

Scandinavian Airlines System

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STRUCTURES - DESCRIPTION AND OPERATION

1. Structures - General

A. Airplane structure is designed to provide maximum strength and safety with minimum weight. Fail safe load paths have been designed into the structure so that failure of one segment cannot endanger the airplane. Materials most commonly used throughout the structure are high strength aluminum, steel, and titanium alloys.

2. General Description

CAUTION: FASTENERS IN GRAPHITE COMPOSITE STRUCTURE MUST BE TITANIUM OR CRES (CORROSION RESISTANT STEEL). FASTENERS CAN BE BARE, OR ALUMINUM-COATED. CRES FASTENERS CAN BE CADMIUM PLATED. ALUMINUM OR ALLOY STEEL FASTENERS WILL CAUSE GALVANIC CORROSION OF GRAPHITE COMPOSITE PANELS.

ALUMINUM FITTINGS INSTALLED ON GRAPHITE COMPOSITE STRUCTURE MUST HAVE A CORROSION PREVENTIVE FAYING SURFACE SEAL.

- A. Composite materials are used extensively on secondary structure and flight control surfaces, where high strength and stiffness and low density requirements permit. Three types of composite materials are used: Graphite/Epoxy for good strength-to-weight for flight control surfaces; Kevlar for good strength characteristics; and Kevlar/Graphite for fracture toughness for areas subject to foreign object damage. For locations of principal composite components, see the SRM 51-70-02.
- B. Pressure relief blowout panels and doors located in various areas of the airplane prevent buildup of excessive pressure which may cause structural damage.

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CORROSION PREVENTION – INTRODUCTION

1. General

- A. The purpose of this document is to provide information for implementing Corrosion Prevention and Control Programs for operators' fleets.
- B. It has been shown that effective Corrosion Prevention and Control Programs have significantly reduced the amount and severity of corrosion maintenance problems.
- C. Operators are urged to share any new corrosion problems/conditions by forwarding all information through their local BOEING CUSTOMER SUPPORT representative, or by contacting BOEING directly at:

Manager  
Maintenance and Maintenance Engineering Technical Services  
Boeing Customer Support  
P. O. Box 3707  
Seattle, WA 98124-2207

- D. The information contained in this and the following documents is of an advisory nature. It is recommended for use in developing a Corrosion Prevention and Control Program that meets the specific needs of the individual operator. Where "allowable damage data" is required in the section concerned with corrosion control, references will normally be made to other documents which have been formally approved, i.e., the applicable Structural Repair Manual.

2. How to Use the Data

- A. The method of using the data is dependent upon the type of information that is needed. If the need is in the planning or the establishing of a corrosion prevention program, the place to start would be in the following Aircraft Maintenance Manual (AMM) sections.
- B. The beginning of each ATA Chapter will show the anticipated problem areas along with the specifically recommended corrosion prevention procedures contained within the specific area AMM sections, and the indicated corrective action information required.
- C. AMM 51-00-50/201 thru AMM 51-00-62/201, contain general information on corrosion and how to deal with it. Familiarity with these sections will help maintenance personnel to understand what initiates corrosion, and what to do to prevent it.
- D. Any inspection intervals given in the AMM Corrosion Prevention section should be the same as the intervals specified in the Maintenance Planning Document (MPD). If any differences are found, use the intervals given in the MPD.

3. Vendors

- A. In the text, vendors are referred to by name and, if available, the Commercial and Government Entity (CAGE) code number. (The CAGE codes are listed in the Federal Cataloging Handbook H4/H8.) In the following lists, the vendors names, codes and addresses are given.

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B. Vendors with no codes:

INTERNATIONAL RESEARCH AND DEVELOPMENT CO.  
FOSSWAY  
NEWCASTLE-UPON-TYNE NE6 2YD  
ENGLAND

C. Vendors with Commerical and Government Entity (CAGE) codes.  
(Refer to the latest issue of the Federal Cataloging Handbook H4/H8 for  
all up-to-date information.)

VH0951 SIKKENS LAKFABRIEKEN BV  
RIJKSSTRAATWEG 31  
P.O. BOX 3  
2170 AJ SASSENHEIM  
THE NETHERLANDS

VS4259 ORION DIAGNOSTICA  
P.O. BOX 83  
02101 ESPOO. FINLAND  
TELEPHONE 358-9-429 2888

VZ0033 GIBSON CHEMICALS, LTD  
350 RESERVE ROAD  
CHELTENHAM, VICTORIA  
AUSTRALIA 3192

VOC DK6 INTERNATIONAL RESEARCH AND DEVELOPMENT, INC.  
110 MARTER AVE.  
SUITE 303  
MOORESTOWN, NJ 08057

VOK209 INLAND TECHNOLOGY, INC.  
2612 PACIFIC HIGHWAY EAST  
NORTH C  
TACOMA, WA 98424

VOLO40 DINOL INTERNATIONAL  
20600 EUREKE ROAD  
SUITE 414  
TAYLOR, MI 48180-5306

VO1139 GENERAL ELECTRIC CO.  
SILICONE PRODUCTS BUSINESS DEPT.  
HUDSON RIVER ROAD  
WATERFORD, NY 12188

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V06030 SUNSHINE SCIENTIFIC INSTRUMENTS, INC.  
1810 GRANT AVE.  
PHILADELPHIA, PA 19115

V07036 NORDSON CORP.  
JACKSON STREET  
AMHERST, OH 44001-2408

V07334 BINKS MANUFACTURING CO.  
9201 W. BELMONT AVE.  
FRANKLIN PARK, IL 60131-2807

V1E874 ATLANTIC RICHFIELD CO.  
WATSON REFINERY  
1801 E. SEPULVEDA BLVD.  
CARSON, CA 90745-6121

V1L860 MENASHA CORP.  
CONTAINER DIVISION  
HIGHWAY 41, P.O. BOX 367  
NEENAH, WI 54956

V13091 ROCHESTER MIDLAND CORP.  
P.O. BOX 1515  
ROCHESTER, NY 14603-1515

V17431 THE DEVILBISS CO.  
DIVISION OF CHAMPION SPARK PLUG CO.  
300 PHILLIPS AVE., P.O. BOX 913  
TOLEDO, OH 43692-0913

V2R369 NORDSON CORP.  
JACKSON STREET  
AMHERST, OH 44001-2408

V23373 ARDROX INC.  
16961 KNOTT AVE.  
LA MIRADA, CA 90638-6015

V25980 GRACO INC.  
60 ELEVENTH AVE. NE  
MINNEAPOLIS, MN 55440

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- V29700 EXXON CO., U.S.A.  
COMMERCIAL SALES  
800 BELL ST., P.O. BOX 2180  
HOUSTON, TX 77252-2180
- V37636 MAGNAFLUX CORP.  
7300 WEST LAWRENCE AVE.  
CHICAGO, IL 60656-1314
- V4H372 CHEVRON USA, INC.  
1301 FIFTH AVE.  
ROOM 2900, P.O. BOX 220  
SEATTLE, WA 98111
- V40161 FUEL QUALITY SERVICE, INC.  
P.O. BOX 1380  
FLOWERY BRANCH, GA 30542
- V45738 OXY METAL INDUSTRIES CORP.  
PARKER COMPANY  
32100 STEPHENSON HIGHWAY  
MADISON HEIGHTS, MI 48071-1003
- V47186 HAMMONDS TECHNICAL SERVICES, INC.  
1151 KITTYCREST LANE  
P.O. BOX 38114-373  
HOUSTON, TX 77238-8114
- VZ0033 GIBSON CHEMICALS, LTD  
350 RESERVE ROAD  
CHELTENHAM, VICTORIA  
AUSTRALIA 3192
- V5X376 TRAYCO, INC.  
1307 NATIONAL CEMETARY ROAD  
P.O. BOX 950  
FLORENCE, SC 48446

OR

TRAYCO, INC.  
693 SOUTH COURT STREET  
LAPEER, MI 48446

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V57573 NILFISK OF AMERICA  
300 TECHNOLOGY DRIVE  
MALVERN, PA 19355-1311

V66724 HOLT LLOYD CORP.  
4647 HUGH HOWELL ROAD  
TUCKER, GA 30084-5004

V70829 J. T. BAKER CHEMICAL CO.  
222 RED SCHOOL LANE  
PHILLIPSBURG, NJ 08865-2219

V72527 VALVOLINE OIL CO.  
200 EAST MAIN STREET  
P.O. BOX 1400  
LEXINGTON, KY 40512

V73138 BECKMAN INDUSTRIAL CORP.  
BECKMAN INDUSTRIAL TECHNOLOGIES  
SUBSIDIARY OF EMERSON ELECTRICAL CO.  
4141 PALM STREET  
FULLERTON, CA 92635

V73277 E. F. HOUGHTON AND CO.  
MADISON AND VAN BUREN AVE.  
VALLEY FORGE. PA 19482

V79003 UNION OIL COMPANY OF CALIFORNIA  
76 DIVISION, WESTERN REGION  
461 SOUTH BOYLSTON STREET  
P. O. BOX 7600  
LOS ANGELES, CA 90017-1443

V8E913 ZIP-CHEM PRODUCTS  
400 JARVIS DRIVE  
MORGAN HILL, CA 95037

V8F610 UNION OIL COMPANY OF CALIFORNIA  
2901 WESTERN AVE.  
SEATTLE, WA 98111

V8H761 GETTY OIL COMPANY  
200 EAST CENTRAL  
EL DORADO, KS 67042-2130

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V8P482 AIR BP  
PRIMARY ROAD  
HOPKINS INTERNATIONAL AIRPORT  
CLEVELAND, OH 44135-3194

V86192 CLEMCO INDUSTRIES  
P. O. BOX 7680  
SAN FRANCISCO, CA 94120

V86961 SHELL CHEMICAL CO.  
DIVISION OF SHELL OIL CO.  
ONE SHELL PLAZA  
P. O. BOX 2463  
HOUSTON, TX 77001

V9V291 ASHLAND PETROLEUM CO.  
DIVISION OF ASHLAND OIL, INC.  
1409 WINCHESTER AVE.  
P. O. BOX 391  
ASHLAND, KY 41114

V98308 CASTROL, INC.  
1925 N. MARIANNA AVE.  
LOS ANGELES, CA 90032-4007

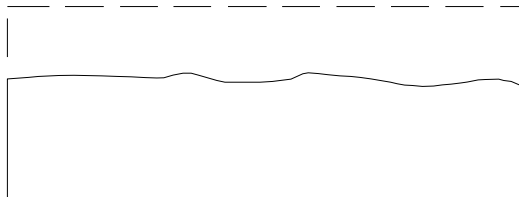
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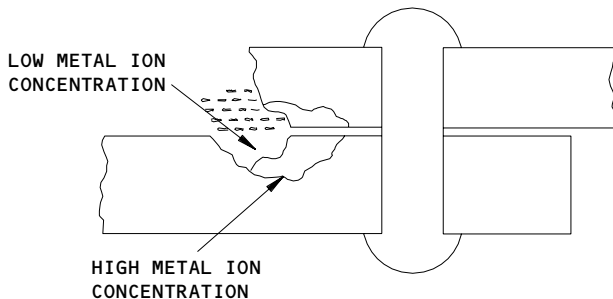
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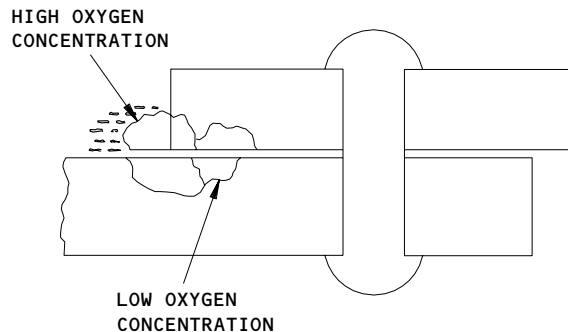
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UNIFORM SURFACE CORROSION



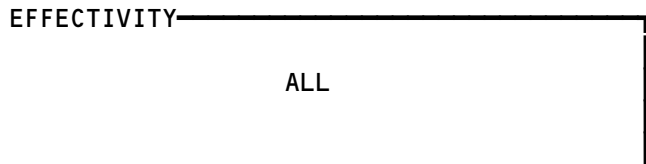
METAL ION CONCENTRATION CELL  
RIVETED LAP JOINT



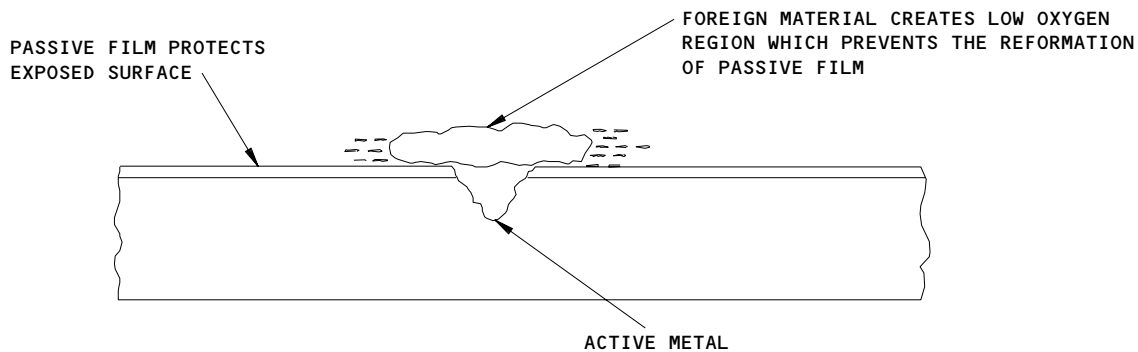
OXYGEN CONCENTRATION CELL

GALVANIC CORROSION CONCENTRATION CELLS

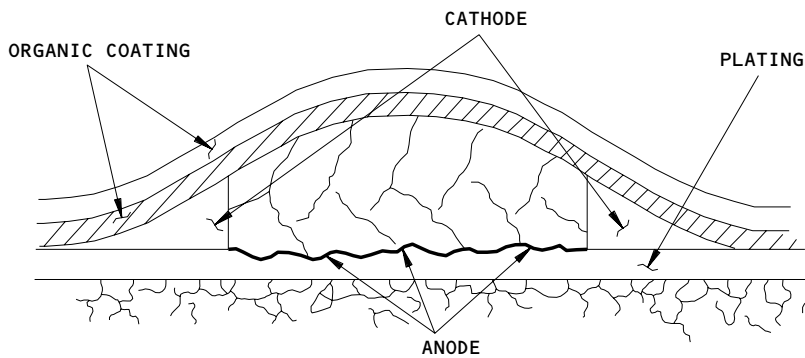
Example Of Fretting Corrosion  
Figure 201 (Sheet 1)



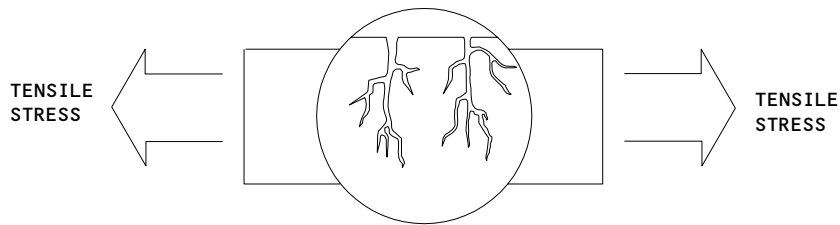
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**PITTING**

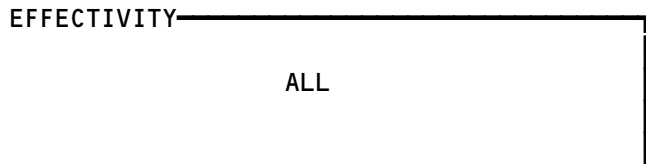


**FILIFORM CORROSION**



**STRESS CORROSION**

Example Of Fretting Corrosion  
Figure 201 (Sheet 2)



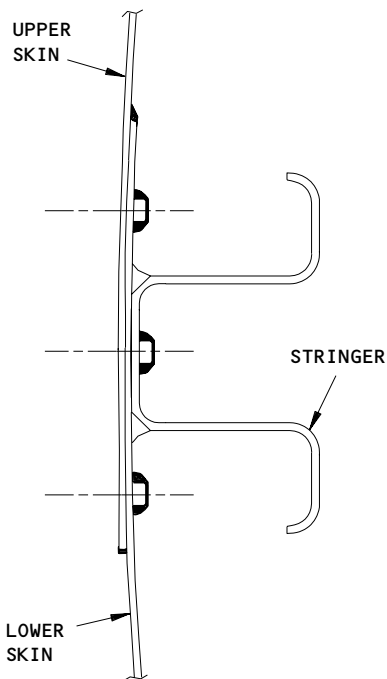
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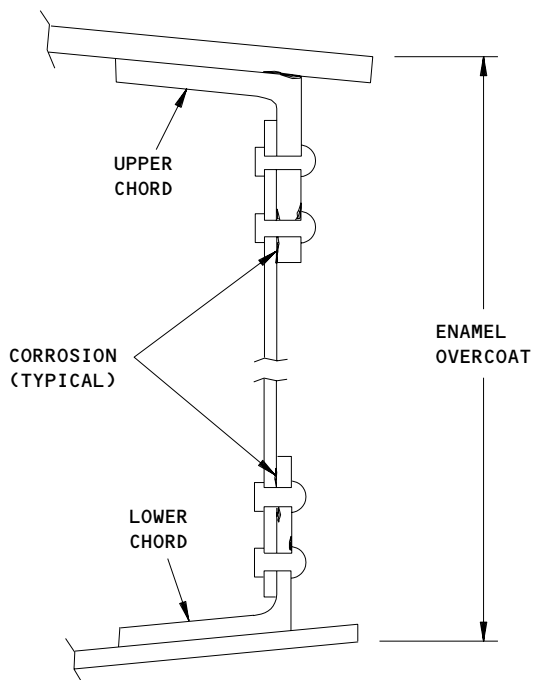
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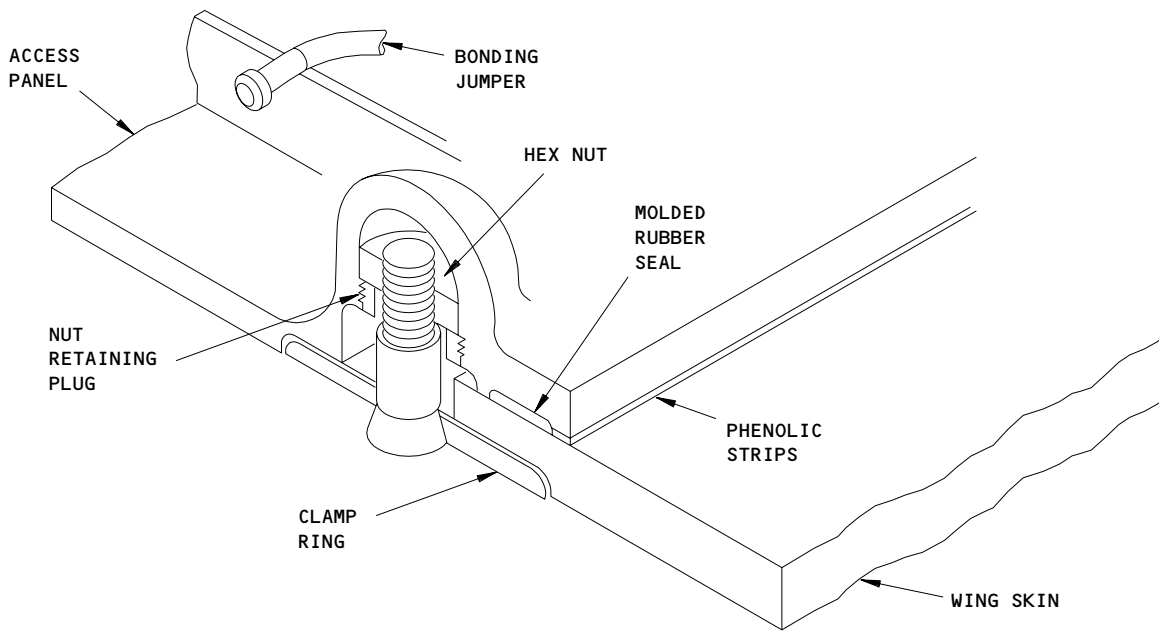




MOVEMENT DUE TO  
FUSELAGE PRESSURIZING



FRETTING DUE TO WING FLEX



WING FUEL TANK ACCESS PANELS  
FRETTING WITH WING MOVEMENT

Example Of Fretting Corrosion  
Figure 201 (Sheet 3)

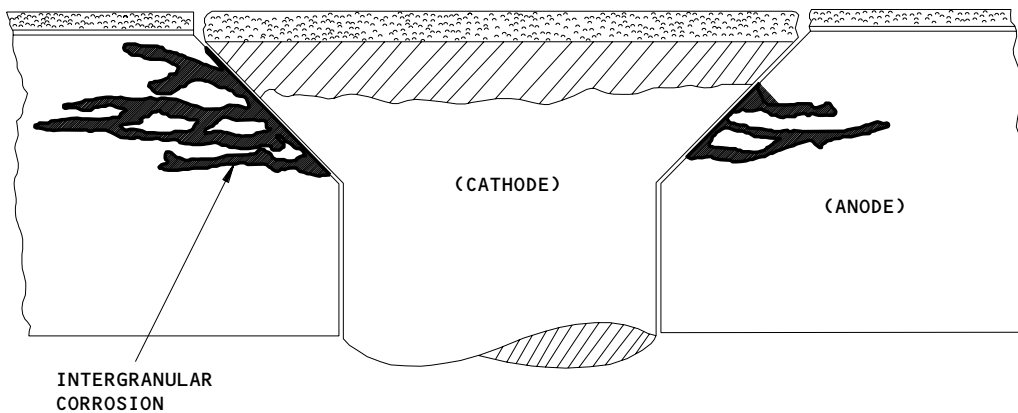
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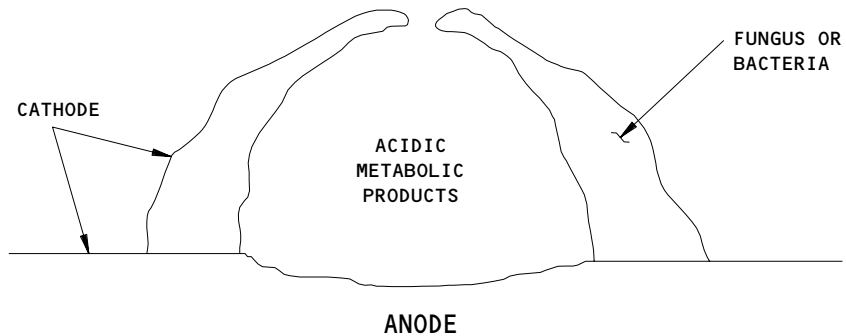
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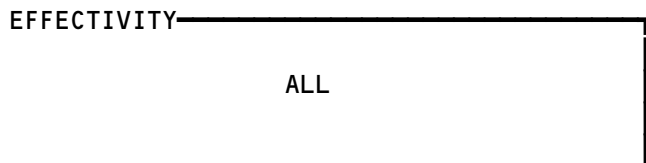


INTERGRANULAR CORROSION



MICROBIOLOGICAL CORROSION

Example Of Fretting Corrosion  
Figure 201 (Sheet 4)



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CORROSION PREVENTION, IDENTIFICATION OF TYPES AND CAUSES - MAINTENANCE PRACTICES

1. General

- A. The ability to recognize corrosion in its early stages is important, and required, in order for corrective action to be taken, and before costly repairs or replacements become necessary.
- B. Corrosion results when, in the presence of a conducting solution (normally water), electron flow occurs between different (dissimilar) metals, or between different points or areas on a metal surface exhibiting different electrical potential.
- C. Identification of Corrosion
  - (1) ALUMINUM ALLOYS - Corrosion of aluminum surfaces is usually indicated by a whitish-powdery deposit, with dulling of the surface on unpainted parts. The white-powdery deposits also form at discontinuities in protective coatings and may spread under painted areas, causing blistering and/or flaking of the paint. As the corrosion spreads, the surface will appear mottled, or etched with pitting.  
  
Swelling or bulging of skin material, pulled or popped rivets are often visual indications of corrosion.
  - (2) ALLOY and CARBON STEELS - Corrosion is indicated by red dust deposits, and pitting of the effected surfaces.
  - (3) CORROSION RESISTANT STEELS - Corrosion is indicated by black pits, or a uniform reddish-brown surface.
- D. Types of Corrosion
  - (1) The terminology used in describing corrosion is based on either the appearance of the corrosion attack, or the mechanism associated with its formation. Frequently, several types of corrosion will occur simultaneously and it becomes difficult to determine the specific cause.
  - (2) The following types of corrosion are those most commonly encountered on airplanes.
    - (a) SURFACE CORROSION - Visible as uniform etching (pitting) of the metal surface, and results from direct chemical attack.
    - (b) GALVANIC - This type of corrosion is usually visible as pitting, and is often referred to as dissimilar metal corrosion. However, it is not limited to just dissimilar metal couplings. Various types of concentration cells (where electron flow occurs between areas at points of different electrical potential) are also examples of GALVANIC corrosion.
    - (c) PITTING - Detected as a series of small (minute) holes on a metal surface, usually in a small, well-defined, local area.

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- (d) **FILIFORM** – This corrosion is a thread-like type of corrosion characterized by a unpredictable directional growth, which develops under protective coatings on certain metals. Usually, but not always, found adjacent to fastener heads and skin edges.
- (e) **STRESS** – This type of corrosion usually manifests itself as very small (fine) cracks. It can occur in alloys that are susceptible to cracking when exposed to a corrosive environment while under a tensile stress.
- (f) **FRETTING** – This type of corrosion damage can occur between close fitting components which rub together. The wear, or chafing, breaks down the protective surface on either or both parts.
- (g) **INTERGRANULAR** – This type of corrosion is detected by a characteristic bulging or blistering of the metal surface. This is the result of the force being created by expanding corrosion products at the metal's grain boundaries.
- (h) **MICROBIOLOGICAL** – This type of corrosion can occur in integral fuel tanks and fuel systems. It is caused by the presence of bacteria and fungi in jet fuel. The fungus grows at the fuel/water interface and the metabolic products formed corrode the metallic structure.

GROUP I	Magnesium and its alloys. Aluminum Alloys 1100, 5052, 5056, 5356, 6061, 6063
GROUP II	Cadmium, Zinc, Aluminum and their alloys (including Group I Aluminum Alloys)
GROUP III	Iron, Lead, Tin, and their alloys (except corrosion resistant steel)
GROUP IV	Chromium, Nickel, Titanium, Copper and their alloys, Corrosion Resistant Steel, Silver, Graphite, Tungsten [1]

NOTE: Members of any one group are similar.  
Members of different groups are dissimilar.

[1] CORROSION RESISTANT STEELS CONTAIN 14 PERCENT OR MORE OF CHROMIUM

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CORROSION PREVENTION – INSPECTION AND DETECTION  
MAINTENANCE PRACTICES

1. General

- A. The operator's regular maintenance program should include inspections for corrosion, followed by corrective treatment of all affected areas. The areas should be inspected for not only actual corrosion damage, but also for any conditions that could cause corrosion (such as damaged finishes or blockage of drain holes).
- B. Because corrosion is a problem that will not go away, frequent inspections of problem areas is recommended. Unusual environmental conditions in some geographical locations could make changes necessary in the frequency of the inspections. Refer to AMM 51-00-52/201 for more details.
- C. Where to look? Because all the components of the airplane can get corrosion, each of the areas on the airplane must be examined regularly. Refer to Section II for details of possible areas of corrosion on particular airplanes, and recommended frequency of inspections and treatment.
- D. Inspection for Corrosion
  - (1) The following are some examples of areas to be inspected for corrosion:
    - (a) INTERIOR SURFACES – Be sure to include areas where drain holes could become clogged. Fittings, braces, component parts inside of the airplane and structural shapes such as gussets, stiffener webs and material hog-outs, can catch unwanted material. This unwanted material can trap moisture that can cause corrosion.
    - (b) EXTERIOR SKIN AREAS – Carefully examine skin areas, painted or not, on the fuselage, wings and tail. Be sure to include all fastener locations and panel edges. If corrosion is found around fastener locations, be sure to remove the fasteners and look for corrosion under the heads and in the holes. Corrosion removal around fasteners without removing the fasteners will NOT stop the corrosion under the fasteners.
    - (c) EXPOSED FITTINGS – Fittings and brackets that are open to wear or damage to surface finishes can get corrosion. These parts are in areas such as:
      - 1) Horizontal stabilizer and vertical fin fittings.
      - 2) Power Plant fittings.
      - 3) Hydraulic and electrical brackets in the wheel well areas.
      - 4) Hydraulic and electrical brackets in the open areas of the front and rear spars of the wing.

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- (d) FLOOR BEAMS - Traces of spillage under flooring should be investigated to determine if any corrosion has occurred on the floor beams or the pressure webs. Areas around the galleys, entry doors, lavatories and battery compartments will require special attention.
- (e) FAIRINGS - Whenever fairings are removed for routine maintenance, the structure under the fairings should be examined for indications of corrosion. The fairings, especially those made of fiberglass, should be examined for coating damage. Fiberglass panels are either aluminum flame sprayed or conductive coated for static bleed off, and should be inspected for damaged coatings.
- (f) SEAT TRACKS - The slots in the seat tracks collect dirt and moisture and, as a result of this, are particularly susceptible to corrosion.
- (g) BILGE AREAS - The stringers and frames under the cargo floor should be inspected for corrosion which can result from the accumulation of dirt, moisture and spillage from cargo.
- (h) PLUMBING HARDWARE - Exposed tubing B-nuts and hydraulic components, tubing identification tapes and braided hoses are to be carefully inspected for any signs of corrosion. Interior surfaces of ram-air ducts, especially where one wall of the duct is a structural member, should be carefully examined for corrosion damage.
- (i) MOISTURE ABSORBING MATERIALS - In areas where there is little air circulation, moisture absorbing materials such as leather, paper, foam rubber, soundproofing and insulation that is attached to or contacting any metal structure can present troublesome corrosion suspect areas. These items should be removed for satisfactory inspection.
- (j) HINGES (Piano and other types) - Hinges should be inspected for ease of operation and evidence of corrosion at the hinge mating surfaces, bearings, inserts and fasteners. Piano hinge failure generally occurs when the joint corrodes and a lug breaks when the joint is actuated.
- (k) INTEGRAL FUEL TANKS - Periodic inspections for corrosion, pitting and blistering of the coating on the interior surfaces of the integral fuel tanks should be made. The interior walls should also be inspected for corrosion. Black areas should be checked for surface corrosion.
- (l) CONTROL CABLES - Examine all control cables at each scheduled inspection. Cable corrosion can start when the grease used as a corrosion preventive coating is gone.

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- (2) SPECIAL INSPECTIONS - In some instances where the loading of nonstandard cargo (i.e., livestock) or cargo spillage of harmful products (i.e., mercury) occur, special inspection requirements are initiated.
  - (a) MERCURY - After a reported mercury spill in the cargo hold area, maintenance personnel are to be instructed to remove the spillage as rapidly as possible due to the damaging effect mercury has on aluminum structures. Visual inspections of mercury penetration into aluminum metals should be noted and reported. Detailed procedures for mercury spillage are given in AMM 51-00-54/201.
  - (b) LIVESTOCK CARGO - Subsequent to livestock hauling on an airplane, specific areas should be inspected for signs of contaminants that cause corrosion. Detailed procedures are given in AMM 51-00-60/201.
- (3) METHODS OF INSPECTION - Visual or non-destructive inspection (NDI) procedures are used for identifying the existence of corrosion. For general inspections, the visual means aided by magnifying glasses, borescopes, etc. are used extensively. The NDI techniques have limited capabilities to locate or detect corrosion because of the complexity of the instrumentation, complexity of the areas being inspected and the time needed to make the inspection. In specific localized areas where an inspection by visual means is impossible, or where the extent of the corrosion has to be determined after a visual inspection, the NDI techniques may be used.
- (4) The following NDI techniques are used to inspect the localized areas:

NOTE: The method employed should be at the judgement of the NDI technician.

- (a) EDDY CURRENT - Eddy current can be used to locate corrosion in airplane skin, doublers and spar areas. The method is also used to determine if corrosion visible by corrosion products, such as skin bulging or joint dislocation, has generated microcracks.
- (b) ULTRASONIC - Ultrasonic inspection techniques are used for flaw detection in honeycomb sandwich constructions or bonded panels. Corrosion can be detected by the measurement of the panel thickness by ultrasonic means.

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- (c) **RADIOGRAPHIC** - Radiography (X-ray) is used for flaw detection in areas that are not accessible for visual inspection without major disassembly. This method is also used as a backup method for other NDI techniques (i.e., detect core corrosion in sandwich panels located by the ultrasonic method). Severe corrosion can be detected by radiographic means if the depth of the metal loss is 20 percent, or greater, of the panel thickness.
- (d) **PENETRANT** - The penetrant technique can be used on non-magnetic parts such as thick skins, forgings, etc., to determine the presence of cracks, after they are removed and stripped of paint. This technique is also used to detect any surface or inner-granular corrosion.
- (e) **MAGNETIC PARTICLE** - This technique may be used on low alloy steel parts. The presence of microcracks can be detected, after the part is stripped of paint and any corrosion removed.

**E. Corrosion Detection**

- (1) **PROTECTED METALS** - Plated surfaces, aluminum clad surfaces or painted surfaces, will normally not be as susceptible to corrosion as un-painted, un-plated or non-clad surfaces.  
The metals in the corrosion-affected areas are characterized by a scaly or blistered appearance, or at times by a discoloration or blistering of the paint.  
Corrosion on metal surfaces can often be recognized by a dulling or darkening of the surface, pitting of the area and, sometimes, by whitish, whitish-gray or reddish deposits, depending on the metal.
  - (a) Refer to AMM 51-00-50/201 for the identification of corrosion on different metals.
- (2) **NDI PROCEDURES** - Once a visual detection of corrosion has been made, an assessment of the extent of the corrosion damage must be made before any repairs can be started. Where visual means cannot determine the full extent of the damage, the applicable NDI technique can be used for the assessment.

**NOTE:** Microcracks must necessarily be checked by one of the NDI techniques.

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(3) SPECIAL - In some cases, operators may have to transport cargo that will require special detection attention, or techniques due to the nature of the cargo. Two examples of these types of cargos are as follows:

(a) MERCURY - During the transporting of mercury, containers have been known to break, spilling the mercury into the cargo hold areas and finding its way to the airplanes structure between the frames, stringers, skin panels and under repair patches. Mercury is highly corrosive when coming into contact with aluminum and its alloys, and will compromise the structural integrity of those structural members that are affected. The presence of mercury in an area, after a known spill has been reported, can be identified by a white powder on the surface, resulting from the chemical combination of the mercury and aluminum particles.

NOTE: A detailed inspection, detection and treatment of mercury corrosion is explained in AMM 51-00-54/201.

(b) LIVESTOCK - Special provisions are sometimes necessary for the transporting of livestock. There are several factors such as humidity, expulsion of salt from the body, waste spillage, etc., that require special corrosion detection techniques.

NOTE: Detailed inspection, detection and treatment information for the transportation of livestock is given in AMM 51-00-60/201.

(4) MARKING - Any areas requiring cleaning and stripping for inspection, should be clearly marked after corrosion detection. The extent of the corroded area should also be clearly identified and reported for repair or treatment.

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CORROSION PREVENTION – ENVIRONMENTAL EFFECTS  
MAINTENANCE PRACTICES

1. General

- A. The probability of encountering some corrosion damage to an airplane is dependent upon a number of factors. Factors such as the degree of protection afforded during manufacturing of the airplane, the maintenance of the protection during the service life of the airplane, and the environment in which the airplane is operated.
- B. Some environmental factors are within the control of the manufacturer or the operator, such as the location of battery compartments or the prevention of spillage from galleys and/or lavatories. In these instances, recommended inspection frequencies or requirements for preventive maintenance can be established which are not dependent on the operator's route structure.
- C. Other environmental factors are readily uncontrollable by the operator, such as the salt-laden atmosphere in marine locations or the airborne pollutants of industrial areas. In these circumstances, corrosion prevention and inspection frequencies become a variable factor.
- D. Environment
  - (1) Actual assessments of the environmental conditions have to be made locally by the operator. The environment is a combination of many factors, and some of those that should be considered are as follows:
    - (a) MARINE ATMOSPHERE – Areas adjacent to salt water normally result in an atmosphere containing salt particles, or salt saturated moisture. The degree of salinity of a body of water, the temperature and the direction of prevailing winds, all together, will create a wide variation in the corrosive properties of the atmosphere in coastal regions. It must be remembered that salt water is an excellent medium for the promotion of electrolytic corrosion.
    - (b) CONTAMINATED ATMOSPHERE – In industrial areas where the atmosphere usually contains pollutants, these pollutants combine with water to form highly corrosive liquids. For example, sulphur compounds are frequently found in such areas and can form sulphur based acids. This can be an even greater hazard when the prevailing winds carry pollutants from a nearby industrial plant to an airplane parking area.
    - (c) RAINFALL – Moderate rainfall in temperate or cold climates does not necessarily constitute an environmental problem. However, heavy rainfall, or hail, can result in damage to the protective finish of an airplane, which will help to initiate corrosion. Tropical rains can result into a hot, humid atmosphere which promotes corrosion. Refer to the subparagraphs on relative humidity and heat.

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- (d) RELATIVE HUMIDITY - A high relative humidity, coupled with a high temperature, results in a water-saturated atmosphere inside the airplane, while on the ground, and is the least desirable environment from the standpoint of corrosion. After take-off, condensation occurs providing the medium for the onset of corrosion. High humidity at lower temperatures is less of a problem, while ideal conditions are those with a high temperature and low relative humidity.
  - (e) TEMPERATURE - A high temperature with a low relative humidity are the best conditions because any moisture in the airplane is dried up. Similarly, an extremely cold atmosphere environment is also usually dry.
  - (f) RUNWAY CONDITIONS - Airplanes operating from gravel, dirt or grass runways, or runways treated with sodium-chloride for ice removal, are exposed to adverse conditions due to the deterioration of the finish and the deposit of corrosive materials.
  - (g) OPERATING ALTITUDE - Airplanes operating at relatively low altitudes are obviously exposed, to a greater extent, to airborne pollutants and to a marine environmental atmosphere than airplanes operating at higher levels.
  - (h) STAGE LENGTHS - Frequent cycling of the airplane, especially in hot and humid zones, will create a greater moisture buildup than would be expected on airplanes used on long stage lengths. This is due to the airplane being exposed to a fresh supply of water-saturated air at every landing, which will condense out in the subsequent flight.
  - (i) VOLCANIC GASES - Corrosive gases from volcanoes are carried in the atmosphere in some regions of the world. There is also a "fallout" zone, downwind of active volcanoes, which can be an undesirable element in some areas.
  - (j) AIRBORNE ABRASIVES - Volcanic ash, blowing sand and coral dust have an erosive effect on airplane finishes, and may find their way into the interfacing surfaces of moving parts or into bearings. This abrasion not only creates a wear problem, it also exposes any unprotected metal to corrosion. The abrasive material itself may also be corrosive, as would be the case with sand from salt water beaches.
- (2) To establish a corrosion prevention and control program to meet an operator's individual requirements, it must first be determined how severe the operating environment is geographically. Then, to establish frequencies for inspections and prevention procedures to suit the route structure.

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- (3) Three categories of operating environments have been established as follows:
- (a) SEVERE – Areas in which there is a industrial atmosphere containing contaminants or a salt water marine atmosphere. Hot, humid tropical areas also come within the SEVERE category.
  - (b) MODERATE – Temperate regions with other than marine or industrially polluted atmospheres.
  - (c) MILD – Warm arid zones, or areas subject to extremely low temperatures. However, the use of chemicals on runways and taxiways to prevent ice formation may transfer low temperature (COLD) zones to the SEVERE category.
- (4) Frequency of inspections or corrosion preventive actions dicussed throughout this section will be given for these three categories where the operating environment is considered a contributing factor.
- (5) The operating environment is defined as being equivalent to the worst area of operations on the route structure on which an airplane is being used. Thus, an airplane starting in a MILD location, but flying to a SEVERE area, would be considered to be operating in a SEVERE environment.

NOTE: Some operators choose to assign only part of their fleets to routes in SEVERE zones, to reduce the maintenance time and costs on the remainder of their fleets.

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CORROSION PREVENTION – CORROSION REMOVAL  
MAINTENANCE PRACTICES

1. General

- A. When removing any type of corrosion, a complete removal is very important. If all of the corrosion is not removed, the corrosion will continue to grow and spread. For example, if corrosion is found around fastener locations, the fasteners must be removed and an inspection made for corrosion under the fastener heads, and in the holes. Corrosion removal around such fasteners without removing the fastener will not stop the corrosion under the fasteners (Fig. 203).
- B. Complete removal of corrosion products is also necessary, or the corrosion could return. Carefully examine all of the area to make sure that all of the corrosion products and other contamination are gone.
- C. Dye penetrant inspections will not show if all of the corrosion and corrosion products were removed from an area. The area must be visually examined to be sure.
- D. The area must be clean, without paint, oil or grease, before you can treat it for corrosion.
- E. Corrosion can be removed by mechanical procedures or chemical procedures. The details and the selection decision will be different for different types and amounts of corrosion on different types of metal. Refer to paragraph 7, and on, for details on the different metals.

TASK 51-00-53-802-001

2. Safety Procedures

A. GENERAL SAFETY PRECAUTIONS

S 832-144

- (1) Obey all safety precautions when using solvents, special cleaning compounds, paint strippers (strong alkalies or acids), etchants (corrosion removers that contain acids) or conversion coating chemicals.

NOTE: Refer to paragraph B. for EMERGENCY SAFETY PROCEDURES.

S 832-002

WARNING: DO NOT BREATHE SOLVENT OR ACID VAPORS. DO NOT USE SOLVENTS OR ACIDS IN ENCLOSED OR CONFINED SPACES WITHOUT SUFFICIENT VENTILATION, OR APPROVED RESPIRATORY PROTECTION. ACID OR SOLVENT VAPORS CAN BE DANGEROUS AND MAY CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

WARNING: DO NOT ADD WATER TO ACID. ALWAYS ADD ACID TO WATER. WATER ADDED TO ACID WILL BOIL AT AN EXPLOSIVELY RAPID RATE AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

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(2) Follow given and proper precedures when mixing chemicals.

S 832-005

(3) Make sure that water is available at the work area for any emergencies, before the work is started.

S 832-150

**WARNING:** DO NOT LET SOLVENTS, CLEANERS, ACID ETCHANTS, OR CONVERSION COATING MATERIALS COME IN CONTACT WITH SKIN. ANY SKIN CONTACT WITH THESE MATERIALS CAN CAUSE INJURY TO PERSONS.

(4) Rubber gloves should be worn when using any solvents, cleaners, acid etchants, or conversion coating chemicals. Goggles or plastic face shields, rubber raincoats and rainhats should be worn when cleaning, stripping, etching or applying conversion coating chemicals to overhead surfaces.

S 832-007

(5) When mixing alkalies with water or other agents, use only those containers which are resistant to the heat that is created as a result of the chemicals being mixed.

S 832-008

(6) Wash any skin or clothing with fresh water immediately after it touches any paint stripper, chemical etchant or conversion coating material.

S 832-009

(7) Should any material gets into the eyes of anyone, quickly flush it out with fresh water. Then, send the injured person to the medical department, infirmary or hospital for further treatment.

S 832-010

**CAUTION:** DO NOT EAT OR KEEP FOOD IN AREAS WHERE IT COULD ABSORB POISONS FROM THE CHEMICALS. ALWAYS WASH YOUR HANDS BEFORE EATING.

(8) Clean up all equipment after the work is completed.

B. EMERGENCY SAFETY PROCEDURES

S 832-145

(1) It is best to know any Emergency Safety Procedures before using materials which refer to an Emergency Safety Procedure.

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S 832-012

**WARNING:** IMMEDIATE FIRST AID IS ABSOLUTELY IMPORTANT FOR SKIN, EYE AND RESPIRATORY TREATMENT.

- (2) If contact is made with any of these materials, treat as described by the following:

Methyl Alcohol	Xylene
Methyl Ethyl Ketone	Petroleum Naphthas
Methyl Ethyl Ketone Isobutyl	Chromates
Toluene	Dichromates
Trichloroethylene	Acetates
Epoxy Resin	Cyclohexanone
Methylene Chloride	Cellosolve
Alodine (brush)	Carbon Tetrachloride

**WARNING:** ANY SPLASHING OF CHEMICALS INTO THE EYES CAN CAUSE INJURY TO PERSONS.

- (a) EYES: If splashed into the eyes, do not rub. Flush eyes immediately with fresh water for at least 15 minutes. Lift the upper and lower eyelids frequently to ensure a complete washing. Transport injured person to a medical facility for further treatment.
- (b) CLOTHING: If splashed on clothing or large areas of the body, immediately remove the clothing and wash the body with plenty of fresh water (shower) and soap (if available) for at least 15 minutes. Wash clothing before reuse. Go to Medical for treatment.
- (c) EXPOSED SKIN: If splashed on exposed skin, immediately wash the affected area with large amounts of fresh water and soap (if available) for at least 15 minutes. Report to Medical for treatment.
- (d) INHALATION: If vapors are inhaled and breathing has slowed down or stopped, remove the person from the exposure area and start artificial respiration (if necessary) at once. Call for an ambulance and continue with treatment until the ambulance arrives.
- (e) If suffering headache or other obvious symptoms resulting from overexposure to the chemicals, move into fresh air immediately.

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S 832-149

**WARNING:** IT CANNOT BE OVEREMPHASIZED THAT IMMEDIATE ATTENTION IS MOST IMPORTANT WHEN SKIN, EYE AND INHALATION TREATMENT IS NEEDED.

(3) If exposed by physical contact with any of the following materials, treat as follows:

Hydrofluoric Acid	Phenol
Nitric Acid	Cresols
Phosphoric Acid	Tricresyl Phosphate

**WARNING:** ANY SPLASHING OF CHEMICALS INTO THE EYES CAN CAUSE INJURY TO PERSONS.

- (a) **EYES:** If splashed into the eyes, do not rub. Flush the eyes immediately with fresh water for at least 15 minutes. Lift the upper and lower eyelids frequently to ensure a complete washing. Transport injured person to a medical facility for further treatment.
- (b) **EXPOSED SKIN:** If splashed on exposed skin, immediately wash the affected area with large amounts of fresh water and soap (if available) for at least 15 minutes. Report to Medical for treatment.
- (c) **CLOTHING:** If splashed on clothing or large areas of the body, immediately remove the clothing and wash the body with plenty of fresh water (shower) and soap (if available) for at least 15 minutes. Wash clothing before reuse. Go to Medical for treatment.
- (d) **INHALATION:** If vapors are inhaled and breathing has slowed down or stopped, remove the person from the exposure area and start artificial respiration (if necessary) at once. Call for an ambulance and continue with treatment until the ambulance arrives.

**NOTE:** Tricresyl Phosphate is not considered an inhalation hazard.

- (e) **INTERNALLY:** Proceed as follows:
  - 1) **WORKER UNCONSCIOUS;**
    - a) Do not give any liquids. Begin artificial respiration immediately (if necessary) and call for Medical assistance.

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- 2) WORKER CONSCIOUS;
- a) PHENOLS and CRESOLS: Do not attempt to induce vomiting. Encourage victim to wash out mouth with large quantities of water. Call for Medical assistance immediately.
  - b) PHOSPHORIC ACID: Do not induce vomiting. Call for Medical assistance immediately.
  - c) NITRIC ACID: Do not induce vomiting. Drink large quantities of water, if possible. Call for Medical assistance immediately.
  - d) HYDROFLUORIC ACID: Drink water to delute the acid, then induce vomiting by placing a finger in the back of the throat. Repeat. Wash out the mouth repeatedly. Call for Medical assistance immediately.
  - e) TRICRESYL PHOSPHATE: Induce vomiting by placing a finger in the back of the throat. If necessary, have victim drink water, then use finger to induce vomiting. Call for Medical assistance immediately.

TASK 51-00-53-202-014

3. Corrosion Damage and Rework Limits

A. General

- (1) Corrosion evaluation will be required after initial inspection and cleaning to determine the nature and extent of the repair or rework. It is difficult to establish a distinct and specific dividing line between various conditions. Consequently, the first requirement for evaluation is a good, and sound, maintenance judgment.

B. Evaluate any corrosion as follows:

S 212-015

- (1) LIGHT CORROSION - Characterized by a discoloration or pitting of the surface to a depth of approximately 0.001 inch (0.025 mm) maximum. This type of damage will normally be removed by a light hand sanding or a minimal chemical treatment.

S 212-016

- (2) MODERATE CORROSION - This corrosion appears similar to LIGHT CORROSION except that there may be some blistering, or evidence of scaling and flaking. Pitting depths may be as deep as 0.010 inch (0.254 mm). This type of corrosion damage will normally be removed by extensive hand or mechanical sanding.

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S 212-017

- (3) HEAVY (SEVERE) CORROSION - The general appearance may be similar to MODERATE CORROSION with severe blistering, exfoliation and scaling or flaking. Pitting depths will be deeper than 0.010 inch (0.254 mm). This type of corrosion damage will normally be removed by extensive mechanical sanding or grinding, or replacement.

C. Degree of Corrosion Damage

S 212-115

- (1) A preliminary assessment of the corrosion damage is sometimes advisable before cleanup to determine whether there is any chance of reclaiming the part. Where damage is obviously in excess of allowable limits, repair or replacement actions should be initiated.

D. Previously Reworked Areas

S 222-117

- (1) Allowable corrosion damage data is normally based on a loss of material thickness, however, this must also include any loss in thickness due to previous rework. Previous rework can be ignored if the actual thickness that remains after corrosion cleanup is measured.

S 252-116

- (2) Suitable NDT equipment (such as eddy-current or ultrasonic instruments) is recommended for both crack detection and thickness measurement.

E. Depth Measurement using a Straightedge

S 222-118

- (1) Depth measurement is often possible using a straightedge (such as a ruler) and a 10-power magnifying glass as shown in figure 201. The straightedge should be placed at various angles to ensure that incorrect measurements are not recorded, due to local surface irregularities.

F. Depth Measurement with a Dial Depth Gage

S 222-142

- (1) The method for taking measurements with a Dial Depth Gage is outlined below:  
(a) Remove corroded material and blend out the damage.

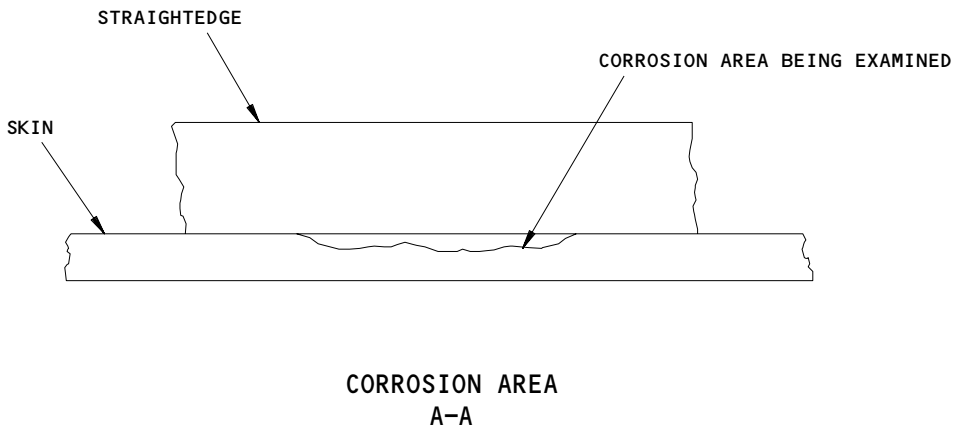
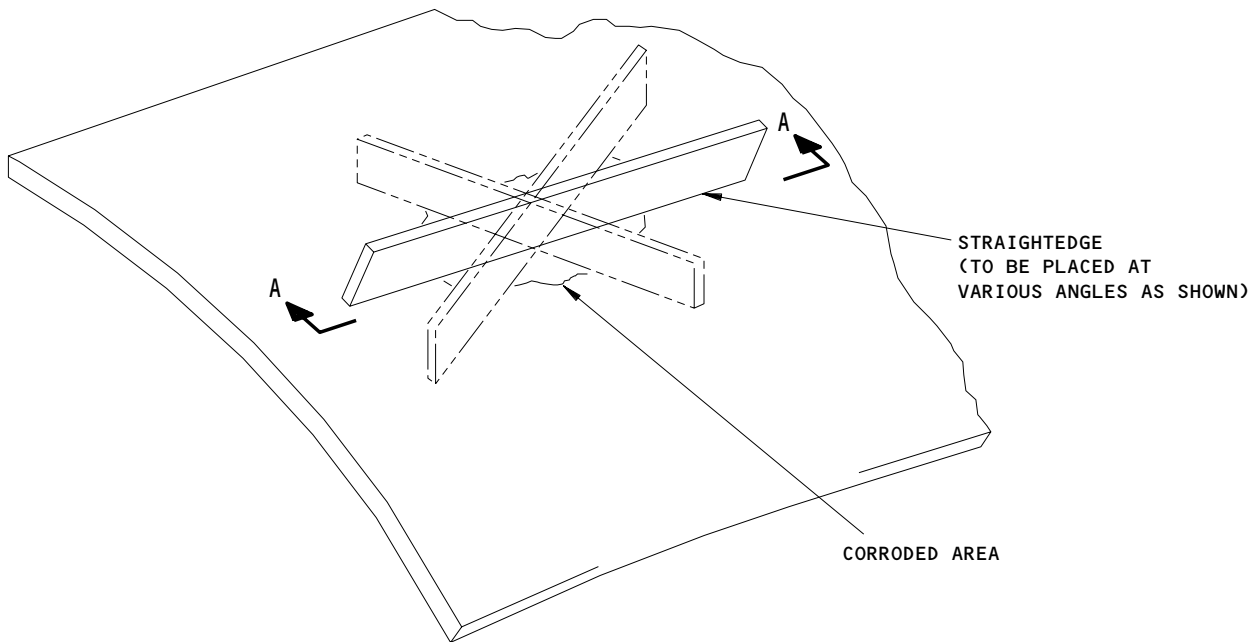
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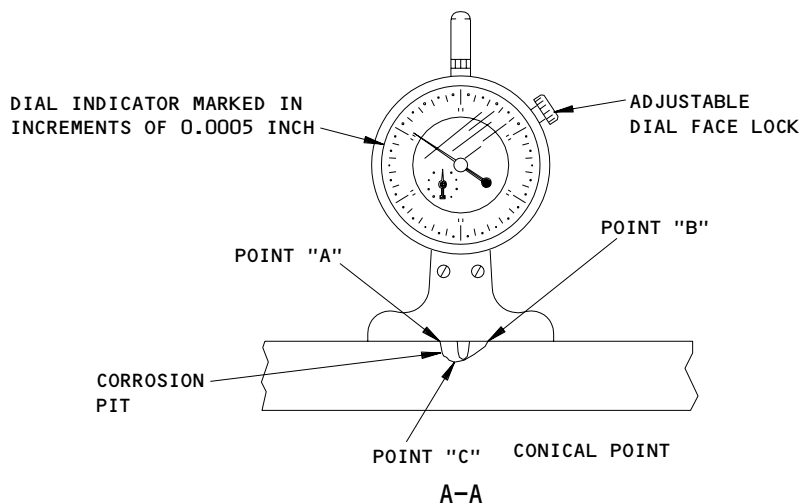
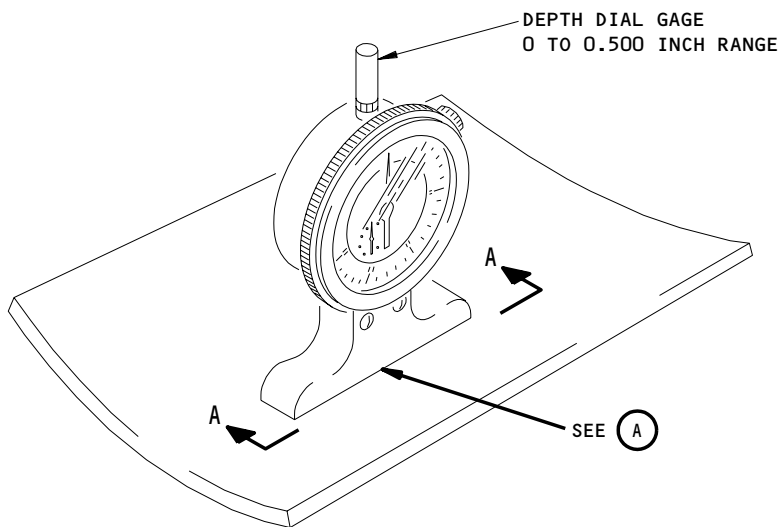
Usage of Straight Edge in Determining Depth of Corrosion  
Figure 201

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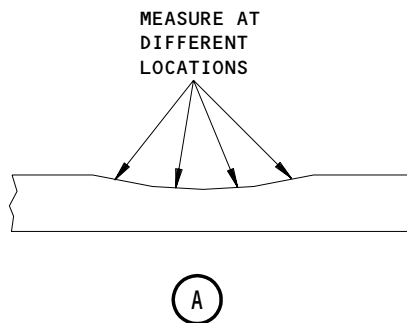
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**CORROSION DEPTH MEASUREMENT**

1. MEASURE THE DEPTH PERPENDICULAR TO THE RADIUS OF CONCAVE OR CONVEX SURFACES. SEE THE MAIN VIEW.
2. MEASURE THE DEPTH ON EDGES ADJACENT TO CORROSION DAMAGE OR BLENDED DEPRESSION (POINTS "A" AND "B"). DO THIS NEAR THE CENTER OF CORROSION DAMAGE OR BLEND DEPRESSION (SEE VIEW A) AND USE THE DEEPEST VALUE AS POINT "C". CALCULATE THE DEPTH AS FOLLOWS:

$$\text{DEPTH} = C - \frac{(A + B)}{2}$$



Corrosion Damage and Repair Depth Measurement with a Depth Dial Gage  
Figure 202

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- (b) Position the Dial Depth Gage and determine the measurement reading.

NOTE: The base of the Dial Depth Gage should be flat against the undamaged surface on each side of the corrosion area. When taking measurements on concave or convex surfaces, place the base of the gage perpendicular to the radius of the curvature of the surface as shown in figure 202.

S 222-020

- (2) Take several additional depth readings.

S 212-021

- (3) Select the deepest reading as the depth of the corrosion damage.

G. Measuring Corrosion Damage with Impression Materials

S 282-143

- (1) In the event that the corrosion area is inaccessible for the use of the Dial Depth Gage, the use of impression materials is recommended.
  - (a) CLAY - Modeling clay or similar materials may be used for making impressions of the corrosion damage. Accurate measurements of the depth of the corrosion damage can be made by a comparator or other accurate measurement means.
  - (b) SILICONE - Flexible mold compound rubber RTV 630A and RTV 630B (General Electric Co., V01139), may be used to make impressions of corrosion damage, and will be more permanent than the clay impressions. Measurements can be made by comparator or other accurate measurement means.

H. Rework Limits

S 192-119

- (1) The maximum rework limitations should be determined from the criteria referenced the individual AMM chapters. If no criteria is available, and the damage is on primary structure, consult The Boeing Company.

S 222-120

- (2) To ensure that allowable limits are not exceeded, an accurate measurement of the material removed, or the material remaining, in the rework area, after fairing, should be made. If the corrosion damage is in a previously worked area, the material removed must include the thickness removed during the previous rework.

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TASK 51-00-53-102-024

4. Corrosion Rework Preparations

A. Prior to starting any corrosion rework or repairs, the airplane and the affected corrosion area must be prepared as outlined in the precedures below:

NOTE: Personnel preforming these procedures shall observe all safety precautions for handling the materials that are used.

S 182-025

(1) Position the airplane on the wash rack, or provide an apparatus which will permit a rapid rinsing of all affected surfaces of the airplane.

S 762-026

(2) Statically ground the airplane (AMM 20-41-00/201).

S 022-027

WARNING: BATTERIES SHOULD BE DISCONNECTED WHEN WORKING IN THE VICINITY OF BATTERY-OPERATED ELECTRICAL EQUIPMENT, ESPECIALLY WHEN FLAMMABLE MATERIALS ARE BEING UTILIZED. INJURY TO PERSONS AND/OR DAMAGE TO EQUIPMENT CAN OCCUR IF THE PROPER PRECAUTIONS ARE NOT FOLLOWED.

(3) Remove or disconnect the airplane batteries as required (AMM 24-31-01/401).

NOTE: Some preventive maintenance procedures also require large quantities of water to be used, such as paint stripping and alodizing. In these instances, disconnecting the batteries is also prudent if there is electrical equipment in the area.

S 952-028

(4) Protect the pitot-static openings, louvers, airscoops, engine openings, landing gear, wheels and tires, magesium skin panels and the airplane's interior from moisture and chemical brightening agents.

S 952-029

(5) Protect surfaces, joints and seams that are adjacent to the rework areas from chemical paint strippers, corrosion removers and chemical surface treatments.

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B. Cleaning

S 112-030

- (1) Prior to any paint stripping and corrosion removal, if the corroded areas or parts are soiled by grease, dirt or any other foreign material, the areas or parts should be cleaned.

S 182-034

- (2) For general cleaning procedures refer to AMM 51-21-00/701.

S 182-035

- (3) Special cleaning procedures may be required in some cases, and will be outlined in the applicable AMM chapters.

S 182-033

- (4) Precautions that are necessary when working with cleaning chemicals are noted in paragraph 2.

C. Paint Removal

S 152-036

- (1) For general procedures, refer to AMM 51-21-01/701.

S 152-037

- (2) For special removal procedures, refer to the appropriate sections of the AMM.

S 182-038

- (3) For safety precautions when using paint stripping chemicals, refer to paragraph 2.

TASK 51-00-53-102-039

5. Corrosion Removal Procedures

A. General

- (1) Corrosion can be removed by mechanical or chemical procedures. Examples of mechanical removal are:
  - (a) Hand sanding with an abrasive paper or metal-wool.
  - (b) Power sanding or buffing with abrasive pads.
  - (c) Grinding wheels and abrasive blasting with compressed air, which includes abrasive blasting with glass beads.
- (2) The decision on which method to use is determined by the different types of metals, different amounts of corrosion and the ease of access to the area or part.

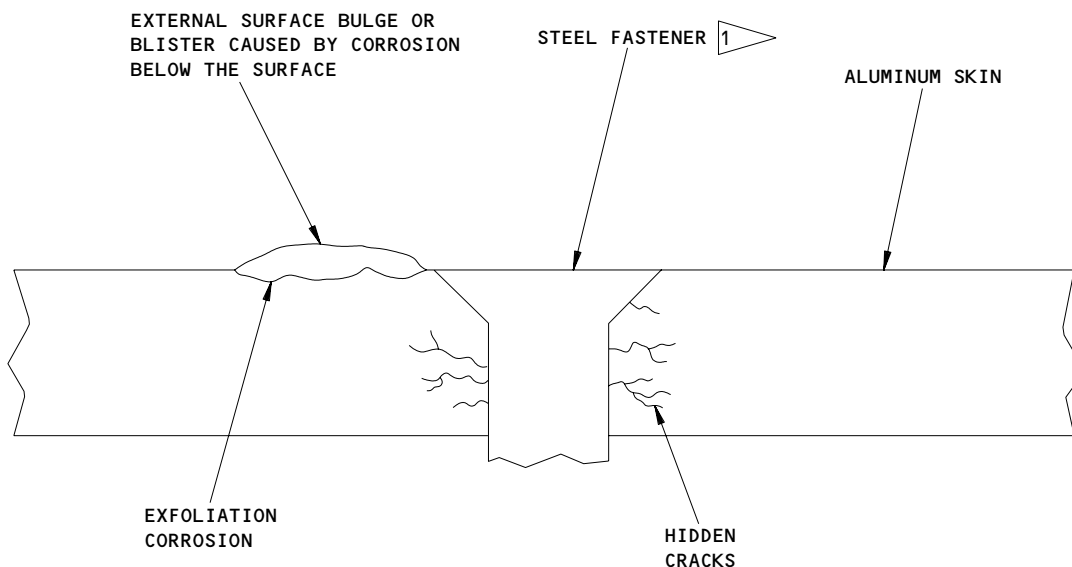
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1 FASTENERS NEAR OR IN THE AREA OF CORROSION MUST BE REMOVED. CORROSION REMOVAL ON THE EXTERNAL SURFACE WITHOUT FASTENER REMOVAL WILL NOT STOP CORROSION UNDER THE FASTENER HEAD OR IN THE HOLE.

Corrosion at Fasteners  
Figure 203

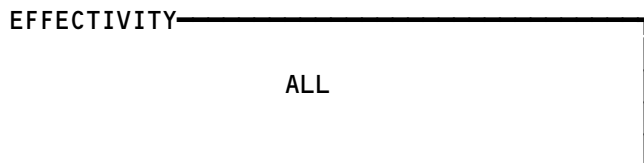
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METALS OR MATERIALS TO BE PROCESSED	RESTRICTIONS	OPERATION	ABRASIVE PAPER OR CLOTH		
			ALUMINUM OXIDE	SILICON CARBIDE	GARNET
FERROUS ALLOYS HEAT TREATED 220 KSI OR HIGHER	DO NOT USE ACID BASE RUST REMOVERS. DO NOT USE HANDHELD POWER TOOLS.	CORROSION REMOVAL AND BLENDS	150-FINER	150-FINER	
		FINISHING	400		
FERROUS ALLOYS	DOES NOT APPLY TO STEEL HEAT TREATED 220 KSI OR HIGHER	CORROSION REMOVAL AND BLENDS	150-FINER	180-FINER	
		FINISHING	400		
ALUMINUM ALLOYS EXCEPT CLAD ALUMINUM	DO NOT USE SILICON CARBIDE ABRASIVE	CORROSION REMOVAL AND BLENDS	150-FINER		7/0-FINER
		FINISHING	400		
CLAD ALUMINUM	SANDING LIMITED TO THE REMOVAL OF MINOR SCRATCHES	CORROSION REMOVAL AND BLENDS	240-FINER		7/0-FINER
		FINISHING	400		
MAGNESIUM ALLOYS		CORROSION REMOVAL AND BLENDS	240-FINER		
		FINISHING	400		
TITANIUM		CLEANING AND FINISHING	150-FINER	180-FINER	
PLATED OR PHOSPHATED SURFACES		REFER TO THE APPLICABLE BASE METAL FOR CORROSION REMOVAL			

Abrasives for Corrosion Removal  
Figure 204 (Sheet 1)



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**BOEING**  
767  
MAINTENANCE MANUAL

METALS OR MATERIALS TO BE PROCESSED	RESTRICTIONS	OPERATION	ABRASIVE FABRIC OR PAD	WOOL		PUMICE 350 MESH OR FINER	ABRASIVE WHEEL
				ALU-MINUM	STAIN-LESS STEEL		
FERROUS ALLOYS HEAT TREATED 220 KSI OR HIGHER	DO NOT USE ACID BASE RUST REMOVERS. DO NOT USE HANDHELD POWER TOOLS.	CORROSION REMOVAL AND BLENDS	FINE TO ULTRA-FINE	X	X	X	
		FINISHING		X	X	X	
FERROUS ALLOYS	DOES NOT APPLY TO STEEL HEAT TREATED 220 KSI OR HIGHER	CORROSION REMOVAL AND BLENDS	FINE TO ULTRA-FINE	X	X	X	X
		FINISHING		X	X	X	
ALUMINUM ALLOYS EXCEPT CLAD ALUMINUM	DO NOT USE SILICON CARBIDE ABRASIVE	CORROSION REMOVAL AND BLENDS	VERY FINE TO ULTRA-FINE	X		X	X
		FINISHING		X		X	
CLAD ALUMINUM	SANDING LIMITED TO THE REMOVAL OF MINOR SCRATCHES	CORROSION REMOVAL AND BLENDS	VERY FINE TO ULTRA-FINE			X	X
		FINISHING				X	
MAGNESIUM ALLOYS		CORROSION REMOVAL AND BLENDS	VERY FINE TO ULTRA-FINE	X		X	
		FINISHING		X		X	
TITANIUM		CLEANING AND FINISHING			X	X	X
PLATED OR PHOSPHATED SURFACES		REFER TO THE APPLICABLE BASE METAL FOR CORROSION REMOVAL			X		

Abrasives for Corrosion Removal  
Figure 204 (Sheet 2)

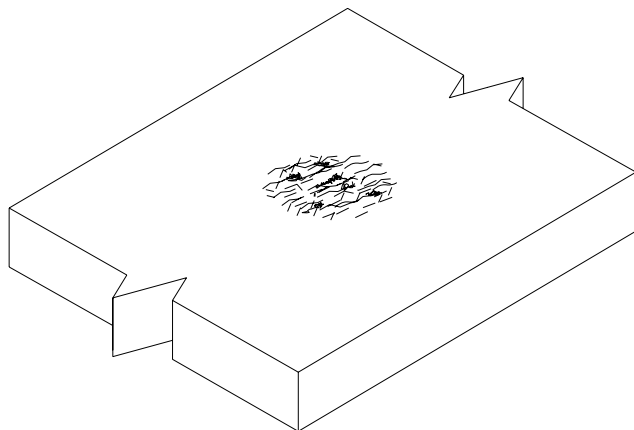
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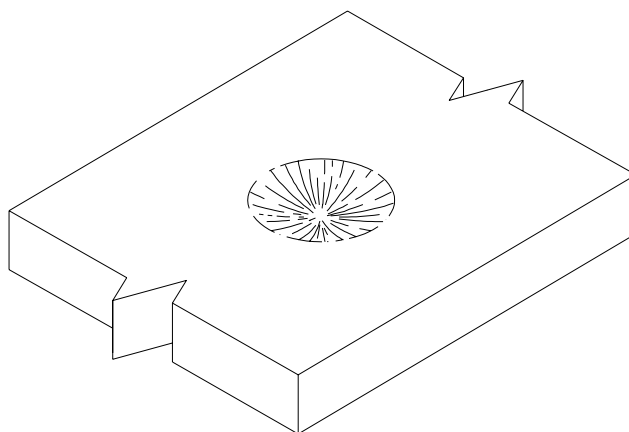
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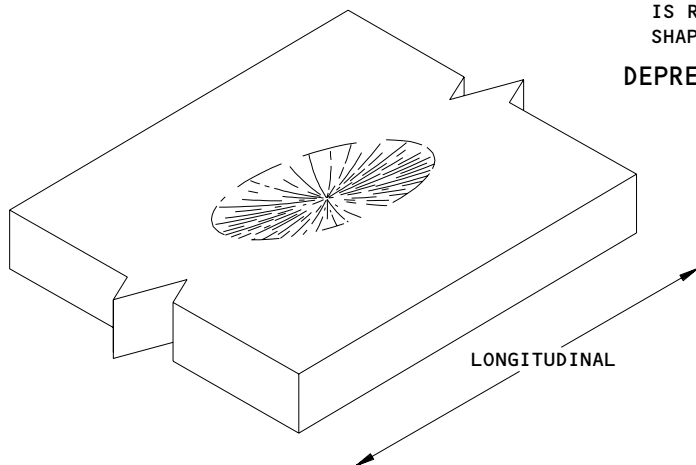
**NOTE:** ALL LOOSE CORROSION PRODUCTS ARE REMOVED FROM THE PIT.

