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CHAPTER 51 - STANDARD PRACTICES AND STRUCTURES - GENERAL

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STRUCTURES - DESCRIPTION AND OPERATION

1. 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.
   B. 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 characteristics in flight control surfaces; Kevlar for good strength characteristics; and Kevlar/Graphite for fracture toughness in areas subject to foreign object damage. For locations of principal composite components, see the Structural Repair Manual, SRM 51-70-02.
   C. Pressure relief blowout panels and doors located in various areas of the airplane prevent buildup of excessive pressure which may cause structural damage.

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 specificially 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 refered to by name and, if available, the Commercial and Goverment 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.
   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
V0CDK6	INTERNATIONAL RESEARCH AND DEVELOPMENT, INC. 110 MARTER AVE. SUITE 303 MOORESTOWN, NJ 08057
V0K209	INLAND TECHNOLOGY, INC. 2612 PACIFIC HIGHWAY EAST NORTH C TACOMA, WA 98424
V0L040	DINOL INTERNATIONAL 20600 EUREKE ROAD SUITE 414 TAYLOR, MI 48180-5306

V01139	GENERAL ELECTRIC CO. SILICONE PRODUCTS BUSINESS DEPT. HUDSON RIVER ROAD WATERFORD, NY 12188
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
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
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
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

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 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.

TASK 51-00-50-212-001

2. Identification of Corrosion
   A. General Identification of Corrosion

      S 212-002

      (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.

      S 212-003

      (2) ALLOY and CARBON STEELS - Corrosion is indicated by red dust deposits, and pitting of the effected surfaces.

      S 212-004

      (3) CORROSION RESISTANT STEELS - Corrosion is indicated by black pits, or a uniform reddish-brown surface.
   B. Types of Corrosion

      S 192-005

      (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.

      S 212-006

      (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.
(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) INNER-GRANULAR - 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 intregral 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

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.

TASK 51-00-51-212-001

2. Corrosion Inspection Areas
   A. Inspect for Corrosion

      S 212-002

      (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.

(d) FLOOR BEAMS - Traces of spillage under flooring should be investigated to determine if any corrosion has occured 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 spliiage 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 coation is gone.

S 212-003

(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.

S 212-004

(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 techiques may be used.

S 202-005

(4) The following NDI techiques 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 techiques 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.

(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-grandular 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.

B. Corrosion Detection

S 212-006

(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.

S 202-007

(2) NDI PROCEDURES - Once a visual detection of corrosion has been made, an assessment of the extent of the corrosion damage must 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.

S 282-009

(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.

S 932-010

(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.

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.

TASK 51-00-52-212-001

2. Assessment of Environmental Conditions
   A. Environments

      S 212-002

      (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 polluntants from a nearby industrial plant to an airplane parking area.
         (c) RAINFALL - Moderate rainfall in temperate or cold climates does not necessarily constitute an enviornmental 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.

(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 rhe 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 enviornmental 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 freash 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 volcanes, which can be an undesirable element in some ares.

(j) AIRBORNE ABRASIVES - Volcanic ash, blowing sand and coral dust have an erosive effect on airplanes 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.

S 192-003

(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.

S 192-004

(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.

S 192-005

(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.

S 192-006

(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.

<u>NOTE</u>: Some operators may 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.

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 of 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 832-002

(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 832-003

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.

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

S 832-006

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

S 832-135

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 plactic face shields, rubber raincoats and rainhats should be worn when cleaning, stripping, etching or applying conversion coating chemicals to overhead surfaces.

S 832-008

(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 832-009

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

S 832-010

(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 832-011

WARNING: 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 832-013

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

S 832-014

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

WARNING: ANY SLASHING 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 symtoms resulting from overexposure to the chemicals, move into fresh air immediately.

S 832-132

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 SLASHING 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.
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 51-00-53-202-016

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 212-017

(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 212-018

(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.

S 212-019

(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 212-020

(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 222-021

(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 252-022

(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 222-023

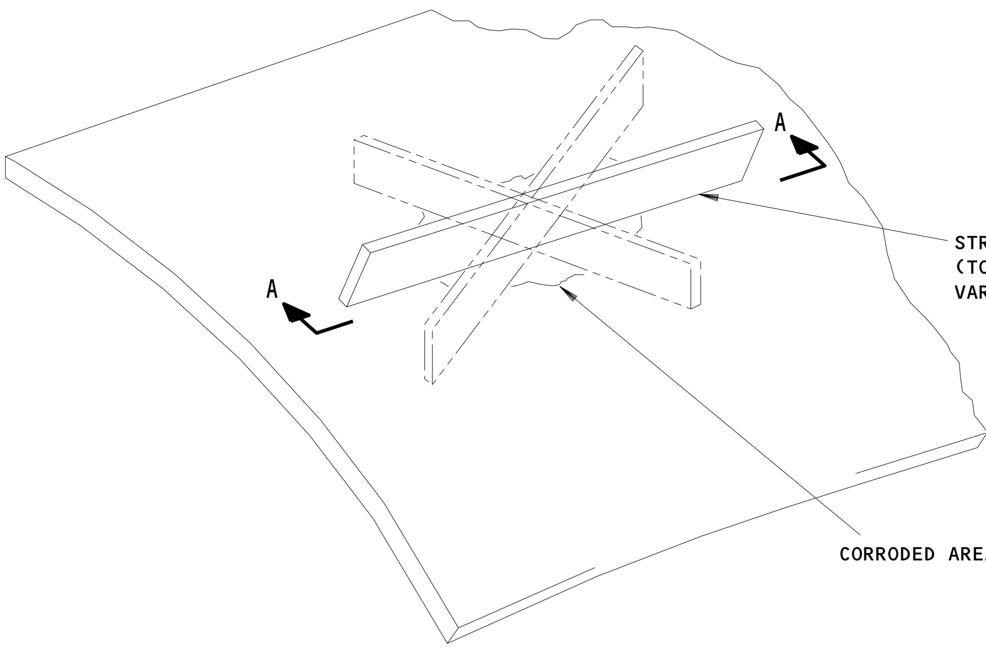
(1) Depth measurement is often possible using a straightedge (such as a ruler) and a 10-power magnifying glass as shown in figure 201. The straightedge should be placed at various angles to ensure that incorrect measurements are not recorded, due to local surface irregularities.

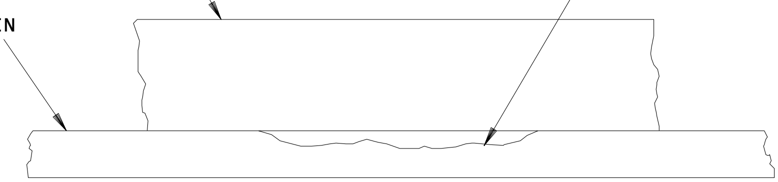
F. Depth Measurement with a Dial Depth Gage

S 222-024

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

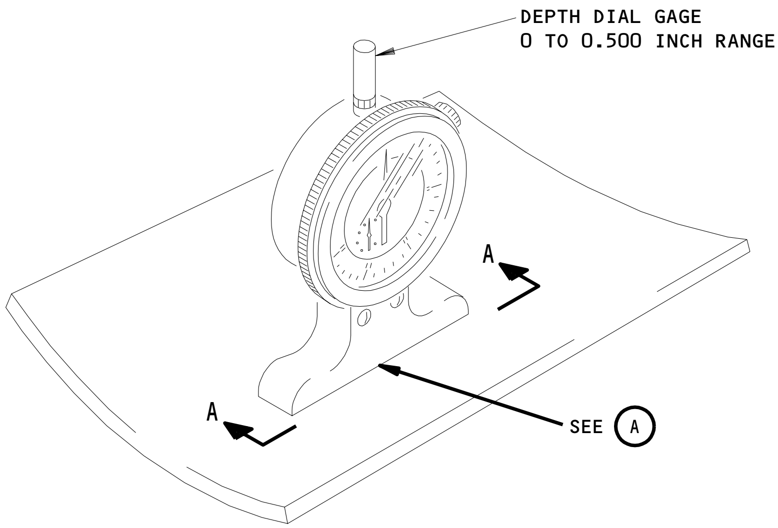
        NOTE: The base of the Dial Depth Gage should be flat against the undamaged surface on each side of the corrosion area. When taking measurements on concave or convex surfaces, place the base of the gage perpendicular to the radius of the curvature of the surface as shown in figure 202.

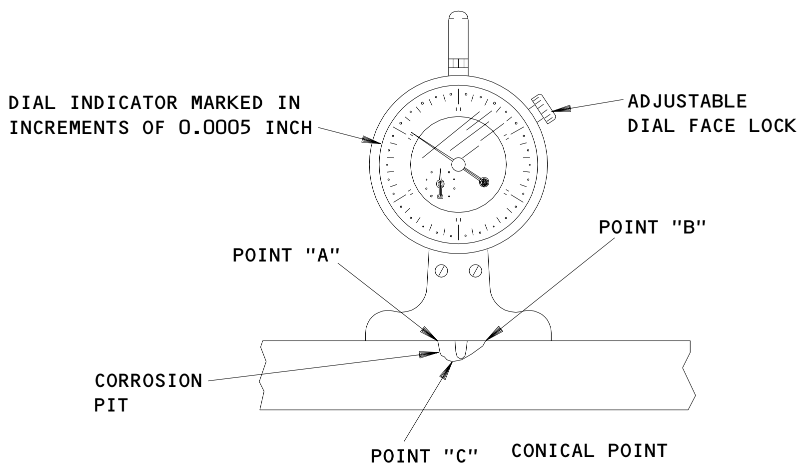




CORROSION AREA
A-A

Usage of Straight Edge in Determining Depth of Corrosion
Figure 201



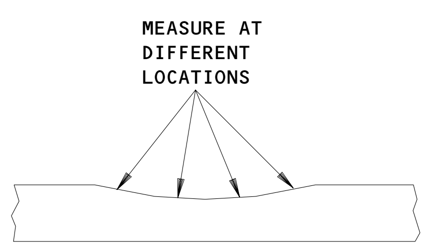


A-A

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:

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



A

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

S 222-025
(2) Take several additional depth readings.

S 212-026
(3) Select the deepest reading as the depth of the corrosion damage.

G. Measuring Corrosion Damage with Impression Materials

S 282-027
(1) In the event that the corrosion area is unaccessible 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 192-028
(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 222-029
(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.

TASK 51-00-53-102-030

4. <u>Corrosion Rework Preparations</u>

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

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

S 182-031
(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 762-032
(2) Statically ground the airplane (AMM 20-41-00/201).

S 022-033

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 952-034
(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 952-035
(5) Protect surfaces, joints and seams that are adjacent to the rework areas from chemical paint strippers, corrosion removers and chemical surface treatments.

B. Cleaning

S 112-036
(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 182-037
(2) For general cleaning procedures refer to AMM 51-21-00/701.

S 182-038
(3) Special cleaning procedures may be required in some cases, and will be outlined in the applicable AMM chapters.

S 182-039
(4) Precautions that are necessary when working with cleaning chemicals are noted in paragraph 2.

C. Paint Removal

S 152-040
(1) For general procedures, refer to AMM 51-21-01/701.

S 152-041
(2) For special removal procedures, refer to the appropriate sections of the AMM.

S 182-042
(3) For safety precautions when using paint stripping chemicals, refer to paragraph 2.

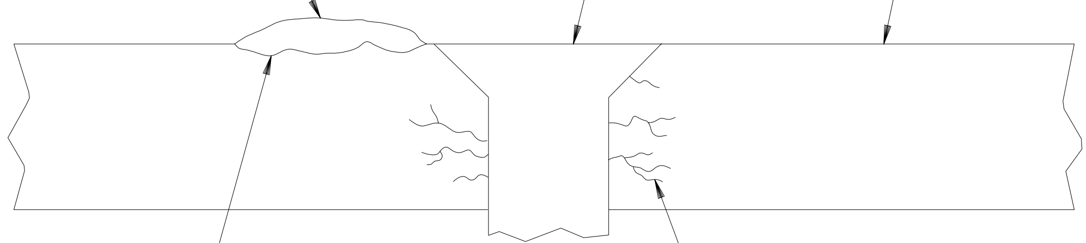
TASK 51-00-53-102-043

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.



