BOMBARDIER
Toronto Site
PROPRIETARY INFORMATION

PPS 31.14

PRODUCTION PROCESS STANDARD

CLEANING ALUMINUM SCREEN FOR LAY-UP IN COMPOSITE PARTS

Issue 7
- This standard supersedes PPS 31.14, Issue 6.
- 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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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for cleaning aluminum wire screen before laying-up in composite assemblies according to PPS 10.35 or PPS 10.43.

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 10.35 - Fabrication of 250°F Cure Epoxy Resin Pre-Impregnated Fibre Reinforced Composite Parts.

3.3 PPS 10.43 - Fabrication of 350°F Cure Epoxy Resin Pre-Impregnated Fibre Reinforced Parts.

3.4 PPS 13.26 - General Subcontractor Provisions.

3.5 PPS 13.39 - Bombardier Toronto Engineering Process Manual.

4 MATERIALS, EQUIPMENT AND FACILITIES

4.1 Materials

4.1.1 Deoxidizers: Turco WO#1
Turco Alumiprep 33
Turco Deoxidine #624

4.1.2 Protective wrapping material (e.g., Kraft paper, polyethylene, nylon or paper bags).

4.2 Equipment

4.2.1 Immersion tanks resistant to the chemicals and to the operating temperatures used (e.g., stainless steel, plastic lined tank or polyethylene pail).

4.2.2 Neoprene gloves (e.g., DSC 422-5).

4.2.3 Suitable racks or wire for suspending material in cleaning tank.

4.2.4 Hot air gun or drying oven.

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 aluminum wire screen before laying-up in composite assemblies according to PPS 10.35 or PPS 10.43 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 Materials Technology 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 aluminum wire screen before laying-up in composite assemblies according to PPS 10.35 or PPS 10.43 according to this PPS, completion of a test program and submission of suitable test samples representative of production parts may be required. Test samples, if applicable, shall meet the requirements as specified by Bombardier Toronto Materials Technology.

5 PROCEDURE

5.1 General

5.1.1 Aluminum wire screen is used in composite assemblies, fabricated as specified in PPS 10.35 and PPS 10.43, to assist in providing electrical continuity from the composite surface to the airframe structure.

5.1.2 Cleaning of aluminum screen consists of chemically removing the surface oxide from the wire mesh strands to minimize electrical resistance in the completed assembly.

5.2 Preparation of Solutions

5.2.1 Prepare the solution baths as follows:

Step 1. Fill the tank half full with water.

Step 2. Add the required amount of chemicals according to Table I slowly into the tank.

Step 3. Fill the tank up to the operating level with water.

TABLE I - MAKE-UP OF DEOXIDANT SOLUTION

BATH TYPE (Note 3)	BATH MAKE-UP (Notes 1 & 2)			OPERATING TEMPERATURE
	IMPERIAL UNITS	METRIC UNITS	U.S. UNITS	
Turco Deoxidine #624, Turco Alumiprep 33 or Turco WO#1	25% by volume (1 part deoxidant to 3 parts water)			Room temperature (60 - 90°F)

Note 1. It is acceptable for subcontractors to deviate from the specified make-up of solutions provided that the control requirements of Table II are met.
Note 2. Use clean tap water to make-up all baths.
Note 3. The tank material shall be resistant to the chemicals and to the operating temperatures used (e.g., acid resistant tanks for containing deoxidants).

5.3 Cleaning of Aluminum Screen

5.3.1 Immerse the wire screen material in the deoxidizer solution for approximately 5 minutes. The screen strips may be rolled or coiled as necessary to fit them into the cleaning tank. Take care to avoid kinking the screen during coiling. Rack and suspend screen material in the cleaning solution in such a way as to prevent it from contacting the tank bottom.

5.3.2 Immediately upon removal from the deoxidizer solution, rinse wire screen thoroughly in hot or cold running water.

5.3.3 Immediately after rinsing, blow dry wire screen using a hot air gun or oven dry at 275°F to 325°F for approximately 15 minutes.

5.4 Handling and Protection of Cleaned Material

5.4.1 Immediately after drying, protect wire screen from contamination by wrapping in clean unused Kraft paper or by placing in a clean unused polyethylene, nylon or paper bag. Do not re-use wrapping material or bags previously used for transporting screen. Keep handling of cleaned screen to a minimum and, wherever possible, handle only by the edges. Material which was coiled for cleaning may be left coiled for wrapping.

5.4.2 Cut details, as required, from the bulk cleaned screen.

5.4.3 It is very important to lay up cleaned wire screen into the composite assembly within 24 hours of cleaning. Maintain suitable records indicating/confirming the cleaning and lay-up times.

6 REQUIREMENTS

6.1 Cleaned aluminum screen shall be a uniform bright silver colour over the entire surface. Evidence of streaking, staining or localized areas of surface oxide shall be cause to re-clean the affected material.

6.2 Cleaned screen shall be completely dried after cleaning and shall be protected from contamination by wrapping according to section 5.4.

6.3 Cleaned wire screen shall have been laid-up in the composite assembly within 24 hours of cleaning. If the delay between cleaning and lay-up exceeds 24 hours, re-clean the screen according to section 5.3 before lay-up. Records indicating/confirming the cleaning and lay-up times shall be maintained.

7 SAFETY PRECAUTIONS

7.1 Do not keep, handle or eat food in the vicinity of cleaning baths.

7.2 Avoid ingestion of any of the materials specified herein. If ingestion occurs, obtain immediate medical attention.

7.3 Wash hands thoroughly after working with chemical baths.

7.4 Do not keep street clothes in the vicinity of chemical baths.

7.5 Wear neoprene gloves and approved chemical splash goggles while mixing solutions and carrying out cleaning operations.

7.6 Avoid skin contact with deoxidizing solutions. If skin contact occurs, wash the affected area with large quantities of clean water. If skin irritation occurs, immediately contact the Health Centre.

7.7 Operators who have any broken skin or open wounds on hands or wrists should not work with chemical baths.

7.8 Should accidental eye contact with deoxidizers occur, flush the eyes for a minimum of 15 minutes at the nearest eye-wash station and obtain immediate medical attention.

7.9 Ensure that sufficient ventilation is provided when using deoxidizing solutions. Consult the Environment, Health and Safety Department for the threshold limit values.

7.10 Operators shall wear protective respiratory equipment according to PPS 13.13 when operating chemical baths.

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.

9 MAINTENANCE OF SOLUTIONS

9.1 Keep the deoxidizer cleaning tank covered when not in use to prevent contamination of the solution.

9.2 Maintain deoxidizer solutions according to Table II.

TABLE II - CONTROL OF DEOXIDIZER SOLUTIONS

SOLUTION	CONCENTRATION	ANALYSIS FREQUENCY (Note 1)	
		STANDARD	EXTENDED
Turco Deoxidine #624, Turco Alumiprep 33 or Turco WO#1	20 to 25% by volume	Weekly	Monthly

Note 1. If, over a 12 month period, it can be demonstrated (through SPC charts, etc.) that the concentration of the applicable solution component is well within the requirements specified, then the analysis frequency may be reduced from “standard” to “extended”. However, in the event that the solution component analysis fails the requirements specified, revert back to the “standard” analysis frequency until a controlled process can again be demonstrated.

10 DISPOSAL OF SOLUTIONS

10.1 Dispose of all chemical waste solutions according to national legislation and local regulations. At Bombardier Toronto, dispose of chemical waste solutions according to EHS-OP-005.