STANDARD OVERHAUL PRACTICES MANUAL

APPLICATION OF CORROSION INHIBITING COMPOUNDS

PART NUMBER NONE

PUBLISHED BY BOEING COMMERCIAL AIRPLANES GROUP, SEATTLE, WASHINGTON, USA
A DIVISION OF THE BOEING COMPANY
PAGE DATE: Jul 01/2009

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STANDARD OVERHAUL PRACTICES MANUAL

Revision No. 22
Jul 01/2009

To: All holders of APPLICATION OF CORROSION INHIBITING COMPOUNDS 20-41-05.

Attached is the current revision to this STANDARD OVERHAUL PRACTICES MANUAL

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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.

APPLICATION OF CORROSION INHIBITING COMPOUNDS

1. INTRODUCTION

A. The data in this subject comes from Boeing Process Specification BAC5877. 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 it 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. COMPOUND DESCRIPTIONS

A. Corrosion inhibiting compounds are used with finish systems to prevent corrosion, or to stop corrosion when the finish system is damaged. Many can get into very small cavities and push out water. Thus they can go in between faying surfaces or between fasteners and holes, where the finish is broken.

B. Make an analysis of your airplane's environment, the inhibitor used, and the application schedule, to be sure of sufficient corrosion protection. Other water displacing corrosion inhibiting compounds could be satisfactory.

C. BMS 3-23 Corrosion Inhibiting Compound

(1) This is an organic compound of nonvolatile base materials in solvents to make a fluid. It does not contain silicones. This compound can be dipped, brushed, or sprayed. The liquid carrier evaporates quickly to put a thin layer of wax-like material on the surface. The coating is not easily rubbed or worn off, but must be applied again if the surface is washed frequently.

(2) BMS 3-23 compound stays tacky and thus will collect unwanted material. The areas where it is applied must be regularly cleaned and then more of the corrosion inhibitor must be applied. The time between applications of the compound will change with the location in the airplane. Refer to the Maintenance Planning Document for details.

(3) Types of BMS 3-23

(a) Type 1 – Makes a transparent colorless layer which can be seen only with ultraviolet light.

(b) Type 2 – Makes a colored layer which can be seen without special light. LPS-3 (V66724) is a common example.

D. BMS 3-26 Corrosion Inhibiting Compound

(1) This is an organic compound of non-volatile base materials in solvents to make a fluid. It does not contain silicones. This compound can be dipped, brushed or sprayed. After it dries, it makes a transparent but visible protective layer. Coated surfaces become dry to the touch after 24 hours. The layer is not easily rubbed or worn off, but must be applied again if the surface is washed frequently.

(2) Types of BMS 3-26

(a) Type 1 – Makes a continuous layer of medium thickness with a drop melting point of 140°F minimum.

(b) Type 2 – Makes a continuous thick layer with a drop melting point of 200°F minimum.

E. BMS 3-29 Corrosion Inhibiting Compound

(1) This is an organic compound of non-volatile base materials in solvents to make a fluid. It does not contain silicones. This compound can be dipped, brushed or sprayed. After it dries, it makes a transparent but visible layer. Coated surfaces become dry to the touch after 24 hours. The layer is not easily rubbed or worn off, but must be applied again if the surface is washed frequently.

(2) BMS 3-29 compound can replace the two-layer system of BMS 3-26 compound over BMS 3-23 compound.

F. BMS 3-35 Corrosion Inhibiting Compound

(1) This is an organic compound of non-volatile base materials in solvents to make a fluid. It does not contain silicones. This compound can be dipped, brushed or sprayed. After it dries, it makes a transparent but visible protective layer. Coated surfaces becomes dry to the touch after 24 hours. The layer is not easily rubbed or worn off, but must be applied again if the surface is washed frequently.

G. MIL-C-16173 Corrosion Preventive Compound

(1) This compound contains non-volatile base materials in solvents to make a fluid. It can be sprayed or brushed. After it dries, it makes a thin layer that can be removed easily with a solvent. This compound gives a more resistant surface protection than the BMS 3-23 and 3-26 compounds. The Grade 1 compound gives a hard film, but does not have the penetrating or water displacing qualities of the BMS 3-23 or equivalent corrosion inhibiting compounds.

