**BOMBARDIER**
*AEROSPACE*
*Toronto (de Havilland)*

# PPS 16.03

## PRODUCTION PROCESS STANDARD

# HANDLING AND PROTECTION OF AIRCRAFT SKINS

Issue 5
- This standard supersedes PPS 16.03, Issue 4.
- PPS ACN 16.03/1 has been superseded in this or previous issues.
- Vertical lines in the left hand margin indicate changes over the previous issue.

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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.

## TABLE OF CONTENTS

**Sections** **Page**



**Figures**

## 1 SCOPE

1.1 This Production Process Standard (PPS) specifies the procedure and requirements for handling and protecting of aircraft skin material, parts and assemblies during transport, fabrication, assembly and storage.

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.

1.1.3 Procedure or requirements specified in a Bombardier Aerospace Process Specification (BAPS) or Bombardier Aerospace Montreal (Canadair) Materials and Processes Specification (MPS) **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 or MPS is specified.

## 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 27.01 - Repair of Surface Defects in Aluminum Alloy Sheet.

## 4 MATERIALS AND EQUIPMENT

### 4.1 Materials

4.1.1 White separator paper, interleaved between aluminum sheets by mill as protection during shipping.

4.1.2 Brown Kraft wrapping paper.

4.1.3 Open mesh rubber matting, Neotex.

4.1.4 Yellow plastic warning tape 3/4" width, red imprinted "*SKINS - HANDLE WITH CARE*".

4.1.5 Masking tape, 1 inch width.

4.1.6 Leather gloves (e.g., DSC 422-3).

4.1.7 Plastic sleeves, 4 mm thick, clear virgin polyethylene.

### 4.2 Equipment

4.2.1 "A" Frame transport dollies.

4.2.2 Transportation and storage fixture to TS.764.10.00.

4.2.3 Felt or rubber padded storage racks.

## 5 PROCEDURE

### 5.1 General

5.1.1 Scratches on the inside or outside surface of an aircraft skin are detrimental to the service life of the air frame. It is imperative that all possible precautions be taken during handling and fabricating to prevent surface damage to skin material, parts and assemblies.

5.1.2 Damage to part surfaces is usually resultant from one or more of the following situations:

- Impingement of parts on one another, against jigs, racks, tools, etc.
- Sliding of parts over one another, or over tool beds, etc.
- Dropping of parts or tools onto part surfaces.
- Stacking tools, router boards, etc., directly against parts or material.
- Overcrowding of storage racks.
- Stacking parts with burred edges or nesting formed parts directly in contact with other parts.

5.1.3 The basic concept of preventing surface damage to skin material and parts according to this standard is to handle parts carefully, and to prevent sliding or impingement contact during transport, fabrication and storage.

5.1.4 The handling and protection procedures specified herein are applicable to bare, alodined, primed and painted surfaces.

### 5.2 General Handling Procedures

5.2.1 Do not slide or drag unprotected sheet material over other material or tool beds at any time, but rather pick up and carry the unprotected sheet material to the required location.

5.2.2 Lift long, thin gauge (0.032 inch or less) parts and material flat in the “S” curve manner (see Figure 1) and with sufficient horizontal support to prevent buckling in the center of the panel. Use wooden dowels to provide horizontal support when lifting wide, thin gauge panels.

5.2.3 Take extreme care when carrying long and awkward parts to avoid hitting tools, racks, machines, other personnel, etc.

5.2.4 Except in the case of very small parts or material, do not attempt to lift or carry more than a few sheets at a time as any slippage between the sheets will result in surface damage.

5.2.5 When stacking flat parts or material on top of or beside one another, care shall be taken to place the parts as squarely in place as possible in order to reduce the amount of sliding necessary for alignment of the parts.

5.2.6 It is recommended as protection against sheared or routed edges, burrs, etc., that clean work gloves (see paragraph 4.1.6) be worn at all times when transporting parts or material.

