BOMBARDIER
Toronto Site
PROPRIETARY INFORMATION

PPS 31.12

PRODUCTION PROCESS STANDARD

CLEANING NICKEL AND NICKEL ALLOYS

Issue 12
- This standard supersedes PPS 31.12, Issue 11.
- Vertical lines in the left hand margin indicate technical changes over the previous issue.
- Direct PPS related questions to christie.chung@aero.bombardier.com or (416) 375-7641.
- This PPS is effective as of the distribution date.

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	Quality	

Signed original on file. Validation of paper prints is the responsibility of the user.

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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for cleaning nickel and nickel alloys.

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 EHS-OP-005 - Hazardous Materials Management - *Bombardier Toronto internal operating procedure*.

3.2 PPS 13.26 - General Subcontractor Provisions.

3.3 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

3.4 PPS 31.04 - Degreasing Processes.

3.5 PPS 31.05 - Surface Treatment of Corrosion Resistant Steel (C9).

3.6 PPS 31.17 - Solvent Usage.

3.7 PPS 37.02 - Resistance Welding of Non-Hardening Steels, Nickel Alloys and Titanium.

3.8 PPS 37.04 - Fusion Welding of Ferrous and Nickel Alloys.

4 MATERIALS, EQUIPMENT AND FACILITIES

4.1 Materials

4.1.1 Hydrofluoric/nitric acid solution, made up and controlled according to PPS 31.05.

4.2 Equipment

4.2.1 Bombardier approved safety glasses.

4.2.2 Soft stainless steel wire brush or wheel (e.g., No. 164F).

4.3 Facilities

4.3.1 This PPS has been categorized as a Controlled Special Process according to PPS 13.39 and as such only facilities specifically approved according to PPS 13.39 are authorized to perform cleaning nickel and nickel alloys according to this PPS.

4.3.2 Bombardier subcontractors shall direct requests for approval to Bombardier Aerospace Supplier Quality Management. Bombardier Aerospace 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 cleaning nickel and nickel alloys according to this PPS, completion of a test program and submission of suitable test samples representative of production parts may be required. Test samples shall meet the requirements specified by Bombardier Toronto Engineering.

5 PROCEDURE (SEE FLOW CHART 1)

5.1 General

5.1.1 Acid pickle heat treated nickel and nickel alloy parts according to PPS 31.05 to remove scale. In all other cases, in-process cleaning during fabrication shall consist of solvent cleaning according to PPS 31.17 or degreasing according to PPS 31.04, as necessary to remove shop soil, dirt, oil or grease from parts.

5.1.1.1 Immediately before fusion welding according to PPS 37.04, mechanically clean surfaces to be welded with a stainless steel wire wheel or brush, followed by solvent cleaning according to PPS 31.17.

5.1.1.2 Weld parts to be resistance welded according to PPS 37.02 as soon as possible after pickling or degreasing. Take care to prevent contamination of welding surfaces from finger oil, shop dirt, grease, etc. If contamination of the weld surfaces has occurred, solvent clean the affected area thoroughly according to PPS 31.17 or degrease the part according to PPS 31.04.

5.1.1.3 If an approved dispositioned Report of Non-Conformance (RNC) specifies in-situ localized cleaning of specific areas on assemblies according to this PPS before fluorescent penetrant inspection, clean as follows. Take extreme care at all times to prevent ingress and/or seepage of cleaning solutions/rinse water, and to prevent contact with sealant and/or materials sensitive to cleaning solutions/rinse water.

Step 1. Suitably protect the surrounding structure (e.g., mask) around the area to be cleaned to prevent contamination with cleaning solutions (e.g., solvent, alkaline cleaners, acid cleaning solutions, etc.).

Step 2. Solvent clean the area to be cleaned according to PPS 31.17.

Step 3. Locally apply hydrofluoric/nitric acid solution and allow to dwell for the time required to remove 0.0002" - 0.0004" from the surface (determine acid solution etch rate according to PPS 31.05). During the dwell time, apply additional hydrofluoric/nitric acid solution as needed to prevent drying during the dwell time. Take care to prevent contamination (e.g., splashing) of the surrounding structure with hydrofluoric/nitric acid cleaning solution.

Step 4. Locally rinse the area to be cleaned using a brush, or swab, and water. Take care to ensure thorough rinsing to remove all trace of hydrofluoric/nitric acid solution without adversely affecting the surrounding structure.

Step 5. Remove materials used to protect the surrounding structure and allow the area to dry.

5.1.1.4 Where an approved dispositioned Report of Non-Conformance (RNC) has specified rework/repair (including fluorescent penetrant inspection, as applicable) of localized specific areas on assemblies, after the rework/repair clean the area as follows. Take extreme care at all times to prevent ingress and/or seepage of cleaning solutions/rinse water, and to prevent contact with sealant and/or materials sensitive to cleaning solvent.

Step 1. Suitably protect the surrounding structure (e.g., mask) around the area to be cleaned to prevent contamination with solvent.

Step 2. Solvent clean the area to be cleaned according to PPS 31.17.

Step 3. Remove materials used to protect the surrounding structure and allow the area to dry.