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.

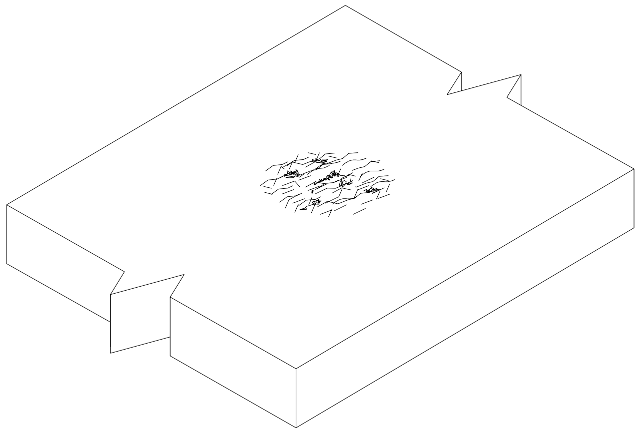
Corrosion at Fasteners
Figure 203

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)

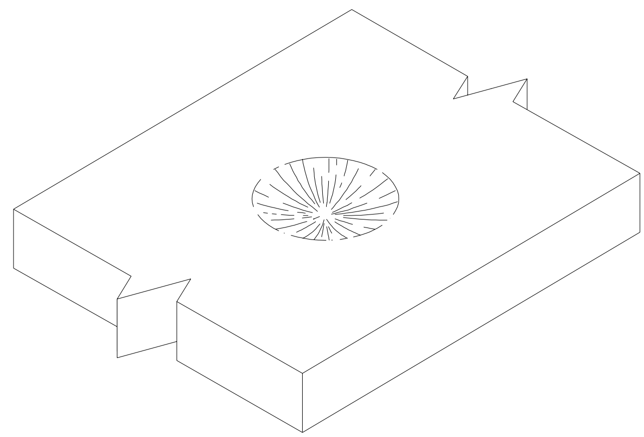
METALS OR MATERIALS TO BE PROCESSED	RESTRICTIONS	OPERATION	ABRASIVE FABRIC OR PAD	WOOL		PUMICE 350 MESH OR FINER	ABRASIVE WHEEL
				ALU-MINUM	STAIN-LESS STEEL		
FERROUS ALLOYS HEAT TREATED 220 KSI OR HIGHER	DO NOT USE ACID BASE RUST REMOVERS. DO NOT USE HANDHELD POWER TOOLS.	CORROSION REMOVAL AND BLENDS	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)



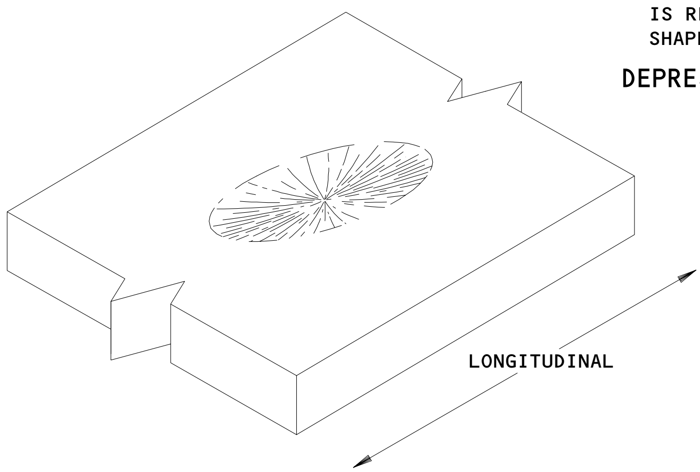
NOTE: ALL LOOSE CORROSION PRODUCTS ARE REMOVED FROM THE PIT.

CORROSION DAMAGE BEFORE REPAIR



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

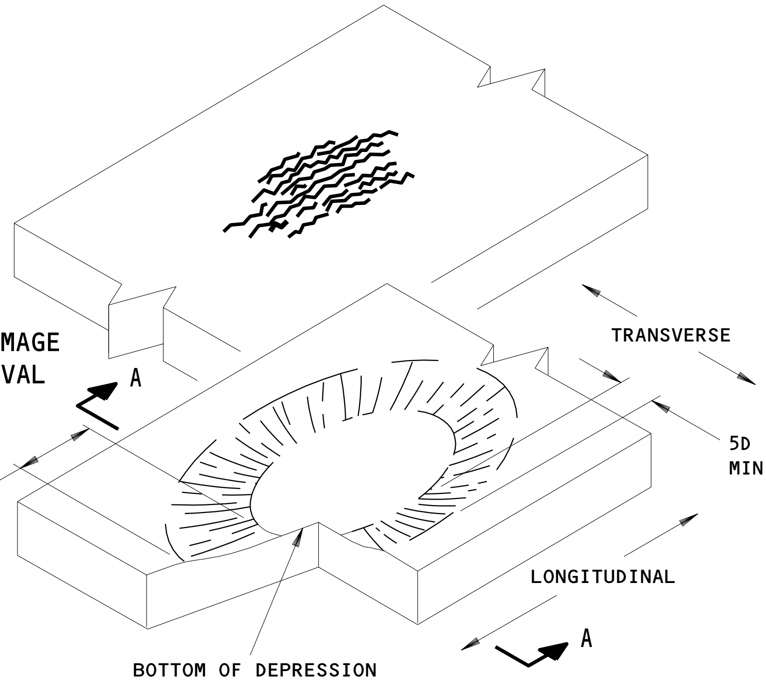
DEPRESSION AFTER CORROSION REMOVAL



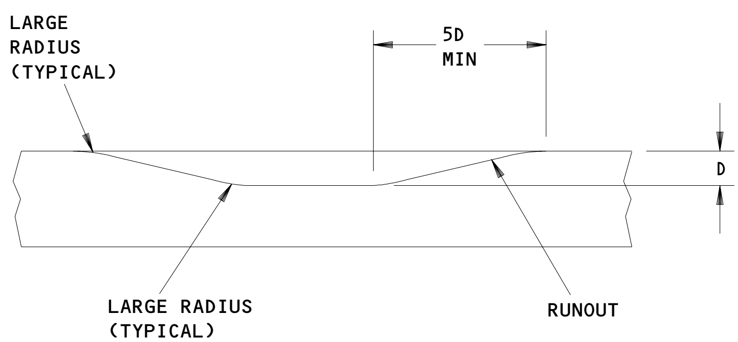
NOTE: THE BLEND NOW HAS THE RATIO AND DIRECTION SHOWN IN FIG. 206.

BLENDOUT COMPETE

Single Depression Blends
Figure 205



DAMAGE REMOVED AND SURFACE IS SMOOTH
WITH SHALLOW ELLIPTICAL BLENDOUT



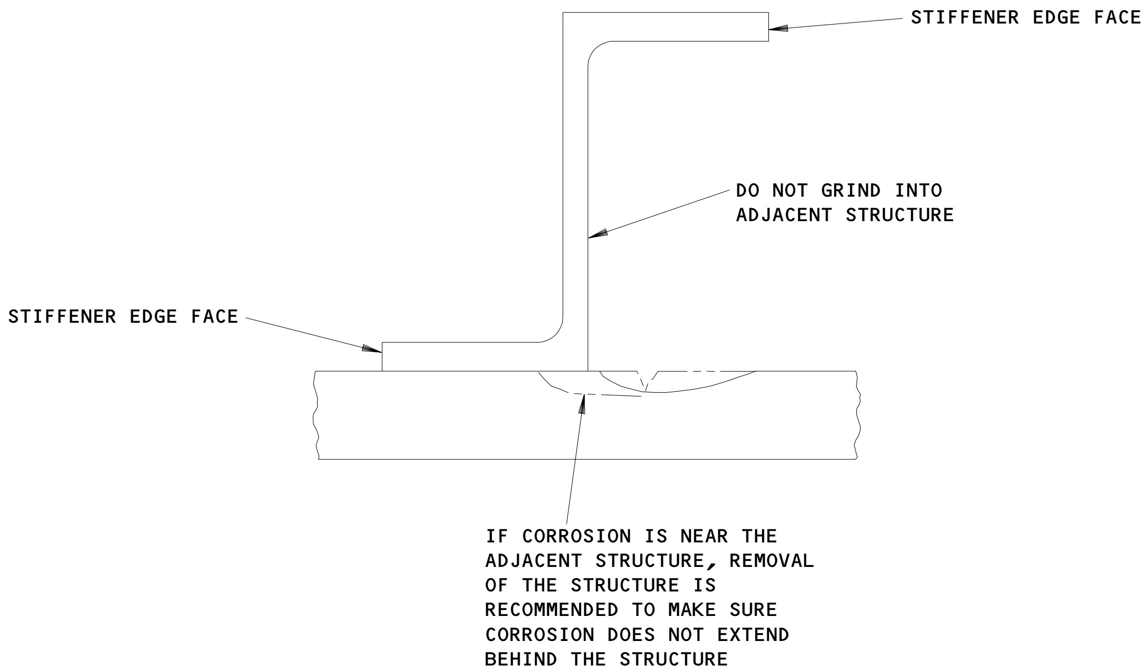
EXAMPLE OF 1:5 BLEND RATIO
A-A

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



Corrosion in Limited Clearance Areas
Figure 207

(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 322-044

(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 222-045

(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).

S 142-046

(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 912-047

(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.

<u>WARNING</u>: 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.

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 confinemrnt 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.

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

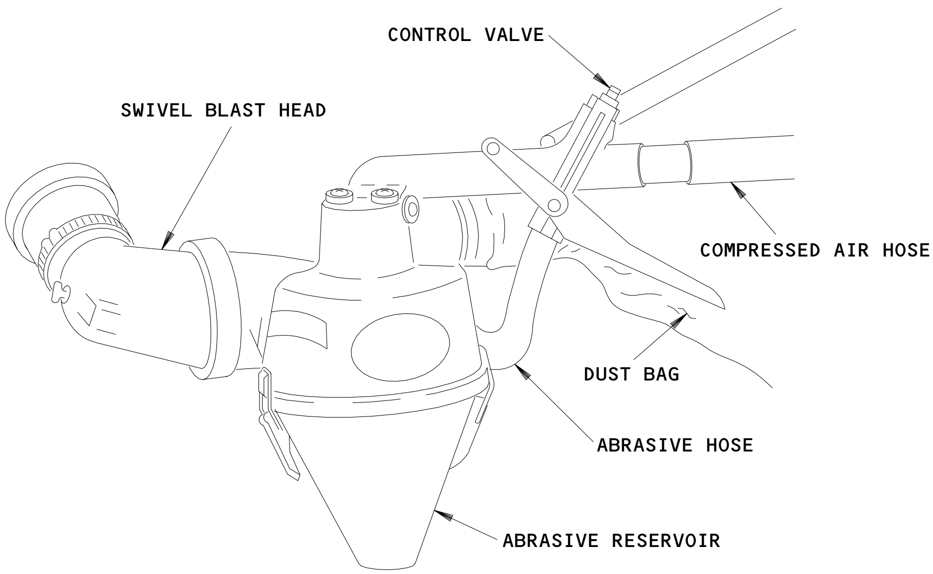
<u>WARNING</u>: THE USE OF GOGGLES OR FACE SHIELD IS MANDATORY WHEN USING EXTERNAL ABRASIVE BLASTING EQUIPMENT. IF NOT USED, INJURY TO PERSONS CAN OCCUR.

<u>WARNING</u>: 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.