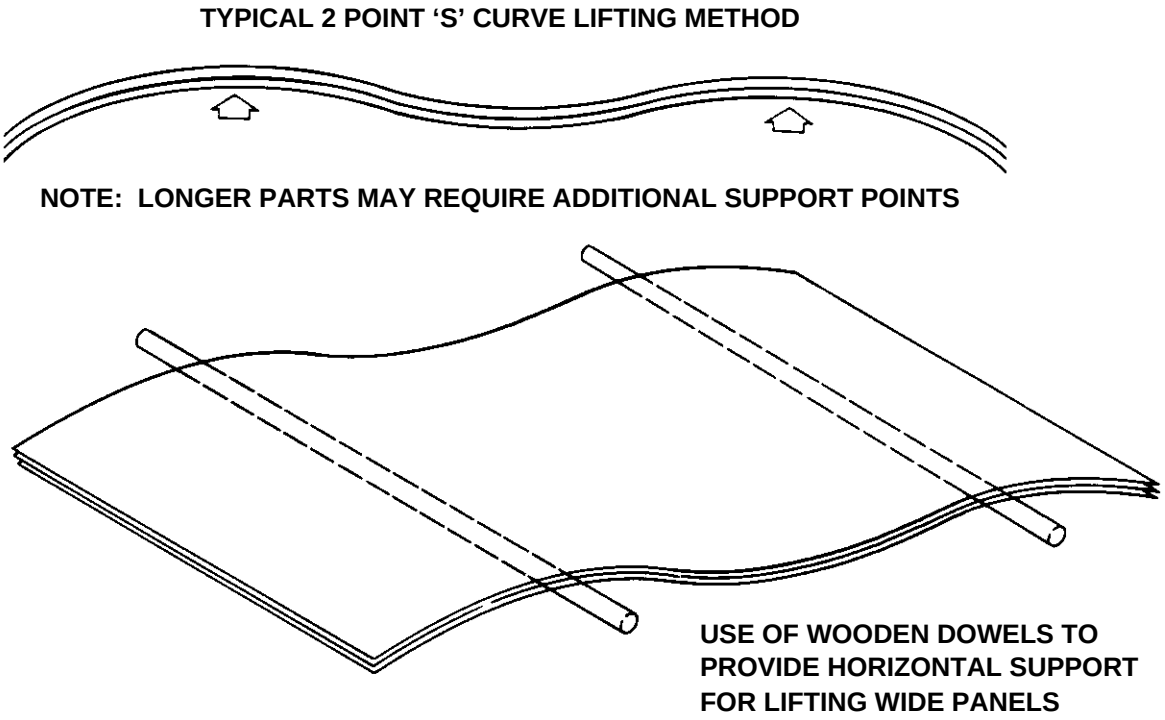



**FIGURE 1 - TYPICAL HANDLING OF THIN GAUGE MATERIAL**

## 5.3 Raw Material

### 5.3.1 Identification of Skin Material

5.3.1.1 All external skin parts are designated on the relevant product specification as “SKIN MAT. HANDLE WITH CARE”. The Raw Material Storesperson shall identify all shop orders for such material with a piece of yellow warning tape (see paragraph 4.1.4), approximately 4 inches long, on each side of the shop order plastic envelope.

5.3.1.2 Raw Material Stores shall identify each part number batch of skin material with a 6 inch long strip of yellow warning tape (see paragraph 4.1.4) approximately in the center of the outer wrap of the protective paper.

5.3.1.3 The shop order shall be the governing control to identify skin material as such at all stages of fabrication.

### 5.3.2 Protection of Raw Material

5.3.2.1 Raw Material Stores shall protect skin material on issuance by placing skin panels inside re-useable plastic sleeves (see paragraph 4.1.7) or interleaving each sheet with separator paper (see paragraph 4.1.1) or Kraft paper (see paragraph 4.1.2) adequately secured to the sheet with masking tape to prevent slippage or displacement of the protective paper during handling and transport.

### 5.3.3 Transporting Raw Material

5.3.3.1 Only transport skin material from Raw Material Stores to the relevant work area by means of “A” Frame transport dollies.

5.3.3.2 When loading transport dollies, tightly stack the material flat against the inclined surface so as to prevent slippage or movement of the load during transport (see Figure 2-A).

5.3.3.3 Stack larger widths of material against the “A” frame first and succeedingly smaller sizes may be stacked on these (see Figure 2-A).

