STANDARD OVERHAUL PRACTICES MANUAL

PROTECTION, STORAGE AND HANDLING OF AIRPLANE COMPONENTS

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STANDARD OVERHAUL PRACTICES MANUAL

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To: All holders of PROTECTION, STORAGE AND HANDLING OF AIRPLANE COMPONENTS 20-70-01.

Attached is the current revision to this STANDARD OVERHAUL PRACTICES MANUAL

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Location of Change	Description of Change
20-70-01	
PGBLK 20-70-01-0	Added procedures for BMS 3-11-filled hydraulic components.

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INTRODUCTION

1. General

A. The instructions in this manual tell how to do standard shop procedures during maintenance functions from simple checks and replacement to complete shop-type repair.

B. This manual is divided into separate sections:

(1) Title Page

(2) Transmittal Letter

(3) Highlights

(4) Effective Pages

(5) Contents

(6) Revision Record

(7) Record of Temporary Revisions

(8) Introduction

(9) Procedures

C. Refer to SOPM 20-00-00 for a definition of standard industry practices, vendor names and addresses, and an explanation of the True Position Dimensioning symbols used.

D. The data is general. It is not about all situations or specific installations. Use it as a guide to help you write minimum standards.

E. If the component overhaul instructions are different from the data in this subject, use the component overhaul instructions.

PROTECTION, STORAGE AND HANDLING OF AIRPLANE COMPONENTS

1. INTRODUCTION

A. The data in this subject comes from Boeing Process Specifications BAC5401, BAC5402, BAC5411 (obsolete) and BAC5485.

B. The data for BMS 3-11-filled hydraulic components comes from these Boeing service letters:

(1) 707-SL-29-025

(2) 727-SL-29-044

(3) 737-SL-29-106

(4) 747-SL-29-070

(5) 757-SL-29-050

(6) 767-SL-29-063

(7) 777-SL-29-029

C. The data is general. It is not about all situations or specific installations. Use this data to help you write minimum standards.

D. Refer to SOPM 20-00-00 for a list of all the vendor names and addresses.

2. GENERAL

A. Refer to SOPM 20-44-02 for data about temporary protective coatings.

B. Give protection to the components and put them away by standard industry practices and the instructions in this subject.

C. If the overhaul instructions are different than the instructions in this subject, use the overhaul instructions.

3. GLASS WINDOWS

A. Glass windows used on the airplane are easily damaged. Protection of windows includes covers or coatings applied to the glass and the correct containers and crates.

B. Handling

(1) Keep windows in their containers until you start to repair them, or until you install them on the airplane.

(2) Do not remove the protective covering from the windows until you start to repair them or install them in the airplane. If the window will be repaired, remove the protective covering only from the area to be repaired, and replace the covering immediately after the repair work is completed.

(3) If you remove the protective covering, be sure to keep the bare window surface away from the work table or other objects that could cause damage.

(4) Do not slide the window, with or without protection, across the work table.

(5) Do not hold the window up on the plastic around the edge of the window.

(6) Be careful not to bump or hit the edges of the window panes, or the plastic around them, or let them touch something that can cause damage.

C. Protection and Packaging

(1) Clean the window fully with a wiper wet with Glyst concentrate, Glasswax or aliphatic naphtha. Use only these cleaners, unless the overhaul instructions are different. Dry and polish with a dry wiper.

(2) Clean the window only before you apply the protective cover to prevent unwanted material under the cover.

(3) Apply protective covering by one of these methods.

CAUTION: BE VERY CAREFUL NOT TO CATCH UNWANTED MATERIAL BETWEEN THE PROTECTIVE COVERING AND THE GLASS SURFACE.

(a) Method No. 1 – Cellulose acetate sheeting cut to the size of the window

CAUTION: DO NOT USE THIS METHOD ON PLASTIC OR PLASTIC-COATED GLASS WINDOWS OR WINDSHIELDS.

1) Cut cellulose acetate sheeting to the same size and shape as the window pane. If the acetate sheeting was used before, be sure to first clean it carefully with aliphatic naphtha.

2) Put the acetate sheeting on the window pane and apply cloth tape all around the edges of the sheeting to fully keep out unwanted material.

