BOMBARDIER
AEROSPACE
Toronto (de Havilland)

PPS 22.03

PRODUCTION PROCESS STANDARD

PHOTOGRAPHIC PROCESS FOR PREPARATION OF SCREEN PRINT STENCILS

Issue 5
- This standard supersedes PPS 22.03, Issue 4.
- Extensive changes and/or deletions have been made at this issue and, therefore, detail changes have not been noted.

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This PPS is effective as of the distribution date specified on the accompanying distribution notice.

Direct any PPS related questions to the PPS Group (416) 375-7641.

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1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for the preparation of photographically processed screen print stencils.

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.

2 HAZARDOUS MATERIALS

2.1 Before receipt at Bombardier Aerospace Toronto, all materials must be approved and assigned Material Safety Data Sheet (MSDS) numbers by the Bombardier Aerospace 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 Aerospace Toronto Environment, Health and Safety Department.

3 REFERENCES

3.1 PPS 13.26 - General Subcontractor Provisions.

3.2 PPS 22.06 - Screen Printing - Direct Process.

3.3 PPS 22.07 - Screen Printing - Reverse Process.

4 MATERIALS AND EQUIPMENT

4.1 Materials

4.1.1 Photo screen film, pre-sensitized, Autotype Super Star.

4.1.2 Strippable cut masking film, Ulano Rybylith.

4.1.3 Screen Blockout, water soluble, Southwestern No. B350.

4.1.4 Abrasive Cleanser (e.g. Ajax or Ulano Microgrit 2).

4.1.5 Wash-Out Developer, hydrogen peroxide solution (3% by weight).

4.1.6 Enzyme Remover, Ulano Enzyme No. 1.

4.1.7 Vinegar (10% acetic acid).

4.2 Equipment

4.2.1 Pulsed xenon lamp (e.g., supplied by NuArc).

4.2.2 Vacuum pump, capable of maintaining 8 to 10 pounds vacuum.

4.2.3 Screen fabric, Monofilament Polyester - Yellow Monotex.
- Mesh Size No. 230 for all screen printed legends.
- Mesh Size No. 125 for printing background colours on reverse process labels.

4.2.4 Suitable screen print frames, wooden.

4.2.5 Developing trays, washing out equipment, spray rinse facility.

4.2.6 Light duty neoprene rubber or latex gloves (e.g. DSC 234-2).

5 PROCEDURE

5.1 General

5.1.1 Preparation of screen print stencils according to this standard basically consists of photographically reproducing a negative image of the required label or legend on an impervious film which is bonded to a screen print fabric to make a screen stencil.

5.1.2 For direct process screen printing according to PPS 22.06, the screened image will be normal, or readable, as printed.

5.1.3 For reverse process screen printing according to PPS 22.07, the screened image will be reversed (mirror image) as printed.

5.1.4 Prepare background colour screens for reverse process labels using No. 125 mesh fabric to provide sufficient ink film thickness to prevent substrate patterns and colours showing through the applied label.

5.2 Preparation of Artwork

5.2.1 Artwork for photo screen masking shall consist of a full size positive image of the required label on strippable cut masking film. If necessary, artwork may be produced larger than full size to ensure clarity of image.

5.2.2 Artwork must conform to the shape, legend and layout as shown on the engineering drawing for the particular label.

5.3 Preparation of Photo Screen Mask

5.3.1 Except as follows, use the original artwork to mask off the photo screen film:

- If the engineering drawing requires a screen printed background with clear legend, prepare a photographic negative from the original artwork.
- If the original artwork is produced larger than full size, prepare a photographic auto-positive at the correct size for the finished label.

5.4 Exposing Photo Screen Film

5.4.1 Thoroughly clean the vacuum frame and glass immediately before using.

5.4.2 Place a sheet of clear mylar over the vacuum frame blanket and cover with a paper towel.

5.4.3 Cut a piece of photo screen film (see paragraph 4.1.1) to the required size and place the film (shiny side up) on the vacuum frame blanket and place the artwork or photo mask directly onto the film.

5.4.3.1 If the film is being prepared for direct process screening according to PPS 22.06, place the photo mask on the film so that the details appear reversed.

5.4.3.2 If the film is being prepared for reverse process screening according to PPS 22.07, place the photo mask on the film so that the details are normal (readable).