**CORROSION DAMAGE BEFORE REPAIR**



**NOTE:** ROUGH EDGES ARE SMOOTH AND ALL CORROSION IS REMOVED. BUT DEPRESSION IS NOT CORRECTLY SHAPED.

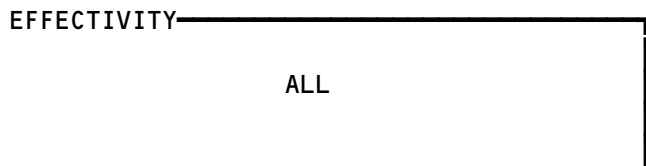
**DEPRESSION AFTER CORROSION REMOVAL**



**NOTE:** THE BLEND NOW HAS THE RATIO AND DIRECTION SHOWN IN FIG. 206.

**BLENDOUT COMPLETE**

Single Depression Blends  
Figure 205

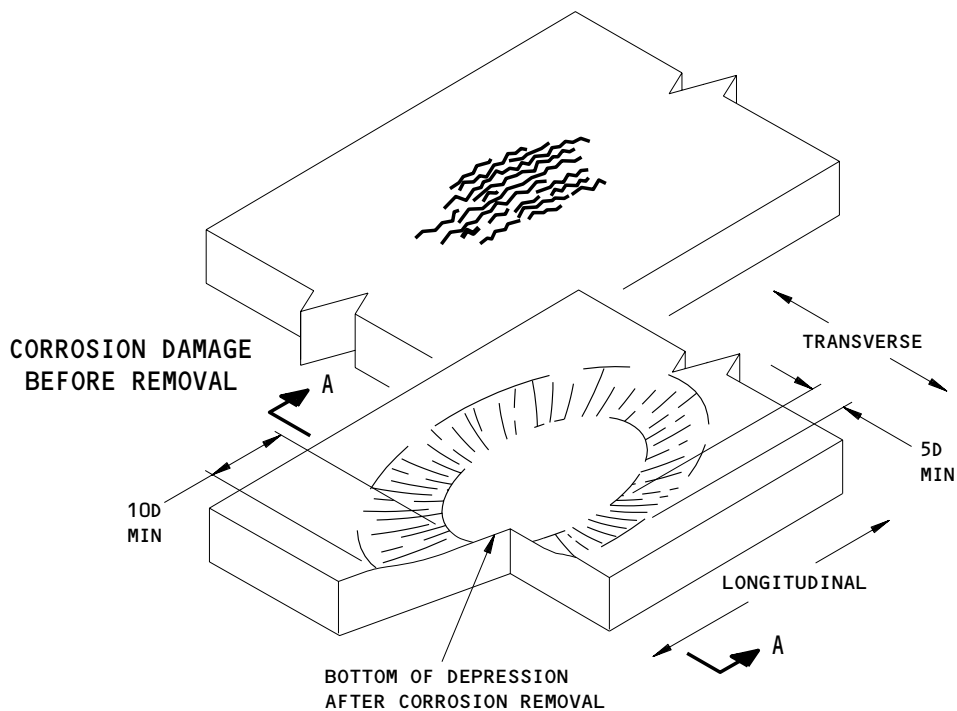


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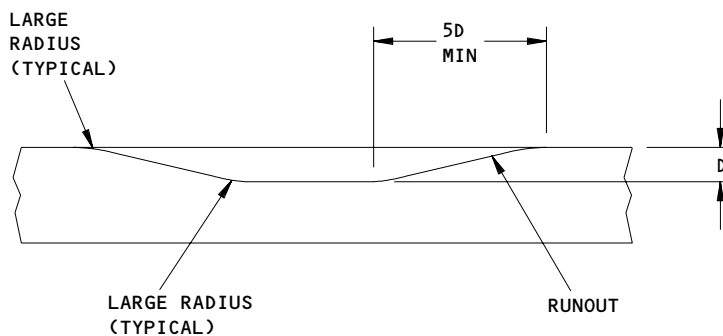
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DAMAGE REMOVED AND SURFACE IS SMOOTH  
WITH SHALLOW ELLIPTICAL BLENDOUT



EXAMPLE OF 1:5 BLEND RATIO  
A-A

**NOTE:**

D = DEPTH OF DEPRESSION

1. SEE SPECIFIC REPAIR FOR MAXIMUM DEPTH
2. BECAUSE THE MAXIMUM DEPTH IS DIFFERENT AT DIFFERENT LOCATIONS, MAXIMUM SIZE OF BLENDOUT WILL ALSO BE DIFFERENT
3. USE THE SAME BLEND RATIO AT ALL TIMES UNLESS THE REPAIR INSTRUCTIONS ARE DIFFERENT

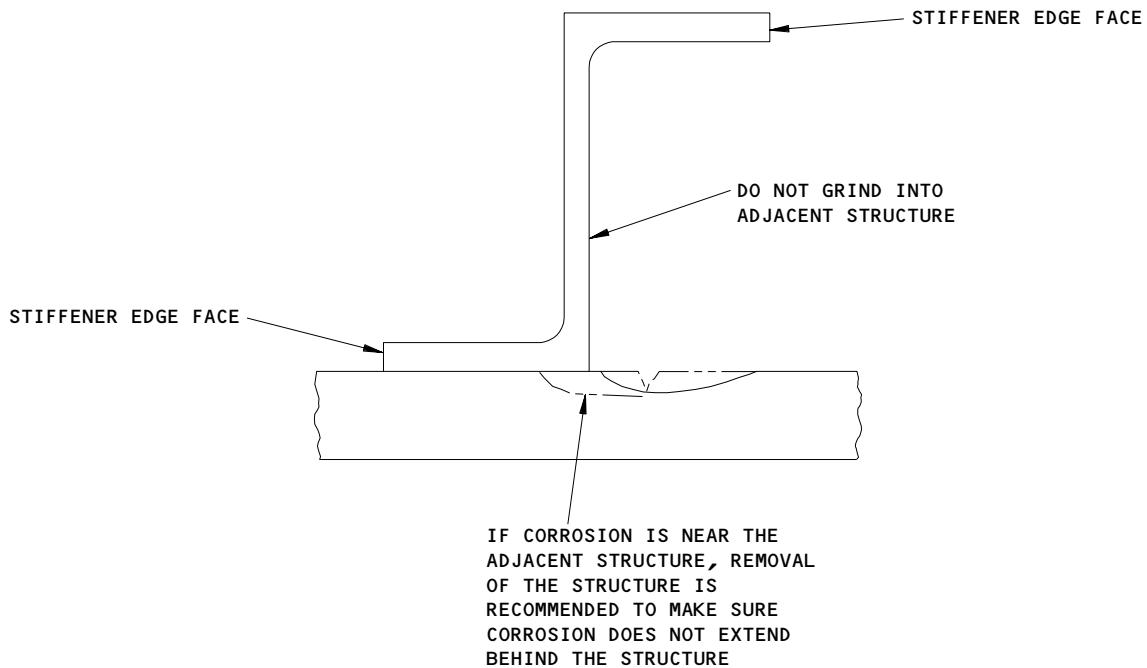
Multiple Depression Blends  
Figure 206

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Corrosion in Limited Clearance Areas  
Figure 207

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098391

- (3) In most corrosion removal operations, the mechanical methods are recommended.

**NOTE:** The chemicals used in the chemical removal procedures can cause corrosion and must not be allowed to flow into joints, seams or on to highly stressed steel parts.

- (4) If the area of corrosion includes or is near fasteners, remove the fasteners before starting to remove the corrosion. There could be corrosion under the fastener heads or in the holes. Corrosion removal around such fasteners without removing the fasteners will not stop the corrosion under the fasteners (Fig. 203). Also, metal from the fastener heads will be rubbed into the adjacent metal surface during the corrosion removal procedures, and can cause subsequent galvanic corrosion.

B. Procedures

S 322-040

(1) Blending Repaired Areas

- (a) After any amount of corrosion removal, blend all depressions with the adjacent surfaces to keep stress concentrations to a minimum.
- (b) Remove rough edges and all corrosion from the damaged area. Make the selection of the applicable abrasive from Figure 204.
- (c) Repair depressions to make smooth, elliptical blend-outs as shown in Figure 205. In areas with multiple pitting close together, remove the material in between to keep any surface irregularities, or waviness, to a minimum (Fig. 206).
- (d) In areas where sufficient clearance does not allow the elliptical shape as specified in Figures 205 and 206, blend as nearly as possible to these dimensions and make the remaining area smooth and continuous, with no sharp or sudden changes (Fig. 207).
- (e) Remove all surface defects. Use the correct abrasive to get the necessary surface finish.

S 222-041

(2) Repair Depth Measurement

- (a) After the corrosion is removed and the surface area is blended out, make depth measurements to be sure that the blending is not deeper than the repair limit.
- (b) A Dial Depth Gage or impression materials can be used to determine the depth (Fig. 202).

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S 142-042

(3) Corrosion Removal (MECHANICAL)

- (a) The mechanical corrosion removal procedure is recommended for most cases of corrosion damage. Some examples of this procedure are:
- 1) Hand sanding with abrasive paper or metal-wool.
  - 2) Power sanding with abrasive pads, grinding wheels, wire brushes or carbide tip scrapers.
  - 3) Abrasive blasting.

S 912-043

(4) For details on the different metals, refer to paragraph 7 and on. For general procedures, refer to the steps below.

- (a) Wire Brushing - Wire brushing is a mechanical abrasive operation usually done with a hand wire brush, or a wire brush mounted on a motor-driven wheel. By using brushes of various lengths and gages of wire, a wide range of abrasive actions are possible. Wire brushing is used to remove heavy corrosion and paint, or dirt, especially where chemical treatment is impractical.
- (b) A typical wire brushing procedure is as follows:
- 1) Protect all adjacent components from the scale, chips, corrosion products and chemical agents.
  - 2) If grease or dirt is found, clean the area per paragraph 4.
  - 3) Remove any loose corrosion with a hand scrapper.

**WARNING:** THE USE OF GOGGLES OR FACE SHIELD IS MANDATORY WHEN USING MOTOR-DRIVEN WIRE BRUSHES. IF NOT USED, INJURY TO PERSONS CAN OCCUR.

- 4) Wire brush (hand or motor-driven) the corrosion area down to a firm metal substrate.
- (c) Grinding - Grinding is a method of removing heavy corrosion by means of portable motorized grinding wheels or abrasive belts. Part of the base metal is ground away with the corrosion. A typical grinding procedure is as follows:
- 1) Protect adjacent components from the scale, chips, corrosion products and chemical agents.
  - 2) If grease or dirt is found, clean the area per paragraph 4.

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**WARNING:** THE USE OF GOGGLES OR FACE SHIELD IS MANDATORY WHEN USING MOTOR-DRIVEN WIRE BRUSHES. IF NOT USED, INJURY TO PERSONS CAN OCCUR.

**CAUTION:** MOTORIZED GRINDING, IF NOT CAREFULLY MONITORED, CAN REMOVE MORE MATERIAL THAN IS NECESSARY. WHEN POSSIBLE, THE USE OF OTHER REWORK METHODS IS PREFERRED.

- 3) Remove paint and corrosion by grinding until a firm corrosion-free surface is reached. Continue grinding to remove any coarse irregularities.
  - 4) Use a fine abrasive paper to polish the surface to the desired finish.
- (d) Abrasive Blasting (GLASS BEADS) – Abrasive blasting is used to clean or finish metals and other materials. It hits the surface with a stream of abrasive particles, for corrosion removal. Glass bead abrasive blasting is only used to remove filiform corrosion. Do not use it to remove other types of corrosion that extend below
- 1) Use the standard blasting procedures and the special details that follow:

**WARNING:** THE USE OF GOGGLES OR FACE SHIELD IS MANDATORY WHEN USING EXTERNAL ABRASIVE BLASTING EQUIPMENT. IF NOT USED, INJURY TO PERSONS CAN OCCUR.

**WARNING:** AVOID EXCESSIVE INHALATION OF ABRASIVE DUST OR INJURY TO PERSONS MAY OCCUR. DUST MASKS OR RESPIRATORS SHOULD BE USED AND ADEQUATE VENTILATION IS TO BE PROVIDED AS REQUIRED.

- (e) IN-CABINET BLASTING – In-cabinet blasting is preferred. External gun blasting may be used if adequate confinement and recovery are provided for the abrasive material.
- 1) For the abrasive, use glass beads (150 mesh or finer).
  - 2) If possible, remove the part from the component. If this is not possible, give all areas adjacent to the part maximum protection from scale, chips, corrosion products and the abrasive blast.
  - 3) If grease or dirt is found, clean the area per paragraph 4.
  - 4) Give maximum protection from the blast to close tolerance areas such as bushings, bearings, close tolerance shafts and threads.

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- 5) Remove only the corrosion products by abrasive blasting with glass beads.

**WARNING:** THE USE OF GOGGLES OR FACE SHIELD IS MANDATORY WHEN USING EXTERNAL ABRASIVE BLASTING EQUIPMENT. IF NOT USED, INJURY TO PERSONS CAN OCCUR.

**WARNING:** AVOID EXCESSIVE INHALATION OF ABRASIVE DUST OR INJURY TO PERSONS MAY OCCUR. DUST MASKS OR RESPIRATORS SHOULD BE USED AND ADEQUATE VENTILATION IS TO BE PROVIDED AS REQUIRED.

- (f) EXTERNAL GUN BLASTING – The frequency in occurrences of filiform corrosion has led to the development of portable abrasive blasting equipment.
- (g) A typical external gun blasting procedure for removing filiform corrosion on aluminum skin is as follows:
  - 1) Remove any heavy soils with an alkaline emulsion cleaner.
  - 2) Strip the protective finish (both the enamel and the primer).
  - 3) Mechanically remove the filiform corrosion by blasting with glass beads (approximately 150 mesh).
  - 4) After the corrosion removal blasting, remove any enamel or primer that may remain in the corrosion cleanup area.
  - 5) Flush the area with clean water and clean the surface in preparation for surface treatment.
- (h) PORTABLE ABRASIVE BLASTER – Filiform corrosion can be quickly removed with the use of a portable abrasive blaster. An example is the Model E-10A Clemco Eductomatic Portable Blast Cleaner (Clemco Industries, V86192) (Fig. 208).
  - 1) The unit weighs 7 pounds and includes an abrasive reservoir (which holds up to 4 pounds of glass beads), a suction abrasive pickup, a swivel blast nozzle and a vacuum abrasive return.
  - 2) The blast head has a concentric arrangement. The inside tube blasts the glass beads against the aluminum surface, the outer passage retrieves the glass beads and dust, and separates them.
  - 3) A double-acting control valve regulates both the blast and the suction. The blast head is connected by a swivel joint to the body of the unit. This feature allows you turn the blast in any direction, while keeping the main body of the machine in the vertical position.
  - 4) Before starting the corrosion removal, try out the equipment on a test panel to get to know the procedure.

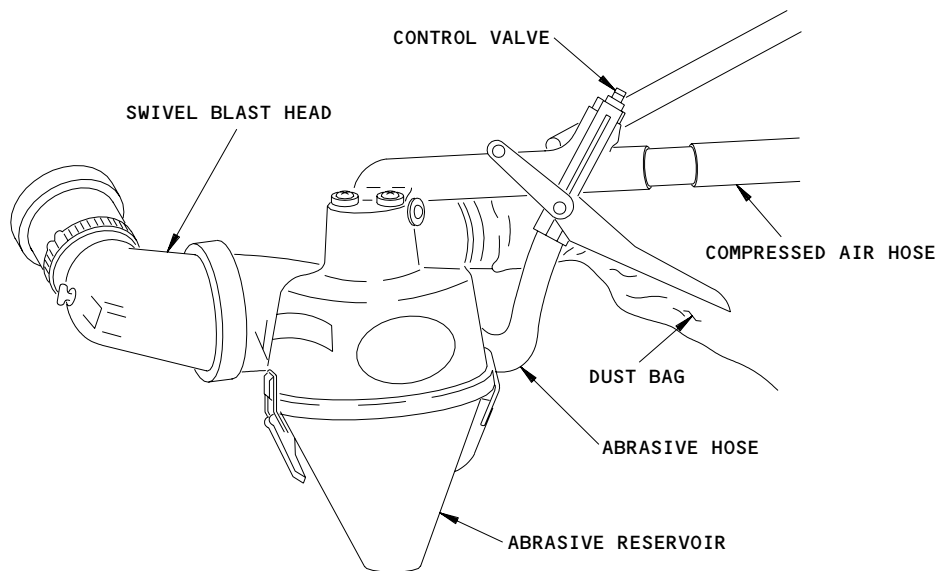
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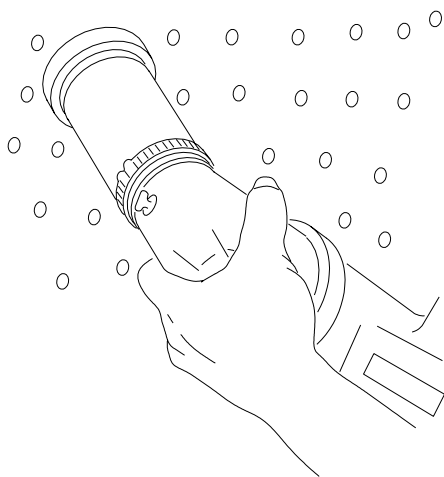
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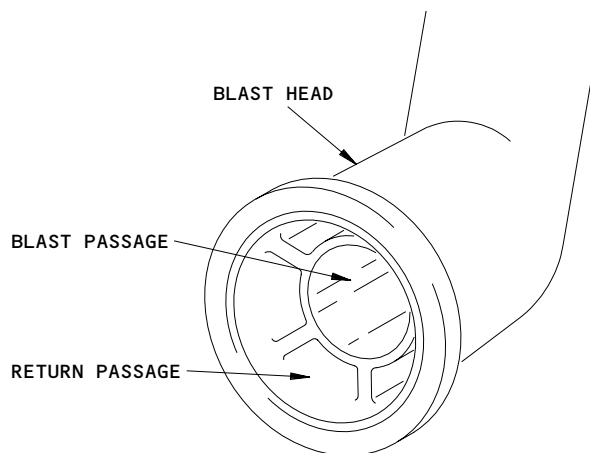
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PORTABLE ABRASIVE BLASTER COMPONENTS  
(CLEMCO MODEL E-10A UNIT IS SHOWN)



BLAST NOZZLE ON WORK SURFACE



BLAST HEAD

**NOTE:** FOR BEST RESULTS, THE BLAST NOZZLE SHOULD BE HELD ON THE SURFACE SO THAT IT REMOVES CORROSION IN AN APPROXIMATE 1-INCH DIAMETER PATH.

THE BLAST HEAD OF THE CLEMCO PORTABLE BLAST CLEANER HAS A CONCENTRIC ARRANGEMENT. THE INNER BLASTS THE GLASS HEADS AGAINST THE CORRODED SURFACE AND THE OUTER PASSAGE RETRIEVES BEADS AND DUST.

Portable Abrasive Blaster  
Figure 208

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- 5) During the operation of the unit, adjust the air source to a maximum of 80 pounds of pressure. Hold the blast nozzle on the surface to remove any filiform corrosion in an approximately one-inch diameter path.
- 6) The glass bead abrasive material quickly removes the corrosion (about 36 linear inches a minute), but almost none of the cladding on the aluminum surface.

S 112-044

- (5) Corrosion Removal (CHEMICAL) – The chemical corrosion removal procedures can be used on the airplane only where chemical flow can be controlled, and the area can be fully washed with water.
  - (a) Because the chemicals that are used for corrosion removal can also be corrosive, they must not be allowed to become entrapped in such locations as lap joints, faying surfaces or splices.
  - (b) On parts removed from an airplane, the chemical corrosion removal procedures can be easier to perform.
  - (c) The chemical agents used in corrosion removal are of the acid type. Because the chemicals are different for each type of metal, details of the procedures are given in the applicable paragraphs that follow.

TASK 51-00-53-102-045

6. Special Corrosion Removal Procedures

A. General

- (1) Special procedures are applicable when corrosion damage is caused by other than the usual airline service.

B. Spilled mercury will cause corrosion very quickly.

S 182-046

- (1) Refer to AMM 51-00-54/201 for details.

C. A fire in the airplane can cause corrosion because of ashes and fire extinguisher chemicals.

S 182-047

- (1) Refer to AMM 54-00-55/201 for details.

D. Spilled alkaline or acid agents will cause corrosion.

S 182-048

- (1) Refer to AMM 51-00-56/201 or AMM 51-00-57/201 for details.

E. Livestock and fish that are carried as cargo can cause a lot of corrosion in the airplane structure, and can make special procedures necessary.

S 182-049

- (1) Refer to AMM 51-00-60/201 and AMM 51-00-61/201 for more details.

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TASK 51-00-53-102-050

7. Corrosion Removal Procedures for Aluminum and Aluminum Alloys

A. General

- (1) Aluminum and its alloys are the most frequently used materials in airplane construction. The metal is not toxic, non-magnetic and because it can absorb large amounts of energy, it will not spark when hit by other metals.
- (2) Although aluminum is high in the electrochemical series, it makes a tightly bonded anodic oxide film when applied to the surface that gives more resistance to mild corrosive conditions.

**WARNING:** OBEY ALL SAFETY PRECAUTIONS AND PROCEDURES OF PARAGRAPH 2. INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT CAN OCCUR IF ALL SAFETY PRECAUTIONS AND PROCEDURES ARE NOT OBEYED.

B. Corrosion Removal (MECHANICAL)

S 212-051

- (1) Make sure that the metal is aluminum.

S 952-052

- (2) Give adjacent areas maximum protection in order to prevent more damage from corrosion products that are removed during the corrosion removal procedure.

S 112-053

- (3) If grease or dirt is found, clean the area per paragraph 4.

S 152-054

- (4) Remove any paint (if necessary) as per paragraph 4.

S 222-055

- (5) Measure the amount of corrosion damage as per paragraph 3.

S 142-056

- (6) Remove all corrosion by one of the following methods:

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**CAUTION:** DO NOT USE A CARBON STEEL BRUSH OR STEEL WOOL ON ANY ALUMINUM SURFACE. STEEL PARTICLES WILL BE RUBBED INTO THE ALUMINUM AND CAUSE MORE CORROSION DAMAGE.

**CAUTION:** STEEL FASTENERS MUST BE REMOVED BEFORE CORROSION REMOVAL BEGINS. THIS IS TO MAKE SURE THAT ALL CORROSION IS COMPLETELY REMOVED, AND THE ALUMINUM SKIN DOES NOT BECOME CONTAMINATED WITH STEEL PARTICLES.

**CAUTION:** CONTAMINATION OCCURS WHEN FASTENER HEADS ARE GROUND DOWN DURING CORROSION REMOVAL FROM THE ADJACENT SKIN SURFACES.

- (a) Remove any light corrosion by hand sanding with abrasive paper (Fig. 204).
- (b) As an alternative, remove light corrosion and stains with pumice paste. Mix pumice powder with water to make a slurry paste. Apply the paste with a clean, soft cloth, and rub gently. When the paste is dried to a white powder, wipe off with a clean dry, soft cloth. Remove any remaining corrosion and corrosion products with No. 600 grit, wet or dry, abrasive paper and water.
- (c) Remove any heavy corrosion products by hand with any of the following items:

**CAUTION:** CORROSION REMOVAL WITH CARBIDE TIPPED SCRAPERS OR GRINDING WHEELS CAN CAUSE SCRIBE MARKS AT THE EDGE OF THE REWORK AREA. DO NOT LEAVE SCRIBE MARKS AT THE EDGE OF THE REWORK AREA. ENSURE THE FINAL FINISH AT THE EDGE IS 63 RMS OR BETTER. SCRIBE MARKS CAN CAUSE CRACKS.

- 1) Carbide-tipped scraper
- 2) No. 400 grit aluminum oxide (Alumina) abrasive paper
- 3) A fine fluted rotary file
- 4) A stainless steel brush (with bristles no larger than 0.010 inch [0.254 mm] in diameter)

**NOTE:** After using a stainless steel brush or a rotary file, polish the surface with No. 400 grit (Alumina) abrasive paper, and then with No. 600 (Alumina) abrasive paper.

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**CAUTION:** HEAVY, CONTINUOUS RUBBING (SUCH AS WITH A POWER-DRIVEN WIRE BRUSH) CAN CREATE ENOUGH HEAT TO CAUSE METALLURGICAL CHANGES.

- (d) Mechanically remove any moderate or bad corrosion with a stainless steel wire brush (with bristles no bigger than 0.010 inch (0.254 mm) in diameter), grinding, or, only for filiform corrosion, abrasive blasting with glass beads. Do not use glass bead abrasive blasting to remove other types of corrosion that extend below the surface. Refer to paragraph 5.B.(3), for the procedures. On non-clad anodized surfaces, be careful not to damage the anodized surface adjacent to the corrosion area.
- (e) Dry abrasive blasting with glass beads (paragraph 5.B.(4)(c)) is approved to remove only filiform corrosion from aluminum alloys. Do not use glass bead abrasive blasting to remove other types of corrosion that extend below the surface. Use air pressures of 40 to 80 p.s.i. The higher pressure removes the corrosion more quickly.

S 322-057

- (7) After removing all of the corrosion that can be seen through a 10-power magnifying glass, remove 0.002-inch more material to be sure you have removed all of the corrosion products.

S 322-058

- (8) Blend repair the area per paragraph 5.B.(1).

S 112-059

- (9) Clean the repaired area.

S 222-060

- (10) Measure the depth of the blends as per paragraph 5.B.(2), to be sure that they are within the repair limits.

S 372-061

- (11) Treat the repaired area (AMM 51-00-58/201).

C. Corrosion Removal (CHEMICAL)

S 952-062

- (1) Mask off adjacent areas to prevent brightener chemicals from contacting any magnesium, anodized aluminum, glass, plexiglass, fabrics or steel that might be near the work area.

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S 372-063

**WARNING:** DO NOT ADD WATER TO THE ACID COMPOUND; ONLY ADD THE ACID COMPOUND TO THE WATER. WATER ADDED TO ACID CAN BOIL AT AN EXPLOSIVELY RATE AND CAUSE INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT.

**WARNING:** WEAR PROTECTIVE CLOTHING, PROTECTIVE MASK AND ACID-RESISTANT GLOVES WHEN WORKING WITH ACID COMPOUNDS. IF ANY ACID ACCIDENTLY CONTACTS THE SKIN OR EYES, IMMEDIATELY FLUSH WITH LARGE AMOUNTS OF FRESH WATER. CONTACT MEDICAL ASSISTANCE IF NECESSARY.

**CAUTION:** AVOID DOING CHEMICAL REMOVAL IN TEMPERATURES ABOVE 100 DEGREES (F.) (37.78 degrees C.) OR BELOW 40 DEGREES (F.) (4.44 degrees C.). DO NOT USE ALKALINE TYPE CORROSION REMOVERS TO REMOVE CORROSION FROM ALUMINUM ALLOYS.

**CAUTION:** WHEN APPLYING CORROSION REMOVAL SOLUTIONS, PARTICULAR CARE SHOULD BE TAKEN TO KEEP ACID OUT OF FAYING SURFACES, BUTT JOINTS, SEAMS, CREVICES, ETC.

- (2) Dilute the phosphoric acid based corrosion removing compound according to the manufacturer's instructions. Mix the compound in plastic, or plastic lined, container.

S 372-064

- (3) Apply the diluted solution to the corroded areas by spraying or with a sponge, or brush. Apply with a circular motion, starting from the lower surface area and working upward, to minimize runs and streaks.
  - (a) Leave the solution on from 5 to 30 minutes, depending on the temperature and the amount of corrosion present. Agitate the solution occasionally with a short-fibered acid resistant brush. Do not allow the solution to dry on the surface, as streaking will result.
  - (b) Rinse the area with a stream of fresh water or wipe off with clean, moist clothes, frequently rinsing the clothes in clean water.
  - (c) Dry the area with a clean, dry cloth and inspect the area for any corrosion.

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S 372-065

**CAUTION:** DO NOT REPEAT THESE PROCEDURES MORE THAN ONCE. IF ANY CORROSION STILL REMAINS AFTER SECOND ATTEMPT, PROCEED TO MECHANICAL REMOVAL METHODS.

(4) Repeat steps (3)(a)(b)(c) if any corrosion remains.

S 322-066

(5) Fair out any depressions resulting from the rework as per paragraph 5.B.(1), and surface finish with No. 400 or No. 600 abrasive paper. (Select the proper abrasive per figure 204.)

S 112-067

(6) Clean the reworked area.

S 222-068

(7) Determine the depth of the faired depression per paragraph 5.B.(2), to ensure that the rework depth limits have not been exceeded.

S 372-069

(8) Treat the reworked surfaces (AMM 51-00-58/201).

TASK 51-00-53-102-070

8. Corrosion Removal Procedures for Magnesium Alloys

A. General

- (1) Magnesium is lightweight, but is the most chemically active metal. It is highly susceptible to corrosion when failure of the protective coating has occurred.
- (2) To preclude any serious structural damage, early detection and prompt corrective action must be taken. The beginning of corrosion is often indicated by the lifting of the paint film, and white spots on the surface. These spots can rapidly develop into snow-like mounds or whiskers.
- (3) Procedures for corrosion removal by either mechanical or chemical methods are provided in the following paragraphs.

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**WARNING:** ALL PERSONNEL USING THESE PROCEDURES WILL OBSERVE THE SAFETY PRECAUTIONS AND PROCEDURES PER PARAGRAPH 2, OR INJURIES TO PERSONS MAY OCCUR.

**WARNING:** SMALL PARTICLES AND FINE SHAVINGS OF MAGNESIUM IGNITE VERY EASILY AND PRESENT AN EXTREME FIRE HAZARD. MAGNESIUM DUST IS HIGHLY FLAMMABLE AND, IN THE PROPER CONCENTRATION, MAY CAUSE AN EXPLOSION. WATER COMING INTO CONTACT WITH MOLTEN MAGNESIUM PRESENTS A STEAM EXPLOSION HAZARD.

**WARNING:** EXTINGUISH MAGNESIUM FIRES WITH (ABSOLUTELY) DRY TALC, CALCIUM CARBONATE, SAND OR GRAPHITE, BY APPLYING THE POWDER TO A DEPTH OF 1/2 INCH (12.7 mm) OR MORE, OVER THE BURNING METAL.

**WARNING:** DO NOT USE FOAM, WATER, CARBON TETRACHLORIDE, OR CARBON DIOXIDE.

**B. Corrosion Removal (MECHANICAL)**

S 212-071

- (1) Positively identify the metal as magnesium.

S 952-072

- (2) Protect the adjacent areas to prevent any additional corrosion damage from corrosion products being removed during the mechanical removal procedure.

S 112-073

- (3) If grease or soil is present, clean the rework area per paragraph 4.

S 152-074

- (4) If necessary, remove any paint from the rework area per paragraph 4.

S 222-075

- (5) Determine the extent of the corrosion damage as per paragraph 3.

S 142-076

- (6) Remove any loose corrosion products with aluminum wool.

S 142-077

- (7) Remove all other corrosion by one of the following methods:

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**CAUTION:** DO NOT USE CARBON STEEL BRUSHES OR STEEL WOOL ON MAGNESIUM SURFACES. TINY METAL PARTICLES WILL BECOME IMBEDDED IN THE MAGNESIUM AND CAUSE FURTHER CORROSION, AND SUBSEQUENT DAMAGE TO THE PART.

**CAUTION:** DO NOT USE SILICONE CARBIDE ABRASIVES ON MAGNESIUM SURFACES.

- (a) Light corrosion will be removed by light hand sanding. Select the proper abrasive paper as indicated in figure 204, or:
- 1) Light corrosion and stains may be removed with pumice paste. Prepare the pumice paste by mixing pumice powder with clean water to form a slurry paste.
  - 2) Apply the paste to the light corrosion or stain, using a clean, soft cloth and rub gently.
  - 3) When the paste has dried to a white powder, wipe it off with a clean, dry, soft cloth.
  - 4) If corrosion products still exist in the rework area, use No. 600 grit wet or dry abrasive paper, and clean water, to remove the remaining corrosion.

- (b) Remove any heavy corrosion products by hand scraping with any of the following items:

**CAUTION:** CORROSION REMOVAL WITH CARBIDE TIPPED SCRAPERS OR GRINDING WHEELS CAN CAUSE SCRIBE MARKS AT THE EDGE OF THE REWORK AREA. DO NOT LEAVE SCRIBE MARKS AT THE EDGE OF THE REWORK AREA. ENSURE THE FINAL FINISH AT THE EGDE IS 63 RMS OR BETTER. SCRIBE MARKS CAN CAUSE CRACKS.

- 1) Carbide-tip scraper
- 2) A fine fluted rotary file
- 3) No. 400 grit (Alumina) abrasive paper.
- 4) Stainless steel brush (bristles of the brush not to exceed 0.010 inch (0.254 mm) in diameter).

**NOTE:** After using a stainless steel brush or a rotary file, the surface will be polished with No. 400 grit (Alumina) abrasive paper, and then with No. 600 grit (Alumina) abrasive paper.

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**CAUTION:** VIGOROUS, HEAVY AND CONTINUOUS RUBBING (SUCH AS WITH A POWER DRIVEN WIRE BRUSH) CAN GENERATE ENOUGH HEAT TO CAUSE A METALLURGICAL CHANGE IN THE MATERIAL.

- (c) Mechanically remove any moderate or severe corrosion by stainless steel wire brush or abrasive blasting. Select the appropriate abrasives from figure 204. Refer to paragraph 5.B.(3).

**NOTE:** Bristles of stainless steel wire brushes should not exceed 0.010 inch (0.254 mm) in diameter.

- (d) Dry abrasive blasting is an approved method for corrosion removal from magnesium alloys. Air pressures of 10 to 35 psi, should be used on magnesium alloy surfaces. Refer to paragraph 5.B.(4)(c).

S 372-078

- (8) After removing all corrosion that is visible through a 10-power magnifying glass, apply the proper corrosion treating solution, refer to paragraph 8.C.(4), and wash the area thoroughly with clean water.

S 322-079

- (9) Fair out depressions resulting from any rework as per paragraph 5.B.(1), and polish the surface finish with No. 400 or No. 600 grit abrasive paper. Select the appropriate abrasive material per as figure 204.

S 112-080

- (10) Clean the reworked area.

S 212-081

- (11) Determine the depth of the faired depression, as per paragraph 5.B.(2) to ensure that the depth rework limits have not been exceeded.

S 372-082

- (12) Treat the reworked area (AMM 51-00-58/201).

**CAUTION:** THE FOLLOWING PROCEDURES ARE NOT APPLICABLE TO ADHESIVE BONDED PARTS OR ASSEMBLES, AREAS WHERE THE CHEMICAL AGENTS MIGHT BECOME LODGED, OR LOCAL BARE AREAS SPECIFIED FOR GROUNDING OR ELECTRICAL BONDING PURPOSES.

#### C. Corrosion Removal (CHEMICAL)

S 212-148

- (1) Positively identify that the metal is magnesium.

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S 142-084

- (2) Remove any loose corrosion products with aluminum wool.

S 952-085

- (3) Mask off other materials and parts, especially rubber parts, bearings, cast or pressed inserts, and plated steel to prevent any contact with the treating solution, or its fumes.

S 832-086

- (4) Two chemical preparations are available and to prepare the solutions, do the following:

(a) Chromium Trioxide preparation

- 1) A Chromic acid solution may be used to remove surface oxidation and light corrosion products from magnesium surfaces. This method is not adequate where deep pitting or heavy corrosion have occurred, which will require mechanical methods of removal.
- 2) If properly used, the chemical method causes less reduction in the cross-section thickness of the material.
- 3) Parts that contain copper-based inserts will not be treated with the chemical removal method, unless properly masked off.
- 4) Excessive amounts of fluorides, sulfates, or chlorides must not be allowed to build up in the solution, as these compounds tend to create a coating, and etch the metal rather than clean the surface.

**WARNING:** ADD THE CHROMIUM TRIOXIDE TO WATER; DO NOT ADD WATER TO THE CHROMIUM TRIOXIDE.

- 5) To make one(1) U.S. gallon (3.79 LITER) of solution add 24 ounces (680.38 grams) of chromium trioxide to clean water in a mixing container of lead lined steel, stainless steel or 1100 aluminum.

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- 6) Reaction time is 1 to 15 minutes when heated to 190 to 202 degrees (F.) (87.8 to 94.4 degrees C.). A longer reaction time is required when mixed at room temperature.
- (b) Sodium Dichromate/Nitric Acid Preparation
  - 1) To prepare the solution, use the following portions:
  - 2) Mix 1.5 pounds (0.68 kg) of sodium dichromate and 1.5 pints (0.71 liter) of concentrated nitric acid for every 1 gallon (3.79 liter) of clean water.

NOTE: The solution should be prepared and stored in clean glass or polyethylene containers.

- 3) Fill a suitable container with a volume of water equal to approximately 1/4 the desired total quantity of solution.
- 4) Add a full quantity of sodium dichromate in proportions indicated above, and agitate until the chemical is dissolved.
- 5) Add another volume of water until the quantity of the solution is equal to 2/3 the total desired quantity.
- 6) Slowly add the total volume of nitric acid to the solution, and mix thoroughly.
- 7) Add water until the total desired quantity of solution is reached and stir until the entire solution concentration is equal.
- 8) Remove any corrosion by carefully applying the chromate acid solution to the corroded area with an acid resistant brush.
- 9) Allow the solution to remain on the surface approximately 15 minutes; agitate the the solution on the surface with the brush. Wipe dry with a clean cloth.
- 10) Rinse thoroughly with clean water while scrubbing with the brush, and wipe dry.
- 11) Repeat the steps as necessary until all of the corrosion products have been removed, and a bright metallic color of the metal appears.
- 12) Fair out any depressions that result from the rework as per paragraph 5.B.(1).
- 13) Apply the surface treatment, after the corrosion removal (AMM 51-00-58/201).

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TASK 51-00-53-102-087

9. Corrosion Removal Procedures for Carbon Steel

A. General

- (1) Carbon steel, in its heated-treated form, is used in areas where high structural or aerodynamic loads occur on the airplane, for example:
  - (a) Landing gear
  - (b) Flap tracks
  - (c) Structural splices
  - (d) Terminal fittings and miscellaneous brackets
  - (e) Red 'iron' rust is one of the most familiar kinds of corrosion on carbon steel, and generally is caused by the formation of ferrous oxides due to atmospheric exposure.
  - (f) Some surface metal oxides are purposely used to protect the underlying base metal.
  - (g) Red 'iron' rust is not one of these, and actually attracts moisture from the air and promotes additional corrosion.
  - (h) The red rust first shows on unprotected airplane hardware such as bolts, nuts and exposed fittings.
  - (i) Slight corrosion damage on highly stressed steel parts can become potentially dangerous, and the so the rust must be removed and controlled.
  - (j) Corroded steel parts should be removed from the airplane for treatment, if possible
  - (k) The general procedures for the removal of corrosion are provided in the following paragraphs.

**WARNING:** PERSONNEL USING THESE PROCEDURES WILL OBSERVE THE SAFETY PRECAUTIONS AND PROCEDURES OUTLINED IN PARAGRAPH 2.

B. Corrosion Removal (MECHANICAL)

§ 212-147

- (1) Positively identify the metal as steel, and determine its heat-treatment value.

§ 952-089

- (2) Protect the adjacent areas to prevent any additional corrosion damage from the corrosion products being removed during the mechanical removal.

§ 112-090

- (3) If any grease or soil is present, clean the rework area as per paragraph 4.

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S 152-091

- (4) Remove (strip) any paint, if applicable, per paragraph 6.

S 122-092

**CAUTION:** HAND-HELD POWER TOOLS MUST NOT BE USED ON HIGH-STRENGTH STEELS HEAT-TREATED TO 220,000 PSI AND ABOVE. EXERCISE EXTREME CARE NOT TO OVERHEAT THE STEEL SURFACE WHEN USING TOOLS ON HIGH-STRENGTH STEEL.

- (5) Corrosion removal on steels heat-treated to 220,000 psi and above will be accomplished by dry abrasive blasting, as outlined in paragraph 5.B.(4)(c), with blasting pressure ranging from 40 to 70 psi, or hand tools described in paragraph 5.B.(3).

S 142-093

- (6) Mechanically remove all corrosion from steel parts heat-treated below 220,000 psi as follows:
- (a) Remove heavy corrosion products using stainless steel hand brush. Use dry abrasive blasting per paragraph 5.B.(4)(c), as an alternate method with blasting pressures ranging from 40 to 70 psi.
  - (b) Remove residual corrosion by hand sanding or with approved hand-operated power tool as outlined in paragraph 5.B.(3). Select appropriate abrasives figure 204.

S 212-094

- (7) Make a visual check through a 10-power magnifying glass to ensure that all of the corrosion has been removed.

S 322-095

- (8) Fair out any depressions resulting from the rework as per paragraph 5.B.(1), and finish the surface with No. 400 grit abrasive paper selected from figure 204.

S 112-096

- (9) Clean the reworked area.

S 222-097

- (10) Determine the depth of the faired depression as per paragraph 5.B.(2), and ensure that the reworked depth limits have not been exceeded.

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S 372-098

- (11) Chemically treat the reworked area immediately upon finishing the rework (AMM 51-00-58/201).

C. Corrosion Removal (CHEMICAL)

S 182-121

**CAUTION:** STEEL PARTS THAT ARE HEAT-TREATED ABOVE 220,000 PSI ARE SUBJECT TO HYDROGEN EMBRITTLEMENT, AND THE USE OF ACIDS IS PROHIBITED.

- (1) Chemical rust removers are of either the acid or alkaline type.

S 182-100

- (2) The acid type is intended for use in removing the rust or black oxide formations by either immersion or brush application of the chemical treatment.

S 182-101

- (3) The alkaline types are intended for use in removing red rust by an immersion treatment.

S 182-102

- (4) Procedures for the use of both types of rust removers are provided below.

S 372-103

- (5) Inhibited Phosphoric Acid Base Rust Remover - Brush-on Method
- (a) Positively identify the metal as being steel.
  - (b) Protect adjacent areas to prevent any additional damage from the chemical corrosion removal agents.
  - (c) If grease or soil is present in the work area, clean the area as per paragraph 4.
  - (d) Remove any heavy rust by chipping and/or wire brushing with a stainless steel bristle brush.

**WARNING:** DO NOT ADD WATER TO THE ACID COMPOUND; ONLY ADD THE ACID COMPOUND TO THE WATER. WATER ADDED TO ACID CAN BOIL AT AN EXPLOSIVE RATE AND CAUSE INJURY TO PERSONNEL AND/OR DAMAGE TO EQUIPMENT.

- (e) Dilute the concentrated acid, according to the manufacturer's instructions, in an acid resistant mixing container.

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- (f) Apply the acid mixture to the corroded area with an acid-resistant brush. Allow the mixture to remain long enough to loosen the rust (2 to 10 minutes) and then rinse completely with clean water.
- (g) Visually examine the corroded area with a 10-power magnifying glass.
- (h) If any corrosion is still evident, repeat the application of the mixture and rinse thoroughly.
- (i) After the corrosion removal is complete, blend or fair the affected area as per paragraph 5.B.(1).
- (j) Determine the depth of the faired depressions per paragraph 5.B.(2), to ensure that the rework limits have not been exceeded.
- (k) Chemically treat the surface of the reworked area immediately upon finishing the rework (AMM 51-00-58/201).

S 372-104

(6) Alkali Type Rust Remover

- (a) Positively identify the metal as steel.
- (b) Protect the adjacent areas and components to prevent damage from the chemical agents, chips, scales or corrosion products.
- (c) Remove any grease and soil from the corrosion damage area as per paragraph 4.
- (d) Remove heavy rust by chipping and/or wire brushing, with a stainless steel bristle brush.

**WARNING:** ALKALI RUST REMOVER, SODIUM HYDROXIDE BASE, IS HIGHLY ALKALINE AND, THEREFORE, HARMFUL TO SKIN AND EYES. PERSONNEL SHOULD WEAR RUBBER (TYPE) GLOVES, APRONS AND GOGGLES WHEN WORKING WITH THIS MATERIAL. ALSO, WORK ONLY IN AREAS WITH ADEQUATE VENTILATION.

- (e) Prepare the alkali based rust remover solution per the manufacturer's instructions. Carbon steel or corrosion resistant steel containers may be used.
- (f) Immerse the parts in the rust remover solution. Temperatures up to the boiling point of the solution may be used to increase the rate of removal.
- (g) Thoroughly rinse the parts in clean water.
- (h) Visually examine the parts, for complete corrosion removal, with a 10-power magnifying glass.
- (i) If corrosion still exists, repeat the immersion procedures.
- (j) Dry the area thoroughly and fair or blend any depressions from the corrosion removal as per paragraph 5.B.(1).

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- (k) Determine the depth of the faired depression per paragraph 5.B.(2), to ensure that the rework depth limits have not been exceeded.
- (l) Chemically treat the surface of the rework area immediately after finishing the rework (AMM 51-00-58/201).

TASK 51-00-53-102-139

10. Corrosion Removal Procedures for Stainless Steel and Nickel-Chromium Alloys

A. General

- (1) Stainless Steel and Nickel-Chromium Alloys are used where corrosion resistance is one of the major considerations in the design of a component or system.
- (2) In most applications these steels will have no other surface protection, except for matching color schemes of the surrounding structure or dissimilar metal organic coatings.
- (3) Stainless steel and nickel-chromium steels, however, are not free from corrosion attack. Corrosion will appear as pitting and will usually be black in color.
- (4) The existence of corrosion products prevents a passive environment at the stainless steel surfaces, and creates an active/passive corrosion cell (AMM 51-00-50/201). It is, therefore, necessary that any corrosion removal is done completely.

**CAUTION:** ABRASIVE BLASTING OR GRINDING WILL NOT BE USED ON THIN WALLED TUBES OR THIN WEBS LESS THAN 0.0625 INCH (1.588 MM) THICK.

B. Corrosion Removal (MECHANICAL)

S 182-110

- (1) Use the same general corrosion removal procedures as those used for Carbon Steel.

C. Corrosion Removal (CHEMICAL)

S 182-111

- (1) In severely corroded areas and where chemical agents will not be trapped in cracks, crevices, lap joints, etc., the chemical removal methods described for corrosion removal on Carbon Steel can be used.

TASK 51-00-53-102-140

11. Corrosion Removal Procedures for Titanium Alloys

A. General

- (1) Titanium alloys are used in several locations in the airplane, particularly in high-temperature areas where high-strength members are exposed to a corrosive environment.

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- (2) Exposure of the titanium surface to fire resistant hydraulic fluids, such as BMS 3-11, causes hydrogen embrittlement, subsequently leading to pitting of the surface.
- (3) The alloy is generally corrosion resistant. Corrosion, however, can appear as white or black color oxides.
- (4) Corrosion removal can be accomplished per the following procedures:

**WARNING:** SMALL CHIPS OR SLIVERS OF A TITANIUM ALLOY, WHICH ARE THE RESULT OF A MACHINING PROCESS OR PROCEDURE, CAN EASILY IGNITE AND CAUSE AN EXTREME FIRE HAZARD TO DEVELOP. EXTINGUISH SUCH FIRES WITH (ABSOLUTELY) DRY TALC, CALCIUM CARBONATE, SAND OR GRAPHITE.

**WARNING:** DO NOT USE WATER, CARBON DIOXIDE, CARBON TETRACHLORIDE OR THE ORDINARY DRY CHEMICAL FIRE EXTINGUISHER.

**B. Corrosion Removal (MECHANICAL)**

S 112-112

- (1) If grease or soil are present, clean the area as per paragraph 4.

S 142-114

- (2) Hand polish with aluminum polish and a clean soft cloth, until all traces of the corrosion or surface deposits are removed.

S 142-122

- (3) Remove the polish with a soft cloth.

S 372-123

- (4) Treat the rework area (AMM 51-00-58/201).

**C. Corrosion Removal (CHEMICAL)**

S 182-124

- (1) Because titanium is susceptible to hydrogen embrittlement when exposed to acid solutions, chemical corrosion removers are not permitted.

TASK 51-00-53-102-141

**12. Corrosion Removal Procedures for Plated or Phosphated Surfaces**

**A. General**

- (1) Metal parts are plated either to provide a smooth surface for wear resistance, or to provide a sacrificial metal to protect the base metal.
- (2) Phosphate treatments on a metal surface provides a good adhesion surface for organic finishes, and provides good wear and corrosion resistance when used with oil or corrosion preventive compounds.
- (3) Cadmium plating corrosion will appear as a dull gray product.

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- (4) Phosphate treated surfaces will appear as a red-black part, darker than common rust, when corroded.

B. Corrosion Removal from Cadmium Plated Surfaces

S 952-125

- (1) Protect all adjacent areas from any contaminants during any corrosion removal.

S 112-126

- (2) If grease or soil is present, clean as per paragraph 4.

S 142-128

- (3) If corrosion appears only on the plated surfaces, rework as follows:
  - (a) Remove all corrosion products by rubbing lightly with stainless steel wool. Limit the rework area to a minimum so that the plating material in adjacent areas is preserved.
  - (b) Apply a chromic acid solution to the corroded area and allow it to remain on the surface for 30 to 60 seconds.
  - (c) The chromic acid solution will be 4 ounces (113.4 grams) of chromium trioxide to 1 U.S. gallon (3.785 liters) of clean water.
  - (d) Rinse with clean water and air dry.

S 212-129

- (4) If corrosion has penetrated to the base metal, rework as follows:
  - (a) Determine from the Structural Repair Manual (SRM) if the part can be reworked or must be replaced.
  - (b) If the part can be reworked, identify the base metal and remove the corrosion as per the applicable procedures.

S 372-130

- (5) Treat the rework surface (AMM 51-00-58/201)

C. Corrosion Removal from Plated Surfaces (EXCEPT CADMIUM PLATED SURFACES)

S 952-131

- (1) Protect all adjacent areas from any contaminants during the corrosion removal procedures.

S 112-132

- (2) If grease or soil are present, clean the area per paragraph 4.

S 142-133

- (3) Remove any heavy corrosion by mechanical methods as per paragraph 5.B.(3).

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S 112-134

- (4) Remove any remaining corrosion using a phosphoric acid base rust remover (mixed at a ratio of 1:1). Allow the acid solution to remain on the surface only long enough to remove the corrosion.

S 172-135

- (5) Thoroughly rinse the acid solution from the surface with clean water and allow to air dry.

S 372-138

- (6) Treat the reworked surface (AMM 51-00-58/201).

D. Corrosion Removal from Phosphated Surfaces

S 372-136

- (1) Phosphated cadmium surfaces will be treated as per the procedures for cadmium plated surfaces.

S 372-137

- (2) Phosphated ferrous alloys will be treated as per the procedures for carbon steel.

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CORROSION PREVENTION - CORROSION REMOVAL TECHNIQUES  
PROCEDURES AFTER MERCURY SPILL - MAINTENANCE PRACTICES

1. General

- A. The corrosive action of mercury is very rapid. Because of this, when a spill happens, immediate actions must be taken after the spillage is discovered.
- B. Mercury amalgamates (combines) readily with aluminum alloys at room temperature if the oxide film on the aluminum has been scratched or damaged. Once a small area of aluminum has been amalgamated, corrosion occurs. This process is accelerated by moisture and particularly by salt water.
- C. The amalgamation of stressed aluminum structure may also result in rapid cracking, similar to stress corrosion cracking.
- D. Mercury is not consumed in the amalgamation process. As the aluminum oxidizes, it separates from the amalgam and the mercury continues to attack fresh aluminum.
- E. The presence of organic finishes, greases, or a thick and continuous oxide layer will retard the amalgamation process.
- F. Detection
  - (1) A grayish-white powder, or flurry, coating on aluminum surfaces will indicate the presence of corrosion caused by spilled mercury.
  - (2) The presence of even small amounts of mercury can be detected by a sniffer. This is an electronic device that is sensitive to mercury vapors.
  - (3) X-ray pictures can also be taken and mercury will show up on the film as small white spots. Corrosion will show up as tree-like forms penetrating a structural component.
- G. Personnel Precautions

**WARNING:** ALWAYS PROVIDE SUFFICIENT AND AMPLE VENTILATION WHILE CLEANING AREAS CONTAMINATED BY MERCURY.

**WARNING:** DO NOT EAT, DRINK, SMOKE OR MAKE CONTACT WITH YOUR FACE AFTER CONTACTING MERCURY, WITHOUT FIRST THOROUGHLY WASHING YOUR HANDS.

- (1) Appreciable amounts of mercury will vaporize at normal temperatures to the extent that a stagnant air mass can become dangerous to a person's health.
- (2) Free mercury, or amalgam, must not be picked up by hand.
- (3) Clean any tools that are used with soap and hot water, or a steam bath. Discard any drill bits after being used on structures that are contaminated by mercury.

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TASK 51-00-54-102-077

2. Isolation of Contaminated Areas

A. On discovery of a mercury spill, steps must be taken to avoid enlarging the contaminated area. The following precautions are advised:

S 012-078

- (1) Do not remove any access/inspection panels, plates, or even fasteners, that could result in the spreading of the mercury. Open such access/inspection panels or plates only after such times as the area has been thoroughly cleaned up.

S 192-079

- (2) If hands become contaminated, do not touch any exposed metal in the surrounding areas, to keep these areas from becoming contaminated.

S 192-081

- (3) Mercury spreads easily from one surface to another by adhering to a person's hands, clothing, shoes, tools, etc. Keep all traffic in the contaminated area to a minimum.

S 192-082

- (4) Wear foot covers (wing socks) to prevent damaging the finish. Failure to wear foot covers can result in exposing any bare metal to corrosion attack.

S 952-083

- (5) Consider protecting uncontaminated areas by taping down protective material such as plastic sheeting. Plastic sheeting or toweling can also be taped over a contaminated area to isolate it while equipment is being collected for the removal of the mercury.

TASK 51-00-54-102-097

3. Mercury Removal Methods

A. General

- (1) The first action to be taken, after a mercury spill is discovered, is to remove all visible mercury without delay.
- (2) The more primitive methods of removal are less effective than those requiring special equipment, but any possible method should be attempted when a speedy clean-up is essential.

B. Procedure

S 162-105

- (1) The following methods of mercury spill removal are suggested:
  - (a) Use paper or cardboard troughs to scoop up the mercury.
  - (b) Use adhesive tape to pick-up small droplets.

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- (c) Use a medicine dropper to retrieve globules.
- (d) Use a high-powered vacuum cleaner with a trap. See figure 201 for a suggested method of making a trap for a high-powered vacuum.
- (e) Use one of the special mercury pick-up brushes that attract the mercury. Some foam pads (sponges), that are commercially available, will pick up mercury.
  - 1) Refer to paragraph 4 for details of a suitable brush and paragraph 5 for a source of supply of brushes and sponges.
- (f) Use the special mercury vacuum cleaner, if available.

S 162-108

**WARNING:** ALL DETECTABLE MERCURY MUST BE REMOVED FROM THE AIRPLANE.

- (2) After removing all visible mercury, more sophisticated means must be employed to ensure that any hidden mercury is located and removed. A sensing device known as a mercury sniffer can be used, or even more effectively, X-Ray pictures can be taken.

S 162-107

- (3) Where there is evidence for the presence of mercury in joints, between faying surfaces, or trapped in any way between structural members, these members must be disassembled, as necessary, to permit a complete removal of the mercury.

C. Removal of Mercury Using Brushes

S 142-109

- (1) A special brush that is made from nickel plated carbon fiber that will pick up mercury, is available.

S 142-110

- (2) A brush made from fine copper wire can also be used to pick up spilled mercury. It is suggested that a suitable brush could be manufactured locally by using the fine wires used in domestic flexible electrical cable.

S 142-111

- (3) The procedures for using a copper brush are as follows:
  - (a) Dip the brush in nitric acid to clean the wires.
  - (b) Dip the brush into clean water to remove the nitric acid.
  - (c) Dip the brush into alcohol to remove the water.

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- (d) You can now pick up the mercury with the brush because the mercury adheres to the copper wires by forming an amalgam. After the brush has collected a quantity of the mercury, it can be shaken off into a suitable container, allowing the picking up process to continue.

D. Special Equipment

S 192-112

- (1) Because of the urgency involved in removing a mercury spill from an airplane, most of the previous procedures utilize materials that are readily available locally. However, the use of some special equipment is beneficial in ensuring that all traces of the mercury are removed. The sources of supply for these items are as follows:
  - (a) Mercury Vacuum Cleaner: NILFISK OF AMERICA, Inc. (V57573)
  - (b) Sensing Device (Mercury Sniffer): BECKMAN INDUSTRIAL CORP. (V73138), or SUNSHINE SCIENTIFIC INSTRUMENTS, Inc. (V06030)
  - (c) Nickel-Plated Carbon-Fiber Brushes: INTERNATIONAL RESEARCH AND DEVELOPMENT CO.
  - (d) Mercury Sponge: J. T. BAKER CHEMICAL CO. (V70829)

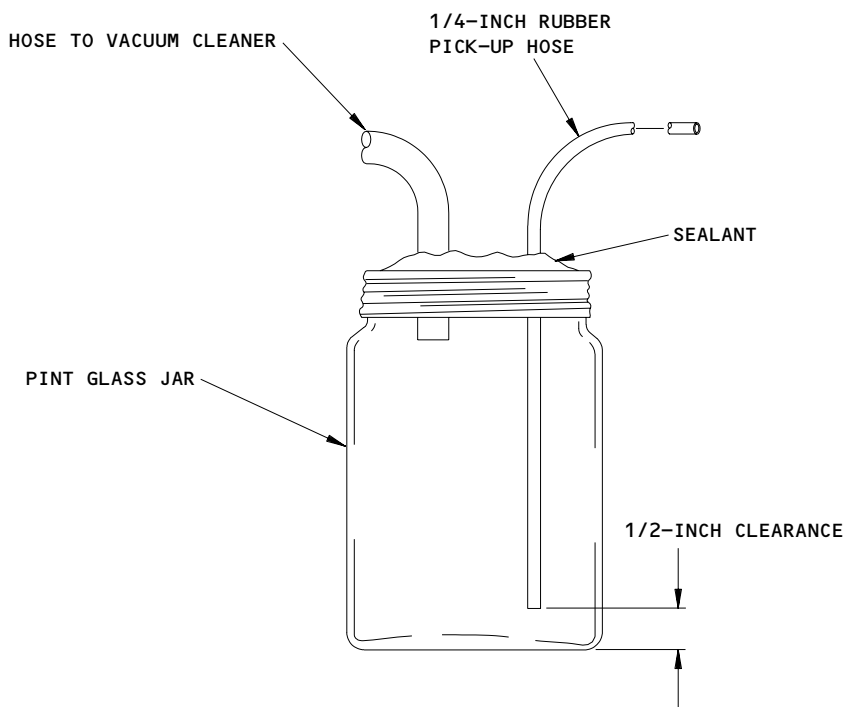
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**NOTE:** MERCURY VAPOR MAY CONTAMINATE THE VACUUM CLEANER.  
CLEAN THOROUGHLY AFTER USE.

Vacuum Cleaner Mercury Trap  
Figure 201

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CORROSION PREVENTION - CORROSION REMOVAL TECHNIQUES  
PROCEDURES AFTER FIRE DAMAGE - MAINTENANCE PRACTICES

1. General

- A. Service experience has shown that corrosion problems can occur if fire damaged areas are not immediately and properly cleaned. The sooty deposits resulting from burning organic materials and the residue from the use of dry powder type fire extinguishers are the prime sources of contamination that may initiate corrosion in metal systems and structures.
- B. The dry powder type fire extinguishers are considered very effective in combatting airplane fires, however, the powder from this type of extinguisher is decomposed by heat and forms carbon dioxide. The residual deposits from this decomposing is hygroscopic and forms sodium hydroxide when moisture is absorbed from the air or mixed with water from airplane flushing.
- C. Sodium hydroxide is alkaline and can cause corrosive damage to aluminum structures, electrical components, etc. The use of large quantities of water for flushing is necessary in every compartment, crevice and corner, and behind electrical panels to eliminate all traces of this rather insoluble white powder.
- D. BCF and similar halogen type fire extinguishers normally leave no chemical residue to corrode parts or surfaces. However, when subjected to flames or hot surfaces, halogenated agents can decompose to produce small amounts of halogen acid.

TASK 51-00-55-202-009

2. Preventive Maintenance

A. General

- (1) Remove fire damaged interiors to expose the airplane's structure. This should include the interior trim, seats, passenger service units, linings, carpet, insulation, galleys, etc.
- (2) Removal of tubing, cables, electrical wiring, etc., is not necessary if they are not affected.

B. Procedure

S 212-010

- (1) Before beginning the corrosion removal, do the following:
  - (a) Screen or mask off any areas not affected.
  - (b) Open all drains, hatches and doors for drainage and ventilation. Use compressed air to blow out all hidden recesses.

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- (c) Inspect the airplane's structure for heat damage, soot, fire extinguishing material residue and corrosion. Any paint discoloration may indicate that temperatures exceeded 350 degrees (F.) (180 degrees C.) and will require a thorough structural analysis.
- (d) Check for acid contamination of the structure, control cables and wire bundles using litmus paper. Products of combustion or decomposed fire extinguishants may combine with moisture to form corrosive chemicals.
- (e) Flush the structure with water, to remove any contaminants, and replace any control cables, wire harnesses, etc., as necessary.
- (f) Remove and replace any structure that has been damaged beyond repair.

**NOTE:** Use Eddy Current inspection techniques, outlined in the Nondestructive Test Manual, to determine if a change in the heat-treatment of any suspect structural member has occurred.

**WARNING:** SOLVENTS CAN CAUSE SKIN IRRITATIONS AND THE VAPOR MAY IRRITATE EYES AND RESPIRATORY SYSTEM (AVOID PROLONGED BREATHING OF THE VAPORS OR REPEATED CONTACT WITH THE SKIN). SOLVENTS CAN ALSO CAUSE HEADACHES, SLEEPINESS OR FAINTING. ONLY USE SOLVENTS IN AREAS WITH ADEQUATE VENTILATION. FACE SHIELDS AND PROTECTIVE CLOTHING SHOULD BE WORN.

- (g) Remove any soot by washing the affected area with 1.1.1 - Trichloroethane, Aerofluor 343 or Shopmaster RTU, non-flammable solvent-type cleaner.
- (h) Pressure gun application is recommended for flushing fay surface joints, such as stringers to airplane body skins.
- (i) A plastic container or an absorbent cloth held beneath the area will catch the contaminated solvent.

**WARNING:** SODIUM DICHROMATE IS TOXIC IF TAKEN INTERNALLY. USE PROTECTIVE CLOTHING, FACE MASK AND RESPIRATOR WHEN SPRAYING THE CLEANING SOLUTION. CONTACT THE LOCAL AUTHORITIES FOR WASTE DISPOSAL REQUIREMENTS.

- (j) Inhibit any corrosion that could be caused by the residue from the dry powder fire extinguisher by washing the affected areas with a 10-percent (by weight) solution of sodium dichromate. The dichromate solution acts as a mild corrosion inhibitor.

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- (k) Thoroughly dry all treated surfaces before continuing with any other treatment.
- (l) Repeat the rinsing and inhibition treatment if any white residue appears.

NOTE: Any remaining liquid dichromate solution will seep through seams and fastener holes during cabin pressurization, and could subsequently discolor the exterior paint finish. The use of forced hot air to dry the area may be necessary before any further flights, if the humidity is high.

- (m) Inspect for any remaining residue contaminates. Contaminates that remain behind such items as clips, brackets, nutplates, etc., may require the removal of the item before cleanup can be completed.

S 122-011

- (2) Remove all corrosion using one of the methods as described in AMM 51-00-53/201.

S 372-012

- (3) Treat all reworked surfaces per AMM 51-00-58/201, and paint the surfaces the same as the surrounding areas (AMM 51-00-59/201).

S 392-014

- (4) Apply clear (Type I) BMS 3-23 corrosion inhibiting compound to the cleaned-up affected areas, especially the skin-to-stringer joints. Allow areas to air-dry thoroughly before reinstalling the insulation blankets.
  - (a) It is important that the affected areas be covered with a continuous film. Use a clean cloth or brush to spread any puddles of corrosion inhibiting compound.
  - (b) A thin, even application is all that is needed to provide corrosion protection and to prevent moisture from causing the sodium dichromate to go into solution again, with the possible resultant staining of exterior surfaces.

S 412-015

- (5) Replace all of the interior items that were removed, and restore the airplane to serviceable condition.

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CORROSION PREVENTION - CORROSION REMOVAL TECHNIQUES  
PROCEDURES AFTER ALKALINE SPILL - MAINTENANCE PRACTICES

1. General

- A. Alkaline spills are caustic and can cause corrosive damage to airplane structures, unless neutralized.
- B. The primary source of alkaline spillage is in the battery compartments, where alkaline electrolytes can overflow during charging or spill during battery servicing.
- C. Alkaline-based corrosion removal compounds and airplane cleaners are used quite extensively during routine maintenance operations. Without thoroughly neutralizing, and/or rinsing, a spilled alkaline compound can produce corrosion damage.
- D. Containers of alkaline compounds can be part of a cargo and may be broken during loading or unloading. Spillage from such sources are usually larger in scale than battery electrolyte spills. It is therefore recommended that the neutralization of the alkaline be accomplished as soon as possible.
- E. Detection
  - (1) Alkalines are clear and not color detectable. However, spillage is usually spread by personnel working in the immediate area. Such known spills should be neutralized as soon as possible.
  - (2) In events where alkaline spillage has gone undetected and has penetrated the protective finishes, a white powdery deposit (aluminum oxide) would indicate corrosion on an aluminum structure.
  - (3) In other instances, particularly around the top of nickel-cadmium battery cells, the alkaline electrolyte that has overflowed the vent caps, reacts with the carbon dioxide in the air and produces a white powdery deposit. This powdery deposit is not corrosive and is considered harmless, but it is an indication that electrolyte has spilled or otherwise escaped.
- F. Personnel Protection

**WARNING:** ALKALINES THAT ARE ACCIDENTLY SPILLED ON SKIN, CLOTHING OR OTHER MATERIAL SHOULD BE IMMEDIATELY FLOODED WITH CLEAN WATER. IF EYES HAVE BEEN SPLASHED WITH ALKALINE, FLOOD THEM WITH CLEAN WATER OR A BORIC ACID SOLUTION AND GO TO A MEDICAL FACILITY IMMEDIATELY.

- (1) Adequate protective clothing (rubber or plastic gloves, goggles, face shield, rubber apron, boots, etc.) should be worn when handling alkaline items (batteries) or working in an alkaline contamination area.
- (2) Individuals should thoroughly wash their hands after using alkaline neutralizing treatment solutions, and/or materials, before eating.

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- (3) Waste materials, solvents, chemical solutions, wiping rags, masking materials, etc., should be collected and safely disposed of.

TASK 51-00-56-102-001

2. Isolation of Contaminated Area

- A. After the discovery of an alkaline spill, steps should be taken to contain the contamination. The following procedures are advised:

S 162-002

- (1) Do not allow alkaline spills to spread to adjacent areas that will not be cleaned.

S 952-003

- (2) In battery areas, the use of plastic sheeting to protect any equipment underneath the battery compartment is advised. If the equipment is in operation, venting should be maintained.

S 952-004

- (3) Protect all uncontaminated areas by covering and securing protective material such as plastic sheeting.

TASK 51-00-56-102-015

3. Alkaline Spillage Cleanup

- A. Cleanup of alkaline spillage should be accomplished by using the following procedures:

S 952-005

- (1) If any equipment is adjacent to the treatment area, use plastic sheeting to cover the equipment in order to prevent them from being splashed by the alkalines or treatment fluids.

S 162-006

- (2) Wipe up all excess fluids with cloths, and discard the cloths into plastic bags or containers for proper disposal.

S 112-007

- (3) Neutralize the treatment area with a 5 percent acetic acid solution, or full strength household vinegar applied with a brush or cloth swab.

S 112-008

- (4) Continue to apply the solution until all chemical reaction ceases. Then, allow the solution to remain on the surface for an additional 5 minutes. Particular attention should be given to faying surface joints. A high pressure spraying application may be necessary to flush the joint thoroughly.

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- S 092-009
- (5) Remove the neutralized mixture from the contaminated area.
- S 162-014
- (6) Rinse the affected area with large quantities of clean water, occasionally agitating the surface with a soft brush.
- S 212-010
- (7) Neutralization of the alkaline fluid should be determined with litmus paper.
- S 162-011
- (8) Wipe the area dry with clean cloths.
- S 372-012
- (9) After thoroughly drying the area, repair or replace any damaged to the finish if at all possible.
- (a) Refer to AMM 51-00-58/201 or AMM 51-00-59/201 for protective finish systems.
- S 622-013
- (10) Apply BMS 3-23 water displacing corrosion inhibiting compound over the entire area.

**NOTE:** For details on the application of BMS 3-23, refer to AMM 51-00-59/201.

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CORROSION PREVENTION - CORROSION REMOVAL TECHNIQUES  
PROCEDURES AFTER ACID SPILLS - MAINTENANCE PRACTICES

1. General

- A. Acid spills, unless neutralized, can rapidly corrode metallic structures.
- B. The primary source of alkaline spillage is in the battery compartments where acid electrolytes may overflow during battery charging or are spilled during battery servicing.
- C. Acid-based corrosion removal compounds and airplane cleaners are used quite extensively during routine maintenance and repair. Spills do occur at times and thorough neutralizing and/or rinsing is necessary to preclude corrosion damage.
- D. Containers of acid concentrates or acid-based chemicals may be part of a cargo, and may be broken during loading or unloading. Spillage from such sources are usually larger in scale than battery electrolyte or maintenance servicing chemical spills mentioned in paragraph B and C. It is, therefore, advisable that the acid spillage be neutralized as soon as possible.
- E. Operators should also be aware of the fact that acids can deteriorate nonmetallic materials such as fabrics, wood, leather, etc.
- F. The F.A.A. has required the removal of all lithium sulfur dioxide batteries from all U.S. civil aircraft. This is due to the fact that many incidents have been reported in which lithium sulfur dioxide batteries have burned or vented violently. Some batteries have also leaked sulfur dioxide gas, which combines with moisture to form extremely corrosive sulfurous acid.
- G. Detection
  - (1) Any discoloration on the surface should be suspect, and investigated. Black, white, yellow and brown are predominant chemical reaction precipitate colors. Precipitate colors depend on the acid and the material on which the acid is spilled.
- H. Personnel Protection

**WARNING:** ACIDS THAT ARE ACCIDENTLY SPILLED ON SKIN, CLOTHING OR OTHER MATERIAL SHOULD BE IMMEDIATELY FLOODED WITH CLEAN WATER. IF EYES HAVE BEEN SPLASHED WITH ACID, FLOOD THEM WITH LARGE AMOUNTS OF CLEAN WATER AND IMMEDIATELY GO TO A MEDICAL FACILITY FOR TREATMENT.

- (1) Adequate protective clothing (rubber or plastic gloves, goggles, face shield, rubber apron, boots, etc.) should be worn when handling acids or working in acid contaminated areas.
- (2) Always wash hands thoroughly after using acid neutralizing treatment solutions and/or materials, before eating.

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- (3) All waste materials such as solvents, chemical solutions, wiping clothes, masking materials, etc., should be collected and properly disposed of.

TASK 51-00-57-102-004

2. Isolation of Contaminated Area

- A. On discovering any acid spill, steps should be quickly taken to contain the contaminated area. The following precedures are advised:

§ 162-001

- (1) Do not allow acid spills to spread to adjacent areas that will not be cleaned.

§ 952-002

- (2) In battery areas, the use of plastic sheeting to protect any equipment underneath the battery compartment is advised. If the equipment is in operation, venting should be maintained.

§ 952-003

- (3) Protect all uncontaminated areas by covering and securing protective material, such as plastic sheeting.

TASK 51-00-57-102-005

3. Acid Spillage Cleanup

- A. Cleanup of acid spillage should be accomplished by using the following procedures:

§ 952-006

- (1) If any equipment is adjacent to the treatment area, use plastic sheeting to cover the equipment in order to prevent them from being splashed by the acids or treatment fluids.

§ 162-007

- (2) Wipe up all excess fluids with cloths, and discard the cloths into plastic bags or containers for proper disposal.

§ 112-008

- (3) Neutralize the treatment area with a 20 percent sodium bicarbonate solution applied with a brush or cloth swab. Particular attention should be given to faying surface joints. A high pressure spray application may be required to flush the joint thoroughly.

**NOTE:** One pound (0.454 kg) of sodium bicarbonate in one gallon (3.79 liter) of water will give the desired mixture.

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- S 112-010
- (4) Continue to apply the solution until bubbling ceases. Then allow the solution to remain on the surface for an additional 5 minutes.
- S 092-011
- (5) Remove the neutralized mixture from the contaminated area.
- S 162-012
- (6) Rinse the affected area with generous quantities of clean water, occasionally agitating the surface with a soft brush.
- S 212-013
- (7) Neutralization of the alkaline fluid should be determined with the use of litmus paper.
- S 162-014
- (8) Wipe the area dry with clean cloths.
- S 372-015
- (9) After thoroughly drying the area, repair or replace damaged finishes if at all possible.
- (a) Refer to AMM 51-00-58/201 and AMM 51-00-59/201 for protective finish systems.
- S 622-009
- (10) Apply BMS 3-23 water displacing corrosion inhibiting compound over the entire area.

**NOTE:** For details on the application of BMS 3-23, refer to AMM 51-00-59/201.

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CORROSION PREVENTION – GENERAL INFORMATION  
STANDARD TREATMENT METHODS – MAINTENANCE PRACTICES

1. General

- A. In order to preclude the occurrence or recurrence of corrosion after corrosion removal or corrosion damage repair, the exposed surfaces of most metals must be immediately treated after rework is completed.
- B. These treatment include conversion coating, plating or the application of a thin protective film, i.e., oil or primer, over the base metal. The conversion coatings and primer applications also enhance the surface adhesion qualities for painting, if required.
- C. Some metals, such as stainless steel and titanium, which are basically corrosion resistant, do not require surface protection, except for painting to match the surrounding structure or in dissimilar metal applications when plating, painting or sealing becomes necessary.
- D. Corrosion Prevention – Although the surface finish has been restored by the treatment methods in this section, to minimize the recurrence of corrosion, service experience has shown that it is advantageous to apply a corrosion inhibiting compound over the surface finish in the more susceptible areas.
  - (1) Refer to the applicable sections in the AMM.
- E. Surface Treatment for Aluminum and Aluminum Alloys
  - (1) Aluminum and its alloys quickly form an invisible protective oxide film on the surface when exposed to the atmosphere. The oxide will provide corrosion protection in mild environmental conditions, but since the rework area is in a corrosion prone location further protection is required.
  - (2) All aluminum surfaces that have been reworked per AMM 51-00-53/201, or the applicable methods in the specific AMM chapters, should be cleaned and have a conversion coating applied. The coating materials chemically convert the aluminum surface into a very thin (0.00001 to 0.0005 inch) (0.000254 to 0.0127 mm) non-metallic chromated film as an integral part of the metal. This film is resistant to corrosion and an excellent adherent for subsequent priming.
  - (3) The conversion coating can be applied by alodizing or by Iridite treatment. Solutions used in both treatments are proprietary, but are readily available through most sources handling chemicals.
  - (4) There are several alodizing chemicals and the treatment procedures for each is presented in the following text. The treatment for Iridite is also included.

