INSPECTION OF EXTRUDED ALUMINUM ALLOY BAR AND ROD

- Issue 7
- This standard supersedes PPS 35.01, Issue 6.
  - Vertical lines in the left hand margin indicate changes over the previous issue.
  - Direct PPS related questions to [christie.chung@aero.bombardier.com](mailto:christie.chung@aero.bombardier.com) or (416) 375-7641.
  - This PPS is effective as of the distribution date.

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Quality

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## 1 SCOPE

- 1.1 This Production Process Standard (PPS) specifies the inspection requirements for macro etch determination of coarse grain envelope on extruded aluminum alloy bar and rod.
  - 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.
  - 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, all materials shall be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Toronto 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 Environment, Health and Safety Department.

## 3 REFERENCES

- 3.1 BAERD GEN-018 - Engineering Requirements for Laboratories.
- 3.2 [PPS 13.26](#) - General Subcontractor Provisions.
- 3.3 [PPS 13.39](#) - Bombardier Toronto Engineering Process Manual.
- 3.4 QAMTR 003 - Receipt Testing of Wrought Aluminum Raw Materials.

## 4 MATERIALS, EQUIPMENT AND FACILITIES

### 4.1 Materials

- 4.1.1 Not applicable to this PPS.

### 4.2 Equipment

- 4.2.1 Not applicable to this PPS.

### 4.3 Facilities

- 4.3.1 This PPS has been identified as a “Critical or Special” process according to [PPS 13.39](#) and as such only facilities specifically approved according to [PPS 13.39](#) are authorized to perform macro etch determination of coarse grain envelope on extruded aluminum alloy bar and rod according to this PPS.
- 4.3.2 Bombardier subcontractors shall direct requests for approval to Bombardier Supplier Quality Management. Bombardier facilities shall direct requests for approval to the appropriate internal Quality Manager.
- 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, Bombardier Toronto 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 Bombardier Aerospace Supplier Quality Management.
  - 4.3.3.1 For approval of subcontractor facilities to perform macro etch determination of coarse grain envelope on extruded aluminum alloy bar and rod 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](#).
  - 4.3.3.2 All testing and evaluation specified herein shall only be performed by Bombardier Toronto Materials Laboratory or by laboratories accredited according to BAERD GEN-018.

## 5 PROCEDURE

- 5.1 Not applicable to this PPS.

## 6 REQUIREMENTS

### 6.1 General

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

## 6.2 Inspection Schedule

- 6.2.1 Except as noted in [paragraph 6.2.4](#), extruded bar and rod of 2014 and 2024 alloys whose minor dimension is 1/2 inch or greater, shall be sampled according to QAMTR 003 for macro examination.
- 6.2.1.1 Extruded bar and rod of 2014 and 2024 alloys whose minor dimension is less than 1/2 inch, shall not be subject to macro etch examination.
- 6.2.2 Extruded bar and rod of 7075 alloy shall only be macro etched when specified on the engineering drawing.
- 6.2.3 Purchase Orders shall state the requirements for macro etch examination and that testing shall preferably be carried out by the supplier and test reports to this effect, shall be supplied with each batch of material requiring macro etch.
- 6.2.4 Extruded bar and rod which require macro etch examination, as detailed above, and are ordered and supplied to exact length, shall be macro tested and documented by the supplier prior to cutting to length and shall not be subjected to further macro examination or receipt.
- 6.2.4.1 If macro etch has not been carried out by the supplier, refer to Bombardier Toronto MRB or Bombardier Toronto delegated MRB for disposition of material.

## 6.3 Sampling

- 6.3.1 One sample, one inch long, shall be cut from each end of each length of bar or rod, as required by QAMTR 003 and shall be submitted to a Bombardier approved laboratory for macro examination.
- 6.3.1.1 Identify samples submitted to the Laboratory with the Receiving Slip number of the material and an identification number relating to the bar represented by the sample.

## 6.4 Macro Etch

- 6.4.1 Macro etch samples shall be polished, etched and examined in regard to the maximum depth of coarse grain envelope and extent of internal defects as follows:
- Re-crystallized coarse grain envelope in excess of the limit stated in [Table I](#) shall be cause for rejection of the represented material.
  - Indications of coring, or excessive segregation, voids or inclusions, shall be cause for rejection of the represented material.
- 6.4.2 Rejected material shall be subject to Bombardier Toronto MRB or Bombardier Toronto delegated MRB action.

TABLE I - MAXIMUM ACCEPTABLE EXTENT OF COARSE GRAIN ENVELOPE

MINOR DIMENSION OF BAR (INCHES)	MAJOR DIMENSION OF BAR (INCHES)				
	0.500 - 0.999	1.00 - 1.99	2.00 - 2.99	3.00 - 4.99	5.00 - 7.00
UNDER 0.500	MACRO ETCH NOT REQUIRED				
0.500 - 0.999	5/32	5/32	5/32	3/16	3/16
1.00 - 1.99	----	5/32	3/16	3/16	7/32
2.00 - 2.99	----	7/32	7/32	7/32	7/32
3.00 - 4.99	----	----	----	1/4	1/4
5.00 - 7.00	----	----	----	----	1/4

## 7 SAFETY PRECAUTIONS

7.1 *Not applicable to this PPS.*

## 8 PERSONNEL REQUIREMENTS

8.1 This PPS has been categorized as a “Critical or Special Process” according to [PPS 13.39](#). Refer to [PPS 13.39](#) for personnel requirements.