5.1.2 After fusion welding, mechanically clean fusion weld beads with a stainless steel wire brush or wheel mounted on a suitable pneumatic drillmotor to remove localized areas of heat treat scale, and then solvent clean according to PPS 31.17.

6 REQUIREMENTS

6.1 After the final fabrication operation and final cleaning, all part surfaces shall be clean and exhibit a uniform surface appearance.

6.2 If there is any evidence of scale or residual particles from mechanical cleaning, the part shall be re-cleaned according to section 5, as applicable.

6.3 Evidence of excessive surface erosion from mechanical cleaning is cause to reject and refer such parts to Bombardier Toronto MRB or Bombardier Toronto delegated MRB for disposition.

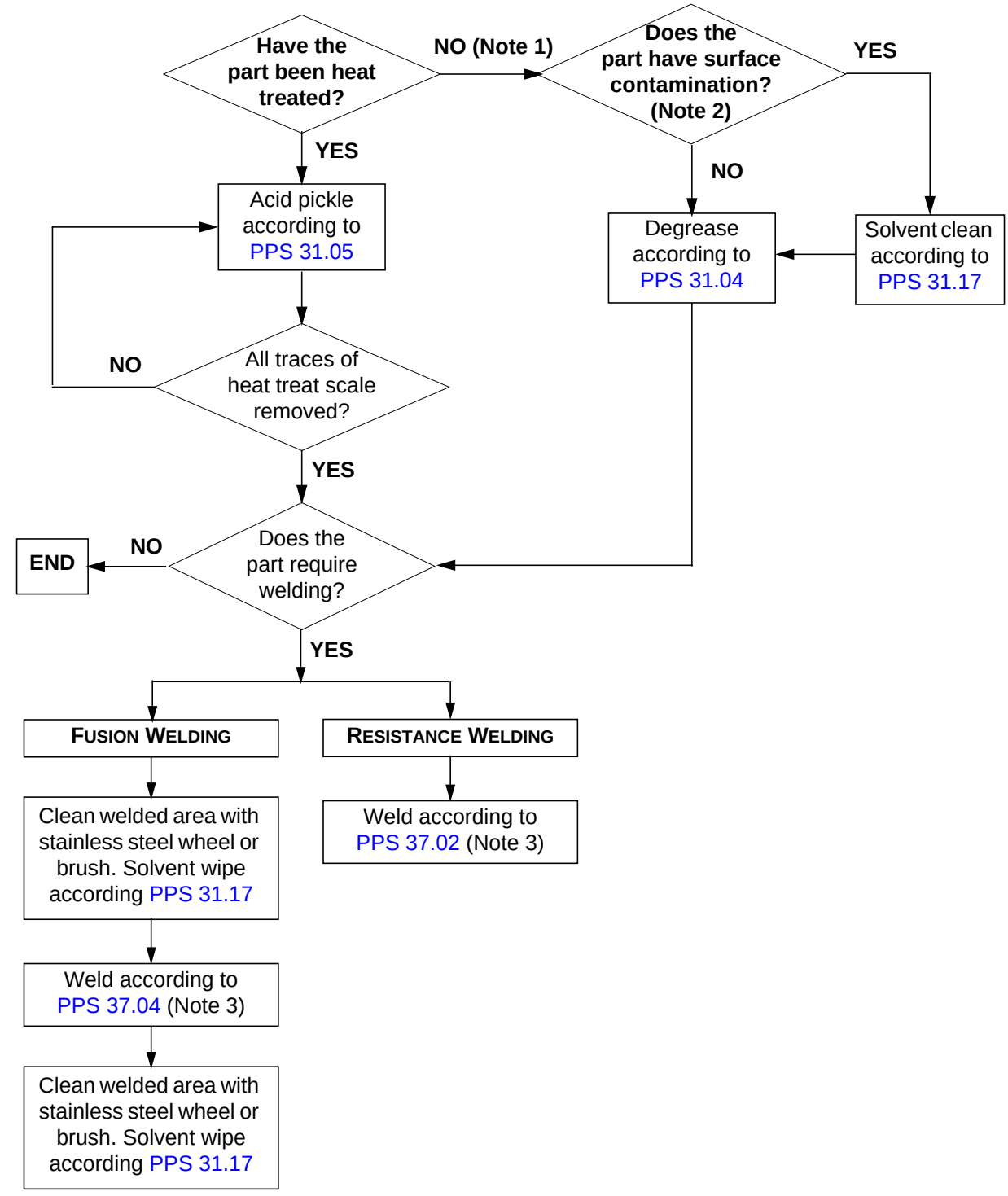
7 SAFETY PRECAUTIONS

7.1 Safety precautions applicable to the materials and procedures specified herein shall be defined by the subcontractor performing the work for Bombardier Toronto.

8 PERSONNEL REQUIREMENTS

8.1 This PPS has been categorized as a Controlled Special Process according to PPS 13.39. Refer to PPS 13.39 for personnel requirements.

FLOW CHART 1 - CLEANING NICKEL AND NICKEL ALLOYS



Note 1. Machined parts and sheet metal details including spun and drop hammer formed parts.
Note 2. Die pick-up and rubber particles.
Note 3. Do not touch or permit contamination of cleaned welding surfaces. If contamination of the weld surfaces has occurred, solvent clean the affected area thoroughly according to PPS 31.17.