TASK 51-00-58-302-014

2. Alodizing Treatment

A. General

- (1) The alodizing chemicals used for aluminum treatment are:

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Alodine 1200 or 1200S (colored film)  
Alodine 1000, 1000L or 1500 (clear film)  
Nitric acid

- (2) The colored film on parts treated with Alodine 1200 or 1200S will vary from a light golden iridescent to a gold-brown.
- (3) Parts treated with Alodine 1000, 1000L or 1500 will have no color.
- (4) For most applications, Alodine 1200 or 1200S is recommended. (If the parts have BMS 10-20 primer, use only Alodine 600, because other coating materials, such as Alodine 1200 or 1200S, can cause a powdery coating to form if applied over cured BMS 10-20 primer).
- (5) Treatment of reworked areas may be accomplished either by immersion, where parts are removed from the airplane, or by manual coating methods.

B. Alodine Solution Preparation

S 372-084

**WARNING:** THE MATERIALS THAT ARE USED ARE TOXIC AND FLAMMABLE. SPONGES, WIPING CLOTHS AND TOOLS THAT COME IN CONTACT WITH ALODINE SHOULD NOT BE ALLOWED TO DRY WITHOUT THOROUGHLY RINSING THEM IN WATER.

**WARNING:** ALODINE POWDER THAT COMES IN CONTACT WITH COMPOUNDS MAY CAUSE COMBUSTION. IF ANY ALODINE SOLUTION IS SPLASHED INTO THE EYES OR ON THE SKIN, IMMEDIATELY FLUSH WITH LARGE AMOUNTS OF CLEAN WATER AND OBTAIN MEDICAL ASSISTANCE. IF ALODINE SOLUTION IS SPILLED ON CLOTHING, REMOVE THE CONTAMINATED CLOTHING AND WASH CLOTHING AND BODY WITH LARGE QUANTITIES OF CLEAN WATER.

- (1) All solutions, except Alodine 1000 or 1000L, will be mixed in and contained in stainless steel tanks, or in tanks lined with acid-resistant plastic or rubber. Alodine 1000 or 1000L solutions will be mixed in and contained in mild steel tanks.

S 372-002

- (2) The cleaned tank should be half filled with (make-up) water. Sprinkle the alodine chemical powder uniformly over the surface, or pour the liquid chemicals along the length of the tank. Stir the solution until the powder chemicals are completely dissolved or the liquid chemicals are completely mixed, then add more water to the volume desired.
  - (a) For large, long tanks, longitudinal agitation is recommended to keep the solution concentrations uniform.

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S 372-003

- (3) Prepare the Alodine 1200 and 1200S solutions for immersion applications in accordance with proportions and control shown in Table 1.

S 372-004

- (4) Prepare Alodine 1000, 1000L and 1500 solutions for immersion applications in accordance with proportions and control shown in Table 2.

S 372-005

- (5) Prepare alodine solutions for manual application in accordance with instructions in Table 3.

C. Alodine Surface Treatment

S 142-006

- (1) Wipe with a dry, clean cheesecloth to remove any base particles, and remove any residue from the treatment area.

S 142-007

- (2) Wipe with a cheesecloth that is dampened (not saturated) with solvent (series 88). Repeat the wiping, using a clean cheesecloth, until no visible residue transfers to the cheesecloth.

S 372-008

- (3) Allow the area to dry for a minimum of 15 minutes.

**NOTE:** A water break test can be used to determine the surface cleanliness. In this method, a mist of distilled water is atomized (sprayed) on the surface to be coated. If the water gathers and forms into droplets within 25 seconds, the surface will be considered as having failed the test. If the water forms a continuous film by flashing (spreading) out suddenly over a large area, the surface will also be considered as having failed the cleanliness test because of impurities on the surface. If the water-drops coalesce into a continuous film of water without a sudden flash and forms a lens (sheet), then the surface can be considered as having satisfactorily passed the water break test.

S 952-009

- (4) Mask off any dissimilar metal inserts, except for chromium, nickel, corrosion resistant steel or titanium.

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D. Immersion Application

S 372-011

- (1) Immerse the part in the alodine solution for 2 to 6 minutes. Use a test sample to find the correct immersion time.

E. Manual Application

S 372-013

- (1) Apply the alodine solution to the cleaned metal surface by brush, swab, swatches of saturated blotting paper, or a clean cellulose sponge.

S 372-085

**CAUTION:** EXERCISE CARE WHEN WIPING FRESHLY TREATED SURFACES TO AVOID SCRATCHING OR TEARING THE COATING.

- (2) Allow the solution to act on the surface for 1 to 5 minutes, until the coating is formed. Coating time will depend on the temperature of the part or area being coated. Maintain a continuous wet film on the surface of the work area.
  - (a) Coating time will depend on the temperature of the part or area being coated.
  - (b) Maintain a continuous wet film on the surface of the work area.

S 372-016

- (3) If, and wherever, difficulty is experienced in the formation of the coating, lightly abrading the area with a fine or very fine aluminum oxide nylon pad, soaked with the coating solution, will help.

S 372-017

- (4) Dirty surfaces may not take the coating and will require a rinsing off of the solution, thorough cleaning and re-application.

S 372-018

- (5) Areas with a powdery coating will need to be cleaned and recoated with fresh solution.

S 372-043

- (6) Remove excess alodine by thoroughly flushing the surface with clean water, then allow to dry at ambient temperature. If possible, blow dry with compressed air.

S 372-044

- (7) Apply any protective (decorative) finish, as required.

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S 952-045

- (8) Remove masking and protective coverings.

TASK 51-00-58-302-019

3. Iridite Treatment

A. General

- (1) The chemicals used in the Iridite Treatment are:

Iridite 14  
Iridite 14-2  
Nitric Acid

- (2) Iridite treating can be controlled by length of time as the solution is applied to give a yellow or a clear coating. Treatment of reworked areas may be accomplished by either the immersion or the manual coating methods.

B. Iridite Solution Preparation

S 372-020

- (1) All compressed air used for solution agitation, or for air drying parts, will be filtered to remove any oils, water and/or solid particles.

S 372-086

**WARNING:** THE MATERIALS USED FOR THE IRIDITE TREATMENT ARE TOXIC AND FLAMMABLE. SPONGES, WIPING CLOTHS AND TOOLS THAT COME IN CONTACT WITH THE IRIDITE SOLUTION SHOULD NOT BE ALLOWED TO DRY WITHOUT FIRST BEING THOROUGHLY RINSED WITH CLEAN WATER.

**WARNING:** IRIDITE POWDER CONTACTING ORGANIC COMPOUNDS MAY CAUSE COMBUSTION. IF ANY IRIDITE SOLUTION IS SPLASHED INTO EYES OR ONTO SKIN, IMMEDIATELY FLUSH WITH LARGE QUANTITIES OF FRESH WATER AND OBTAIN MEDICAL ASSISTANCE. IF IRIDITE SOLUTION IS SPLASHED ONTO CLOTHING, IMMEDIATELY REMOVE THE CONTAMINATED CLOTHING AND WASH THE CLOTHING AND BODY WITH CONSIDERABLE AMOUNTS OF FRESH WATER.

- (2) All containers use for the iridite solution should be fabricated from or lined with stainless steel or plastic. Some plastic materials that are suitable to use are polyethylene, Koroseal, Tygon, Lucoflex and Lucite.

S 372-022

- (3) Slowly add the iridite powder to room temperature water by the required concentration. Agitate the solution by stirring (clean filtered compressed air is also satisfactory) until all of the soluble material is dissolved.

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S 372-046

- (4) Prepare Iridite 14 or Iridite 14-2 solutions for immersion or manual applications in accordance with proportions and controls shown in Table 4.

C. Iridite Surface Treatment

S 142-023

- (1) Wipe the surface with a dry, clean cheesecloth to remove any loose particles and residue from the treatment area.

S 142-024

- (2) Wipe with cheesecloth dampened (not saturated) with solvent (series 88). Repeat the procedure using cheesecloth until no visible residue transfers to the cheesecloth.

S 142-025

- (3) Allow the treatment area to dry for a minimum of 15 minutes.

NOTE: A water break test can be used to determine the surface cleanliness. In this method, a mist of distilled water is atomized (sprayed) on the surface to be coated. If the water gathers and forms into droplets within 25 seconds, the surface will be considered as having failed the test. If the water forms a continuous film by flashing (spreading) out suddenly over a large area, the surface will also be considered as having failed the cleanliness test because of impurities on the surface. If the water-drops coalesce into a continuous film of water without a sudden flash and forms a lens (sheet), then the surface can be considered as having satisfactorily passed the water break test.

S 952-026

- (4) Mask off any dissimilar metal inserts, except for chromium, nickel, corrosion resistant steel, or titanium.

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D. Immersion Application

S 372-027

- (1) Immerse the part in the iridite solution for 1 to 6 minutes, until the desired coating is obtained.
  - (a) The use of a test sample is recommended to ascertain the correct immersion time.

NOTE: The iridite solution will accumulate sludge. For no reason, should the depth of the sludge be allowed to reach a point where it touches the parts.

E. Manual Application

S 372-087

CAUTION: DO NOT ATTEMPT TO BRUSH OUT THE SOLUTION LIKE PAINT, AS A SOFT COATING WILL SCRATCH OR TEAR WHILE STILL FRESH.

- (1) Apply the iridite solution liberally and evenly with a nylon brush, cotton swab, cellulose sponge or white blotting paper.

S 372-029

- (2) Maintain a continuous wet film for 3 to 6 minutes, if a yellow coating is required, and from 30 seconds to 3 minutes if a clear coating is required.

S 372-030

- (3) Remove any excess iridite solution by thoroughly flushing the part or area with clean water, then allow to dry at ambient temperature. If possible, blow dry with compressed air.

S 372-031

- (4) All powder that is visible on the parts after treatment should be wiped off with dry clean cloths.

S 372-032

- (5) Reapply the original protective finish.

S 952-033

- (6) Remove all masking and protective coverings.

TASK 51-00-58-302-034

4. Surface Treatment for Magnesium Alloys

A. General

- (1) The chemicals used for magnesium treatment are:

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Chromic Acid (CrO<sub>3</sub>)  
Calcium Sulfate (CaSO<sub>4</sub>·2H<sub>2</sub>O)

- (2) Magnesium alloys are highly susceptible to corrosion when the metal surface is exposed without a protective finish. An oxide-carbonate film will normally form on an exposed magnesium alloy surface, but this surface provides very little protection against corrosion. A proper protective finish is therefore required.
- (3) All magnesium alloy surfaces that have been reworked per AMM 51-00-53/201 will be cleaned and treated with a conversion coating. The coating materials convert the magnesium alloy surface into an inhibitive passive layer on the base metal that resists corrosion. This coating is applied using the brush-on method.

#### B. Solution Preparation

S 372-035

- (1) The solution should be prepared, and stored, in containers made of polyethylene or glass.

S 372-036

- (2) Prepare the solution using the following proportions and control.

**NOTE:** The chemicals should be added to the make-up water in the order that is given.

- |                     |   |
|---------------------|---|
| (a) Chromic Acid    | 1.3 ounce (38.45 ml) to 1 gallon (3.79 liter) |
| (b) Calcium Sulfate | 1 ounce (29.57 ml) to 1 gallon (3.79 liter)   |
| (c) Distilled Water | 1 gallon (3.79 liter)                         |
| (d) pH              | 1.2 to 1.6                                    |

**NOTE:** Adjust the pH with additions of sodium hydroxide or sulfuric acid as required.

S 372-037

- (3) Vigorously stir the solution for 15 minutes to ensure that it is saturated with the calcium sulfate.

S 372-038

- (4) Let the solution stand for 15 minutes to allow any undissolved calcium sulfate to settle on the bottom of the container.

S 372-039

- (5) Pour the mixed solution into another suitable container without transferring any undissolved calcium sulfate.

#### C. Conversion Coating Application

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S 142-047

**CAUTION:** THE FOLLOWING PROCEDURE IS NOT APPLICABLE TO ADHESIVE BONDED PARTS OR ASSEMBLIES, OR AREAS WHERE THE BRUSHED-ON SOLUTION COULD BECOME LODGED, OR ON LOCAL AREAS MADE BARE SPECIFICALLY FOR GROUNDING OR ELECTRICAL BONDING PURPOSES.

- (1) Wipe the treated area with a dry clean cheesecloth to remove any loose particles and residue.

S 142-048

- (2) Wipe the area with a cheesecloth dampened (not saturated) with solvent (series 88). Repeat the procedure using a clean cheesecloth until no visible residue transfers to the cheesecloth.

S 142-041

- (3) Allow the treatment area to dry for a minimum of 15 minutes.

**NOTE:** A water break test can be used to determine the surface cleanliness. In this method, a mist of distilled water atomized (sprayed) on the surface to be coated. If the water gathers and forms into droplets within 25 seconds, the surface will be considered as having failed the test. If the water forms a continuous film by flashing (spreading) out suddenly over a large area, the surface will also be considered as having failed the cleanliness test because of impurities on the surface. If the water-drops coalesce into a continuous film of water without a sudden flash and forms a lens (sheet), then the surface can be considered as having satisfactorily passed the water break test.

S 952-042

- (4) Mask off any dissimilar metal inserts, except for those made of chromium, nickel, corrosion resistant steel, or titanium.

S 372-052

**CAUTION:** SEVERE RUBBING OF WET SURFACES CAN CAUSE COATING DAMAGE.

- (5) Apply the solution by swabbing with a brush, swab, cellulose sponge or swatches of saturated white blotter paper. Maintain a continuous wet film until the metal surface becomes a golden to dark brown in color.

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S 372-050

- (6) Rinse with clean cold water.

S 372-053

**CAUTION:** DO NOT DIRECT HIGH PRESSURE AIR AT THE SURFACE WHILE DRYING AS THE COATING IS STILL SOFT.

- (7) Allow the surface to dry at ambient temperature. If possible, blow dry with compressed air.

S 372-051

- (8) Reapply any protective (decorative) finish, as required.

S 952-054

- (9) Remove masking and protective covering.

TASK 51-00-58-302-055

5. Surface Treatment for Carbon Steels

A. General

- (1) Bare surfaces of carbon (alloy) steels are highly reactive when exposed to the environment. Carbon steel is either cadmium or cadmiumtitanium plated after machining and heat treated.
- (2) Steel parts absorb hydrogen during processing operations and in service when hydrogen may be produced and diffused into the metal. Hydrogen absorption, can cause crack initiation and propagation, resulting in delayed brittle fracturing when the part is under sustained tensile strength.
- (3) The susceptibility of carbon steel parts to hydrogen embrittlement increases as hardness and strength increases.
- (4) Steel parts heat-treated to 180 ksi, and below, are not considered susceptible to hydrogen embrittlement, while steel parts heat-treated to 220 ksi, and above, are highly susceptible to hydrogen embrittlement and must be plated by low embrittlement processes.

B. Surface Treatment

S 352-056

- (1) In order to preclude the use of conventional plating processes, the rework of surfaces of all carbon steel parts will be cadmium plated by low hydrogen embrittlement cadmium plating processes.

S 372-057

- (2) Reapply a protective or the original finish after plating.

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TASK 51-00-58-302-067

6. Surface Treatment for Stainless Steels and Nickel-Chromium Alloys

A. General

- (1) No surface treatment is required after rework on nickel-chromium alloys.
- (2) Stainless steel requires treatment (passivation) after rework.

B. Finishes

S 372-058

- (1) Reapply original or decorative finish, if required.

TASK 51-00-58-302-068

7. Surface Treatment for Titanium Alloys

A. General

- (1) No surface treatment is required after rework on titanium alloys.

B. Finishes

S 372-059

- (1) Reapply original or decorative finish, if required.

TASK 51-00-58-302-069

8. Surface Treatment for Cadmium Plated or Phosphated Metals

A. General

- (1) The need for the reworking of cadmium plated surfaces indicates a break in the plated surface and the exposure of the base metal.

B. Cadmium Plating

S 382-088

**CAUTION:** STEEL PARTS THAT ARE HEAT-TREATED ABOVE 180 KSI ARE SUBJECT TO HYDROGEN EMBRITTLEMENT. LOW HYDROGEN EMBRITTLEMENT PLATING MUST BE USED.

- (1) Surface treatment should consist of replating of the base metal using low hydrogen embrittlement stylus cadmium plating.

S 382-061

- (2) Major rework will require stripping and replating.

C. Phosphate Coating

S 382-062

- (1) Phosphate coating is applied to the cadmium plating on alloy steels heat-treated to 180 ksi, and above, that are partially cadmium plated.

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- S 382-063
- (2) Surface treatment involves the use of phosphoric acid on the cadmium plating.
- S 382-064
- (3) If the cadmium is broken, replate as per paragraph A.(1) before coating.
- S 382-065
- (4) Phosphate coating of alloy steels heat-treated to 180 ksi, and below, is applied, instead of plating, to inaccessible areas such as inside of tubing, sharp bends, etc.
- S 382-066
- (5) The coating procedures of the base metal is the same as described in paragraph 9.C.(5) of AMM 51-00-53/201.

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TABLE 1 ALODINE SOLUTION PREPARATION FOR IMMERSION METHOD			
MATERIAL	VARIABLE	MAKE-UP *[1]	CONTROL
Alodine 1200	Concentration	1.2 oz/1 gal (34.02 gr/3.79 L)	1.0 to 3.0 oz/1 gal (28.35 to 85.05 gr/3.79 L)
	pH	- - - -	1.5 to 2.1 *[2]
	Temperature	- - - -	60 to 100 degrees (F.) (15.55 to 37.78 degrees C.)
Alodine 1200S	Concentration	1.2 oz/1 gal (34.02 gr/3.79 L)	1.0 to 3.0 oz/1 gal (28.35 to 85.05 gr/3.79 L)
	pH	- - - -	1.3 to 1.8 *[2]
	Temperature	- - - -	60 to 100 degrees (F.) (15.55 to 37.78 degrees C.)

\*[1] After make-up, allow the solution to set, undisturbed, for 24 hours before using. The small amount of precipitate which forms will not bother the coating process.

\*[2] Adjust the pH 1.8 to 2.0 with Alodine Toner 22. Approximately 1 percent by volume on make-up operation near the upper range is recommended. The pH may be lowered by additions of nitric acid or raised by additions of sodium hydroxide.

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TABLE 2 ALODINE SOLUTION PREPARATION FOR IMMERSION METHOD			
MATERIAL	VARIABLE	MAKE-UP *[1]	CONTROL
Alodine 1000 (Powder)	Concentration	0.15 oz/1 gal (4.25 gr/3.79 L)	0.14 to 0.18 oz/1 gal (3.97 to 5.10 gr/3.79 L)
	pH	- - - -	below 4.5 *[3]
	Temperature	- - - -	140 to 150 degrees (F.) (60 to 65.56 degrees C.)
Alodine 1000L (Liquid) *[2]	Concentration	19.20 fl oz/1 gal (0.57 L/3.79 L)	17.9 to 23.0 fl oz/1 gal (0.53 to 0.68 L/3.79 L)
	pH	- - - -	below 4.5 *[3]
	Temperature	- - - -	150 to 160 degrees (F.) (65.56 to 71.11 degrees C.)
Alodine 1500	Concentration	1.28 fl oz/1 gal (37.85 ml/3.79 L)	1.10 to 1.46 fl oz/ 1 gal (34.53 to 43.18 ml/3.79 L)
	pH	- - - -	below 4.0 *[3]
	Temperature	- - - -	150 to 160 degrees (F.) (65.56 to 71.11 degrees C.)

\*[1] Where powder is used, allow the solution to set, undisturbed, for 24 hours before using. The small amount of precipitate which forms will not bother the coating process.

\*[2] Alodine 1000L is a concentrate. One gallon of concentrate is equivalent to 1 ounce of Alodine 1000 powder.

\*[3] Adjust the pH 1.8 to 2.0 with Alodine Toner 22. Approximately 1 percent by volume on make-up operation near the upper range is recommended. The pH may be lowered by additions of nitric acid or raised by additions of sodium hydroxide.

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TABLE 3 ALODINE SOLUTION PREPARATION FOR MANUAL APPLICATION	
MATERIAL	PREPARATION INSTRUCTIONS
1200	Add 3 ounces (85.05 gr) of powder to water for each gallon (3.79 L) of solution. Stir well until the powder is dissolved. Disregard any small amount of settled-out insoluble material. Let the solution stand for at least one hour before using. A pH range of 1.50 to 1.90 is required and adjusted by the additions of nitric acid.
1200S	Add 2 ounces (58.70 gr) of powder to water for each gallon (3.79 L) of solution. Stir well until the powder is dissolved. Disregard any small amount of settled-out insoluble material. Let the solution stand for at least one hour before using.
1000	Add 0.4 ounce (11.34 gr) of powder to water for each gallon (3.79 L) of solution. Stir well until the powder is dissolved. Disregard any small amount of settled-out insoluble material. Let the solution stand for at least one hour before using.
1000L	Dilute 4 volumes of the Alodine 1000L with 6 volumes of water and stir well to produce a final concentration of 0.4 ounce (11.83 ml) of Alodine 1000L per gallon (3.79 L) of solution.
1500	Add 8 fluid ounces (0.24 L) of Alodine 1500 to water for each gallon (3.79 L) of final solution. Stir well to get a uniform mixture.

**NOTE:** When a water break-free surface cannot be obtained, Ridosol 501 wetting agent (same source as for alodine) may be added to the solution. Add 0.10 to 0.50 percent by volume, i.e., 0.128 to 0.64 fluid ounces (3.78 to 18.93 ml) per gallon (3.79 L).

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TABLE 4 IRIDITE SOLUTION PREPARATION			
MATERIAL	VARIABLE	MAKE-UP *[1]	CONTROL
Iridite 14	Concentration	2.8 oz/1 gal (79.38 gr/3.79 L)	2.7 to 3.3 oz/1 gal (76.54 to 95.55 gr/3.79 L)
	pH	- - - -	1.0 to 1.7 *[2]
	Temperature	- - - -	Room Temp to 95 degrees (F.) (Room Temp to 35 degrees C.)
Iridite 14-2	Concentration	1.45 oz/1 gal (41.11 gr/3.79 L)	1.25 to 2.25 oz/1 gal (35.44 to 63.79 gr/3.79 L)
	pH	- - - -	1.1 to 16 *[2]
	Temperature	- - - -	Room Temp to 95 degrees (F.) (Room Temp to 35 degrees C.)

\*[1] After make-up, allow the solution to set, undisturbed for 24 hours before using. The small amount of precipitate which forms will not affect the coating process.

\*[2] Higher concentrations will tend to have lower pH values, which will rise with age or use, generally leveling off within the ranges stated. The pH may be lowered by additions of the original material, nitric acid, or both, and may be raised by additions of ammonium hydroxide.

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TASK 51-00-58-302-070

9. Treatment of Fasteners and Fastener Holes in Composites

A. General

- (1) With more and more use of composite materials in the building of airplanes, some repairs will have to be made to removal panels.

B. Graphite panel installation on graphite structural component

S 022-071

- (1) Remove fasteners, if loose.

S 372-072

- (2) On countersinks and in holes, apply primer (BMS 10-11 Type 1, or BMS 10-79 Type 2).

S 422-073

- (3) Install removal stainless steel or titanium fasteners (dry).

S 422-074

- (4) Install permanent fasteners with wet primer (BMS 10-11 Type 1 or BMS 10-79 Type 2) or BMS 5-95 sealant.

C. Graphite panel installed on aluminum structure, or aluminum repair plates on graphite panels

S 022-075

- (1) Remove fasteners, if loose

S 372-076

- (2) On countersinks and in holes, apply primer (BMS 10-11 Type 1 or BMS 10-79 Type 2).

S 392-077

- (3) Apply BMS 5-95 sealant on mating surfaces.

S 422-078

- (4) Install fasteners with wet BMS 5-95 sealant.

S 392-079

- (5) Fillet all seal protruding fasteners heads and nuts/washers.

D. Armada, fiberglass or graphite panels, installed in any combination

S 022-080

- (1) Remove fasteners, if loose.

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- S 372-081
- (2) On countersinks and in holes, apply primer (BMS 10-11 Type 1 or BMS 10-79 Type 2).
- S 422-082
- (3) Install removable fasteners with wet primer (BMS 10-11 Type 1 or BMS 10-79 Type 2).
- S 422-083
- (4) Install permanent fasteners with wet primer (BMS 10-11 Type 1 or BMS 10-79 Type 2) or BMS 5-95 sealant.

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CORROSION PREVENTION – GENERAL INFORMATION  
STANDARD PREVENTIVE MAINTENANCE PROCEDURES – MAINTENANCE PRACTICES

1. General

- A. The data contained in this subject is general in nature. For specific procedures on preventive maintenance of individual airplane models and systems, refer to the applicable chapters in the Airplane Maintenance Manual (AMM).
- B. Airplane Washing
- (1) Washing helps to decrease corrosion as well as maintain the appearance of the airplane. Procedures for airplane washing are in Chapter 12 of the AMM.
  - (2) Washing removes corrosive deposits that collect on the airplane surfaces. Dirt collects moisture, which in turn causes corrosion. However, other factors are important in a washing program.
    - (a) Washing, and in particular high-pressure water or steam, can get moisture into areas that are not usually contaminated by normal means.
    - (b) The detergents that are used for washing can cause corrosion if they are not fully rinsed off. Rinsing can be a problem if high-pressure water streams push the washing solutions into small cavities.
    - (c) Any washing solution that removes unwanted grease and oil will also remove the greases and oils that are needed for lubrication. Re-lubrication after an airplane is washed will be necessary.
    - (d) Frequent washing of an airplane will, in time, remove any corrosion inhibiting compounds, such as BMS 3-23, BMS 3-26, BMS 3-29 or BMS 3-35. The amount of time that it takes to remove the corrosion inhibiting compounds is a consideration needed to be taken when determining the frequency of washing an airplane, and the strength of the detergent used.
    - (e) Too much washing and polishing of unpainted aluminum surfaces can wear away the protective clad finish.
  - (3) The washing frequency must agree with the operating environment and the external appearance of the airplane. As a guide, the following frequencies are recommended:
    - (a) Mild Zones (AMM 51-00-52/201) – every 90 calendar days
    - (b) Moderate Zones (AMM 51-00-52/201) – every 45 calendar days
    - (c) Severe Zones (AMM 51-00-52/201) – every 15 calendar days
  - (4) Polishes can be used on unpainted surfaces, but should probably be applied only once every 18 to 24 months.

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C. Protective Finish

- (1) Maintenance of the surface finish is important in order to prevent corrosion from becoming a problem. Damage to paint or other surface coatings should be repaired at the earliest convenient opportunity. If surface coating cannot be repaired right away, use a corrosion inhibitor to minimize the risk of corrosion.
- (2) Where damage to the finish is not confined to the paint, and on surfaces without paint, clean and treat the metal before you apply new protective coatings.
- (3) Examples of finish systems are shown in figure 1. Refer to Chapter 51 of the AMM for details on how to remove and apply finishes.

D. Corrosion Inhibitors

- (1) Corrosion inhibitors are used with finish systems, and to prevent or stop corrosion when the finish system is damaged. Many inhibitors can be used to get into small cavities in order to push out water. Thus, they can go in between faying surfaces or between fasteners and holes, where the finish may be broken.

NOTE: Make an analysis of the airplane's environment, the inhibitor to be used and the application schedule, to be sure of sufficient corrosion protection.

NOTE: Other water-displacing corrosion inhibiting compounds could be satisfactory. For standardization, operators are encouraged to evaluate using BMS 3-35 and BMS 3-29 as a replacement for both BMS 3-23 and the "dual coat" consisting of BMS 3-23 and BMS 3-26. However, BMS 3-23 and BMS 3-26 are still acceptable.

- (2) BMS 3-23 Water-Displacing Corrosion Inhibiting Compound
  - (a) This is an organic compound of nonvolatile base materials in solvents to make a fluid. It does not contain silicones. Dipping, brushing or spraying can apply this compound. The liquid carrier evaporates quickly to put a thin layer of wax-like material on the surface. The coating is not easily rubbed off or worn off, but must be applied again if the surface is washed frequently.
  - (b) BMS 3-23 compound stays tacky, and thus will collect unwanted materials. 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 where it is applied on the airplane. The types of BMS 3-23 are listed below.
    - 1) Type I - A transparent, colorless film, which is detectable only with ultraviolet.

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2) Type II - A colored film which is readily detected by the unaided eye.

(c) Materials qualified under BMS 3-23:

TYPE	MATERIAL	VENDOR
I	Boeshield T-9 (colorless)	Gibson Chemicals, Ltd., VZ0033
	Boeshield T-9HF (colorless)	Oxy Metal Industries, V45738
II	Boeshield T-9 (colored)	Gibson Chemicals, Ltd., VZ0033
	Boeshield T-9HF (colored)	Oxy Metal Industries, V45738
	LPS-3	Holt Lloyd Corp., V66724
	Dinitrol AV8 (Replaces AV5B-2)	Dinol International, V0L040

(d) Precautions for the use of BMS 3-23

**WARNING:** THESE COMPOUNDS ARE APPROXIMATELY EQUAL TO KEROSENE OR ALIPHATIC NAPHTHA IN TOXICITY. TO PROTECT SKIN, USE THE SAME PRECAUTIONS AS FOR KEROSENE.

**WARNING:** WHEN SPRAYING THE COMPOUNDS IN AN ENCLOSED AREA, SUCH AS THE LOWER FUSELAGE, A VAPOR CONCENTRATION OF 500 PARTS PER MILLION IS THE MAXIMUM COMFORTABLE WORKING LIMIT. AT THIS CONCENTRATION, A MAN CAN WORK AN 8-HOUR SHIFT. VAPOR LEVELS EXCEEDING 500 PARTS PER MILLION ARE NOT DIRECTLY TOXIC, BUT FORCED VENTILATION MAY BE NECESSARY TO MAINTAIN A COMFORTABLE LEVEL.

**WARNING:** PERCHLOROETHYLENE IS THE PREFERRED SOLVENT AS IT IS NONFLAMMABLE. HOWEVER, PERCHLOROETHYLENE IS TOXIC. IF USED IN EXTREMELY CONFINED AREAS, MECHANICAL VENTILATION IS MANDATORY, WITH RESPIRATORY AND SKIN PROTECTION BEING NECESSARY.

1) Because they are hydrocarbons, these compounds can be dangerous when mixed with oxygen. Oxygen system components must be shielded to protect them from direct or indirect contamination.

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**WARNING:** AS A FIRE/SAFETY PRECAUTION, THE MATERIAL SHOULD BE KEPT AWAY FROM SURFACES THAT WILL GET HOTTER THAN 300 DEGREES F. (148.89 DEGREES C) IN SERVICE. THE DRY FILM FLASH POINT IS 500 DEGREES (F.)(260 DEGREES C.).

**WARNING:** THE CORROSION INHIBITOR CONTAINS FLAMMABLE COMPONENTS. DO NOT EXPOSE THESE MATERIALS TO OPEN FLAMES, ACTIVE CIRCUITS OR OTHER COMPONENTS WHERE A POTENTIAL FIRE HAZARD WOULD EXIST. THE VOLATILE CARRIER IS ALSO FLAMMABLE. MAINTAIN ALL SAFETY PRECAUTIONS UNTIL THE CARRIER HAS FULLY EVAPORATED.

- 2) All precautions must be taken when using these materials, which can constitute a FIRE HAZARD when subjected to high temperatures.
- 3) Mask electrical connectors where there is a possibility of contamination of electrical contacts. Refer to the applicable chapter in the AMM for the use of CICs on main landing gear electrical connections.

**CAUTION:** REMOVE ANY EXCESS CORROSION INHIBITING COMPOUNDS FROM MECHANISMS AND MOVING PARTS WITH A CLEAN, DRY CLOTH. THE RESULTANT THIN FILM IS ADEQUATE FOR CORROSION PROTECTION. EXCESSIVE BUILDUP COULD HARDEN AT LOW TEMPERATURES AND CAUSE OPERATING DIFFICULTIES.

- 4) The use of corrosion inhibiting compounds on control cables is not considered a suitable substitute for the cleaning and corrosion protective procedures in the airplane maintenance manual. Direct application of these compounds on control cables, pullys, teflon-lined bearings and lubricated surfaces should be avoid.

**CAUTION:** THE COMPOUND CAN CAUSE SILICONE RUBBER AND BMS 3-11 RESISTANT SEALS TO SWELL.

- 5) Be careful when you apply the corrosion inhibiting compound near door or emergency hatch seals, grease seals in bearing assemblies or rubber-lined clamps used for tubing support or wiring harnesses. Hydraulic seals may also be affected, so these corrosion inhibiting compounds are not suitable for use on actuator rods.

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- 6) Do not apply corrosion inhibiting compounds on grease joints or sealed bearings, because these compounds can dissolve greases and other lubricants. They are penetrating compounds and can get around the seals, and into bearings.
  - 7) Do not apply or allow any corrosion inhibiting compounds to get on insulation blankets, as these compounds decrease the water-repellent quality and increase the flammable quality of the blankets.
  - 8) Do not apply these compounds on interior materials such as cargo liners. The compounds change the flammable quality of the materials.
  - 9) Do not apply these compounds near engines, cowling or related areas of high temperature, or where firewall sealant is used. The high temperatures can cause deterioration of the compounds. and corrosion inhibiting compounds can cause damage to the sealant.
  - 10) Some corrosion inhibiting compounds will dry tack-free, and may cause increased friction or sluggish operation between moving parts. Do not spray these compounds on areas such as exposed actuator rods, that come in contact with other surfaces.
- (e) Compatibility of BMS 3-23
- 1) As these materials are all usually hydrocarbons, you can apply a new application of a different compound over the existing corrosion inhibitors without any bad effects.
  - 2) The compounds can be used on fiberglass fairings and ducts, if the temperature of the duct is not hotter than 220 degrees (F.) (104.44 degrees C.).
  - 3) The compounds can be used on bladder type fuel tanks and fuel vapor barriers.
- (f) Cleaning before application of BMS 3-23
- 1) The surface needs to be clean, but does not have to be extremely clean before applying these compounds. However, better joint penetration will be obtained if the area is thoroughly cleaned before the first application.

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- 2) Vacuum or wipe away any loose dirt or other unwanted matter, then clean the surfaces where necessary using the usual airplane cleaning agents or solvents.
- (g) Methods of Application of BMS 3-23
- 1) Spray Application
    - a) Aerosol containers can be used with a plastic nozzle extension, but they are not generally recommended due to the cost and amount of overspray that is generated.
    - b) The preferred application method is with a standard pressure pot equipment, using an airless spray gun, operated at low pressure (45 psi).
    - c) Greater accessibility will be provided with the use of accessories, such as spray gun extension kits and swivel adapters for variable nozzle positioning.
    - d) Standard air atomizing equipment (siphon or pressure pot) may be used when access is sufficient to allow for the application of a wet coat. A spray nozzle-to-surface distance of no more than 12 inches is required for a wet application.
    - e) When a spray gun is operated with a pressure pot, a suitable extension may be made as follows:
      1. Remove and retain the air cap.
      2. Remove the fluid tip.
      3. Solder or braze a piece of 1/8 inch (3.175 mm) annealed copper tubing, of desired length, on the end of the tip.
      4. Make a nozzle at the end of the tubing by clamping the tube around a piece of 0.010 inch (0.254 mm) diameter wire.
      5. Do not connect the air hose to the spray gun.
      6. Use 20 to 30 psi, pot pressure, for spraying.
  - 2) Brush Application
    - a) Brush application may be accomplished by using an ordinary paintbrush. This method is most appropriate for small confined areas, or where caution is necessary to prevent corrosion inhibiting compounds from getting into or on surrounding equipment.

NOTE: Application of corrosion inhibiting compounds by the use of a clean cloth, and wiping the area, is also an acceptable method.

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- b) For large areas, or where confinement is not a problem, the spray application method is the most effective method to use.
- (h) Application of BMS 3-23
  - 1) Obey the precautions given in paragraph 1.D.(3) and use masking or shields to give protection to surrounding components. Do not apply the corrosion inhibiting compounds to any area that will subsequently be painted or sealed.
  - 2) Statically ground the airplane.
  - 3) Before you apply the corrosion inhibitor near batteries, electrical connectors or other components where there could be a fire hazard, remove the external power connection and put the battery switch in the OFF position.
  - 4) Allow all primers and/or enamels to cure for a minimum of 8 hours.
  - 5) Apply a continuous wet coat to permit joint penetration by capillary action. An application rate of 1 gallon (3.79 L) per hour by spraying, at a coverage rate of 15 to 20 square feet per minute, will produce a thickness of 0.0003 inch (0.00762 mm).
    - a) A minimum soak period of 60 minutes is required, to ensure maximum penetration, before any excess compound is removed.
  - 6) The use of equipment that applies these compounds under pressure directly to a joint or lap, will improve the penetration.
    - a) Refer to step (7) for details of spraying equipment and procedures.
    - b) These materials can also be applied by brush.
  - 7) Wipe up any puddles with a clean dry cloth after the 60-minute minimum soak time.
  - 8) Ventilate the area with a flow of compressed air until the volatile solvent fumes are gone.
  - 9) Remove all masking and/or shields from the treated area.

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- 10) Do not use any corrosion compounds near oxygen system components. If you find corrosion near an oxygen system component:
  - a) Clean away any corrosion products and repair the area.
  - b) Chemically treat all bare aluminum surfaces.
  - c) Apply one coat of BMS 10-11, Type I (BAC 452 green) primer.
  - d) Apply one coat of BMS 10-11, Type I (BAC 377 yellow) primer.
  - e) Apply BMS 10-11, Type II epoxy, or BMS 10-60 polyurethane enamel.
- (i) Removal of BMS 3-23
  - 1) Complete removal of corrosion inhibiting compounds is required before any repainting is to be done.
  - 2) Solvent cleaning is required before penetrant inspections.
  - 3) The following solvents have been successfully used to remove these compounds:

NOTE: The use of Methyl Ethyl Ketone (MEK) or acetone is not recommended.

- a) Perchloroethylene
- b) Trichloroethylene
- c) Trichloroethane
- d) Naphtha
- e) Magnaflux Corp. solvent (V37636)

WARNING: MIL-PRF-680 IS HIGHLY FLAMMABLE IN THE PRESENCE OF OPEN FLAMES AND SPARKS.

- f) Dry cleaning solvent (MIL-PRF-680) (Not recommended for use in the lower lobe cargo compartment).
  - g) Biogenic SE377C cleaner (V13092) (Preferred for the removal of BMS 3-23 corrosion inhibiting compound from areas with faying surfaces.)
  - h) Citra Safe (V0K209)
- 4) When solvents are used to remove water-displacing corrosion inhibiting compounds, give the area a compressed air flow until the solvents evaporate.

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- (j) Exterior discoloration caused by BMS 3-23
  - 1) The liberal use of water-displacing corrosion inhibiting compounds on the internal surfaces of the airplane can lead to some discoloration of the external surfaces. Because of the excellent penetrating properties of these materials, a "bleed-through" can be expected at fastener locations that are not fluid tight. This is normal and does not indicate a requirement to replace or redrive the fasteners. The tiny passages should seal themselves within a short time.
  - 2) You can remove these compounds from the exterior surface with one of the solvents listed. These solvents will not stain or damage the exterior of the airplane, or any decorative finish. However, a noticeable difference in the oxidation of the exterior surfaces can occur between those areas, which have been coated with the compounds, and areas that have not.
  - 3) If a difference in any of the colors is seen, it can usually be buffed out with one of the materials listed in chapter 20 of the Airplane Maintenance Manual (AMM).
- (3) BMS 3-26 Corrosion Inhibiting Compound
  - (a) 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. After it dries, it makes a transparent, but visible, protective layer.
  - (b) 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 surfaces are washed frequently.
  - (c) Types of BMS 3-26
    - 1) Type I - Makes a continuous layer of medium thickness, with a drop melting point of 140 degrees F (60 degrees C) minimum.
    - 2) Type II - Makes a continuous thick layer, with a drop melting point of 200 degrees (F.) (93.33 degrees C.) minimum.

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(d) Materials qualified under BMS 3-26

TYPE	MATERIAL	VENDOR	
I	Ardrox 3321	Ardrox, Inc.,	V23373
	Dinitrol AV25B	Dinol International,	V0L040
	Dinitrol AV25B-2	Dinol International,	V0L040
	LPS Formula B997	Holt Lloyd Corp.,	V66724
II	Ardrox 3322	Ardrox Inc.,	V23373
	Dinitrol AV100D (Replaces AV100B)	Dinol International,	V0L040
	LPS Formula B1007	Holt Lloyd Corp.,	V66724

- (e) Precautions for the use of BMS 3-26
- 1) Use the same precautions for BMS 3-26 that are listed for BMS 3-23 water-displacing corrosion inhibiting compound (refer to paragraph 1.D.(3)).
- (f) Compatibility of BMS 3-26
- 1) As these materials are usually hydrocarbons, you can apply a new application of a different compound over the existing corrosion inhibitors without any bad effects.
- (g) Cleaning before application of BMS 3-26
- 1) The surface needs to be clean, but does not have to be extremely clean before applying these compounds. Vacuum or wipe away any loose dirt or other unwanted matter. Then clean the surfaces where necessary, with the usual airplane cleaning agents or solvents.
- (h) Methods of application of BMS 3-26
- 1) The same application procedures used for BMS 3-23 can be used for applying BMS 3-26, with the differences noted in steps A) and B) below.
    - a) Let the BMS 3-26 compound dry. Do not attempt to wipe up any puddles after 60 minutes.
    - b) If the coated surface will contact another surface (such as insulation blankets), let the coating dry to a tack-free condition.

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(i) Removal of BMS 3-26

- 1) The same solvents used for removing BMS 3-23, water-displacing corrosion inhibiting compound, can be used for the removal of BMS 3-26. In addition, the following solvents can also be used.

Use on BMS 3-26 TYPE	MATERIAL	VENDOR
I	Varsol No. 1	Exxon Company, USA, V29700
	Shell-Sol 345	Shell Petrochemical V86961
	Skellysolve-S	Getty Oil Co., V4H372
	Union No. 5 Thinner	Union Oil Co. of California, V79003 or V8F610
	S-76 Cleaning Solvent	Union Oil Co. of California, V79003 or V8F610
	Klenzine	Atlantic Richfield Company, V1E874
	Sikkens 96.126	Sikkens, VH0951
II	Skellysolve V	Getty Oil Co., V8H761
	Standard 265 Thinner	Chevron USA, Inc., V4H372
	Sikkens 96.131	Sikkens, VH0951

(j) Exterior discoloration caused by BMS 3-26

- 1) The liberal use of water-displacing corrosion inhibiting compounds on the internal surfaces of the airplane can lead to some discoloration of the external surfaces. Because of the excellent penetrating properties of these materials, a "bleed-through" can be expected at fastener locations that are not fluid-tight. This is normal and does not indicate a requirement to replace or redrive the fasteners. The tiny passages should seal themselves within a short time.

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- 2) You can remove these compounds from the exterior surface with one of the solvents listed. These solvents will not stain or damage the exterior of the airplane, or any decorative finish. However, a noticeable difference in the oxidation of the exterior surfaces can occur between those areas, which have been coated with the compounds, and areas that have not.
  - 3) If a difference in any of the colors is seen, it can usually be buffed out with one of the materials listed in Chapter 20 of the Airplane Maintenance Manual (AMM).
- (4) BMS 3-29 Corrosion Inhibiting Compound
- (a) 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. After it dries, it makes a transparent, but visible, protective layer.
  - (b) 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 surfaces are washed frequently.
  - (c) BMS 3-29 specifies an advanced corrosion inhibiting compound that has the penetration characteristics of BMS 3-23, and the durability of BMS 3-26.
  - (d) BMS 3-29 may be used instead of a single coat of BMS 3-23, or the two-coat system (dualcoat) of BMS 3-23 and BMS 3-26.

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(e) Materials qualified under BMS 3-29

MATERIAL	VENDOR
Dinitrol AV-30	Dinol International, VOL040

**NOTE:** Dinol AV-30 (BMS 3-29) weighs over 3 times as much as Dinol AV-8 (BMS 3-23) and could produce a significant weight increase when/if used on all the areas where a single coat of corrosion inhibiting compound is recommended. This is based on the dry film weights of AV-30 compared to the dry film weights of AV-8, when applied at the recommended thickness. Once the coating has cured, a weight increase of approximately 500 grams (17.64 oz) per liter (1.07 qt) of AV-8 used, or 80 grams (2.82 oz) per square meter (1.2 square yard) of surface area covered will be realized. The weight increase from AV-8 is approximately 330 grams (11.64 oz) per liter (1.07 qt), and 25 grams (0.88 oz) per square meter (1.2 square yard). A decrease in the coating weight of approximately 40 percent would be realized if AV-30 is used instead of the BMS 3-23/BMS 3-26 dual-coat (140 grams per square meter) (4.94 oz per 1.2 square yard). All weights are approximations and will vary, depending on the actual dry film thickness.

- (f) Precautions for the use of BMS 3-29
  - 1) Use the same precautions for BMS 3-29 that are listed for BMS 3-23 water-displacing corrosion inhibiting compound (refer to paragraph 1.D.(3)).
- (g) Compatibility of BMS 3-29
  - 1) As these materials are usually hydrocarbons, you can apply a new application of a different compound over the existing corrosion inhibitors without any bad effects.
- (h) Cleaning before application of BMS 3-29
  - 1) The surface needs to be clean, but does not have to be extremely clean before applying these compounds. However, better joint penetration will be obtained if the area is thoroughly cleaned before the first application.
  - 2) Vacuum or wipe away any loose dirt or other unwanted matter, then clean the surfaces where necessary using the usual airplane cleaning agents or solvents.
- (i) Methods of application of BMS 3-29
  - 1) The same application procedures used for BMS 3-23 can be used for applying BMS 3-29, with the differences noted in steps (b) and (c) below.

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- 2) Let the BMS 3-29 compound dry. Do not attempt to wipe up any puddles after 60 minutes.
  - 3) If the coated surface will contact another surface (such as insulation blankets), let the coating dry to a tack-free condition.
- (j) Removal of BMS 3-29
- 1) The same solvents used for removing BMS 3-23, water-displacing corrosion inhibiting compound, can be used for the removal of BMS 3-29. In addition, the following solvents can also be used.

MATERIAL	VENDOR
Varsol No. 1	Exxon Company, USA, V29700
Shell-Sol 345	Shell Petrochemical V86961
Skellysolve-S	Getty Oil Co., V4H372
Union No. 5 Thinner	Union Oil Co. of California, V79003 or V8F610
S-76 Cleaning Solvent	Union Oil Co. of California, V79003 or V8F610
Klenzine	Atlantic Richfield Company, V1E874
Sikkens 96.126	Sikkens, VH0951
Skellysolve V	Getty Oil Co., V8H761
Standard 265 Thinner	Chevron USA, Inc., V4H372
Sikkens 96.131	Sikkens, VH0951

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- (k) Exterior discoloration caused by BMS 3-29
  - 1) The liberal use of water-displacing corrosion inhibiting compounds on the internal surfaces of the airplane can lead to some discoloration of the external surfaces. Because of the excellent penetrating properties of these materials, a "bleed-through" can be expected at fastener locations that are not fluid-tight. This is normal and does not indicate a requirement to replace or redrive the fasteners. The tiny passages should seal themselves within a short time.
  - 2) You can remove these compounds from the exterior surface with one of the solvents listed. These solvents will not stain or damage the exterior of the airplane, or any decorative finish. However, a noticeable difference in the oxidation of the exterior surfaces can occur between those areas, which have been coated with the compounds, and areas that have not.
  - 3) If a difference in any of the colors is seen, it can usually be buffed out with one of the materials listed in Chapter 20 of the Airplane Maintenance Manual (AMM).
- (5) BMS 3-35 Corrosion Inhibiting Compound
  - (a) A (new) heavy duty CIC, BMS 3-35 has been developed. Although the compound provides crevice penetration close to that achieved with BMS 3-23, it meets the same 1500 hour salt spray corrosion protection requirements as BMS 3-29.
  - (b) BMS 3-35 is approved for use on all BOEING commercial model airplanes, including those no longer in production.
  - (c) Materials qualified under BMS 3-35

MATERIAL	VENDOR
Cor-Ban 3-35	Zip-Chem Products, V8E913
Dinitrol AV-15	Dinol International, V0L040

- (d) Precautions for the use of BMS 3-29
  - 1) Use the same precautions for BMS 3-35 that are listed for BMS 3-23 water-displacing corrosion inhibiting compound (refer to paragraph 1.D.(3)).
- (e) Compatibility of BMS 3-35
  - 1) BMS 3-35 corrosion inhibiting compounds are compatible with all BOEING approved CICs. And, as these materials are usually hydrocarbons, you can apply a new application of a different compound over the existing corrosion inhibitors without any bad effects.

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- (f) Cleaning before application of BMS 3-29
  - 1) The surface needs to be clean, but does not have to be extremely clean before applying these compounds. However, better joint penetration will be obtained if the area is thoroughly cleaned before the first application.
  - 2) Vacuum or wipe away any loose dirt or other unwanted matter, then clean the surfaces where necessary using the usual airplane cleaning agents or solvents.
- (g) Methods of application of BMS 3-35
  - 1) The application hardware and processes for BMS 3-35 are the same as applying other heavy duty CIC products.
- (h) Production incorporation
  - 1) Refer to Airplane Configuration Bulletin 9914598, dated 17 January 2000, for models 737, 747, 757, 767, and Airplane Configuration Bulletin 9912596 for the 777 model; and Airplane Configuration Bulletin dated 11 October 1999 for further information, including production airplane models Line Number incorporation.
- (6) MIL-C-16173 Corrosion Preventive Compound
  - (a) Although the water-displacing corrosion inhibiting compounds are the primary corrosion inhibitors used in airplane manufacturing, in certain applications where a more durable surface protection is required, solvent-dispersed corrosion inhibiting compounds, per MIL-C-16173, Grade 1, are used.
  - (b) These materials are volatile liquids which can be sprayed or brushed on the surfaces to be treated. The liquid carrier evaporates and leaves a residue (hard grease in appearance) which will become sufficiently dry to permit handling after approximately 4 hours.
  - (c) Types of MIL-C-16173
    - 1) GRADE 1 - These compounds form a hard film, but do not have the penetrating or water-displacing qualities of BMS 3-23 or similar corrosion inhibiting compounds. These compounds are the most common type of MIL-C-16173 used for corrosion prevention, and Cosmoline 1058 (V73277) is the MIL-C-16173, Grade 1, material that is most commonly used in production.
    - 2) GRADE 2 - These compounds form a film which stays soft after it dries. This coating does not displace water.
    - 3) GRADE 3 - These compounds form a film which stays soft after it dries. This coating will displace water.

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- 4) GRADE 4 - These compounds form a transparent film. This coating dries enough to touch in about 4 hours, and is non-tacky after 24 hours.
- 5) GRADE 5 - These compounds form a film which stays soft after it dries. The coating can be removed with a low pressure water stream. This compound will displace water.
- (d) Precautions for the use of MIL-C-16173
  - 1) Use the same precautions for MIL-C-16173 that are listed for BMS 3-23 water-displacing corrosion inhibiting compound (refer to paragraph 1.D.(3)).
- (e) Compatibility of MIL-C-16173
  - 1) As these materials are usually hydrocarbons, you can apply a new application of a different compound over the existing corrosion inhibitors without any bad effects.
- (f) Cleaning before application of MIL-C-16173
  - 1) The surface needs to be clean, but does not have to be extremely clean before applying these compounds. However, a better continuous film will be obtained if the area is thoroughly cleaned before the first application.
  - 2) Vacuum or wipe away any loose dirt or other unwanted matter, then clean the surfaces where necessary using the usual airplane cleaning agents or solvents.
- (g) Methods of application of MIL-C-16173
  - 1) The same application procedures used for BMS 3-23 can be used for applying MIL-C-16173, with the differences noted in steps (b) and (c) below.
  - 2) Let the MIL-C-16173 compound dry. Do not attempt to wipe up any puddles after 60 minutes.
  - 3) If the coated surface will contact another surface (such as insulation blankets), let the coating dry to a tack-free condition. (Use only grades 1, 4 or 5. Grades 2 and 3 form soft films which would be damaged by such contact.)
- (h) Removal of MIL-C-16173
  - 1) All of the compound needs to be removed before trying to paint the surface. Solvent cleaning is also required before penetrant inspections are to be performed.
  - 2) Naphtha can be used to remove these compounds. Methyl Ethyl Ketone (MEK) or acetone is not recommended.
  - 3) When solvents are used to remove corrosion inhibitors, give the area a continuous flow of pressurized air until the solvents evaporate.
- (7) MIL-C-11796 Corrosion Preventive Compound
  - (a) This is a petrolatum-based compound, which is applied as a hot liquid.

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- (b) Types of MIL-C-11796
- 1) Class 1 - These compounds form a hard film coating. They can penetrate from 3 to 8 mm (0.118 to 0.315 in) and have a melting point of 155 degrees (F.) (68.33 degrees C.) or higher.
  - 2) Class 1A - These compounds are similar to Class 1 compounds, but will not cause an oil slick on water.
  - 3) Class 2 - These compounds form a medium film coating. They can penetrate 9 to 15 mm (0.354 to 0.590 in) and have a melting point of 150 degrees (F.) (65.55 degrees C.).
  - 4) Class 3 - These compounds form a soft film coating that can be applied, and easily removed, at room temperature. They can penetrate 20 to 25 mm (0.787 to 0.984 in) and have a melting point of 150 degrees (F.) (57.22 degrees C.). These compounds can mix with lubricating oil.

NOTE: Refer to the Qualified Products List of MIL-C-11796 for a complete listing of approved material part numbers and vendors for all classes.

- (c) Precautions for the use of MIL-C-11796
- 1) Use the same precautions for MIL-C-11796 that are listed for BMS 3-23 water-displacing corrosion inhibiting compound (refer to paragraph 1.D.(3)).
- (d) Compatibility of MIL-C-11796
- 1) As these materials are usually hydrocarbons, you can apply a new application of a different compound over the existing corrosion inhibitors without any bad effects.
- (e) Cleaning before application of MIL-C-11796
- 1) The surface needs to be clean, but does not have to be extremely clean before applying these compounds. However, a better continuous film will be obtained if the area is thoroughly cleaned before the first application.
  - 2) Vacuum or wipe away any loose dirt or other unwanted matter, then clean the surfaces where necessary using the usual airplane cleaning agents or solvents.
- (f) Methods of application of MIL-C-11796
- 1) These compounds are applied as a hot liquid. During the application process, keep the compounds in the following temperature ranges:
    - a) Class 1 and 1A            170 to 200 degrees (F.)  
  (76.66 to 93.33 degrees C.)

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- b) Class 2                           160 to 190 degrees (F.)  
  (71.11 to 87.77 degrees C.)
- c) Class 3                           150 to 180 degrees (F.)  
  (65.55 to 82.22 degrees C.)
- 2) Apply the compound to the surface with a brush or a swab.
- 3) Small parts can be dipped in a container of the compound as long as the temperature ranges are kept.
- 4) To apply the compound to the internal surfaces of hollow parts, such as tubes, use a fill and drain method.

NOTE: Be sure that all hollow parts are thoroughly cleaned on the inside before attempting to fill them with the compound. The amount of time the compound remains filled in the hollow parts will determine the thickness of the film coating. Do not allow the compound to dry while filled in the hollow part.

(g) Removal of MIL-C-11796

- 1) All of the compound needs to be removed before trying to paint the surface. Solvent cleaning is also required before penetrant inspections are to be performed.
- 2) Dry cleaning solvent (MIL-PRF-680) can be used to remove these compounds. Methyl Ethyl Ketone (MEK) or acetone is not recommended.
- 3) When solvents are used to remove these compounds, give the area a continuous flow of pressurized air until the solvents evaporate.

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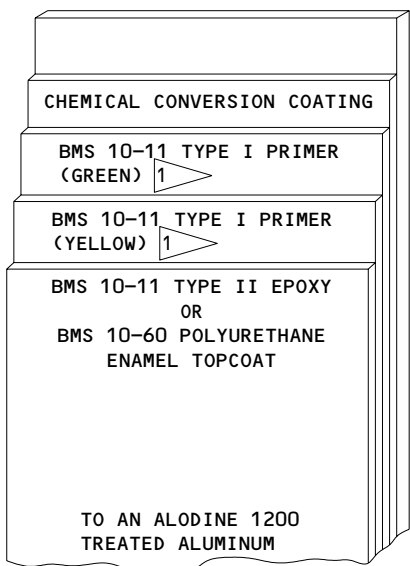
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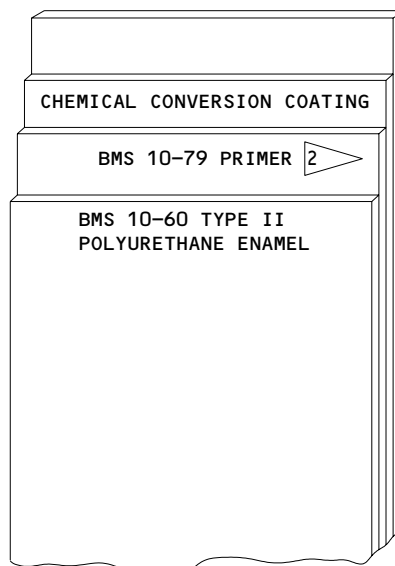
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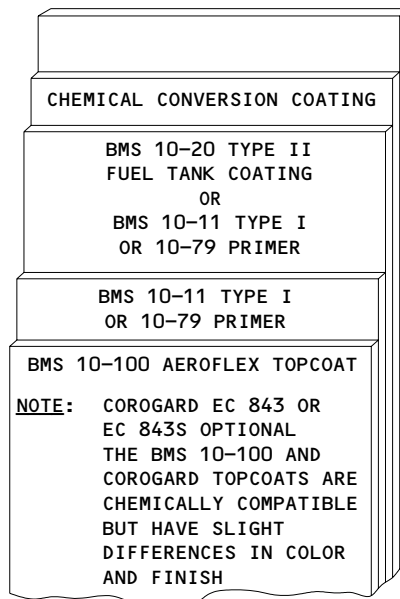




**INTERIOR AND EXTERIOR PROTECTIVE  
(NON-AERODYNAMIC)**



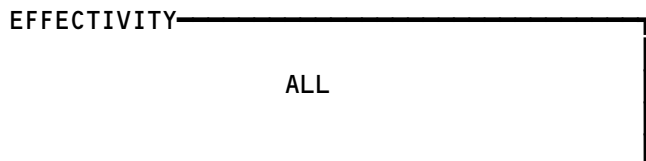
**EXTERIOR PROTECTIVE  
(FILIFORM RESISTANT)**



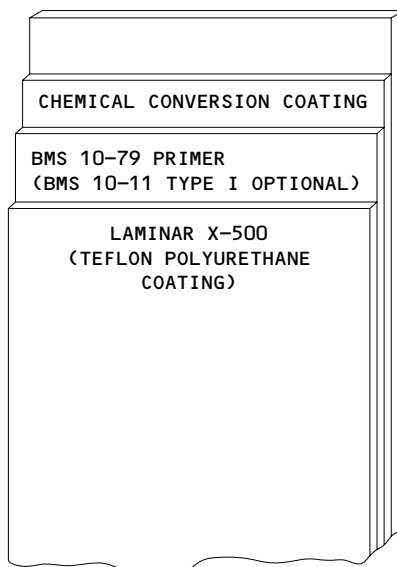
**BMS 10-11 (AEROFLEX OR COROGARD)  
PAINT SYSTEM**

- 1 GREEN PRIMER USED ON DETAILS BEFORE INSTALLATION, YELLOW PRIMER ADDED AFTER INSTALLATION. DUAL COLORS USED FOR INSPECTION PURPOSES ONLY.
- 2 OPERATORS ENCOUNTERING DELAMINATION PROBLEMS WITH THE FINISH SHOULD USE BMS 10-79 TYPE II PRIMER IN LIEU OF TYPE I. THE PRIMER SHOULD BE APPLIED SUBSTRATE.

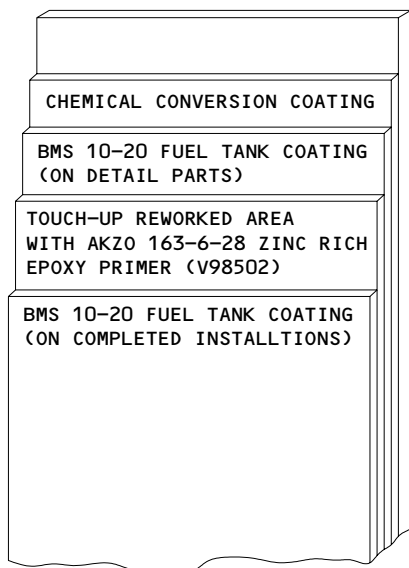
Finish Systems  
Figure 201 (Sheet 1)



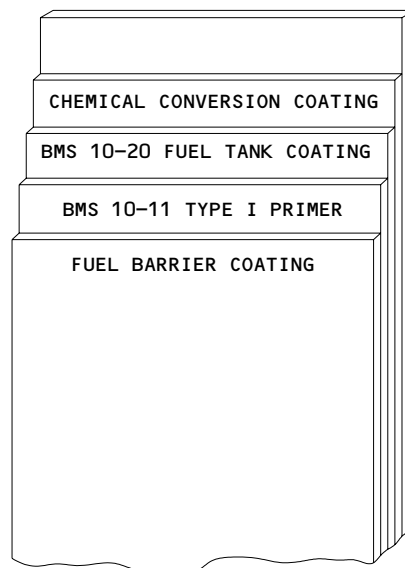
**51-00-59**



ABRASION RESISTANT FINISH

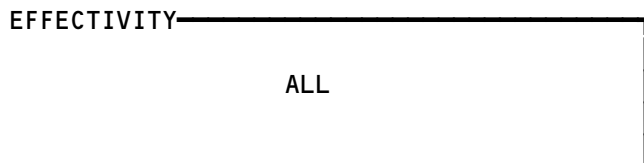


INTEGRAL FUEL TANK



SECONDARY FUEL BARRIER

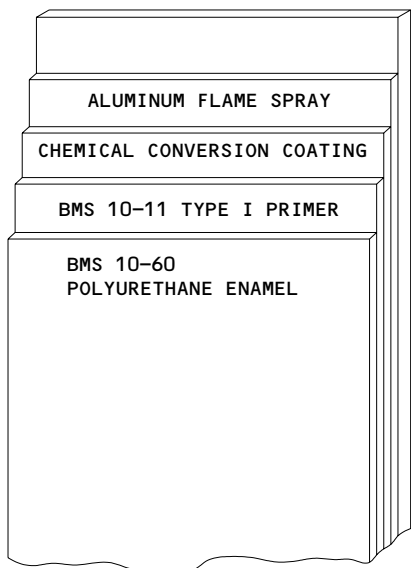
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Figure 201 (Sheet 2)



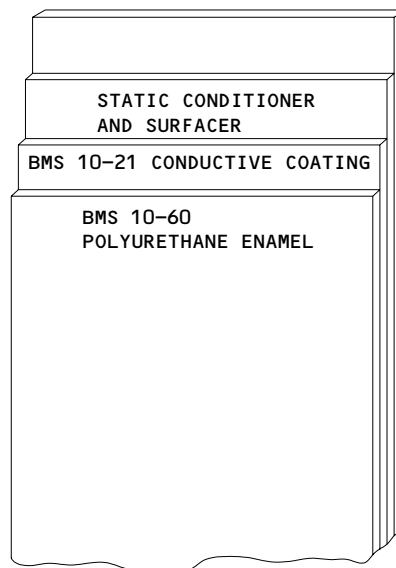
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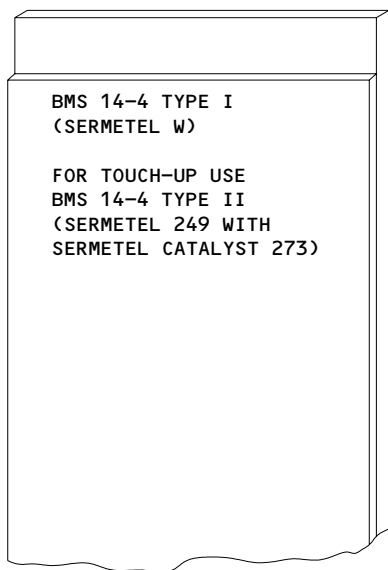
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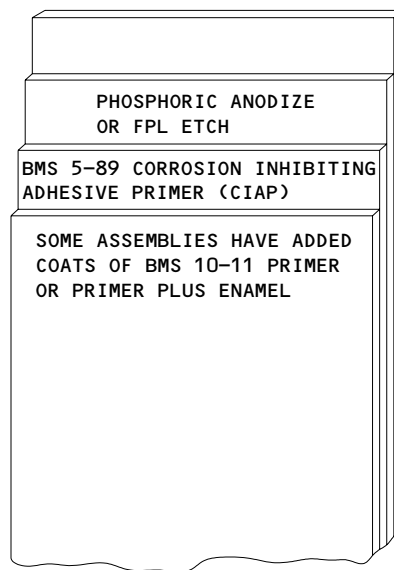
FIBERGLASS REINFORCED PLASTIC EXTERIOR  
(ALUMINUM FLAME SPRAYED)



FIBERGLASS REINFORCED PLASTIC EXTERIOR  
(CONDUCTIVE COATED)



HEAT-, WEATHER-, AND OIL-  
RESISTANT COATING



BONDED STRUCTURE

Finish Systems  
Figure 201 (Sheet 3)

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CORROSION PREVENTION – STANDARD PREVENTIVE MAINTENANCE PROCEDURES  
TRANSPORTATION OF LIVE ANIMALS – MAINTENANCE PRACTICES

1. General

- A. Corrosion problems can arise from the transporting of live animals and usually occur from two main sources.
  - (1) One problem source is derived from animal wastes, which are corrosive, and because the effects of the waste products are so well known, adequate steps are usually taken to ensure that the airplane does not become contaminated.
  - (2) The second problem source is the increase in humidity inside the airplane.
- B. Problems associated with the occasional transportation of small animals in the cargo compartments are negligible, but the bulk transportation of large animals makes it advisable to ensure that adequate precautionary measures against corrosion are taken.
- C. Animal Wastes
  - (1) It is the usual practice to dehydrate animals before transportation to minimize the amount of waste products generated.
  - (2) The bulk transportation of animals necessitates the use of absorbent floor coverings, such as wood shavings, to contain the waste materials. Solids should be removed after every flight and replaced with clean wood shavings. After two round-trips, the floor covering should also be replaced.
- D. Humidity
  - (1) Animals generate more heat than humans, consequently there is a greater possibility of moisture buildup in the airplane.
  - (2) To permit the maximum possible circulation of air from the cabin air conditioning system, the use of pens with open areas in the side-walls is recommended.
  - (3) To reduce the effects of high ground temperatures, it is recommended that fans be used to circulate air through the cabin while the airplane is on the ground.
- E. Preventive Maintenance
  - (1) The bulk transportation of live animals will necessitate the periodic cleaning and deodorizing of the airplane. As this requires the removal of the cabin lining and insulation blankets, it also provides an excellent opportunity to preform preventive maintenance.
  - (2) At each available opportunity, inspect the inner skin surface and the fuselage structure for signs of corrosion. Ensure that all drains are unobstructed, and that there no trapped liquids.

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**CAUTION:** DISINFECTANTS MAY CONTAIN CHEMICALS THAT ARE HARMFUL TO AIRPLANE STRUCTURES. SODIUM HYDROXIDE SOLUTIONS, SODIUM CARBONATE SOLUTIONS (PLAIN OR WITH 0.1 PERCENT SODIUM SILICATE) AND CHLORINATED LIME SOLUTIONS WILL ALL CORRODE ALUMINUM. CRESYLIC AND LIQUIFIED PHENOL SOLUTIONS WILL SEVERELY ATTACK ORGANIC FINISHES, SEALANTS AND PLASTICS, INCLUDING THE ACRYLIC WINDOWS OF THE AIRPLANE INTERIOR.

- (3) After the airplane has been cleaned and deodorized, and before the reinstallation of the insulation blankets and cabin lining, treat the inner skin surface and structure with water-displacing corrosion inhibiting compounds as described in AMM 51-00-59/201.

**NOTE:** In the fuselage crown area, airplanes used for livestock transportation will require, and receive, more frequent preventive maintenance than recommended in Section II.

- (4) Dry all of the insulation blankets before reinstallation.
- (5) No additional preventive maintenance is needed for the occasional transportation of small animals, except that where there is obvious contamination from animal wastes. Localized cleaning should be performed, followed by treatment with water-displacing corrosion inhibiting compounds.

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CORROSION PREVENTION – STANDARD PREVENTIVE MAINTENANCE PROCEDURES  
MICROBIAL GROWTH IN INTEGRAL FUEL TANKS – MAINTENANCE PRACTICES

1. General

- A. Corrosion of integral fuel tanks has been encountered due to microbial growth.
- B. This growth is caused by micro-organisms that enter the fuel tank with the fuel, when the tanks also contain some water. The water either enters the tank with the fuel or is the result of condensation within the tank itself.
- C. The microbes thrive at the water/fuel interface and multiply rapidly, forming a slime or matted growth within the tank. This matted growth traps water so that it cannot be removed by normal sumping procedures.
- D. Corrosion is produced when the protective finishes, on the lower surfaces of the fuel tank, eventually break down under the continuous exposure to the water soaked microbial growth mats, and the by-products of the microbial growth.
- E. The incidence of microbial contamination of fuel is higher in hot and humid climates. Therefore, the possibility of fuel tank corrosion increases when airplanes operate in these regions.

TASK 51-00-61-202-001

2. Detection of Microbial Contamination

A. General

- (1) Although most tropical areas are considered high risk areas, problems have been encountered in almost all parts of the world. Therefore, it is very important that proper fuel system maintenance is practiced at all times.
- (2) Personnel involved in sumping the fuel tanks should be advised to report any evidence of slime in the fuel/water samples removed from the airplane.
- (3) Fuel samples can be checked for micro-organisms with the Microbe-Monitor Test Kit from Air BP (V8P482). This kit contains two bottles in which a fuel sample is placed in each with a hypodermic syringe. One bottle contains a liquid to sustain the microbes, while the other bottle contains a similar liquid with a biocide added. A dye in the sample bottles will change color to indicate, within 48 hours, if the fuel sample is contaminated.
- (4) An alternate test kit, the Hum-Bug Detector Kit from Humanoids Technical Services, Inc. (V47186), is also acceptable.

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- (5) Another alternate test kit, the Escalate Combo Microbial Test Kit from Orion Diagnostics (VS4259) (catalogue number 67987), has been approved and detects fungal growth after 3.5 to 4 days, and will even detect contamination after a few hours.

**NOTE:** As with all of the kits, this method will not quantify the exact amount of contamination, but only provides a qualitative estimate of the relative amount of contamination.

#### B. Inspection

S 212-002

- (1) If microbial contamination is found, do a check of the fuel/water interface following a tank sumping. A tank entry should be made as soon as possible to remove the microbial growth. If too much time is allowed to pass, it exposes the tank structure and components to a higher probability of corrosion.

S 212-005

**WARNING:** OBEY ALL OF THE FUEL TANK ENTRY PRECAUTIONS (AMM 28-11-00/201). FAILURE TO OBEY THE FUEL TANK ENTRY PRECAUTIONS COULD CAUSE INJURY TO PERSONS OR DAMAGE TO EQUIPMENT.

- (2) Entry into a contaminated fuel tank will reveal a colored deposit on the horizontal tank surfaces and the top surfaces of the plumbing. This deposit is usually brown or black, although other colors have been noted. There may also be some evidence of corrosion products where the effects of microbial contamination are becoming apparent.

S 212-004

- (3) Anytime the fuel tanks are entered, they should be inspected for microbial growth. Also, ensure that the limber holes and drains are not blocked.

**NOTE:** See the applicable AMM chapter for the location of the drains on the different models of airplanes.

TASK 51-00-61-302-012

### 3. Removal of Microbial Deposits

#### A. Cleaning

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S 142-006

**CAUTION:** DO NOT USE DETERGENTS AS THEY CAN SPREAD THE MICROBIAL GROWTH.

- (1) Microbial deposits can usually be removed by scrubbing the tank with a soft to firm brush, or a sponge, and clean warm water.

**NOTE:** Efficiency of removal is dependent upon how long the tanks are ventilated (aired out) prior to the microbial growth removal. The longer the tanks are allowed to dry, the more difficult it is to remove the growth.

- (a) Ventilate the tanks using air movers (fans). Continue the ventilation during the tank cleaning to aid in drying the tank.
- (b) Open or remove the sump drain valves.
- (c) Starting at the outside edge of the tank, work towards the access door openings and the fuel sump drains.
- (d) Check that the tank is free of all loosen fungus.
- (e) Ensure that all of the drain holes, slots and tubes are clear of loosen fungus, or other foreign material, which could block the drainage of water or fuel.

S 142-007

- (2) Mop up any residual matter.

S 142-008

- (3) Thoroughly vacuum, clean and flush the tank to remove all remaining foreign material following the cleaning procedures.

S 372-009

- (4) After the cleanup of the fungus, the reworked area can be touched up with Bostik 463-6-28, zinc-rich epoxy primer, and topcoated with BMS 10-20.

S 112-010

- (5) Corrosion removal and any restoration of the damaged finish is a requirement after the removal of microbial deposits, per AMM 51-00-58/201 and AMM 51-00-59/201.

B. Removal of Corrosion

S 112-013

- (1) Corrosion should be removed by one of the methods described in AMM 51-00-59/201.

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S 392-011

- (2) Restore any damaged finish after the corrosion removal in accordance with AMM 51-00-59/201.

