STANDARD OVERHAUL PRACTICES MANUAL

CLEANING AND RELUBRICATING BEARINGS

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STANDARD OVERHAUL PRACTICES MANUAL

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To: All holders of CLEANING AND RELUBRICATING BEARINGS 20-30-01.

Attached is the current revision to this STANDARD OVERHAUL PRACTICES MANUAL

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Location of Change	Description of Change
	NO HIGHLIGHTS

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STANDARD OVERHAUL PRACTICES MANUAL

A = Added, R = Revised, D = Deleted, O = Overflow

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STANDARD OVERHAUL PRACTICES MANUAL

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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.

CLEANING AND RELUBRICATING BEARINGS

1. INTRODUCTION

A. The data in this subject comes from Boeing Process Specifications BAC5040 and BAC5200, and field experiences. The airline has a copy of the Boeing Process Specification Manual.

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

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

2. GENERAL

A. These instructions tell how to clean, lubricate, do preservation and give protection to these bearings:

(1) New bearings supplied with preservative or lubricant that is different than required.

(2) New lubricated bearings when it is a long time since the lubrication date.

(3) Used bearings.

B. For easy reference in these instructions, we put the bearings into these types:

(1) Type 1 – Wheel bearings

(2) Type 2 – Unshielded ball and roller bearings (but not wheel bearings)

(3) Type 3 – Shielded (sealed or unsealed) ball, roller and needle bearings

(4) Type 4 – Instrument or precision bearings. These include:

(a) Bearings identified as instrument or precision grade.

(b) Bearings smaller than 1.00 inch outside diameter.

(c) Bearings with a maximum torque of less than 5 ounce-inches.

(d) Bearings made by Miniature Precision Bearings, Inc. (V40920); Micro-Precision Division of Micromatic Hone Corp., Los Angeles, California; Microtech Corporation, Pasadena, California; Barden Corporation (V70854).

(5) Type 5 – Ball bearings per MIL-B-7949, with removable snap-ring style retaining rings and seals.

(6) Type 6 – Sintered metal bearings

(7) Type 7 – Teflon-lined bearings

C. The instructions in this subject are for only Types 1, 2, 5, 6, and 7 bearings. Do not use these instructions for Types 3 and 4 bearings. For Types 3 and 4 bearings, refer to the vendor's instructions.

D. Keep the area and equipment sufficiently clean to give protection against corrosion, deterioration and damage. Air conditioning is recommended.

E. Keep a relative humidity of 40 percent maximum in the area.

F. Final rinse, preservative and lubricating fluid systems must have filters to remove all particles larger than 10 microns. Particles larger than 0.45 micron must be a maximum of 1.0 mg per 100 ml of fluid.

3. MATERIALS

NOTE: Equivalent substitutes can be used.

A. Solvents (SOPM 20-60-01)

(1) Dry cleaning – P-D-680

(2) Mineral spirits – TT-T-291

(3) Trichloroethylene – BMS 11-6, Type 1

(4) Trichloroethane – O-T-620

B. Fingerprint remover – MIL-C-15074 (SOPM 20-60-01)

C. Grease (SOPM 20-60-03)

(1) Aeroshell 5

(2) BMS 3-33 or MIL-G-23827

(3) MIL-G-81322

D. Oil – MIL-L-7870 (SOPM 20-60-03)

E. Container, grease-proof – MIL-B-117, Type 1, 2, or 3, Class C, Style 1, 2, or 3 (SOPM 20-60-04)

F. Corrosion preventive compound – MIL-C-16173, Grade 3 (SOPM 20-60-02)

4. HANDLING BEARINGS BEFORE CLEANING AND RELUBRICATING

A. New Bearings

(1) Keep new bearings in their original container until they are installed or cleaned and lubricated.

(2) If new bearings were removed from their original container and not installed or cleaned and lubricated immediately, put them in containers per Paragraph 9. and identify them per Paragraph 10.

B. Used Bearings

(1) If the bearings will not be cleaned and relubricated immediately after removal from an assembly, give them protection from dirt, dust, moisture, corrosion or abrasion. Use vapor barrier material sealed with tape. Refer to SOPM 20-44-02 for more details.

5. CLEANING

A. General

(1) Before you clean the bearing, carefully remove any seals and retainers. Do not damage any parts.