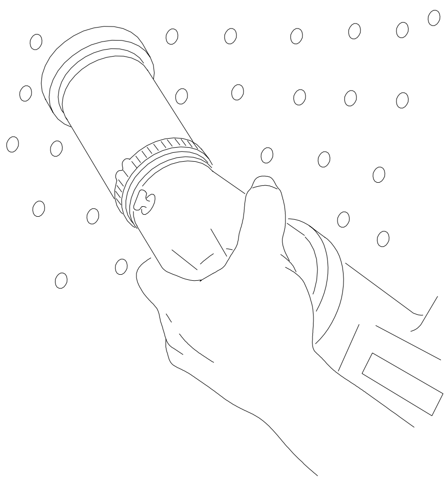
(f) EXTERNAL GUN BLASTING - The frequency in occurrences of filiform corrosion has led to the development of portable abrasive blasting equipment.

(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.

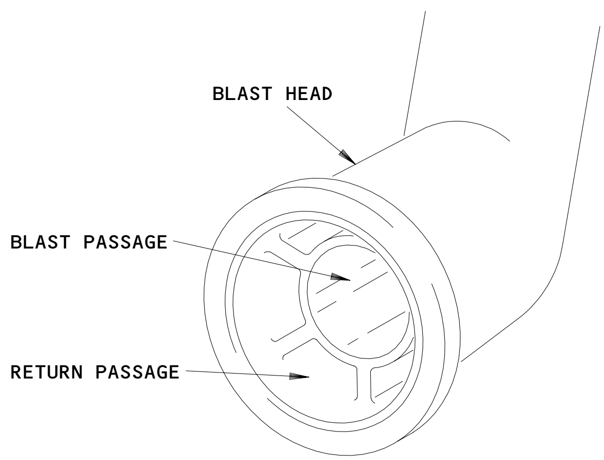
(h) PORTABLE ABRASIVE BLASTER - Filiform corrosion can be quickly removed with the use of a portable abrasive blaster. An example is the Model E-10A Clemco Eductomatic Portable Blast Cleaner (Clemco Industries, V86192) (Fig. 208).
1) The unit weighs 7 pounds and includes an abrasive reservoir (which 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 seperates 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.



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

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 112-048
(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 removel 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 51-00-53-102-049
6. <u>Special Corrosion Removal Procedures</u>
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 182-050
(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 182-051
(1) Refer to AMM 51-00-55/201 for details.
D. Spilled alkaline or acid agents will cause corrosion.

S 182-052
(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 182-053
(1) Refer to AMM 51-00-60/201 and AMM 51-00-61/201 for more details.

TASK 51-00-53-102-054

7. Corrosion Removal Procedures for Aluminum and Aluminum Alloys

A. General

(1) Aluminum and its allows 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.

B. Corrosion Removal (MECHANICAL)

S 212-055

(1) Make sure that the metal is aluminum.

S 952-136

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.

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

S 112-057

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

S 152-058

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

S 222-059

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

S 142-060

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

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:
   1) Carbide-tipped scrapper
   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.

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 322-061
(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 322-062
(8) Blend repair the area per paragraph 5.B.(1).

S 112-063
(9) Clean the repaired area.

S 222-064
(10) Measure the depth of the blends as per paragraph 5.B.(2), to be sure that they are within the repair limits.

S 372-065
(11) Treat the repaired area (AMM 51-00-58/201).
C. Corrosion Removal (CHEMICAL)

S 952-066
(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.

S 372-067

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 372-068

(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.

S 372-069

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 322-070

(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 112-071

(6) Clean the reworked area.

S 222-072

(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 372-073

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

TASK 51-00-53-102-074

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 occured.

(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.

B. Corrosion Removal (MECHANICAL)

S 212-075

(1) Positively identify the metal as magnesium.

S 952-137

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.

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

S 112-077

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

S 152-078

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

S 222-079

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

S 142-080

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

S 142-081

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

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:
 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.

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

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.

(c) Mechanically remove any moderate or severe corrosion by stainless steel wire brush or abrasive blasting. Select the appropiate 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 paragaph 5.B.(4)(c).

S 372-082
(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 322-083
(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 112-084
(10) Clean the reworked area.

S 212-085
(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 372-086
(12) Treat the reworked area (AMM 51-00-58/201).

C. Corrosion Removal (CHEMICAL)

S 212-133
(1) Positively identify that the metal is magnesium.

S 142-138

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.

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

S 952-089

(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 832-090

(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.
      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).

TASK 51-00-53-102-091

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.

B. Corrosion Removal (MECHANICAL)

S 212-134

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

S 952-139

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

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

S 112-094

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

S 152-095
(4) Remove (strip) any paint, if applicable, per paragraph 6.

S 122-096

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 142-097
(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 212-098
(7) Make a visual check through a 10-power magifying glass to ensure that all of the corrosion has been removed.

S 322-099
(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 112-100
(9) Clean the reworked area.

S 222-101
(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.

S 372-102

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

C. Corrosion Removal (CHEMICAL)

S 182-103

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 182-104

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

S 182-105

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

S 182-106

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

S 372-107

(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.

(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 372-108
(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).

(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 51-00-53-102-109

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.

B. Corrosion Removal (MECHANICAL)

S 182-140

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.

(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 method described for corrosion removal on Carbon Steel can be used.

TASK 51-00-53-102-112

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.

(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:

B. Corrosion Removal (MECHANICAL)

S 112-141

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.

(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 142-115
(3) Remove the polish with a soft cloth.

S 372-116
(4) Treat the rework area (AMM 51-00-58/201).

C. Corrosion Removal (CHEMICAL)

S 182-117
(1) Because titanium is susceptible to hydrogen embrittlement when exposed to acid solutions, chemical corrosion removers are not permitted.

TASK 51-00-53-102-118

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 sacrifical 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.

(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 952-119

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

S 112-120

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

S 142-121

(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 212-122

(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 372-123

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

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

S 952-124

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

S 112-125

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

S 142-126

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

S 112-127
(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 172-128
(5) Thoroughly rinse the acid solution from the surface with clean water and allow to air dry.

S 372-129
(6) Treat the reworked surface (AMM 51-00-58/201).

D. Corrosion Removal from Phosphated Surfaces

S 372-130
(1) Phosphated cadmium surfaces will be treated as per the procedures for cadmium plated surfaces.

S 372-131
(2) Phosphated ferrous alloys will be treated as per the procedures for carbon steel.

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

TASK 51-00-54-102-016

1. Prepare for Corrosion Prevention After Mercury Spill

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.

S 192-017

(1) 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.

S 192-018

(2) The amalgamation of stressed aluminum structure may also result in rapid cracking, similiar to stress corrosion cracking.

S 192-019

(3) Mercury is not consumed in the amalgamation process. As the aluminum oxidizes, it seperates from the amalgam and the mercury continues to attack fresh aluminum.

S 192-020

(4) The presence of organic finishes, greases, or a thick and continuous oxide layer will retard the amalgamation process.

B. Detection

S 192-021

(1) A grayish-white powder, or flurry, coating on aluminum surfaces will indicate the presence of corrosion caused by spilled mercury.

S 192-022

(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.

S 192-023

(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.

C. Personnel Precautions

S 192-024

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.

S 192-026

(2) Free mercury, or amalgam, must not be picked up by hand.

S 102-027

(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.

TASK 51-00-54-102-001

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 012-002

(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 192-003

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

S 192-004

(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 192-005

(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 952-006

(5) Consider protecting uncontaminated areas by tapeing 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 51-00-54-102-007

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 162-008

(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.

(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 commerically 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 162-009

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 162-010

(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 142-011

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

S 142-012

(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.

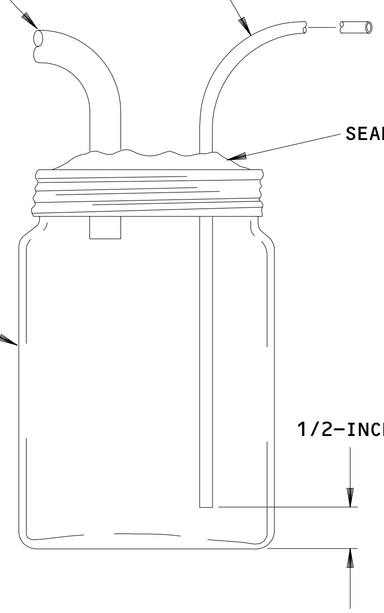
S 142-013

(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.
   (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 192-014

(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 INSTRUCTMENTS, Inc. (V06030)
   (c) Nickel-Plated Carbon-Fiber Brushes: INTERNATIONAL RESEARCH AND DEVELOPMENT CO.
   (d) Mercury Sponge: J. T. BAKER CHEMICAL CO. (V70829)



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

Vacuum Cleaner Mercury Trap
Figure 201

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 51-00-55-202-001

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 212-002

      (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.

(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 contaminates, 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 occured.

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 - Tri-chloroethane, 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 assorbent 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.

(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 122-003
(2) Remove all corrosion using one of the methods as described in AMM 51-00-53/201.

S 372-004
(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 392-005
(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 continous 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 412-006
(5) Replace all of the interior items that were removed, and restore the airplane to serviceable condition.

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

TASK 51-00-56-102-017

1. Prepare for Corrosion Prevention After Alkaline Spill

A. Alkaline spills are caustic and can cause corrosive damage to airplane structures, unless neutralized.

S 112-018

(1) The primary source of alkaline spillage is in the battery compartments, where alkaline electrolytes can overflow during charging or spill during battery servicing.

S 112-019

(2) 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.

S 112-020

(3) 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.

B. Detection

S 112-021

(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.

S 112-022

(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.

S 112-023

(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.

C. Personnel Protection

S 662-024

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.

S 662-025

(2) Individuals should thoroughly wash their hands after using alkaline neutralizing treatment solutions, and/or materials, before eating.

S 192-026

(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 51-00-56-102-005

3. Alkaline Spillage Cleanup

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

S 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 alkalines or treatment fluids.

S 162-007
(2) Wipe up all excess fluids with cloths, and discard the cloths into plastic bags or containers for proper disposal.

S 112-008
(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 112-009
(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.

S 092-010
(5) Remove the neutralized mixture from the contaminated area.

S 162-011
(6) Rinse the affected area with large quantities of clean water, occasionally agitating the surface with a soft brush.

S 212-012
(7) Neutralralization of the alkaline fluid should be determined with litmus paper.

S 162-013
(8) Wipe the area dry with clean cloths.

S 372-014
(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 622-015
(10) Apply BMS 3-23 water displacing corrosion inhibiting compound over the entire area.

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

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

TASK 51-00-57-102-017

1. Prepare for Corrosion Removal

A. Acid spills, unless neutralized, can rapidly corrode metallic structures.

S 112-018

(1) 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.

S 102-019

(2) 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.

S 102-020

(3) 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 maint- enance servicing chemical spills mentioned in paragraph 2 and 3. It is, therefore, advisable that the acid spillage be neutralized as soon as possible.

S 192-021

(4) Operators should also be aware of the fact that acids can deteriorate nonmetallic materials such as fabrics, wood, leather, etc.

S 192-022

(5) 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.

B. Detection

S 192-023

(1) Any discoloration on the surface should be suspect, and investigated. Black, white, yellow and brown are predominant chemical reaction precipitate colors. Precipiate colors depend on the acid and the material on which the acid is spilled.

C. Personnel Protection

S 662-024

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.

S 662-025

(2) Always wash hands thoroughly after using acid neutralizing treatment solutions and/or materials, before eating.

S 192-026

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

TASK 51-00-57-102-001

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:

S 162-002

(1) Do not allow acid 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 51-00-57-102-005

3. Acid Spillage Cleanup

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

S 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.

S 162-007

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

S 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.

S 112-009

(4) Continue to apply the solution until bubbling ceases. Then allow the solution to remain on the surface for an additional 5 minutes.

S 092-010

(5) Remove the neutralized mixture from the contaminated area.

S 162-011

(6) Rinse the affected area with generous quantities of clean water, occasionally agitating the surface with a soft brush.

S 212-012

(7) Neutralization of the alkaline fluid should be determined with the use of litmus paper.

S 162-013

(8) Wipe the area dry with clean cloths.

S 372-014

(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 622-015

(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.