(2) Types of MIL-C-16173

(a) Grade 1 compounds make a hard layer like a hard grease. This layer is sufficiently dry to be touched in 4 hours. But it will not go into crevices or push out water.

(b) Grade 2 compounds make a film layer which stays soft after it dries. This compound does not push out water.

(c) Grade 3 compounds make a layer which stays soft after it dries. This compound will push out water.

(d) Grade 4 compounds make a transparent layer. This layer is sufficiently dry to be touched in 4 hours, and is not tacky after 24 hours.

(e) Grade 5 compounds make a layer which stays soft after it dries. The layer can be removed with low-pressure steam. This compound will push out water.

3. PRECAUTIONS

A. Do not apply or let corrosion inhibiting compounds get on insulation blankets. These compounds decrease the water-repellent quality and increase flammable quality of the blankets. If corrosion inhibiting compounds get on blankets, refer to Paragraph 6. for instructions.

WARNING: WHEN MIXED, THE COMPOUND AND OXYGEN CAN BE EXPLOSIVE. KEEP THE COMPOUND AWAY FROM OXYGEN SYSTEM COMPONENTS.

B. Because these compounds are hydrocarbons, they can be dangerous when mixed with oxygen. Give all oxygen system components protection from all direct or indirect contamination from these compounds.

C. Do not apply corrosion inhibiting compounds on interior materials such as cargo liners. The compounds change the flammable quality of these materials.

WARNING: AS A FIRE SAFETY PRECAUTION, DO NOT APPLY COMPOUND TO ANY SURFACE THAT WILL GET HOTTER THAN 300°F (149°C) IN SERVICE. THE DRY FILM FLASH POINT IS 500°F (260°C)

D. Give protection to all surfaces that will get hotter than 300°F in service to keep the compound off these surfaces. Do not apply corrosion inhibiting compounds near engines, cowling, or other areas of high temperature, or where firewall sealant is used. The high temperatures can cause deterioration of the compounds. Corrosion inhibiting compounds can cause damage to the sealant. Corrosion inhibiting compounds can be used on fiberglass fairings and ducts if the temperature of the duct will not be hotter than 220°F.

WARNING: CORROSION INHIBITING COMPOUNDS CONTAIN FLAMMABLE COMPONENTS. DO NOT PUT OR USE THESE MATERIALS NEAR OPEN FLAMES, ACTIVE CIRCUITS, OR OTHER COMPONENTS WHERE THERE IS A RISK OF FIRE. THE VOLATILE CARRIER IS ALSO FLAMMABLE. OBEY SAFETY PRECAUTIONS UNTIL THE CARRIER IS FULLY EVAPORATED.

E. Mask electrical connectors where contamination of electrical contacts could occur.

CAUTION: THE CARRIERS USED IN THE COMPOUND ARE VOLATILE HYDROCARBONS WHICH WILL WASH OUT LUBRICANTS FROM COMPONENTS.

F. Give protection to pulleys, control cables, bearings, pivot pins, and other lubricated surfaces, from direction application of compound. Do not apply corrosion inhibiting compounds on grease joints or sealed bearings. These compounds dissolve greases and other lubricants. They are penetrating compounds and get around the seals and into the bearings.

CAUTION: REMOVE UNWANTED CORROSION INHIBITING COMPOUNDS FROM MECHANISMS AND MOVING PARTS WITH A CLEAN, DRY WIPER. THE REMAINING THIN LAYER IS SUFFICIENT FOR CORROSION PROTECTION. TOO MUCH OF A LAYER BUILDUP COULD BECOME HARD IN COLD TEMPERATURES AND CAUSE OPERATING DIFFICULTIES.

G. Corrosion inhibiting compounds on control cables are not a good substitute for the cleaning and corrosion protection procedures in the maintenance and overhaul instructions. Laboratory tests show that the service life of carbon steel cable is decreased by the direct application of these compounds. But overspray on the cables as you apply these compounds to adjacent structure is not an important problem for cable life.

CAUTION: CORROSION INHIBITING COMPOUNDS CAN CAUSE SILICONE RUBBER AND BMS 3-11 RESISTANT SEALS TO BECOME LARGER.

H. Be careful when you apply corrosion-inhibiting compound near door or emergency hatch seals, grease seals in bearing assemblies or rubber-lined clamps for tubing or wiring. Do not apply these compounds on actuator rods, because the compound will get on the hydraulic seals.