5.4.3.3 Place a sheet of clear mylar over the film and apply 8 to 10 pounds vacuum.

5.4.3.4 Position the pulsed xenon lamp approximately 36 inches away from and directly in front of the vacuum frame and expose for approximately 10 minutes. Base exposure times on film suppliers data and operators experience to produce properly exposed film.

5.5 Developing Film

5.5.1 Place the exposed film in a tray of developer (see paragraph 4.1.5) diluted 4:1 with water (i.e., 4 part developer to 1 part water), for approximately 2 minutes.

5.5.2 Rinse film with warm water spray at 70°F to 90°F.

5.5.3 Check film against light to ensure that all unexposed gelatin has been removed and all details of the labels and legend are clearly defined.

5.6 Preparation of Screen

5.6.1 Cut a piece of screen fabric (see paragraph 4.2.3) to the required size and staple fabric to a suitable size wooden frame.

5.6.1.1 The fabric must be smooth and tight after being mounted to the frame.

5.6.2 Thoroughly scrub all screens (new or used) inside and outside with an abrasive cleanser (see paragraph 4.1.4) in conjunction with soap or detergent.

5.6.2.1 The use of an abrasive cleanser is to roughen the surface of the screen fabric to improve adhesion and durability of the film.

5.6.3 Rinse screen fabric thoroughly with warm water to remove all traces of cleanser, soap or detergent.

5.7 Bonding Film to Screen

5.7.1 Cut suitable material (e.g. cardboard, newspapers) to act as a build-up between screen and table.

5.7.2 Place the wet film, emulsion side up on the build-up.

5.7.3 Position clean screen over the film so that screen comes in contact with the emulsion and apply weights to the frame to maintain this contact.

5.7.4 Wipe inside of fabric with a clean cloth or newspaper until film has been completely bonded into fabric.

5.8 Drying of Screens

5.8.1 After bonding film, allow the screen to dry at room temperature for a minimum of 1 hour before removing film backing.

5.8.2 When film is thoroughly dry, strip off the clear plastic backing by carefully lifting one corner and rolling the backing away from the film.

5.9 Blockout

5.9.1 Block out all exposed fabric around film with screen blockout (see paragraph 4.1.3). Block out pin holes, scratches and minor imperfections in the film stencil as required.

5.10 Stripping Film from Screen

5.10.1 Wash off all traces of ink from the screen using the appropriate washout thinners specified in PPS 22.06 or PPS 22.07, as applicable.

5.10.2 Soak film in hot water (120°F to 140°F) for 5 to 10 minutes.

5.10.3 Lightly scrub the screen fabric inside and out with a small stiff bristle brush.

5.10.4 It is acceptable to use a pressure washer to wash off all traces of water soluble ink from the screen.

5.10.5 If necessary, treat the screen fabric with enzyme remover (see paragraph 4.1.7) to remove residual haze left after stripping film and inks from the screen.

5.10.5.1 Neutralize the screen with vinegar after using enzyme remover.

6 REQUIREMENTS

6.1 Photo screen films must be tightly bonded to the screen fabric and must show no signs of peeling or flaking.

6.2 Finished screens must be free from pin holes, scratches, etc.

6.3 The finished screen must produce clear cut lettering and images.

6.4 The lettering size and style must conform to the requirements of the engineering drawing.

6.5 Identify all finished screens with the applicable drawing number, tool number and issue number.

7 SAFETY PRECAUTIONS

7.1 Operators must avoid looking directly at the pulsed xenon lamp during exposing of film and it is recommended that such exposure be carried out in a separate work area.

7.2 Operators must wear suitable light duty neoprene or latex rubber gloves during developing film and bonding film to screen.

8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for the preparation of photographically processed screen print stencils must have a basic understanding of the procedure and requirements as specified herein and must have exhibited their familiarity to their supervisor.

9 STORAGE

9.1 Store screen fabric and photo screen film in suitable cupboards or racks at room temperature (61°F to 90°F).

9.2 Store wash-out developer concentrate in a cool dark area.

10 MAINTENANCE OF EQUIPMENT

10.1 Place a sheet of mylar between the blanket and the glass of the vacuum frame when not in use.

10.2 Protect the glass at all times against scratches and breakage.