3) Parts or assemblies given protection by this method can be kept in storage indoors up to 18 months.

(b) Method No. 2 – Transparent polyester tape

1) Apply transparent polyester tape to the surface of the glass to fully cover all of the glass. The tape can be cut to size before or after application.

CAUTION: IF YOU CUT THE TAPE TO SIZE AFTER APPLICATION, BE VERY CAREFUL NOT TO DAMAGE THE WINDOW SURFACE OR ITS EDGES.

(c) Method No. 3 –Strippable temporary protective coating per SOPM 20-44-02.

1) Apply a smooth, continuous layer, minimum thickness 0.008 inch, of protective coating to all of the surface of the glass. Cheesecloth can be applied with the coating to help you remove the coating subsequently.

(d) Method No. 4 – Die-cut cellulose acetate sheeting cut smaller than window

1) Cut cellulose acetate sheeting one inch smaller than the glass size. If the acetate sheeting was used before, be sure to first clean it carefully with aliphatic naphtha.

2) Put the sheeting on the glass, adjust its position as necessary, and attach it with two or three small pieces of cloth tape.

CAUTION: IF YOU CUT THE TAPE TO SIZE AFTER APPLICATION, BE VERY CAREFUL NOT TO DAMAGE THE WINDOW SURFACE OR ITS EDGES.

3) Apply strips of 3 inch wide cloth tape to fully seal the edges of the applied sheeting and cover all of the bare glass surface. Tape can be cut to length before or after application.

4) Parts or assemblies given protection by this method can be kept in storage up to 18 months.

(4) Wrap the window per step (a) or (b):

(a) Put the window in a polyethylene bag of wall thickness 0.006 inch, fold the open end of bag at least twice, then fully seal the folds with masking tape.

(b) Wrap the window in greaseproof paper or 0.006 inch thick polyethylene film, fold all joints at least twice, then fully seal the folds with masking tape.

(5) Put each wrapped window in a fiberboard container, add padding as necessary, and seal the container with tape.

(6) On the outside of the container, identify the contents, such as by part number, serial number, test date, etc. Include such precautions as "GLASS - HANDLE WITH CARE," "KEEP DRY" and "THIS SIDE UP" on at least two sides.

CAUTION: DO NOT LET THE CONTAINER BECOME WET. TESTS SHOW THAT SOME RESINS USED TO MAKE CONTAINERS, WHEN MIXED WITH WATER, WILL ETCH THE WINDOW GLASS.

(7) If you will send the window from one depot to another, put the fiberboard container in a wooden crate and put the same identification on the same markings on the crate that are on the container. During wet weather, be sure to give the crate protection from moisture.

D. Storage of Glass Windows

(1) Windows must stay in their individual containers during storage.

(2) The storage area must be clean, without metallic objects or other substances which could come through the surfaces of the container and damage the window. Do not let glass touch metal or glass touch glass.

CAUTION: CONTAINERS PUT ON EDGE PUTS WEIGHT ON WINDOW EDGES WHICH CAN CAUSE DEFORMATION OF THE PLASTIC AROUND THE OUTSIDE OF THE WINDOW.

(3) Containers must be put down flat and not put on edge.

(4) Containers must not be stored near steam pipes, heater outlets or other sources of heat.

(5) The storage area must be dry. The air must have a low relative humidity.

CAUTION: DO NOT LET THE CONTAINER BECOME WET. TESTS SHOW THAT SOME RESINS USED TO MAKE CONTAINERS, WHEN MIXED WITH WATER, WILL ETCH THE WINDOW GLASS.

E. Materials

NOTE: Equivalent substitutes can be used.

(1) Protective Coating – Spraylat SC-1048, V87354.

(2) Cellulose Acetate Sheeting, Transparent, 0.020 inch gage – Kodapak No. E-463, V32153.

(3) Mylar polyester film, V18873.

(4) Polyester Transparent Tape – Pressure Sensitive, No. 850, V76381.

(5) Masking Tape – Scotch No. 202, V76381.

(6) Cloth Tape – Permacel 692, V99742.