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 adhasion 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 51-00-58-302-001

2. Alodizing Treatment
   A. General
      (1) The alodizing chemicals used for aluminum treatment are:

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 caoting 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 372-081

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

WARNING: ALODINE POWDER THAT COMES IN CONTACT WITH ORGANIC 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 372-010

(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.

S 372-011

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

S 372-012

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

S 372-013

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

C. Alodine Surface Treatment

S 142-014

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

S 142-015

(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 372-016

(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 952-017

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

D. Immersion Application

S 372-018

(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 372-082

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

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

S 372-020

(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 372-021

(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 372-022

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

S 372-023

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

S 372-024

(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 372-025

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

S 952-026

(8) Remove masking and protective coverings.

TASK 51-00-58-302-002

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 372-083

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.

(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 372-028

(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 372-029

(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.

S 372-030

(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 142-031

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

S 142-032

(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 142-033

(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 952-034

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

D. Immersion Application

S 372-035

(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 372-084

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 372-037

(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 372-038

(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 372-039

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

S 372-040

(5) Reapply the original protective finish.

S 952-041

(6) Remove all masking and protective coverings.

TASK 51-00-58-302-003

4. Surface Treatment for Magnesium Alloys

A. General

(1) The chemicals used for magnesium treatment are:

Chromic Acid (CrO_3)
Calsium Solfate ($CaSO_4.2H_2O$)

(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 372-043

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

S 372-044

(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 372-045

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

S 372-046

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

S 372-047

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

C. Conversion Coating Application

S 142-048

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 142-049
(2) Wipe the area with a cheesecloth dampened (not saturated) with solvent (series 88). Repeat the precedure using a clean cheesecloth until no visible residue transfers to the cheesecloth.

S 142-050
(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 wat 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 952-051
(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.

S 372-053
(6) Rinse with clean cold water.

S 372-054

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 372-055
(8) Reapply any protective (decorative) finish, as required.

S 952-056
(9) Remove masking and protective covering.

TASK 51-00-58-302-004
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 352-057
(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 372-058
(2) Reapply a protective or the original finish after plating.

TASK 51-00-58-302-005

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 372-059

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

TASK 51-00-58-302-006

7. Surface Treatment for Titanium Alloys

A. General

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

B. Finishes

S 372-060

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

TASK 51-00-58-302-007

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 382-085

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 382-062

(2) Major rework will require stripping and replating.

C. Phosphate Coating

S 382-063

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

S 382-064
(2) Surface treatment involves the use of phosphoric acid on the cadmium plating.

S 382-065
(3) If the cadmium is broken, replate as per paragraph A.(1) before coating.

S 382-066
(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 382-067
(5) The coating procedures of the base metal is the same as described in paragraph 9.C.(5) of AMM 51-00-53/201.

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 degress (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.

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 degress (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.

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).

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.

TASK 51-00-58-302-008

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 022-068

(1) Remove fasteners, if loose.

S 372-069

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

S 422-070

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

S 422-071

(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 022-072

(1) Remove fasteners, if loose

S 372-073

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

S 392-074

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

S 422-075

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

S 392-076

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

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

S 022-077

(1) Remove fasteners, if loose.

S 372-078
(2) On countersinks and in holes, apply primer (BMS 10-11 Type 1 or BMS 10-79 Type 2).

S 422-079
(3) Install removable fasteners with wet primer (BMS 10-11 Type 1 or BMS 10-79 Type 2).

S 422-080
(4) Install permanent fasteners with wet primer (BMS 10-11 Type 1 or S42 S BMS 10-79 Type 2) or BMS 5-95 sealant.

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 deposites 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 exterinal appearance of the airplane. As a guide, the following frequencies are recommended:
         (a) Mild Zones (AMM 51-00-52/201) - every 90 calender days
         (b) Moderate Zones (AMM 51-00-52/201) - every 45 calender days
         (c) Severe Zones (AMM 51-00-52/201) - every 15 calender days
      (4) Polishes can be used on unpainted surfaces, but should probably be applied only once every 18 to 24 months.

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.

TASK 51-00-59-112-001

2. Application of Corrosion Inhibitors

A. General

(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.

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.

<u>WARNING</u>: 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.).

<u>WARNING</u>: 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.

<u>CAUTION</u>: 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.

<u>CAUTION</u>: 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.

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 apray 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.

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.

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 contectors 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.

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: P-D-680 IS HIGHLY FLAMMABLE IN THE PRESENCE OF OPEN FLAMES AND SPARKS.

    f) Dry cleaning solvent (P-D-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 (VOK209)

4) When solvents are used to remove water-displacing corrosion inhibiting compounds, give the area a compressed air flow until the solvents evaorate.

(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.

(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 (b) and (c) below.
2) Let the BMS 3-26 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.

(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.

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.
(e) Materials qualified under BMS 3-29

MATERIAL	VENDOR
Dinitrol AV-30	Dinol International, V0L040

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.
   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

(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-30	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.

(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 Janurary 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 suffciently 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.

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.

(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 ca use 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 degress (F.) (65.55 degrees C.).
   4) Class 3 - These compounds form a soft film coating that can be applied, and easily removed, at room temper- ture. They can penetrate 20 to 25 mm (0.787 to 0.984 in) and have a melting point of 150 degress (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.

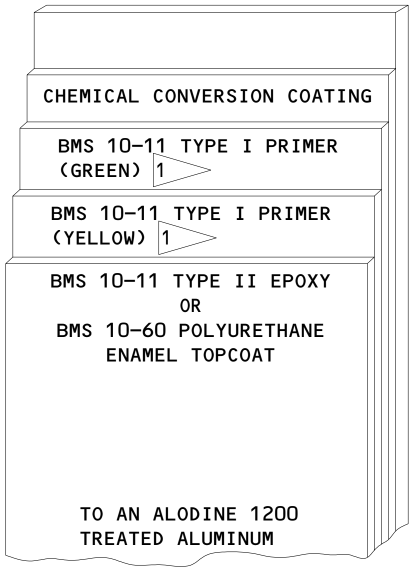
(c) Precautions for the use of MIL-C-11796
   1) Use the same precautions for MIL-C-11796 that are listed for BMS 3-23 water-displacing corrosion inhibiting compound (refer to paragraph 1.D.(3)).
(d) Compatibility of MIL-C-11796
   1) As these materials are usually hydrocarbons, you can apply a new application 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.)

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.)

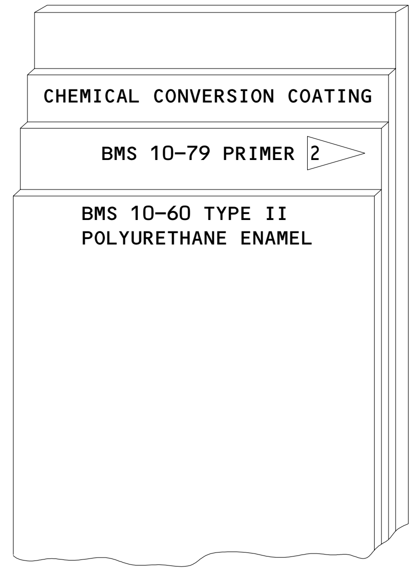
2) Apply the compound to the surface with a brush or a swab.
3) Small parts can be dipped in a container of the compound as long as the temperature ranges are kept.
4) To apply the compound to the internal surfaces of hollow parts, such as tubes, use a fill and drain method.

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.

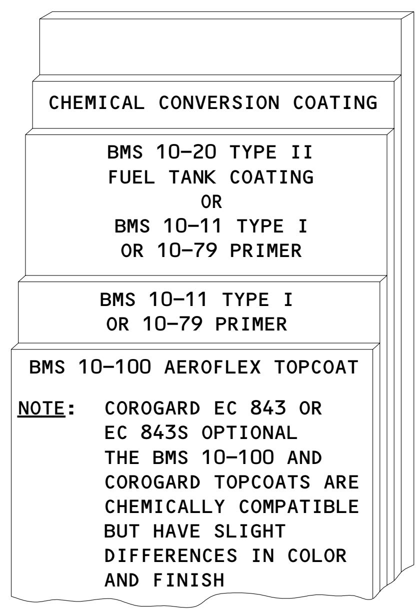
(g) Removal of MIL-C-11796
1) All of the compound needs to be removed before trying to paint the surface. Solvent cleaning is also required before penetrant inspections are to be performed.
2) Dry cleaning solvent (P-D-680) can be used to remove these compounds. Methyl Ethyl Ketone (MEK) or acetone is not recommended.
3) When solvents are used to remove these compounds, give the area a continuous flow of pressurized air until the solvents evaporate.



INTERIOR AND EXTERIOR PROTECTIVE
(NON-AERODYNAMIC)



EXTERIOR PROTECTIVE
(FILIFORM RESISTANT)

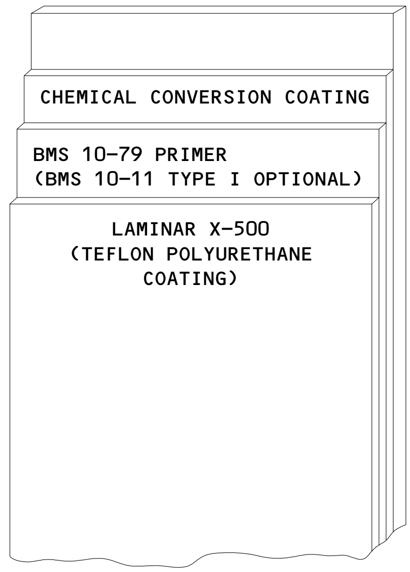


BMS 10-11 (AEROFLEX OR COROGARD)
PAINT SYSTEM

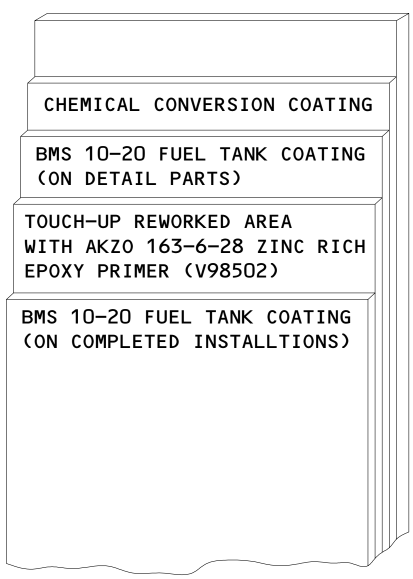
1 GREEN PRIMER USED ON DETAILS BEFORE INSTALLATION, YELLOW PRIMER ADDED AFTER INSTALLATION. DUAL COLORS USED FOR INSPECTION PURPOSES ONLY.

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.