TASK 51-00-61-602-014

4. Biocide Treatment

A. General

- (1) If a biocide is put into the fuel storage tanks, in the fuel truck supplying the airplane, or directly into the airplane's fuel tanks, you will reduce the incidence of microbial growth.
- (2) Two biocide options are recommended, Biobor JF (Hammond Technical Services, Inc. (V47186)) or Kathon FP 1.5 (Fuel Quality Service, Inc. (V40161)).

**NOTE:** Specific recommended instructions for the use of Kathon FP 1.5 will be added as required; however, suggested application time periods in steps 4.A.(5) and (6), and residual water drainage described in step 4.B.(2) should be adhered to, in addition to the restrictions shown in the following table.

KATHON FP 1.5 BIOCIDES		
ENGINE MANUFACTURER	CONTINUOUS USAGE Parts Per Million (by volume)	INTERMITTENT USAGE Parts Per Million (by volume)
GENERAL ELECTRIC	100 P.P.M.	100 P.P.M.
ROLLS-ROYCE	50 P.P.M.	100 P.P.M.
CFM	100 P.P.M.	100 P.P.M.
PRATT & WHITNEY	100 P.P.M.	100 P.P.M.

- (3) The quantity of Biobor JF, approved by engine manufacturers to treat to treat aviation fuel, is 270 parts per million (P.P.M.) for intermittent applications. This concentration can be used for an initial treatment, with a follow-up treatment of 135-150 P.P.M., and with application time periods made in conjunction with service checks. This will allow the biocide to remain in the tanks for the recommended period of time as noted in paragraph 4.B.(3).

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- (4) Intermittent applications should be made if fuel analysis indicates the fuel is contaminated with fungus. To calculate the quantity of biocide that is required to treat the fuel, multiply the quantity of fuel in pounds by 0.004. This gives a 270 P.P.M. concentration (use half of this for a 135 P.P.M. concentration). This is equivalent to 25.37 fluid ounces (750.28 milliliter) of biocide per 1000 gallons (3.79 kiloliter) of JP4, or 25.86 fluid ounces (764.77 milliliter) of biocide per 1000 gallons (3.79 kiloliter) of kerosene calculated on a fuel density at 15 degrees C (59 degrees F). Interpolations may be made for other concentrations.
- (5) The application time periods will vary for each operator, and will depend on the operating environment (including fuel storage tanks). An operating environment will determine the amount of moisture and subsequent microbial infestation present in fuel tanks.
- (6) It is recommended that operators in severe environments make the first follow-up treatment one month after the initial control treatment. Subsequent biocide concentrations and application time periods may be adjusted after a fuel sample analysis of fuel drained from an airplane tank indicates the degree of fuel contamination.
- (7) The addition of Biobor JF must be accomplished with extreme care to prevent localized concentration, resulting in borax salt deposits. These deposits will not go back into solution and can eventually be picked up in engine filters.

B. Treatment

S 622-015

- (1) The preferred way of adding Biobor JF is by metered injection directly into the flowing streams of fuel. Adding Biobor JF to the airplane can be accomplished in one of the following methods:

Method 1. Mix the required amount of Biobor JF in a fuel tanker truck, making sure that it is mixed thoroughly. Make sure that there is no water in the airplane fuel tank, and then fuel the airplane.

Method 2. Fill the airplane fuel tank to at least one-half full of fuel. Mix the required amount of Biobor JF in 10 to 20 gallons (37.85 to 75.70 liters) of fuel. Add this to the fuel tank through the overwing fueling port and then finish fueling the tank through the same filler port. Circulate the fuel in the tank to assure that the Biobor JF is well mixed with the fuel.

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**CAUTION:** BEFORE ADDING UNDILUTED BIOBOR JF TO THE FUEL TANK, MAKE SURE NO WATER IS TRAPPED IN THE TANK UNDER OR NEAR THE OVERWING FILL PORT.

Method 3. Fill the airplane fuel tank to at least 60 percent and add the required amount of Biobor JF directly to the tank. Immediately finish filling the tank through the overwing port, and then mix the fuel/Biobor JF by starting the fuel boost pumps and circulating the fuel to ensure that the Biobor JF is mixed thoroughly. Before adding Biobor JF to the fuel tank, make sure that there is no water trapped in the tank.

**NOTE:** When the 757 main tanks are 45 percent full, there is no fuel under the overwing filler port.

**NOTE:** When the 767 main fuel tanks are 80 percent full, there is no fuel under the overwing filler port.

**NOTE:** When using Method 2 or 3, fill one main tank and thoroughly mix the fuel/Biobor JF. Then fill the center auxiliary tank, and then the opposite main tank, through the crossfeed and fueling manifold systems. Refill the main tank as before.

S 622-016

- (2) Before performing the treatment of the airplane's fuel tanks with biocide, drain any residual water from the tank as described in Chapter 12 of the AMM.

**NOTE:** For effective control, the suppliers of Biobor JF recommend that it remain in the tank for 72 hours before any more untreated fuel is added. Under normal airplane operations this recommendation is frequently impracticable, but it is advisable to plan on adding biocide at a service check, which will allow the treated fuel to remain in the tank for at least 72 hours.

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C. Frequency of Preventive Maintenance

S 682-017

- (1) As water is necessary for microbial growth, fuel tanks should be sumped frequently where the fuel supplies are known to contain water, or where high humidity and the resultant condensation within the tank is a known factor.

S 682-018

- (2) Successful water drainage requires that the water be given time to separate out and reach the area of the drain.

S 682-019

- (3) As flight schedules do not always permit time for the water to settle out, sumping of the tanks before refueling is recommended to remove any water accumulated from previous refueling operations.

NOTE: All 767 airplanes have an automatic sumping system which provides environmental protection with the fuel tanks. This system functions whenever either boost pump in a main tank, and left or right pump in the auxiliary tank, is running and where sumping will take place when the respective override pump is running. This system will pick up water at several points between pairs of lower stringers near the tank ends, thus preventing the accumulation of large amounts of water at the tank end low points. This will also reduce the amount of residual water and the incidence of microbial growth in the fuel tanks. However, manual sumping and biocide treatment may still be necessary, based on the operator's experience.

S 622-020

- (4) The frequency of the biocide treatment should be determined from the operator's experience, with regards to the fuel quality from the operator's suppliers (refer to paragraphs 4.A.(5) and (6)).

S 622-021

- (5) Airplanes operated in temperate climates, with proven supplies of uncontaminated fuel, can eliminate the biocide treatment if they do not have microbial contamination.

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CORROSION PREVENTION – STANDARD PREVENTIVE MAINTENANCE PROCEDURES  
TRANSPORTATION OF FISH – MAINTENANCE PRACTICES

1. General

- A. This information is about the corrosion problems arising from the transportation of fish that occur from spillage from the containers.
- B. This procedure has this task.

TASK 51-00-62-202-013

2. Preventive Maintenance

A. General

- (1) The use of airplanes for shipment of fish requires periodic cleaning and deodorizing of the airplane using locally available supplies. As this requires removal of cabin lining and insulation blankets it also provides an excellent opportunity to perform corrosion preventive maintenance.

B. Reference

- (1) AMM 25-52-00/701, Cargo Compartment Cleaning
- (2) AMM 25-52-03/401, Insulation – Cargo Compartment
- (3) AMM 51-00-51/201, Structures – Corrosion Inspections
- (4) AMM 51-21-03/701, Corrosion Removal and Control
- (5) AMM 51-24-09/701, Compound – Corrosion Inhibiting
- (6) AMM 51-41-00/001, Airframe Drainage
- (7) AMM 53-01-03/701, Tracks – Passenger Seats

C. Procedure

S 162-014

- (1) When known spills have occurred, Clean the Cargo Compartment (AMM 25-52-00/701).

NOTE: Avoid spreading the spilled fluids through floor clearances.

S 162-015

- (2) Clean spills on seat tracks (AMM 53-01-03/701).

S 212-016

- (3) At each available opportunity inspect the items that follow:
  - (a) The inner skin surface and fuselage structure for signs of corrosion (AMM 51-00-51/204).

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- (b) Make sure that all the drains are unobstructed and that there are no trapped liquids (AMM 51-41-00-001).
- (c) Condition of insulation blankets (AMM 25-52-03/401).
  - 1) Replace soaked insulation blankets.

S 622-017

- (4) After the airplane has been cleaned and deodorized do these steps:
  - (a) Apply corrosion inhibiting compound to the inner skin surface and structure (AMM 51-24-09/701) as necessary.
  - (b) Install the equipment that you removed.

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REDUCED VERTICAL SEPARATION MINIMUM (RVSM) – INSPECTION/CHECK

1. General

- A. RVSM will permit the airplane to be separated by 1000 feet vertically from FL290 to FL410, instead of the current 2000 feet. RVSM makes more available route assignments and give benefits to operators through better route assignments and reduced schedule delays.
- B. This procedure contains one task. The task is to examine the airplane skin for smoothness in the area of the pitot-static probes.

TASK 51-10-00-206-001

2. Examine the Airplane Skin

A. Equipment

- (1) A51006-26 – Skin Waviness Tool
- (2) Isoscope meter – Fischer Technology Inc.

B. Access

(1) Location Zones

- |         |  |
|---------|--|
| 113/114 | Area forward of Nose Landing Gear Wheel Well         |
| 115/116 | Nose Landing Gear Wheel Well                         |
| 117/118 | Area outboard and above Nose Landing Gear Wheel Well |

C. Prepare the Skin Waviness Tool

S 826-019

- (1) Calibrate the skin waviness tool.

NOTE: After ten airplanes have been measured, the measuring tool should be calibrated as shown in this procedure.

- (a) Put the tool on a flat surface.
- (b) Engage the plunger until it touches the flat level surface.
- (c) Make sure that the tool shows 5.500 inches +/- 0.003 inches.

NOTE: The correct measurement tool reading is the sum of the plunger scale reading and the dial gage reading.

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- (d) If the tool does not show 5.500 inches +/- 0.003 inches, adjust the tool leg height so that it read 5.500 inches +/- 0.003 inches.
- (e) Unlock the knob that locks the carriage.
- (f) Measure twice on a flat surface to make sure that the tool is within the tolerance.

S 826-023

- (2) Calibrate the dial gage.
  - (a) Set the plunger at 5.000 inches.

NOTE: The dial gage must be calibrated at a room temperature.

- (b) Unlock the dial and rotate it until it is set to zero.

NOTE: The dial gage should be set to zero before each airplane is measured.

- (c) Lock the dial.

NOTE: Do not unlock the dial until all of the measurements have been taken on this airplane.

#### D. Prepare to Measure the Skin

S 046-020

WARNING: DO NOT MEASURE THE AIRPLANE WHEN THE PITOT PROBES ARE HEATED. THE PROBES ARE EXTREMELY HOT AND PERSONS CAN BE SEVERELY BURNED IF THEY COME IN CONTACT WITH THE PROBE.

- (1) Open the "Pitot Heat" circuit breaker and attach a "DO NOT REMOVE" tag on the overhead breaker panel.

S 166-021

- (2) If the area to be measured is wet, wipe it dry with a non-abrasive cloth.

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S 216-024

- (3) Replace unplated pitot-static probes that have been in use for three years or more (AMM 34-11-01/401).

S 216-025

- (4) If visual inspection finds pitot-static probe damage, replace damaged probes (AMM 34-11-01/401).

**NOTE:** As an alternative to replacement of damaged probes, operators can refer to AMM 34-11-01/601 which gives permitted probe damage limits. If the probe damage is within the limits given in AMM 34-11-01/601, probe replacement is not necessary.

S 216-026

- (5) If angle-of-attack sensor damage is found, replace damaged sensor (AMM 34-12-03/401).

S 426-022

- (6) Install the mylar Waterline Reference Templates (WRT's) on the applicable sides of the airplane, Fig. 601.

**NOTE:** The templates are used to position the forward and aft facing legs of the skin smoothness measurement tool. Correct tool positioning is critical for data accuracy. There are four templates; two for the Body Station 164.75 frame (right and left) and two for the Body Station 212.5 frame (right and left). The WRT's provide all of the necessary frame, bulkhead, stringer, and rivet location information in the area of the pitot-static probes.

- (a) Align the aft template horizontally with the first rivet row aft of BSTA 212.5, Fig. 601.

**NOTE:** BSTA 212.5 is the second frame aft of the pitot-static probes.

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- (b) Align the aft template vertically with the first rivet row above the Angle of Airflow (AOA) sensor.

NOTE: This row of rivets is at the height of the floor for the flight compartment. It is approximately WL 207.

- (c) Use tape to keep the aft templates on the skin.
- (d) Temporarily mark the tooling point locations on the sides of the airplane. For reference, write the corresponding waterline next to each mark. The corresponding waterline appears below each mark on the WRT.
- (e) Align the forward template horizontally with the first rivet row forward of BSTA 164.75, Fig. 601.

NOTE: BSTA 164.75 is the fourth frame forward of the pitot-static probes. The upper forward tool leg may be up to 1 inch (25.4 mm) horizontally from the tool point location on the forward template. Adjust the horizontal alignment of the forward template so that it agrees with the length of the tool by temporarily placing the tool to a corresponding water line.

- (f) Align the forward template vertically with the first rivet row above the Angle of Airflow (AOA) sensor.

NOTE: This row of rivets is at the height of the floor for the flight compartment. It is approximately WL 207.

- (g) Use tape to keep the forward templates on the skin.
- (h) Temporarily mark the tooling point locations on the sides of the airplane. For reference, write the corresponding waterline next to each mark. The corresponding waterline appears below each mark on the WRT.
- (i) Remove the templates from the airplane.

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E. Measure the skin waviness

S 226-010

- (1) Measure the skin at 108 points on each side of the airplane in the area of the pitot-static probes, Fig. 601.

**NOTE:** Some of the points around the pitot-static probes and the angle of attack sensor cannot be measured because of the interference between the tool and the airplane. These points are identified on the example chart Fig. 602. For these points calculate the correct dimension using the formulas shown below in this procedure.

The contour measurement accuracy is critical to correctly make an estimate of the waviness in the pitot-static area. Two people are needed to support the tool correctly. Hold the tool against the skin by the legs. Incorrect measurements can occur if the tool is held by the center of the beam. It is recommended that a third person write down the measurements.

- (a) Put the tool at a Body Waterline.

**NOTE:** The gage dial face should point up.

- (b) Hold both aft feet against the skin.

**NOTE:** Do not push hard against the skin.

- (c) Hold the forward end of the tool against the skin.

**NOTE:** Do not push hard against the skin. If only one forward foot contacts the skin, measure with only the lower forward foot against the skin. Both aft feet must always contact the skin when measurements are made.

- (d) Unlock the knob that locks the slide assembly.  
(e) Put the plunger at the desired BSTA index location.  
(f) Lock the knob that prevents the slide assembly from moving.  
(g) Push the plunger down until it contacts the skin.

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- (h) Make a record of the measurements you take on a form similar to the one shown in Fig. 603.

**NOTE:** Measurements should be recorded to the nearest thousandth of an inch (+/- 0.001 inch). Make sure that you write the measurement in the correct column for the BSTA and the Waterline location.

- 1) Write the measurement in the box labeled MEAS.
- (i) Compare the actual measurement to the reference (REF) dimension and make a record of the difference between the two numbers in the DIFF box.
- (j) Compare the actual measurement to the reference (REF) dimension and make a record of the difference between the two numbers in the DIFF box.
- (k) Repeat steps (d) through (i) for each BSTA index along the first Body Waterline.
- (l) Repeat steps (a) through (j) at each Body Waterline until all 108 points on each side of the airplane have been measured.

**NOTE:** There are five tool indices on the worksheet that cannot be measured because of interferences. Calculate these dimensions as shown below.

Point (d) on WL 214:

BODY STATION 198.62

$$\text{DIMENSION} = \frac{(\text{MEASUREMENT AT WL 210}) + (2)(\text{MEASUREMENT AT WL 216})}{3}$$

Point (e) on WL 214:

BODY STATION 194.85

$$\text{DIMENSION} = \frac{(\text{MEASUREMENT AT WL 210}) + (2)(\text{MEASUREMENT AT WL 216})}{3}$$

Point (f) on WL 202:

WATERLINE 202

$$\text{DIMENSION} = \frac{(\text{MEASUREMENT AT BSTA 187.36} + \text{MEASUREMENT AT BSTA 194.85})}{2}$$

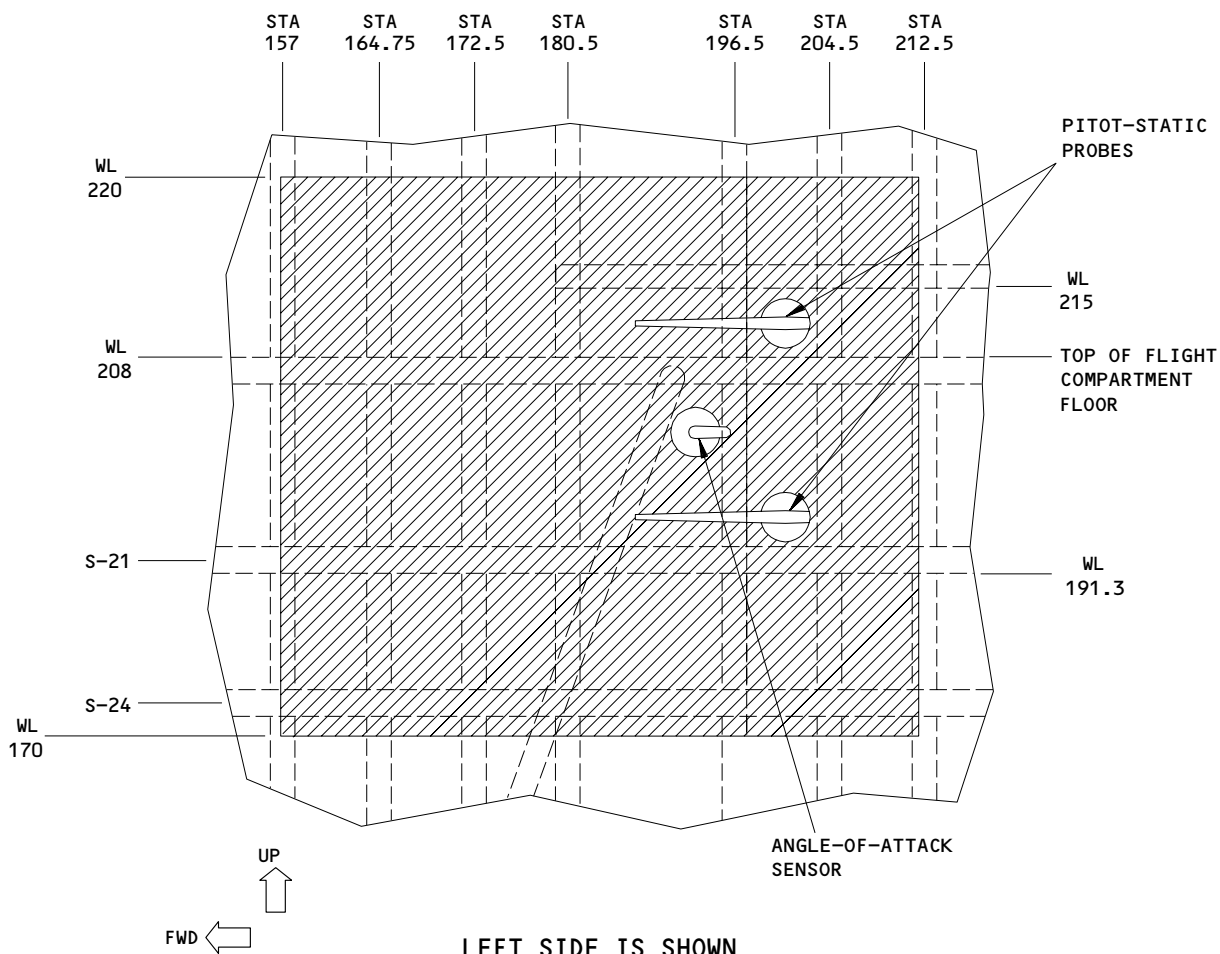
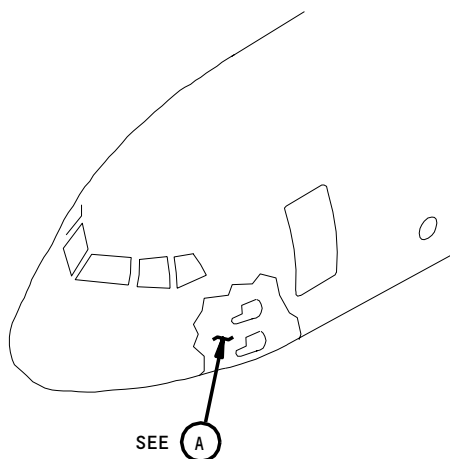
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LEFT SIDE IS SHOWN  
(RIGHT SIDE IS OPPOSITE)

(A)

Skin Waviness Inspection  
Figure 601 (Sheet 1)

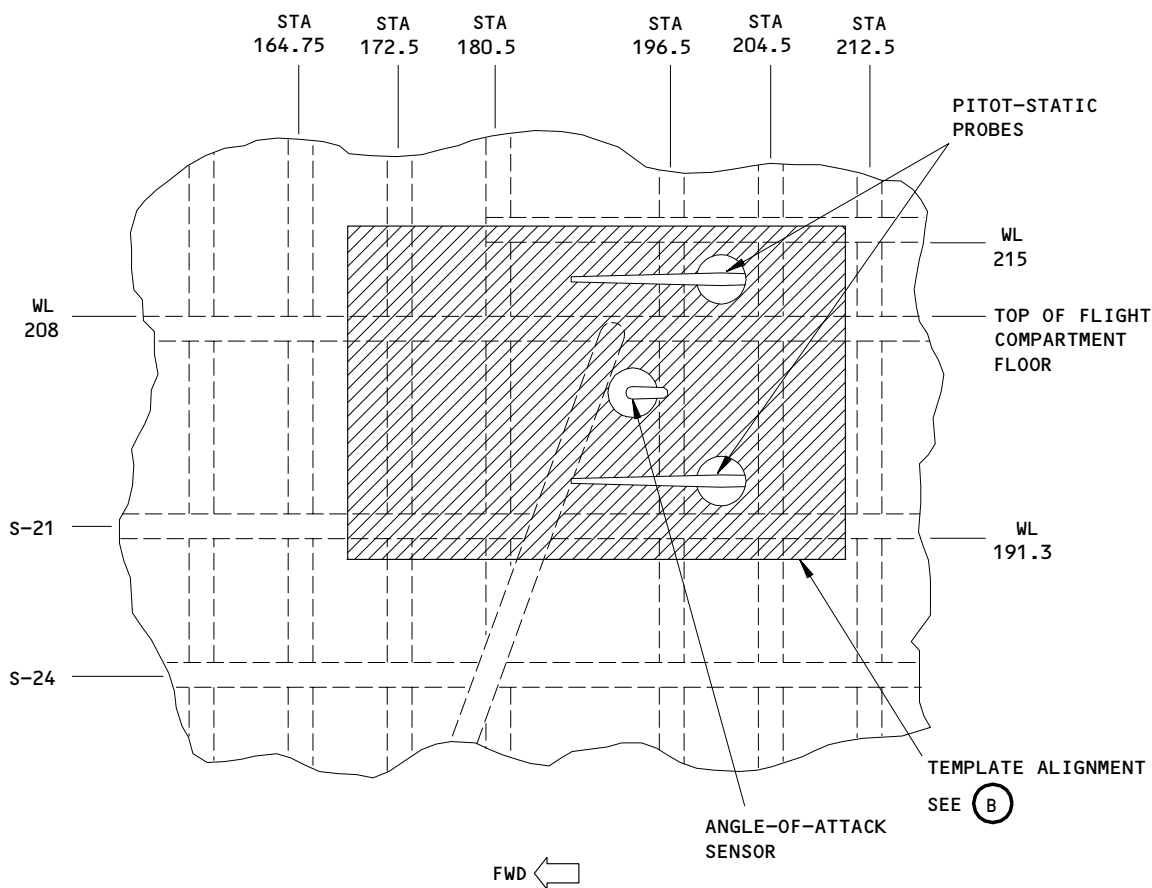
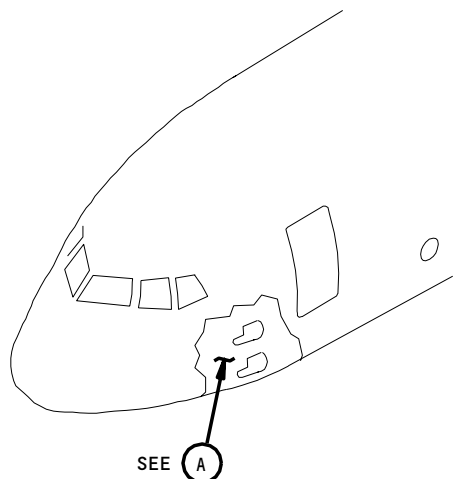
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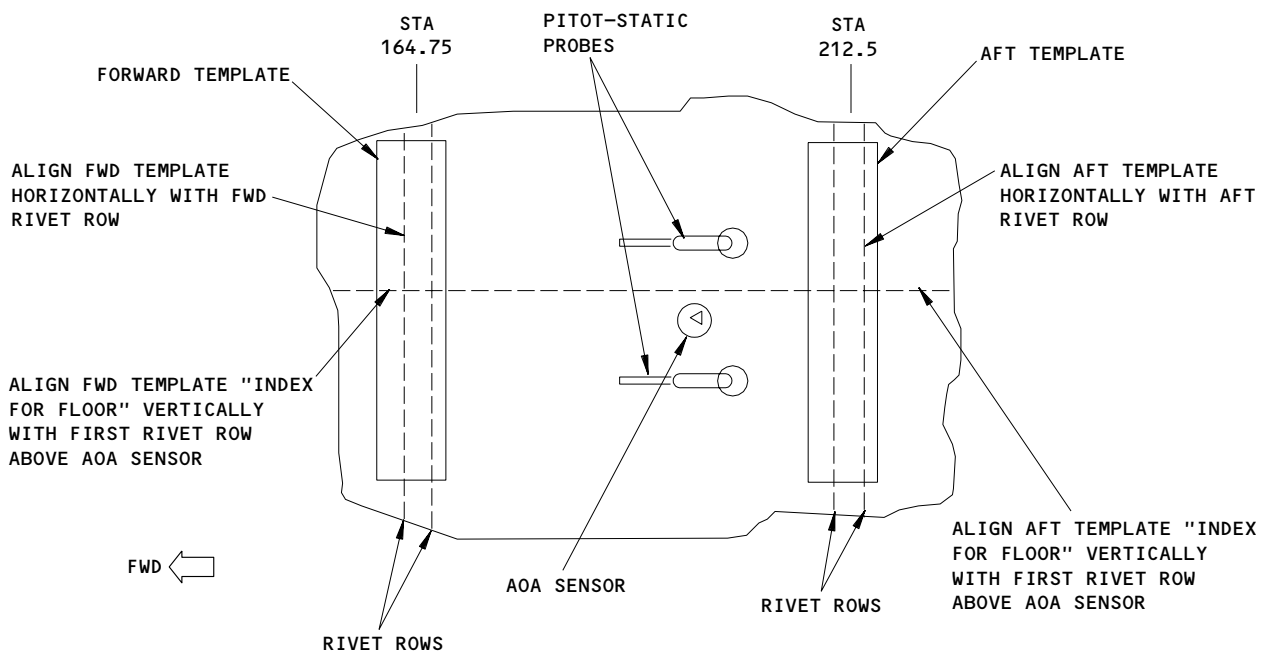
LEFT SIDE IS SHOWN  
(RIGHT SIDE IS OPPOSITE)

(A)

Skin Waviness Inspection  
Figure 601 (Sheet 2)

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TEMPLATE ALIGNMENT

(B)

Skin Waviness Inspection  
Figure 601 (Sheet 3)

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# 767 SECTION 41 SKIN WAVINESS MEASUREMENT TABULATION WORKSHEET LEFT SIDE-PROBES AND SENSORS INSTALLED

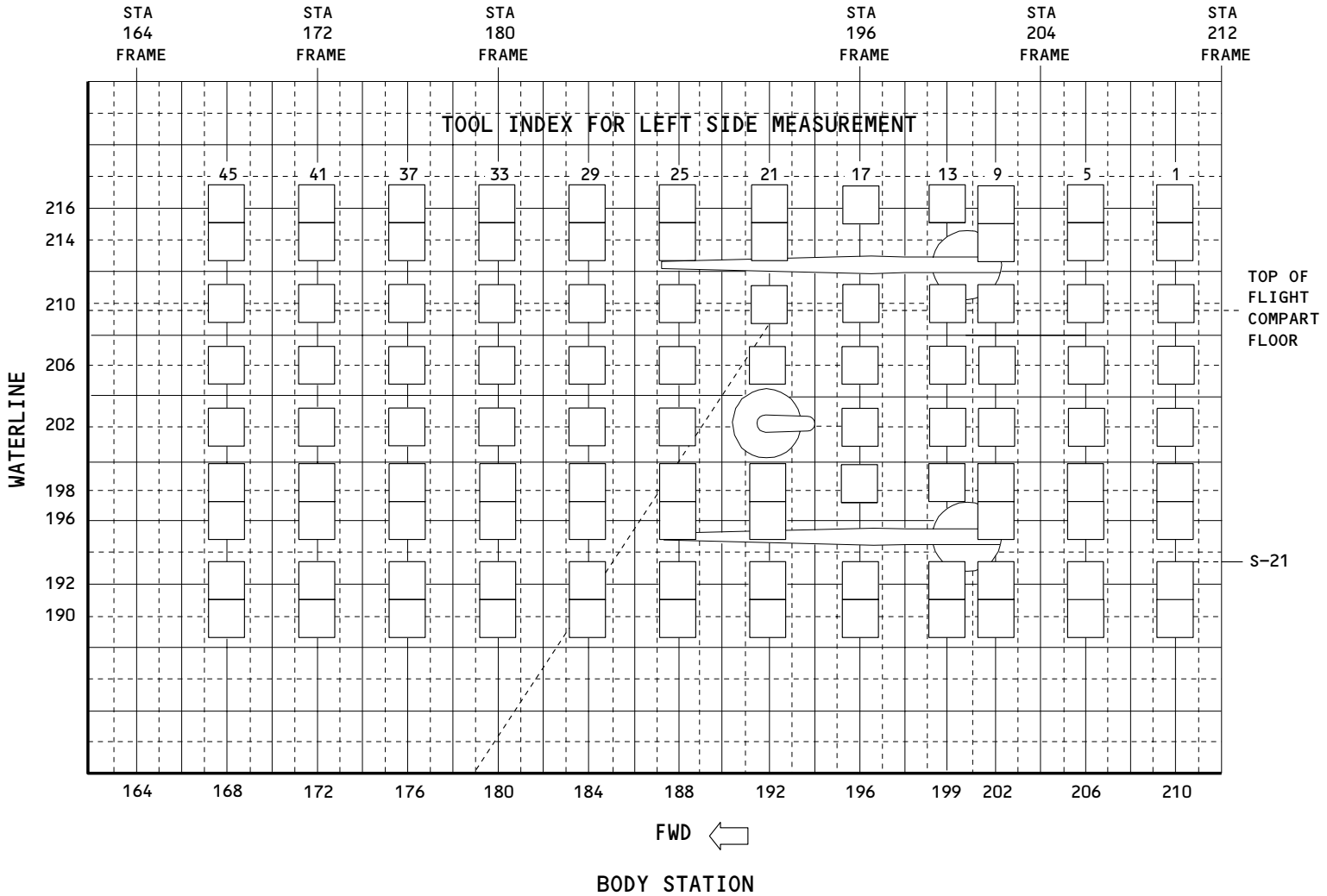
AIRPLANE: \_\_\_\_\_ DATE: \_\_\_\_\_

HOURS: \_\_\_\_\_ CYCLES: \_\_\_\_\_

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Measurement Tabulation Worksheet  
Figure 602 (Sheet 1)





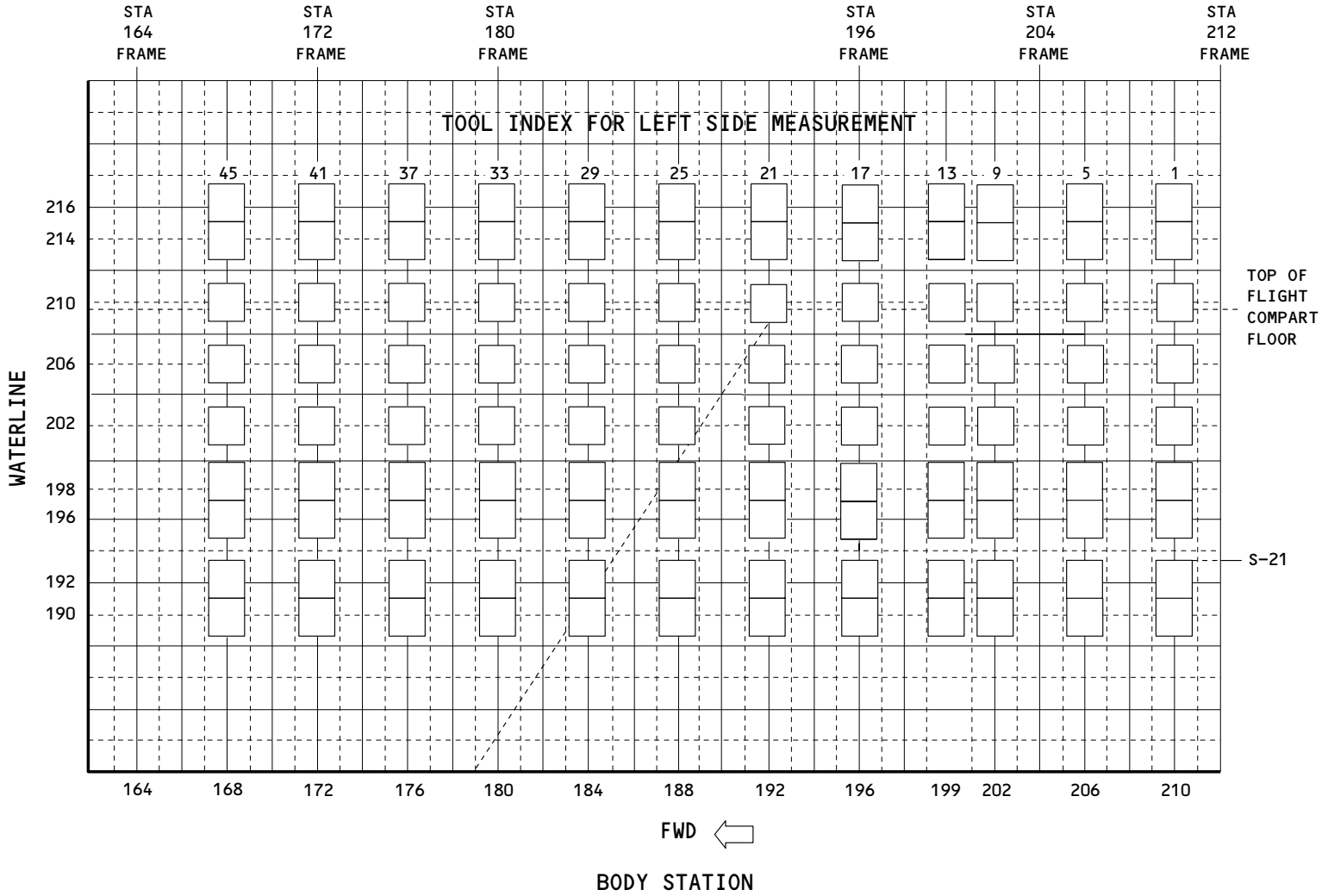
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# 767 SECTION 41 SKIN WAVINESS MEASUREMENT TABULATION WORKSHEET LEFT SIDE- PROBES AND SENSORS REMOVED

AIRPLANE: \_\_\_\_\_ DATE: \_\_\_\_\_

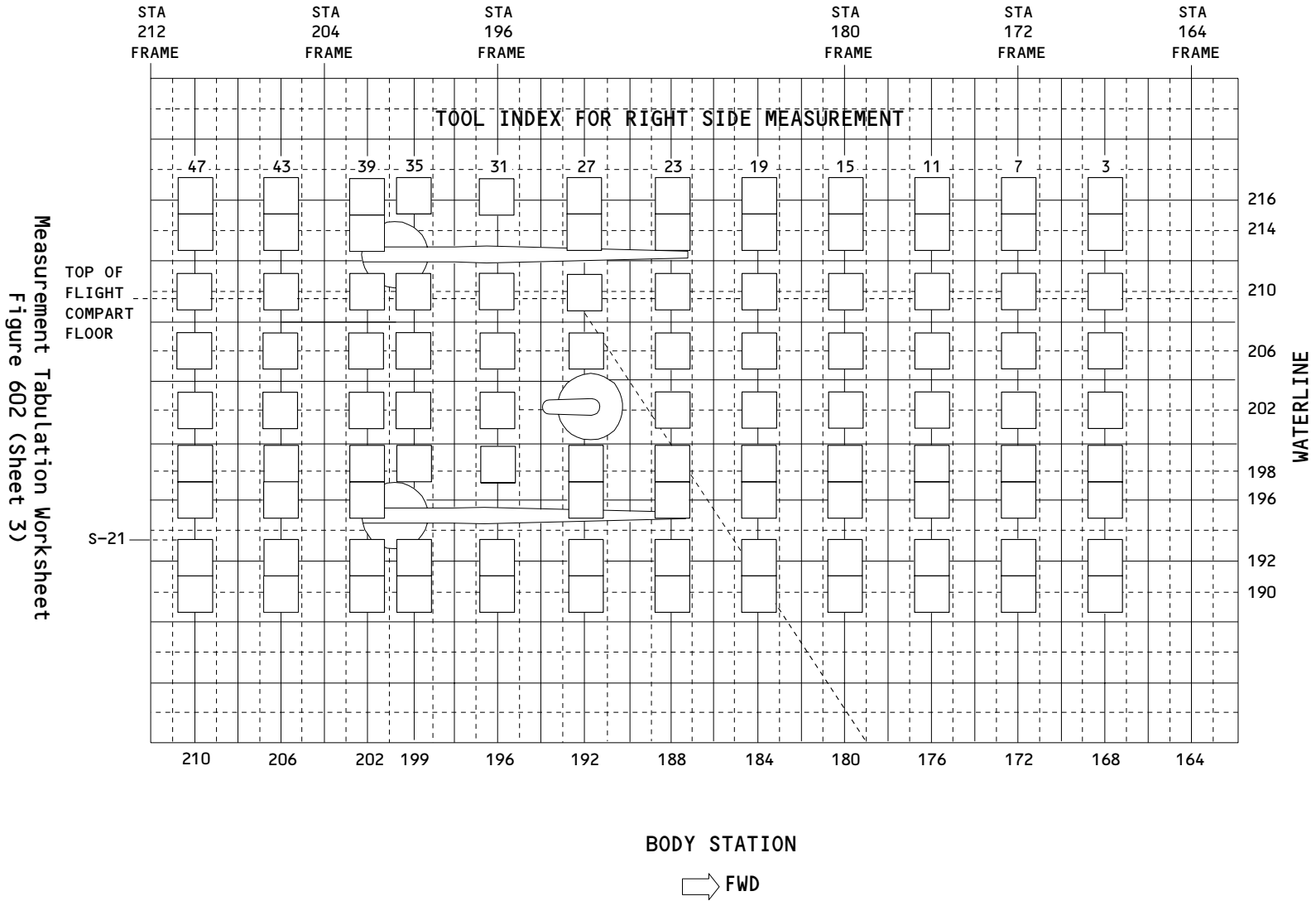
HOURS: \_\_\_\_\_ CYCLES: \_\_\_\_\_



Measurement Tabulation Worksheet  
Figure 602 (Sheet 2)

# 767 SECTION 41 SKIN WAVINESS MEASUREMENT TABULATION WORKSHEET RIGHT SIDE-PROBES AND SENSORS INSTALLED

AIRPLANE: \_\_\_\_\_ DATE: \_\_\_\_\_  
HOURS: \_\_\_\_\_ CYCLES: \_\_\_\_\_



Measurement Tabulation Worksheet  
Figure 602 (Sheet 3)



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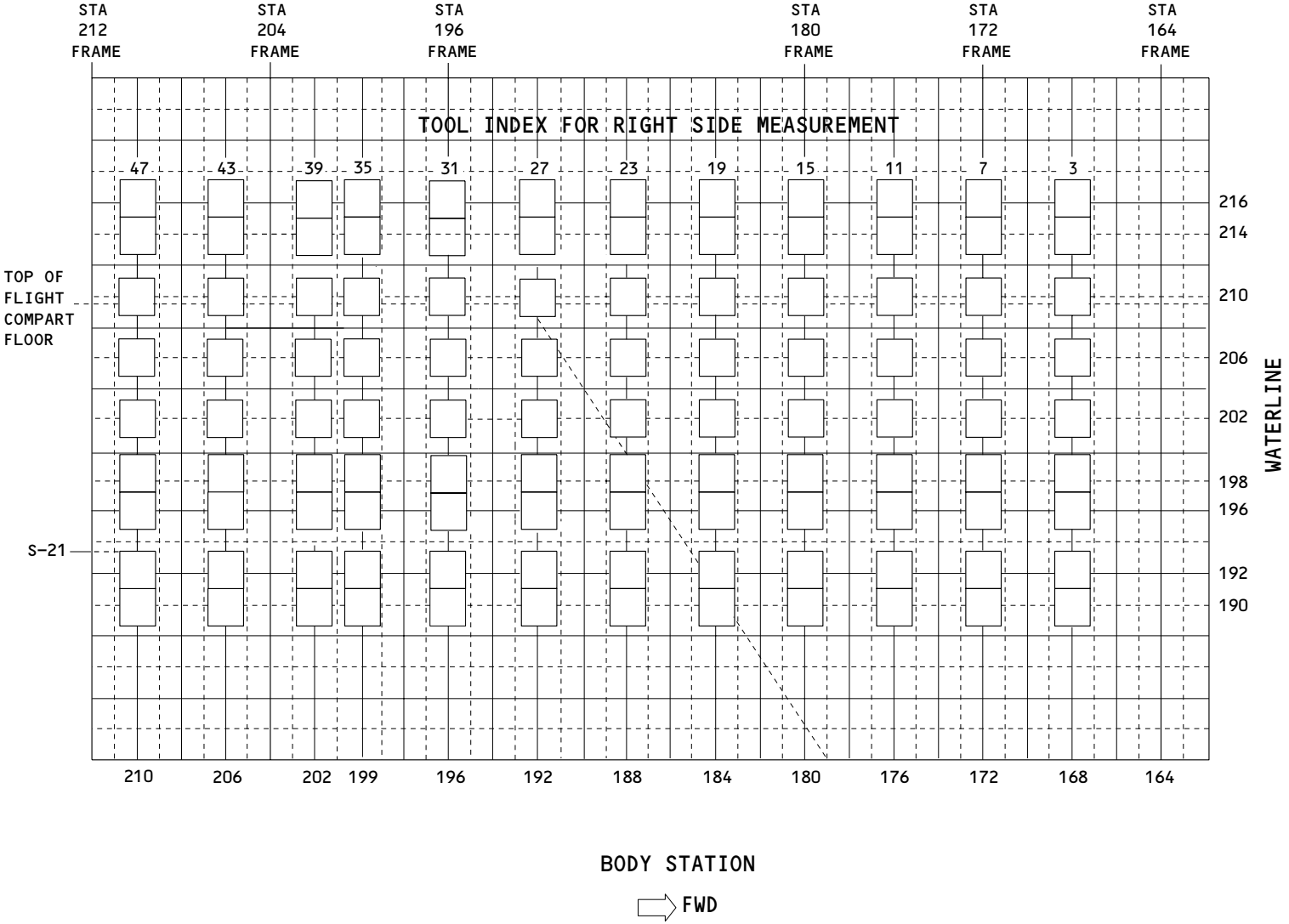
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# 767 SECTION 41 SKIN WAVINESS MEASUREMENT TABULATION WORKSHEET RIGHT SIDE-PROBES AND SENSORS REMOVED

AIRPLANE: \_\_\_\_\_ DATE: \_\_\_\_\_

HOURS: \_\_\_\_\_ CYCLES: \_\_\_\_\_

Measurement Tabulation Worksheet  
Figure 602 (Sheet 4)



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Point (g) on WL 196:

BODY STATION 198.62

$$\text{DIMENSION} = \frac{(\text{MEASUREMENT AT WL 192}) + (2)(\text{MEASUREMENT AT WL 198})}{3}$$

Point (h) on WL 196:

BODY STATION 194.85

$$\text{DIMENSION} = \frac{(\text{MEASUREMENT AT WL 192}) + (2)(\text{MEASUREMENT AT WL 198})}{3}$$

S 226-009

- (2) Analyze the data on the chart.
  - (a) After you have completed all 108 measurements write the minimum and maximum number for each DIFF line in the MAX and MIN boxes on the right side of the chart.
  - (b) Subtract the MIN number from the MAX number and write this number in the MAX-MIN box.
  - (c) Compare the MAX-MIN figures to the limit figures in the boxes on the right side of the chart.
    - 1) If the readings are less than the reference limits then the airplane is ready to be flown with RVSM.

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EXAMPLE WORKSHEET

AIRPLANE: (a) DATE: (b)  
HOURS: (m) CYCLES: (n)

WL 216	REF	5.327	5.126	4.981	4.881	4.830	4.821	4.846	4.899	4.992	5.123	5.288	5.483	WL 216	Limit 0.10	
	MEAS	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	MAX	MIN	MAX-MIN
	DIFF	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(j)	(k)	(L)
WL 214	REF	5.328	5.128	4.976	4.872	4.811	4.791	4.809	4.866	4.959	5.087	5.250	5.447	WL 214	Limit 0.09	
	MEAS	(c)	(c)	(c)	(d)	(e)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	MAX	MIN	MAX-MIN
	DIFF	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(j)	(k)	(L)
WL 210	REF	5.336	5.132	4.973	4.858	4.785	4.753	4.760	4.806	4.890	5.011	5.170	5.365	WL 210	Limit 0.09	
	MEAS	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	MAX	MIN	MAX-MIN
	DIFF	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(j)	(k)	(L)
WL 206	REF	5.337	5.134	4.975	4.859	4.784	4.747	4.749	4.789	4.865	4.978	5.127	5.314	WL 206	Limit 0.12	
	MEAS	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	MAX	MIN	MAX-MIN
	DIFF	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(j)	(k)	(L)
WL 202	REF	5.336	5.133	4.974	4.858	4.782	4.744	4.746	4.785	4.860	4.972	5.120	5.303	WL 202	Limit 0.12	
	MEAS	(c)	(c)	(c)	(c)	(c)	(f)	(c)	(c)	(c)	(c)	(c)	(c)	MAX	MIN	MAX-MIN
	DIFF	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(j)	(k)	(L)
WL 198	REF	5.335	5.131	4.971	4.853	4.776	4.738	4.737	4.774	4.848	4.958	5.104	5.286	WL 198	Limit 0.10	
	MEAS	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	MAX	MIN	MAX-MIN
	DIFF	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(j)	(k)	(L)
WL 196	REF	5.333	5.130	4.970	4.851	4.773	4.733	4.732	4.768	4.840	4.949	5.095	5.276	WL 196	Limit 0.09	
	MEAS	(c)	(c)	(c)	(g)	(h)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	MAX	MIN	MAX-MIN
	DIFF	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(j)	(k)	(L)
WL 192	REF	5.333	5.127	4.964	4.843	4.762	4.720	4.716	4.750	4.820	4.927	5.070	5.249	WL 192	Limit 0.09	
	MEAS	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	MAX	MIN	MAX-MIN
	DIFF	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(j)	(k)	(L)
WL 190	REF	5.331	5.124	4.960	4.837	4.754	4.711	4.705	4.737	4.806	4.912	5.054	5.233	WL 190	Limit 0.10	
	MEAS	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	(c)	MAX	MIN	MAX-MIN
	DIFF	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(i)	(j)	(k)	(L)
INDEX	1	5	9	13	17	21	25	29	33	37	41	45				
BSTA	210.01	206.20	202.40	198.62	194.85	191.10	187.36	183.63	179.92	176.22	172.53	168.86	-----> FWD			

Data Analysis  
Figure 603



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Left Side

AIRPLANE: \_\_\_\_\_ DATE: \_\_\_\_\_  
DATE: \_\_\_\_\_ CYCLES: \_\_\_\_\_

WL 216	REF	5.483	5.288	4.123	4.992	4.899	4.846	4.821	4.830	4.881	4.981	5.126	5.327	WL 216	LIMIT 0.10
	MEAS													MAX	MIN
	DIFF														WAVINESS
WL 214	REF	5.447	5.250	5.087	4.959	4.866	4.809	4.791	4.811	4.872	4.976	5.128	5.328	WL 214	LIMIT 0.09
	MEAS													MAX	MIN
	DIFF														WAVINESS
WL 210	REF	5.365	5.170	5.011	4.890	4.806	4.760	4.753	4.785	4.858	4.973	5.132	5.336	WL 210	LIMIT 0.09
	MEAS													MAX	MIN
	DIFF														WAVINESS
WL 206	REF	5.314	5.127	4.978	4.865	4.789	4.749	4.747	4.784	4.859	4.975	5.134	5.337	WL 206	LIMIT 0.12
	MEAS													MAX	MIN
	DIFF														WAVINESS
WL 202	REF	5.303	5.120	4.972	4.860	4.785	4.746	4.744	4.782	4.858	4.974	5.133	5.336	WL 202	LIMIT 0.12
	MEAS													MAX	MIN
	DIFF														WAVINESS
WL 198	REF	5.286	5.104	4.958	4.848	4.774	4.737	4.738	4.776	4.853	4.971	5.131	5.335	WL 198	LIMIT 0.10
	MEAS													MAX	MIN
	DIFF														WAVINESS
WL 196	REF	5.276	5.095	4.949	4.840	4.768	4.732	4.733	4.773	4.851	4.970	5.130	5.333	WL 196	LIMIT 0.09
	MEAS													MAX	MIN
	DIFF														WAVINESS
WL 192	REF	5.249	5.070	4.927	4.820	4.750	4.716	4.720	4.762	4.843	4.964	5.127	5.333	WL 192	LIMIT 0.09
	MEAS													MAX	MIN
	DIFF														WAVINESS
WL 190	REF	5.233	5.054	4.912	4.806	4.737	4.705	4.711	4.754	4.837	4.960	5.124	5.331	WL 190	LIMIT 0.10
	MEAS													MAX	MIN
	DIFF														WAVINESS
INDEX		45	41	37	33	29	25	21	17	13	9	5	1		
BSTA		168.86	172.53	176.22	179.92	183.63	187.36	191.10	194.85	198.62	202.40	206.20	210.01		

Data Collection and Analysis  
Figure 604 (Sheet 1)

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767 Section 41 Measured Skin Contour  
Right Side

AIRPLANE: \_\_\_\_\_ DATE: \_\_\_\_\_  
HOURS: \_\_\_\_\_ CYCLES: \_\_\_\_\_

WL 216	REF	5.327	5.126	4.981	4.881	4.830	4.821	4.846	4.899	4.992	5.123	5.288	5.483	WL 216	Limit 0.10	
	MEAS													MAX	MIN	MAX-MIN
	DIFF															
WL 214	REF	5.328	5.128	4.976	4.872	4.811	4.791	4.809	4.866	4.959	5.087	5.250	5.447	WL 214	Limit 0.09	
	MEAS													MAX	MIN	MAX-MIN
	DIFF															
WL 210	REF	5.336	5.132	4.973	4.858	4.785	4.753	4.760	4.806	4.890	5.011	5.170	5.365	WL 210	Limit 0.09	
	MEAS													MAX	MIN	MAX-MIN
	DIFF															
WL 206	REF	5.337	5.134	4.975	4.859	4.784	4.747	4.749	4.789	4.865	4.978	5.127	5.314	WL 206	Limit 0.12	
	MEAS													MAX	MIN	MAX-MIN
	DIFF															
WL 202	REF	5.336	5.133	4.974	4.858	4.782	4.744	4.746	4.785	4.860	4.972	5.120	5.303	WL 202	Limit 0.12	
	MEAS													MAX	MIN	MAX-MIN
	DIFF															
WL 198	REF	5.335	5.131	4.971	4.853	4.776	4.738	4.737	4.774	4.848	4.958	5.104	5.286	WL 198	Limit 0.10	
	MEAS													MAX	MIN	MAX-MIN
	DIFF															
WL 196	REF	5.333	5.130	4.970	4.851	4.773	4.733	4.732	4.768	4.840	4.949	5.095	5.276	WL 196	Limit 0.09	
	MEAS													MAX	MIN	MAX-MIN
	DIFF															
WL 192	REF	5.333	5.127	4.964	4.843	4.762	4.720	4.716	4.750	4.820	4.927	5.070	5.249	WL 192	Limit 0.09	
	MEAS													MAX	MIN	MAX-MIN
	DIFF															
WL 190	REF	5.331	5.124	4.960	4.837	4.754	4.711	4.705	4.737	4.806	4.912	5.054	5.233	WL 190	Limit 0.10	
	MEAS													MAX	MIN	MAX-MIN
	DIFF															
INDEX		47	43	39	35	31	27	23	19	15	11	7	3			
BSTA		210.01	206.20	202.40	198.62	194.85	191.10	187.36	183.63	179.92	176.22	172.53	168.86			

-----> FWD

Data Collection and Analysis  
Figure 604 (Sheet 2)



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- 2) If the readings are higher than the reference limits contact Boeing for further analysis.

NOTE: Operators with airplanes that fail this inspection can supply the results to Boeing. Boeing will do a Computational Fluid Dynamics (CFD) analysis of the skin measurements to find if the skin waviness is within the limits necessary for RVSM. The analysis examines the skin measurements at all four pitot-static probes at the same time. For this reason, an airplane which failed the dimensional check can still have skin waviness within the limits necessary for RVSM.

NOTE: If the analysis shows the skin waviness is within the limits necessary for RVSM, Boeing will talk to the FAA for skin waviness approval.

NOTE: If the analysis shows that the skin waviness is not within the limits for RVSM, Boeing can give the data for the installation of shims under the skin. After you install the shims, you should do the skin measurement and data analysis again. This will make sure the skin waviness is within the limits necessary for RVSM.

F. RVSM Reporting:

NOTE: Boeing requests operators use the following Reduced Vertical Separation Minimum (RVSM) Reporting System to tell Boeing about airplanes that fail the skin waviness inspection.

S 516-015

- (1) If you find a problem, send duplicates of this information to Boeing with this heading.

ATTENTION – RVSM DISCREPANCY – SERVICE BULLETIN RELATED

S 516-014

- (2) Include the following information:

- (a) The Service Bulletin Number.
- (b) The airplane serial number.
- (c) The number of flight cycles and hours on the airplane.
- (d) The necessary information as shown on the " 767 Section 41 Measured Skin Contour " worksheets.

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S 516-016

- (3) Send the data and reports of the skin waviness and RVSM to Boeing through the Field Service Representative or directly to:

(a) Boeing Commercial Airplane Group,  
P.O. Box 3707,  
Seattle, Washington 98124

Attn: Director, 747/767 Service Engineering,  
Org. M-7240, Mail Stop 04-CR

S 976-017

- (4) Boeing will review all requirements immediately. Boeing will do a Computational Fluid Dynamics (CFD) analysis on the data.

NOTE: Boeing will notify the operator if the CFD analysis shows the skin waviness is within acceptable limits. If the CFD analysis shows that the skin waviness is not within acceptable limits, Boeing will notify the operator of the necessary corrective action.

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WINDOW AND DOOR LEAKS – INSPECTION/CHECK

1. General

- A. This procedure has these tasks:  
(1) Leak Check of the No. 2 Openable Window  
(2) Leak Check of the Doors and Hatches

TASK 51-11-00-286-001

2. Leak Check of the No. 2 Window

- A. General  
(1) This procedure is for the right and left No. 2 Openable Windows.
- B. Equipment  
(1) ST6760-6, No. 2 Window Vacuum Blanket  
(2) ST6760A-1, Ultrasonic Leak Probe Tool  
(3) ST9999-VBA-201, Vacuum Generator (No. 2 window, doors and hatches)  
(4) ST9999-VBA-301, Vacuum Generator (No. 2 window only)
- C. References  
(1) AMM 30-41-00/501, Control Cabin Window Anti-Ice System  
(2) AMM 56-11-02/501, No. 2 Window
- D. Access  
(1) Location Zone  
101 Control Cabin, Left  
102 Control Cabin, Right
- E. Procedure

S 866-002

**WARNING:** DISARM THE WINDOW HEAT SYSTEM BEFORE YOU CHECK THE WINDOWS. IF THE WINDOW POWER IS ON, YOU CAN GET AN ELECTRICAL SHOCK WHEN YOU TOUCH THE WINDOW. THE SHOCK CAN CAUSE INJURY TO PERSONS.

- (1) Make sure the power is OFF for the window heat system.  
(a) Make sure that the window heat switches are in the OFF position.

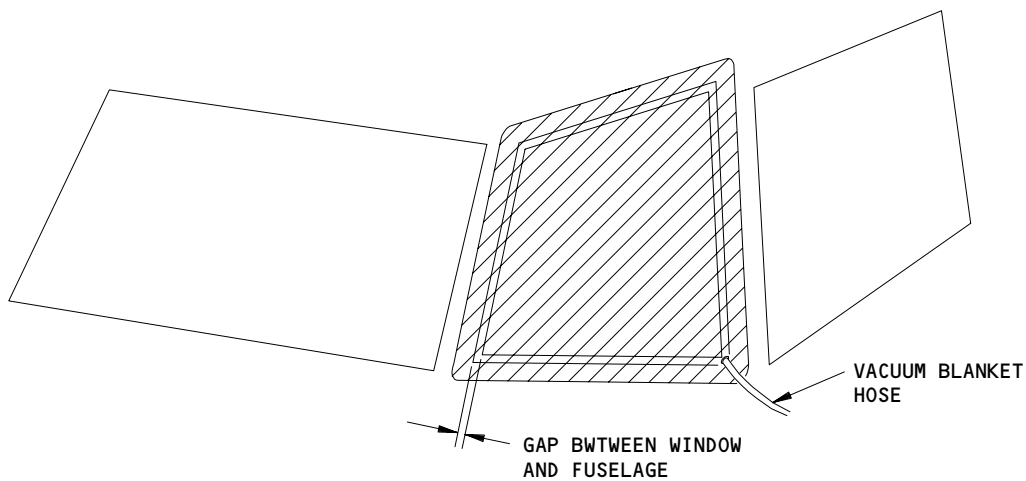
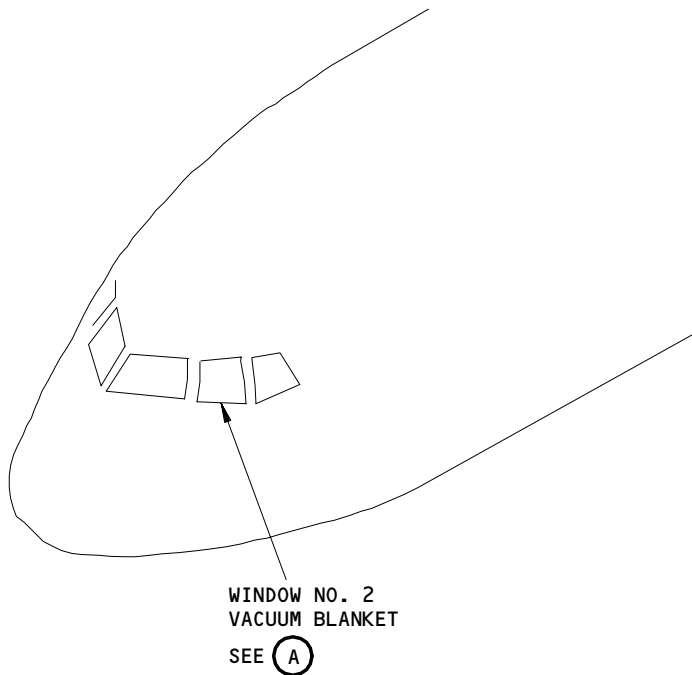
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WINDOW NO. 2 VACUUM BLANKET

(A)

**NOTE:** THE VACUUM BLANKET COVERS THE ENTIRE WINDOW AND THE GAP BETWEEN THE WINDOW AND THE FUSELAGE.

Window No. 2 Vacuum Blanket Check  
Figure 601

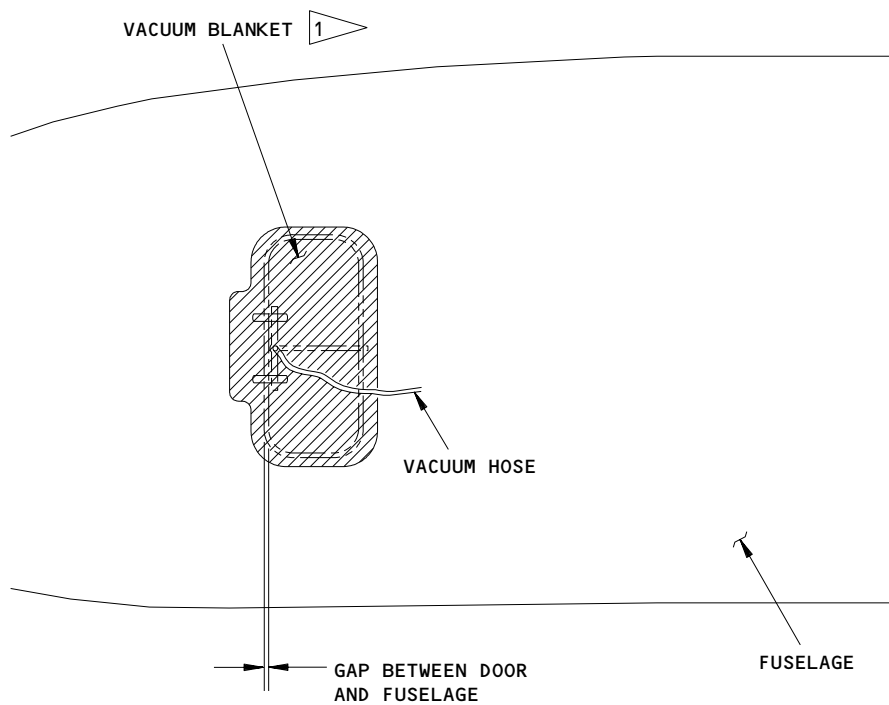
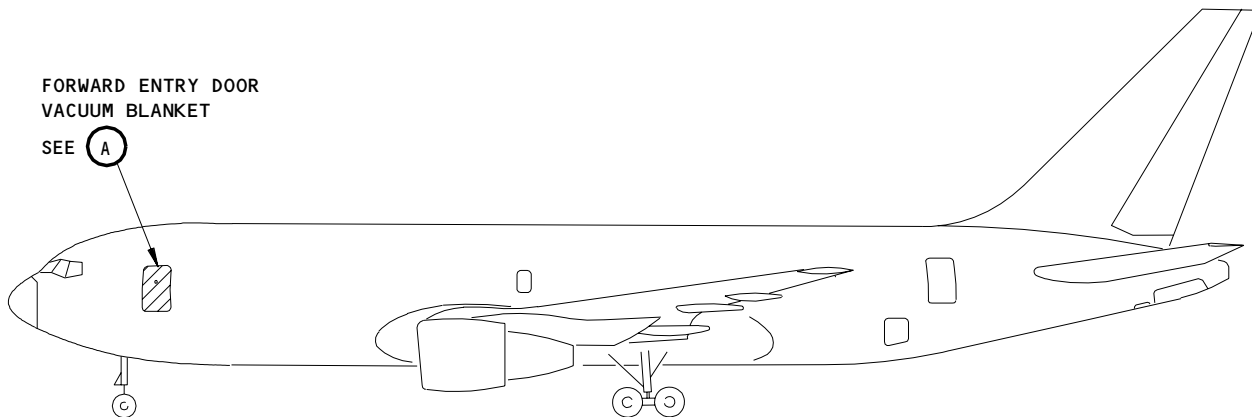
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E85617



FORWARD ENTRY DOOR VACUUM BLANKET

(A)

**NOTE:** THE VACUUM BLANKET COVERS THE ENTIRE DOOR AND THE GAP BETWEEN THE DOOR AND THE FUSELAGE.

1 THIS PROCEDURE IS THE SAME FOR THE FORWARD SERVICE DOORS AND THE ESCAPE HATCHES.

Forward Entry Door Vacuum Blanket Check  
Figure 602

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- (b) Open these circuit breakers and attach the DO-NOT-CLOSE tags:
  - 1) Panel P36
    - a) 36G6 or 36H4 or 36L5, ICE/RAIN WINDOW HEAT 1L
    - b) 36H1 or 36H7, ICE/RAIN WINDOW HEAT 2R
    - c) 36H1 or 36H7, ICE/RAIN WINDOW HEAT 3R
  - 2) Panel P37
    - a) 37D2 or 37F1 or 37F4, ICE & RAIN WINDOW HEAT 1R
    - b) 37E1 or 37H7, ICE/RAIN WINDOW HEAT 2L
    - c) 37E2 or 37H6, ICE/RAIN WINDOW HEAT 3L

S 026-003

- (2) Remove the window padding from the window, as follows:
  - (a) Remove the latch handle cover.
  - (b) Remove the covers from all sides of the window.
  - (c) Remove any protective tape around the window opening.
  - (d) Loosen the protective tape in the corners of the window.
  - (e) Plug the window interior lining holes in the No. 2 window frame.
  - (f) Plug the window fluid drain line on the airplane structure at the lower aft side of the No. 2 window.

S 846-004

- (3) Prepare the vacuum blanket:
  - (a) Calibrate the ultrasonic leak detector as follows:
    - 1) Use the white noise generator to set the PASS/FAIL indication to 40dB.
  - (b) Connect the vacuum generator to the vacuum bag.
  - (c) Connect the vacuum generator to a compressed air source.

S 486-005

- (4) Install the vacuum blanket over the No. 2 window (Fig. 601).
  - (a) Place the vacuum port over the lower aft outside corner of the window.
  - (b) Make sure the vacuum blanket covers the entire window and the gap between the window and the fuselage.
  - (c) Remove all bubbles and creases.
  - (d) Make sure the vacuum gauge indicates 18 to 20 inch (HG) of vacuum after you attach the blanket to the window.

S 276-006

- (5) Do a check of the noise levels around the interior of the No. 2 window as follows:
  - (a) Hold the ultrasonic leak detector approximately 2 inches from the window.

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- (b) Move the ultrasonic leak detector around the edge of the window.
- (c) Use the headphones and watch the noise scale on the ultrasonic leak detector.

S 816-007

- (6) If the noise levels are more than 40dB, do the steps that follow:
  - (a) Determine the exact location of the noise with a stethoscope.
  - (b) Remove the vacuum blanket from the window.
  - (c) Do the applicable No. 2 window adjustments (AMM 56-11-02/501).
  - (d) Install the vacuum blanket again and check for leaks.

NOTE: You will have to repeat the installation of the vacuum blanket and do a check for leaks to make sure all the leaks have been corrected.

F. Put the Airplane Back to Its Usual Condition:

S 416-008

- (1) Install the No. 2 window padding:
  - (a) Install the covers on all sides of the window.
  - (b) Install the latch handle cover.

S 866-009

- (2) Make sure the power is ON for the window heat system.
  - (a) Remove the DO-NOT-CLOSE tags and close these circuit breakers:
    - 1) Panel P36
      - a) 36G6 or 36H4 or 36L5, ICE/RAIN WINDOW HEAT 1L
      - b) 36H2 or 36H6, ICE/RAIN WINDOW HEAT 2R
      - c) 36H1 or 36H7, ICE/RAIN WINDOW HEAT 3R
    - 2) Panel P37
      - a) 37D2 or 37F1 or 37F4, ICE/RAIN WINDOW HEAT 1R
      - b) 37E1 OR 37H7, ICE/RAIN WINDOW HEAT 2L
      - c) 37E2 or 37H6, ICE/RAIN WINDOW HEAT 3L

S 716-010

- (3) Do the operational test for the window heat control system (AMM 30-41-00/501).

TASK 51-11-00-286-011

3. Leak Check of the Doors and Hatches

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TASK 51-11-00-286-016

4. Leak Check of the Crew Entry Door

A. General

- (1) This task is for the following:
  - (a) Entry and Service Doors.
  - (b) Overwing Escape Hatches

B. Equipment

- (1) ST6760A-1, Ultrasonic Leak Probe Tool
- (2) ST9999-VBA-201, Vacuum Generator (No. 2 window, doors, and hatches)
- (3) ST6760-1, Door and Hatch Vacuum Blanket

C. References

- (1) AMM 52-09-01/401, Entry and Service Door Seals
- (2) AMM 52-09-03/401, Overwing Emergency Exit Hatch Seals
- (3) AMM 52-11-00/501, Entry and Service Doors
- (4) AMM 52-21-01/201, Overwing Escape Hatches

D. Access

- (1) Location Zone
  - 831 Forward Entry Door
  - 833 Aft Entry Door
  - 841 Forward Service Door
  - 843 Aft Service Door
  
  - 832 Overwing Escape Hatch (Left)
  - 842 Overwing Escape Hatch (Right)

E. Procedure

S 846-012

- (1) Do the steps that follow to prepare the vacuum blanket:
  - (a) Calibrate the ultrasonic leak detector as follows:
    - 1) Use the white noise generator to set the PASS/FAIL indication to 40dB.
  - (b) Connect the vacuum generator to the vacuum blanket.
  - (c) Connect the vacuum generator to a compressed air source.

S 486-013

- (2) Install the vacuum blanket over the exterior of the Forward and Aft Entry and Service Doors or Overwing Escape Hatches (Fig. 602).
  - (a) Make sure the vacuum blanket covers the entire exterior of the door or hatch and the gap between the door or hatch and the fuselage.

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- (b) Remove all bubbles and creases.
- (c) Make sure the vacuum gauge indicates 18 to 20 inches (HG) of vacuum when the blanket is attached to the door or hatch.

S 276-014

- (3) Do a check of the noise levels around the interior of the door or hatch that you test as follows:
  - (a) Hold the ultrasonic leak detector approximately 2 inches from the door or hatch.
  - (b) Move the ultrasonic leak detector around the edge of the door or hatch.
  - (c) Use the headphones and watch the noise meter on the ultrasonic leak detector.

S 816-015

- (4) If the noise levels are more than 40dB do the steps that follow:
  - (a) Determine the exact location of the noise with a stethoscope.
  - (b) Remove the vacuum blanket from the door or hatch.
  - (c) Make sure the door seal or hatch seal is clean and in good condition; free from wrinkles, kinks, cracks, rips, tears, etc.
    - 1) Replace the door seal or hatch seal if you find wrinkles, kinks, cracks, rips, tears, or other types of damage (AMM 52-09-01/401, and AMM 52-09-03/401).
  - (d) Install the vacuum blanket again and check for leaks.

NOTE: You will have to repeat the installation of the vacuum blanket and do a check for leaks to make sure all the leaks have been corrected.

- (e) If the seal does not need to be replaced do the step that follows:
- (f) Do the applicable door or hatch adjustments:
  - AMM 52-11-00/501, Entry and Service Doors
  - AMM 52-21-01/201, Overwing Emergency Exit Hatches
- (g) Install the vacuum blanket again and check for leaks.

NOTE: You will have to repeat the installation of the vacuum blanket and do a check for leaks to make sure all the leaks have been corrected.

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STRUCTURES FINISHES - DESCRIPTION AND OPERATION

1. General

- A. The structure of the airplane is protected from corrosion by various finishes. Finish applied to the surface depends upon material to be finished and whether the surface is an interior or exterior surface.
- B. Exterior surfaces of the airplane are defined, for the purpose of this subject, as follows:
  - (1) All aerodynamic surfaces, including doors, hatches and covers.
  - (2) Landing gear and wheel wells.
  - (3) All exposed areas of flight control surfaces, supports and cove areas.
  - (4) Integral fuel tanks, wing inspar surfaces, bulkheads and interior surfaces other than furnishings.
- C. The standard primer used throughout the airplane is BMS 10-11, Type I except for fuel tank components which use BMS 10-20, Type II and aerodynamic surfaces which use BMS 10-79. These primers are chemical and solvent resistant, organic finishes which may be applied by spray or brush. A coat of enamel, BMS 10-11 or 10-60 is applied over primer areas where additional corrosion protection is required. In addition the following details receive BMS 10-11, Type II white enamel before assembly.
  - (1) Details located beneath main deck floor except wing center section.
  - (2) Details to be assembled with epoxy-graphite composites.
  - (3) Details comprising wheel wells.

CAUTION: DO NOT USE PAINT STRIPPERS ON COMPOSITE SURFACES. PAINT STRIPPERS WILL DAMAGE COMPOSITE STRUCTURE.

- D. Remove paint from metal surfaces with paint strippers. Paint on composite surfaces must be removed using mechanical paint stripping methods.
- E. A record should be kept of all painting and repairs done to outboard ailerons, rudder, and elevators to ensure that the operational balance moment is not exceeded. Flight control surfaces which exceed the operational balance moment may flutter during flight. Refer to SRM 51-60-00 for operational balance moment determination.
- F. Refer to chapter 28-11-00, Fuel Tanks, for integral fuel tank cleaning and sealing.