(7) Cleaner – Glasswax, V53793.

(8) Cleaner – Glyst Concentrate, V61102.

(9) Wipers – BMS 15-5.

(10) Aliphatic Naphtha – TT-N-95 (Flash point 20°F).

4. RUBBER OR RUBBER-LIKE MATERIALS

A. Some elastomers (rubber and rubber-like materials) can get deterioration because of oxygen, ozone, sunlight, heat, rain, and other agents while the material is made or during storage. This could cause decreased serviceability or malfunction. Precautions during storage, and age control, will help prevent problems with rubber parts. Refer to BAC5401 for more data.

B. Storage

(1) Do not let different rubber materials touch each other.

(2) Keep parts away from steam pipes, heater outlets or other sources of heat, or where they could touch water, oils, grease, or other contamination.

(3) Store parts at 100°F maximum, unless higher temperatures are caused by temporary changes in the weather. Keep the relative humidity sufficiently low that condensation does not occur.

(4) Do not put parts or assemblies in stacks or piles that could crush, kink, or deform rubber items. Long items can be tied in loose coils. If an item is in storage longer than 24 months, be sure to examine it for defects before you use it.

(5) Cap or seal hoses with plugs per MIL-C-5501 and store without kinks or sharp bends.

C. Age Control

(1) Age control requirements apply only when specified by the part drawings, material standards, or other documents.

(2) Cure Data Codes

(a) The cure date code is the letter Q preceded by one digit and followed by two digits as follows:

1) The first digit indicates the applicable quarter of the year. Each year is divided into quarters as follows:

1st quarter - January, February, March

2nd quarter - April, May, June

3rd quarter - July , August, September

4th quarter - October, November, December

2) The last two digits indicate the year.

EXAMPLE: 3Q98 identifies a part cured in the third quarter of 1998; that is, sometime between July 1 and September 30, 1998.

(b) You will find the cure date code on all parts made from rubber or rubber-like material unless the code is specified as not necessary in the applicable specification. Some items could have the cure date code adjacent to or below the part number or equivalent identification.

(3) Storage Expiration Dates

(a) The expiration date for an item is the last day of the quarter that is a specified number of quarters after the quarter identified in the cure date code. Thus, if an item has a maximum permitted age of 4 quarters and it was cured in the first quarter of the year, it is acceptable until the end of the first quarter, or March 31, of the following year.

(b) For parts not yet installed, and bulk materials, Table 1 gives the maximum age, in quarters after the cure date quarter, that an item can have and be acceptable for installation.

Table 1: Age Maximums For Rubber Parts

Source	Item Type	Maximum Age Before Installation, Quarters After Cure-Date Quarter*[1]
Items and products that come directly from vendors or their agents or other sources	Hoses	48
	O-rings and other parts	60
Items in sealed packages shipped by Boeing to customers as spares or components of kits	Hoses	45
	O-rings and other parts	57

*[1] EXAMPLE: A hose sent from a vendor, made in the first quarter of 1998 (coded as 1Q98), is acceptable for installation until 48 quarters (12 years) later, which is until the end of the first quarter of 2010. Thus the expiration date for this hose is March 31, 2010.

(c) Age control is not necessary for rubber parts after they are installed.

(4) Here are some examples of materials and parts not in the age control program. This list is only a guide. Refer to the part drawing, material standard or equivalent documents to see if the age control program applies.

(a) Silicone rubber

(b) Ethylene propylene rubber

(c) Butyl rubber

(d) Hydrin rubber

(e) Urethanes

(f) Compressed asbestos-rubber sheet packing

(g) Vulcanized-in-place seals

(h) Chlorosulfonated polyethylene

(i) Static seals when used with fasteners, such as sealing washers and permanently installed O-rings used with bolts, bulkhead fittings and dome nuts

(j) Fluorinated hydrocarbon such as Teflon, Viton, and Kel-F

(k) Cushion mountings, dust seals, and grommets installed as protection from damage to or by other parts.

5. ELECTRICAL AND ELECTRONIC COMPONENTS

A. Electrical Wire Bundles

(1) Indicator lights, connectors, switches or other component permanently attached to wires of a bundle must be put in a plastic bag attached in position with tape.