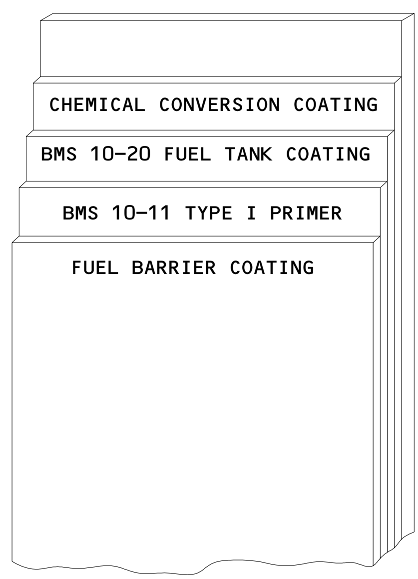
Finish Systems
Figure 201 (Sheet 1)



ABRASION RESISTANT FINISH

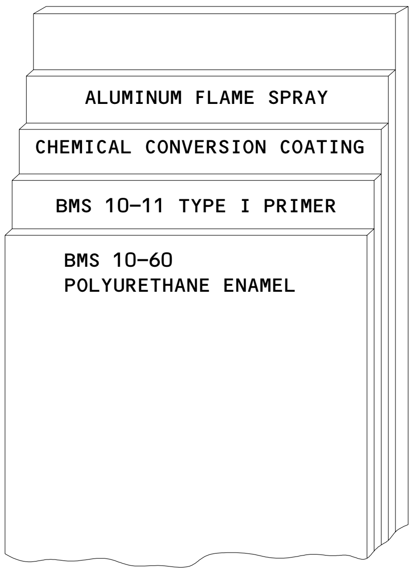


INTEGRAL FUEL TANK

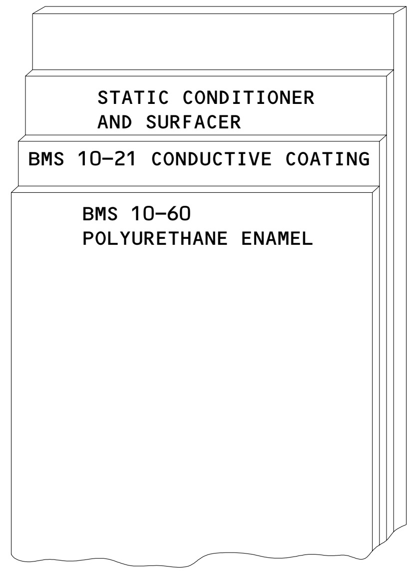


SECONDARY FUEL BARRIER

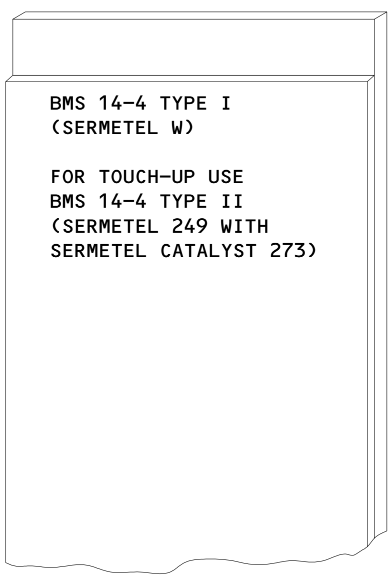
Finish Systems
Figure 201 (Sheet 2)



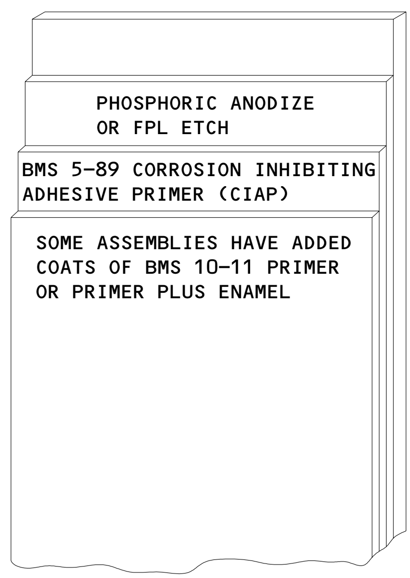
FIBERGLASS REINFORCED PLASTIC EXTERIOR
(ALUMINUM FLAME SPRAYED)



FIBERGLASS REINFORCED PLASTIC EXTERIOR
(CONDUCTIVE COATED)



HEAT-, WEATHER-, AND OIL-
RESISTANT COATING



BONDED STRUCTURE

Finish Systems
Figure 201 (Sheet 3)

J73165

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

1. General
   A. Problems associated with the occasional transportation of small animals in cargo compartment are negligible, but the bulk transportation of large animals makes it advisable to ensure that adequate precautionary measures agains against corrosion are taken. Corrosion problems arising from the transportation of live animals occur from two main sources. One is derived from animal wastes which are corrosive. Because the effects of waste products are so well known, adequate steps are usually taken to ensure that the airplane does not become contaminated. The second problem source is the increase in humidity inside the airplane.
   B. 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 to contain the waste. Solids are removed after every flight and replaced with clean wood shavings. After two-round trips the floor covering is replaced.
   C. 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 sidewalls is recommended.
      (3) To reduce the effect of high ground temperatures it is recommended that fans be used to cirulate air through the cabin while the airplane is on the ground.

TASK 51-00-60-202-001

2. Preventive Maintenance
   A. General
      (1) The use of airplanes for bulk shipment of live animals necessitates periodic cleaning and deodorizing of the airplane. As this requires removal of cabin lining and insulation blankets it also provides an excellent opportunity to perform preventive maintenance.
   B. References
      (1) AMM 25-50-00/701, Cargo Compartment - Cleaning/Painting

(2) AMM 25-50-07/401, Insulation - Cargo Compartment
(3) AMM 51-00-51/201, Fuselage - Corrosion Inspections
(4) AMM 51-00-58/201, Corrosion Prevention - Treatment Methods
(5) AMM 51-41-00/201, Airframe Drainage - Maintenance Practices
(6) AMM 53-01-02/701, Tracks - Passenger Seat

C. Procedure

S 162-002

(1) When known animal waste spills have occurred, clean the cargo compartment (AMM 25-50-00/701).

NOTE: Avoid spreading the spilled fluids through floor clearences.

S 162-005

(2) Clean spills on seat tracks (AMM 53-01-02-/701).

S 212-003

(3) At each available opportunity inspect the items that follow:
(a) The inner skin surface and fuselage structure for signs of corrosion, (AMM 51-00-51/201).
(b) Make sure that all drains are unobstructed and that there are no trapped liquids, (AMM 51-41-00/201).
(c) The condition of insulation blankets, (AMM 25-50-07/401).
1) Replace soaked insulation blankets.

S 622-004

(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 51-00-58/201).

NOTE: In the fuselage crown area, airplanes used for livestock transportation will require and receive more frequent preventive maintenance to prevent corrosion.

(b) Install the equipment that you removed.

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) 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.
      (2) 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 place 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.
      (3) An alternate test kit, the Hum-Bug Detector Kit from Humanoids Technical Services, Inc. (V47186), is also acceptable.

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

<u>NOTE</u>: 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 212-021

<u>CAUTION</u>: 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.

(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 212-003

<u>WARNING</u>: 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.

<u>NOTE</u>: See the applicable AMM chapter for the location of the drains on the different models of airplanes.

TASK 51-00-61-302-005

3. <u>Removal of Microbial Deposits</u>

A. Cleaning

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 112-011
(1) Corrosion should be removed by one of the methods described in AMM 51-00-59/201.

S 392-012

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

TASK 51-00-61-602-013

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 BIOCIDE		
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 conjuction 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).

(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 622-014

(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.

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 622-015

(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.

C. Frequency of Preventive Maintenance

S 682-016

(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 682-017

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

S 682-018

(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 622-019

(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 622-020

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

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 51-00-62-202-015

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 perventive maintenance.
   B. References
      (1) AMM 25-50-00/701, Cargo Compartment - Cleaning/Painting
      (2) AMM 25-50-07/401, Insulation - Cargo Compartment
      (3) AMM 51-00-51/201, Structures - Corrosion Inspections
      (4) AMM 51-00-58/201, Corrosion Prevention - Treatment Methods
      (5) AMM 51-41-00/201, Airframe Drainage - Maintenance Practices
      (6) AMM 53-01-02/701, Tracks - Passenger Seat
   C. Procedure

      S 212-013
      (1) At each available opportunity inspect the items that follow:
         (a) The inner skin surface and fuselage structure for signs of corrosion, (AMM 51-00-51/201).
         (b) Make sure that all drains are unobstructed and that there are no trapped liquids (AMM 51-41-00/201).
         (c) The condition of insulated blankets (AMM 25-50-07/401).
            1) Replace soaked insulation blankets.

      S 622-014
      (2) After the airplane has been cleaned and deodorized do these steps:
         (a) Apply corrosion inhibiting compound to the inner skin surface and structure (AMM 51-00-58/201) as necessary.

(b) Install the equipment that you removed.

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 make more available route assignments and give benefits to operators through better route assignments and reduced schedule delays.

   B. This procedure contains these tasks:
      (1) Examine the Skin Waviness at the Static Ports
      (2) Examine the Step Height of the Static Ports
      (3) RVSM Reporting
   C. Access
      (1) Location Zone
          100 Fuselage - Lower Half

   D. Equipment
      (1) Isoscope meter - Fischer Technology Inc.

TASK 51-10-00-206-027

2. Examine the Thickness of the Paint Finishes Inside and Outside the RVSM Extra Critical Area
   A. General
      (1) The 3 inch (76.2 mm) radius area (bare aluminum) around the static ports should not be painted.
      (2) Outside the 3 inch (76.2 mm) radius, but within ten inch from the static ports, the paint thickness including markings and other finishes should not exceed 0.013 inch (0.330 mm).

      (3) Outside the ten inch radius area around the static ports, the paint thickness including markings and other finishes should not exceed 0.033 inch (0.838 mm).

          NOTE: The above are guidelines and exceedance to the above guidelines does not necessarily mean that they would affect the aircraft's RVSM airworthiness or be subject to restriction from RVSM operations. Operators that have exceeded the above guidelines should contact Boeing for further assessment.

   B. Procedure (Eddy Current Method)

      NOTE: This task is intended to supplement test equipment manufactures' instructions for the manual operation of the test equipment, and is not intended to replace them.

      S 216-023
      (1) Examine the thickness of the paint/finishes inside and outside the RVSM Extra Critical Area around the static ports using the steps that follow:
          (a) Get access to the inspection area.

(b) Remove loose paint, dirt and sealant from the surface of the part to be examined.

(c) Make sure that the temperature in the area where the material will be examined is between 40 degrees Fahrenheit (4 degrees Centigrade) and 90 degrees Fahrenheit (32 degrees Centigrade) and will not change during the test. Do not do a test of the material in direct sunlight or in a cool airflow.

NOTE: Changes in material temperature will change the conductivity.

S 826-029

(2) Calibrate the Instrument.

NOTE: Different test equipment manufacturers follow different methods of calibration or adjustment. Verify calibration according to manufacturer's instructions.

(a) To decrease the risk of errors caused by temperature, put the instrument, probe, reference standards, and the material to be examined at the location where the inspection will be done.

(b) To decrease the risk of errors caused by temperature, put the instrument, probe, reference standards, and the material to be examined at the location where the inspection will be done.

(c) Use nonconductive thickness shims to verify calibration or test blocks bearing calibrated nonconductive coatings that are traceable to a suitable National Institute of Standards and Technology (NIST) or similar regional standards authority.

(d) Make sure that the instrument, probe, reference standards, and the material to be examined are at the same temperature.

(e) Measure the thickness of a series of non conductive shims covering the expected range of coating thickness.

NOTE: Verify the test equipment at regular intervals to prevent an inaccurate reading.

S 256-030

(3) Measure the paint thickness as follows:

(a) Inspect the test equipment probe and area to be measured are clean and free of debris.

(b) Take multiple readings on the on the bare surface (areas free from paint) to establish the base reference.

(c) Identify the minimum distance the test equipment must be from edges, fasteners, ridges or other structure and the curvature limit that would cause an abnormal measurement change.

NOTE: This prevents incorrect indications on the test equipment.

(d) Take multiple readings on the on the coated surface to establish the paint thickness measurement.

S 976-031

(4) Report the information as follows (if necessary):
   (a) Instrument used, serial number.
   (b) Range, mean average of the thickness indications.
   (c) Record each indication if necessary.

C. Procedure (Ultrasonic Method)

NOTE: This task is intended to supplement test equipment manufacturers' instructions for the manual operation of the test equipment, and is not intended to replace them.

S 216-033

(1) Examine the thickness of the paint/finishes inside and outside the RVSM Extra Critical Area around the static ports using the steps that follow:
   (a) Get access to the inspection area.
   (b) Remove loose paint, dirt and sealant from the surface of the part to be examined.

      NOTE: Rough surfaces can give incorrect indications. Thus the area must be smooth.

S 826-034

(2) Calibrate the Instrument.

   NOTE: Different test equipment manufacturers follow different methods of calibration or adjustment. Verify calibration according to manufacturer's instructions.

   (a) A couplant is necessary to transmit the ultrasonic pulse from the test equipment's probe into the coating. The couplants that follow can possibly be used with the test equipment:

      NOTE: For specific information regarding the use of couplants, refer to the test equipment's instructions.