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INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING

1. General

A. This task contains general information to apply finishes on the airplane.

TASK 51-21-00-377-001

2. Apply Finishes on the Airplane

A. General

- (1) Before you apply finish to a surface, you must correctly prepare the surface. To prepare a surface, you will remove the damaged finish, remove corrosion and clean the surface. For some surfaces, you will also apply a conversion coating.
- (2) Use approved compounds to remove damaged finishes.
- (3) More than one method of corrosion removal is available. Some procedures used to remove corrosion include chemical treatments, hand sanding with abrasive paper or metal wool, mechanical sanding with abrasive mats, or dry abrasive blasting. The procedure that is used must agree with the metal and the quantity of corrosion.
- (4) Solvent is frequently used to make sure the surface is fully clean. To get satisfactory results, you must make sure the surface is fully clean before you apply paints or finishes.
- (5) Some conversion coatings are used to prevent damage on metal surfaces. The coating is made by a chemical procedure which changes the surface metal into an oxide layer. Different conversion coatings are used with different metals. Chromic acid or equivalent oxidizing agent will form a thin tight layer and prevent corrosion.
- (6) To apply flame sprayed aluminum, refer to Chapter 20-10-05 of the Component Maintenance Manual.

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PAIN T STRIPPING – CLEANING/PAINTING

1. General

- A. This procedure contains one task. The task is the removal of paint (paint stripping).

TASK 51-21-01-157-001

2. Paint Stripping

A. General

- (1) You can remove paint on metal surfaces with paint strippers or solvents. Solvents are usually used to remove small quantities of paint. Do not use paint stripper on plastic laminates, fiberglass, aerodynamic smoother, edges of metal bonds or rubber parts. Only use approved solvents for these materials.
- (2) Use dry abrasive to remove the paint from the composite surfaces. Do not use paint strippers on composite panels. Paint strippers can structurally damage the composite panels.
- (3) You can use a spray gun or brush for paint stripping. The brush-on procedure is frequently used during line maintenance.
- (4) Before you remove the paint with the stripping procedure, make sure the surface is dry and the temperature is between 50°F and 100°F. Do not use the stripping procedure in hot or wet weather.
- (5) Use alkaline solvent, emulsion cleaning agents or degreasing solvent to clean the surface with too much soil.
- (6) Make sure the components in the paint stripper mixture are fully mixed. Keep the container closed when not in use.
- (7) Protection is necessary for parts which are easily damaged by paint strippers. Put the applicable tape or covers on lubricated parts, rubber parts, laminated plastics, fiberglass, aerodynamic smoother and metal bonded edges. Do not let paint strippers fall on teflon lined self-lubricated bearings, electrical terminal plugs, nylon-coated wiper and nylon bushings. The chemical compounds in the paint stripper can cause damage to the airplane components.
- (8) Apply tape to all access doors, fairings, and wing leading and trailing edges at least 1 inch on the skin.

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- (9) Apply tape on the drain holes and vents.
  - (10) Make sure no paint strippers fall on the joints. Do not use strippers in the fuel tanks.
  - (11) Strippers that you apply with a brush or with a spray gun contain agents that make a solution thick. Apply these strippers on vertical and horizontal surfaces.
  - (12) Strippers that you apply with a cloth are used to remove temporary finishes, waxes and oversprays.
- B. Equipment
- (1) Plastic scraper (See AMM 51-31-01/201 for approved plastic scrapers)
- C. Consumable Materials
- (1) G00217 Gloves, clean - Commercially available
  - (2) G00117 Brush, soft and rigid bristle - Commercially available
  - (3) G00217 Sponge
  - (4) G00034 Cheesecloth - new, clean, dry, lint free
  - (5) G00117 Tape - Aluminum Foil Permacel P112
  - (6) G00291 Tape - Conductive Scotch No. 425 (Aluminum Foil)
  - (7) G00365 Paper - plastic coated, VV-P-272C
  - (8) G00252 All plastic coated or impregnated paper which is chemically neutral, water proof and resistant to stripper solutions.
  - (9) G00111 Polyethylene, polypropylene, mylar or equivalent plastic sheeting resistant to paint strippers.
  - (10) Spray or Brush-On Strippers
    - (a) E00043 Alcor L0-2030M
    - (b) E00044 Stripper - Organic Cee Bee A-228D
    - (c) E00119 Cee Bee A-306B
    - (d) E00120 Cee Bee R256A
    - (e) E00041 Stripper - Organic Fiber-Resin ES-1
    - (f) E00122 Pennwalt EZ Strip 19E
    - (g) B00279 Stripper - Brush on organic paint Turco 52923
    - (h) E00002 Stripper - (Paint) Turco 5351
    - (i) E00125 Turco 5873
  - (11) Wipe or Squirt-On Strippers
    - (a) E00124 Ethylene Glycol Monobutyl Ether (Butyl Cellosolve) TT-E-776
    - (b) B00068 Ethyl Alcohol, Denatured, O-E-760, Grade III or IV

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- (c) B00148 Methyl Ethyl Ketone (MEK) - TT-M-261
  - (d) E00046 Organic Stripper - Methyl Isobutyl Ketone (MIBK), TT-M-268
  - (e) B00153 Toluene (Toluol), Technical grade, TT-T-548 or JAN-T-171, Grade A
  - (f) E00050 Stripper - Organic Turco 800
  - (g) E00048 Organic stripper - Xylene, ASTM-845 or -846 Grade A or B
- (12) B00316 Solvent - Aliphatic Naphtha, TT-N-95 Type I (Supersedes BMS 3-2)
- (13) B00074 Solvent - Degreasing MIL-PRF-680 (Supersedes P-D-680)
- (14) B00102 Abrasive - Aluminum Oxide Coated Cloth, ANSI B74.18
- D. References
- (1) AMM 51-31-01/201, Seals and Sealing
- E. Prepare for Paint Stripping

S 957-026

- (1) Apply tape or covers to areas which are easily damaged by the strippers.
- (a) Use solvent, aliphatic naphtha or MIL-PRF-680 Type I, to remove the loose soil, grease and oil. Be careful not to put solvent on a larger area than it is necessary.
  - (b) Clean the surface with a cheesecloth, soft brush or sponge that is moist with solvent.

NOTE: You can use a spray gun to help clean the surface.

- (c) Flush the surface with clean solvent. Then, rub the surface with a clean cheesecloth.
- (d) Remove all unwanted solvent. Let the surface dry.

S 107-005

- (2) Do these steps to clean the area again:

CAUTION: YOU MUST FULLY CLEAN THE SURFACE BEFORE YOU APPLY PAINT OR ADHESIVES. USE NAPHTHA IN THE LAST STEP OF THE PROCEDURE TO CLEAN THE SURFACE. DO NOT USE MIL-PRF-680, TYPE I FOR THE LAST STEP OF THE PROCEDURE TO CLEAN THE SURFACE. DAMAGE TO THE SURFACE CAN OCCUR IF MIL-PRF-680, TYPE I IS USED IN THE LAST STEP.

- (a) Use a squirt bottle to apply the solvent on the surface.
- (b) Clean the surface with a clean cheesecloth until all large pieces of soil are removed. Use a soft bristle brush if it is necessary.
- (c) Clean the surface again until no signs of soil are found on a clean cheesecloth.

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- (d) Dry the area with a clean dry cheesecloth. Do not let drops of solvent to dry on the surface.

F. Procedure - Paint Stripping

S 377-015

**WARNING:** DO NOT GET ORGANIC-PAINT STRIPPERS IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THE ORGANIC-PAINT STRIPPERS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE CHEMICAL-RESISTANT GLOVES, HATS, COATS, GOGGLES OR PLASTIC FACE SHIELDS WHEN YOU USE THE ORGANIC-PAINT STRIPPERS. IMMEDIATELY USE WATER TO REMOVE THE ORGANIC-PAINT STRIPPER THAT TOUCHES YOUR SKIN. KEEP THE ORGANIC-PAINT STRIPPERS AWAY FROM SPARKS, FLAME, AND HEAT. THE ORGANIC-PAINT STRIPPERS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE. REFER TO THE APPLICABLE FIRE, INDUSTRIAL HYGIENE AND SAFETY STANDARDS FOR THE SAFE USE OF ORGANIC-PAINT STRIPPERS.

- (1) Fully mix the strippers. Refer to the manufacturer's instructions.

S 157-016

**WARNING:** DO NOT BREATHE THE FUMES OF THE PAINT STRIPPERS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. THE VAPORS OF THE PAINT STRIPPERS CAN CAUSE INJURY.

- (2) Apply the stripper on the paint. Keep the surface wet.

S 157-023

**CAUTION:** MAKE SURE THAT YOU ONLY USE APPROVED SCRAPERS ON THE AIRPLANE SKIN. SCRAPERS THAT ARE NOT APPROVED CAN MAKE SCRATCHES ON THE SKIN AND CAUSE FATIGUE CRACKS.

**CAUTION:** DO NOT USE ABRASIVE PADS (SCOTCH-BRITE) OR ABRASIVE PAPER ON THE ALUMINUM SURFACE UNLESS THE SCRIBE LINE INSPECTIONS WERE MADE. ABRASIVE PADS CAN SMOOTH THE ALUMINUM SURFACE AND HIDE SCRIBE LINE MARKS. IF YOU USE ABRASIVE PADS TO REMOVE PAINT OR PRIMER BEFORE YOU DO THE SCRIBE LINE INSPECTIONS, YOU CAN BE REQUIRED TO DO REPEAT INSPECTIONS BASED ON THE SCRIBE LINE INSPECTION SERVICE BULLETIN.

- (3) Remove the paint with an approved plastic scraper before the stripper dries.

S 177-007

- (4) Flush the area with high-pressure warm water.

S 177-008

- (5) Dry the surface with a cheesecloth.

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G. Procedure - Remove the Adhesives

S 157-009

**CAUTION:** MAKE SURE THE STRIPPER DOES NOT TOUCH THE SURFACE FOR MORE THAN 2 HOURS. DAMAGE TO THE SURFACE CAN OCCUR IF THE STRIPPER TOUCHES THE SURFACE FOR A LONG TIME.

- (1) Fully mix the stripper. Refer to the manufacturer's instructions.

S 427-020

- (2) Apply small amounts of stripper on the adhesive with a brush. Let the stripper absorb the adhesive for 30 minutes. Do not let the stripper fall on aluminum surfaces.

S 157-024

**CAUTION:** MAKE SURE THAT YOU ONLY USE APPROVED SCRAPERS ON THE AIRPLANE SKIN. SCRAPERS THAT ARE NOT APPROVED CAN MAKE SCRATCHES ON THE SKIN AND CAUSE FATIGUE CRACKS.

**CAUTION:** DO NOT USE ABRASIVE PADS (SCOTCH-BRITE) OR ABRASIVE PAPER ON THE ALUMINUM SURFACE UNLESS THE SCRIBE LINE INSPECTIONS WERE MADE. ABRASIVE PADS CAN SMOOTH THE ALUMINUM SURFACE AND HIDE SCRIBE LINE MARKS. IF YOU USE ABRASIVE PADS TO REMOVE PAINT OR PRIMER BEFORE YOU DO THE SCRIBE LINE INSPECTIONS, YOU CAN BE REQUIRED TO DO REPEAT INSPECTIONS BASED ON THE SCRIBE LINE INSPECTION SERVICE BULLETIN.

- (3) Remove the stripper and loosened adhesive with a cheesecloth or an approved plastic scraper.

S 157-011

- (4) If necessary, apply the stripper again to remove all unwanted adhesive.

S 117-012

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (5) Flush the surface with a sponge that is soaked with water or you can use a solvent, Series 80 (AMM 20-30-80/201) to clean the surface.

S 107-019

- (6) Dry the surface with a clean dry cheesecloth.

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H. Dry Abrasive Stripping of Composites

S 157-028

- (1) Do the stripping to the composite substrates.
  - (a) Remove the enamel or topcoat with 150 grit or finer abrasive, B00102 paper.
    - 1) Abrade (sand) the topcoat equally down to the primer surface.

NOTE: It is not necessary to remove the primers for the reapplication of primer enamels, or a topcoat.

- (b) Abrade (sand) and feather the primer and enamel layers with 240 grit or finer abrasive, B00102 paper.

NOTE: Do not damage the fiber of the composite substrate.

NOTE: If the substrate has a conductive coating, abrade (sand) off all of the layers in the area to be repainted. This is to get a constant conductivity after the paint touch-up.

I. Procedure - Remove the High Temperature Primer (BMS 10-53)

S 157-013

CAUTION: DO NOT USE WATER UNTIL THE PRIMER IS REMOVED. WATER MAKES THE EPOXY HARD. DAMAGE TO THE SURFACE CAN OCCUR IF THE EPOXY BECOMES HARD.

- (1) Apply Turco 5292, full strength, with a brush. Do not use force to apply the paint stripper on the primer, but apply a thick layer of the stripper on the area.

S 157-017

- (2) Permit sufficient time to loosen the primer (20 minutes to 1 hour).

S 157-018

- (3) When the primer is loose, fully rub the area with a stiff bristle brush.

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S 117-021

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (4) Clean the area with a solvent, Series 80 (AMM 20-30-88/201). Use a brush or spray gun.

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TYPE OF ORGANIC FINISH TO BE REMOVED	APPROVED METAL SUBSTRATES	MEANS OF APPLICATION	TYPE OF STRIPPER	APPROVED STRIPPER	OPERATING TEMPERATURE (°F)
PRIMERS, WAX, OVER SPRAY, AND TEMPORARY COATINGS	ALL	WIPE OR SQUIRT-ON	SOLVENT	BUTYL CELL-OSOLVE, METHYL ISOBUTYL KETONE ETHYL ALCOHOL, XYLENE, TOLUENE, TURCO 800	ROOM  (NOT MORE THAN 90°F)
ALL FINISHES	ALL EXCEPT STEEL HEAT-TREATED ABOVE 220 KSI	SPRAY ON BRUSH-ON	SOLVENT NON-PHENOLIC NON-CHROMATED  SOLVENT NON-PHENOLIC CHROMATED	CEE BEE A-306B  TURCO 5878  PENNWALT EZ STRIP 19E	50-100°F RECOMMENDED 65-800°F  50-100F RECOMMENDED 65-80°F
ADHESIVES *[1]	ALUMINUM	SPRAY ON BRUSH-ON	SOLVENT	ALCOR LO-203ON FIBER-RESIN ES1 TURCO 5351 (THICK) TURCO 5351 (THIN)	50-100°F RECOMMENDED 65-80°F
*[2]	ALL EXCEPT STEEL HEAT-TREATED ABOVE 220 KSI	SPRAY OR BRUSH-ON	SOLVENT	TURCO 5292B TURCO 5351 (THICK)	50-100°F RECOMMENDED 65-80°F
ALL EXCEPT *[1] AND *[2]	ALL	SPRAY OR BRUSH-ON	SOLVENT	TURCO 5292B CEE BEE A-228-D TURCO 5351 (THICK)	50-100°F RECOMMENDED 65-80°F

\*[1] EPON 933, EPON 9303, BMS 5-42, 5-51, 5-70, 5-80, 5-89  
\*[2] BMS 10-53, 10-39, EPOXY PRIMER, EPOXIES, POLYURETHANES

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J. Procedure – Dry Abrasive Stripping Of Composites

S 157-027

- (1) Do the stripping to the composite substrates.
  - (a) Remove the enamel or topcoat with 150 grit or finer abrasive, B00102 paper.
    - 1) Abrade (sand) the topcoat equally down to the primer surface.

NOTE: It is not necessary to remove the primers for the reapplication of primer, enamels or a topcoat.
    - 2) Abrade (sand) and feather the primer and the enamel layers with 240 grit or finer abrasive, B00102 paper.

NOTE: Do not damage the fiber of the composite substrate

NOTE: If the substrate has a conductive coating, abrade (sand) off all of the layers in the area to be repainted. This is to get a constant conductivity after the paint touch-up.

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PREPAINT CLEANING AND TREATMENT - CLEANING/PAINTING

1. General

A. This procedure contains 3 tasks:

- (1) The first task is to clean the surface before you apply paint.
- (2) The second task is to prepare the surface before you apply paint.
- (3) The third task is to clean and prepare plastic surfaces before you apply paint.

TASK 51-21-02-107-001

2. Clean the Surface

A. Equipment

- (1) Plastic scrapers (See AMM 51-31-01/201 for approved plastic scrapers)
- (2) Stiff bristle brush; Commercially available
- (3) Spray equipment; Commercially available
- (4) Pitot Static Probe Cover; Commercially Available

B. Consumable Materials

- (1) Masking Materials
  - (a) Aluminum foil tapes
    - 1) G00291 Scotch No. 425
  - (b) Masking tapes
    - 1) G50314 Masking Tape
    - 2) G00270 Masking Tape, Scotch Flatback 250, 3M
    - 3) G02219 Tape, Yellow Vinyl Adhesive, Scotch Brand No. 471, 3M
    - 4) G02443 Tape, Barricade, Non-Adhesive
    - 5) G00366 Permacel P-705
    - 6) G00132 3M No. 214
    - 7) G00367 Mystic 6223
  - (c) G00111 Plastic film mylar or polyethylene
  - (d) G00365 Polyethylene coated paper, VV-P-272C
  - (e) G00139 Protex 20V
- (2) Solvents
  - (a) G00148 Methyl Ethyl Ketone (MEK) - TT-M-261
  - (b) B00135 Naphtha
  - (c) B00153 Methyl Iso-Butyl Ketone (MIBK) TT-M-268
  - (d) B00153 Toluene (Toluol) TT-T-548 or JAN-T-171 Grade A
  - (e) 1:1 MEK-Toluene Mixture
  - (f) B00189 Thinner, TL-52
- (3) B00280 Stripper - Turco 5351
- (4) G00034 Cheesecloth
- (5) Miscellaneous Materials
  - (a) G00251 Aluminum oxide abrasive paper, 240-grit (minimum)

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- (b) B00340 Silicon carbide paper, 240-grit (minimum)
- (c) B00102 Silicon carbide abrasive disc (Bear Tex) 240-grit (minimum)
- (d) B00107 Scotchbrite sheets, Type A, Aluminum Oxide Abrasive 240-grit (minimum)
- (e) B00101 Nylon pad, Aluminum Oxide Abrasive, Type F, 240-grit (minimum)
- (f) B00137 Abrasive paper 240-grit (minimum), P-P-121

C. References

- (1) AMM 51-21-01/701 - Paint Stripping
- (2) AMM 51-21-04/701 - Alodine Coating
- (3) AMM 51-21-10/701 - Decorative Exterior Finishes
- (4) AMM 51-31-01/201 - Seals and Sealing

D. Procedure - Clean the Surface

S 917-002

**CAUTION:** DO NOT APPLY SOLVENTS, CLEANERS, AND ALODINE ON SEALANTS AND SMOOTHERS. SOLVENTS, CLEANERS AND ALODINE CAN REACT CHEMICALLY WITH SEALANTS AND SMOOTHERS AND CAUSE DAMAGE.

- (1) Put covers on all adjacent areas.
  - (a) If the adjacent areas have the pitot static probes and ports installed, use the pitot static probe covers and barricade tapes to cover the pitot static probes and ports.

S 037-003

- (2) Remove all temporary finishes.

S 127-004

**CAUTION:** DO NOT LET STRIPPERS FALL ON FIBERGLASS, ALUMINUM FIBERGLASS, ACRYLIC WINDOWS OR FILLETS. DAMAGE TO THESE SURFACES CAN OCCUR.

**CAUTION:** MAKE SURE THAT YOU ONLY USE APPROVED SCRAPERS ON THE AIRPLANE SKIN. SCRAPERS THAT ARE NOT APPROVED CAN MAKE SCRATCHES ON THE SKIN AND CAUSE FATIGUE CRACKS.

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**CAUTION:** DO NOT USE ABRASIVE PADS (SCOTCH-BRITE) OR ABRASIVE PAPER ON THE ALUMINUM SURFACE UNLESS THE SCRIBE LINE INSPECTIONS WERE MADE. ABRASIVE PADS CAN SMOOTH THE ALUMINUM SURFACE AND HIDE SCRIBE LINE MARKS. IF YOU USE ABRASIVE PADS TO REMOVE PAINT OR PRIMER BEFORE YOU DO THE SCRIBE LINE INSPECTIONS, YOU CAN BE REQUIRED TO DO REPEAT INSPECTIONS BASED ON THE SCRIBE LINE INSPECTION SERVICE BULLETIN.

- (3) Use approved plastic scrappers, abrasive paper or Scotchbrite sheets to remove bad finishes and unwanted adhesive from the surface. You can also use strippers to remove bad finishes from the surface (AMM 51-21-01/701).

S 177-005

- (4) Use a spray gun to remove all the remaining stripper material, loose dust and contamination.

**NOTE:** Use water at a temperature between 135°F and 145°F and at a rate of 10 to 20 gallons per minute.

S 117-006

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

**CAUTION:** TAKE THE NECESSARY PRECAUTIONS WHEN YOU CLEAN AROUND FASTENERS, SEAMS, AND LAP JOINTS. IF YOU ARE NOT CAREFUL, DAMAGE TO THE FASTENERS, SEAMS, AND LAP JOINTS CAN OCCUR.

- (5) Use a rigid bristle brush that is moist with solvent, Series 85 (AMM 20-30-85/201) to clean around fasteners, seams and lap joints.

**NOTE:** You can isolate the sealant fillet from the skin when you clean with solvent, Series 85 (AMM 20-30-85/201). Do not test the bond of the fillet with your fingernail or with a knife. Only do a visual inspection of the interface between the fillet and the skin.

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S 147-007

- (6) Remove separation that is confined to the thin edge of the sealant with solvent, Series 85 (AMM 20-30-85/201) and lightly rub with Scotchbrite sheets.

**NOTE:** If separation occurs between the body of the sealant fillet and the airplane skin, remove the separated part of the fillet.

S 397-019

**CAUTION:** OBEY THE INSTRUCTIONS IN THE PROCEDURE TO REPAIR THE SEALANT. IF YOU DO NOT OBEY THE INSTRUCTIONS, DAMAGE TO THE AIRPLANE SURFACE CAN OCCUR.

- (7) Repair all damaged sealant (AMM 51-31-01/201).

S 127-009

- (8) Use silicone carbide paper to make stainless steel and titanium surfaces rough.

**NOTE:** Do not make aluminum flame-sprayed fiberglass or Alodine 1200 treated surfaces rough.

S 117-010

- (9) Before you paint the surface, clean the surface with solvent, Series 85 (AMM 20-30-85/201). Clean the surface until no signs of soil are found on a clean cheesecloth.

TASK 51-21-02-207-016

### 3. Prepare the Surface

#### A. Equipment

- (1) Plastic scrapers (See AMM 51-31-01/201 for approved plastic scrapers)
- (2) Stiff bristle brush; Commercially available

#### B. Consumable Materials

- (1) Masking Materials
  - (a) Aluminum foil tapes
    - 1) G00117 Permacel P-112
    - 2) G00291 Scotch No. 425
  - (b) Masking tapes
    - 1) G00366 Permacel P-705
    - 2) G00132 3M No. 214
    - 3) G00367 Mystic 6223
  - (c) G00111 Plastic film mylar or polyethylene
  - (d) G00365 Polyethylene coated paper,  
VV-P-272C
  - (e) G00301 Protex 20V

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- (2) Solvents
    - (a) G00148 Methyl Ethyl Ketone (MEK) - TT-M-261
    - (b) B00135 Naphtha
    - (c) B00153 Methyl Iso-Butyl Ketone (MIBK) TT-M-268
    - (d) Toluene (Toluol) TT-T-548 or JAN-T-171 Grade A
    - (e) 1:1 MEK-Toluene Mixture
    - (f) B00189 Thinner, TL-52
  - (3) Alkaline Cleaners
  - (4) G00034 Cheesecloth
  - (5) Miscellaneous Materials
    - (a) G00251 Aluminum Oxide Abrasive Paper, 240-grit (minimum)
    - (b) B00340 Silicon carbide paper, 240-grit (minimum)
    - (c) B00102 Silicon carbide abrasive disc (Bear Tex) 240-grit (minimum)
    - (d) B00107 Scotchbrite sheets, Type A, Aluminum Oxide Abrasive 240-grit (minimum)
    - (e) B00101 Nylon pad, Aluminum Oxide Abrasive, Type F, 240-grit (minimum)
    - (f) B00137 Abrasive paper 240-grit (minimum), P-P-121
    - (g) C00064 Conversion Coating, MIL-C-5541 (Alodine)
- C. References
- (1) AMM 51-21-01/701 - Paint Stripping
  - (2) AMM 51-21-04/701 - Alodine Coating
  - (3) AMM 51-21-10/701 - Decorative Exterior Finishes
  - (4) AMM 51-31-01/201 - Seals and Sealing
- D. Procedure - Prepare the Surface

S 377-011

**CAUTION:** TAKE THE NECESSARY PRECAUTIONS WHEN YOU CLEAN AROUND FASTENERS, SEAMS AND LAP JOINTS. IF YOU ARE NOT CAREFUL, DAMAGE TO THE FASTENERS, SEAMS, AND LAP JOINTS CAN OCCUR.

- (1) Prepare Method I: (Before you apply wash or epoxy primer system without alodizing)
  - (a) Prepare the alkaline cleaner, mix 1 part (by volume) of cleaner with 3 parts (by volume) of water.
  - (b) Use abrasive pads and alkaline cleaner to make the surface rough.

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- (c) Flush the surface with water until you get a water break-free surface. Make sure you flush all unwanted material from the joints and fasteners.

**NOTE:** A water break-free surface will have a continuous layer of water for 30 seconds.

- (d) Before you apply the primer, let the surfaces, seams and lap joints fully dry.
- (e) Apply primer on the surface (AMM 51-21-10/701).

S 377-012

- (2) Prepare Method II: (before you apply an epoxy primer system with alodizing)

**CAUTION:** DO NOT MIX SOLVENTS WITH ALODINE. A FIRE CAN OCCUR IF THE SOLVENTS ARE MIXED WITH ALODINE.

- (a) Use Scotchbrite sheets and clean water to make the surface rough.
- (b) Use a cheesecloth that is moist with water to clean the surface. Clean the surface again to remove all remaining particles.
- (c) Flush the surface with water until you get a water break-free surface. Make sure you flush all unwanted material from the joints and fasteners.

**NOTE:** A water break-free surface will have a continuous layer of water for 30 seconds.

**WARNING:** DO NOT GET ALODINE IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THIS MATERIAL. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

- (d) Apply Alodine 1000, 1000L, 1200 or 1200S (AMM 51-21-04/701).
- (e) Before you apply the primer, let the surfaces, seams and lap joints fully dry.
- (f) Apply BMS 10-11 or BMS 10-79 primer on the surface (Ref 51-21-10).

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S 377-013

- (3) Do these steps to prepare surfaces that are painted:
- (a) For Epoxy primer that was applied in less than 48 hours:
- 1) Use abrasive papers or pads to remove rough surfaces and loose soils. Rub the surface until it is smooth.

NOTE: If it is necessary to rub the surface to the bare metal, prepare the surface as if it was not painted.

- 2) Before you apply the topcoat, clean the surface with tack rags to remove dust and lint.

- (b) For Epoxy primer that was applied for more than 48 hours:

CAUTION: USING COARSE GRIT ABRASIVES CAN CAUSE DAMAGE TO THE SUBSTRATE FIBERS IF THE GRIT COMES IN CONTACT WITH THE RESIN COATING OF THE COMPOSITE SUBSTRATE. TO REDUCE THE POSSIBILITY OF DAMAGE TO THE COMPOSITE SUBSTRATE, ONCE THE TOPCOAT BEEN REMOVED, USE PROGRESSIVELY FINER GRITS TO OBTAIN THE REQUIRED SURFACE FINISH.

- 1) Use abrasive papers or pads to remove surface and loose soil. It is optional to use coarse grit abrasives for expedient cleaning and material removal to the first paint topcoat layer.

NOTE: Do not use abrasive paper on rough surfaces such as castings and forgings. Use a tack rag or solvent to clean these surfaces.

- 2) Rub the surface with a clean cheesecloth that is moist with solvent.

NOTE: Rub glossy enamel surfaces until the gloss is removed

- 3) Dry the surface with a clean dry cheesecloth.

NOTE: Make sure that the surface is dry before you apply the finish.

- (c) For Prestec that was applied in less than 12 hours:
- 1) It is not necessary to prepare the surface.
- (d) For Prestec that was applied in more than 12 hours:
- 1) Rub the surface with 240 grit (minimum) abrasive paper.
  - 2) Remove all the remaining particles and soils with a cheesecloth that is moist with naphtha.
  - 3) Before the solvent becomes dry, rub the surface with a clean dry cheesecloth.

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TASK 51-21-02-207-017

4. Clean and Prepare Plastic Surfaces

A. Equipment

- (1) Plastic scrapers (See AMM 51-31-01/201 for approved plastic scrapers)
- (2) Stiff bristle brush; Commercially available
- (3) Spray equipment; Commercially available

B. Consumable Materials

(1) Masking Materials

- (a) Aluminum foil tapes
  - 1) G00117 Permacel P-112
  - 2) G00291 Scotch No. 425
- (b) Masking tapes
  - 1) G00366 Permacel P-705
  - 2) G00132 3M No. 214
  - 3) G00367 Mystic 6223
- (c) G00111 Plastic film mylar or polyethylene
- (d) G00365 Polyethylene coated paper,  
VV-P-272C
- (e) G00301 Protex 20V

(2) Solvents

- (a) G00148 Methyl Ethyl Ketone (MEK) -  
TT-M-261
- (b) B00135 Naphtha
- (c) B00151 Methyl Iso-Butyl Ketone (MIBK)  
TT-M-268
- (d) B00153 Toluene (Toluol) TT-T-548 or  
JAN-T-171 Grade A
- (e) 1:1 MEK-Toluene Mixture
- (f) B00189 Thinner, TL-52

(3) G00034 Cheesecloth

(4) Miscellaneous Materials

- (a) G00251 Aluminum Oxide Abrasive Paper, 240-  
grit (minimum)
  - (b) B00340 Silicon carbide paper, 240-grit  
(minimum)
  - (c) B00102 Silicon carbide abrasive disc (Bear  
Tex) 240-grit (minimum)
  - (d) B00107 Scotchbrite sheets, Type A,  
Aluminum Oxide Abrasive 240-grit  
(minimum)
  - (e) B00101 Nylon pad, Aluminum Oxide Abrasive,  
Type F, 240-grit (minimum)
  - (f) B00137 Abrasive paper 240-grit (minimum),  
P-P-121
- (5) C00058 Magna 28-C-1 Static Conditioner
  - (6) C00059 Magna 8-W-5 Surfacer
    - (a) C00061 Hardener - 50-C-3 or 10-C-32
    - (b) C00062 Reducer - 66-C-28

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C. References

- (1) AMM 51-21-01/701 - Paint Stripping
- (2) AMM 51-21-04/701 - Alodine Coating
- (3) AMM 51-21-10/701 - Decorative Exterior Finishes
- (4) AMM 51-31-01/201 - Seals and Sealing

D. Procedure - Clean the Surface

S 107-014

- (1) Do these steps for surfaces with no paint and surfaces with surface porosity.

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (a) Use a clean cheesecloth that is moist with toluene or methyl ethyl ketone (MEK) , acetone, isopropyl alcohol, or ethyl alcohol to remove grease and contamination.
- (b) Dry the surface with a clean dry cheesecloth.
- (c) For structural and non-structural laminates:
  - 1) Use 240 grit, minimum, abrasive paper to remove the glossy finish of the laminate.

**NOTE:** When you rub the surface, make sure you do not rub the fiberglass material.

- 2) Use a clean cheesecloth that is moist with TL-52 thinner to remove all remaining particles and soil from the surface.
- 3) Before the thinner becomes dry, dry the surface with a clean dry cheesecloth.
- (d) For Nonstructural Laminates Only (Optional)
  - 1) Use the sand blast equipment to make the laminate surface lightly rough.

**NOTE:** When you use the sand blast equipment on the surface, make sure you do not remove the fiberglass material.

- 2) Use TL-52 thinner to remove all remaining particles and soils from the surface.
- 3) Before the thinner becomes dry, dry the surface with a clean dry cheesecloth.

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- (e) Prepare surface porosity as follows:  
1) For a Magna Surface Conditioner System:

NOTE: This system contains Magna 28-C-1 static conditioner which is used for microscopic holes and Magna 8-W-5 which is used for larger surface defects. Make sure you apply the static conditioner before you apply the surfacer.

- a) Use a clean cheesecloth to apply the Magna 28-C-1 static conditioner on the surface.

NOTE: Do not make the static conditioner thin. Use sufficient pressure to push the static conditioner into the microscopic holes of the laminate.

- b) Let the surface dry for approximately 30 minutes at room temperature or higher (until it becomes white).  
c) Use a clean dry cheesecloth to remove all the unwanted material from the laminate surface.  
d) After you remove all the unwanted material from the laminate surface, immediately apply the subsequent material.

NOTE: If the surface becomes soiled after you applied the conditioner, use toluene or naphtha to clean the surface and apply static conditioner again.

CAUTION: DO NOT USE MAGNA 8-W-5 SURFACER AS A FAIRING COMPOUND OR CONTOURING MATERIAL. MAGNA 8-W-5 SURFACER IS VERY HARD WHEN CURED AND DIFFICULT TO RUB WITH ABRASIVE PAPER.

- e) Mix 4 parts (by volume) of Magna 8-W-5 with 1 part (by volume) of hardener 50-C-3 or 10-C-32.  
f) Fully mix the mixture. Do not move the mixture for 15 minutes before it is applied.  
g) Make the mixture thin with 1 part (by volume) of 66-C-28 reducer.

NOTE: The pot life of the mixture is 6 hours at 70°F. Do not use the mixture if the pot life has expired.

- h) Use a brush, spray gun or cloth to apply the mixture (surfacer).

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- (f) Use 150-grit (minimum) abrasive paper to make the surface smooth.

NOTE: After 5 hours, the surfacer becomes very hard. You must make the surface smooth before 5 hours.

- (g) Use a clean cheesecloth that is moist with naphtha to remove all remaining particles.

NOTE: If microscopic or small holes show on the surfacer, apply Magna 28-C-1 again after you rubbed and cleaned the surface. Immediately apply the subsequent layers as soon as possible.

S 107-015

- (2) Do these steps for surfaces with no paint and for surfaces without surface porosity.
  - (a) Use Scotchbrite sheets and clean water to make the surface rough.
  - (b) Use a cheesecloth that is moist with water to clean the surface. Clean the surface again to remove all remaining particles.

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CORROSION REMOVAL AND CONTROL – CLEANING/PAINTING

1. General

- A. The procedures in the maintenance manual are for light corrosion only. Refer to the Structural Repair Manual for heavy corrosion.
- B. It is important to carefully examine all structural parts for corrosion.
- C. You must replace or repair all parts that have corrosion. If you cannot remove the part from the airplane, use the applicable procedure to remove the corrosion.
- D. When you remove corrosion, make sure you remove all the corrosion. Failure to remove all the corrosion permits corrosion to start again.
- E. If you cannot remove the corrosion, immediately apply BMS 3-33 to help prevent more corrosion. Then, Remove the corrosion when it is possible.
- F. This procedure contains these tasks.

TASK 51-21-03-107-001

2. Aluminum Alloy Corrosion Removal and Control

A. General

- (1) Acid brighteners for aluminum can cause illness and you must use them only when necessary. Phosphoric acid type corrosion removers are weak and do not affect metal surfaces.

B. Equipment

- (1) Cleaning brushes, nylon and wire
- (2) Soft Bristle Paint Brush
- (3) Synthetic Sponge
- (4) Lint-free Cotton Cloth
- (5) Scraper (See AMM 51-31-01/201 for approved scrapers)

C. Consumable Materials

- (1) B00046 Acid – Corrosion Removing and Metal Conditioning Compound – (Phosphoric Acid Base) (MIL-C-10578)
- (2) B00102 Abrasive – Aluminum Oxide Coated Cloth
- (3) B00166 Abrasive – Pumice

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- (4) G00251 Abrasive - Non-Metallic Mats
- (5) G00291 Scotch 425 or 427 Tape
- (6) G50077 Abrasive - Aluminum Oxide Paper  
(240 Grit or finer)
- (7) G50138 Cloth - Soft Cotton
- (8) G50256 Water - Regular
- (9) G50590 Metallic Wool - Aluminum
- (10) E50003 Compound - Corrosion Removal (AMS 1640B)

D. References

- (1) AMM 51-21-02/701, Prepaint Cleaning and Treatment
- (2) AMM 51-21-04/701, Coating - Chemical Conversion
- (3) AMM 51-24-03/701, Compound - Corrosion Inhibiting

E. Procedure - Aluminum Corrosion Removal (Chemical Method)

S 357-008

- (1) Do these steps to prepare the area for general external skin corrosion:
  - (a) Put the airplane in the location where you can immediately flush all areas with water.
  - (b) Remove all grease, oil, dirt, and loose paint material (AMM 51-21-02/701).
  - (c) Apply tape to hinges, mating surfaces, access doors and other openings that can allow the corrosion removing compound to damage other metal types, (AMM 51-21-02/701).
  - (d) Apply tape to areas of magnesium, steel and cadmium plated parts.

NOTE: This will prevent the accidental corrosion of different metal types.

S 117-009

- (2) Do the steps that follow to remove aluminum corrosion from the external surface of the airplane with corrosion removal compound (AMS 1640B):

CAUTION: DO NOT LET ACID BRIGHTENERS FOR ALUMINUM AND PHOSPHORIC ACID CORROSION REMOVERS FOR ALUMINUM OR STEEL FALL ON TEFLON LINED SELF-LUBRICATED BEARINGS, ELECTRICAL TERMINAL PLUGS, NYLON COATED WIRES, NYLON BUSHINGS, WHITE THERMAL PROTECTIVE FINISH, OR FABRIC OR PLASTIC SURFACES. THE CHEMICALS IN THE ACID BRIGHTENERS AND THE PHOSPHORIC ACID CORROSION REMOVERS CAN CAUSE DAMAGE TO THESE COMPONENTS AND SURFACES.

- (a) Apply the corrosion removal compound with any of the items that follow:
  - 1) Use a soft bristle paint brush to apply the compound.
  - 2) Use a synthetic sponge to apply the compound.
  - 3) Use a lint-free cloth to apply the compound.

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- (b) Apply the corrosion removal compound at the lowest area and work up into a circular movement.

NOTE: This will give a good layer and dwell time for the compound on the surface. Also compound applied warm (140 degrees Fahrenheit (60 degrees Centigrade) maximum temperature) on the surface gives better results.

CAUTION: DO NOT LET THE CORROSION REMOVAL COMPOUND STAY ON THE SURFACE CORROSION FOR MORE THAN 12 MINUTES. DAMAGE TO THE SURFACE CAN OCCUR.

- (c) Let the corrosion removal compound stay on the surfaces for 5 to 12 minutes and do the steps that follow:

NOTE: Do not remove corrosion when the airplane is at temperatures above 100 degrees Fahrenheit (38 degrees Centigrade) or below 45 degrees Fahrenheit (7 degrees Centigrade). Work on a small area as necessary. Do not let the corrosion removal compound dry on the surface.

- 1) Rinse with water.
- 2) Do again this procedure to remove more corrosion, if necessary.
- 3) Dry the treated surface and do the steps in Chemical Conversion Coatings - Cleaning/Painting (AMM 51-21-04/701) for treatment of bare aluminum.

S 357-011

- (3) Do the steps that follow, to remove small quantities of aluminum corrosion from the external surface of the airplane with the phosphoric acid base compound (MIL-C-10578).

NOTE: These steps are optional to the first procedure.

- (a) Fully flush the surface with water.

WARNING: DO NOT ADD WATER TO ACID. ALWAYS ADD ACID TO WATER. ACID IS EXPLOSIVE WHEN WATER IS ADDED TO IT. IF YOU ADD WATER TO ACID, INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT CAN OCCUR.

- (b) Add 1 part (by volume) of the phosphoric acid based compound (MIL-C-10578) to 3 parts (by volume) of water.

NOTE: If different water to compound ratios are listed by the manufacturer, use the mixing ratios on the product instead.

- (c) Apply the phosphoric acid based compound/water solution to the surface.

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- (d) Fully flush all of the prepared area and the adjacent area with water.

**CAUTION:** MAKE SURE THAT YOU FLUSH OUT ALL THE PHOSPHORIC ACID WATER SOLUTION FROM SKIN SEAMS AND ALL OPENING OF HOLES ON THE SURFACE.

- (e) Do again this procedure to remove more corrosion, if necessary.
- (f) Dry the treated surface and do the steps in Chemical Conversion Coatings – Cleaning/Painting (AMM 51-21-04/701) for treatment of bare aluminum.

F. Procedure – Aluminum Corrosion Removal (Mechanical Method)

S 117-010

- (1) Do the steps that follow to prepare the airplane for mechanical corrosion removal from the external surface of the airplane:
  - (a) If necessary, put the airplane in an area where you can fully flush all the surfaces with water quickly.
  - (b) Remove all grease, oil, dirt, and loose paint material (AMM 51-21-02/701).
  - (c) Apply tape to the hinges, mating surfaces, access doors and other openings that can allow the corrosion by-products to damage other metal types, (AMM 51-21-02/701).
  - (d) Apply tape to areas of magnesium, steel and cadmium plated parts.

**NOTE:** This will prevent the accidental corrosion of different metal types.

S 147-012

- (2) Do any of the steps that follow to remove aluminum corrosion from the external surface of the airplane (Non-powered tools and materials):
  - (a) Use a Scotchbrite abrasive to rub away corrosion.
  - (b) Use an abrasive cloth to rub away corrosion.
  - (c) Use a 240 grit or finer abrasive paper to rub away corrosion.
  - (d) Use aluminum wool to rub away corrosion.

**NOTE:** Metallic wools are available in five grades, ranging from very fine to extra coarse.

- (e) Use a stainless steel brush to brush away corrosion.
  - 1) Remove the corrosion with a linear motion and do not crosshatch.

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NOTE: This will unnecessarily damage the surface.

- 2) After wire brushing soft metal such as aluminum, the surface areas must be polished with a Scotchbrite abrasive or abrasive cloth.
- (f) Use pumice abrasive powder to rub away corrosion as follows:
  - 1) Mix pumice abrasive powder with water and rub over the area with a soft cotton cloth.
  - 2) After the solution dries, the pumice abrasive powder is wiped off the surface.
- (g) Scrapers are used primarily for the initial removal of heavy corrosion deposits in corners and crevices that cannot be reached with other equipment.
  - 1) Plastic or hard resin phenolic scraper may be used on any metal surface.
  - 2) Aluminum scrapers shall be used only on aluminum or magnesium surfaces.
  - 3) Steel scrapers shall be used only on steel surfaces.
- (h) Dry the treated surface and do the steps in Chemical Conversion Coatings - Cleaning/Painting (AMM 51-21-04/701) for treatment of bare aluminum.

TASK 51-21-03-307-013

3. Steel Alloy Corrosion Removal and Control

A. Procedure - Steel Corrosion Removal

S 107-003

- (1) Do the subsequent steps to remove steel corrosion (steel parts heat-treated to 180 ksi or less):

CAUTION: WHEN THE HEAT-TREAT VALUE OF A PART IS UNKNOWN, PREPARE THE PART AS IF IT WAS HEAT-TREATED OVER 180 KSI AND DO NOT APPLY ACID SOLUTIONS TO THE PART. MAKE SURE THAT ALL ADJACENT AREAS HAVE PROTECTION DURING THE REMOVAL OF CORROSION. DAMAGE TO THE PART CAN OCCUR IF THERE IS NO PROTECTION FROM THE ACID SOLUTIONS.

- (a) Remove all loose corrosion with a stainless steel wool and a wire brush.

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**CAUTION:** APPLY THE ACID SOLUTION ONLY ON THE AREAS OF CORROSION. LET THE ACID SOLUTION STAY ON THE SURFACE UNTIL YOU CAN SEE A GRAY COATING. DAMAGE TO THE ADJACENT AREA CAN OCCUR.

- (b) Use a phosphoric acid corrosion remover to remove the remaining corrosion from the surface.

**NOTE:** Use one part of phosphoric acid corrosion remover to three parts of water.

- (c) Flush the surface with clean water.
- (d) Clean the surface with a moist cloth. Let the surface dry. Use a machine to dry the surface if possible.
- (e) Immediately apply protective finish as applicable.

S 107-005

- (2) Do the subsequent steps to remove steel corrosion (steel parts heat-treated over 180 ksi, optional for parts less than 180 ksi):

**CAUTION:** MAKE SURE ALL THE ADJACENT AREAS HAVE PROTECTION DURING THE MANUAL REMOVAL OF CORROSION. DAMAGE CAN OCCUR IF THE ADJACENT AREAS DO NOT HAVE PROTECTION.

- (a) Use 220 grit (maximum) abrasive paper or dry abrasive blast the surface to remove corrosion.
- (b) Use a solvent to clean the surface.
- (c) Apply protective finish.

**NOTE:** Apply primer coats in 1 hour after you rub or dry-blast the surface.

S 107-006

- (3) Do the subsequent steps to remove corrosion from resistant steel (all types), nickel-base alloys and titanium:

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**WARNING:** SMALL PARTICLES OF TITANIUM ALLOY CAN EASILY CAUSE IGNITION. USE DRY TALC, CALCIUM CARBONATE, SAND, OR GRAPHITE TO EXTINGUISH A TITANIUM ALLOY FIRE. DO NOT USE WATER, CARBON DIOXIDE, CARBON TETRACHLORIDE, OR AN ORDINARY DRY CHEMICAL FIRE EXTINGUISHER TO EXTINGUISH A TITANIUM ALLOY FIRE. INJURY OR DAMAGE CAN OCCUR IF INCORRECT PROCEDURES ARE USED TO EXTINGUISH A TITANIUM ALLOY FIRE.

**CAUTION:** MAKE SURE THAT ALL ADJACENT AREAS HAVE PROTECTION WHEN YOU REMOVE CORROSION. DAMAGE CAN OCCUR IF THE ADJACENT AREAS DO NOT HAVE PROTECTION DURING THE CORROSION REMOVAL.

- (a) Use stainless steel wool, a wire brush, fine abrasive paper or abrasive blasting to remove corrosion.

**NOTE:** Make sure that no particles of corrosion stay on the surface. Rub the surface until all corrosion is gone.

- (b) Polish the surface with 400 grit aluminum oxide paper to remove all scratches.
- (c) Remove the remaining particles with solvent alkaline cleaner. Then flush the surface with water.
- (d) Air blast dry the surface.
- (e) Apply protective finish if it is necessary.

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ALODINE COATING - CLEANING/PAINTING

1. General

- A. This procedure contains one task. The task is to apply Alodine coating.
- B. Alodine is a protective coating and paint base. The solutions used are Alodine 600, 1000, 1000L, 1200, and 1200S. Alodine 600 is used in the fuel tank next to BMS 10-20 primer.
- C. In areas where the Alodine may come in contact with BMS 10-20 primer, only Alodine 600 should be used.

TASK 51-21-04-377-001

2. Apply the Alodine Coating

A. Equipment

- (1) Brush, soft-bristle (fiber); Commercially available
- (2) Container, stainless steel or acid resistance (not lead or glass, recommend polyethylene), commercially available
- (3) Gloves, neoprene or rubber; Commercially available
- (4) Respirators; Commercially available

B. Consumable Materials

- (1) C00064 Coating - Chemical Conversion Coating for Aluminum or Aluminum Alloys. MIL-C-5541, (MIL-C-81706). Alodine 600, 1000, 1000L, 1200, and 1200S.
- (2) G00034 Cheesecloth - New, Clean, Dry, Lint Free
- (3) B00148 Solvent - Methyl Ethyl Ketone (MEK), TT-M-261
- (4) G00116 Sponge, Cellulose (Aircraft Cleaning) L-S-626
- (5) B00102 Abrasive Pad - Aluminum Oxide Disks and Sheet
- (6) B00107 Chamois Scotchbrite Sheet, Pads Finishing Type A
- (7) G01745 Wheel - Abrasive, Aluminum Oxide

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- (8) G00270 Tape - Masking
- (9) G00291 Tape - Aluminum, 3M No. 425
- (10) Paper - PH indication

C. References

- (1) AMM 20-30-88/201, Solvent, Series 88
- (2) AMM 51-21-03/701, Corrosion Removal and Control
- (3) SRM 51-20-05, Repair Sealing

D. Prepare the Surface

S 957-024

- (1) Apply tape to all adjacent areas. Do not let Alodine solution fall on surfaces that have no tape.

NOTE: You do not have to apply tape on anodized surfaces.

S 397-008

- (2) Seal all holes and clearances on assemblies that have honeycomb or foam plastic. Use the applicable sealing or caulking material or use rubber plugs to prevent entrance of Alodine solution.

S 147-009

- (3) Clean the surface with a liquid solvent degreaser. Use a clean brush or rags. Dry the surface with warm air or rub it.

S 147-025

- (4) Remove the organic, inorganic and hydraulic fluid resistant finishes from the repair area. Use the subsequent materials:
  - (a) Scotchbrite Tycro, Type 3A.
  - (b) High quality aluminum oxide abrasive wheel attached to a drill motor.
  - (c) 400 grit (minimum grit number) aluminum abrasive fabric or pad.
  - (d) 400 grit (minimum grit number) aluminum oxide paper.

S 147-026

- (5) Remove all the material (organic, inorganic) from the area until you get a clean and shiny aluminum surface.

S 147-010

- (6) Clean the surface with a dry, clean cheesecloth to remove all loose and remaining particles from the area.

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S 117-011

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (7) Rub the surface with a cheesecloth. Make the cheesecloth moist (not soaked) with solvent, Series 88 (AMM 20-30-88/201). Clean the surface with a clean cheesecloth until no remaining particles are found on the cheesecloth.

S 917-012

- (8) Let the surface dry for a minimum of 15 minutes.

S 107-013

- (9) Remove all corrosion material found on the surface (AMM 51-21-03/701).

S 107-014

- (10) Refer to SRM 51-20-05 on how to clean the structure and repair parts, before you install the sealant in the integral fuel tanks.

E. Prepare the Alodine Solution

S 377-002

**WARNING:** DO NOT GET ALODINE SOLUTION IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THIS MATERIAL. AIR MUST FLOW FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

- (1) To prepare the Alodine 1000 solution, do these steps:

**NOTE:** In areas where Alodine may come in contact with BMS 10-20 primer, only Alodine 600 should be used.

- (a) If you use Alodine 1000 powder, add 0.4 ounces of Alodine 1000 powder to water for each gallon of final solution.

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- (b) If you use Alodine 1000L, do the steps that follow:
  - 1) Put 6 parts (by volume) of water on a clean polyethylene container.
  - 2) Add 4 parts (by volume) of Alodine 1000L liquid concentrate to the water.
- (c) Fully mix the Alodine solution.
- (d) Let the solution stay for an hour before it is used.
- (e) Put the Alodine 1000 solution in clean polyethylene bottles.
- (f) Identify the bottles with a label. Write the date when the solution was mixed and the date when the pot life ends.

NOTE: The pot life of the Alodine 1000 solution is 14 days. Because the Alodine 1000 solution is sensitive to all types of contamination, make sure all containers are fully clean before they are used.

S 377-020

- (2) To prepare the Alodine 600, 1200, or 1200S solution, do these steps:

NOTE: In areas where Alodine may come in contact with BMS 10-20 primer, only Alodine 600 should be used.

- (a) Put Alodine 600, 1200 or 1200S on paper and use a roller to make the powder smooth.
- (b) Put water in a stainless steel or acid-resistant container. Do not use lead or glass containers.
- (c) For Alodine 600 or 1200, add 3 ounces of powder for each gallon of final solution.
- (d) For Alodine 1200S, add 2 ounces of powder for each gallon of final solution.
- (e) Fully mix the solution.
- (f) Do not move the solution for at least 1 hour.

NOTE: A dirty solution is unsatisfactory. Prepare the solution in small quantities and discard it when it is dirty. If nondistilled water is used, add nitric acid to control the pH range from 1.50 to 1.90 for Alodine 1200 or 1200S. For Alodine 600 add 2 percent by volume of Alodine toner 22 to control the pH range from 1.50 to 2.00. Do a pH check. Do not add wetting agents or other materials to this solution.

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F. Procedure - Apply the Alodine Coating

**NOTE:** In areas where the Alodine may come in contact with BMS 10-20 primer, only Alodine 600 should be used.

S 377-021

**WARNING:** DO NOT GET ALODINE SOLUTION IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THIS MATERIAL. AIR MUST FLOW FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

(1) Do these steps to apply the Alodine 1000 Solution:

**WARNING:** DO NOT LET THE ALODINE 1000 SOLUTION DRY ON THE CHEESECLOTH. IMMEDIATELY FLUSH THE CHEESECLOTH WITH WATER AND SOAK IT IN A CONTAINER FILLED WITH WATER. A DRY CHEESECLOTH WITH ALODINE SOLUTION IS FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

(a) Apply Alodine 1000 solution with a clean cheesecloth.

**NOTE:** Keep the room temperature above 65°F.

(b) Keep the part wet with the Alodine 1000 solution until 30 seconds before color is produced.

(c) Flush the part with water.

**CAUTION:** DO NOT TOUCH THE PART UNTIL IT IS FULLY DRY. THE WET ALODINE SOLUTION IS EASILY DAMAGED.

(d) Air dry the part.

**NOTE:** Dry at 120 degrees F (optimum), 130 degrees F (maximum).

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S 377-023

(2) Do these steps to apply the Alodine 600, 1200 or 1200S Solution:

**WARNING:** DO NOT LET THE 600, 1200, OR 1200S DRY ON THE CHEESECLOTH. IMMEDIATELY FLUSH THE CHEESECLOTH WITH WATER AND SOAK IT IN A CONTAINER FILLED WITH WATER. A DRY CHEESECLOTH WITH ALODINE SOLUTION IS FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

- (a) Apply Alodine 600, 1200 or 1200S equally with a fiber or nylon brush or a clean cheesecloth. Start from the bottom.
- (b) Continue to apply the Alodine 600, 1200, or 1200S solution until the color of the surface changes.

**NOTE:** Do not let the Alodine 600, 1200, or 1200S solution dry until the color of the surface changes.

**CAUTION:** BE CAREFUL WHEN YOU FLUSH AND DRY THE PART. WET ALODINE 600, 1200 OR 1200S SOLUTION IS EASILY DAMAGED.

- (c) Carefully flush the part with a cheesecloth that is soaked with water.

**NOTE:** Do not rub the surface of the part with the cheesecloth.

- (d) Clean the part again if it is necessary.
- (e) Flush all cheesecloths with water and keep them in a container filled with water.
- (f) Air dry the surface.

**NOTE:** Do not touch the surface until the solution is dry. Dry at 120 degrees F (optimum), 130 degrees F (maximum).

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S 377-019

- (3) Apply the last finish or start adhesive bonding in accordance with Chapter 51 of Structural Repair Manual after you dry the parts or surface. Hold the parts or surface with clean gloves and keep the parts or surface dry and clean to prevent surface contamination.

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DECORATIVE EXTERIOR FINISHES - CLEANING/PAINTING

1. General

- A. This procedure contains these tasks:  
(1) Decorative Exterior Paint System Application  
(2) Decorative Exterior Paint System Repair

TASK 51-21-10-377-003

2. Decorative Exterior Paint System Application

A. General

- (1) Do not get paint or primer on the surfaces of the items that follow:  
(a) Decoupled static dischargers or retainers on the wing and empanage.  
(b) Rain repellent nozzles that are forward of the windshields.  
(c) Rubber mohair seals, rub strips made of stainless steel, anodized handles and door handle pans, or silicone rubber sealant.  
(d) Pressure relief valves, or outflow valves.  
(e) Circular bands, one inch in width, around or on the pressure relief valve doors, or outflow valves.  
(f) Door operating mechanisms, hinge assemblies, and equivalent surfaces.  
(g) Acrylic windows  
(h) Pitot Static Ports and Probes.

- (2) Do not allow solvents, cleaners, or overspray to contact polycarbafil plastic parts.

B. References

- (1) AMM 51-21-02/701, Clean the Surface to be Painted  
(2) AMM 51-21-02/701, Prepare the Surface to be Painted

C. Procedure

S 107-030

- (1) Do this task: Clean the Surface to be Painted (AMM 51-21-02/701).

S 847-031

- (2) Do this task: Prepare the surface to be Painted (AMM 51-21-02/701).

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S 377-040

**WARNING:** DO NOT GET FINISHES, CLEANERS, THINNERS, OR SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

**CAUTION:** DO NOT APPLY PAINT OR NON-TRANSPARENT MATERIALS OR OTHER UNAPPROVED MATERIALS TO THE ACRYLIC WINDOWS. PAINT OR NON-TRANSPARENT MATERIALS OR OTHER UNAPPROVED MATERIALS WILL CAUSE STRUCTURAL DAMAGE TO THE ACRYLIC AND WILL PREVENT DAMAGE DETECTION. DAMAGE TO THE WINDOW CAN CAUSE A WINDOW BLOWOUT.

- (3) Apply the decorative exterior paint system as specified by the paint manufacturer's specifications and with the table (Table 701).

Decorative Exterior Paint System Application Specifications Table 701		
Description	Coating Specification	Application Specification
Chemical and Solvent Resistant Finishes	BMS 10-11	BAC 5736
Corrosion Resistant Finish for Integral Fuel Tanks	BMS 10-20	BAC 5793
Polyurethane Enamel	BMS 10-60	BAC 5845
Exterior Decorative Paint	BMS 10-72 AMS 3095	D6-1816
Urethane Compatible Primer	BMS 10-79	BAC 5882

S 217-038

- (4) Examine the thickness of the paint/finishes around the flush static ports using the isoscope meter to make sure these guidelines are met:
- (a) The three inch radius area (bare aluminum) around the static ports should not be painted.

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- (b) Outside the three inch radius, but within ten inch from the static ports, the paint thickness including markings and other finishes should not exceed 0.013 inch.

NOTE: In lieu of using an Isoscope Meter, an alternate method of measurement would be to use a 6-inch scale and feeler gage.

- (c) Outside the ten inch radius area around the static ports, the paint thickness including markings and other finishes should not exceed 0.033 inch. However, we do not expect any normal paint job that would require the paint thickness to be close to 0.033 inch thick. A typical coat of paint is between 3 to 5 mil thick.

TASK 51-21-10-307-020

3. Decorative Exterior Paint System Repair

A. Consumables

- (1) B00102 Abrasive, aluminum oxide disks and sheets A-A-1048
- (2) G00034 Cloth, Process Cleaning Absorbent Wiper (cheesecloth, gauze) - BMS15-5
- (3) B01005 Solvent, Final Cleaning of All Organic Coatings Prior to Painting - Series 85 (AMM 20-30-85/201 or SOPM 20-30-85)

B. References

- (1) AMM 51-21-01/701 Paint Stripping

C. Procedure

S 307-034

- (1) Repair areas with minor damage (no bare metal) as follows:
  - (a) Rub the surface smooth with a 240 grit (minimum) wet or dry abrasive, A-A-1048 paper.
  - (b) Remove the remaining particles with a clean cloth, BMS15-5 that is moist with solvent, Series 85 (AMM 20-30-85/201 or SOPM 20-30-85).
  - (c) Dry the surface with a clean cloth, BMS15-5.
  - (d) Apply the applicable primer and topcoats, if necessary, as follows:
    - 1) Do this task: Decorative Exterior Paint System Application.
  - (e) Make sure you get a smooth continuous surface.

S 307-035

- (2) Repair areas with large damage (bare metal) as follows:

CAUTION: DO NOT LET PAINT STRIPPER TOUCH FIBERGLASS OR SEAMS OF ADHESIVE BONDED PARTS. THE PAINT STRIPPER CAN CAUSE DAMAGE TO FIBERGLASS OR SEAMS OF ADHESIVE BONDED PARTS.

- (a) Rub the surface smooth with abrasive, A-A-1048 paper, or do this task:
  - 1) Strip paint (AMM 51-21-01/701).

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- (b) Feather the edges of the adjacent area with a 240 grit (minimum) abrasive, A-A-1048 paper that is moist with water.
- (c) Remove the remaining particles with a clean cloth, BMS15-5 that is moist with solvent, Series 85 (AMM 20-30-85/201 or SOPM 20-30-85).
- (d) Dry the surface with a clean cloth, BMS15-5.
- (e) Apply the applicable primer and topcoats as follows:
  - 1) Do this task: Decorative Exterior Paint System Application.
- (f) Feather all the edges to get a smooth continuous finish.

S 307-036

- (3) Repair areas with defective paint layers as follows:
  - (a) Rub the surface with a 240 grit (minimum) wet or dry abrasive, A-A-1048 paper to remove defects.
  - (b) Feather the edges into the adjacent areas.
  - (c) Remove the remaining particles with a clean cloth, BMS15-5 that is moist with solvent, Series 85 (AMM 20-30-85/201 or SOPM 20-30-85).
  - (d) Dry the surface with a clean cloth, BMS15-5.
  - (e) Apply the applicable topcoats per manufacturer's specifications and Table 701.
  - (f) Feather the edges to get a smooth continuous finish.

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INTUMESCENT (HEAT PROTECTIVE) FINISH – CLEANING/PAINTING

1. General

- A. This procedure contains one task. The task is to apply intumescent finish on fiberglass material.

TASK 51-21-11-377-001

2. Apply the Intumescent Finish

A. Equipment

- (1) Spray gun; Commercially available  
(2) Brush soft bristle

B. Consumable Materials

- (1) B00061 Methylene Chloride – Technical,  
MIL-D-6998  
(2) C00371 Intumescent Paint – AVCO 1600 BTX  
(a) Component A (base)  
(b) Component B (hardener)  
(3) C00259 Primer – BMS 10-11, Type I

C. References

- (1) 51-21-02/701 – Prepaint Cleaning and Treatment

D. Prepare the Surface

S 117-002

- (1) Clean and prepare the surface (Ref 51-21-02).

E. Prepare the Primer

S 377-003

- (1) Refer to the manufacturer's instructions to mix the primer.

NOTE: The induction time for the primer is 30 minutes.

S 937-004

- (2) Identify the container with a label. Write the date and hour when the mixture was mixed. Also write the date and hour when the pot life ends.

NOTE: The pot life of the primer after you mix it is as follows:

Below 80°F	18 hours
80°-85°F	12 hours
Above 85°F	8 hours

F. Prepare the Intumescent Finish

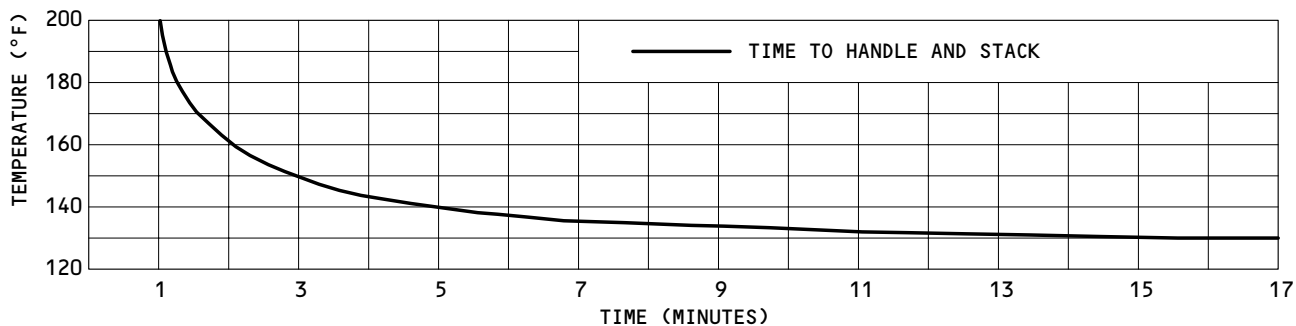
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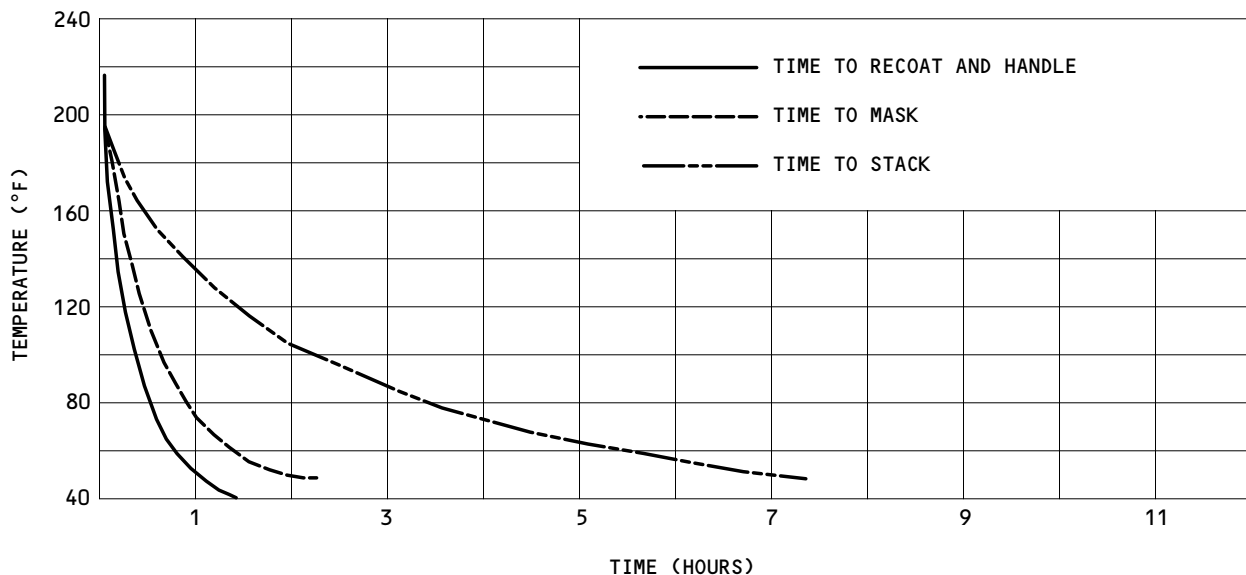
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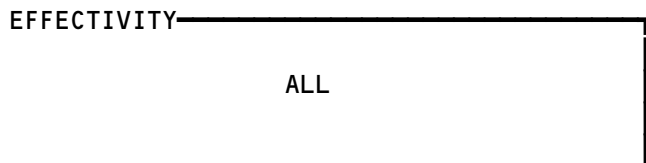


INFRARED LAMP CURE



NORMAL AIR CURE

Cure Charts - Primer BMS 10-11, Type I  
Figure 701



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61851

S 377-005

**WARNING:** DO NOT GET THE BASE, HARDENER, AND THINNER MATERIALS, IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

**WARNING:** DO NOT USE A PAINT SHAKER TO MIX THE AVCO 1600 BTX PAINT. IF A PAINT SHAKER IS USED, INJURY OR DAMAGE CAN OCCUR BECAUSE THE PAINT IS POISONOUS AND FLAMMABLE.

**CAUTION:** THE MIXTURE RATIO BETWEEN COMPONENTS A (BASE) AND B (HARDENER) OF THE AVCO 1600 BTX IS VERY IMPORTANT WHEN YOU APPLY THE FINISH. THE POT LIFE IS 1 HOUR AT 70°F TO 80°F FOR 1-QUART VOLUME OF THE MIXED COMPOUND. MIX THE COMPOUNDS AFTER YOU LET THE PRIMER CURE. AN INCORRECT MIXTURE CAN CAUSE AN UNSATISFACTORY FINISH.

(1) Mix the AVCO 1600 BTX components as follows:

**NOTE:** Refer to the manufacturer's instructions to mix the AVCO 1600 BTX components.

- (a) Component A (base) - 100 parts (by weight)
- (b) Component B (hardener) - 3.4 parts (by weight)

S 937-006

(2) Identify the container with a label. Write the date and hour when the mixture was mixed. Also, write the date and hour when the pot life ends.

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G. Procedure - Apply Intumescent Finish

S 377-008

- (1) Apply the primer with a spray gun. Make sure the film thickness is between 0.0003 and 0.0008 inch.

S 867-009

- (2) Let the primer cure before you apply the second layer. Refer to the cure chart for the minimum cure time (Fig. 701).

S 377-010

- (3) Apply a second layer of primer. Make sure the maximum film thickness is 0.0016 inch.

S 867-011

- (4) Let the second layer of primer cure. Refer to the cure chart for the minimum cure time (Fig. 701).

S 377-012

- (5) Apply the intumescent finish with a spray gun or brush. Make sure the total wet thickness is 0.018 to 0.023 inch.

**NOTE:** If you use a spray gun, make sure you use 60 psi atomization air pressure and 22 psi fluid pressure.

You can also add 10% (by weight) methylene chloride to the solution to make it easier to spray. Use 45 psi atomization air pressure and 15 psi fluid pressure if you spray a solution that has 10% methylene chloride.

S 867-013

- (6) Permit 30 minutes dry time for each layer of intumescent finish that you apply.

S 867-007

- (7) Let the intumescent finish dry for 48 hours at room temperature before you machine or assemble the part.

**NOTE:** You can touch the intumescent finish 24 hours after it is dry.

S 217-014

- (8) Examine the finish and make sure it has no small holes. Refer to the Prepare the Surface Porosity procedure (Ref 51-21-02).

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MOISTURE RESISTANT SURFACE TREATMENT – CLEANING/PAINTING

1. General

- A. This procedure contains one task. The task is to apply moisture resistant surface finish.
- B. This procedure is for kevlar and hybrid (kevlar/graphite) composite panels. The surfaces of these panels are cleaned, sealed, and painted to prevent damage from moisture. Apply moisture resistant surface finish on the panels while they are on the airplane. It is recommended that you do the surface treatment operation in a hangar.

TASK 51-21-12-607-001

2. Apply Moisture Resistant Surface Finish

A. Equipment

- (1) Gloves, neoprene or rubber – commercially available
- (2) Respirators – commercially available
- (3) Spray equipment, 50 psig minimum – commercially available

B. Consumable Materials

- (1) G02088 Abrasive Paper – 180-grit (minimum)
- (2) G00034 Cheesecloth – new, clean, dry lint free
- (3) C00033 Enamel – BMS 10-60, Type II
- (4) G00270 Masking tape – Permacel No. 76
- (5) A00247 Sealant – BMS 5-95, Class F
- (6) B00148 Methyl Ethyl Ketone (MEK) – TT-M-261
- (7) B00153 Toluene (Toluol) – TT-T-548, Grade A or JAN-T-171, Grade A
- (8) G00216 Wiper – commercially available

C. References

- (1) 24-22-00/201, Electrical Power – Control
- (2) 27-21-01/401, Rudder System
- (3) 27-51-00/201, Trailing Edge Flap System
- (4) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems

D. Prepare the Airplane

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S 947-002

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY AND DAMAGE CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** BEFORE YOU OPERATE THE FLAP/SLAT SYSTEM, MAKE SURE THAT THE ENGINE STRUT ACCESS DOORS AND THE THRUST REVERSER COWLING NEAR THE SLATS ARE CLOSED. FAILURE TO OBEY CAN RESULT IN SYSTEM DAMAGE.

- (1) Do these steps to prepare the wing:
  - (a) Get access to the inboard-flap cove panels, the aft segments of the flap linkage fairings, and the fixed trailing edge upper panels.
  - (b) Supply electrical power (AMM 24-22-00/201).
  - (c) Pressurize the center hydraulic system (AMM 29-11-00/201).
  - (d) Extend the outboard trailing edge flaps to get access to the trailing edge wedge (AMM 27-51-00/201).
  - (e) Remove electrical power, if it is not necessary (AMM 24-22-00/201).
  - (f) Remove the pressure from the center hydraulic system, if it not necessary (AMM 29-11-00/201).

S 947-003

- (2) Do these steps to prepare the horizontal stabilizer:
  - (a) Get access to the horizontal stabilizer, the fixed trailing edge panel upper surfaces, and the horizontal stabilizer tip panel.
  - (b) Put the horizontal stabilizer to the neutral position.
  - (c) Put the WING and TAIL FLIGHT CONTROL SHUTOFF L, C, and R on the right side panel, P61, to the OFF position and attach DO-NOT-OPERATE tags. Make sure that the switch position lights are ON.
  - (d) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
    - 1) 11H17, FLIGHT CONTROL SHUTOFF TAIL L
    - 2) 11H18, FLIGHT CONTROL SHUTOFF TAIL C
    - 3) 11H27, FLIGHT CONTROL SHUTOFF TAIL R
  - (e) Remove the pressure from the left, right and center hydraulic systems (AMM 29-11-00/201).

S 947-004

- (3) Do these steps to prepare the vertical fin:
  - (a) Get access to the vertical fin-tip panel.
  - (b) Do the deactivation procedure for the rudder system (AMM 27-21-01/401).
  - (c) Supply electrical power (Ref 24-22-00).

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- (d) Open this circuit breaker on the overhead circuit breaker panel, P11, and attach a DO-NOT-CLOSE tag:
    - 1) 11G10, RUDDER RATIO
  - (e) Put the WING and TAIL FLIGHT CONTROL SHUTOFF L, C, and R switches on the right side panel, P61, to the OFF position and attach DO-NOT-OPERATE tags. Make sure that the switch position lights are ON.
  - (f) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
    - 1) 11H17, FLIGHT CONTROL SHUTOFF TAIL L
    - 2) 11H18, FLIGHT CONTROL SHUTOFF TAIL C
    - 3) 11H27, FLIGHT CONTROL SHUTOFF TAIL R
- E. Procedure - Apply Moisture Resistant Surface Finish

S 407-006

- (1) For panels that have water in the panel material, but without damage, apply thermal blankets or heat lamps at 125°F (maximum) to dry the panels.

S 377-025

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (2) Clean the panel surface with a cheesecloth that is moist with the 50/50 MEK/Toluene mixture, Naphtha, isopropyl alcohol, or ethyl alcohol.