CAUTION: DO NOT USE METHODS 1 THRU 5 ON TYPE 7 (TEFLON-LINED) BEARINGS. TEFLON-LINED BEARINGS MUST BE CLEANED BY METHOD 6 ONLY. TYPE 6 (SINTERED METAL) BEARINGS MUST BE CLEANED BY METHOD 2 ONLY.

(2) The numbered cleaning procedures are given in order of preference. Unless the bearings are Teflon-lined or sintered-metal, you can use any method.

B. Method 1 – Ultrasonic Cleaning

(1) Clean the bearing manually with dry cleaning solvent or mineral spirits. Remove all of the preservative, grease, oil and dirt that you can see. Hold the bearing only with clean, lint-free gloves, neoprene rubber gloves, tongs or holders, until the bearing is preserved or lubricated.

(2) Ultrasonically clean with BMS 11-6, Type 1 trichloroethylene. To prevent damage to the bearing, keep the power less than 5 watts per square inch and the frequency more than 40 kHz.

(a) Hold the bearing in vapor over the boiling sump.

(b) Move the bearing to the ultrasonic reservoir.

(c) Remove from the ultrasonic reservoir. Spray rinse the bearing with the same type of solvent.

(d) Move the bearing down into the vapor over the sump for 30 seconds.

(e) Dry the bearing per Paragraph 6.

C. Method 2 – Vapor Degreasing

(1) Use this method for Type 6 (sintered-metal) bearings. But do not do it unless:

(a) The bearing pores have too much contamination to permit removal with a clean cloth.

(b) The oil in the bearing is dirty.

(c) The bearing was put into storage at a temperature more than 90°F for a long time.

(2) Clean the bearing manually as in Paragraph 5.B.(1) above.

(3) Drain all of the solvent from the bearing.

(4) Vapor degrease the bearing per SOPM 20-30-03. During the procedure, apply the wash spray to the bearing for a minimum of 5 minutes.

(5) Dry the bearing per Paragraph 6.

D. Method 3 – Pressurized Spray Wash

(1) Clean the bearing manually as in Paragraph 5.B.(1) above.

(2) Drain all of the solvent from the bearing.

(3) Pressure-spray wash with dry cleaning solvent or mineral spirits.

(4) Drain all of the solvent from the bearing.

(5) Dry the bearing per Paragraph 6.

E. Method 4 – Four-Stage Immersion Cleaning

(1) Use four tanks, one after the other. Fill each tank with dry cleaning solvent or mineral spirits. (The dirty bearing goes into Tank 1 first, then Tanks 2, 3, and 4 as specified below.) When Tank 1 becomes too dirty, remove it and replace with Tank 2. Move Tank 3 into the place where Tank 2 was. Put a tank of clean solvent where Tank 3 was. In Tank 4, keep the solvent clean and filtered per Paragraph 2.F. above.

(2) Clean the bearing in Tank 1 to remove heavy contamination, to make it easy to clean in the next step.

(3) Clean the bearing in Tank 2 until you cannot see any more contamination.

(4) Wash the bearing in Tank 3 to remove all signs of dirty solvent that came with the bearing from Tank 2.

(5) Wash the bearing in Tank 4.

(6) Drain all of the solvent from the bearing.

(7) Dry per Paragraph 6.

F. Method 5 – Fingerprint Removal

(1) Put the bearing in fingerprint remover. Shake the bearing for a minimum of 2 minutes.

(2) Wash the bearing in filtered mineral spirits.

(3) Dry per Paragraph 6.

G. Method 6 – Type 7 Teflon-Lined Self-Lubricating Bearings

(1) These bearings have a Teflon liner bonded to the bushing metal by an adhesive system. Boeing did not do tests on the adhesive system for resistance to solvents and cleaners. Therefore we do not recommend that you use solvents or cleaners to clean these bearings.

(2) If it is necessary to clean these bearings, wipe them with a clean, lint-free cloth moist with warm water only, then let them air dry or blow them dry with compressed air. Do not use solvents or cleaners on these bearings.

6. DRYING

A. Use one of these methods to dry bearings:

(1) Put in a ventilated oven at 200-250°F for a minimum of 30 minutes.