(2) Wire bundles with a large number of components permanently attached must be stored in cardboard boxes to give these components protection from damage.

(3) Wire bundles must be kept in a dry area that does not have large changes of temperature which could cause condensation to collect on the bundle.

(4) Wire bundles kept on shelves must be loosely coiled or distributed to keep attached components away from objects that could cause damage. If bundles are to be stacked, put cardboard separators between bundles.

(5) If you hang wire bundles on a vertical surface, do not use only one support which can badly bend the wires. Use a sufficient number of supports to keep the bend radius a minimum of ten times the bundle diameter.

B. Electronic Components

(1) Keep circuit boards and electronic assemblies at temperatures of 60-100°F. Humidity control is not necessary, but make sure moisture does not collect on the components.

(2) Put away small electronic components and assemblies as follows:

(a) Put the component in a plastic bag and seal the bag.

(b) Wrap cushioning material around the outside of the plastic bag.

(c) Put this in a paper bag or cardboard container.

(d) Identify the package with the part number, test date and other important data.

6. OXYGEN SYSTEM COMPONENTS

A. Vapor degrease or aqueous degrease oxygen system components per SOPM 20-30-03 before you put them away. Use the general cleaning method before you install fittings. Use the special procedure for oxygen system components as a final cleaning after pressure tests and after sleeves or unions are installed on units not to be pressure tested. Refer to BAC5402 for more data.

B. Wear clean lint-free gloves while you work with unpackaged oxygen system components after final cleaning.

C. Individually seal the cleaned BAC, NAS, AN and MS fittings in polyethylene bags or sleeves. Put the fittings in the bag within 10 minutes after you clean them if in an uncontrolled area, or within 8 hours if in a controlled work area.

D. Install protective caps or plugs in all openings of tube assemblies. Visually-clean plastic caps can be used on B-nuts and other fittings if they do not engage the thread and let in plastic particles.

(1) Protective metal caps or metal plugs can be used again after they are vapor degreased per SOPM 20-30-03 or immersion-cleaned with Freon TF solvent.

(2) Keep protective caps and plugs in sealed polyethylene bags until immediately before you use them. After you open the bag and remove a supply sufficient for 5 minutes of work, immediately close the bag again.

E. Seal tube assemblies and tube assembly ends in new, clean polyethylene or nylon bags. Use 4-mil minimum thick polyethylene or 3-mil minimum thick transparent nylon on parts that weigh less than approximately one pound. Use 6-mil minimum thick polyethylene or 3-mil minimum thick transparent nylon bags or sleeves for all other parts. To seal the bags, fold twice and staple them. Other methods can be used to seal the bags if they do not catch dust or moisture in the bags.

F. Do not open the bags that hold oxygen system components until immediately before installation. If the bag is torn or unsealed during storage, clean the parts again.

G. Identify all bags that contain cleaned oxygen system components and protective caps and plugs as Breathing Oxygen System Components. Include the part number and the date when the part was cleaned and sealed.

H. Put the sealed parts away where they will have protection from dust, moisture, lubricants or other contaminants and where the temperature will be 60-90°F and the relative humidity will be no higher than 90%.

I. Keep oxygen modules in the same orientation as they are installed in the airplane.

7. BMS 3-11-FILLED HYDRAULIC COMPONENTS

A. General

(1) These general recommendations are superseded by any component-specific overhaul instructions.

(2) Although these instructions are for BMS 3-11-filled components, they can be used for hydraulic components that use a different hydraulic fluid such as MIL-H-5606, MIL-H-6083, BMS 3-32, etc., but the fittings, seals and materials that you use must be specifically for that different hydraulic fluid.

B. Ports and Fittings

(1) Seal all ports and electrical connectors with caps and plugs that are resistant to BMS 3-11 hydraulic fluid.

(a) Make sure the installed caps or plugs will not leak hydraulic fluid when the unit is filled with the fluid for storage.