S 147-009

- (3) Lightly rub the panel surface with abrasive paper. Make sure you remove the gloss from the panel surface.

S 147-010

- (4) Clean the panel surface with a clean wiper (that is moist) with the 50/50 MEK/Toluene mixture, Naphtha, isopropyl alcohol, or ethyl alcohol. Dry the panel surface with a dry cheesecloth.

S 957-011

- (5) Apply masking tape on the adjacent areas.

**NOTE:** Make sure the surface temperature is between 60-80°F before you apply the moisture resistant surface finish.

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S 377-012

- (6) Add the 50/50 MEK/Toluene mixture, 20% by volume, to the sealant and fully mix them together

**NOTE:** The pot life is approximately 1-1/2 hours at 75°F.

S 377-015

- (7) Use a spray gun at 50 psig (minimum) to apply two layers of sealant to the external surface of the panel.

**NOTE:** Each layer of sealant must have a wet thickness of 5-8 mils (0.005 to 0.008 inch) to get a dry thickness of  $8 \pm 2$  mils (0.008  $\pm$  0.002 inch). Let each layer dry for 15 to 30 minutes.

Increase the air spray pressure if it is necessary.

S 377-013

- (8) Let the sealant dry for 2 hours at a temperature of 60°F to 80°F.

S 377-021

- (9) Apply two or three layers of enamel to the external surface of the panel. Let each layer dry for 10 minutes (minimum). Make sure the dry thickness for each layer is two to four mils.

S 037-015

- (10) Remove the masking tape from the adjacent surfaces.

S 377-022

- (11) Let the top coat of the enamel cure for 3 hours (minimum) at 60°F (minimum), before taxi or flight.

F. Put the Airplane Back to Its Usual Condition

S 947-017

**WARNING:** KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS, AND STABILIZER ARE FULLY POWERED SURFACES. INJURY AND DAMAGE CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

**CAUTION:** BEFORE YOU OPERATE THE FLAP/SLAT SYSTEM, MAKE SURE THAT THE ENGINE STRUT ACCESS DOORS AND THE THRUST REVERSER COWLING NEAR THE SLATS ARE CLOSED. FAILURE TO OBEY CAN RESULT IN SYSTEM DAMAGE.

- (1) Do these steps to put the wing back to its usual condition:  
(a) Supply electrical power (Ref 24-22-00).

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- (b) Pressurize the center hydraulic system (Ref 29-11-00).
- (c) Retract the outboard trailing edge flaps (Ref 27-51-00).
- (d) Remove electrical power if it is not necessary (Ref 24-22-00).
- (e) Remove the pressure from the center hydraulic system (Ref 29-11-00).

S 947-013

- (2) Do these steps to put the horizontal stabilizer back to its usual condition:
  - (a) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
    - 1) 11H17, FLIGHT CONTROL SHUTOFF TAIL L
    - 2) 11H18, FLIGHT CONTROL SHUTOFF TAIL C
    - 3) 11H27, FLIGHT CONTROL SHUTOFF TAIL R
  - (b) Pressurize the left, right and center hydraulic system (AMM 29-11-00/201).
  - (c) Remove the DO-NOT-OPERATE tags and put the WING and TAIL FLIGHT CONTROL SHUTOFF L, C, and R switches on the right side panels, P61, to the on position.

S 947-019

- (3) Do these steps to put the vertical fin back to its usual condition:
  - (a) Remove the DO-NOT-CLOSE tags and close these circuit breakers on the P11 panel:
    - 1) 11H17, FLIGHT CONTROL SHUTOFF TAIL L
    - 2) 11H18, FLIGHT CONTROL SHUTOFF TAIL C
    - 3) 11H27, FLIGHT CONTROL SHUTOFF TAIL R
  - (b) Remove the DO-NOT-CLOSE tag and close this circuit breaker on the P11 panel:
    - 1) 11G10, RUDDER RATIO
  - (c) Remove the DO-NOT-OPERATE tags and put the WING and TAIL FLIGHT CONTROL SHUTOFF L, C, and R switches on the right side panels, P61, to the on position.
  - (d) Remove electrical power, if it is not necessary (AMM 24-22-00/201).

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TEDLAR FILM SURFACES – CLEANING/PAINTING

1. General

- A. This procedure contains one task. The task is the repair of tedlar film surfaces.

TASK 51-21-13-307-001

2. Repair of Tedlar Film Surfaces

A. Consumable Materials

- (1) G02088 Abrasive Paper – 150-grit (minimum)
- (2) G00215 Brush – Soft bristle fiber
- (3) G00034 Cheesecloth
- (4) C00033 Enamel – BMS 10-60, Type II
- (5) G00132 Masking Tape
- (6) C00259 Primer – BMS 10-11
- (7) G00251 Scotchbrite Sheets
- (8) G50597 Sealant – BMS 8-301, Class 3
- (9) B00148 Solvent – Methyl Ethyl Ketone (MEK)

B. Procedure

S 937-002

- (1) Apply masking tape around the damaged area.

S 127-003

- (2) Rub the damaged area with Scotchbrite sheet or 150-grit (minimum grit number) abrasive paper.

S 437-004

- (3) Remove the masking tape.

S 117-005

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (4) Clean the surface with a cheesecloth that is moist with solvent, Series 98 (AMM 20-30-98/201).

**NOTE:** Let the solvent dry before you apply the sealant.

S 377-006

- (5) Do these steps for clear tedlar film surfaces:
  - (a) Apply the sealant on the damaged surface.
  - (b) Let the sealant cure for 60 to 70 minutes at a temperature of 145°F (62.78°C) to 155°F (68.33°C).

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S 377-007

- (6) Do these steps for grey or white tedlar film surfaces:
- (a) Apply the sealant on the damaged area.
  - (b) Let the sealant cure for 60 to 70 minutes at a temperature of 145°F (62.78°C) to 155°F (68.33°C).
  - (c) Apply one layer of BMS 10-11 primer on the damaged area.
  - (d) Apply one layer of BMS 10-60, Type II enamel on the damaged surface.

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CORROSION PROTECTIVE FINISHES – DESCRIPTION AND OPERATION

1. General

A. Procedures are provided for application of finishes for protection of aluminum, steel, titanium and nonmetallic surfaces from chemical and other environmental contamination.

2. Protective Finishes

A. The following protective finishes are used to protect airplane parts.

- (1) Chemical and solvent resistant finish is used for general purpose corrosion protection on interior and exterior of airplane.
- (2) A conductive coating system for exterior fiberglass is used to prevent static electricity buildup.
- (3) Abrasion resistant Teflon finish is used to protect aluminum faying surfaces from chafing when used in conjunction with composites.
- (4) Nonglare coatings are added to areas to provide a dull finish where it is required. For finishes used as airline options, refer to applicable exterior decorative markings drawing.
- (5) An Aeroflex or Corogard paint system or polyurethane enamel is used to protect against corrosion on wing upper and lower inspar skins and horizontal stabilizer upper and lower inspar skins.
- (6) High temperature coating for titanium is used to protect titanium from fire resistant hydraulic fluid at 270°F and above.
- (7) Nonskid surface coating is used to provide nonskid surfaces in required areas on the airplane.
- (8) Decorative paint system is a polyurethane system recommended for exterior decorative markings. It also provides corrosion protection in some areas.
- (9) BMS 3-23 is used as a corrosion preventive compound.

3. Equipment

A. Clean and proper equipment is essential to good finishing. Equipment air supply should have filters to eliminate contamination from oil, grit and water droplets.

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HYDRAULIC FLUID RESISTANT FINISH – CLEANING/PAINTING

1. General

- A. This procedure contains one task. The task is to apply hydraulic fluid resistant finish.

TASK 51-24-01-377-013

2. Apply the Hydraulic Fluid Resistant Finish

A. References

- (1) AMM 20-30-02/201, Cleaners and Polishes

B. Consumable Materials

- (1) Abrasive Paper – 280-grit (minimum)  
(a) G00251 Aluminum Oxide – Scotchbrite, Type A  
(b) B00102 Aluminum Oxide – Bear Tex  
(2) B00192 Solvent – General Purpose, BMS 3-2, Type 1  
(3) B00002 Cleaner – Alkaline, Manual Cleaning  
(4) G00027 Cheesecloth – Boiled, Rurple Cloth No. 301  
(5) C00272 Finish – Protective, BMS 3-11 Resistant  
(a) Finch 683-3-2 (Base)  
(b) Finch X-310 (Catalyst)

C. Prepare the Surface

S 127-004

- (1) Rub the high gloss plastic or painted surface with the abrasive paper.

NOTE: Do not rub the painted surface around decals when the hydraulic fluid resistant coating is used to seal edges.

S 117-006

- (2) Clean the surface as follows:  
(a) For decals, placards, and stencils, apply alkaline cleaner with a cheesecloth (AMM 20-30-02/201).  
(b) For all other surfaces:  
1) Clean the surface with a clean cheesecloth that is moist with solvent.  
2) Before the solvent dries, rub the surface with a clean dry cheesecloth.  
3) Clean the surface again if it is not fully clean.

D. Procedure – Prepare the Hydraulic Fluid Resistant Finish

S 397-005

- (1) When you apply the hydraulic fluid resistant finish over sealants, permit the sealant to fully cure.

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S 377-007

**CAUTION:** USE CLEAN CONTAINERS WHEN YOU MIX THE HYDRAULIC FLUID RESISTANT FINISH. DO NOT USE CONTAINERS THAT CONTAIN ORGANIC COATINGS. DIRTY CONTAINERS AND ORGANIC COATINGS CAN CAUSE CONTAMINATION OF THE MIXTURE.

- (2) Fully mix 1 part (by volume) of the Catalyst (X-310) to 2 parts (by volume) of the base (683-3-2). Mix the base component continuously, when you add the catalyst.

S 977-009

- (3) Immediately after you mix the compound, identify the container with a label. Write the date and hour when the compound was mixed, and the date and hour when the pot life ends.

**NOTE:** The compound has a pot life of 4 hours at 70°F. Do not use the compound when its pot life has ended. The use of the compound when its pot life has ended, will decrease its performance. Keep the materials, that were not mixed, at a temperature between 40°F and 90°F. You can keep the materials that were not mixed for 12 months from the date of manufacture.

E. Procedure - Apply the Hydraulic Fluid Resistant Finish

S 117-010

- (1) Make sure the surface is clean before you apply the hydraulic fluid resistant finish.

S 377-001

- (2) Apply the hydraulic fluid resistant finish with a spray gun or brush until the finish is 1 to 2 mils (0.001 to 0.002 inch) thick.

**NOTE:** The temperature must be more than 65°F and the relative humidity must be less than 85 percent for best results.

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S 427-014

- (3) Apply the hydraulic fluid resistant finish on the decals. Make sure you apply a 1/4 inch minimum thickness.

S 217-002

- (4) Make sure the hydraulic fluid resistant finish is bonded to the surface.

NOTE: The 1/4 inch overlap will seal the edges of the decal.

S 307-003

- (5) Repair all the damaged hydraulic fluid resistant finish. Clean the surface again and apply the hydraulic fluid resistant finish as it is necessary.

S 867-012

- (6) Let the hydraulic fluid resistant finish cure for 4 hours at 65°F (minimum), before you move the airplane to an open area.

NOTE: It takes 14 days at 65°F (minimum) before the hydraulic fluid resistant finish is fully cured.

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CONDUCTIVE COATING FOR EXTERIOR FIBERGLASS AND KEVLAR - CLEANING/PAINTING

1. General

- A. This procedure contains one task. The task is to apply conductive coating on external fiberglass and kevlar.
- B. It is necessary to apply conductive coating on almost all external fiberglass and kevlar surfaces. Do not apply conductive coating to the nose radome (AMM 53-12-01/201).

TASK 51-24-02-377-008

2. Apply the BMS 10-21 Type III Conductive Coating (Fig. 701)

A. References

- (1) AMM 51-21-02/701, Prepaint Cleaning and Treatment
- (2) AMM 51-21-10/701, Decorative Exterior Finishes

B. Equipment

- (1) Multimeter - Commercially Available
- (2) Film Resistance Measure Probe (F70328-1)

C. Consumable Materials

- (1) B00083 Solvent - Aliphatic Naphtha TT-N-95 Type II
- (2) B00102 Abrasive - Aluminum Oxide Coated Cloth
- (3) C00767 Coating - Anti-Static, BMS 10-21 Type III
- (4) G00034 Cotton Wiper - Process Cleaning Absorbent Wiper  
(Cheesecloth, Gauze) BMS 15-5
- (5) G00251 Abrasive - Non-Woven, Non Metallic, Mats  
Scotchbrite, A-A-58054
- (6) G50077 Abrasive - Aluminum Oxide Paper, 240 Grit or Finer
- (7) G50630 Tape - Copper Foil with Conductive Adhesive (3M 1181 Tape)

D. Procedure

S 117-001

**WARNING:** DO NOT GET PAINT MATERIALS AND SOLVENTS IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

- (1) Clean and prepare the surface (AMM 51-21-02/701).

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S 377-020

- (2) Prepare the BMS 10-21 Type III conductive coating with the steps as follows:
- Refer to the manufacturer's instructions to mix the conductive coating.
  - Fully shake each conductive coating component.

**NOTE:** The conductive coating is supplied with two components, the base component and the catalyst.

- Put a label on the container with, the data that follows, immediately after it is mixed:
  - The date and time it was mixed.
  - The pot life expiration time is as follows:
    - 4 hours if the temperature is less than 81 degrees Fahrenheit (27 degrees centigrade).
    - 2 hours if the temperature is 81 degrees Fahrenheit (27 degrees centigrade) to 100 degrees Fahrenheit (38 degrees Centigrade).
- Let the conductive coating compound stay for at least 30 minutes before it is used.

S 377-011

**WARNING:** DO NOT APPLY PAINT THAT HAS METAL PARTICLES ON THE ANTENNA FAIRINGS. THE METAL PARTICLES IN THE PAINT CAN CAUSE THE ANTENNA TO OPERATE INCORRECTLY.

- (3) Apply the conductive coating compound with a paint spray gun or paint brush.
- Be sure that the temperature for the application of the coating must be 40 degrees Fahrenheit (4 degrees Centigrade) to 100 degrees Fahrenheit (38 degrees Centigrade). The preferred temperature is 50 degrees Fahrenheit (10 degrees Centigrade) to 90 degrees Fahrenheit (32 degrees Centigrade).
  - The dry film thickness after it has been cured must be 0.0006 ±0.0002 inches (0.0152 ±0.0051 mm).

S 377-004

- (4) Cure the BMS 10-21 Type III conductive coating with the one of the steps that follow: (Figure 702)
- Let the conductive coating that is in the fastener holes cure for at least 20 minutes at 70 degrees Fahrenheit (21 degrees Centigrade) to 90 degrees Fahrenheit (32 degrees Centigrade) before you install the fasteners.
  - Air dry the surface of the conductive coating for 2 hours at 60 degrees Fahrenheit (16 degrees Centigrade).

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- (c) To cure the conductive coating quickly, apply a minimum temperature of 140 degrees (60 degrees Centigrade) before you do the resistivity measurements (Figure 702).

NOTE: The increased drying time as shown in Figure 702 is not a full cure.

- 1) The flash-off time necessary before the higher temperature cure is 15 minutes minimum at 75 ±15 degrees Fahrenheit (24 ±8 degrees Centigrade).
- 2) The cool-off time necessary before subsequent processing the cure is 15 minutes minimum at 75 ±15 degrees Fahrenheit (24 ±8 degrees Centigrade).

S 767-014

- (5) Do the steps that follow to measure the resistivity of the conductive coating (Fastener-to-Conductive Surface Test Method):

NOTE: The resistivity of the conductive coating after it is cured must be no more than 300,000 ohms/square.

NOTE: Let the conductive coat cure for the specified time as shown in Figure 703 before you measure the conductivity.

- (a) If the bonding surface and the head of the fastener are covered with a finish, do the steps as follows:
- 1) Remove a sufficient quantity of the outer coating or paint to let the probes touch the conductive finish.

NOTE: If it necessary, you can push the probes through the outer coating.

- 2) Put the multimeter with the film resistance measure probe in direct contact with the bonding fastener and the conductive finish.
  - a) Put the film resistance measure probe 1.00 ±0.25 inches (25.40 ±6.35 mm) apart as shown in Figure 702.
- 3) Make a record of the value of the resistivity shown on the multimeter.
  - a) The maximum permitted resistivity is 300,000 Ohms/square.

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S 707-018

- (6) Do the steps that follow to measure the resistivity of the conductive coating on uninstalled panels (Figure 703) (Fastener-to-Fastener Test Method):

**NOTE:** The resistivity of the conductive coating after it is cured must be no more than 300,000 ohms/square.

- (a) Make sure the conductive coating shows in the fastener location.
- (b) Clean the area with aliphatic naphtha solvent.
- (c) Install one temporary fastener at each fastener location to be measured.

**NOTE:** This procedure can be used for measuring electrical resistivity of panels with covered (painted) conductive coatings when the ground fastener locations show.

- (d) Connect the multimeter probes at the two fasteners locations as shown in Figure 703.
- (e) Make a record of the value of the resistivity shown on the multimeter.
  - 1) The maximum permitted resistivity is 300,000 Ohms/square.
- (f) Remove the temporary fasteners from the surface.

S 707-019

- (7) Do the steps that follow to measure the resistivity of the conductive coating shown in Figure 704 (Square Test Method):

**NOTE:** The term ohms/square is used to give the resistance in ohms of current passing from one side of a square region to the opposite side, regardless of the size of the square.

**NOTE:** Do not use this procedure to measure the resistivity of conductive finishes when the surface is covered (painted).

- (a) Put two pieces of 3M 1181 copper foil tape (of equal length (L)) parallel to each other on the conductive coating surface.

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- (b) The two strips of 3M 1181 copper foil tape must be put parallel to each other a distance of one tenth the length of the two strips (0.1L  $\pm$ 5 percent).
- (c) Push the two strips of 3M 1181 copper foil tape against the conductive coating.
- (d) Measure the resistivity with a multimeter.
  - 1) The measured value multiplied by 10 gives the value of resistivity in ohms/square.

NOTE: The term ohms/square is used because it gives the resistance in ohms of current passing from one side of a square region to the opposite side, regardless of the size of the square.

NOTE: The maximum permitted resistivity is 300,000 Ohms/square.

- (e) Remove the 3M 1181 copper foil tape, from the surface.

S 107-015

- (8) Do these steps if the resistivity of the conductive coating is more than 300,000 Ohms/square:
  - (a) Use an abrasive to remove the conductive coating.
  - (b) Remove the remaining particles with a clean cotton wiper that is moist with aliphatic naphtha solvent.
  - (c) Dry the surface with a clean cotton wiper before the solvent is dry.
  - (d) Do the steps to apply a new layer of conductive coating.
  - (e) Do the steps to cure the conductive coating.
  - (f) Do the steps to measure the resistivity of the new layer of conductive coating.

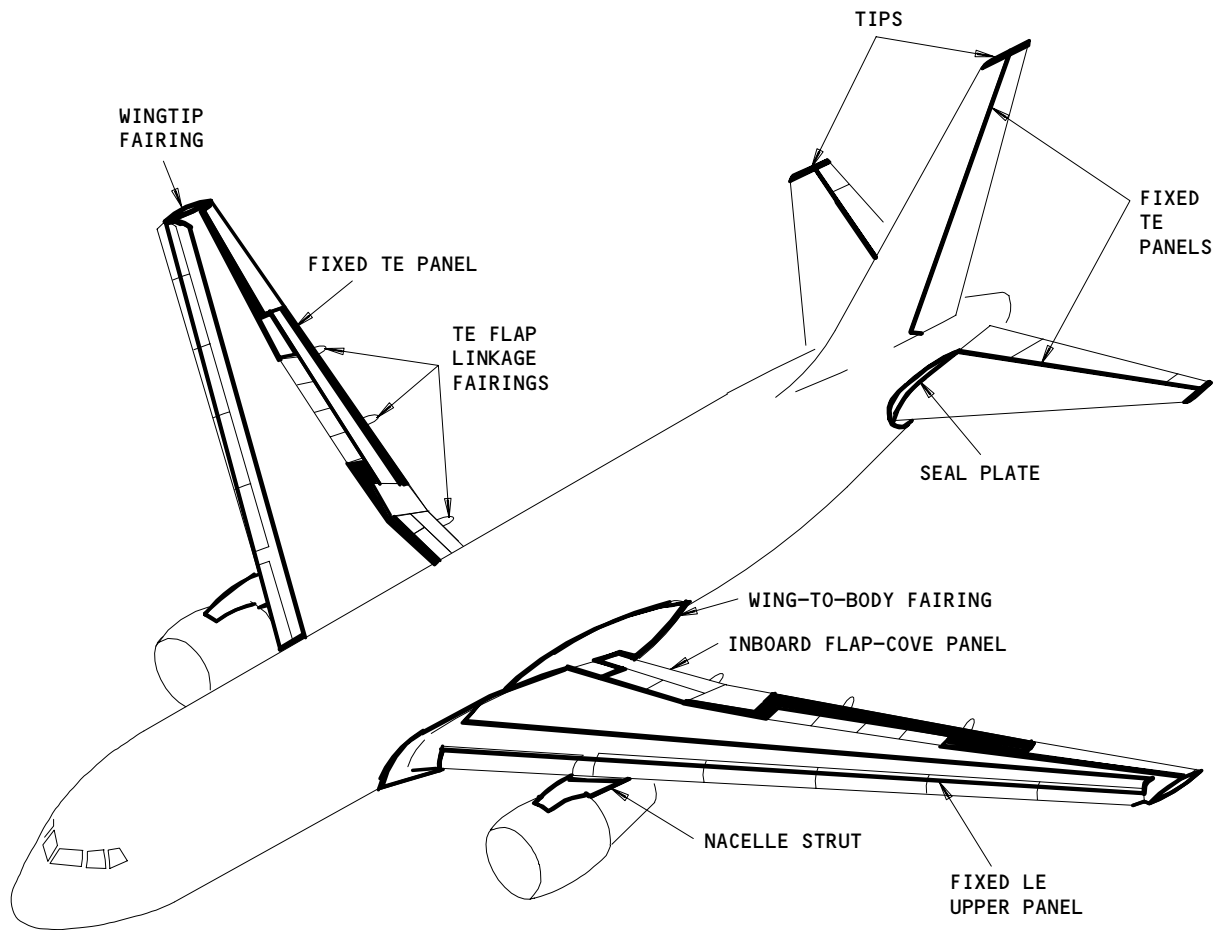
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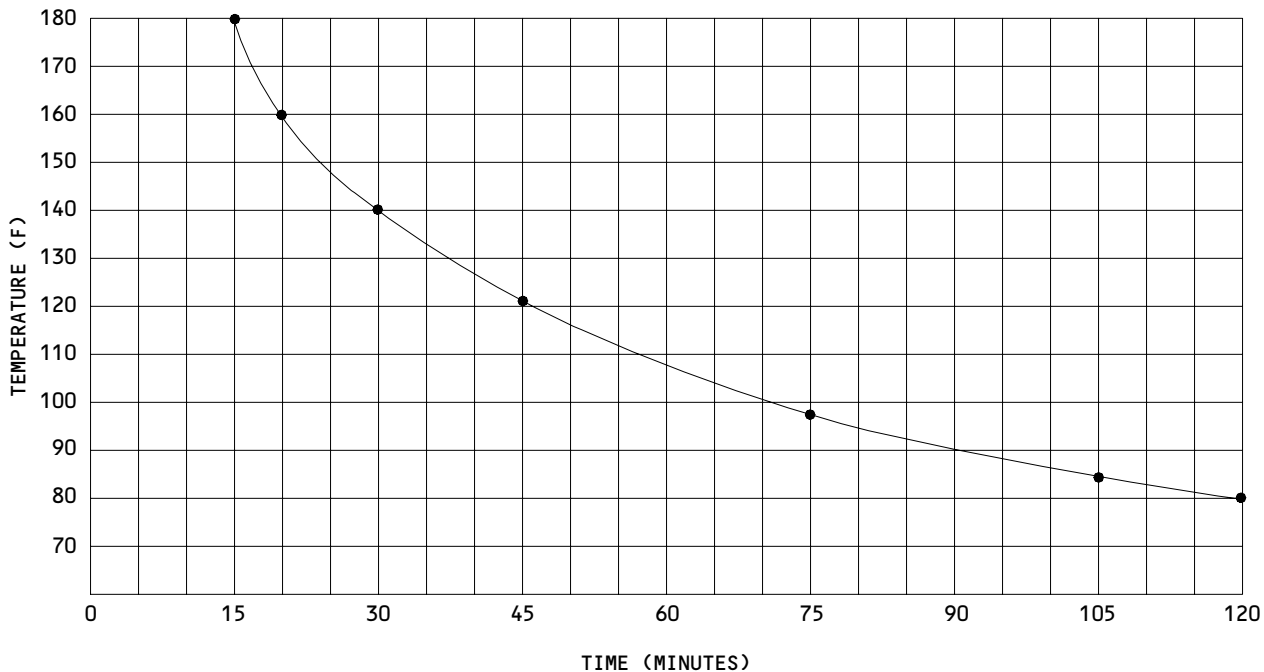
Fiberglass/Kevlar Exterior Panel Areas  
Figure 701

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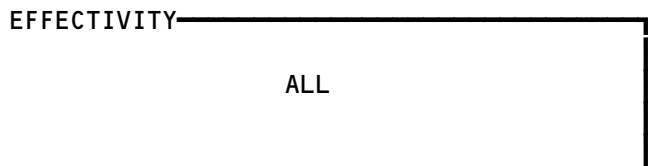
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Conductive Coating Cure Times  
Figure 702

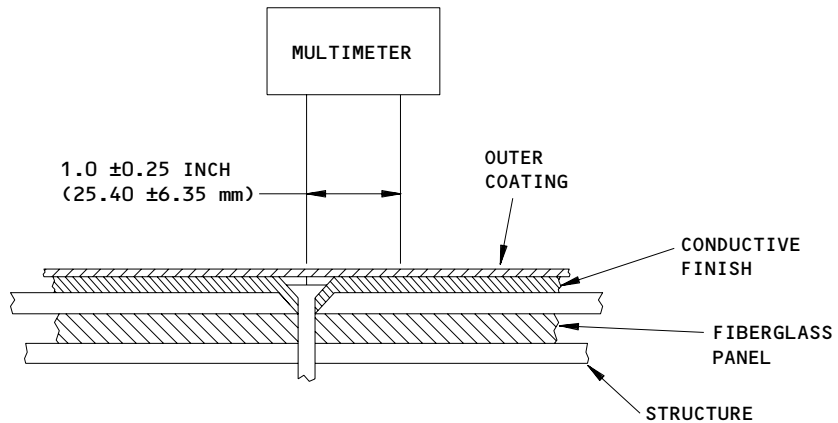


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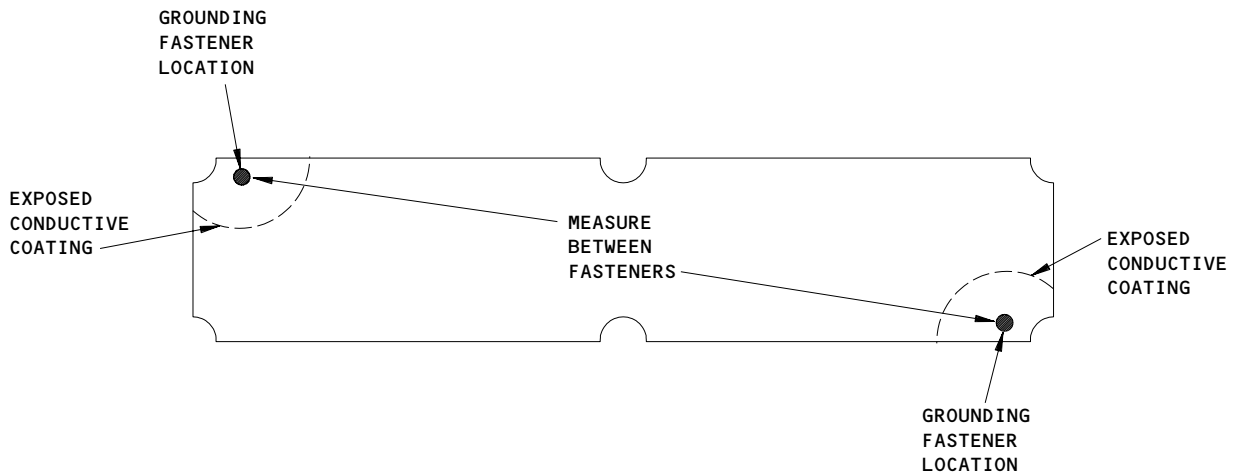
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RESISTANCE MEASUREMENT  
OF CONDUCTIVE FINISH



RESISTANCE MEASUREMENT  
OF CONDUCTIVE FINISH  
WITH EXPOSED FASTENERS

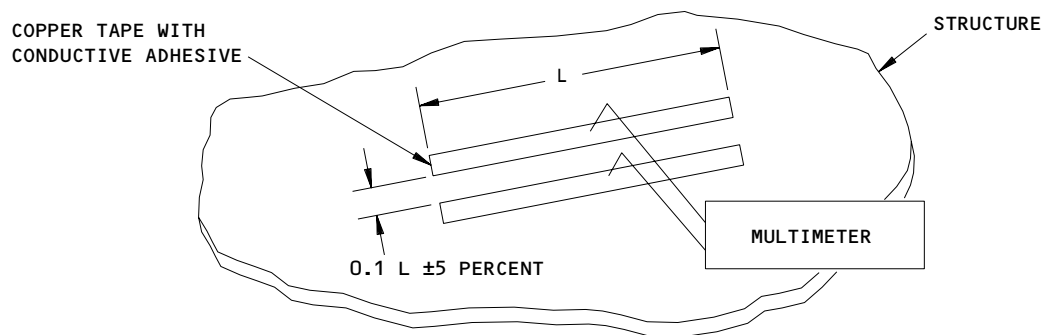
Resistance Measurement of Conductive Finish  
Figure 703

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Measuring Resistance of Conductive Finish by the Ohms Per Square Procedure  
Figure 704

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CORROSION INHIBITING COATING - CLEANING AND PAINTING

1. General

- A. This procedure contains one task. The task is to apply corrosion inhibiting coating.

**NOTE:** BMS10-100 coating is sensitive to fuel, hydraulic fluid and solvents. The appearance of fluid stains or emulsification of the finish may occur when exposed to these materials. Matching the color and appearance of the repair area to the original application of BMS10-100 coating is very difficult. Some color and appearance mismatch is considered acceptable.

TASK 51-24-03-377-001

2. Apply the Corrosion Inhibiting Coating

A. Equipment

- (1) Metal sieve - 60 to 80 mesh (commercially available)
- (2) Stainless steel pressure pot liners and equipment to mix the chemicals (commercially available)
- (3) Paint spray equipment
  - (a) For suction supply, use a DeVilbiss MBC or JGA gun, EX needle and tip, 30 or 36 air cap, or Binks No. 18 gun 60 X 66 SC nozzle assembly, or equivalent. Air pressure 45 to 55 psi.
  - (b) For pressure supply, use a DeVilbiss MBC or JGA gun E needle and tip, 704 or 765 air cap, or Binks No. 18 gun 66 X 66 SD nozzle assembly, or equivalent. Fluid pressure 10 to 20 psi and air pressure 50 to 70 psi.
- (4) Power mixer (optional) (commercially available)

B. Consumable Materials

- (1) C50016 BMS10-100 Coating - Flexible Corrosion Inhibiting
  - (a) Aeroflex Base - G12E25

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- (b) Ultraflex Base - 763-66-9200
  - (2) C00035 Corrosion Resistant Coating - EC-843
  - (3) C00035 Corrosion Resistant Coating - EC-843-S
  - (4) C00035 Aluminum Powder - EC-1101
  - (5) C00468 Primer - BMS 10-11 Type I
  - (6) C00584 Primer - BMS 10-79 Type II
  - (7) C00175 Primer - BMS 10-79 Type III
  - (8) Thinners and Solvents
    - (a) B00079 Normal Butyl Acetate - TT-B-838
    - (b) B00151 Methyl Isobutyl Ketone - TT-M-268
    - (c) B00094 Toluene - TT-T-548
    - (d) B00344 Xylene - TT-X-916
    - (e) C0662 Thinner - C25/90S
  - (9) G00219 Epoxy Tack Rag
  - (10) G50123 Tack Rag, C-60
  - (11) G00382 Sand paper - 280-grit (minimum)
  - (12) G01163 Clean, lintless cloth
- C. References
- (1) 51-21-02/701, Prepaint Cleaning and Treatment
  - (2) 51-21-10/701, Decorative Exterior Finishes - Cleaning/Painting
- D. Prepare the Corogard EC-843 and EC-843-S Coating

S 377-013

**WARNING:** WHEN COROGARD EC-843 OR EC-843-S IS MIXED WITH ALUMINUM POWDER IN A METAL CONTAINER, IT CAUSES A FLAMMABLE HYDROGEN GAS. IF THIS MIXTURE IS KEPT FOR 16 HOURS BEFORE YOU APPLY THE MIXTURE, YOU MUST KEEP IT IN AN OPEN CONTAINER OR IN A CLOSED CONTAINER WHICH HAS OPENINGS IN THE COVER. INJURY OR DAMAGE CAN OCCUR IF THESE MATERIALS ARE NOT USED CORRECTLY.

- (1) Put the aluminum powder component in a different container from the resin component. Slowly add the resin component with methyl isobutyl ketone or normal butyl acetate to make a mixture that is smooth and constant.

**NOTE:** Corogard EC-843 and EC-843-S are supplied with two components, the resin component and the aluminum powder component (12.5 ounces aluminum powder EC-1101 for each gallon of resin EC-843, or 9.0 ounces aluminum powder EC-1101 for each gallon of resin EC-843-S).

S 377-003

- (2) Fully mix the mixture manually or with a power mixer. Make sure the mixture is smooth and constant.

S 377-004

- (3) Continuously mix the mixture when you add the remaining quantity of resin component.

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S 377-006

- (4) Use one of these materials to make the mixture thin for aerospray:

**NOTE:** Do not add more than 20 percent (by volume) of thinner to the base material. The pot life of the mixture is 4 hours. There is no temperature limit.

- (a) Methyl Isobutyl Ketone
- (b) Butyl Acetate
- (c) Five parts Methyl Isobutyl Ketone (by volume) to three parts Butyl Acetate (by volume)
- (d) One part Methyl Isobutyl Ketone (by volume) to one part Butyl Acetate (by volume)

E. Prepare the BMS10-100 Coating

S 377-007

- (1) Fully mix the BMS10-100 material manually or use a power mixer. Mix the BMS10-100 material for 10-15 minutes. Make sure that the aluminum pigment is constant in the mixture.

**NOTE:** Do not make air bubbles when you mix the material.

S 377-008

- (2) Use the Aeroflex thinner to make the mixture as thin as necessary. Use the Aeroflex thinner in a quantity not more than 20 percent by volume of the base.

**NOTE:** It is not necessary to thin the mixture for aerospray. The pot life of this mixture is 8 hours. There is no temperature limit.

F. Procedure - Apply the Corrosion Inhibiting Coating

S 377-009

- (1) Apply BMS 10-11 or BMS 10-79 primer on the surface.

S 377-002

- (2) Let the primer cure before you apply the mixture (AMM 51-21-10/701).

S 377-010

- (3) Put the Corogard or BMS10-100 mixture through a clean cloth or sieve.

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S 377-011

- (4) After the primer has dried, apply the Corogard or BMS10-100 mixture with a spray gun. Add sufficient layers to get a total dry thickness of 2 to 3 mils (0.002 to 0.003 inch).

**NOTE:** Do not apply Corogard EC-843 and EC-843-S on surfaces which are not level.

If the applied mixture becomes dry when you use Corogard EC-843 and EC-843-S, decrease the atomization air pressure or make the mixture thin. Increase the ratio of the normal butyl acetate to the methyl isobutyl ketone in the thinner to make the mixture thin.

To decrease the effect of bronzing, the Corogard EC-843 and EC-843-S material has more pigments than usually necessary. Some of the aluminum pigments may rub off but this does not cause a decrease in the quality of the Corogard EC-843 and EC-843-S.

If the applied mixture becomes dry when you use BMS10-100, decrease the atomization air pressure or add the C25/90S thinner to make the mixture thin.

S 377-012

- (5) Cure the mixture at 65°F to 85°F for a minimum of 4 hours before you move the airplane to an open area.

S 377-014

- (6) Cure the mixture for 24 hours before flight.

**NOTE:** You can decrease the cure time if you apply heat on the surface. Apply heat at 125 ±5°F for 2 hours.

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G. Repair and Rework - Corrosion Inhibiting Coating

S 357-016

- (1) Repair small damages such as scratches and gouges:
  - (a) Clean area with toluene or xylene.
  - (b) Rub the area smooth with 280 grit (minimum) abrasive paper.
  - (c) Clean the area with clean rags moist with toluene or xylene.
  - (d) Dry the solvent with a clean cheesecloth or clean with a tack rag.

S 377-017

- (2) Apply the BMS10-100 coating to the repaired area.
  - (a) Feather all the edges.
  - (b) Use a brush for small damages.

S 227-018

- (3) Make sure that the repair and overlap thickness is not more than 5.0 mils.

NOTE: The color of the new BMS10-100 coating will not be the same as the adjacent surface. Permit the coating to dry a minimum of 4 hours at 65-85°F (18.3-29.4°C).

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NONGLARE FINISH - CLEANING/PAINTING

1. General

A. This procedure contains one task. The task is to apply nonglare coating.

TASK 51-24-04-307-013

2. Apply the Nonglare Coating

A. Consumable Materials

(1) Solvents

- (a) B00153 Toluene (Toluol) TT-T-548
- (b) B00084 Xylene (Xylol) ASTAA-845 or -846
- (c) B00151 Methyl Isobutyl Ketone (MIBK) TT-M-268
- (d) B00148 Methyl Ethyl Ketone (MEK) - TT-M-261

(2) B00137 Abrasive Paper - Aluminum Oxide, grit as specified

(3) G00251 Abrasive Pad - Aluminum Oxide; Scotchbrite, Type A

(4) G00034 Cheesecloth

(5) C00334 Coating - Nonreflective, Nextel Suede  
3101

(6) G00132 Masking Tape - 3M #214

(7) Primer - 911-P4

B. References

(1) 51-21-02/701 - Prepaint Cleaning and Treatment

C. Procedure

S 117-001

(1) Clean and prepare the surface (Ref 51-21-02).

S 377-004

(2) Mix the primer as follows:

(a) Base - 2 parts (by volume)

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

(b) Thinner - 1 part (by volume)

**NOTE:** Use a mixture of two solvents to make the base thin. The mixture must have an equal quantity of each solvent. MIBK, Toluene, and MEK are satisfactory solvents. Toluene has the longest flash time and MIBK has the shortest flash time.

S 377-005

(3) Apply primer on the surface.

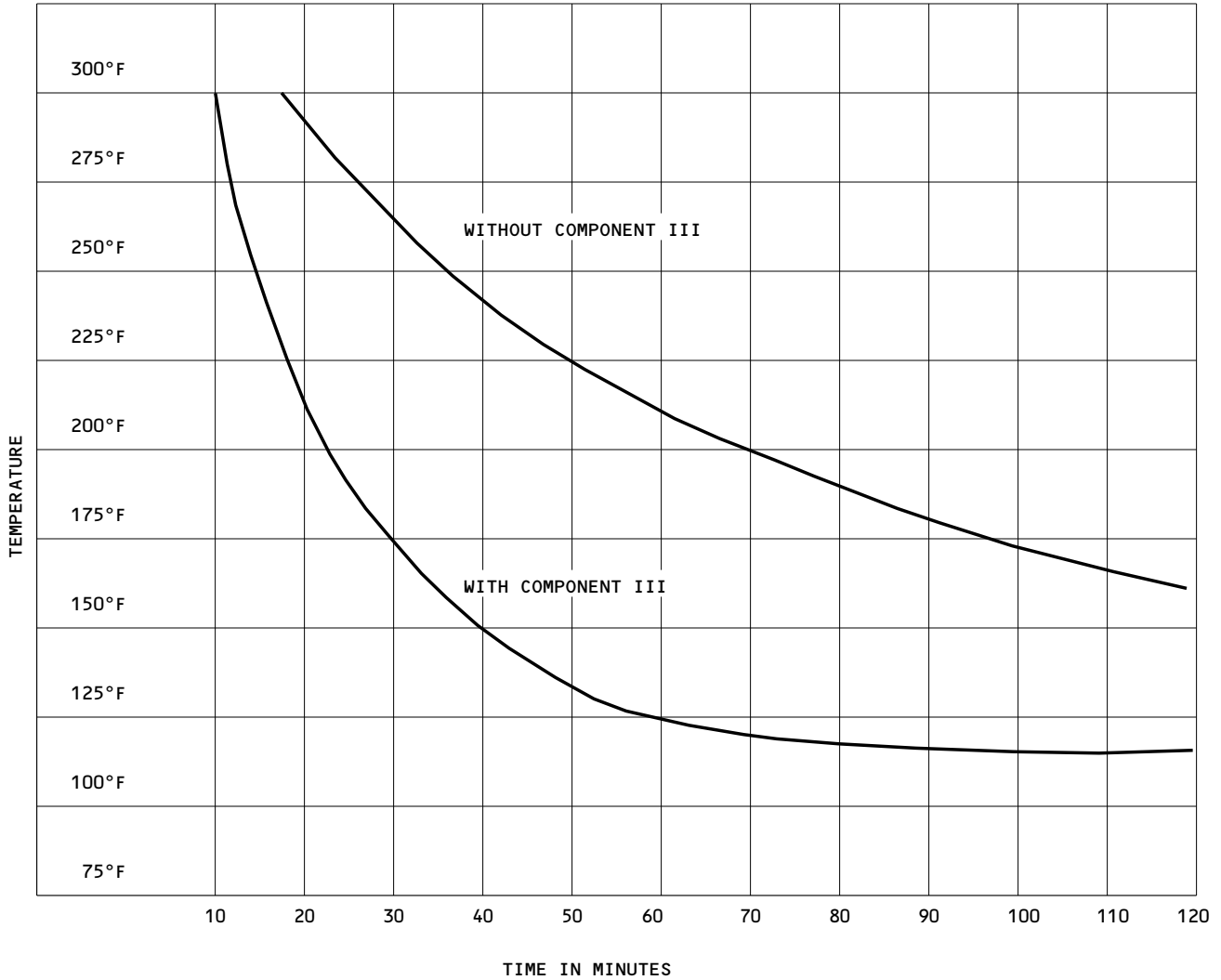
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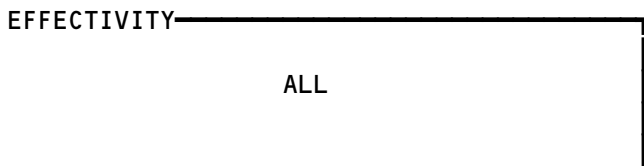
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Topcoat Cure Chart - Nextel Suede 3101  
Figure 701



51-24-04

S 217-006

- (4) Make sure that the dry thickness is between 0.4 mil and 1.0 mil (0.0004 to 0.001 inch).

S 377-007

- (5) Let the primer dry (minimum of 10 minutes and maximum of 60 minutes) at 70° to 90°F before you apply the Nextel Suede 3101.

S 377-008

- (6) Mix the Nextel Suede 3101 components as follows:

**NOTE:** Add the catalyst component II to the base component I. Sufficiently shake the mixture for 15 minutes. Then add the thinner. Do not move the mixture for 15 minutes before you use it.

The usual pot life without the promoter component III is 8 hours. When you add the promoter component III, the pot life of the mixture decreases approximately 4 to 6 hours.

- (a) Base component I - 8 parts (by volume)
- (b) Catalyst component II - 1 part (by volume)
- (c) Promoter component III - Refer to manufacturer's instruction.

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (d) Thinner - 1/3 part (by volume)

**NOTE:** Use MEK or Xylene to make the base component thin, or use a mixture of MEK and Xylene to make the base component thin. If a mixture of MEK and Xylene is used, the MEK and Xylene must be in equal quantities.

S 217-009

- (7) Make sure the mixture is equally mixed. Also, make sure the mixture is free from unwanted particles.

S 937-010

- (8) Identify the container with a label. Write the date and the hour when the mixture was mixed. Also, write the date and hour when the pot life ends.

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S 377-011

- (9) Apply the Nextel Suede 3101 on the primed surface with a spray gun. Make sure that the dry thickness is 2 to 3 mils (0.002 to 0.003 inch).

NOTE: If the thickness is larger than what is specified, cracks on the surface can occur.

S 377-012

- (10) Cure the Nextel Suede 3101. Refer to Fig. 701 for the cure times.

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NONSKID FINISH - CLEANING/PAINTING

1. General

- A. This procedure contains two tasks:
  - (1) The first task is to apply nonskid finish.
  - (2) The second task is to apply the safety walk surfacing.
- B. Apply nonskid finish on the overwing emergency walkway and on the floors of the main deck. Different types of materials are used for each area.

TASK 51-24-05-377-003

2. Apply the Nonskid Finish

A. Equipment

- (1) Spray equipment (optional)
  - (a) High Volume Low Pressure spray gun (gravity feed or pressure assist cup) with 0.070 inch fluid nozzle (or higher).
- (2) Fluid hose - of sufficient diameter for correct operation; Commercially available
- (3) Brush - with correct bristle material, commercially available

B. Consumable Materials

(1) Finishes

- (a) C50018 Coating - Desoto Desothane HS CA8022/B7022 (BAC7022 white, semigloss) Base Component and CA8020D Curing Solution Component.
- (b) C50019 Coating - Desoto Desothane HS CA8012/B701 (BAC701 black, flat) Base Component and CA8010D Curing Solution Component.

(2) Solvents

- (a) B00083 Aliphatic Naphtha TT-N-95, Type II
- (b) B00151 Methyl Isobutyl Ketone (MIBK) TT-M-268
- (c) B00148 Methyl Ethyl Ketone (MEK) TT-M-261
- (d) B00094 Toluene (Toluol) TT-T-548, Grade A

(3) Miscellaneous Materials

- (a) Abrasive Paper, 100 or Finer Grit, Scotchbrite, Type A (very fine)

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- (b) G00270 Masking tape
- (c) G00034 Cheesecloth
- (d) G50123 Tack Rag, C-60

C. Prepare the Nonskid Finish

S 377-022

- (1) Do these steps to prepare nonskid finish:
- (a) Mix coating according to manufacturers instruction.

NOTE: The pot life for the mixture is 3.5 hours for white mixtures and 2.5 hours for the black mixtures.

- (b) While continuing mixing coating, add 0.30 lbs (.14 kgs) of Grade 1/2 pumice per gallon of mixed coating.

NOTE: Addition of pumice to black coating is optional when the black coating is applied directly over the white coating containing pumice.

S 117-001

WARNING: DO NOT GET THE SOLVENTS IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THESE SOLVENTS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE SOLVENTS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

- (2) Do these steps to clean the area:

NOTE: Make sure the overwing area is painted before you apply the nonskid finish. If you find bare metal, apply primer and paint finish before you apply the nonskid finish.

- (a) Clean the surface with a cheesecloth that is moist with Toluene. If it is necessary, rub the surface with 100-grit (minimum grit number) abrasive paper.

NOTE: If it has been more than 48 hours since the paint was applied, it is necessary to use the abrasive paper.

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**WARNING:** DO NOT GET METHYL ISOBUTYL KETONE (MIBK) IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM MIBK. PUT ON A PROTECTIVE SPLASH GOGGLE AND GLOVES WHEN YOU USE MIBK. KEEP MIBK AWAY FROM SPARKS, FLAME, AND HEAT. MIBK IS A POISONOUS AND FLAMMABLE SOLVENT WHICH CAN CAUSE INJURY OR DAMAGE.

- (b) Clean the surface with a cheesecloth that is moist with solvent.
- (c) Wipe with tack rag to remove remaining particles.

S 957-002

- (3) Apply masking tape on the adjacent area.

D. Procedure - Apply Nonskid Finish

S 377-006

- (1) Apply nonskid finish with a spray gun. Make sure that the dry thickness is between 0.005 to 0.007 inch (6 to 8 ounces for each square yard).

**NOTE:** The dry thickness is the distance from the primer to the external surface.

S 917-007

- (2) Dry each layer with a minimum dry time of 15 minutes.

S 037-023

**CAUTION:** ANY MASKING TAPE ADJACENT TO THE OVERWING EMERGENCY EXIT WALKWAY COATING EDGE SHOULD BE PULLED BEFORE THE COATING IS THOROUGHLY DRY SO THAT REMOVAL OF THE COATING IS AVOIDED.

- (3) Carefully remove the tape before the finish is fully dry.

**NOTE:** Air dry for a minimum of 2 hours.

S 917-024

- (4) Air dry a minimum of 4 hours at 90°F prior to walking on coating.

S 917-008

- (5) Let the finish dry fully prior service.

**NOTE:** The finish is fully hard after 24 hours at 70°F.

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E. Repair - Nonskid Finish

S 357-026

- (1) Do these steps to prepare the nonskid surface for repair:

**NOTE:** The damage must be less than 10 percent of the necessary painted area.

- (a) Remove loose material.
- (b) Rub the surface smooth with 100-grit (minimum) abrasive paper.
- (c) Smooth and feather the paint edges with 100-grit (minimum) abrasive paper.

S 377-027

- (2) Do this task, Apply the Nonskid Finish.

TASK 51-24-05-397-009

3. Apply the Safety Walk Surfacing

A. Equipment

- (1) Spray Equipment
- (2) Roller; Commercially available
- (3) Rubber Mallet; Commercially available

B. Consumable Materials

- (1) Finishes
  - (a) Primer - BMS 10-11, Type 1
  - (b) Primer - BMS 10-103
  - (c) Safety Walk - Type B
  - (d) Scotch Tred Nonslip Surfacing
  - (e) Safety Walk Brand Conformable Nonslip Surfacing
- (2) Solvents
  - (a) B00083 Aliphatic Naphtha TT-N-95, Type II
  - (b) B00151 Methyl Isobutyl Ketone (MIBK) TT-M-268
  - (c) B00148 Methyl Ethyl Ketone (MEK) TT-M-261
  - (d) B00094 Toluene (Toluol) TT-T-548, Grade A
- (3) Sealer - Safety Walk Brand Bead
- (4) Miscellaneous Materials
  - (a) Abrasive Paper, 100 or Finer Grit Scotchbrite, Type A (very fine)
  - (b) G00034 Cheesecloth
  - (c) Tack Rag, C-60

C. Prepare the Surface

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S 117-005

**WARNING:** DO NOT GET THE SOLVENTS IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THESE SOLVENTS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE SOLVENTS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

- (1) Clean the surface with a clean cheesecloth that is moist with solvent.

S 117-025

- (2) Wipe with tack rag if surface is dirty with particles only.

S 117-011

- (3) Rub surface with 100 grit (minimum grit number) abrasive paper.

**NOTE:** If it has been more than 48 hours since surface coat has been applied, it is necessary to use the abrasive paper.

D. Procedure - Apply the Safety Walk Surfacing

S 397-015

- (1) Apply one layer of primer with a spray gun.

S 037-016

- (2) Remove the protective material from the Safety Walk, Scotch Tred or Safety Walk Conformable Nonslip Surfacing.

S 437-017

- (3) If you will apply the Safety Walk or Scotch Tred on the overwing emergency walkway on the wing, do these steps:
  - (a) Push the Safety Walk or Scotch Tred tightly on the surface.
  - (b) Attach the Safety Walk or Scotch Tred with a roller or rubber mallet.
  - (c) Make sure that the air caught between the surface and the safety walk surfacing is removed.

S 437-018

- (4) If you will apply the Safety Walk Conformable Nonslip Surface on the main deck floors, do these steps:
  - (a) Push the Safety Walk Conformable Nonslip Surface tightly on the surface.
  - (b) Attach the Safety Walk Conformable Nonslip Surface with a roller or rubber mallet.
  - (c) Make sure that the air caught between the surface and the safety walk surfacing is removed.

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- S 437-019
- (5) Apply a bead of Safety Walk Brand Sealer around the edges.
- S 917-020
- (6) Let the finish cure for 30 minutes at 70°F or more.

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HIGH TEMPERATURE COATING (TITANIUM) – CLEANING/PAINTING

1. General

- A. This procedure contains two tasks. The first task is to apply high temperature finish (titanium). The second task is to apply BMS 10-80 finish.

TASK 51-24-07-707-021

2. Apply High Temperature Coating

A. Equipment

- (1) Rubber gloves; Commercially available
- (2) Mild steel tanks and related equipment (for Turco 4338 solution); Commercially available
- (3) Paint spray equipment; Commercially available
- (4) Sand blast equipment; Commercially available
- (5) Soft bristle brushes

B. Consumable Materials

- (1) Solvent
  - (a) B00075 Stoddard Type 1
  - (b) B00076 Stoddard Type 2
- (2) E00003 Stripper – Turco 4338
- (3) B00007 Cleaner – Oakite 61
- (4) Distilled or deionized water
- (5) G00034 Cheesecloth
- (6) Coarse aluminum wool
- (7) G00116 Cellulose sponges, L-S-626
- (8) C00018 Finish – High Temperature (for titanium), B-2000
- (9) G02191 Grit-Abrasive, Aluminum Oxide

C. Prepare the Titanium Parts

S 167-016

- (1) Use the sand blast equipment to remove contamination and high temperature finish from the titanium parts.

NOTE: You can clean the titanium part, with the sand blast equipment, while the parts are installed on the airplane. If the titanium parts are removed from the airplane, you can use paint strippers to clean the parts.

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S 217-002

- (2) Make sure that no sand particles get on the adjacent surfaces.

S 907-006

- (3) Replace all parts that have metal corrosion.

S 037-007

- (4) If you must use strippers to remove the high temperature finishes from the titanium parts, remove the titanium parts from the airplane.

S 167-008

- (5) Do these steps to remove hydraulic fluid contamination from the titanium parts that are installed on the airplane:

**NOTE:** A light glossy brown layer, a black layer that is not shiny, or a bare surface are signs of Skydrol contamination. Titanium parts in areas with possible contamination to hydraulic fluid are covered with a flat, black inorganic finish. Make sure you know the difference between the black inorganic finish and the matt black layer.

- (a) Clean the parts with a cheesecloth or an aluminum wool that is moist with Oakite 61.

**NOTE:** Make sure the aluminum wool is sufficiently rough to get a surface that is not shiny.

- (b) Flush the parts with water. Use a cellulose sponge to remove unwanted material.  
(c) Dry the parts with a clean dry cheesecloth.  
(d) Clean the parts again until you get a water-break-free surface.

S 107-017

- (6) Do these steps to remove all the remaining unwanted material:  
(a) Fully flush the area with water. Flush the area with high pressure water if it is possible.  
(b) Clean the area with Stoddard solvent and flush it with water until you get a water-break-free surface.  
(c) Dry the surface with a clean dry cheesecloth.

S 167-009

- (7) Do these steps to remove high temperature finish and contamination from titanium parts that were removed from the airplane (stripping procedure):

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**WARNING:** DO NOT TOUCH OR HOLD TURCO 4338 WITHOUT THE NECESSARY PROTECTION. WEAR GOGGLES AND HEAVY RUBBER GLOVES. USE MILD STEEL CONTAINERS TO KEEP THE TURCO 4338. IF TURCO 4338 POWDER IS MIXED WITH ORGANIC SOLVENTS SUCH AS ACETONE OR METHYL ETHYL KETONE, AN EXPLOSION CAN OCCUR.

- (a) Refer to the manufacturer's instruction to prepare the Turco 4338 stripper.
  - (b) Put the parts in the stripper solution for 30 to 40 minutes.
  - (c) Remove the parts from the stripper solution and fully flush them with water.
  - (d) Use an air water spray to remove all unwanted material.
  - (e) Clean the parts again until the black finish is removed.
- D. Procedure - Apply High Temperature Finish.

S 377-018

**CAUTION:** DO NOT APPLY HIGH TEMPERATURE FINISH IN A ROOM THAT CONTAINS SOLVENTS. SOLVENTS CAN CAUSE POOR ADHESION OF THE FINISH.

**CAUTION:** DO NOT SHAKE THE HIGH TEMPERATURE FINISH. IF YOU SHAKE THE HIGH TEMPERATURE FINISH, AIR BUBBLES CAN OCCUR IN THE FINISH AND CAUSE DAMAGE TO THE FINISH WHEN IT IS APPLIED.

- (1) Slowly add distilled or deionized water to the high temperature finish. Refer to the manufacturer's instructions. Mix the mixture continuously when you add distilled or deionized water.

S 377-011

- (2) Use a brush or spray gun to apply the high temperature finish.

**NOTE:** Use brushes that have soft, high quality bristles.

S 217-001

- (3) Make sure the finish is 0.8 to 1.2 mils (0.0008 to 0.0012 inch) thick when it is dry.

S 377-012

- (4) Let the finish dry for 1 hour (minimum) at 70°F to 90°F.

S 377-013

- (5) Put the parts in an oven for 1 hour (minimum) at 350 ± 25°F.

**NOTE:** If the finish is not fully dry when you put the parts in the oven, damage to the finish can occur. Let the finish dry for more time if it is necessary.

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TASK 51-24-07-307-019

3. Apply BMS 10-80 Finish

A. Equipment

- (1) Clean white gloves; Commercially available
- (2) Spray equipment; Commercially available

B. Consumable Materials

- (1) C00314 Low Emissivity Gold Coating - BMS 10-82 (Storage 40-80°F)
- (2) B00184 Solvent - BMS 11-7
- (3) B00154 Toluene (Toluol) TT-T-548 or JAN-T-171,  
Grade A
- (4) Abrasive Paper, Aluminum Oxide - Scotchbrite,  
Type A

C. Prepare the titanium parts

S 917-003

**CAUTION:** MAKE SURE THAT THE TITANIUM SURFACE IS CLEAN. DO NOT LET SALT DEPOSITS FALL ON THE SURFACE. DO NOT TOUCH THE SURFACE. USE CLEAN WHITE COTTON GLOVES. SALT DEPOSITS AND FINGERPRINTS CAN CAUSE DAMAGE TO THE SURFACE.

- (1) Make sure you use clean gloves when you hold the titanium parts.

S 217-004

- (2) Examine all the parts for hydraulic fluid contamination.

S 167-005

- (3) Use a scotchbrite sheet that is moist with BMS 11-7 or TT-T-548 solvent to remove unwanted material.

**NOTE:** You must clean and dry the parts before you apply the BMS 10-80 finish.

D. Procedure - Apply BMS 10-80 Finish.

S 377-020

**WARNING:** DO NOT GET BMS 10-80 AND SOLVENTS IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME AND HEAT. THESE MATERIALS ARE POSIONOUS AND FLAMMABLE AND CAUSE INJURY OR DAMAGE.

- (1) Fully mix the BMS 10-82 finish manually.

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S 377-014

- (2) Use a spray gun to apply BMS 10-82 finish. Make sure you get a red transparent constant layer.

NOTE: Let each layer of finish dry for 5 to 10 minutes. The recommended atomizing air pressure is 10 to 25 psi.

S 377-015

- (3) After you apply the BMS 10-80 finish, put the parts in an oven for 15 minutes at a temperature of  $880 \pm 40^{\circ}\text{F}$  ( $471 \pm 22^{\circ}\text{C}$ ).

NOTE: Make sure the air flows freely in the oven to remove smoke and fumes. You must get a tight yellow gold finish on the surface which is smooth and constant.

Protection is necessary to prevent damage and contamination of the titanium parts.

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CORROSION INHIBITING COMPOUND - CLEANING/PAINTING

1. General

- A. This procedure contains these tasks:
  - (1) Prepare the Surface
  - (2) Apply the Corrosion Inhibiting Compound
  - (3) Cure the Corrosion Inhibiting Compound
  - (4) Repair of the Corrosion Inhibiting Compound
  - (5) Removal of the Corrosion Inhibiting Compound
- B. The function of the BMS3-23 Corrosion Inhibiting Compound is to go into the mating structure to make sure a thin layer stays. This film displaces moisture for corrosion prevention. The application of BMS3-23 to open areas is not as important.
- C. The function of the BMS3-26 Corrosion Inhibiting Compound is used in areas of the airframe subject to severe corrosive environments. It can be applied to painted and unpainted surfaces.
- D. The function of the BMS3-29 Corrosion Inhibiting Compound is to go in between mated structure and to make a protective overcoat on open areas. The primary purpose of BMS3-29 is for use in areas of high surface moisture (i.e. bilge areas).
- E. The function of the BMS3-35 Corrosion Inhibiting Compound combines good penetration properties into inaccessible areas and provides a tack free film. The primary purpose of BMS3-35 is for touch up of areas and general corrosion prevention.
- F. Corrosion inhibiting compound is not necessary in the areas where titanium structures and aluminum structures touch (interface).
- G. Corrosion inhibiting compound is translucent in nature and gives superior protection from corrosion when it is applied to the specification limits.

TASK 51-24-09-917-012

2. Prepare the Surface to apply the Corrosion Inhibiting Compound

- A. Consumable Materials
  - (1) B00074 Solvent, Degreasing - MIL-PRF-680
  - (2) B00093 Solvent, Tetrachloroethylene (Perchloroethylene) - 0-T-236
  - (3) B00316 Solvent, Aliphatic Naphtha - TT-N-95
  - (4) B00634 Solvent, Stabilized Limonene Cleaner - BMS11-10
  - (5) G00034 Cloth, Process Cleaning Absorbant Wiper - BMS15-5
  - (6) G00252 Material, Plastic Sheeting (polyethylene) - L-P-512
  - (7) G00270 Tape, Masking, General Purpose - A-A-883

B. Procedure

S 917-011

- (1) Prepare the surface to apply the corrosion inhibiting compound.
  - (a) Clean the surface with one of the steps that follow:
    - 1) Clean the surface with a vacuum cleaner.
    - 2) Use a cloth to wipe the surface to remove moisture or other foreign materials.

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**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (b) When the area is very dirty, clean the surface with one of these applicable solvents:

**NOTE:** You must fully clean the surface to help the corrosion inhibiting compound get on the surface and in the mating surfaces.

- 1) Solvent, Aliphatic Naphtha.
- 2) Solvent, Degreasing.
- 3) Solvent, Tetrachloroethylene (Perchloroethylene).
- 4) Solvent, Stabilized Limonene Cleaner.

S 607-020

- (2) Apply masking tape or polyethylene film, to the area where you will not apply the corrosion inhibiting compound.

S 607-021

**WARNING:** DO NOT LET CORROSION INHIBITING COMPOUND GET IN THE OXYGEN SYSTEM. IF THE CORROSION INHIBITING COMPOUND GETS IN THE OXYGEN SYSTEM, A FIRE OR AN EXPLOSION CAN OCCUR. THIS CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

- (3) Make sure you keep all corrosion inhibiting compound out of the oxygen system components that follow:
- (a) Bottles.
  - (b) Pressure metering equipment.
  - (c) Indicating equipment.
  - (d) Connections.

S 287-023

- (4) Do not apply corrosion inhibiting compound to the areas that follow:
- (a) Near the engines.
  - (b) Cowlings.
  - (c) Areas of high temperature or where firewall sealant is used.

**NOTE:** High temperature causes deterioration in corrosion inhibiting compounds.

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- (d) Electrical ground strap/surface interfaces to make sure you have a sufficient ground path.
- (e) Bare surfaces that get a layer of primer and paint.

NOTE: It is not easy to apply a primer and paint on the corrosion preventive compound. The corrosion preventive compound gets in the surface and can bleed-out. This can cause the primer and paint to have a unsatisfactory bond.

- 1) Let the primer and enamel dry for a minimum of 8 hours before you apply the corrosion preventive compound.
- (f) Sliding pins and other mechanical joints in a sliding surface contact.
- (g) Actuator rods.

NOTE: Corrosion inhibiting compound such as BMS 3-23 or all other hydrocarbons can cause damage to the seals that are used with BMS 3-11 hydraulic fluid.

S 287-022

- (5) Put covers on the components that follow:

NOTE: Masking tape is not sufficient. Use plastic sheets or equivalent covers to fully seal these components from the compound.

- (a) Control cables.
- (b) Pulley and quadrant cable grooves.
- (c) Cam surfaces.
- (d) Bushings and bearings (all types including teflon).
- (e) Wire bundles, coax connectors.
- (f) Mechanical silicone seals.
- (g) Rubber seals.
- (h) Insulation blankets.
- (i) Lubricated components.
- (j) Shutoff valves.
- (k) Pneumatic ducts with surface temperatures that are more than 200 degrees Fahrenheit (93 degrees Centigrade) during normal operations.
- (l) Applicable drain valves.
- (m) Areas that will be painted or sealed.
- (n) High visual items such as doorways, hatches, and window frames.

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TASK 51-24-09-377-008

3. Apply Corrosion Inhibiting Compound

A. General

- (1) This procedure gives instructions to apply the water-displacing corrosion inhibitive compound BMS3-23, BMS3-26, BMS3-29 and BMS3-35. It is recommended that you apply the compound regularly.

**NOTE:** Each airline must know it's aircraft's environment, the corrosion inhibitive compound they use and when it was applied. If not, the corrosion protection can be unsatisfactory. Boeing recommends BMS3-23, BMS3-26, BMS3-29, and BMS 3-35 and has made them a standard for organic corrosion inhibitors. There are other water-displacing corrosion inhibiting compounds that are satisfactory for use.

B. Consumable Materials

- (1) B00316 Solvent, Aliphatic Naphtha - TT-N-95  
 (2) B00634 Solvent, Stabilized Limonene Cleaner - BMS11-10  
 (3) G00034 Cloth, Process Cleaning Absorbent Wiper - BMS15-5

C. Procedure

S 917-014

- (1) Apply the Corrosion Inhibiting Compound  
 (a) Clean surface with solvent.  
 (b) Apply the corrosion inhibiting compound to a thickness as shown in Table 701.

COATING THICKNESS RANGES TABLE 701		
Corrosion Inhibiting Compound	Coating Thickness Dry	Coating Thickness Wet
BMS 3-23	Continuous Coat, No Minimum Thickness	Continuous Coat, No Minimum Thickness
BMS 3-26, Type I	0.002 ±0.001 Inches (0.051 ±0.026 mm)	0.004 ±0.002 Inches (0.102 ±0.051 mm)
BMS 3-26, Type II	0.005 ±0.001 Inches (0.127 ±0.025 mm)	0.010 ±0.002 Inches (0.254 ±0.051 mm)
BMS 3-29	0.004 ±0.001 Inches (0.102 ±0.026 mm)	0.008 ±0.002 Inches (0.203 ±0.051 mm)
BMS 3-35	0.002 ±0.001 Inches (0.051 ±0.026 mm)	0.004 ±0.002 Inches (0.102 ±0.051 mm)

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- (c) The application temperature for BMS3-23, BMS3-29, and BMS3-26 Type I must be between 40 degrees Fahrenheit (4 degrees Centigrade) and 100 degrees Fahrenheit (38 degrees Centigrade).
- (d) The application temperature for BMS3-26 Type II must be between 50 degrees Fahrenheit (10 degrees Centigrade) and 100 degrees Fahrenheit (38 degrees Centigrade).
- (e) The application temperature for BMS3-35 must be between 32 degrees Fahrenheit (0 degrees Centigrade) and 86 degrees Fahrenheit (30 degrees Centigrade).

**CAUTION:** KEEP BMS3-23 AWAY FROM SURFACES THAT CAN BE 150 DEGREES FAHRENHEIT (66 DEGREES CENTIGRADE) OR MORE DURING USE. THE DRY FILM FLASH POINT IS 500 DEGREES FAHRENHEIT (260 DEGREES CENTIGRADE). THE BMS3-23 CAN CAUSE A FIRE OR AN EXPLOSION.

- (f) Spray or brush BMS3-23 corrosion inhibiting compound to achieve a continuous coat.

**NOTE:** The BMS3-23 is not satisfactory for surfaces that can be more than 150 degrees Fahrenheit (66 degrees Centigrade) because it contains wax compounds. Keep BMS3-23 away from surfaces that can be 150 degrees Fahrenheit (66 degrees Centigrade) or more during use. The dry film flash point is 500 degrees Fahrenheit (260 degrees Centigrade). The BMS3-23 can cause a fire or an explosion.

- (g) Spray or brush either the BMS3-26, BMS3-29 and BMS3-35 compound to get a bubble free coat (after it is dry), with a wet or dry thickness as specified in Table 701.

**NOTE:** When the BMS3-26, BMS3-29 and BMS3-35 compound is not sprayed, shake or mix the compound before it is used.

- (h) When the compound is applied to parts where it cannot be sprayed or brushed (e.g. slotted tracks), do the step that follows:
  - 1) Fill the area with the compound, and then drain the compound which will give a protection coat.
- (i) Where BMS3-29 is specified as optional to BMS3-23, the application requirements for BMS3-29 shall apply.
- (j) Use a cloth to remove to wipe up puddles if puddles block drain holes or cross drains.

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- (k) Make sure you have a good flow of air in the areas where the corrosion inhibiting compound was applied, as follows:

NOTE: The air flow times are recommended minimum times. A longer air flow time to get a satisfactory evaporation is recommended. This is for lower temperatures, high humidity, and when too much of the compound is applied. You must keep the temperature within the application limits for the material used.

- 1) After you apply the BMS3-23 in enclosed areas, apply a good air flow to the area for a minimum of one hour before you close-up the area.

NOTE: The one hour will let the volatile solvents in the compound to evaporate.

- 2) After you apply the BMS3-26, BMS3-29 or the BMS3-35 in enclosed areas, apply a good air flow to the area for a minimum of four hours before you close-up the area.
- 3) Do not remove the masking tape or applicable covers until the corrosion inhibiting compound has dried sufficiently. This will make sure the compound will not rub off or move to another surface.
  - a) When the masking tape or covers have been removed, do a touch-up of the corrosion inhibiting compound where it is necessary to prevent corrosion in the areas of a structural interface.

- (l) Do not contaminate the insulation blankets with the corrosion inhibiting compound.

NOTE: These compounds can decrease the ability of the insulation blankets to repel water.

- 1) If contamination occurs along a seam, the blanket must be replaced.
- 2) For contamination in all other areas, remove the corrosion inhibiting compound with solvent.

NOTE: When you cannot remove the contamination, you must replace the blanket.

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TASK 51-24-09-917-015

4. Cure the Corrosion Inhibiting Compound

A. General

- (1) This task to cure the corrosion inhibiting compound is not necessary when the insulation blankets will not be touched by the compound.

B. Consumable Materials

- (1) G00252 Material, Plastic Sheeting (polyethylene) - L-P-512

C. Procedure

S 757-024

- (1) If required, perform the following test to determine acceptable cure in contact areas:

**NOTE:** This is to make sure the compound does not move from the surface if it is touched by the insulation blankets.

- (a) Obtain a sample of polyethylene film, 0.002 (0.051 mm) to 0.006 (0.152 mm) inch in thickness.
- (b) Press the polyethylene film against the corrosion inhibiting compound with light finger pressure.
- (c) Make a check to see if the corrosion inhibiting compound has moved to the polyethylene film or lifted from the structure.
- (d) Table 702 that follows will give you the approximate cure to times.

**NOTE:** Typically, the times in Table 702 will be sufficient to cure the compound when adequate ventilation is provided and when the compound is applied within the thickness ranges specified in Table 701. Ventilation, coating thickness, temperature, and humidity, all influence, the rate at which the coating cures. These values are intended for information only and actual cure times may vary. Follow the manufacturers instruction for the applicable cure times.

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APPROXIMATE CURE TIMES TABLE 702	
Compound	Time
BMS 3-23	1 Hour
BMS 3-26, Type I	6 Hours
BMS 3-26, Type II	6 Hours
BMS 3-29	3 Hours
BMS 3-35	1 Hour

**NOTE:** BMS3-23 will not cure in 1 hour; however, this is a sufficient amount of time to allow solvents to flash off prior to installation of insulation blankets. BMS3-23 does not cure to a tack free coating.

TASK 51-24-09-917-016

5. Repair of the Corrosion Inhibiting Compound

A. General

- (1) All damage or bubbles in cured coatings in the Flow Coat Application of BMS3-23 or BMS3-35 must be repaired.
- (2) The limits of the damage or bubbles in the General Applications of BMS3-23, BMS3-26, BMS3-29 or BMS3-35 corrosion inhibiting compound in the cured coating is as follows and must be repaired:
  - (a) The coating damage dimension is more than 1 percent of a given square foot (929 square centimeters).
  - (b) The coating damage is larger than 1 square inch (6 square centimeters).
- (3) All damage or bubbles in the cured BMS3-23, BMS3-26, BMS3-29 and BMS3-35 coating must be repaired.

**NOTE:** When BMS3-29 or BMS3-35 is specified as optional to BMS3-23, the damage permitted will be the same as that necessary for the BMS3-23.

B. Consumable Materials

- (1) B00316 Solvent, Aliphatic Naphtha -TT-N-95

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- (2) B00634 Solvent, Stabilized Limonene Cleaner – BMS11-10
- (3) G00034 Cloth, Process Cleaning Absorbent Wiper BMS15-5

C. Procedure

S 917-017

- (1) Do the steps that follow to repair the damaged or contaminated corrosion inhibiting compound:
  - (a) Clean the damaged area with solvent.
  - (b) Apply the applicable corrosion inhibiting compound.
  - (c) Cure the Corrosion Inhibiting Compound.