      1) Water.
         a) Ideal for smooth, thin coatings.
      2) Glycol gel.
         a) For rough coatings, provided it is not a contaminant for the coating to be measured.
      3) Other liquids such as liquid soap may be used.
   (b) Use nonconductive thickness shims to verify calibration or test blocks bearing calibrated nonconductive coatings that are traceable to a suitable National Institute of Standards and Technology (NIST) or similar regional standards authority.

(c) Although most ultrasonic instruments are pre-calibrated, accuracy should be verified by measuring a known thickness of the coating (reference standard) as determined by:
   1) A thickness equal to or more than the coating thickness range to be measured.

      NOTE: Verify the test equipment at regular intervals to prevent an inaccurate reading.

S 276-035

(3) Measure the paint thickness as follows:
   (a) Inspect the test equipment probe and area to be measured are clean and free of debris.
   (b) Apply couplant to the area.
   (c) Place the instrument’s probe flat on the surface and apply constant pressure. Hold the probe steady during the measurement.
   (d) Take multiple readings on the on the bare surface (areas free from paint) to establish the base reference.
   (e) Identify the minimum distance the test equipment must be from edges, fasteners, ridges or other structure and the curvature limit that would cause an abnormal measurement change.

      NOTE: This prevents incorrect indications on the test equipment.

   (f) Take multiple readings on the on the coated surface to establish the paint thickness measurement.
   (g) Remove the couplant used in the process.

S 976-036

(4) Report the information as follows (if necessary):
   (a) Instrument used, serial number.
   (b) Type of base material.
   (c) Type of coating.
   (d) Range, mean average of the thickness indications.
   (e) Record each indication if necessary.

TASK 51-10-00-206-028

3. Examine the Skin Waviness at the Static Ports

A. Procedure

S 216-008

(1) Visually inspect an area within a 3 inch (76 mm) radius of the static port for irregularities.

NOTE: The area should be smooth and free of any noticeable foreign material or roughness. Waviness measurements are required in four places each side of the airframe, (Fig. 601). Measurements 1 and 2 are applicable to the upper port. Measurements 3 and 4 are applicable to the lower port.

(a) Determine if the skin waviness is a "bulge" or a "dip" inside the 3 inch radius around the static ports.

NOTE: The usual procedure is to use a 5.75 to 5.9 inch (146 to 150 mm) scale. Put the scale on its edge against the side contour of the airplane. This is the easiest way to see the general shape of the skin. Good lighting makes this task easier.

(b) Look for light under the scale. If the light is under the center of the scale there is a "dip" condition. If the light is under the sides of the scale there is a "bulge" condition.

NOTE: If there is light at each edge of the scale but the scale does not rock back and forth easily, then this condition is also considered a "dip".

(c) Use a feeler-gage to measure the skin waviness.

NOTE: If the waviness is a "dip" record the measurement as a negative number. If it is a "bulge" record it as a positive number. For "bulges" the end of the scale that has the largest observed shim is the measurement value. The measured "shim value" should be divided by 2 to determine the "actual bulge height".

1) A "dip" in the skin is measured at the largest gap below the scale, (Fig. 601) Sheet 2.

2) A "bulge" in the skin is measured at the gaps at either end of the scale, (Fig. 601) Sheet 2.
   a) Use the larger of the two "bulge" measurements for the calculations below.

S 226-012

(2) Analyze the data to see if that port passes or fails. The calculation for port flushness is as follows:

(a) If both measurements for a port are a "bulge" then use this calculation:

Average Port Flushness = 0.25 X {bulge upper + bulge lower}

(b) If one of the measurements is a "bulge" then use this calculation:

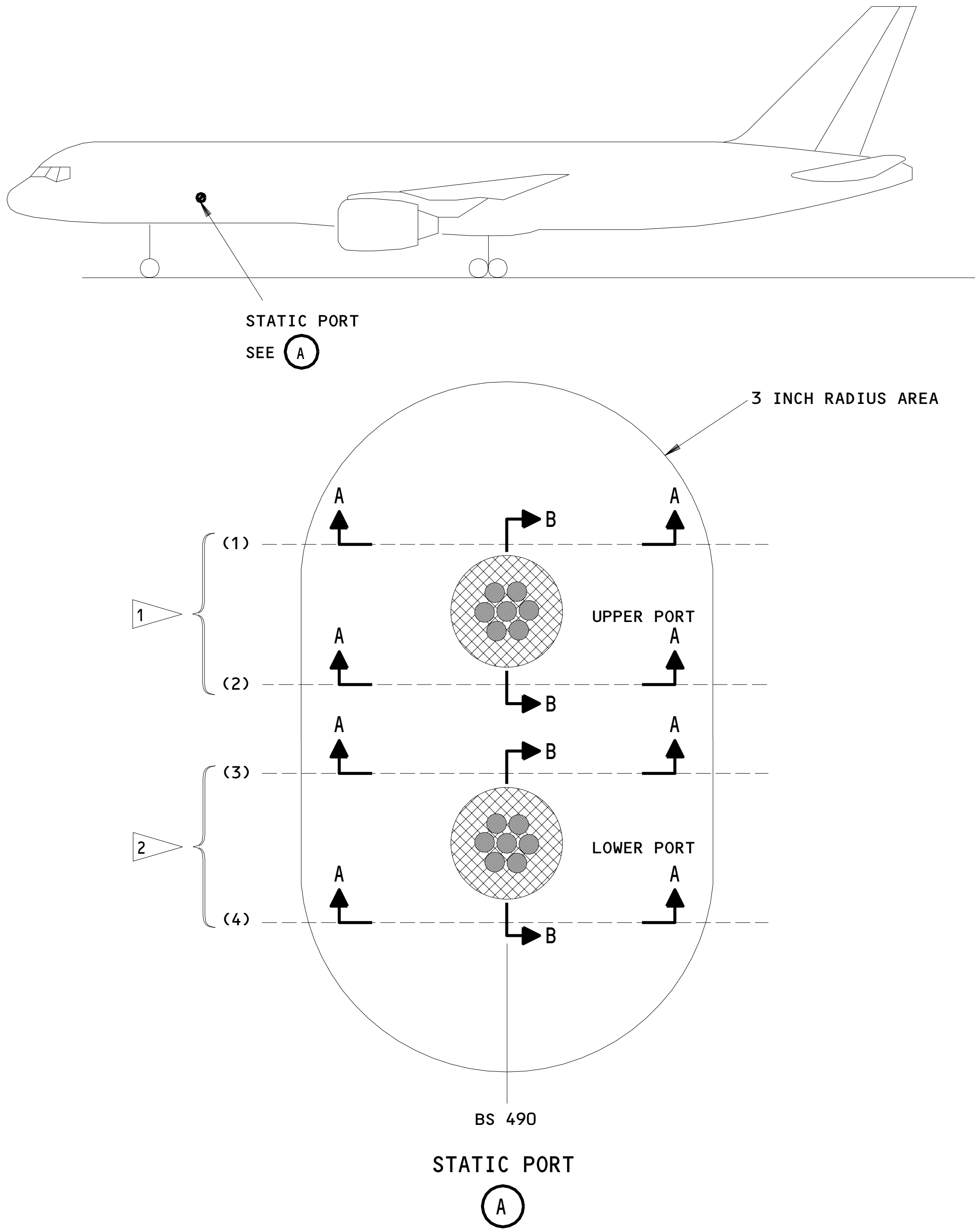
Average Port Flushness = 0.50 X {(0.50 X bulge) + dip}

(c) If both measurements are "dips" then use this calculation:

Average Port Flushness = 0.50 X {dip upper + dip lower}

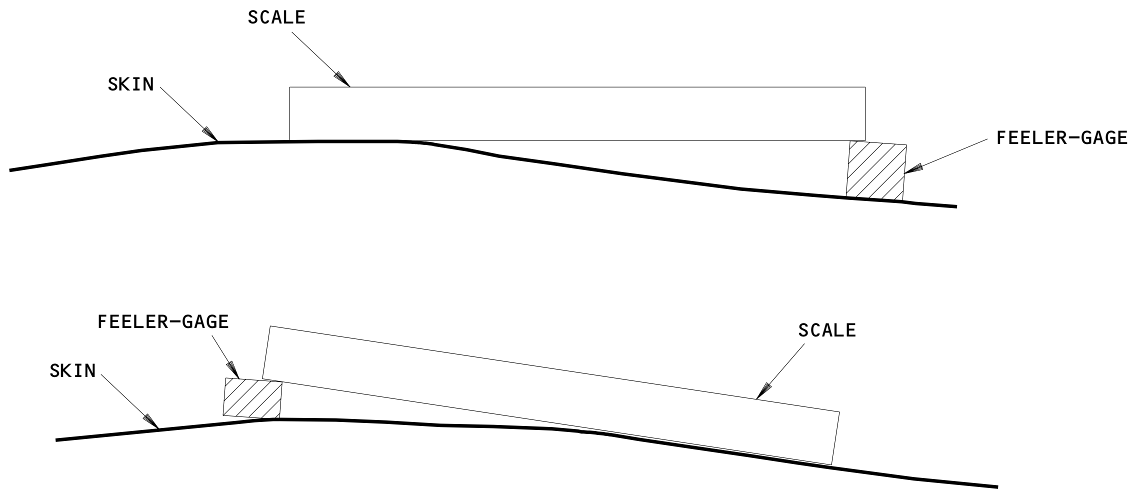
S 226-013

(3) Make sure the measurements pass the inspection:
(a) If the Average Port Flushness is greater than or equal to -0.010 inch and is less than or equal to +0.010 inch, then the port passes the inspection.
(b) If the Average Port Flushness is less than -0.010 inch or is greater than +0.010 inch, then the port fails the inspection.
   1) If one or more of the ports fail the inspection, make a permanent record of all the measurements you take and report them to Boeing (Refer to the task for RVSM Reporting).

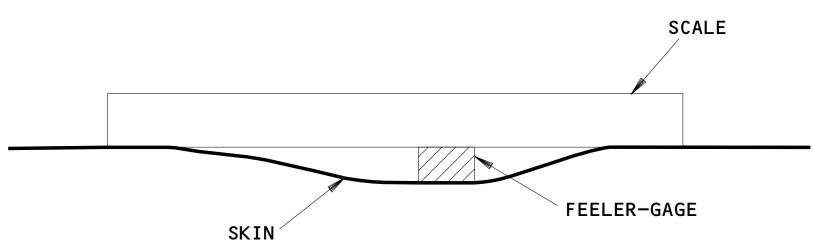


1 LOCATIONS OF INSPECTION WITH A SCALE FOR THE UPPER PORT.
2 LOCATIONS OF INSPECTION WITH A SCALE FOR THE LOWER PORT.

Static Port Waviness Inspection
Figure 601 (Sheet 1)