(b) Unless the overhaul instructions are different, you can use these caps or plugs, as applicable, for leak-free closure of hydraulic ports of components:

1) BACC14AD pressure seal cap, flareless tube

2) MS21913 plug, flareless tube

3) BACP20AU plug, flareless tube

4) AS4662 plug fitting, short flareless

5) AS4694 cap fitting assembly, hollow end, acorn, short flareless

6) AS5169 port plug and bleeder fitting (for flareless boss ports only)

(c) We recommend caps or plugs that have seals.

(2) Keep the caps and plugs installed in the components and hoses until immediately before installation.

(3) Be careful when you remove plastic plugs from the ports, to help prevent unwanted plastic pieces in the threads.

(4) Be careful to make sure paint near the port face does not chip off or get into the unit.

(5) Make sure the area around a port face (a sealing surface) has protection from dents, scratches, corrosion or contamination.

(6) Keep the fittings that will be screwed into the port clean and lubricated .

C. Preservation and Storage

(1) After you are done with the component tests, drain the hydraulic fluid from the unit, then refill it (90% minimum) with new, clean BMS 3-11 hydraulic fluid.

(a) Add sufficient fluid to lubricate all internal seals.

(b) Make sure there is sufficient air volume for thermal expansion during storage.

(2) Flush hoses and tubes, then install protective caps and plugs, as applicable, on the end fittings, until immediately before the component is connected to the system.

(3) Do not use compressed air to blow out a tube, hose or reservoir, because the air supply could possibly not be clean.

(4) Keep filler caps clean.

(5) Clean the exterior of units with isopropyl alcohol, and blow these surfaces dry with compressed air.

(6) Make sure hydraulic assembly areas are free of airborne contaminants.

(7) Remove condensation that collects on a unit moved from a cold storage area into a warmer area.

(8) Apply corrosion inhibiting compounds on the exterior of units that will be in storage a long time.

(9) Keep parts in a storeroom that will give protection from weather and direct sunlight. Ultraviolet radiation will cause deterioration of seals.

(10) For storage conditions, we recommend a temperature range of 55-110°F (67°F is best) and a relative humidity of 40% or less.

D. Packaging

(1) When practical, seal the unit in a polyethylene barrier bag and include desiccant. Make sure the identification tag is visible.

(2) Wrap the unit in nylon film, bubble wrap, or other padded, non-corrosive material to prevent damage to the component and its barrier bag.

(3) Put the unit in a corrugated cardboard box or other superior protective container.

(4) Fill all empty space in the container around the unit with packing material.

(5) If the unit is not sealed in a polyethylene barrier bag, add desiccant and seal the box or container with packing tape or the closure mechanism.

(6) Attach a tag to the package with the part number, nomenclature and maintenance date, as applicable.

(7) When size or other factors let you pack more than one item in the same shipping or storage container, individually package each item first, then physically separate them, as with partitions, to help prevent external damage.

(8) Be sure to include in the package or container any special instructions necessary to prevent damage to the units when they are packed or unpacked.

(9) If the units have springs or other items that have stored potential energy, be sure to pack the unit to prevent the risk of injury or damage.

(10) Use tape, string, or something equivalent to hold loose pieces that could be damaged or lost.

(11) Give special protection to units that have electrical components sensitive to electrostatic discharge. Refer to SOPM 20-12-02 for details.

E. Fluids

(1) Unless specified differently in the overhaul instructions, use new hydraulic fluid, or filter the hydraulic fluid to NAS1638 Class 8 minimum standard, and 7500 ppm (0.75%) maximum water content.

(2) Water is a chemical contamination. If you think the hydraulic fluid has water in it, drain the unit and refill it as specified.

(3) Make sure surfaces that will touch hydraulic fluid stay clean and dry.

F. Exposed Surfaces

(1) Be careful not to put scratches or dents in the surfaces of exposed cylinder rods or attachment bolts. Give protection to these surfaces as necessary.

(2) Keep motor and pump shafts clean, and give them protection from physical damage.

(3) Give splines protection from physical damage. Be sure to apply the applicable lubricant to them before assembly.

(4) Give tapered shafts and the inside diameters of couplings protection from physical damage.

(5) Give special protection to critical and close-tolerance surfaces, and to sensitive and easily-damaged components.