I. Corrosion inhibiting compounds can be used on bladder fuel tanks and fuel vapor barriers.

J. Do not spray these compounds on surfaces that must move freely against other surfaces, such as in linkages, mechanisms, solenoids or cable feed-throughs. Some compounds dry tack free, but if the surfaces touch, the compound layers could increase friction in the joints, or bond the surfaces together.

4. SURFACE PREPARATION

A. A fully clean surface is not necessary before you apply these compounds. But the compounds will more easily soak into joints if the area is cleaned before application. The recommended cleaning procedure is:

(1) Remove all moisture and loose unwanted material with vacuum cleaner, brush, or clean cloth.

(2) If the surface is very dirty or greasy, clean per BAC 5744 or BAC 5750 (Ref SOPM 20-30-03). Water-break-free surfaces are not necessary.

5. APPLICATION OF COMPOUND

WARNING: CORROSION INHIBITING COMPOUNDS ARE APPROXIMATELY AS POISONOUS AS KEROSENE OR ALIPHATIC NAPHTHA. FOR SKIN PROTECTION, USE THE SAME PRECAUTIONS AS FOR KEROSENE. WHEN YOU SPRAY THESE COMPOUNDS IN AN ENCLOSED AREA, A VAPOR CONCENTRATION OF 500 PARTS PER MILLION IS THE MAXIMUM COMFORTABLE WORKING LIMIT. AT THIS CONCENTRATION A PERSON CAN WORK AN 8-HOUR SHIFT. VAPOR LEVELS HIGHER THAN 500 PPM ARE NOT DIRECTLY TOXIC, BUT FORCED VENTILATION COULD BE NECESSARY TO KEEP A COMFORTABLE LEVEL. PERCHLOROETHYLENE IS A PREFERRED SOLVENT BECAUSE IT IS NONFLAMMABLE, BUT PERCHLOROETHYLENE IS POISONOUS. IF USED IN CONFINED AREAS, MECHANICAL VENTILATION IS MANDATORY. RESPIRATORY AND SKIN PROTECTION COULD BE NECESSARY.

A. General

(1) Compatibility: Because these materials are usually hydrocarbons, new layers of a different compound can be applied over old layers of corrosion inhibitors without problems.

(2) Before you apply the compound, let BMS 10-11 primers and enamels, and BMS 10-103 primers, cure for a minimum of 1 hour, and let all primers and enamels cure for a minimum of 8 hours.

(3) Apply a continuous wet layer of compound by spray, brush, or swab to get the dry thickness per Table 1. Make sure that the layer is continuous on all crevices, joints, and laps to let the compound soak in by capillary action. Equipment that applies the compound under pressure directly to a joint or lap will help it to soak in.

(4) The minimum layer thickness limits are to make sure the surfaces have corrosion protection. The maximum layer thickness limits are to make sure the compound does not add too much weight to the airplane.

Table 1: Compound Thickness Ranges

Corrosion Inhibiting Compound	Dry Layer Thickness, inch *[1]
BMS 3-23	*[2]*[4]
BMS 3-26, Type I	0.001-0.003
BMS 3-26, Type II	0.004-0.006
BMS 3-29	0.003-0.005 *[3]*[4]*[5]
BMS 3-35	*[2]
MIL-C-16173, Grade 1	0.002

*[1] The layer can be thicker than the maximum values shown, but cross drains and drain holes must not be blocked.

*[2] This compound has no minimum coating thickness, because a sufficiently large quantity is necessary to make sure the compound goes into crevices, joints and laps.

*[3] If the BMS 3-29 compound is specified as optional to BMS 3-23 compound, apply the BMS 3-29 compound to the thickness specified for BMS 3-23 compound.

*[4] The layer can be thinner where the compound soaked into mating surfaces.

*[5] If the surface is more than 45 degrees from horizontal, apply the BMS 3-29 compound to make a continuous layer.

(5) For BMS 3-23 compounds, let the compound stay on the surface a minimum of 60 minutes. Then wipe away puddles with clean gauze or cloth. For BMS 3-26, BMS 3-29, BMS 3-35, and MIL-C-16173 compounds, do not wipe the coating. Let the compound dry tack-free if the coated surface will touch another surface, such as insulation blankets. (Do not apply corrosion inhibiting compounds on insulation blankets. The compounds reduce the water-repellent quality and increase flammable quality of the blankets. If corrosion inhibiting compounds get on blankets, refer to Paragraph 6. for instructions.)