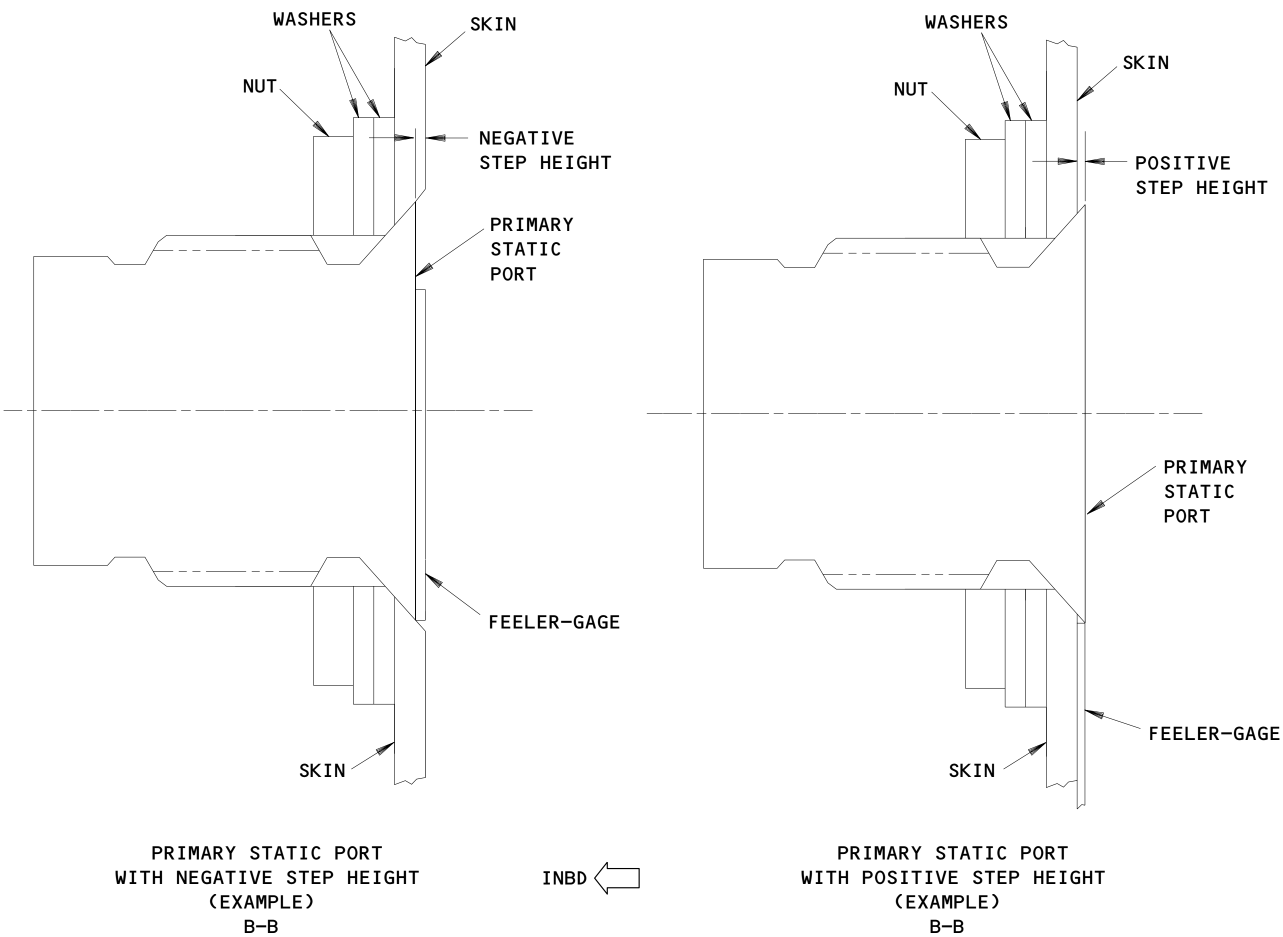


BULGE IN SKIN
(EXAMPLE)
A-A



DIP IN SKIN
(EXAMPLE)
A-A

Static Port Waviness Inspection
Figure 601 (Sheet 2)



Static Port Waviness Inspection
Figure 601 (Sheet 3)

NOTE: Operators with airplanes that fail this inspection can supply the results to Boeing. Boeing will examine the skin measurements at all static locations (left and right) 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 that the skin waviness is not within the limits for RVSM, Boeing can supply corrective action as necessary.

TASK 51-10-00-206-018

4. Examine the Step Height of the Static Ports

A. Procedure

S 216-019

(1) Use a feeler-gage to measure the height of the static port, (Fig. 601) Sheet 3.

NOTE: A port that extends above the outer surface of the skin has a positive step height. A port that is below the outer surface of the skin has a negative step height.

(a) If a static port height is greater than or equal to -0.002 inch and is less than +0.006 inch, then the port passes the inspection.

(b) If a static port height is less than -0.002 inch or greater than +0.006 inch, then the static port fails the inspection.

1) To fix a failed port, remove it and install it at the correct height (AMM 34-11-03/401).

TASK 51-10-00-206-022

5. RVSM Reporting

A. 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 286-014

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

ATTENTION - RVSM DISCREPANCY - SERVICE BULLETIN RELATED

(a) Include the following information:

1) The Service Bulletin Number.

2) The airplane serial number.

3) The number of flight cycles and hours on the airplane.

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

1) Boeing Commercial Airplane Group
P.O. Box 3707
Seattle, Washington 98124
Attn: Director, 757 Service Engineering
Org. M-7271, Mail Stop 2H-84

WINDOW, DOOR AND HATCH LEAK CHECK - 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

   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 part 3, No. 2 Window Vacuum Blanket
      (2) ST6760A-1, Ultrasonic Leak Probe Tool
      (3) ST9999-VBA-201, Vacuum Generator (No. 2 window, door and hatch)
      (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

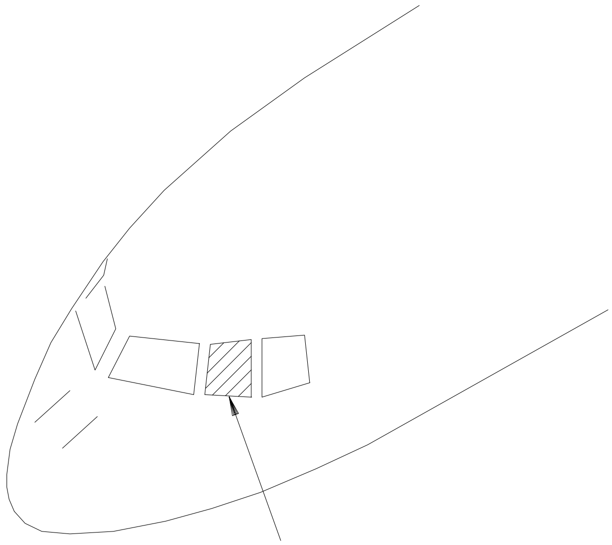
   E. Procedure

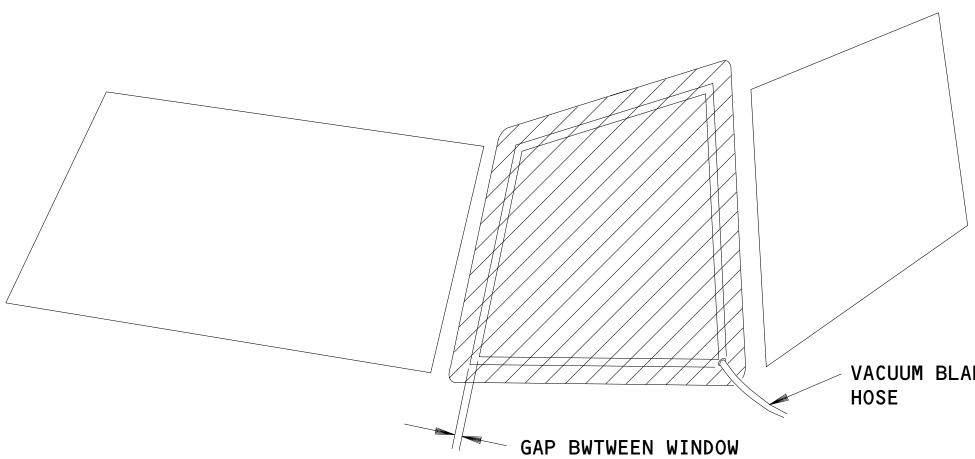
      S 866-002

   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.
      (b) Open these circuit breakers and attach the DO-NOT-CLOSE tags:
         1) P6-12 panel
            a) WINDOW ANTI-ICE R
         2) P6-11 panel
            a) WINDOW ANTI-ICE L

      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.



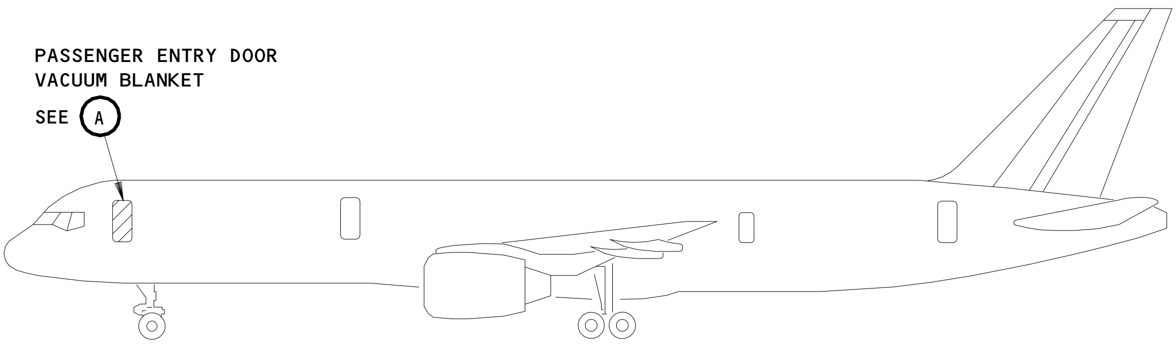


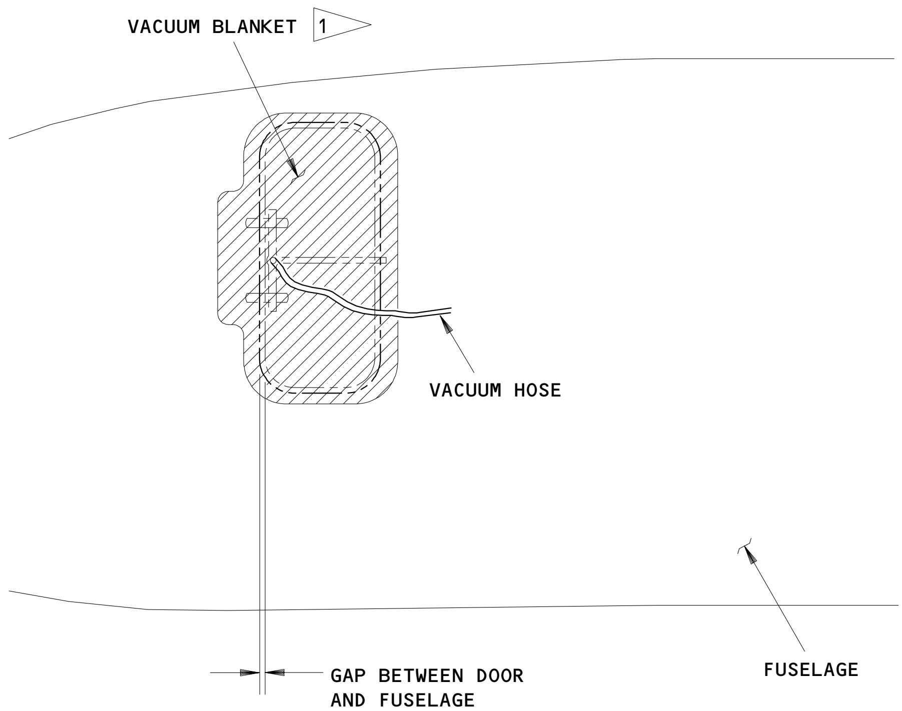
WINDOW NO. 2 VACUUM BLANKET

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





PASSENGER 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 GALLEY ENTRY DOORS AND THE EMERGENCY EXIT DOORS.

Passenger Entry Door Vacuum Blanket Check
Figure 602

(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 846-017
(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 486-018
(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 276-019
(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.
(b) Move the ulstasonic leak detector around the edge of the window.
(c) Use the headphones and watch the noise scale on the ultrasonic leak detector.

S 816-020
(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 416-021
(1) Install the No. 2 window padding:
(a) Install the covers on all sides of the window.

(b) Install the latch handle cover.