CAUTION: DO NOT SPIN BEARINGS WITH COMPRESSED AIR OR TURN THEM QUICKLY BY ANY MEANS BEFORE LUBRICATION. THEY COULD BE DAMAGED BY THE SPEED.

(2) Dry with filtered compressed air free of grit, moisture, and oil. Use filters to remove all particles larger than 10 microns.

(3) Bearings that were ultrasonic cleaned or vapor degreased can be air dried at 65°F minimum room temperature for 60 minutes minimum. Make sure the relative humidity is less than 40%.

7. HANDLING OF BEARINGS AFTER CLEANING

A. If the bearings are not in their original containers, give them protection from contamination and corrosion at all times.

B. Be careful with cleaned bearings. Use only lint-free gloves, neoprene rubber gloves, or tongs. Clean or discard dirty gloves when bearing contamination is possible. Do not touch bearings with bare hands.

8. LUBRICATION

A. Keep the grease in a sealed container until the time of use. Keep the grease as clean as initially supplied. After the lubrication is completed, discard grease that is not in the original container.

CAUTION: DO NOT LUBRICATE TYPE 7 (TEFLON-LINED) BEARINGS. THE TEFLON IN THEM GIVES SUFFICIENT LUBRICATION. ALSO, GREASE OR OTHER LUBRICANTS CAN COLLECT CONTAMINATION WHICH COULD DAMAGE THE TEFLON SURFACES.

B. Lubricate Types 1, 2, and 5 bearings within 30 minutes after they were cleaned and dried. Lubricate Type 6 bearings immediately after they are cleaned and dried. Do not lubricate Type 7 bearings.

C. Pack Type 1, 2, and 5 bearings one-third full with the lubricant specified by overhaul instructions. If no lubricant is specified, use Aeroshell 5 grease on Type 1 bearings, MIL G 81322 grease on military applications, and BMS 3-33 or MIL-G-23827 grease on Types 2 and 5 bearings. Turn the bearing until all internal surfaces have a layer of lubricant. Also apply a layer of lubricant on external surfaces of the bearing.

D. Clean spatulas can be used to apply the lubricant. But the spatulas must be made of nonferrous metal, such as nickel, monel, or inconel. Do not use wooden spatulas.

E. To lubricate cleaned Type 6 bearings, soak them for 20 minutes in a bath of MIL-L-7870 oil at 135-140°F. (Do not keep this oil heated above room temperature except while you soak the bearings. The oil evaporates easily and the heat will cause deterioration of its low-temperature properties.) Remove the bearings from the heated oil and immediately put them in a room temperature bath of MIL-L-7870 oil.

9. PRESERVATION

A. Use this procedure to put away Type 1, 2, or 5 bearings without lubrication.

B. Within 30 minutes after the bearing is cleaned and dried, put it into MIL-C-16173 grade 3 corrosion preventive compound for one minute.

C. Remove the bearing and let it drain.

D. Clean any seals or retainers in filtered mineral spirits. Dry them. Install them on the bearing.

E. Before you lubricate the bearing, remove the preservative by a cleaning method of Paragraph 5.

10. PROTECTION AND IDENTIFICATION

A. Type 1, 2, 5

(1) If the bearings will not be installed immediately after lubrication, put each one into a MIL-B-117 bag or sleeve. Keep the included air volume to a minimum. If the bearings weigh more than 6 ounces, also put each one into a cardboard box.

(2) Identify each bearing or container with part number, manufacturer, lubricant, and date lubricated. Make sure the identification can be read after a 24-hour soak in the bearing lubricant.

B. Type 6

(1) If the bearings will not be installed immediately after lubrication, put each one into a MIL-B-117 Type 2 Class C container.

(2) Identify each bearing with part number, manufacturer, lubricant, and date lubricated.

C. Type 7

(1) If the bearings will not be installed immediately after lubrication, put each one into a MIL-B-117 container.

(2) Identify each bearing with part number and manufacturer.

11. STORAGE

A. Keep all of the bearings in a dry area and give them protection from dirt and other contamination.

B. Keep the Type 6 bearings at moderate temperatures below 90°F, to keep the oil in them.

C. Within 6 years of the lubrication date, examine all Types 1, 2 and 5 bearings as follows:

(1) Look at the bearing for signs of corrosion.

(2) Hold the inner race and turn the outer race. Make sure the bearing turns smoothly.