(6) Give the area a good flow of air until the solvents are completely evaporated.

(7) Remove the masks or shields.

B. Spray Application

(1) For BMS 3-23 compound, this procedure will make a layer of 0.0003 inch thick.

(a) Adjust the application rate to one gallon per hour.

(b) Hold the nozzle 12 inches maximum from the surface.

(c) Apply compound at a coverage rate of 15-20 square feet per minute.

(2) You can use aerosol cans and plastic nozzle extensions. But we cannot recommend these because of their cost and amount of overspray they cause.

(3) The preferred application method uses standard pressure pot equipment with an airless spray gun operated at low pressure (45 psi). You can get such spray equipment from the following suppliers:

(a) Nordson Corporation (V07036 or V2R369)

(b) The DeVilbiss Company (V17431)

(c) Binks Manufacturing Company (V07334)

(d) Graco Incorporated (V25980)

(4) You will find access easier if you use accessories such as spray gun extension kits and swivel adapters for the nozzle.

(5) You can use standard air atomizing equipment (siphon or pressure pot) when access is sufficient to let you apply a wet coat. When you spray with a pressure pot, you can make a suitable extension as follows:

(a) Remove and keep the air cap.

(b) Remove the fluid tip. Solder or braze 1/8-inch annealed copper tubing of a necessary length on the end of the tip.

(c) To make a nozzle at the end of the tubing, clamp the tube end around a 0.010-inch diameter wire.

(d) Do not connect air hose to spray gun.

(e) Spray with a pot pressure of 20-30 psi.

C. Brush Application

(1) Use an ordinary paint brush or a clean cloth. This method is best for local areas or where you must be careful to keep the corrosion-inhibiting compound away from adjacent equipment.

(2) For large areas or where confinement is not a problem, spray application is the best method to use.

D. The fill and drain procedure can be used to apply corrosion inhibiting compounds to surfaces such as interiors where a brush or sprayer cannot be used.

6. REMOVAL OF COMPOUND

A. You must remove all of the corrosion-inhibiting compounds before you paint the surface. You must also clean with a solvent before penetrant inspection.

B. These solvents (Ref SOPM 20-60-01) can remove BMS 3-23, BMS 3-26, and BMS 3-29, and BMS 3-35 compounds:

NOTE: Acetone is not recommended.

(1) Perchloroethylene

(2) Trichloroethylene

(3) Trichloroethane

(4) Aliphatic Naphtha, TT-N-95

(5) Magnaflux Corp. solvent

(6) Dry cleaning solvent, P-D-680

(7) Biogenic SE377C cleaner (V13091) (preferred for removal of BMS 3-23 compound from areas with faying surfaces).

(8) Citra Safe

(9) Methyl propyl ketone (MPK)

(10) Methyl ethyl ketone (MEK)

C. These solvents (Ref SOPM 20-60-01) can be used to remove BMS 3-29 and BMS 3-35 compounds, and also BMS 3-26 compounds of the type indicated:

(1) Type 1 removal

(a) Varsol No. 1

(b) Shell-Sol 345

(c) Skellysolve S

(d) Chevron 325

(e) Union No. 5 Thinner

(f) S-76 Cleaning Solvent

(g) Klenzine

(h) Sikkens 96.126

(2) Type 2 removal

(a) Skellysolve V

(b) Standard 245 Thinner

(c) Sikkens 96.131

D. To remove MIL-C-16173 compounds, use dry cleaning solvent P-D-680. Do not use methyl ethyl ketone (MEK) or acetone.

E. When you use solvents to remove the corrosion inhibiting compounds, give the area a good flow of air until the solvents evaporate.

F. Contamination of insulation blankets by corrosion inhibiting compounds is not recommended. Contamination is permitted if it is on not more than 12 percent of the total surface area of the blanket. This includes spot contamination and large areas of contamination. A large continuous area of contamination must be no more than 4 square inches, and must be a minimum of 6 inches from adjacent areas of contamination in any direction. Corrosion inhibiting compounds can be removed from the blanket with Biogenic SE377C, aliphatic naphtha, Citra Safe, BMS 11-9 or BMS 11-7 solvent, or methyl ethyl ketone.