5.3.3.4 At no time shall larger size material be stacked on smaller size materials or tools as the resultant edge corner contact would damage the skin surfaces (see Figure 2-B).

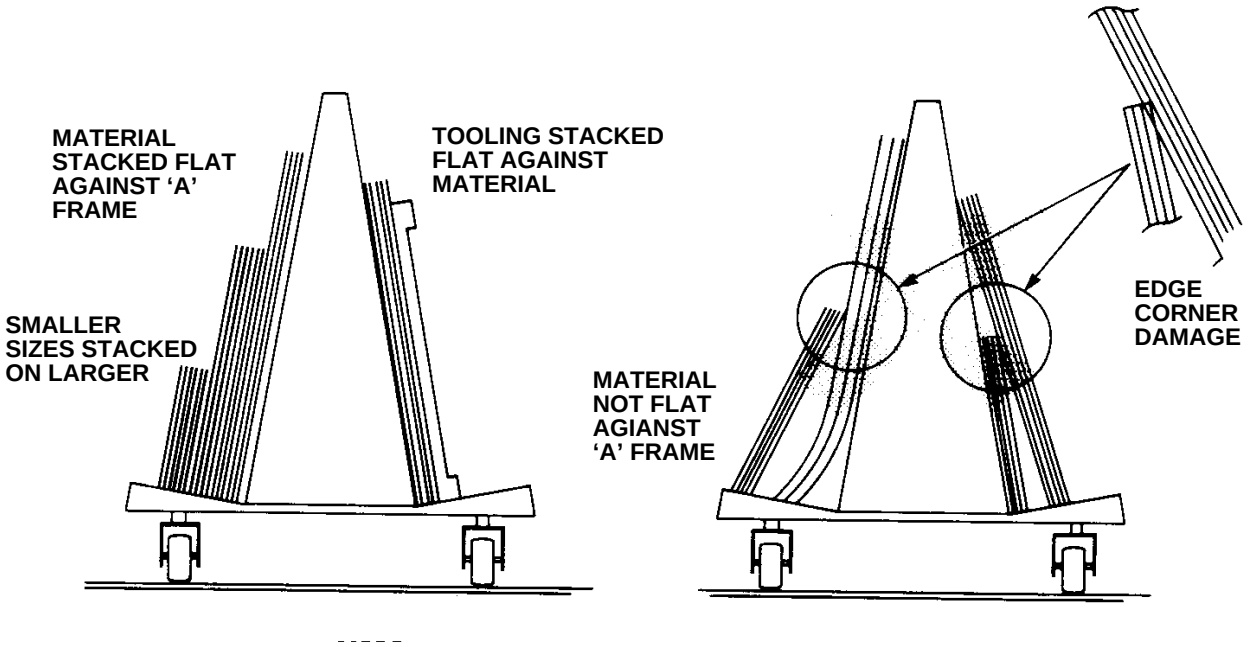



**FIGURE 2-A - CORRECT LOADING**

**FIGURE 2-B - INCORRECT LOADING**

**FIGURE 2 - LOADING "A" FRAME TRANSPORT DOLLIES**

### 5.3.4 Storage of Raw Material in Work Areas (see Figure 3)

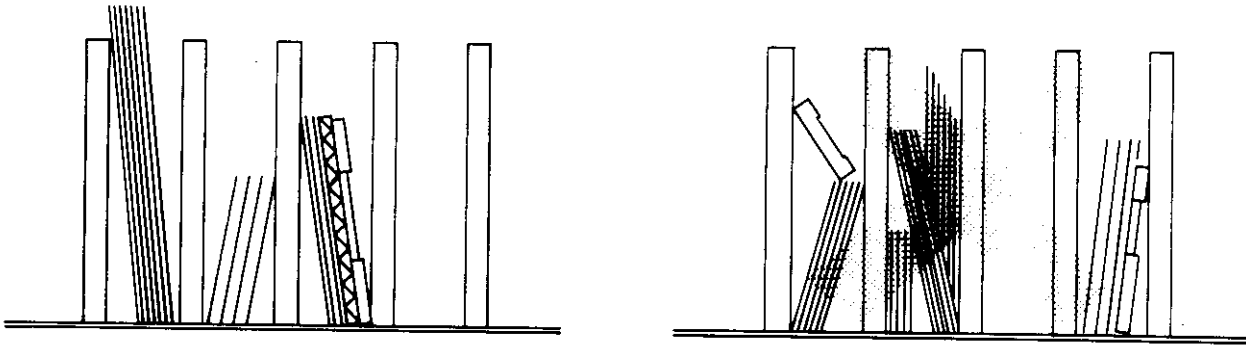
5.3.4.1 Store raw material awaiting work in the applicable shop area on edge in floor mounted rubber padded pipe racks or other suitably protected shelves or compartments.