TASK 51-24-09-917-018

6. Removal of the Corrosion Inhibiting Compound

A. Consumable Materials

- (1) B00074 Solvent, Degreasing – MIL-PRF-680
- (2) B00090 Solvent, Trichloroethane 1.1.1 – MIL-T-81533
- (3) B00093 Solvent, Tetrachloroethylene (Perchloroethylene) – O-T-236
- (4) B00148 Solvent, Methyl Ethyl Ketone (MEK)
- (5) B00316 Solvent, Aliphatic Naphtha –TT-N-95
- (6) B00634 Solvent, Stabilized Limonene Cleaner – BMS11-10
- (7) G00034 Cloth, Process Cleaning Absorbent Wiper – BMS15-5

B. Procedure

S 917-019

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. SOLVENTS ARE HAZARDOUS MATERIALS. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (1) Remove the unwanted corrosion inhibiting compound with a cloth moist with solvent.

**NOTE:** Make sure you use the applicable safety precautions when you apply solvent to remove unwanted compound.

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ABRASION-RESISTANT TEFLON FINISH – CLEANING/PAINTING

1. General

- A. This procedure contains several tasks as follows:
  - (1) Preparation of the surface to be finished.
  - (2) Application of the BMS 10-86 Type I Coating.
  - (3) Application of the BMS 10-86 Type II Coating.
  - (4) Application of the BMS 10-86 Type III Coating.
- B. Apply abrasion-resistant teflon finish unless you are told differently. Use the thickness as it is specified. When no thickness is specified, apply abrasion-resistant teflon finish to a dry thickness of 5 to 10 mils (0.005 to 0.010 inch). You can use a total dry thickness of 20 mils (0.020 inch) maximum if it is approved by specification or for replacement of solid (phenolic) rubstrips.
- C. Use a brush when you cannot use a spray gun. Also use a brush when the dry-to-install time is between 1 to 2 hours.

TASK 51-24-13-377-009

2. Prepare The Surface To Be Finished

- A. Consumable Materials
  - (1) B00068 Solvent – Ethyl (Denatured), AMS 3002F
  - (2) B00102 Abrasive – Aluminum Oxide Coated Cloth
  - (3) B00130 Alcohol – Isopropyl, TT-I-735
  - (4) B00666 Solvent – Methyl Propyl Ketone
  - (5) G00034 Cleaning Wiper – BMS 15-5
  - (6) G00251 Abrasive – Mat, Non-Woven, Non-Metallic, A-A-58054
  - (7) G50079 Scraper – Wood or Plastic
- B. References
  - (1) Airplane Structure Cleaning Solvents (Series 83) – AMM 20-30-83/201
  - (2) Airplane Structure Cleaning Solvents (Series 84) – AMM 20-30-84/201
- C. Procedure

S 847-010

- (1) Prepare the Surface to be Finished
  - (a) Clean the surface with a clean cotton wiper that is moist with solvent.

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**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE DANGEROUS MATERIALS. SOLVENTS CAN BE FLAMMABLE. OBEY THE MATERIAL SAFETY DATA SHEETS (MSDS) FOR SOLVENTS. OBEY LOCAL REGULATIONS FOR THE CORRECT PROCEDURES TO USE OR DISCARD SOLVENTS. SOLVENTS CAN CAUSE INJURIES TO PERSONNEL AND DAMAGE TO EQUIPMENT.

(b) Dry the surface with a clean cotton wiper before the solvent dries.

**CAUTION:** ONLY USE APPROVED SCRAPERS ON THE AIRPLANE SKIN. SCRAPERS THAT ARE NOT APPROVED CAN MAKE SCRATCHES ON THE SKIN, AND CAUSE FATIGUE CRACKS.

(c) Remove all unwanted material from the surface. Use an approved scrapper to clean around fasteners, seams, and lap joints.

**NOTE:** An abrasive mat or abrasive cloth may be used instead of the scrapper.

**CAUTION:** DO NOT USE ABRASIVE PADS (SCOTH-BRITE), OR ABRASIVE PAPER ON THE ALUMINUM SURFACE UNLESS THE SCRIBE LINE INSPECTIONS WERE MADE. ABRASIVE PADS CAN SMOOTH THE ALUMINUM SURFACE AND HIDE THE SCRIBE LINE MARKS. IF YOU USE ABRASIVE PADS TO REMOVE THE PAINT OR REQUIRED TO DO REPEAT INSPECTIONS BASED ON THE SCRIBE LINE INSPECTION SERVICE BULLETIN.

(d) If necessary, do the procedure for final cleaning of metal prior to painting (AMM 20-30-84/201).

(e) If necessary, do the procedures for general cleaning of composites (AMM 20-30-83-201).

(f) Clean the surface again with a cotton wiper that is moist with solvent.

(g) Dry the surface with a clean cotton wiper before the solvent dries.

TASK 51-24-13-377-011

3. Apply The Abrasion-Resistant Teflon Finish, BMS 10-86 Type I

A. Consumable Materials

- (1) C00304 Coating - Teflon Filled, Non Decorative, Sparyable Material, BMS 10-86 Type I
- (2) G00270 Tape - Scotch Flatback Masking Tape 250

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B. Procedure

S 377-012

- (1) Do these steps to apply the BMS 10-86 Type I coating.

**NOTE:** BMS 10-86, Type I is a non-decorative, sprayable material with a minimum pot life of 2 hours.

- (a) Clean all equipment before you mix the contents of the BMS 10-86 Type I coating.
- (b) Follow the manufacturer's instructions to mix the contents of the BMS 10-86 Type I coating.
- (c) Follow the manufacturer's instructions to achieve the required viscosity of the BMS 10-86 Type I coating.
- (d) Apply masking tape on all adjacent areas.
- (e) Use a spray gun to apply the BMS 10-86 Type I coating.
- (f) Let each layer of BMS 10-86 Type I coating dry for 5 minutes.
- (g) Apply a total of four or five layers.
- (h) Follow the manufacturer's instructions before you touch the surface.
- (i) Follow the manufacturer's instructions to cure the BMS 10-86 Type I coating.
- (j) Remove the masking tape.

TASK 51-24-13-377-013

4. Apply The Abrasion-Resistant Teflon Finish, BMS 10-86 Type II

A. Consumable Materials

- (1) C50149 Coating - Teflon Filled, Non Decorative, Brushable or Sparyable Material, BMS 10-86 Type II
- (2) G00270 Tape - Scotch Flatback Masking Tape 250

B. Procedure

S 377-014

- (1) Do these steps to apply the BMS 10-86 Type II coating (Brushable Method).

**NOTE:** BMS 10-86, Type II is a non-decorative, brushable or sprayable material with a minimum pot life of 30 minutes.

- (a) Clean all equipment before you mix the contents of the BMS 10-86 Type II coating.
- (b) Follow the manufacturer's instructions to mix the contents of the BMS 10-86 Type II brushable coating.
- (c) Follow the manufacturer's instructions to achieve the required viscosity of the BMS 10-86 Type II brushable coating.
- (d) Apply masking tape on all adjacent areas.
- (e) Do the steps that follow to use a brush to apply the BMS 10-86 Type II brushable coating:
  - 1) Apply the BMS 10-86 Type II brushable coating in only one direction.

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- 2) Follow the manufacturer's instructions before you touch the surface.
- 3) Follow the manufacturer's instructions to cure the BMS 10-86 Type II brushable coating.
- 4) Remove the masking tape.

S 377-015

- (2) Do these steps to apply the BMS 10-86 Type II coating (Sprayable Method).

**NOTE:** BMS 10-86, Type II is a non-decorative, brushable or sprayable material with a minimum pot life of 30 minutes.

- (a) Clean all equipment before you mix the contents of the BMS 10-86 Type II sprayable coating.
- (b) Follow the manufacturer's instructions to mix the contents of the BMS 10-86 Type II sprayable coating.
- (c) Follow the manufacturer's instructions to achieve the required viscosity of the BMS 10-86 Type II sprayable coating.
- (d) Apply masking tape on all adjacent areas.
- (e) Do the steps that follow to apply the BMS 10-86 Type II sprayable coating:
  - 1) Apply a layer of the BMS 10-86 Type II sprayable coating.
  - 2) Let each layer of BMS 10-86 Type II sprayable coating dry for 5 minutes.
  - 3) Apply a total of four or five layers.
  - 4) Follow the manufacturer's instructions before you touch the surface.
  - 5) Follow the manufacturer's instructions to cure the BMS 10-86 Type II sprayable coating.
  - 6) Remove the masking tape.

TASK 51-24-13-377-017

5. Apply The Abrasion-Resistant Teflon Finish, BMS 10-86 Type III

A. Consumable Materials

- (1) C50150 Coating - Teflon Filled, Decorative, Sprayable Material, BMS 10-86 Type III
- (2) G00270 Tape - Scotch Flatback Masking Tape 250

B. Procedure

S 377-016

- (1) Do these steps to apply the BMS 10-86 Type III coating.

**NOTE:** BMS 10-86, Type III is a decorative, sprayable material with a minimum pot life of 3 hours.

- (a) Clean all equipment before you mix the contents of the BMS 10-86 Type III coating.
- (b) Follow the manufacturer's instructions to achieve the required viscosity of the BMS 10-86 Type III sprayable coating.
- (c) Apply masking tape on all adjacent areas.

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- (d) Do the steps that follow to apply the BMS 10-86 Type III coating:
- 1) Apply a layer of the BMS 10-86 Type III coating.
  - 2) Let each layer of BMS 10-86 Type III coating dry for 5 minutes.
  - 3) Apply a total of four or five layers.
  - 4) Follow the manufacturer's instructions before you touch the surface.
  - 5) Follow the manufacturer's instructions to cure the BMS 10-86 Type III coating.
  - 6) Remove the masking tape.

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ABRASION-RESISTANT TEFLON FINISH – APPROVED REPAIRS

1. General

- A. This procedure contains one task. The task is to repair the abrasion-resistant teflon finish.

TASK 51-24-13-308-001

2. Repair the Abrasion-Resistant Teflon Finish

A. Consumable Materials

- (1) C00008 Reducer – 66-C-20
- (2) B00153 Solvent – Toluene (Toluol) TT-T-548
- (3) G00034 Cheesecloth
- (4) G02088 Abrasive Paper, Aluminum Oxide – 280-grit (minimum)
- (5) G00270 Masking Tape – Commercially available

B. References

- (1) 51-24-13/701 – Abrasion-Resistant Teflon Finish

C. Procedure

S 958-003

- (1) Apply masking tape around the damaged area.

S 128-004

- (2) Rub the damaged area with 280-grit (minimum) abrasive paper.

S 118-002

**WARNING:** DO NOT GET PAINT MATERIALS AND SOLVENTS IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE. REFER TO THE APPLICABLE INDUSTRIAL HYGIENE, FIRE AND SAFETY STANDARDS FOR THE SAFE USE OF PAINT MATERIALS AND SOLVENTS.

- (3) Clean the area with a clean cheesecloth that is moist with toluene or reducer 66-C-28. Then dry the area with a clean cheesecloth.

S 378-005

- (4) Apply the abrasion-resistant teflon finish (Ref 51-24-13).

**NOTE:** Primer is not necessary unless you find bare metal.

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- S 038-006  
(5) Remove the masking tape.

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ABRASION-RESISTANT SILICONE FINISH - CLEANING/PAINTING

1. General

- A. This procedure contains two tasks. The first task is to apply Dow Corning 92-009 finish on fiberglass surfaces. The second task is the repair of Dow Corning 92-009 finish.

TASK 51-24-14-307-019

2. Apply Dow Corning 92-009 Finish

A. General

- (1) If you use Dow Corning 92-009 finish intermittently and if it stays in the spray pot for more than 4 hours, you must use a moisture-free thinner. Add a sufficient quantity of Drierite to the bottom surface of the container. Then let the Drierite material dry for 24 hours. If the Drierite material stays blue, then you can use the solvent. If the Drierite material stays pink, do the procedure again until you get a blue color. It is recommended that you use moisture-free, bottled, compressed air.
- (2) Use thinner to make the finish thin and to clean the equipment.
- (3) Identify all the equipment you use to apply silicone finishes or primer. Write FOR USE WITH SILICONES ONLY on a tag. If not, you must discard the equipment.
- (4) Make sure the finish thickness is 5 to 10 mils (0.005 to 0.010 inch) if it is not specified differently.
- (5) Shake the pigmented material before it is used. Make sure that no silicone material is in the paint shaker.

B. Equipment

- (1) Spray Gun - Binks No. 18, Binks Mfg Co,  
Franklin Park, Illinois
  - (a) Air Nozzle - No. 68PB
  - (b) Fluid Nozzle - No. 68
  - (c) Needle - No. 68
- (2) Brush - Commercially available
- (3) Roller - Short napped mohair; Commercially available

C. Consumable Materials

- (1) C00010 Coating - Abrasion-Resistant-Dow Corning 92-009

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- (2) C00010 Primer - Dow Corning, RTV 1201
- (3) B00135 Thinner - Naptha, VMP
- (4) Solvents
  - (a) B00189 TL-52
  - (b) B00153 Toluene (Toluol) TT-T-548
- (5) G00010 Dessicant-Drierite (Ref 20-30-07)
- (6) G02088 Abrasive Paper - 240 to 400-grit
- (7) G00034 Cheesecloth

D. Prepare the Surface

S 127-005

**WARNING:** DO NOT GET THE FINISHES AND SOLVENTS IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THESE FINISHES. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THESE FINISHES AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

**CAUTION:** DO NOT RUB THE SURFACE TOO MUCH. MAKE SURE THAT THE FIBERGLASS MATERIAL DOES NOT SHOW ON THE SURFACE. IF FIBERGLASS MATERIAL SHOWS ON THE SURFACE, YOU CAN GET A SURFACE THAT IS NOT SMOOTH.

- (1) Rub the surface with 240- to 400-grit abrasive paper.

S 117-006

- (2) Clean the surface with a cheesecloth that is moist with TL-52 solvent.

S 917-007

- (3) Dry the surface with a clean cheesecloth before the TL-52 solvent becomes dry.

E. Procedure - Apply Dow Corning 92-009 Finish

S 377-008

- (1) Make the primer thin. Add 2 parts (by volume) of toluene to the primer.

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S 377-009

- (2) Use a spray gun to apply the primer. Make sure that the dry thickness is between 0.1 to 0.2 mil (0.0001 to 0.0002 inch).

S 377-001

- (3) Let the primer dry at room temperature for 1 hour minimum before you apply the Dow Corning 92-009 finish.

S 377-010

- (4) Do these steps to apply the Dow Corning 92-009 finish with a pressure spray gun:
- (a) Add 1 part (by volume) of thinner to 2 parts (by volume) of the Dow Corning 92-009.
  - (b) Use Binks No. 18 gun, 68 PB air nozzle, 68 fluid nozzle and No. 68 needle. Use 4 to 8 psi of pressure on the pot and 40 psi on the spray gun.

**CAUTION:** DO NOT APPLY SILICONE FINISH TO SURFACES WITH SILICONE RUBBER. THE SILICONE FINISH CAN REACT CHEMICALLY WITH THE SILICONE RUBBER AND CAUSE DAMAGE.

- (c) Apply 3 to 4 layers of Dow Corning 92-009 finish on the surface.
- (d) Let each layer of the Dow Corning 92-009 finish dry for 5 to 10 minutes.

S 377-012

- (5) Do these steps to apply Dow Corning 92-009 Finish with siphon spray equipment:

**NOTE:** Use siphon spray equipment only when the pressure spray gun is not available.

- (a) Add 1 part (by volume) of thinner to 1 part (by volume) of Dow Corning 92-009 finish.

**CAUTION:** DO NOT APPLY SILICONE FINISH TO SURFACES WITH SILICONE RUBBER. THE SILICONE FINISH CAN REACT CHEMICALLY WITH THE SILICONE RUBBER AND CAUSE DAMAGE.

- (b) Apply 3 to 4 layers of Dow Corning 92-009 finish on the surface.
- (c) Let each layer of the Dow Corning 92-009 finish dry for 5 to 10 minutes.

S 377-013

- (6) Do these steps to apply the Dow Corning 92-009 finish with a brush:

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**CAUTION:** DO NOT APPLY SILICONE FINISH TO SURFACES WITH SILICONE RUBBER. THE SILICONE FINISH CAN REACT CHEMICALLY WITH THE SILICONE RUBBER AND CAUSE DAMAGE.

(a) Apply Dow Corning 92-009 on the surface with a brush. Make sure that the finish is applied constantly and equally.

**NOTE:** For good results, apply Dow Corning 92-009 finish on horizontal surfaces.

(b) Let each layer of the Dow Corning 92-009 Finish dry for 5 to 10 minutes.

S 377-014

(7) Do these steps to apply the Dow Corning 92-009 finish on a part that is removed from the airplane:

(a) Soak the part in the Dow Corning 92-009 finish.

(b) Let the part drain. Put the part in a rack and hang the rack to let the part dry.

S 377-011

(8) Do these steps to apply the Dow Corning 92-009 Finish with a roller:

**CAUTION:** DO NOT APPLY SILICONE FINISH TO SURFACES WITH SILICONE RUBBER. THE SILICONE FINISH CAN REACT CHEMICALLY WITH THE SILICONE RUBBER AND CAUSE DAMAGE.

(a) Apply Dow Corning 92-009 finish with a napped mohair roller.

(b) Let each layer of the Dow Corning 92-009 Finish dry for 5 to 10 minutes.

S 377-015

(9) Cure the surface or the part for 24 hours.

**NOTE:** The cure of Dow Corning 92-009 finish must agree with the moisture content of the air. The cure is much faster on humid days than on dry days. After the finish has dried, you can wet the surface without damage.

S 037-017

(10) Immediately remove all masking tape to prevent the removal of finish from the adjacent areas.

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TASK 51-24-14-307-018

3. Repair of Dow Corning 92-009 Finish

A. Consumable Materials

- (1) B00135 Thinner - Naptha, V MP
- (2) C00010 Primer - Dow Corning, RTV 1201

B. Procedure

S 117-002

- (1) Clean the area with a cheesecloth that is moist with thinner.

S 377-016

- (2) Dry the surface with a clean dry cheesecloth before the thinner becomes dry.

S 377-003

- (3) Apply the primer on the surface.

S 377-004

- (4) Apply the Dow Corning 92-009 finish. Use the correct equipment as applicable.

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GALLEY/ENTRYWAY/PAINTED FLIGHT DECK FLOOR TOPCOAT – APPROVED REPAIRS

1. General

- A. This procedure contains one task. The task is to repair the topcoat on the galley floor, the topcoat on the entryway floor and the topcoat on the painted flight deck floor only.

TASK 51-24-15-308-002

2. Repair the Galley/Entryway/Painted Flight Deck Floor Topcoat

A. Equipment

- (1) Spray Equipment – Commercially available
- (2) Power Disk Sander – Commercially available

B. Consumable Materials

- (1) B00300 Solvent – Trichloroethane 1, 1, 1  
Federal Specification O-T-620C
- (2) C00032 BMS 10-60 Type II, Protective Enamel  
(select color to match)
- (3) C00319 Primer – BMS 10-79 Type II
- (4) C00839 Coating – BMS 5-108, Type I, Class B-2  
Polyurethane Base Sealing Coating
- (5) G00380 Abrasive paper – 100-grit, minimum
- (6) G02124 Abrasive paper – 60 to 100-grit
- (7) G02126 Rubber Anti-Skid Material – Atlos Stock  
#TP-027 + 0165 Atlos Rubber
- (8) G00033 Cheesecloth – BMS 15-5

C. Prepare the Topcoat

S 378-001

**WARNING:** DO NOT GET THE FINISHES AND SOLVENTS IN YOU MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THESE MATERIALS. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. USE THE NECESSARY RESPIRATORY PROTECTION. KEEP THESE MATERIALS AWAY FROM SPARKS, FLAME, AND HEAT. THESE MATERIALS ARE POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

- (1) Mix (by hand) these components:

**NOTE:** Stir slowly and avoid air bubbles.

- (a) BMS 10-60, Type II, Protective Enamel (one quart including catalyst)
- (b) Rubber Anti-Skid Material (six fluid ounces)

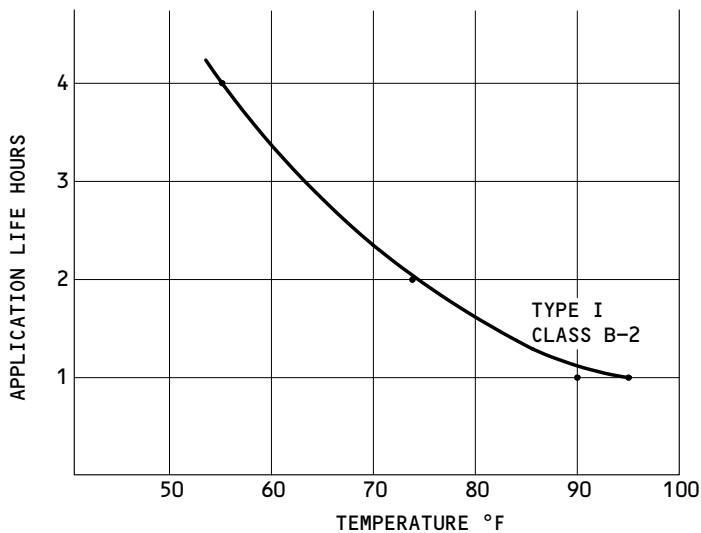
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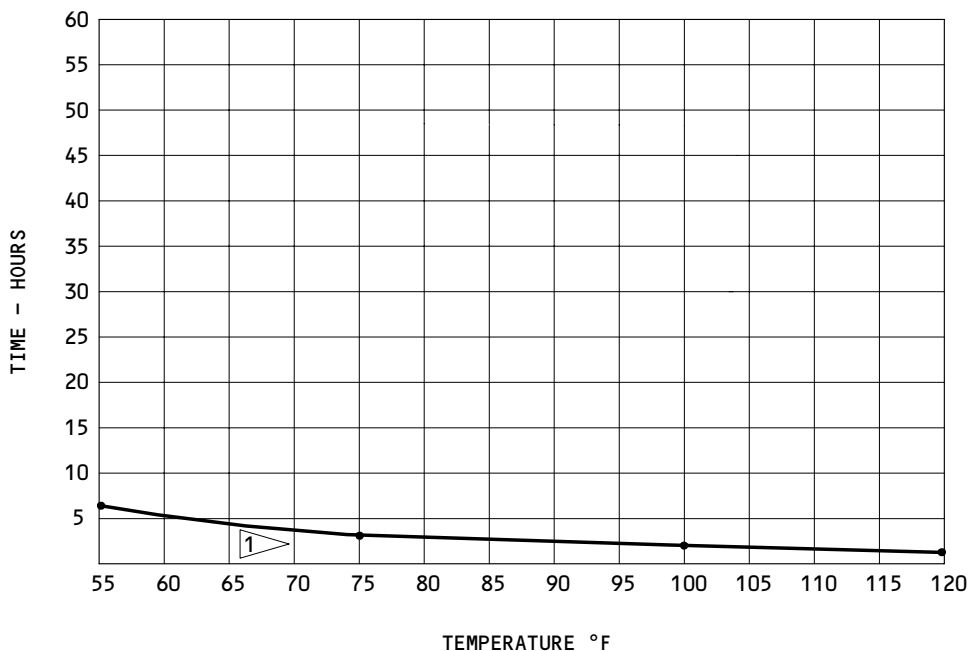
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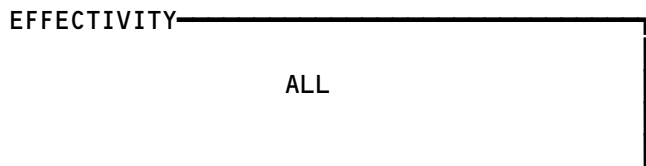
APPLICATION LIFE OF BMS 5-108, TYPE I, CLASS B-2



BMS 5-108, TYPE I, CLASS B-2 TACK FREE SCHEDULE

1 TACK FREE

BMS 5-108 Type I, Class B-2 Application Life and Tack Free Schedule  
Figure 801



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D. Prepare the Basecoat

S 378-005

- (1) Mix the BMS 5-108, Type I, Class B-2 coating in accordance with the manufacturers recommended instructions. The expected application life of the blended coating is shown in Figure 801.

E. Procedure - Repair the Galley/Entryway/Painted Flight Deck Floors

S 358-006

- (1) Do these steps to repair the topcoat that is not worn through the basecoat:

- (a) Clean the topcoat with a cheesecloth that is moist with solvent, Series 86 (AMM 20-30-86/201).

NOTE: To prevent damage on the adjacent surfaces, make a tent or use a protective shroud when you use the power sander.

WARNING: DO NOT GET DUST PARTICLES IN YOUR MOUTH OR LUNGS. USE THE NECESSARY RESPIRATORY PROTECTION. THE TOPCOAT PAINTS CONTAIN LEAD PARTICLES THAT ARE DANGEROUS TO PERSONS.

- (b) Rub the damaged area with 100-grit (minimum) abrasive paper to remove the topcoat. Do not remove the basecoat.
- (c) Clean the surface with a cheesecloth that is moist with solvent, Series 86 (AMM 20-30-86/201).
- (d) Apply one layer of primer on the surface.
- (e) Apply the topcoat mixture on the surface with a roller or an equivalent process. Make sure the applied topcoat is smooth with the adjacent surfaces.

NOTE: Apply the topcoat while the primer is tacky.

- (f) Let the topcoat cure.

NOTE: Heat air so air temperature is 60 degrees or greater.

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S 358-007

- (2) Do these steps to repair the topcoat that is damaged through the basecoat:

(a) Clean the surface with a cheesecloth that is moist with solvent.

**WARNING:** DO NOT GET DUST PARTICLES IN YOUR MOUTH OR LUNGS. USE THE NECESSARY RESPIRATORY PROTECTION. THE TOPCOAT PAINTS CONTAIN LEAD PARTICLES THAT ARE DANGEROUS TO PERSONS.

- (b) Rub the damaged area with 60 to 100 grit abrasive paper to remove the topcoat. Also, lightly rub the surface of the basecoat in the damaged area.
- (c) Clean the surface with a cheesecloth that is moist with solvent. Wipe the solvent off while still wet.
- (d) If the basecoat has been removed, apply a 0.001 to 0.002 inch wet film thickness of BMS 5-108 primer and allow to dry for a minimum of two hours and a maximum of 8 hours.
- (e) Clean the surface with a cheesecloth that is moist with the solvent. Wipe the solvent off while still wet.
- (f) Apply the BMS 5-108 basecoat on the surface until you get a dry film thickness of 0.015 to 0.025 inch.
- (g) Let the basecoat cure to at least a tack free condition before application of topcoat.
- (h) Sand to a dull finish with 100 grit (minimum) sandpaper.
- (i) Remove sanding residue with a cheesecloth that is moist with the solvent. Wipe the solvent off while still wet.
- (j) Apply one coat of BMS 10-79 Type II primer.
- (k) Apply the topcoat mixture on the surface with a roller or an equivalent process. Make sure the applied topcoat is smooth with the adjacent surfaces.

**NOTE:** Apply the topcoat while the primer is tacky.

- (l) Let the topcoat cure.

**NOTE:** Heat air so air temperature is 60 degrees or greater.

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SEALS AND SEALING - DESCRIPTION AND OPERATION

1. General

- A. Certain portions of airplane structure are sealed to prevent passage of gases or liquids through small gaps which normally exist at joints in fabricated structures. Sealing compounds are applied to crevices, edges and joints through which fluid or gas might pass. Sealant used depends upon such factors as resistance to effect of fluids and temperatures.
- B. In addition to sealing requirements contained in this section, installation drawing for specific items may require additional sealing.
- C. Sealing definitions used in this section are as follows:
  - (1) Absolute - No leakage allowed. All openings of any nature must be sealed, including all fasteners except those that are self-sealing.
  - (2) Extensive - All holes, slots, joggles and enclosure joints shall be sealed. Only the following fasteners shall be sealed:
    - (a) Bolts in class II holes or larger.
    - (b) Seal around flange of non O-ring type nutplates.
  - (3) Intermediate - All holes, slots, joggles and enclosure joints shall be sealed. Fasteners do not require sealing.
  - (4) Limited - All holes, slots and joggles shall be sealed.
  - (5) Special - A combination or modification of the above levels for a special purpose or unusual conditions.
- D. Unless otherwise specified, all sealing shall be accomplished per 51-31-01.
- E. Refer to Chapter 28 for integral fuel tank sealing.

2. Structural Sealing

- A. Most structural sealing on the airplane encloses the pressurized zone of the fuselage and integral fuel tanks in the wing.
- B. Several local areas of structure are sealed to provide protection from, and proper drainage of, certain fluids. Examples are areas below toilets, galley, battery stowage and air conditioning plenums.
- C. In the area of the engines, sealant is used to isolate nacelles and pylons from the wing.
- D. If you disconnect a bonding jumper when you remove a panel, you must connect it when you install the panel.

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- E. If you break a faying surface seal during panel removal, you must apply a new faying surface seal during the panel installation (AMM 51-31-01/201).

NOTE: Most access panels do not have a faying surface seal. If a panel has a faying surface seal, apply BMS 5-95 sealant if the panel does not touch fuel, and BMS 5-26 sealant if the panel touches fuel (unless other AMM procedures are specified).

- F. Aerodynamic sealant is not required on panels that are removed as frequently as every "C" check. If the access panel is only removed at intervals longer than a "C" check, replace the aerodynamic seal with BMS 5-95 in critical airflow areas and BMS 5-44 in non-critical airflow areas. Refer to AMM 51-31-01/201 for other sealing requirements.

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SEALS AND SEALING - MAINTENANCE PRACTICES

1. General

- A. This procedure contains these tasks:
  - (1) surface preparation for sealing procedure.
  - (2) non-removable faying (mated) surface seal application.
  - (3) removable faying (mated) surface seal application.
  - (4) hole and slot seal application.
  - (5) fillet seal application.
  - (6) fastener seal application.
  - (7) aerodynamic smoother application.
  - (8) electrical fitting seal application.
  - (9) fuel seal application.
  - (10) sealing materials protection.
  - (11) accelerated curing.
  - (12) chemical sealant removal.
- B. These tasks give instructions to prevent the leakage of fluids and gases.
- C. Listen for the air leakage during a fuselage pressure check to help you find the location of the air leakage.
- D. Look for the fluids or stains that are on the dry side of the structural members to help you find the location of the fluid leakage.
- E. There are drain (limber) holes in the fuselage stringers and fuselage frames.
- F. The drain holes permit fluids and condensation to drain downward to the external (overboard) drains that are on the bottom of the airplane.
- G. Make sure you do not cause blockage to these drain holes when you apply the sealant.
- H. For information on internal and external drain holes and paths, refer to AMM 51-41-00/201.
- I. For information on types of sealant (AMM 20-30-01/201).
- J. For information on access panel locations, refer to AMM chapter 06 - Dimensions and Areas.
- K. For information on alternative sealants, refer to figure 207.

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TASK 51-31-01-302-001

2. Prepare for Sealing

A. Equipment

(1) Sealant Removal Tools

**NOTE:** The tools listed below are approved tools to be used for removal of cured sealant from unpainted clad aluminum surfaces on the exterior of the fuselage including the outboard exposed surfaces of butt and circumferential splice surfaces.

Tools used for the removal of cured sealant from surfaces other than unpainted clad aluminum on the exterior fuselage shall not scratch those surfaces and shall not contain silicon, PTFE (polytetrafluoroethylene) or other material known to interfere with the adhesion of paint or sealant.

It is preferable that part numbers of approved sealant removal tools are permanently attached to those tools.

Sealant removal tools can also be used during cleaning and paint stripping.

- (a) Handle, P/N SHR 0272-T, AC Tech, Garden Grove, CA (use with P/N TS1275-4 scraper)
- (b) Handle - Rubber, Skyholder, P/N 310/1 Elixair International Limited, Dorchester DT2 8LY, UK (use with P/N 311 scraper)
- (c) Handle - Plastic, P/N SHN0272, PnJ Machining, Inc., Puyallup, WA (use with P/N DFD5019, P/N SCD5019, P/N SFD7519, or P/N DAD5013 scraper)
- (d) Handle - Wooden, P/N SHW0215, PnJ Machining, Inc., Puyallup, WA (use with P/N DFD5019, P/N SCD5019, P/N SFD7519, or P/N DAD5013 scraper)
- (e) Handle - Metal, P/N SHR0272, PnJ Machining, Inc., Puyallup, WA (use with P/N DFD5019, P/N SCD5019, P/N SFD7519, or P/N DAD5013 scraper)

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(f) Plastic Scraper (Use one of these plastic scrapers):

NOTE: Handles are available for some scrapers and can be purchased separately with the scrapers as listed above. Make sure you use a soft plastic scrapers to remove the sealant.

- 1) 6" length - rectangular with one end sharpened, P/N TS1275-4, AC Tech, Garden Grove, CA
  - 2) 9" length - tapered with both ends sharpened, P/N 1-6390-A, Bomatic, Inc., Ontario, CA
  - 3) 6" length - rectangular with one end sharpened - 20 or 40 mm wide, P/N 10810, Custom Components LTD, Unit 3, Feltrim Business Park, Swords Co., Dublin
  - 4) 5" length - rectangular with one end sharpened - 3, 23, 34, 38 mm widths and 4, 6 mm thicknesses and the other end designed to fit handle, P/N 311, Elixair International Limited, Dorchester DT2 8LY, UK
  - 5) 9" length - rectangular with both ends sharpened, P/N ST982LF, General Tool & Supply, Tukwila, WA
  - 6) 6" length - rectangular with one end sharpened, P/N 411B60, Jus N Type Tooling, Fallbrook, CA
  - 7) 9" length - tapered with both ends sharpened, P/N 411B90, Jus N Type Tooling, Fallbrook, CA
  - 8) 5" and 9" lengths - three widths: 1/2, 3/4, 1 (additional scrapers available from same material), P/N DFD5019, P/N SCD5019, P/N SFD7519, or P/N DAD5013, PnJ Machining, Inc., Puyallup, WA
  - 9) 6" length - rectangular with one end sharpened, P/N 234350, PPG Aerospace, Semco Division
- (g) Skymill & Skybag - Pneumatic sharpener with bag, P/N 309/3 and P/N 310/3B, Elixair International Limited, Dorchester DT2 8LY, UK

NOTE: This pneumatic scraper sharpener can be used with most scrapers.

(h) Squeegee - 4" length - rectangular, P/N J5-0275-2010, Cascade Plastics Co. Inc., Fife, WA

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B. Consumable Materials

- (1) B00184 Cleaning Solvent - BMS 11-7
- (2) G00027 Cheesecloth
- (3) G50260 Aluminum Oxide Paper - 250-grit
- (4) G50261 Aluminum Oxide Paper - 400-grit
- (5) G50262 Qualified Wiper

C. References

- (1) AMM 20-30-01/201, Adhesives, Cements, Sealers

D. Procedure

S 302-002

- (1) If structural repair is necessary on the airplane structure, refer to the Structural Repair Manual.

S 212-003

- (2) Examine the seal in the area where there is a leak.

S 212-004

- (3) Identify the seal surface and the seal plane in the adjacent structure.

**NOTE:** The seal plane is the limit plane through the assembly of Structural Items with a continuous flow of fluids or gases.

S 212-005

- (4) Identify the type of seal necessary to do the repair.

S 212-006

**CAUTION:** DO NOT MIX THE SEALING MATERIALS. THE SEALING MATERIALS CAN CONTAMINATE EACH OTHER AND CAUSE POOR ADHESION.

- (5) Identify the type of sealant that is used in the damaged area.

**NOTE:** Refer to AMM 20-30-01 for the type of sealants that are available.

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S 362-093

**CAUTION:** MAKE SURE THAT YOU USE APPROVED SEALANT REMOVAL TOOLS TO REMOVE THE SEALANT. DO NOT USE METAL CUTTING TOOLS. METAL CUTTING TOOLS CAN CAUSE DAMAGE TO THE AIRPLANE SURFACE.

**CAUTION:** DO NOT USE ABRASIVE PADS (SCOTCH-BRITE) OR ABRASIVE PAPER ON THE ALUMINUM SURFACE UNLESS THE SCRIBE LINE INSPECTIONS WERE MADE. ABRASIVE PADS CAN SMOOTH THE ALUMINUM SURFACE AND HIDE SCRIBE LINE MARKS. IF YOU USE ABRASIVE PADS TO REMOVE PAINT OR PRIMER BEFORE YOU DO THE SCRIBE LINE INSPECTIONS, YOU CAN BE REQUIRED TO DO REPEAT INSPECTIONS BASED ON THE SCRIBE LINE INSPECTION SERVICE BULLETIN.

- (6) Remove the sealant in the damaged area:
- (a) Remove the sealant with an approved sealant removal tool listed in the Equipment list, dry wiper, or clean cloth dampened with solvent.
  - (b) If necessary, do these steps to sharpen the scraper:
    - 1) Sharpen the scraper with 220-grit or fine aluminum oxide paper by hand or by metal sharpening wheel.
    - 2) If you sharpen the scraper by hand, rub the sharpened scraper on qualified wiper to remove loose sanding particles.
    - 3) If you use a metal sharpening wheel, rub the sharpened scraper on 400-grit or finer aluminum oxide paper to remove debris, and then rub it on qualified wiper to remove loose sanding particles.

S 362-009

- (7) Remove the loose pieces of the sealant from the damaged areas.
- (a) Make sure the sealant is removed completely to expose the surface.

S 102-072

- (8) Do these steps to clean the damaged area immediately before you apply the sealant:
- (a) Make sure you clean an area that is wider than necessary to apply the sealant.
  - (b) Make sure you remove the grease, oil, dirt, and loose particles.
  - (c) Make sure you use a clean cheesecloth that is moist with solvent.
  - (d) Continue to clean the area with the clean cheesecloth until there is no sign of grease, oil, dirt, or loose particles on the cheesecloth.
  - (e) Make sure the solvent is removed from the area with a dry, clean cheesecloth before the solvent dries.

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- (f) Use compressed air to remove the remaining solvent from the area.
- (g) If a large quantity of primer was accidentally removed from the area, then you must apply more primer to the area after you apply the sealant.

TASK 51-31-01-392-013

3. Non-Removable Faying (Mated) Surface Seal Application (Fig. 201)

A. General

- (1) You must clean all the equipment before and after you apply the sealing compound.
- (2) When the sealing compounds are used with an activator, you must clean the equipment before the compounds become hard.
- (3) Do not mix the tools that you use for silicone with the tools that you use for the non-silicone materials.
- (4) Do not apply the materials, which are used to smooth, fair, and seal, on the zinc chromate primer until the primer is hard and strong.

B. Equipment

- (1) Sealant Removal Tool (See Equipment in the Prepare for Sealing task)
- (2) Spatula made of wood or plastic (Ref. ST982)
- (3) Sealing gun and nozzles

C. Procedure

S 302-014

- (1) Do the Surface Preparation for Sealing task.

S 392-015

**CAUTION:** DO NOT CAUSE A BLOCKAGE WHEN YOU APPLY SEALANT NEAR OR AROUND THE FUSELAGE DRAIN HOLES, TUBES, OR PATHS. THE FUNCTION OF THE DRAIN HOLES IS TO DRAIN CONDENSATION AND FLUIDS OVERBOARD. IF YOU CAUSE A BLOCKAGE, FLUIDS WILL COLLECT IN THE AIRPLANE. THE FLUIDS CAN CAUSE CORROSION TO THE STRUCTURE, OR A FIRE IF THE FLUIDS ARE FLAMMABLE.

- (2) Apply the sealing compound to one surface with a flow gun or spatula. Make sure you apply the sealing compound on the full area of the faying (mated) surface.

**NOTE:** The thickness of the sealing compound must be 1/32 inch (0.7929 mm).

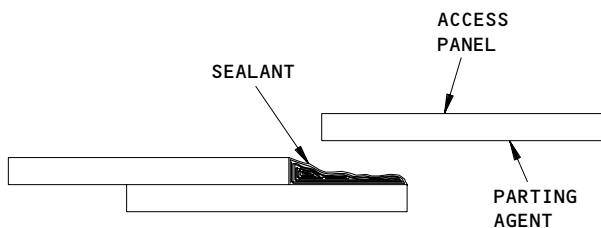
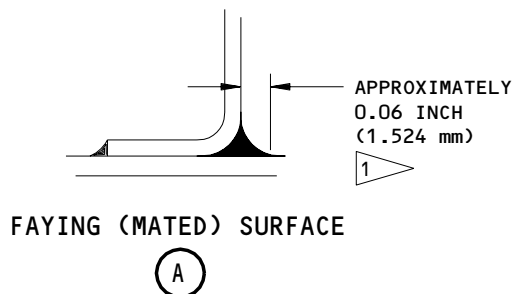
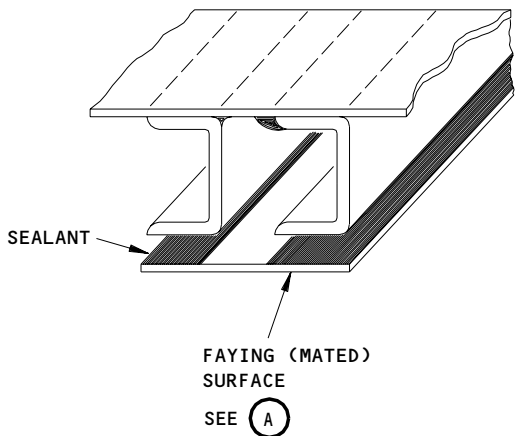
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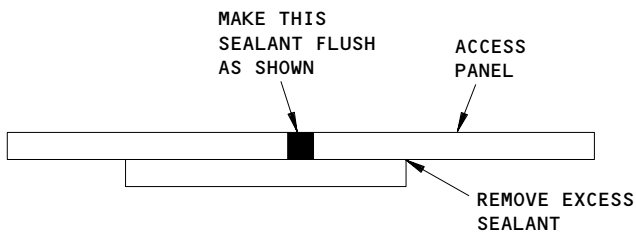
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STEP 1



STEP 2

**REMOVABLE SEALS**  
(THE SEALANT IS APPLIED IMMEDIATELY BEFORE THE ACCESS PANEL IS INSTALLED)

1 AFTER ASSEMBLY OF THE PARTS, THE SEALANT MUST AGREE WITH THIS DIMENSION

Faying Surface Seal  
Figure 201

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- S 432-016
- (3) Put the component parts together. Install the necessary fasteners.
- S 212-017
- (4) If you will seal the fasteners, make sure you install them during the pot life of the sealing compound.
- S 492-018
- (5) If you cannot install the permanent fasteners before the pot life of the sealing compound ends, use temporary fasteners to hold the parts together until the sealing compound dries.
- S 392-019
- (6) Install the permanent fasteners with the new sealant. Apply the sealant on the fastener or in the hole.
- S 212-020
- (7) Remove the unwanted sealant with an approved sealant removal tool.
- S 212-073
- (8) Make sure the faying (mated) surface is smooth and the squeeze out is approximately 0.06 inch (1.524 mm) along the joint.

TASK 51-31-01-402-078

4. Removable Faying (Mated) Surface Seal Application (Fig. 201)

A. General

- (1) You must clean all the equipment before and after you apply the sealing compound.
- (2) When the sealing compounds are used with an activator, you must clean the equipment before the compounds become hard.
- (3) Do not mix the tools that you use for silicone with the tools that you use for the non-silicone materials.
- (4) Do not apply the materials, which are used to smooth, fair, and seal, on the zinc chromate primer until the primer is hard and strong.

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B. Equipment

- (1) Sealant Removal Tool (See Equipment in the Prepare for Sealing task)
- (2) Spatula made of wood or plastic (Ref. ST982)
- (3) Sealing gun and nozzles

C. Consumable Materials

- (1) G50365 Agent - Parting, Peelable, AC962-73C.  
BAC5000 PSD 6-187
- (2) G50366 Agent - Parting, Peelable, AZ 534-2B.  
BAC500, PSD 6-187
- (3) G50367 Agent - Parting, Peelable, AZ 634-2.  
BAC5000, PSD 6-187  
(Boeing raw material code 5542000302)
- (4) G50368 Agent - Parting, Peelable, Partall Coverall Film.  
BAC5000, PSD 6-187
- (5) G50369 Agent - Parting, Peelable, Spraylat SC-1071H-1 Blue  
(ZR-5827). BAC5000, PSD 6-187
- (6) G02185 Parting Agent - Green strippable Vinyl  
Coating 4A-183 (formerly 598-5002)  
(Boeing raw material code 5542000301)

D. Procedure

S 842-079

- (1) Do the Prepare for Sealing task.

S 392-021

**CAUTION:** DO NOT LET A WET PARTING AGENT TOUCH AN ACRYLIC SURFACE. IF A WET PARTING AGENT TOUCHES AN ACRYLIC SURFACE, DAMAGE TO THE ACRYLIC SURFACE CAN OCCUR.

- (2) Apply the parting agent to one of the mating surfaces. If one of the mating surfaces is acrylic, apply the parting agent to the non-acrylic surface.

S 432-023

- (3) When the parting agent is sufficiently dry to touch, apply sealant to the opposite mating surface.

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S 432-080

**CAUTION:** DO NOT CAUSE A BLOCKAGE WHEN YOU APPLY SEALANT NEAR OR AROUND THE FUSELAGE DRAIN HOLES, TUBES, OR PATHS. THE FUNCTION OF THE DRAIN HOLES IS TO DRAIN CONDENSATION AND FLUIDS OVERBOARD. IF YOU CAUSE A BLOCKAGE, FLUIDS WILL COLLECT IN THE AIRPLANE. THE FLUIDS CAN CAUSE CORROSION TO THE STRUCTURE, OR A FIRE IF THE FLUIDS ARE FLAMMABLE.

- (4) Apply the sealing compound to one surface with a flow gun or spatula. Make sure you apply the sealing compound on the full area of the faying (mated) surface.

**NOTE:** The thickness of the sealing compound must be 1/32 inch (0.7925 mm).

S 432-081

- (5) Put the component parts together. Install the necessary fasteners.

S 432-082

- (6) If you will seal the fasteners, make sure you install them during the pot life of the sealing compound.

S 432-083

- (7) If you cannot install the permanent fasteners before the pot life of the sealing compound ends, use temporary fasteners to hold the parts together until the sealing compound dries.

S 432-084

- (8) Install the permanent fasteners with the new sealant. Apply the sealant on the fastener or in the hole.

S 432-085

- (9) Remove the unwanted sealant with an approved sealant removal tool.

S 432-086

- (10) Make sure the faying (mated) surface is smooth and the squeeze out is approximately 0.06 inch (1.524 mm) along the joint.

TASK 51-31-01-392-024

5. Injection Seal Application

A. Equipment

- (1) Sealing gun and nozzles

B. Procedure

S 302-025

- (1) Do the Prepare for Sealing task.

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S 392-026

**CAUTION:** DO NOT CAUSE A BLOCKAGE WHEN YOU APPLY SEALANT NEAR OR AROUND THE FUSELAGE DRAIN HOLES, TUBES, OR PATHS. THE FUNCTION OF THE DRAIN HOLES IS TO DRAIN CONDENSATION AND FLUIDS OVERBOARD. IF YOU CAUSE A BLOCKAGE, FLUIDS WILL COLLECT IN THE AIRPLANE. THE FLUIDS CAN CAUSE CORROSION TO THE STRUCTURE, OR A FIRE IF THE FLUIDS ARE FLAMMABLE.

- (2) When a continuous seal is necessary, put a finger or a spatula on one end of the hole to stop the flow of the sealant (Fig. 202).

S 392-027

**CAUTION:** DO NOT FULLY EMPTY A FLOW GUN. ALWAYS APPLY THE SEALANT FROM ONE DIRECTION. DO NOT SEAL A SURFACE FROM THE TWO ENDS OF A HOLE. AIR POCKETS AND POSSIBLE LEAKS IN THE SEAL CAN OCCUR.

- (3) Put the sealant into one end of the hole with a flow gun until the sealant comes out from all other openings.

**NOTE:** When an opening is to be closed only for support of the sealant, it is not necessary to apply the sealant to the full depth of the opening.

S 392-028

- (4) When you apply the sealant at the bottom of the slot, make sure you fill the slot. Make sure you get a continuous seal with the bottom and sides of the slot.

TASK 51-31-01-392-029

6. Hole and Slot Seal Application

A. Equipment

- (1) Spatula made of wood or plastic (Ref. ST982)

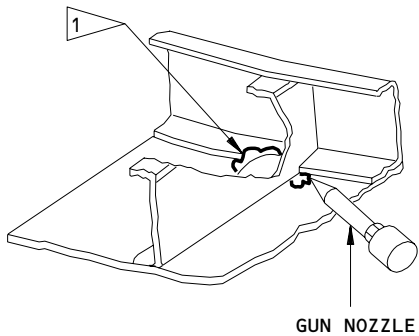
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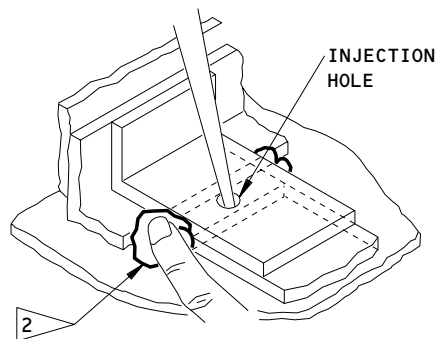
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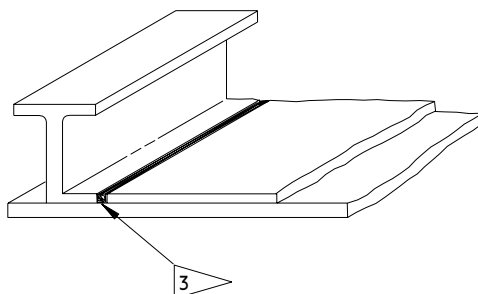
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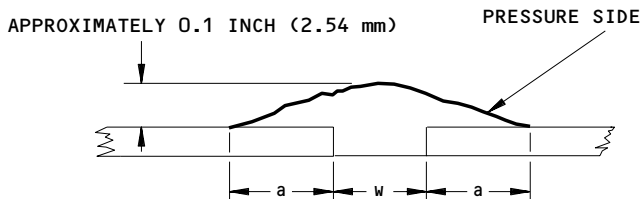
INJECTION SEAL



INJECTION SEAL

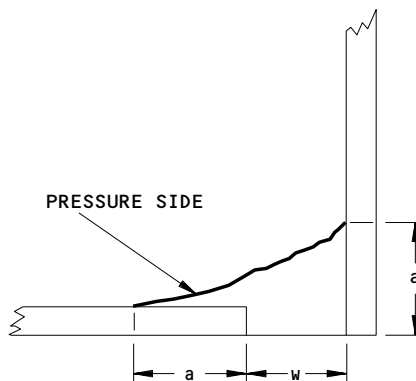


SLOT SEAL



**NOTE:** a = 0.25 INCH (6.35 mm) MINIMUM, BUT NOT LESS THAN "w".

HOLE FILLING



HOLE FILLING

- 1 THE INJECTION SEAL IS COMPLETE WHEN THE SEALANT GOES THROUGH TO THE OTHER END
- 2 USE YOUR FINGER OR A SPATULA TO STOP THE FLOW OF THE SEALANT AT THE OTHER END
- 3 THE SEALANT MUST FULLY FILL THE SLOT

Injection Seal  
Figure 202

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- (2) Sealing gun and nozzles
- B. Consumable Materials
  - (1) G00138 Masking Tape - Permacel No. 70 or 85,  
American Tuck No. 210
- C. Procedure

S 302-030

- (1) Do the Prepare for Sealing task.

S 392-002

- (2) Apply the sealant on all the tool and coordination holes that are not riveted (Fig. 202).

S 392-032

- (3) Apply the sealant on the rivets in fully sealed areas.

S 392-033

- (4) Apply a hole filling compound to the pressure side of the hole.

S 952-034

- (5) Apply the masking tape on the large slots and holes.

S 952-035

- (6) Remove the masking tape after the sealant is mixed.

S 392-036

- (7) Apply the compound to the pressure side of the hole with a spatula or applicable tool.

S 392-037

- (8) Apply the compound tightly into the hole or slot.

S 392-038

- (9) Make the compound smooth with the adjacent surfaces.

TASK 51-31-01-392-039

7. Fillet Seal Application

- A. Equipment
  - (1) Fillet Fairing Tools
  - (2) Sealing gun and nozzles
- B. Procedure

S 302-040

- (1) Do the Prepare for Sealing task.

S 392-001

- (2) Apply the sealant with a flow gun.

S 392-042

- (3) Put the nozzle tip into the seam.

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S 212-074

- (4) Make sure the sealant is applied in a straight line (Fig. 203).

S 392-043

- (5) Push the bead of the sealant forward of the nozzle head.

S 212-044

- (6) Push the sealant tightly into position with the fairing tool. Make sure you get a smooth fillet.

S 392-045

- (7) Apply the sealant again to get a full body fillet.

**NOTE:** A second application of the sealant is necessary only for integral fuel tanks. You can cut the nozzle tip to give the full body seal some contour.

S 392-046

- (8) Use the fairing tool to get the last shape of the fillet.

S 392-047

- (9) Push the tool against the sealant and move the tool parallel to the bead.

S 212-075

- (10) Make sure the seal is smooth. Make sure there are no air bubbles in the seal.

S 212-076

- (11) Make sure the bead has the shape of a faired fillet, after the work is completed.

TASK 51-31-01-392-048

8. Fastener Seal Application (Fig. 204)

A. General

- (1) If the fasteners were installed during the pot life of the sealant, sealing is not necessary.

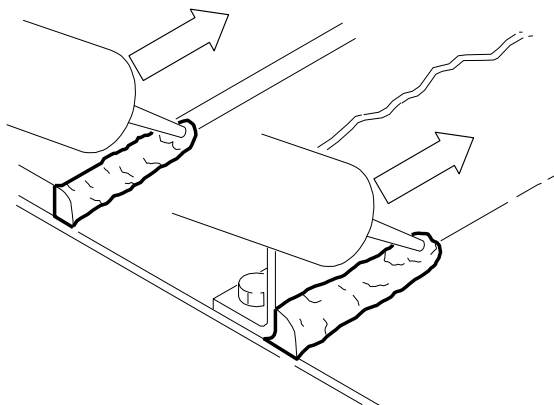
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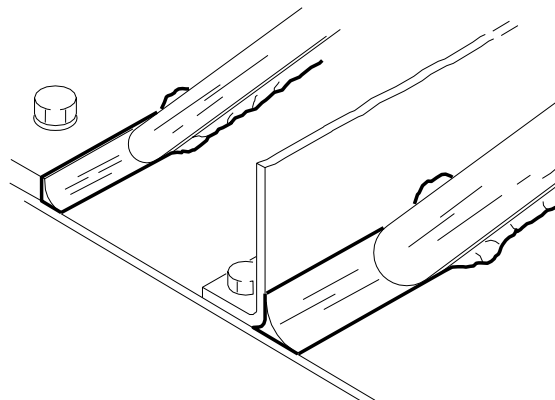
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
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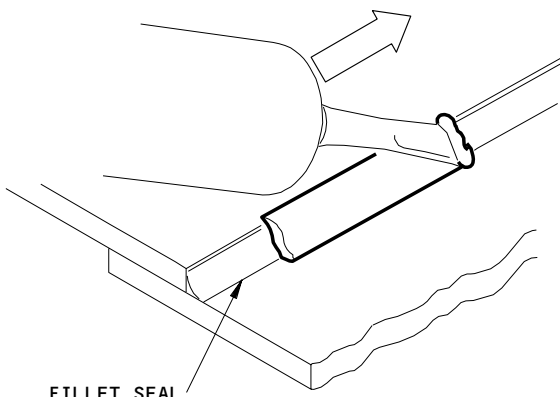
STEP 1   
(APPLICATION)



STEP 2   
(FINISH)

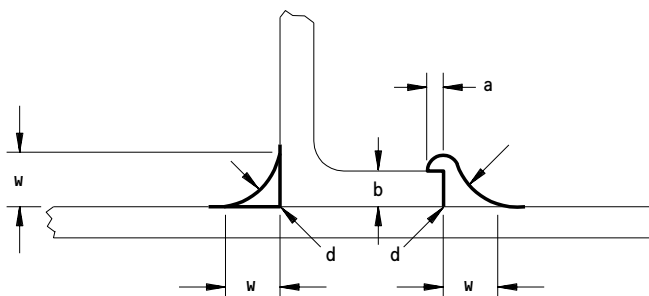
FILLET SEAL

a = 0.04-0.15 INCH (1.016-3.81 mm) EXCEPT a = 0 WHEN  
 b = 0.15 INCH (3.81 mm) OR MORE  
 d = 0.08 INCH (2.032 mm) MINIMUM  
 w = 0.12-0.25 INCH (3.048-6.35 mm)





FILLET SEAL

APPLICATION OF FILLET  
FULL BODY SEAL



FILLET SEAL  
FINISHED DIMENSIONS

-  APPLY SEALANT WITH A FLOW GUN
-  USE AN UNLUBRICATED FAIRING TOOL TO PUSH THE SEALANT INTO POSITION

Fillet Seal  
Figure 203

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- (2) Install rivets dry, unless you are told differently.

**NOTE:** Install 5056 aluminum rivets wet with sealant in aluminum structure. Install 5056 aluminum rivets dry in magnesium structure.

- (3) Use the specified procedure for fastener sealing for corrosion prevention.

**NOTE:** When a procedure is not specified, use procedure 1.

**B. Equipment**

- (1) Fillet Fairing Tools
- (2) Sealant Removal Tool (See Equipment in the Prepare for Sealing task)
- (3) Spatula made of wood or plastic (Ref. ST982)
- (4) Sealing gun and nozzles

**C. Fastener Sealing**

S 302-049

- (1) Do the Prepare for Sealing task.

S 392-050

**CAUTION:** DO NOT CAUSE A BLOCKAGE WHEN YOU APPLY SEALANT NEAR OR AROUND THE FUSELAGE DRAIN HOLES, TUBES OR PATHS. THE DRAIN HOLES DRAIN FLUIDS AND CONDENSATION OVERBOARD. IF YOU CAUSE A BLOCKAGE, FLUIDS WILL COLLECT. THE FLUIDS CAN CAUSE CORROSION TO THE STRUCTURE, OR A FIRE IF THE FLUIDS ARE FLAMMABLE.

- (2) Use one of these procedures to seal the fasteners that are installed through the mating surface. Use these procedures when the sealant pot life has ended or when no mating surface sealant is used (Fig. 204):
  - (a) Apply the sealant to the fastener or hole at the installation.
  - (b) Apply the sealant to the fastener after the installation.
  - (c) Make the sealant smooth around the fastener after the installation.

S 392-051

- (3) Seal the fasteners that have metal covers as follows:
  - (a) Fill the metal cover between half to two-thirds full of sealant.
  - (b) Push the metal cover down on the fastener until the flange touches the structure.
  - (c) Remove the unwanted sealant from the top of the metal cover with an approved sealant removal tool.
  - (d) Make the sealant smooth around the base of the metal cover.

**D. Fastener Sealing for Corrosion Prevention**

S 102-087

- (1) Clean the surface, do this task; Prepare for Sealing.

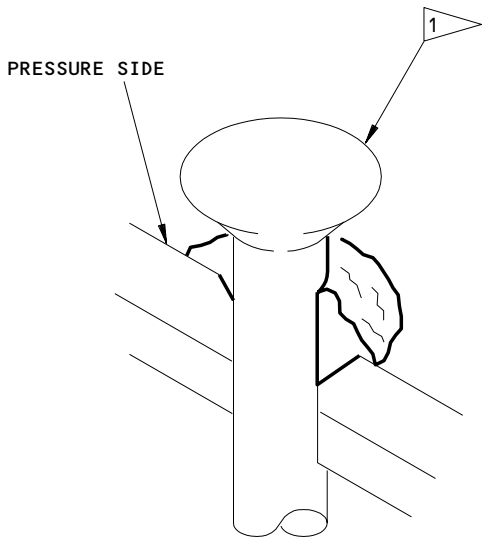
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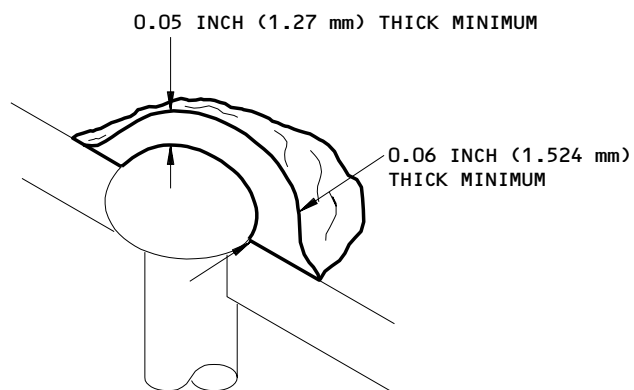
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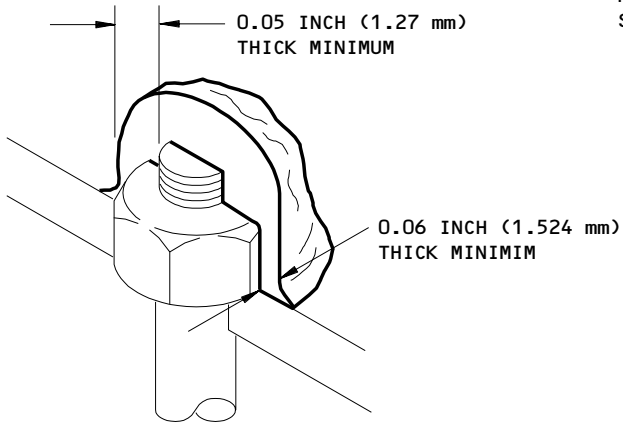
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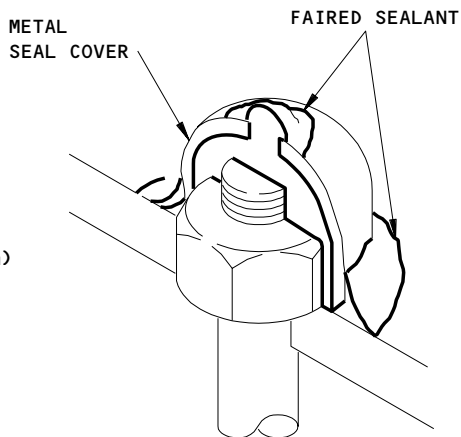
SEAL DURING INSTALLATION



SEAL AFTER INSTALLATION



FILLET AFTER INSTALLATION



FAIRING SEAL AT THE METAL SEAL COVER

1 YOU CAN APPLY THE SEALANT TO THE HOLE OR THE FASTENER

Fastener Seal  
Figure 204 (Sheet 1)

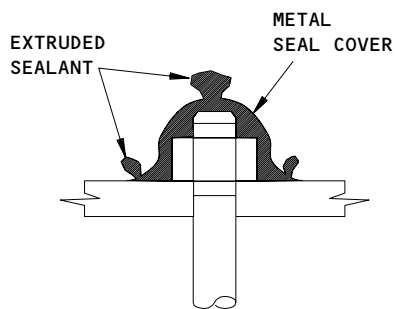
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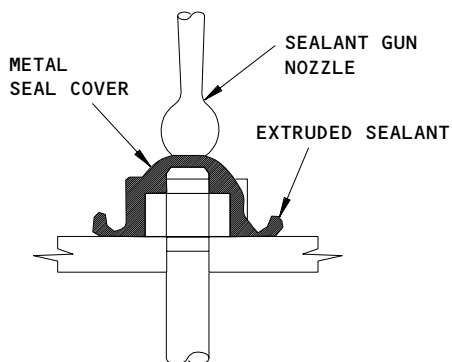
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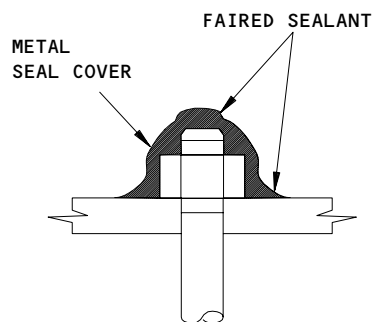




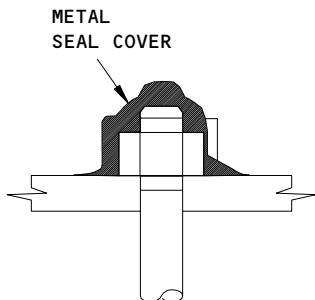
SEAL COVER AFTER  
AFTER INJECTION



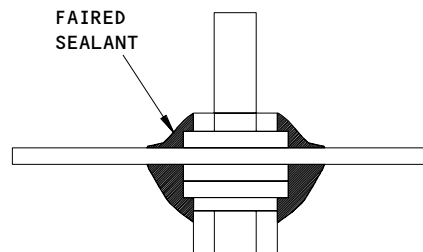
INJECTING SEALING  
SELF-CENTERING SEAL COVER



SEAL COVER  
AFTER FAIRING

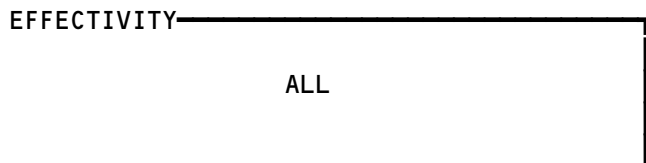


AFTER FAIRING  
SELF-CENTERING SEAL COVER



SEALING OF  
STANDARD GROUND STUD

Fastener Seal  
Figure 204 (Sheet 2)

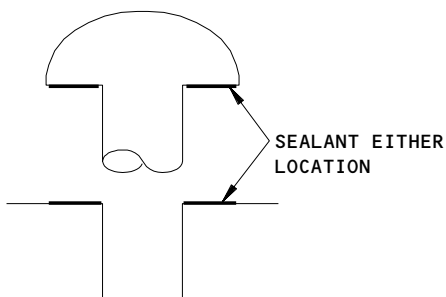


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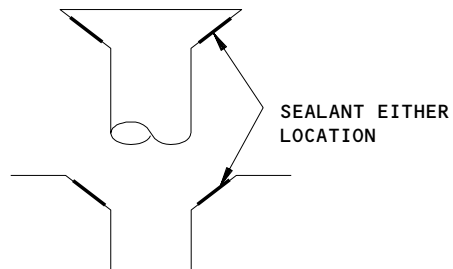
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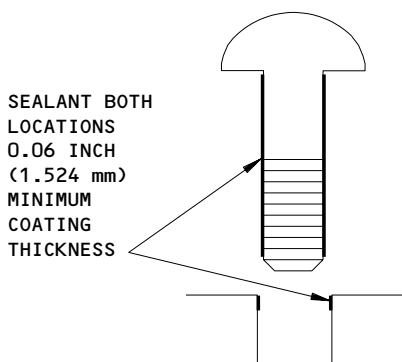


PROTRUDING HEAD FASTENER

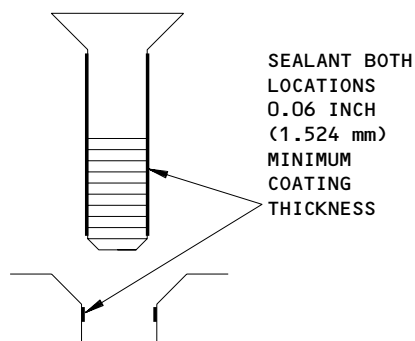


COUNTERSUNK FASTENER

PROCEDURE 1



PROTRUDING HEAD FASTENER

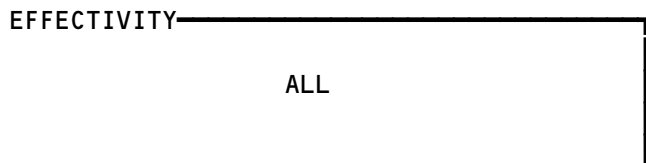


COUNTERSUNK FASTENER

PROCEDURE 2

TYPICAL FASTENER SEALING FOR CORROSION PROTECTION

Fastener Seal  
Figure 204 (Sheet 3)

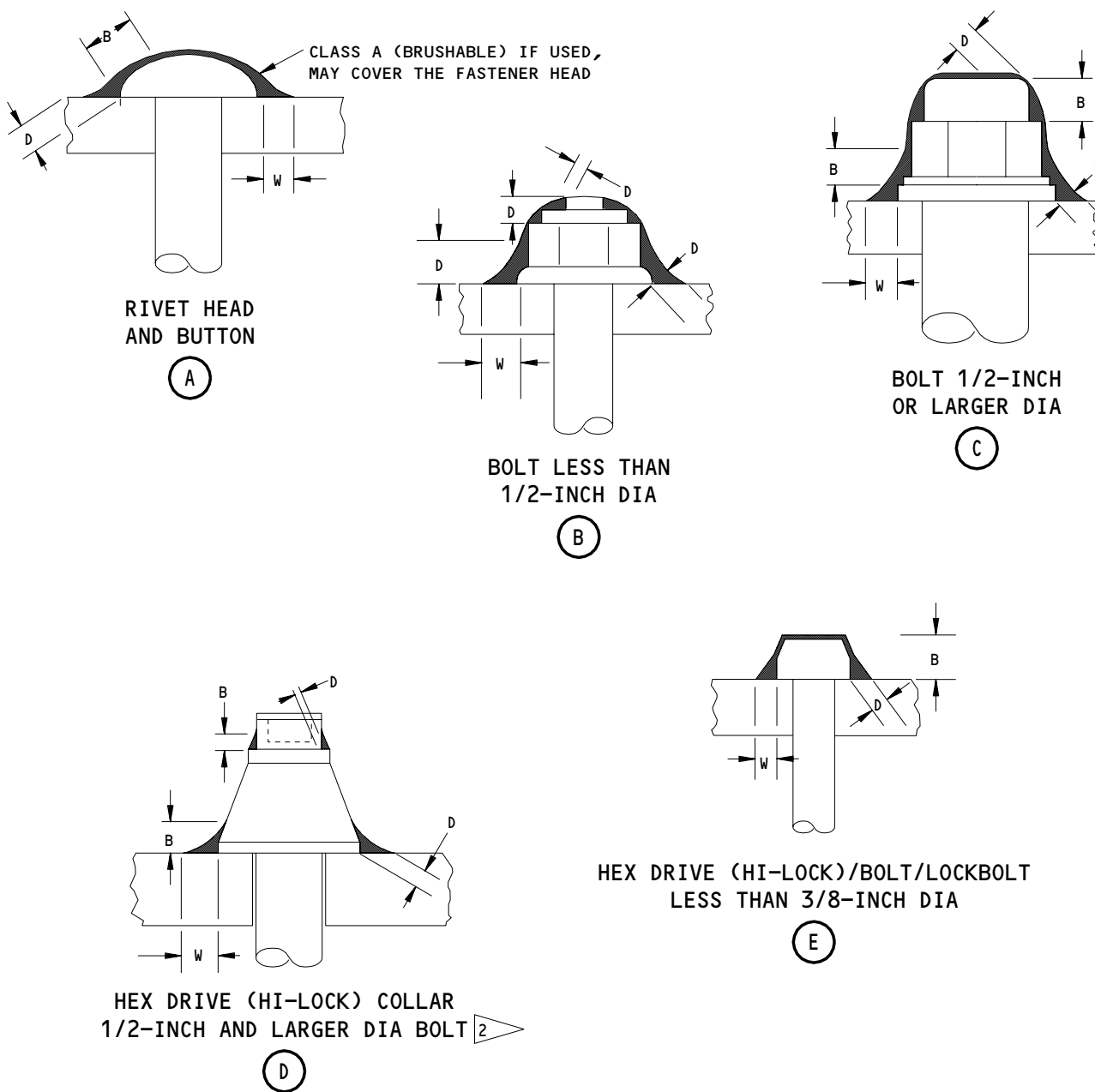


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TYPICAL FILLET SEALING DIMENSIONS FOR CORROSION PROTECTION

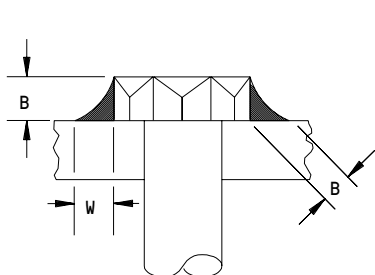
Fastener Seal  
Figure 204 (Sheet 4)

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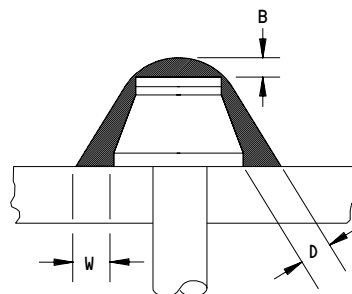
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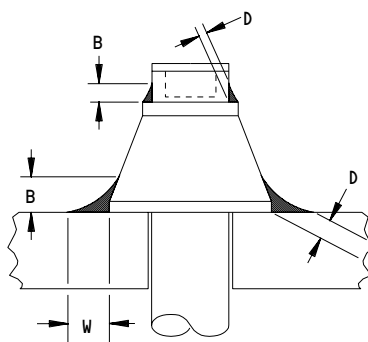
HEX DRIVE (HI-LOCK)/  
BOLT/LOCKBOLT  
3/8-INCH OR LARGER DIA

(F)



LOCK BOLT  
COLLAR

(G)



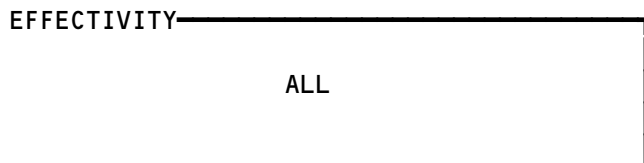
HEX DRIVE (HI-LOCK) COLLAR  
LESS THAN 1/2-INCH DIA BOLT

(H)

- 2 RECESSED AREA IN END OF HEX DRIVE PIN NEED NOT BE FILLED WITH SEALANT  
 D = 0.02 INCH (0.508 mm) MINIMUM  
 B = 0.10 INCH (2.54 mm) MINIMUM, EXCEPT 0.20 INCH (5.08 mm) MAXIMUM  
 FOR VIEWS C, D, AND F.  
 W = 0.10 INCH (2.54 mm) MINIMUM TO 0.20 INCH (5.08 mm) MAXIMUM

TYPICAL FILLET SEALING DIMENSIONS FOR CORROSION PROTECTION

Fastener Seal  
Figure 204 (Sheet 5)



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S 392-088

- (2) Procedure 1 – corrosion protection below the head area of the fastener:
- (a) Apply sealant to all surfaces and countersinks below the fastener head.
  - (b) Install the fastener.
  - (c) A continuous extrusion of sealant is necessary around the fastener.
  - (d) Clean off unwanted sealant with an approved sealant removal tool.