5.3.4.2 Store only one part number batch of material in one pipe rack division and under no circumstances shall material be jammed into the storage compartments.

5.3.4.3 Take extreme care to avoid sliding of pieces over one another or slippage of material where more than one piece is being unloaded at a time from transport dollies for placement in storage racks.

5.3.4.4 Leave protective paper or plastic sleeving in place at all times when material is in the storage racks.

5.3.4.5 Under no circumstances shall tools or material be stacked on top of skin material.



**CORRECT** **INCORRECT**

**FIGURE 3 - STORAGE OF RAW MATERIAL IN WORK AREA**

### 5.4 Fabrication Handling Practices

#### 5.4.1 Drill and Rout

5.4.1.1 Remove protective paper or plastic sleeving from the skin material for drilling and routing operations. On completion of such operations, re-protect the routed parts with plastic sleeving, separator or Kraft paper attached to the parts with masking tape.

5.4.1.2 Take care to prevent damage to the skin material when stacking router board set-ups against one another.

5.4.1.3 Do not wipe drilling chips and router cuttings off the surface of the skin material, but rather blow or vacuum off to prevent damage.

#### 5.4.2 Forming

5.4.2.1 Remove plastic sleeving or protective paper and tape from skin material before forming.

5.4.2.2 Formed parts may be nested or stacked together provided the parts are place inside plastic sleeving or interleaved with separator or Kraft paper taped in place and that the exterior surface of the topmost part in the nest or stack is protected with plastic sleeving or Kraft paper taped in place.