S 392-089

- (3) Procedure 2 – corrosion protection below the head area and shank of the fastener:
- (a) Apply sealant to the entire shank and thread of the fastener.

NOTE: Apply sealant to the shank only for fasteners which will use self-sealing nuts or collars.

- (b) Install the fastener and nut or collar.
- (c) Clean off unwanted sealant with an approved sealant removal tool.

S 392-090

- (4) Procedure 3 – corrosion protection below the head area and shank of the fastener and the bottom attaching hardware:
- (a) Apply sealant to the entire shank or thread of the fastener.
  - (b) Install fastener.
    - 1) A continuous extrusion of sealant is necessary around the base of the washer, if used under the fastener head.

NOTE: More sealant can be applied to the shank of the installed fastener to get the necessary sealant extrusion.

- (c) Install the nut or collar.
- (d) A continuous extrusion of sealant is necessary around the fastener head, the washer (if used), and the bottom of the nut or collar.

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(e) Clean off unwanted sealant with an approved sealant removal tool.

S 392-091

- (5) Apply the fillet-seal to the installed fastener.  
(a) Use class A or Class B (brushable) sealants.

NOTE: Brush marks are permitted if the fillet-seal dimensions.

TASK 51-31-01-392-052

9. Aerodynamic Smoother Application

A. Equipment

- (1) Sealant Removal Tool (See Equipment in the Prepare for Sealing task)  
(2) Spatula made of wood or plastic (Ref. ST982)  
(3) Sealing gun and nozzles

B. Consumable Materials

- (1) G00138 Masking Tape - Permacel No. 70 or 85,  
American Tuck No. 210

C. References

- (1) AMM 51-41-00/201, Airframe Drainage

D. Procedure

S 302-053

- (1) Do the Prepare for Sealing task.

S 952-054

- (2) Apply the masking tape to the surface that is adjacent to the damaged area.

S 392-055

CAUTION: DO NOT CAUSE A BLOCKAGE WHEN YOU APPLY SEALANT NEAR OR AROUND THE FUSELAGE DRAIN HOLES, TUBES, OR PATHS. THE FUNCTION OF THE DRAIN HOLES IS TO DRAIN CONDENSATION AND FLUIDS OVERBOARD. IF YOU CAUSE A BLOCKAGE, FLUIDS WILL COLLECT IN THE AIRPLANE. THE FLUIDS CAN CAUSE CORROSION TO THE STRUCTURE, OR A FIRE IF THE FLUIDS ARE FLAMMABLE.

WHEN YOU APPLY THE AERODYNAMIC SMOOTHER TO THE WING-TO-BODY FAIRINGS, LIMIT YOUR APPLICATIONS TO THE LOCATIONS SHOWN IN AMM 51-41-00/201. THE CLEARANCES BETWEEN THE FAIRING PANELS ARE MADE TO LET THE FLUIDS IN THE FAIRING TO DRAIN OVERBOARD.

- (3) Apply the aerodynamic smoother with a flow gun or spatula. Make sure there are no air bubbles when you apply the aerodynamic smoother.

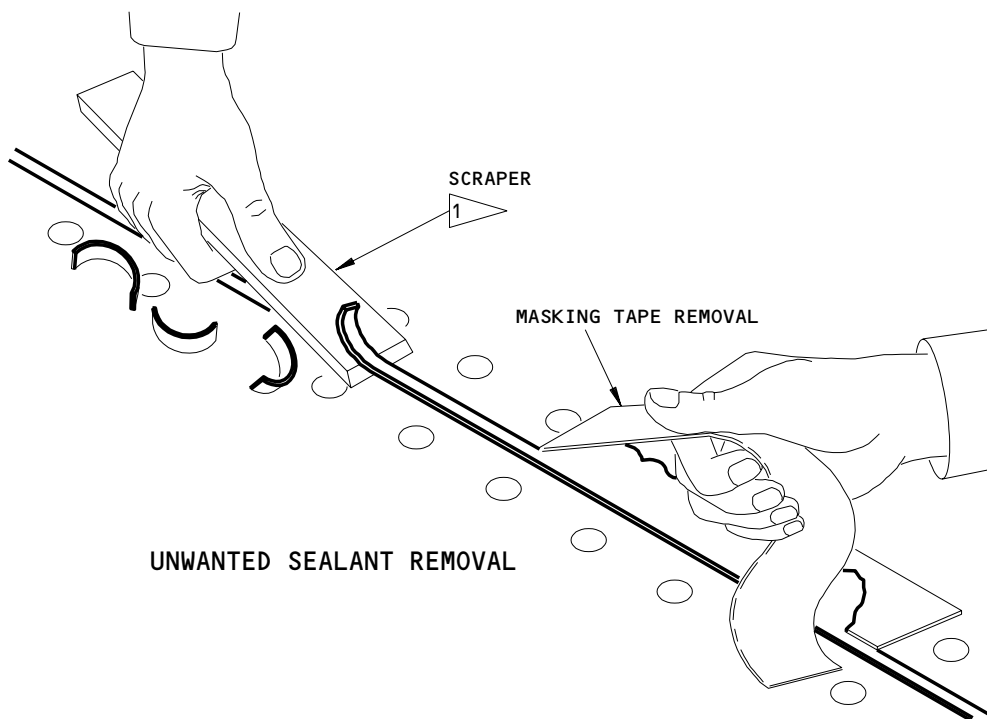
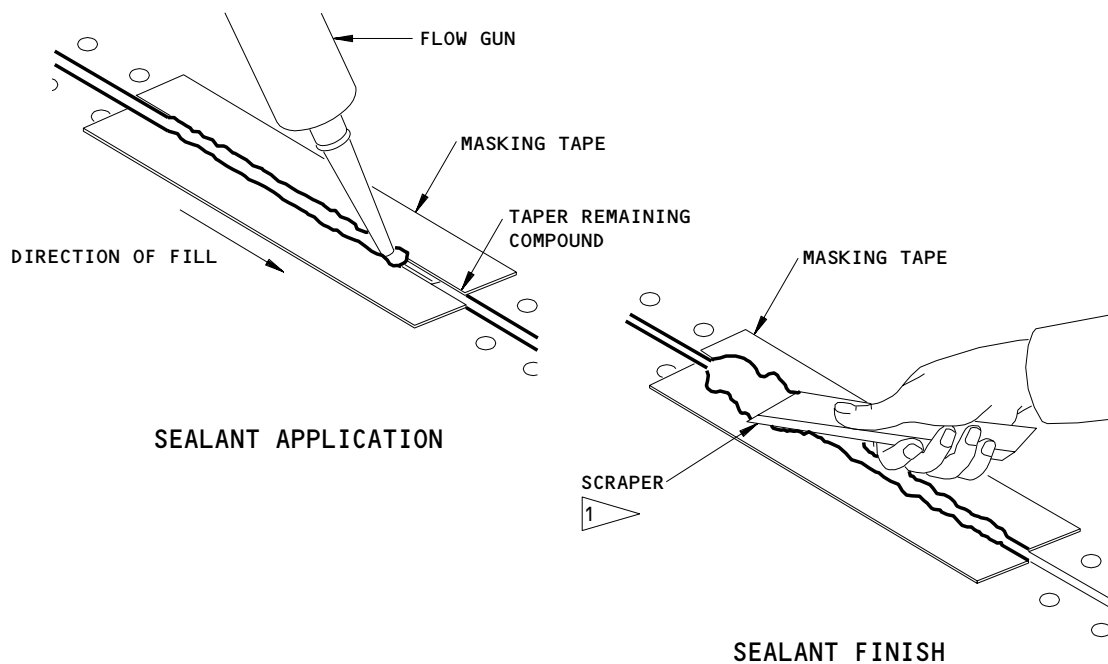
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1 USE AN APPROVED NON METALLIC SEALANT REMOVAL TOOL TO REMOVE UNWANTED SEALANT AFTER THE SEALANT HAS CURED

Aerodynamic Sealer  
Figure 205

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S 392-003

- (4) Apply more of the aerodynamic smoother, if it is necessary, to make the edges around the seal smooth.

**NOTE:** Because of shrinkage, you must apply the aerodynamic smoother again, approximately 8 hours apart, to fill the clearances.

S 392-057

- (5) Use a spatula to make the seal smooth with the masking tape.

S 952-058

- (6) Remove the masking tape after the seal is smooth or let the masking tape stay during the curing time.

S 392-059

- (7) Make the edges of the seal smooth. Remove all the unwanted compound with an approved sealant removal tool.

TASK 51-31-01-392-060

10. Electrical Fitting Seal Application

A. General

- (1) BMS 5-37 sealant is the recommended sealant for the electrical seal fittings. BMS 5-45 and BMS 5-95 sealants will do the same function as the BMS 5-37. But, BMS 5-45 and BMS 5-95 are not the recommended sealants because they will bond to electrical wires which do not have a teflon coating. It is not easy to do maintenance on electrical seal fittings that have sealant bonded to the electrical wires. Reference SWPM 20-10-20 (D6-5446) for more complete sealing instructions.

B. Equipment

- (1) Fillet Fairing Tools
- (2) Sealant Removal Tool (See Equipment in the Prepare for Sealing task)

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- (3) Spatula made of wood or plastic (Ref. ST982)
- (4) Sealing gun and nozzles
- C. Consumable Materials
  - (1) G00138 Masking Tape - Permacel No. 70 or 85, American Tuck No. 210, 3/4-inch (19.05 mm) wide and 1 1/2-inch (38.1 mm) wide
- D. References
  - (1) SWPM 20-10-20, Installation of Bulkhead Seals
- E. Procedure

S 302-061

- (1) Do the Prepare for Sealing task.

S 392-004

- (2) Seal the multiple cutouts in the primary sealing areas as follows:
  - (a) Put the wire bundle through an available cutout.
  - (b) Isolate the wires before you apply the seal:
    - 1) If there are three or less wires, use the plastic separators to isolate the wires.
    - 2) If there are four or more wires, use the wire coil separators to isolate the wires. Wind the wire coil separators two to four turns around each wire.
  - (c) Assemble the fitting together around the wires. Make sure the flange of the fitting is on the pressurized side of the airplane.

NOTE: A fitting is made of two halves.

- (d) Make sure the plastic separators or the wire coil separator is satisfactorily installed on the wires in the bulkhead fitting.
- (e) Put a 8-inch long string against the bulkhead fitting and parallel with the wires.
- (f) Wind three turns of 1 1/2-inch (38.1 mm) wide masking tape around the fitting.
- (g) Crimp the 1 1/2-inch (38.1 mm) wide masking tape around the bulkhead fitting. Make sure the wires are in the center of the bulkhead fitting and the masking tape.
- (h) Wind three turns of 3/4-inch (19.05 mm) wide masking tape around the 1 1/2-inch (38.1 mm) wide masking tape.
- (i) Put the bulkhead fitting, cover plate and the filler in position on the unpressurized side of the airplane. Install the fasteners.
- (j) Make an injection hole in the 1 1/2-inch (38.1 mm) wide masking tape at an applicable location.

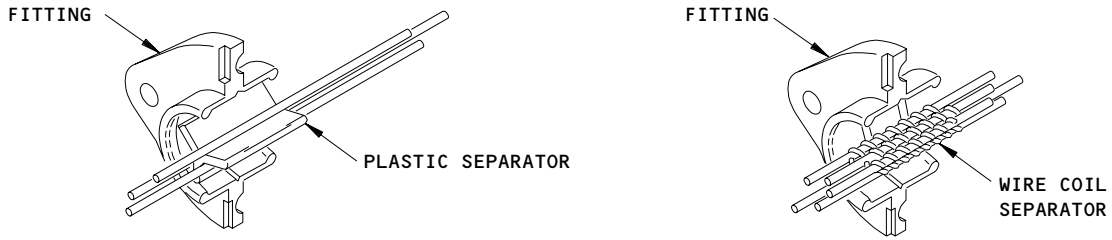
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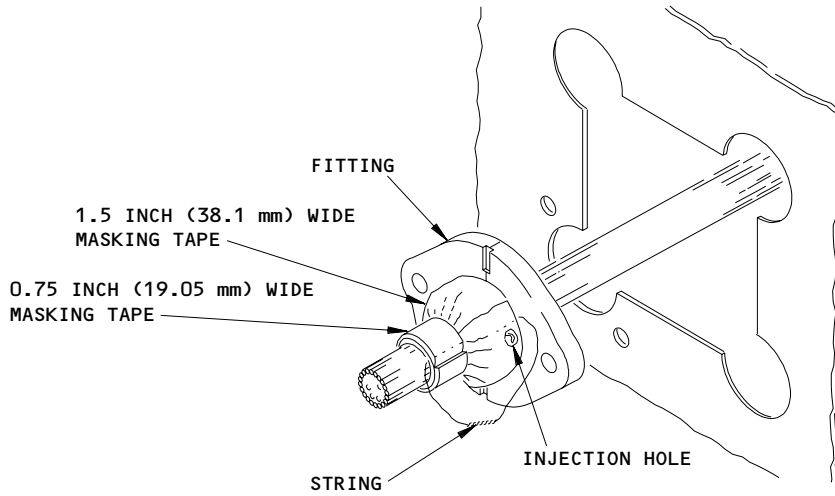
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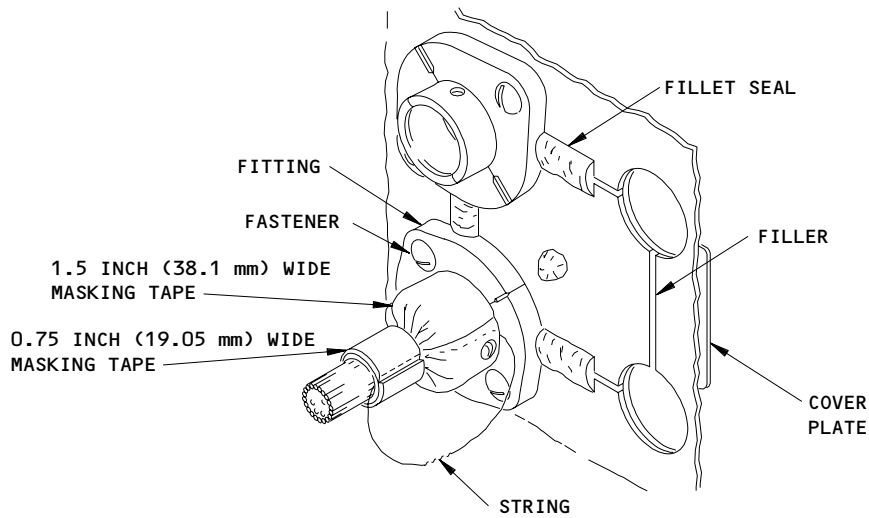
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**INSTALLATION OF SEPARATORS**



**BULKHEAD FITTING**



**INSTALLATION OF BULKHEAD FITTING**

Electrical Fitting Seal  
Figure 206

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- (k) Use the sealing gun to apply the sealant. Apply the sealant until it comes out from the flange of the bulkhead fitting.
- (l) Apply the sealant to make a fillet seal on the filler.
- (m) Apply the sealant on the fastener that is in the center of the filler.
- (n) Let the sealant cure for 16 to 24 hours.
- (o) Pull the string to remove the masking tape.

S 392-063

- (3) Do the steps above to seal the multiple cutouts in the intermediate sealing areas. Do not use the coil spacers.

S 392-064

- (4) Do the above steps to seal the single cutouts in primary or intermediate areas. Do not use the seal plate or filler.

TASK 51-31-01-392-065

11. Fuel Seal Application

A. References

- (1) AMM 28-11-00/801, Fuel Tanks - Approved Repair

B. Procedure

S 392-066

- (1) Seal the integral fuel tanks (AMM 28-11-00/801).

**NOTE:** The dry bay access panels are sealed with the "Fillet Seal Application" and "Fastener Seal Application" tasks.

TASK 51-31-01-602-067

12. Protection of Sealing Materials

A. Procedure

S 602-068

- (1) Keep the sealing materials away from grease, oil, dirt, metal particles and all unwanted materials.

S 602-069

- (2) After the sealant is tack-free, put a protective cover on the sealing area for protection.

TASK 51-31-01-392-070

13. Accelerated Curing

A. Equipment

- (1) Hot air blowers
- (2) Heat Lamps

B. Procedure

S 392-071

- (1) Use one of these steps to accelerate the cure:

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**CAUTION:** MAKE SURE THE TEMPERATURE IS BELOW 120°F. IF THE TEMPERATURE IS ABOVE 120°F, BUBBLES WILL OCCUR ON THE SEALANT.

- (a) Use hot air blowers or heat lamps to apply heat to the sealant.
- (b) Make the airplane structure warm after you apply the sealant.

TASK 51-31-01-002-104

14. Chemical Sealant Removal

A. Consumable Materials

(1) Chemical strippers:

- (a) E00002 Turco 5351 stripper
- (b) E50004 Cee-Bee E-1058 stripper
- (c) E50005 Skykleen 2000 stripper
- (d) E50006 Naftosolv FN stripper
- (e) E50007 Eldorado PR-5044 stripper
- (f) E50008 Skyrestore (thick) stripper

B. Chemically remove sealant as follows:

S 022-097

- (1) Remove the sealant with an approved scraper and scraper handle.

S 952-098

- (2) Mask the surrounding areas as necessary to prevent contact with chemical strippers.

**NOTE:** Do not allow chemical strippers to contact substrates other than aluminum.

**NOTE:** Do not use chemical strippers on reverse lap joints.

**NOTE:** Chemical strippers will soften and remove paint.

S 942-099

- (3) Use one of the following chemical strippers to remove the sealant:
  - Turco 5351 stripper
  - Cee-Bee E-1058 stripper
  - Skykleen 2000 stripper
  - Naftosolv FN stripper
  - Eldorado PR-5044 stripper
  - Skyrestore (thick) stripper

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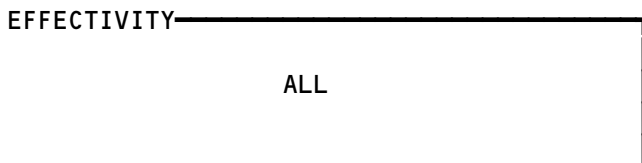
PERMITTED SUBSTITUTES FOR INITIAL SPECIFIED SEALANT								
INITIAL SPECIFIED SEALANTS	PERMITTED ALTERNATIVE SEALANTS							
	BMS 5-26	BMS 5-45	BMS 5-63	BMS 5-95	BMS 5-142	PR-1826	PR-1828	BMS 5-150
BMS 5-19	NO	YES	NO	NO	NO	YES	NO	NO
BMS 5-26	---	YES	NO	NO	NO	YES	YES	NO
BMS 5-32	NO	YES	NO	YES	YES	YES	YES	NO
BMS 5-45	NO	---	NO	NO	NO	YES	YES	NO
BMS 5-63	NO	NO	---	NO	NO	NO	NO	NO
BMS 5-79	NO	YES	NO	YES	YES	YES	YES	NO
BMS 5-95	NO	YES	NO	---	YES	YES	YES	YES BMS 5-150 (CLASS B-2 ONLY)
BMS 5-142	NO	YES	NO	YES	---	YES	YES	NO

TABLE I

1 THIS ALTERNATIVE IS NOT PERMITTED FOR MATING SURFACE SEAL, PRE-PACK SEALING, AND WET FASTENER INSTALLATION PROCEDURES.

2 YOU MUST APPLY A LAYER OF PRIMER BEFORE YOU APPLY THE SEALANT.

Alternative Sealants Data  
Figure 207



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S 112-100

- (4) Chemically strip any sealant remaining on the surface as follows:
- (a) Using a natural bristle brush, apply a thin coating of chemical stripper on the sealant.
    - 1) Do not apply excessive chemical stripper.
    - 2) Stripper should hang and not flow.
  - (b) Let the stripper dwell until the sealant can be easily removed by dry wiping, but do not exceed 40 minutes.
    - 1) Remove softened sealant with a clean dry cloth.
    - 2) Approved scrapers may be used to facilitate removal.

S 112-102

- (5) After chemical stripping is complete, remove stripper by thoroughly washing with a water-based alkaline cleaner (Ref 20-30-02, Maintenance Practices).

S 172-103

- (6) Rinse area thoroughly with water.

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NOSE WHEEL WELL DOOR SEAL – MAINTENANCE PRACTICES

1. General

- A. This procedure contains a task to make a splice in the forward seal on the nose wheel well door. The seal is located on the fuselage at the forward edge of the wheel well. The seal can be either one piece, one piece with a notch at the centerline of the airplane, or two pieces with a splice at the centerline of the airplane.
- B. It is acceptable when you remove the seal to cut it along the centerline of the airplane. It is satisfactory to install the seal in two pieces with a splice at the centerline of the airplane.

TASK 51-31-51-302-001

2. Nose Wheel Well Door Seal Splice

A. General

- (1) Use this procedure when it is necessary to do these tasks:
  - (a) To get clearance for the drain hole at the centerline of the airplane
  - (b) To install the seal when it is in two pieces.

B. Consumable Materials

- (1) G00110 Rubber – BMS 1-11 Type II Grade 60 foam
- (2) A00027 Adhesive – BAC 5010 Type 60

C. Access

- (1) Location Zones
  - 117 Fuselage, Lower Half
  - 118 Fuselage, Lower Half
- (2) Access Panels
  - 115 Nose Wheel Door L
  - 116 Nose Wheel Door R

D. Procedure

S 752-002

- (1) Make sure the seal is installed in the retainer.

S 352-006

- (2) Make an insert from the rubber as follows:

NOTE: You will use this piece of rubber as an insert for the splice.

- (a) Cut a piece of the rubber that is 2.50 inches long with a 0.375 inch diameter.

S 352-005

- (3) Make a splice in the seal at the centerline of the airplane.
  - (a) Cut the seal at the drain hole in the centerline of the airplane.
  - (b) Trim the ends of the seal sufficiently to allow liquid to go through the drain hole.
  - (c) Install the foam insert in the ends of the seal.

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(d) Bond the foam insert to the seal with the adhesive.

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AIRFRAME DRAINAGE - DESCRIPTION AND OPERATION

1. General
  - A. External drain holes and internal drain paths are provided to prevent water and other fluids from collecting within the airplane. Drain holes and drain paths must be inspected periodically to ensure they are clear of obstructions.
2. External Drains
  - A. Drain ports are located on exterior surfaces of body, wing and empennage to dump fluids overboard. Leveling compound is used to ensure proper drainage in sloping areas.
  - B. Spring type valves are used in pressurized areas. The valves close off ports when airplane is pressurized and allow ports to remain open when airplane is not pressurized.
  - C. Scupper drains are used in unpressurized areas. Drain ports in unpressurized areas are always open. Open drain holes are used to drain areas such as wing/body fairings from inside to outside.
3. Skinline Drainage
  - A. The airplane, because of the nearly level attitude, uses a skinline drainage concept throughout the lower lobe.
  - B. Skinline drainage will provide liquid flow through holes in each stringer from one bay to the next, eventually terminating at a drain valve.
4. Internal Drain Paths and Drain Holes
  - A. Internal structure is provided with tubes, dams, channels and drain holes, to direct flow of fluids toward external drainage points.

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AIRFRAME DRAINAGE – MAINTENANCE PRACTICES

1. General

- A. This procedure has these tasks:
  - (1) Examine and Clean the External Drain Holes and Drain Valves.
  - (2) Repair the Drainage Leveling Compound.
  - (3) Canted Pressure Deck Check Inspection
  - (4) Canted Pressure Deck Inspection and Clean.
- B. You must examine and clean the drain holes and drain valves regularly. This will help you make sure the drains operate correctly.
- C. The leveling compound and limber holes permit the fluids in the airplane to move to the external drain holes.
- D. The leveling compound is in many areas of the airplane. You can repair leveling compound that has damage.

TASK 51-41-00-102-001

2. Examine and Clean the External Drain Holes and Drain Valves (Fig. 201)

- A. References
  - (1) AMM 51-41-01/401, Fuselage Drain Valve
- B. Consumable Materials
  - (1) B00402 Cleaner – MIL-PRF-87937
  - (2) B00003 Cleaner – GMC 528B
  - (3) G00034 Cheesecloth
- C. Access
  - (1) Location Zone  
100 Lower Half of Fuselage
- D. Procedure – Examine the Drain System

**NOTE:** Examine the external drain holes and drain valves regularly. If it is necessary, clean the drain holes and valves. Refer to the Clean the Drain Holes and Drain Valves paragraph. If it is necessary, repair the leveling compound. Refer to the Repair the Drainage Leveling Compound task.

S 212-002

- (1) Examine the drain valves to make sure they are clean and operate correctly.

S 212-003

- (2) Make sure the scuppers and tubes do not have blockage.

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S 212-016

- (3) AIRPLANES WITH ANTI-FLUTTER CANISTERS ON THE CANTED PRESSURE DECK DRAIN TUBES;

Make sure the anti-flutter canisters do not have blockage.

- (a) Access the anti-flutter canisters in the main landing gear wheel well.  
(b) Disconnect hose on both ends of the cannister. Make sure the cannister and hoses have no blockage.

E. Procedure - Clean the Drain Holes and Drain Valves

S 112-004

- (1) Remove all unwanted materials from the drain holes with a cheesecloth that is moist with cleaner (MIL-PRF-87937 or GMC 528B).

S 022-019

- (2) Do these steps:  
(a) Remove the drain valve (AMM 51-41-01/401).

NOTE: Remove the drain valve when you are out of the airplane.

- (b) Remove all the unwanted materials from the drain valves with a cheesecloth that is moist with the cleaner.  
(c) Install the drain valve (AMM 51-41-01/401).

TASK 51-41-00-392-007

3. Repair the Drainage Leveling Compound

A. Reference

- (1) AMM 51-21-02/701, Prepaint Cleaning and Treatment - Cleaning/Painting  
(2) AMM 51-21-10, Decorative Exterior Finish - Cleaning/Painting  
(3) AMM 51-24-09/701, Corrosion Inhibiting Compound - Cleaning/Painting

B. Equipment

- (1) Brush, stiff-bristle (Commercially available)  
(2) Hardwood tool (Commercially available)

C. Consumable Materials

- (1) A00302 BMS 5-125, Type II or III, Compound, Self-Leveling, for Fluid Drainage  
(a) Optional:  
A00247 BMS 5-95, Class B  
(2) C00259 Primer - BMS 10-11, Type I

D. Access

- (1) Location Zone  
100 Lower Half of Fuselage

E. Procedure

S 162-008

- (1) Remove the damaged leveling compound with the hardwood tool.

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S 162-009

- (2) Remove all the loose pieces of the leveling compound with the brush.

S 112-010

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (3) Remove the corrosion inhibiting compound from structure and leveling compound with solvent (AMM 51-24-09/701).

S 842-049

- (4) Prepare the painted surfaces for painting (AMM 51-21-02/701).

S 372-011

- (5) Apply new primer to areas where the primer is damaged (AMM 51-21-10/701)..

**NOTE:** The primer must be tack-free before you apply the leveling compound.

S 392-012

- (6) Mix the base and the curing agent. Obey the manufacturer's instructions.

S 392-013

**CAUTION:** AIRPLANE MUST BE IN A LEVEL OR TAXI ATTITUDE DURING THE POURING AND GEL TIME (6 HOURS MINIMUM AT 72+/-5 DEGREES F) OF THE COMPOUND. IF THE AIRPLANE IS NOT LEVEL, THE COMPOUND CAN ENTER AND BLOCK THE INTERNAL DRAIN PATHS. THIS WILL CAUSE FLUID TO COLLECT. STRUCTURAL DAMAGE CAN RESULT.

- (7) Pour the leveling compound until it is level with the top of the drain hole or clearance.

TASK 51-41-00-202-021

4. Inspect - Canted Pressure Deck Drain Check (Fig. 203)

A. Access

(1) Location Zones

732 Main Wheel Well (left)  
742 Main Wheel Well (right)

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B. Procedure - Drain Line Check

S 212-022

- (1) Get access to the drain line through the main wheel well.

S 212-023

- (2) Visually check the external drain, reducer, drain hose and canister for damage, blockage, holes, or signs of frozen water.

S 412-039

- (3) AIRPLANES PRE-SERVICE BULLETIN 767-51A0020;  
Install a temporary plug in the sidewall hole of the most outboard drain hose if required

NOTE: Some airplanes have holes in the hose sidewall at the top or bottom.

S 012-040

- (4) Disconnect the drain hose from the drain tube assembly and drain valve assembly.

S 212-048

- (5) To make sure free flow of drain line, do the steps that follow:

WARNING: WHEN YOU USE COMPRESSED AIR, MAKE SURE THAT CORRECT EYE PROTECTION IS WORN BY AFFECTED PERSONNEL TO PREVENT INJURY.

CAUTION: DO NOT USE MORE THAN 8 PSI OF COMPRESSED AIR. DRAIN VALVES CAN BE DAMAGED.

- (a) Blow 3-5 psi compressed air through the drain line.  
(b) Make sure that air flows freely.  
1) If air does not flow freely, do this task, Inspection and Clean Canted Pressure Deck.

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(c) Stop air flow.

S 212-024

- (6) To make sure free flow of the drain tube assemblies except the outboard drain valve assembly, do the steps that follow:

**WARNING:** WHEN YOU USE COMPRESSED AIR, MAKE SURE THAT CORRECT EYE PROTECTION IS WORN BY AFFECTED PERSONNEL TO PREVENT INJURY.

**CAUTION:** DO NOT USE COMPRESSED AIR ON THE OUTBOARD DRAIN VALVE ASSEMBLY. DRAIN VALVE ASSEMBLY CAN BE DAMAGED.

- (a) Blow 3-5 psi compressed air through the drain tube assembly.
- (b) Make sure that air flows freely.
  - 1) If air does not flow freely, do this task, Inspection and Clean Canted Pressure Deck.
- (c) Stop air flow.
- (d) Make sure that water does not flow out of the end of the drain tube assembly.
  - 1) If water flows out of the drain hose, do this task, Inspection and Check Canted Pressure Deck.
- (e) Connect the drain hose to the drain tube assembly and drain valve assembly.
  - 1) If installed, remove the temporary plug in the sidewall hole of the drain hose.

TASK 51-41-00-212-026

5. Inspection and Clean - Canted Pressure Deck (Fig. 204)

A. Access

- (1) Location Zones
  - 732 Main Wheel Well (left)
  - 742 Main Wheel Well (right)
  - 100 Lower Half of Fuselage

B. Prepare to inspect the drain system.

S 012-027

- (1) Remove seats as necessary.

S 012-028

- (2) Remove the floor panels as necessary.

C. Inspect and clean the drain system.

S 142-029

- (1) Remove all unwanted materials from the wing center section cavity and drain inlets.

S 142-030

- (2) Make sure that all scavenge tubes, valves, drain hoses, and exits are clear.

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D. Put the airplane back to its usual condition.

S 412-031

- (1) Reinstall the equipment you removed.

TASK 51-41-00-782-032

6. Pressure Check - Canted Pressure Deck

A. General

- (1) This test is to find leaks in the wheel well canted pressure deck area, which can cause fluid to spray on the lateral control cables.

B. References

- (1) AMM 05-51-24/201, Cabin Pressure Leakage Test

C. Access

(1) Location Zones

- |     |                         |
|-----|-------------------------|
| 732 | Main Wheel Well (left)  |
| 742 | Main Wheel Well (right) |

D. Procedure

S 782-033

- (1) Get access to the canted pressure deck in the main wheel wells.

S 782-034

- (2) To pressurize the airplane, do this task, Cabin Pressure Leakage Test (AMM 05-51-24/201).

S 782-035

- (3) Hold your hand 6 inches away from the canted pressure deck.

**NOTE:** The cable ball seals will have air leakage. Isolate the air leakage around the cable ball seals.

S 782-036

- (4) Airflow that cannot be felt from a leak location on the canted pressure deck is permitted.

**NOTE:** A minimum quantity of air leakage is permitted.

S 782-038

- (5) If an air leak is found, repair the source of the leak.

E. Put the airplane back to its usual condition.

S 782-037

- (1) Release the airplane pressure (AMM 05-51-24/201).

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TASK 51-41-00-212-041

7. Detail Visual Check – Canted Pressure Deck (Fig. 205)

A. Access

(1) Location Zones

- 732 Main Wheel Well (left)
- 742 Main Wheel Well (right)

B. Procedure

S 212-042

- (1) Get access to the canted pressure deck in the main wheel wells.

S 212-043

- (2) Carefully examine the pressure deck for loose, missing, or cracked sealant.

S 212-044

- (3) Examine the area surrounding outboard most drain tube penetrations (left and right) for missing sealant.

S 212-045

- (4) Examine the bulkhead area for loose or missing fasteners.

S 212-046

- (5) Examine the cable penetrations for loose seals.

S 212-047

- (6) Examine the seal where the station 955 bulkhead fitting goes into the canted pressure deck.

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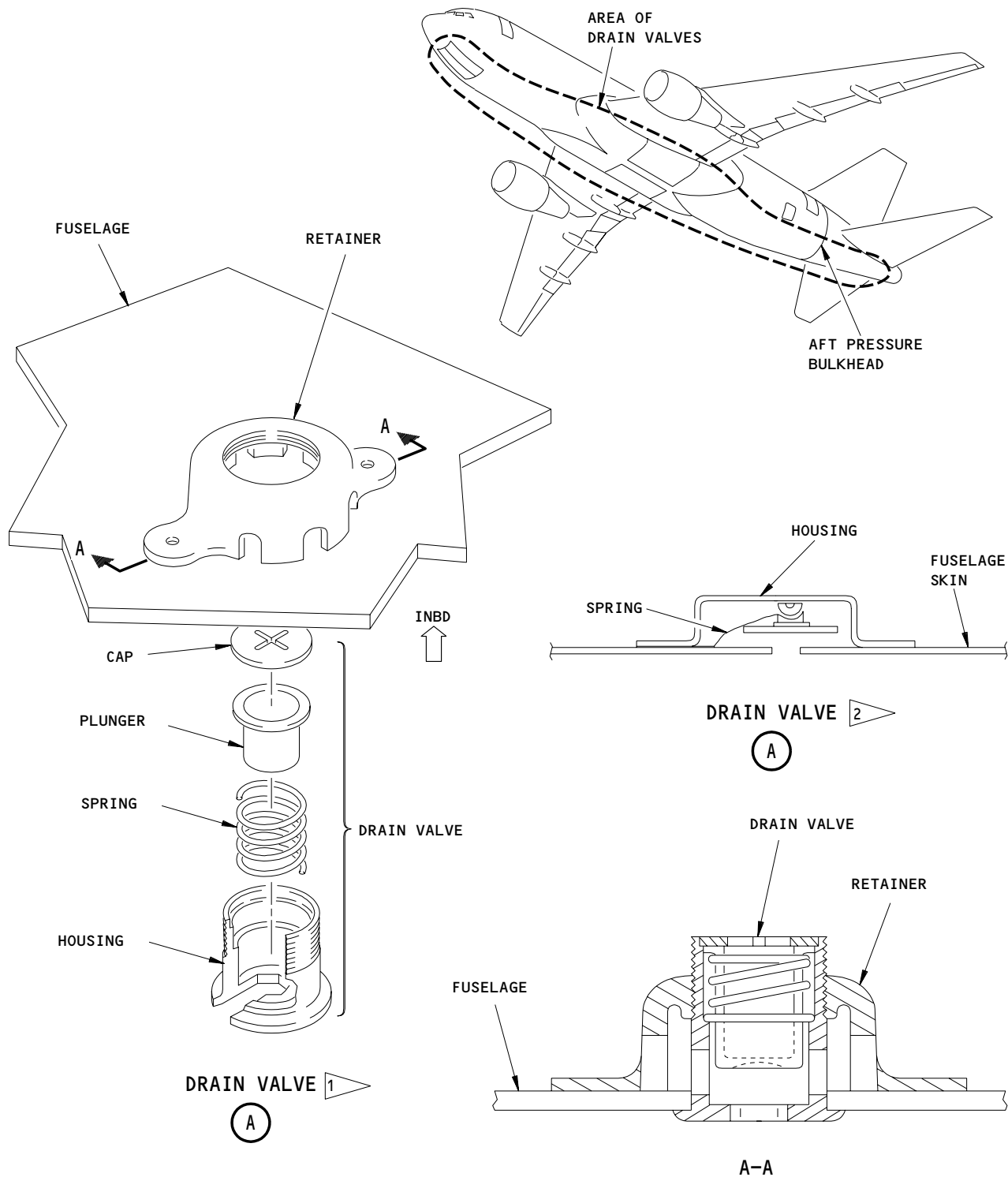
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- 1 AIRPLANES WITH DRAIN VALVES THAT ARE PLUNGER TYPE
- 2 AIRPLANES WITH DRAIN VALVES THAT ARE LEAF SPRING TYPE

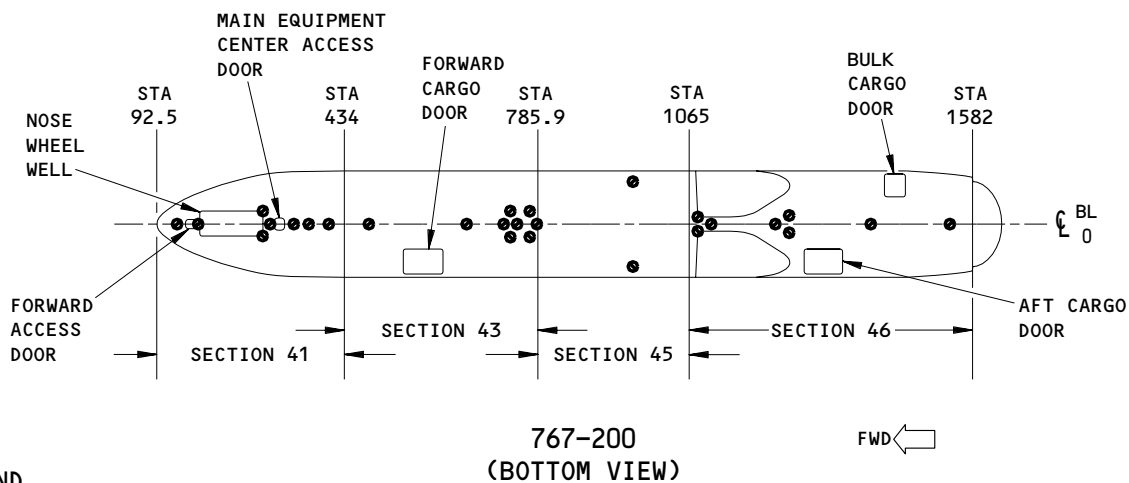
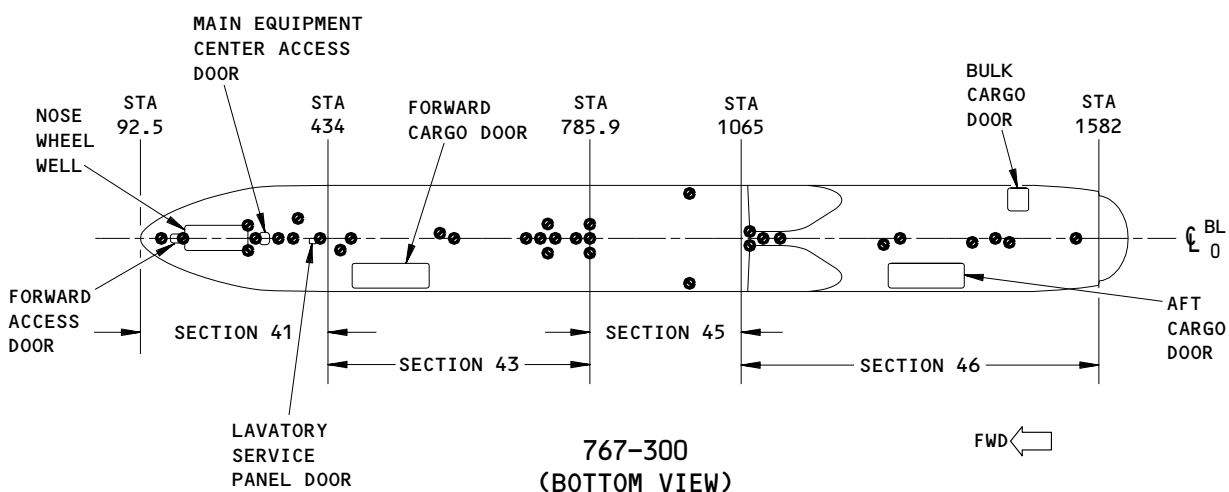
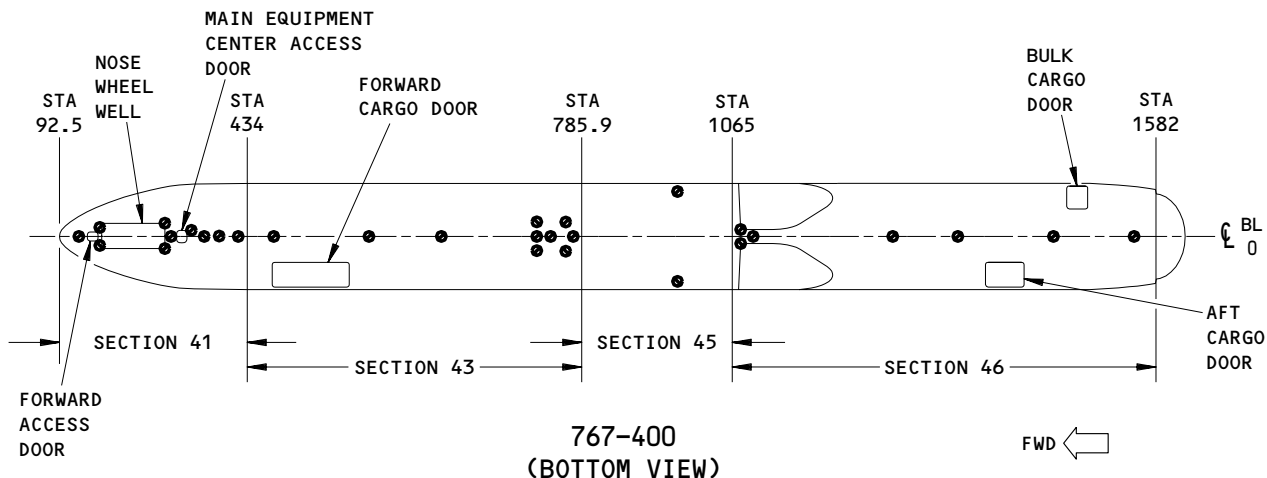
External Drains  
Figure 201

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**LEGEND**

- EXTERNAL DRAIN LOCATION

Typical External Drain Locations  
Figure 202

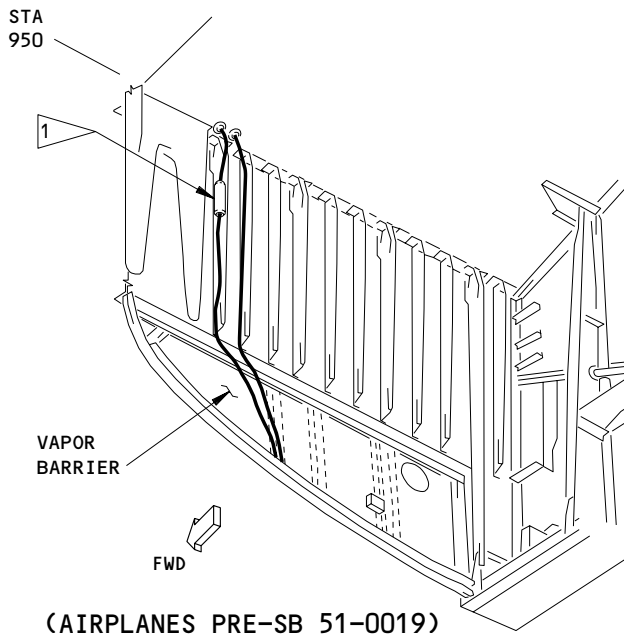
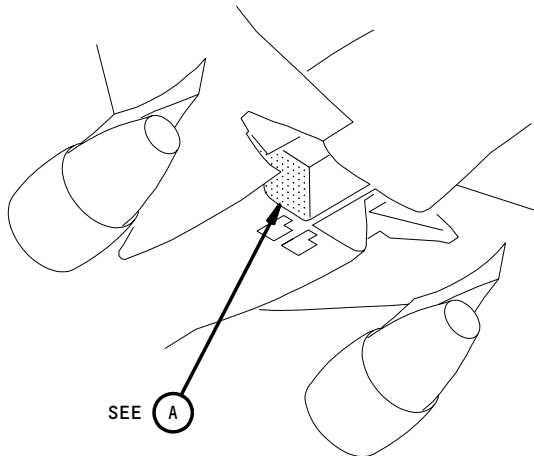
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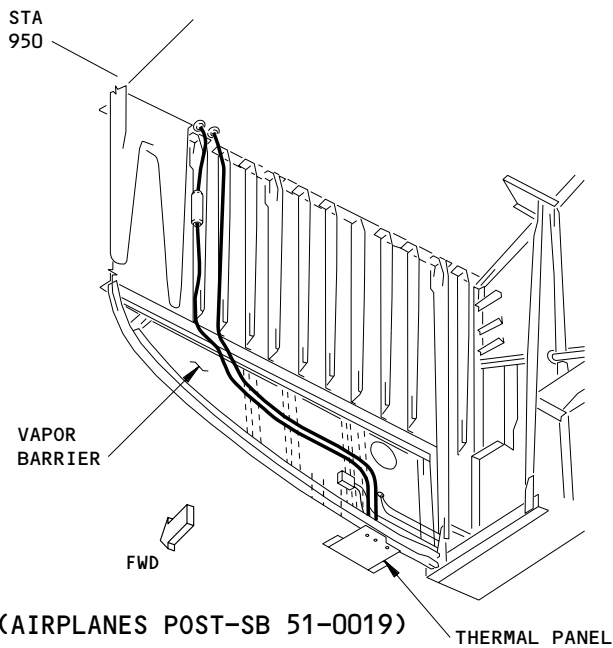
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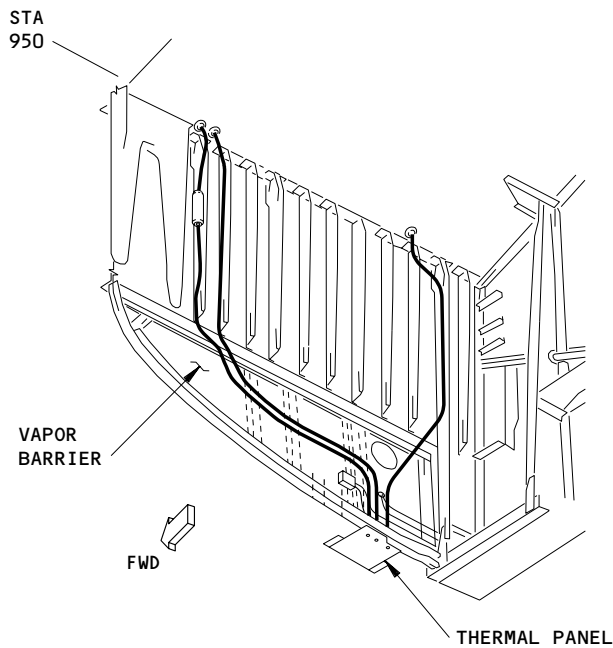
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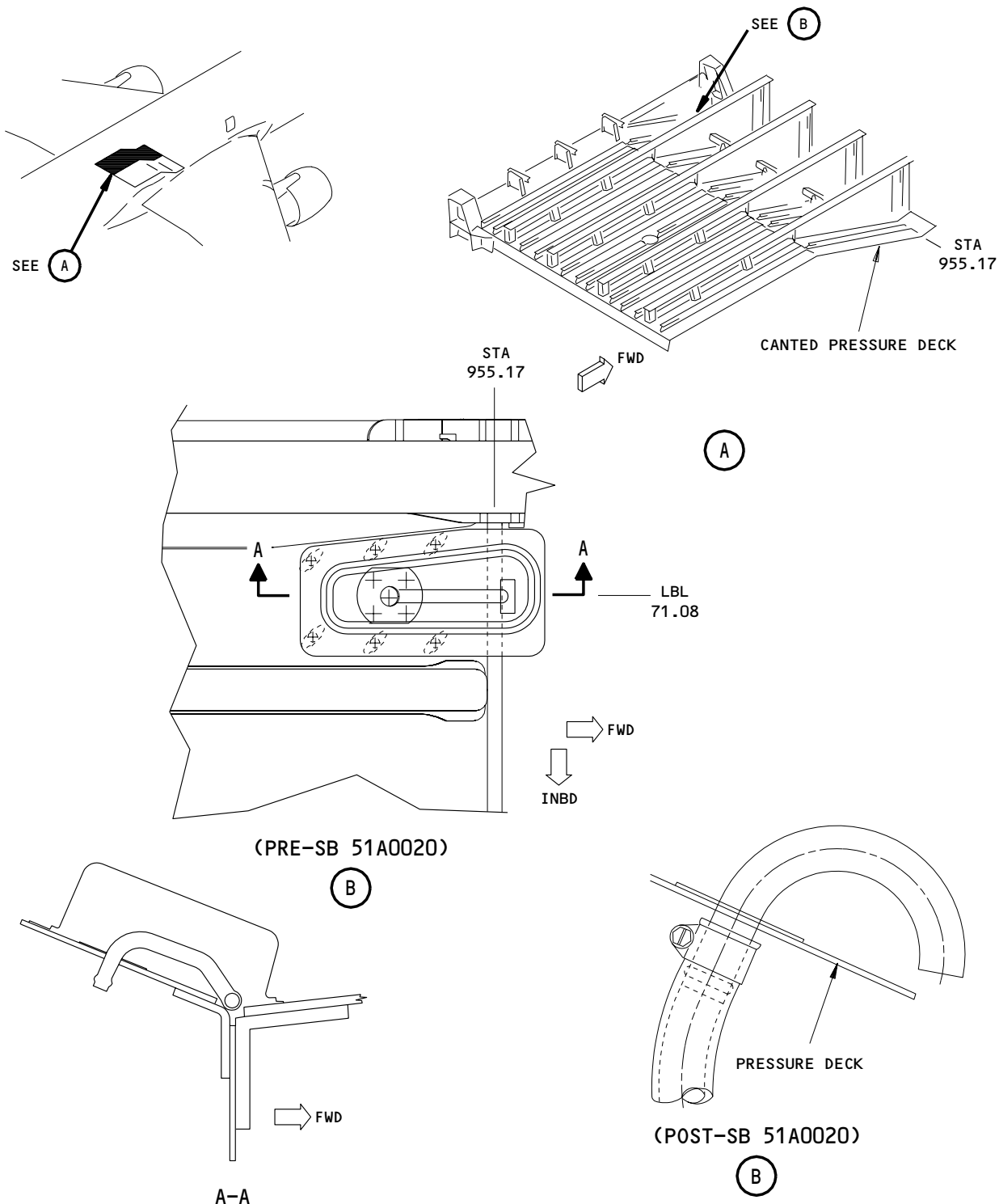
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1 AIRPLANES POST-SB 51-0016

Main Landing Gear Wheel Well  
(Left Side is Shown, Right Side is Equivalent)  
Figure 203

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Canted Pressure Deck  
(Left Side is Shown, Right Side is Equivalent)  
Figure 204

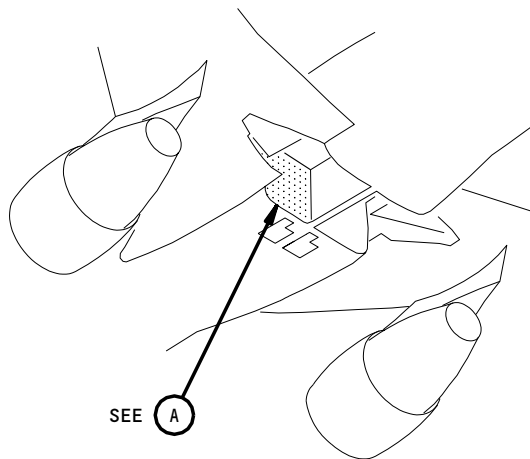
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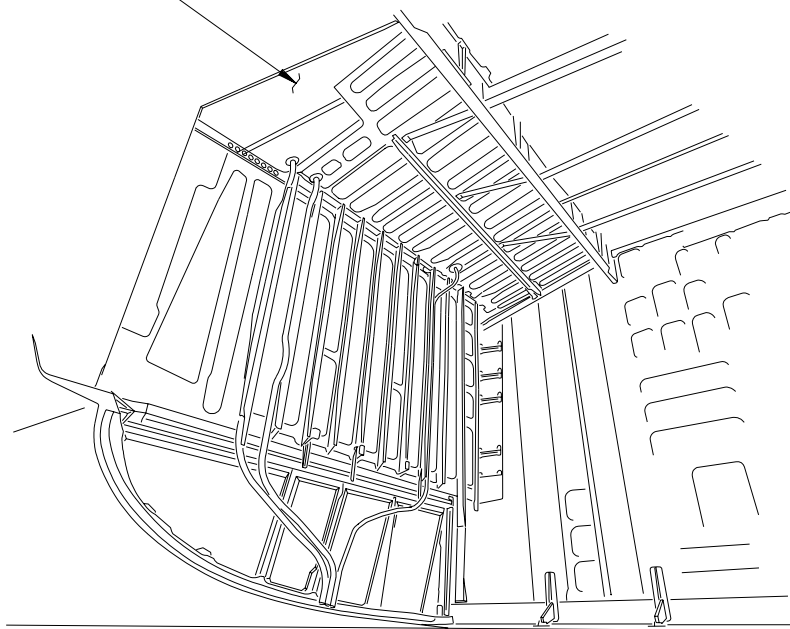
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CANTED PRESSURE DECK



FWD ←

(A)

Canted Pressure Deck Main Landing Gear Wheel Well  
(Left Side is Shown, Right Side is Equivalent)  
Figure 205

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AIRFRAME DRAINS - INSPECTION/CHECK

1. General

- A. This procedure contains one task. The task is to examine the airframe drains.

TASK 51-41-00-206-002

2. Examine the Airframe Drains

A. References

- (1) 51-41-00/201, Airframe Drainage

B. Access

- (1) Location Zone  
100 Lower Half of Fuselage

C. Procedure

S 216-001

- (1) Make sure the airframe drains are clean in areas of the airplane which are not pressurized.

S 216-003

- (2) Make sure the spring-type drainage valves are free to open and close.

S 216-004

- (3) Make sure the spring-type drainage valves are open when the airplane is not pressurized.

S 166-005

- (4) Clean the airframe drains if it is necessary (Ref 51-41-00).

TASK 51-41-00-206-006

3. Main Door Entryway Drains

- A. AIRPLANES WITH DOOR DRAINS;  
Procedure

S 216-007

- (1) Drain holes are provided inboard of the threshold in each main door entryway, with drain tubes leading to exterior drains.

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S 216-008

- (2) Check that drain holes and drain paths are clean and free of obstructions at all main entry doors.
  - (a) If the entryway drain is blocked with ice, slowly pour hot water into the drain.

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FUSELAGE DRAIN VALVE – REMOVAL/INSTALLATION

1. General

- A. This procedure contains two tasks. The first task is the removal procedure for the fuselage drain valve. The second task is the installation of the fuselage drain valve.
- B. You can get access to the fuselage drain valve from the outer surface of the fuselage.

TASK 51-41-01-004-001

2. Remove the Fuselage Drain Valve (Fig. 401)

A. General

- (1) Refer to AMM 51-41-00, Airframe Drainage – Maintenance Practices, for the locations of the fuselage drain valves.

B. Equipment

- (1) Tool – Drain Valve Installation – 2024  
Stewart Industries Inc.  
5210 14th Ave. NW  
Seattle, Wa 98107-3795

C. References

- (1) AMM 51-41-00/201, Airframe Drainage
- (2) IPC 51-41-01, Fig. 5

D. Access

- (1) Location Zones  
100 Lower Half of the Fuselage

E. Procedure

S 914-005

- (1) Find the drain valve assembly that you will remove (AMM 51-41-00/201).

S 024-002

- (2) Turn the drain valve assembly out of the valve retainer with the Drain Valve Installation tool. Remove the drain valve assembly (1) from the fuselage.

TASK 51-41-01-404-003

3. Install Fuselage Drain Valve (Fig. 401)

A. General

- (1) Refer to AMM 51-41-00/201, Airframe Drainage – Maintenance Practices, for the locations of the fuselage drain valves.

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**B. Equipment**

- (1) Tool - Drain Valve Installation - 2024  
Stewart Industries Inc.  
5210 14th Ave. NW  
Seattle, Wa 98107-3795

**C. Parts**

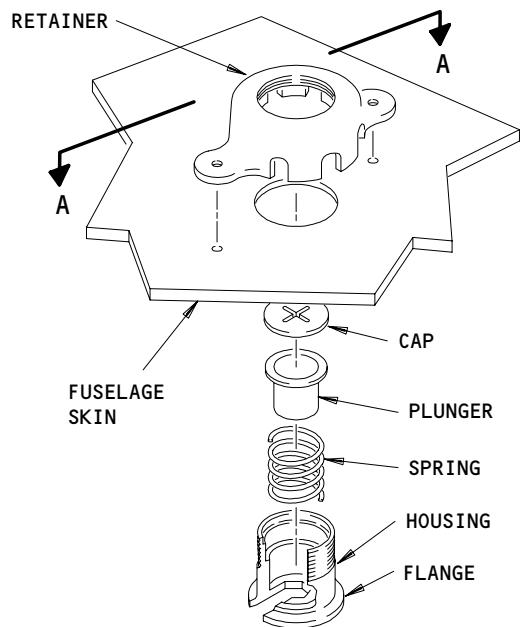
AMM		NOMENCLATURE	AIPC		
FIG	ITEM		SUBJECT	FIG	ITEM
401	1	Valve Assembly (Drain Valve Assembly)	51-41-01	05	25

**D. References**

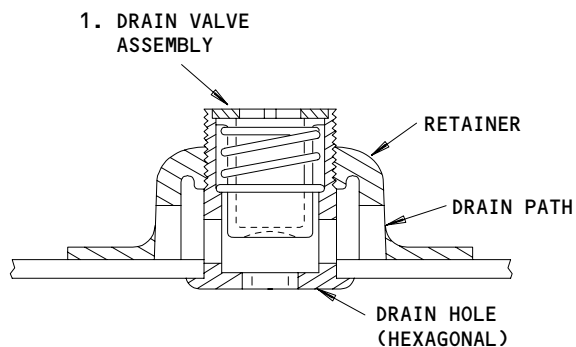
- (1) AMM 51-41-00/201, Airframe Drainage

**E. Access**

- (1) Location Zones  
100 Lower Half of the Fuselage



**DRAIN VALVE ASSEMBLY**



**(SHOWN INSTALLED)  
A-A**

**Drain Valve Installation  
Figure 401**

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F. Procedure

S 914-006

- (1) Find the location on the fuselage where you will install the drain valve assembly (AMM 51-41-00/201).

S 424-004

- (2) Put the drain valve assembly (1) in position in the fuselage.

S 434-007

- (3) Turn the drain valve assembly into the valve retainer with the Drain Valve Installation tool until the flange is against the fuselage.

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BONDED RUB PADS - MAINTENANCE PRACTICES

1. General

- A. This procedure contains one task. The task is to repair the bonded phenolic rub pads.

TASK 51-51-00-302-001

2. Repair the Bonded Phenolic Rub Pads

A. Equipment

- (1) Sealing gun; Commercially available
- (2) Spatula; Commercially available
- (3) Hardwood or Plastic Wedge; Commercially available
- (4) Heat lamps, 250 watts; Commercially available
- (5) Thermocouples; 200°F Capacity; Commercially available
- (6) Rubber or cotton gloves; Commercially available

B. Consumable Materials

- (1) Abrasive paper or cloth, 100-grit (minimum)
- (2) G00034 Cheesecloth
- (3) A00767 Sealant - BMS 5-45 Type II, Class B-1/2 or Class B-2
- (4) Abrasive Paper - Aluminum Oxide, Scotchbrite, Type A
- (5) B00148 Solvent - Methyl Ethyl Ketone (MEK) - TT-M-261
- (6) B00153 solvent - Toluene (Toluol), TT-F-548
- (7) B00135 solvent - Naphtha
- (8) B00184 solvent - BMS 11-7

C. Procedure - Repair Bonded Phenolic Rub Pads (Heat Source Available)

S 102-002

- (1) Do these steps to prepare the mating surface:

NOTE: Make sure you put on clean cotton or rubber gloves when you clean the mating surfaces.

(a) To clean the phenolic rub pads, do these steps:

- 1) Remove all loose soil, grease or oil from the surface with a clean cheesecloth.

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**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- 2) Clean the surface with a cheesecloth that is moist with solvent, Series 98-1 (AMM 20-30-98/201).
- 3) Immediately dry the surface with a clean dry cheesecloth.
- 4) Lightly rub the phenolic pad with abrasive paper until the gloss is removed. Make sure the gloss is removed from all edges and corners of the pads.
- 5) Remove all remaining particles with a clean cheesecloth.

**NOTE:** Do not use solvent to remove the remaining particles.

- 6) Clean the surface with a clean cheesecloth that is moist with solvent, Series 98-1 (AMM 20-30-98/201) until all the remaining particles are removed.
  - 7) Clean the surface again if it is necessary.
- (b) To clean the clad aluminum surfaces that do not have primer applied, do these steps:
- 1) Remove all loose soil, grease or oil from surface with a clean cheesecloth.
  - 2) Clean the surface with a clean cheesecloth that is moist with solvent, Series 88 (AMM 20-30-88/201).
  - 3) Immediately dry the surface with a clean dry cheesecloth.
  - 4) Lightly rub the clad surface with Scotchbrite sheets until the mating surface is not shiny.
  - 5) Remove the remaining particles with a clean cheesecloth.

**NOTE:** Do not use solvent to remove the remaining particles.

- 6) Clean the surface with a cheesecloth that is moist with BMS 11-7 solvent until all the remaining particles are removed.
  - 7) Immediately dry the surface with a clean cheesecloth.
  - 8) Clean the surface again if it is necessary.
- (c) To clean the metal surfaces that have BMS 10-11 primer applied, do these steps:

**NOTE:** It is not necessary to clean the metal surfaces if the BMS 10-11 primer was applied in less than 6 hours.

- 1) For surfaces that have the primer applied between 6 and 48 hours, clean the surface with a cheesecloth that is moist with naphtha.
- 2) Immediately dry the surface with a clean cheesecloth.

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- 3) For surfaces that have the primer applied for more than 48 hours, clean the surface with a cheesecloth that is moist with BMS 11-7 solvent.
- 4) Immediately dry the surface with a clean cheesecloth.
- 5) Clean the surface again if it is necessary.

S 392-003

- (2) Do these steps to apply the adhesive on the mating surface.
  - (a) In less than 1 hour before you apply the adhesive, make sure all the surfaces are clean.
  - (b) Remove the rub pads with a hardwood or plastic wedge.
  - (c) Use heat lamps to make the adhesive soft.

**NOTE:** Do not apply heat at a temperature of 190°F or more. Use a thermocouple to measure the temperature.

- (d) Remove the remaining adhesive from the surface with hardwood or plastic wedge.

**WARNING:** DO NOT GET SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. SOLVENTS MAY BE FLAMMABLE OR HARMFUL TO THE ENVIRONMENT. REFER TO PRODUCT MATERIAL SAFETY DATA SHEETS (MSDS) AND LOCAL REQUIREMENTS FOR PROPER HANDLING PROCEDURES.

- (e) Clean the area with a clean cheesecloth that is moist with solvent, Series 98-1 (AMM 20-30-98/201).
- (f) Immediately dry the area with a clean dry cheesecloth.
- (g) Refer to the manufacturer's instructions to mix the base component and the curing agent. Make sure the mixture is smooth and constant. Keep air bubbles to a minimum when you mix the components.

**NOTE:** Class B-2 sealant has a pot life of 2 hours and class B-1/2 has a pot life of 1/2 hour at 70°F. Keep the components that were not mixed in clean, airtight metal containers. Keep the mixed components at -20°F or lower. If the mixture is kept at temperatures between -20 and -30°F, the mixture has a pot life of 7 days. If the mixture is kept at temperatures between -30 and -40°F, the mixture has a pot life of 10 days. If the mixture is kept at temperatures below -40°F, the mixture has a pot life of 14 days.

**CAUTION:** DO NOT APPLY ADHESIVE IF THE TEMPERATURE OF THE STRUCTURE IS BELOW 50°F. AT TEMPERATURES BELOW 50°F, THE PERFORMANCE OF THE ADHESIVE IS UNSATISFACTORY.

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- (h) Apply a thin constant layer (approximately 50 grams for each square foot) of the mixture on each mating surface.

NOTE: Use a spreader that has serrations to apply the adhesive on a large mating surface.

- (i) Make sure the adhesive has a sufficient thickness to let the adhesive flow around the edges of the rub pad when the cure pressure is applied.
- (j) Do these steps to assemble the parts in less than 2 hours after you mix the B-2 material or in less than 20 minutes after you mix the B-1/2 material:
- 1) Put the rub pads in position.
  - 2) Use a clean roller or rub the surface with a clean cheesecloth to remove the air caught between the surfaces.

NOTE: Too much pressure can push the adhesive out from the rub pads.

- 3) Remove unwanted adhesive with a clean cheesecloth that is moist with solvent, Series 98-1 (AMM 20-30-98/201). Do not let the solvent go into bond line.
- 4) Let the adhesive dry for 10 minutes before you apply the cure pressure.
- 5) Apply the cure pressure equally to the part in less than 3.0 hours after you mix the B-2 material or in less than 1.0 hour after you mix the B-1/2 material.

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- 6) Cure the phenolic pads that are bonded to aluminum at constant pressure of 5 to 14 pounds per square inch (psi). Refer to the subsequent chart.

Curing Temperature (°F)	Hours After You Apply the Cure Pressure	
	Adhesive Class B-1/2	Adhesive Class B-2
77 ±5	45	72
72 ±5	68	108
67 ±5	90	144
62 ±5	135	216
115 ±5 *[2]	12 *[2]	18*[2]
185 ±5 *[1]	0.75 *[1]	0.75*[1]
Bond Line Temperature below cure Pressure		

- \*[1] More time on the cure pressure is necessary to heat the adhesive from 70 to 180°F.  
\*[2] Optional cure temperature and time. You can use the optional cure temperature and time only with Pro Seal 890.

- (k) Remove the unwanted adhesive with a hardwood or plastic wedge.  
(l) Remove the remaining adhesive from the surface with a clean cheesecloth that is moist with solvent, Series 98-1 (AMM 20-30-98/201).

D. Procedure – Repair Bonded Phenolic Rub Pads (No Heat Source Available)

**NOTE:** This procedure is recommended for a field repair of the bonded rub strips when a short cure time is necessary.

S 342-004

- (1) Refer to the steps in the first procedure to apply adhesives on the mating surfaces.

S 432-005

- (2) Do these steps to apply a new pad:  
(a) Refer to the manufacturer's instructions to mix the sealant.  
(b) Mix 22 (±2) parts (by volume) of BMS 5-45, PR-1776M B-2 with actuator to 100 parts (by volume) of the base component.  
(c) To install the new rub strip on the assembly, do these steps:  
1) Make sure the mating surfaces are clean.  
2) Put the rub strip flat against the assembly surface.

**NOTE:** Do not hold or use a clamp on the rub strip.

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- 3) If the clearance between the mating surfaces of the rub strip and the assembly is greater than 0.125 inch, install a new rub strip with a clean roller to get a smaller clearance.
  - 4) Apply a thin constant layer of adhesive (approximately 50 grams for each square foot) on each mating surface.
  - (d) Assemble the parts in less than 25 minutes after you mix the adhesive.
  - (e) Keep the minimum cure time and temperature at 6 hours and 64°F.
  - (f) To apply the cure pressure, do these steps:
    - 1) Apply a smooth constant pressure to the rub strip every 15 minutes during the first 3 hours after the parts are assembled.
    - 2) Keep a continuous bead of adhesive at the bond line to get a satisfactory bond between the mating surfaces.
    - 3) Apply more pressure to remove air pockets in the bond line during the first 3 hours after the parts are assembled.
- E. Procedure – Repair Bonded Phenolic Rub Pads (field repairs with a heat source available)

S 342-006

- (1) Refer to the steps in the first procedure to apply adhesive on the mating surface.

S 432-007

- (2) Do these steps to apply a new pad:
  - (a) Refer to the manufacturer's instructions to mix the sealant.
  - (b) Mix 22 (±2) parts (by volume) of BMS 5-45, PR-1776M B-2 with activator to 100 parts (by volume) of the base component.
  - (c) To install the new rub strip on the assembly, do these steps:
    - 1) Make sure the mating surfaces are clean.
    - 2) Put the rub strip flat against the assembly surface.

NOTE: Do not hold or use a clamp on the rub strip.

- 3) If the clearance between the mating surfaces of the rub strip and the assembly is greater than 0.125 inch, install a new rub strip with a clean roller to get a smaller clearance.
- 4) Apply a thin constant layer of adhesive (approximately 50 grams on each square foot) on each mating surface.
- (d) Assemble the parts in less than 25 minutes after you mix the adhesive.
- (e) To cure the assembly, do these steps:
  - 1) Use two heat lamps, 250 watts each, as a heat source. Put the lamps 9 inches apart and 6 inches from the rub strip. Make sure the heat lamps point down on the rub strip.
  - 2) Apply heat on the assembly at a temperature of 90 (±5)°F. Permit at least 1 1/2 hours from the time you mix the adhesive to the time you cure the adhesive.

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3) Cure the assembly for 2 hours minimum at 85 to 120°F.

NOTE: Use a thermocouple to measure the temperature.

4) Let the assembly stay for at least 20 minutes before you apply the cure pressure.

(f) To apply the cure pressure, do these steps:

1) Apply a smooth constant pressure to the rub strip every 15 minutes during the first 2 hours after the parts are assembled.

2) Keep a continuous bead of adhesive at the bond line to get a satisfactory bond between the mating surfaces.

3) Apply more pressure to remove air pockets in the bond line as the adhesive cures in the assembly.

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LIGHTNING STRIKE PROTECTION – DESCRIPTION AND OPERATION

1. General

- A. Lightning protection devices are used to maintain this protective shield and to ensure that penetration of the shield by the high voltages and currents of a lightning strike is stopped.
- B. Low conductivity composite structures, such as graphite fiber-epoxy and honeycomb components, and external electrically floating metal sections require grounding to the metal airframe to provide a low resistance path along the airplane exterior for the lightning current.

2. Lightning Protection System

- A. The functions of the lightning protection system are to:
  - (1) Prevent penetration of the exterior skin into fuel vapor and other critical safety of flight areas.
  - (2) Prevent puncturing of low conductivity composite structures such as fairings and control surfaces.
  - (3) Prevent arcing and sparking or limit the movement of electrical charges to the exterior surfaces of the airplane.
- B. The following protective devices are used to provide low resistance current paths between structural components and the metal airframe.
  - (1) Bonding jumpers
  - (2) Diverter strips and rods
  - (3) Conductive coatings
  - (4) Metal sheets or grids adhesively bonded to dielectric type structure
- C. Instructions for the removal and installation of these protective devices are covered in the chapters relating to structures, components, or parts connected to these devices.

3. Safety of Flight Components

- A. The following items are considered to be safety of flight items requiring protection either by the installation of lightning protection devices or engineering design that limits the flow of electrical charges to the exterior surfaces of the airplane.
- B. Fuel tanks
  - (1) Access doors
  - (2) Measuring sticks
  - (3) Over-the-wing caps
  - (4) Wing skin-integral fuel tanks
  - (5) Wing skin joints
  - (6) Vents
  - (7) Electrical wiring within fuel tanks

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4. High Maintenance and Replacement Cost Items – Usually Not Critical to Safety of Flight

- A. Items under this category normally do not affect the airplane's operation and safety when struck by lightning. Due to their high maintenance and replacement cost factors, diligence must be exercised to ensure proper installation of the components and related lightning protection devices.
- B. The following items are considered to be high maintenance/replacement cost components and require careful attention during removal or installation to preserve the integrity of their shield against lightning strikes.
- (1) Control surfaces:
    - (a) Hinges
    - (b) Actuators
  - (2) Nose radome
  - (3) Tail cone
  - (4) Wing tips
  - (5) Trailing edges
  - (6) Antennas
  - (7) Total air temperature probe
  - (8) Fuel probes – computer
  - (9) Navigational lights
  - (10) Weather radar
  - (11) Pitot probes
  - (12) Strobe lights

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