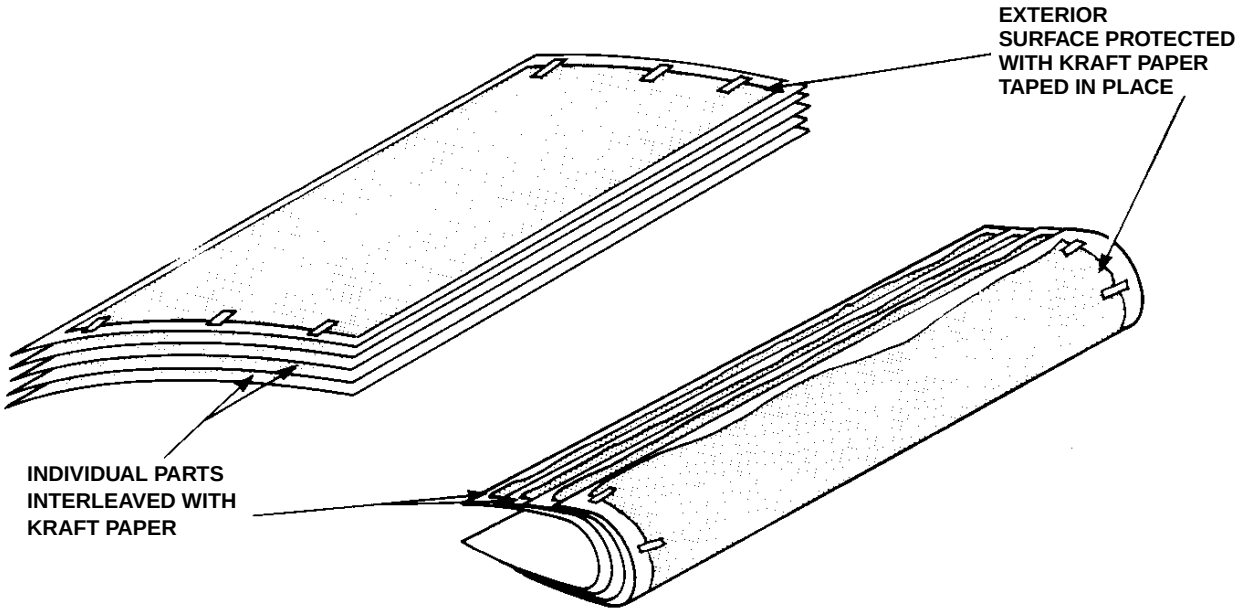



**FIGURE 4 - PROTECTING FORMED PARTS**

### 5.4.3 Heat Treating and Processing

5.4.3.1 Plastic sleeving, paper and tape shall be removed from skin parts being processed through the heat treat or chemical process shop (vapour degrease, alodine, etc.) and on completion of processing shall be re-protected for transport, by using re-useable plastic sleeving or interleaving with separator or Kraft paper taped in place.

5.4.3.1.1 Formed parts which are nested or stacked must have the exterior surface of the topmost part protected with plastic sleeving or Kraft paper taped in place.

5.4.3.2 Take care when racking and unloading parts from process racks to prevent surface damage.

### 5.4.4 Bench Work

5.4.4.1 Protect all work benches on which skin material or parts will be laid during any fabrication stage with open mesh rubber matting.

5.4.4.2 Take care to not lay tools, other parts or material on top of any skin surface during bench fabrication operations.

5.4.4.3 On completion of bench fabrication operation, re-protect skin parts for transport by re-using plastic sleeves or interleaving the parts with separator or Kraft paper taped in place.

### 5.4.5 Transportation and Storage

5.4.5.1 Transport or store long, flexible, thin gauge (0.32 inches or less) parts in transportation and storage fixtures (see paragraph 4.2.2 and Figure 5).

5.4.5.1.1 Protect skin parts which are to be transported or stored using the transportation and storage fixture by using plastic sleeving or interleaving with separator or Kraft paper taped in place.

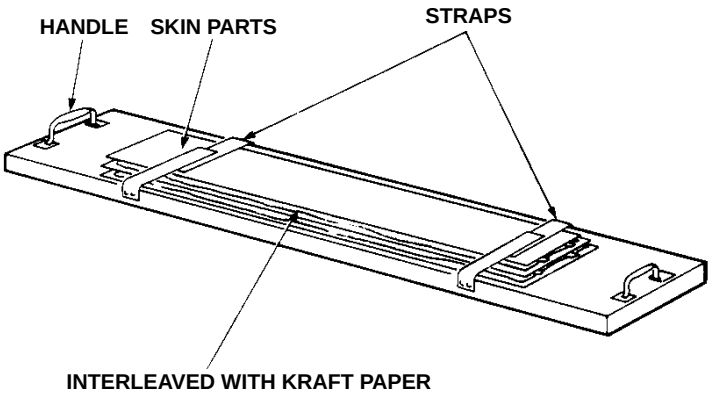



**FIGURE 5 - TRANSPORTATION AND STORAGE FIXTURE**

### 5.5 Assemblies

5.5.1 Store large skin assemblies individually in suitable rubber or felt pad racks and adequately wrap or protect with packing material taped to the exterior surfaces during transport.

## 6 REQUIREMENTS

6.1 Handle and protect skin material according to this standard at all times during transport and fabrication operations.

6.2 Refer to PPS 27.01 for disposition of damaged skin material, parts or assemblies.

## *7 SAFETY PRECAUTIONS*

*7.1 Refer to PPS 31.17 for the safety precautions for handling and using solvents.*

*7.2 Wear clean work gloves (see paragraph 4.1.6) at all times when transporting parts or materials with routed edges, burrs, etc.*

## 8 PERSONNEL REQUIREMENTS

8.1 Personnel responsible for handling and protecting of aircraft skin material, parts and assemblies during transport, fabrication, assembly and storage must have a basic understanding of the procedure and requirements as specified herein and must have exhibited their familiarity to their supervisor.

## 9 SPECIAL POINTS TO NOTE

9.1 Keep storage racks and transport dollies free from sharp edges, protruding nail or screw heads, staples, etc., which may cause surface damage to the materials, parts or assemblies.