S 866-022
(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) P6-12 panel
a) WINDOW ANTI-ICE R
2) P6-11 panel
a) WINDOW ANTI-ICE L

S 716-023
(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

A. General
(1) This task is for the following:
(a) No. 1, 2 and 4 Passenger Doors
(b) No. 3 Emergency Exit Door

B. Equipment
(1) ST6760A-1, Ultrasonic Leak Probe Tool
(2) ST9999-VBA-201, Vacuum Generator (No. 2 window, door and hatch)
(3) ST9999-VB, Door and Hatch Vacuum Blanket

C. References
(1) AMM 52-09-01/401, No. 1, 2 and 4 Passenger Door Seal
(2) AMM 52-09-06/401, No. 3 Emergency Exit Pressure Seal
(3) AMM 52-11-00/501, No. 1, 2 and 4 Passenger Doors
(4) AMM 52-21-01/501, No. 3 Emergency Exit Door

D. Access
(1) Location Zone

831	No. 1 Passenger Door (Left)
832	No. 2 Passenger Door (Left)
836	No. 4 Passenger Door (Left)
841	No. 1 Passenger Door (Right)
842	No. 2 Passenger Door (Right)
846	No. 4 Passenger Door (Right)
835	No. 3 Emergency Exit Door (Left)
845	No. 3 Emergency Exit Door (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 No. 1, 2 or 4 Passenger Door, Crew Entry Door, No. 3 Emergency Exit Door or Overwing Emergency Exit 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.

(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 ed 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 52-09-06/401).

(d) Install the vacuum blanket again and check for leaks.

NOTE: You will have to repeat the installation of the vaccum 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, No. 1, 2 and No.4 Doors
- AMM 52-21-01/201, NO. 3 Emergency Exit Door

(g) Install the vacuum blanket again and check for leaks.

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

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. This is a chemical and solvent resistent, green colored, organic finish which may be applied by spray or brush. A coat of white enamel, BMS 10-60 is applied over primer areas where corrosion protection and better visibility for maintenance purposes are required. In addition the following details receive BMS 10-11, Type II white enamel before assembly.
      (1) Details located beneath floor panels except wing center section.
      (2) Details to be assembled with epoxy-graphite composites.
      (3) Details comprising wheel wells.
   D. Refer to chapter 28-11-00, Fuel Tanks, for integral fuel tank cleaning and sealing.

INTERIOR AND EXTERIOR FINISHES - CLEANING/PAINTING

TASK 51-21-00-377-001

1. Cleaning/Painting of Interior and Exterior Finishes

   A. General

      (1) Before you apply paint finishes or systems to a surface, you must prepare the surface. To prepare a surface, you will usually remove the remaining damaged finish, remove corrosion, clean the surface, and apply a conversion coating, if necessary.

      (2) Damaged or remaining paint finishes are removed with solvents, stripping compounds, or mechanical strippers. Solvents are frequently used to remove paint from small areas. Stripping compounds are used to remove paint from large areas or disassembled parts. Mechanical strippers are used to remove paint from composite materials.

      NOTE: THE USE OF PAINT STRIPPERS WILL STRUCTURALLY DAMAGE COMPOSITE PANELS.

      (3) Some approved procedures are available for corrosion removal. The procedures usually used to remove corrosion are chemical treatments, hand sanding with abrasive paper or metal wool, mechanical sanding with abrasive mats, and dry abrasive blasting. The procedure used must agree with the metal and the level of corrosion.

      (4) Solvent cleaning is frequently used to remove the remaining material from the stripping and corrosion removal procedures. Surfaces prepared by this procedure for conversion coating or painting must be fully clean.

      (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 an equivalent oxidizing agent will form a thin tight layer and prevent corrosion.

PAINT STRIPPING - CLEANING/PAINTING

1. General
   A. This procedure contains one task. The task is paint stripping.

   TASK 51-21-01-157-011

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 strippers on plastic laminates, fiberglass, aerodynamic smoothers, edges of material bonds, or rubber parts. Only use approved solvents for these materials.

         NOTE: THE USE OF PAINT STRIPPERS WILL STRUCTURALLY DAMAGE COMPOSITE PANELS.

      (2) Use dry abrasive to remove the paint from the composite surfaces.
      (3) You can use a spray gun or brush for paint stripping. The brush-on procedure is frequently used for line maintenance.
      (4) Before you remove the paint with the stripping procedure, make sure the surface is dry and that the temperature is between 50°F and 100°F. Do not use the stripping procedure in hot or wet weather.
      (5) Use cleaning agents to clean the surfaces that have too much soil. You can use cleaning agents such as solvent alkaline, solvent emulsion or solvent degreasing.
      (6) Make sure that the components in the paint stripper mixture are fully mixed. Keep the container closed when the paint stripper is 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 smoothers, and metal bonded parts.
      (8) Apply tape to all access doors, fairings and wing leading and trailing edges at least one inch on the skin.

(9) Apply tape on the drain holes and vents.
(10) Make sure that no paint strippers fall on the joints. Do not use strippers in the fuel tanks.
(11) Strippers that you spray or brush-on contain agents that make a solution thick. Apply these strippers on vertical and horizontal surfaces.
(12) Strippers that you wipe or squirt-on are used to remove temporary coatings, waxes and oversprays.
(13) Apply the stripper to the area no larger than can be worked.
(14) Strippers should meet the requirements of Standard Overhaul Practices Manual (SOPM) 20-30-02. In addition to this procedure, Boeing specifications BAC 5725 and BAC 5771 provide procedures for paint stripping.

B. Equipment
(1) Scraper (See AMM 51-31-01/201 for approved scrapers to remove paint and adhesive)

C. Consumable Materials
(1) G00217 Gloves, clean
(2) G00034 Sponge
(3) G00215 Cheesecloth - new, clean, dry, lint free
(4) G00117 Brush - soft and stiff bristles
(5) Tape - Aluminum Foil Permacel P112
(6) G00291 Tape - Conductive Scotch No. 425 (Aluminum Foil)
(7) G00365 Paper, plastic coated per VV-P-272C
(8) All plastic coated or impregnated paper which is chemically neutral, water proof and resistant to stripper solutions.
(9) Polyethylene, polyproplene, mylar or equivalent plastic sheeting resistant to paint strippers.
(10) Spray or Brush-On Strippers
(a) E00043 Alcor LO-2030M, Alcor Chemical Company
(b) E00044 Cee Bee A-228D, McGean Chemical Company, Inc.
(c) E00119 Cee Bee A-306B, McGean Chemical Company, Inc.
(d) E00120 Cee Bee R256A, McGean Chemical Company, Inc.
(e) E00041 Fiber-Resin ES-1, Fiber Resin Corp.
(f) E00122 Pennwalt EZ Strip 19E, Penwalt Corp.
(g) E00126 Turco 5873, Turco Products, Inc.
(11) Spray or Brush-On Strippers
(a) B00279 Turco 5292B, Turco Products, Inc.
(b) B00280 Turco 5351 - Brush on Organic Paint, Turco Products, Inc.

(c) B00269 Turco 5351 - Immersion Type Organic Paint, Turco Products, Inc.

(12) Wipe or Squirt-On Strippers
- (a) E00047 Ethyl Alcohol, Denatured, O-E-760, Grade III or IV
- (b) E00046 Methyl Isobutyl Ketone (MIBK), TT-M-268
- (c) E00049 Toluene (Toluol), Technical grade, TT-T-548
- (d) E00050 Turco 800, Turco Products, Inc.
- (e) E00048 Xylene (Xylol), TT-X-916, Grade A or B
- (f) B00092 JAN-T-171 Grade A
- (g) B00082 Ethylene Glycol Monobutyl Ether (Butyl Cellosolve), TT-E-776

(13) B00192 Solvent, BMS 3-2, Type I

(14) B00074 Solvent, P-D-680, Type I

D. Prepare for Paint Stripping

S 957-014

CAUTION: DO NOT LET PAINT STRIPPERS FALL ON TEFLON LINED SELF-LUBRICATED BEARINGS, ELECTRICAL TERMINAL PLUGS, NYLON-COATED WIRES AND NYLON BUSHINGS. THE CHEMICAL COMPOUNDS IN THE PAINT STRIPPERS CAN CAUSE DAMAGE TO THE AIRPLANE COMPONENTS.

(1) Apply tape or covers to areas which are easily damaged by the strippers.

S 107-009

(2) Do the subsequent steps to clean the area:

NOTE: Use BMS 3-2, Type I or P-D-680, Type I solvent for this step. Use the correct type of solvent.

- (a) Remove the loose soil, grease and oil. Be careful not to put soil on a larger area than necessary.
- (b) Wet the surface with the solvent.

(c) Clean the surface with a cheesecloth, a soft brush or a sponge.

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

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

S 107-004
(3) Do the subsequent steps to clean the area again:

NOTE: Use BMS 3-2 for this last step. Do not use P-D-680, Type I for this last step.

(a) Use a squirt bottle to apply the solvent on the surface.
(b) Clean the surface a with clean cheesecloth until all large pieces of soil are removed. Use a soft bristle brush if it is necessary.
(c) Change the cheesecloth frequently.
(d) Do the cleaning procedures again until no signs of soil are found on the cheesecloth.
(e) Dry the area with a clean dry cheesecloth. Do not permit drops of solvent to become dry.

E. Procedure - Paint Stripping

S 847-001
(1) Fully mix the strippers.

S 847-002
(2) Immediately shake the strippers before it is applied.

S 157-005
(3) Do the subsequent steps if you use spray or brush-on strippers:
(a) Apply the stripper on the paint. Keep the surface wet.

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 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 757-53A0092.

(b) Remove the loosened paint with an approved scraper.

S 157-006

(4) Do the subsequent steps if you use wipe or squirt-on strippers:

(a) Apply the stripper with a squirt bottle or a stripper-soaked cheesecloth on the paint. Keep the surface wet.

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 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 757-53A0092.

(b) Remove the paint with an approved scraper before the surface dries.

S 177-007

(5) Do the subsequent steps when you flush or dry the surface:

(a) Flush the area with high-pressure water (hot water recommended).

(b) Dry the area after the last water flush.

S 157-008

(6) Do the subsequent steps to remove adhesives:

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.

(a) Apply small amounts of mixed stripper on adhesive with a brush. Do not let the stripper fall on aluminum surfaces.

(b) Let the stripper absorb the adhesive for 30 minutes.

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 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 757-53A0092.

(c) Remove the stripper and loosened adhesive with a cheesecloth or an approved scraper.
(d) If necessary, apply the stripper again and do the steps again to remove the stripper.

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

(e) Flush the surface with a sponge soaked in water.
(f) Dry the surface with a cheesecloth or a solvent cleaner with solvent, Series 80 (AMM 20-30-80/201).
(g) If it is necessary do all steps again to remove remaining areas of adhesive.

S 157-010
(7) Do the subsequent steps to remove high temperature primer, BMS 10-53:

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.

(a) Apply Turco 5292B, 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.

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

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 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 757-53A0092.

(c) When the primer is loose, fully rub the area with a brush or use an approved scraper.

WARNING: MANY ORGANIC-FINISH STRIPPERS ARE FLAMMABLE, DANGEROUS AND CAN CAUSE CORROSION. FOR SAFE OPERATION WITH THESE MATERIALS, REFER TO THE APPLICABLE FIRE, INDUSTRIAL HYGIENE AND SAFETY STANDARDS. DO NOT TOUCH OR BREATHE SOLVENTS AND STRIPPERS FOR A LONG TIME. DO NOT USE THESE MATERIALS IN CONFINED SPACES WITHOUT A SUFFICIENT FLOW OF AIR. USE CHEMICALLY RESISTANT GLOVES, HATS, COATS, GOGGLES OR PLASTIC FACE SHIELDS WHEN YOU USE PAINT STRIPPERS. IMMEDIATELY USE WATER TO REMOVE ALL PAINT STRIPPERS FROM YOUR SKIN. IMMEDIATELY FLUSH OUT ALL UNWANTED MATERIALS IN YOUR EYES AND SEE A DOCTOR OR A MEDICAL SPECIALIST. FAILURE TO OBEY CAN RESULT IN INJURY.

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

TYPE OF ORGANIC FINISH TO BE REMOVED	APPROVED METAL SUBSTRATES	PROCEDURE TO APPLY THE STRIPPER	TYPE OF STRIPPER	APPROVED STRIPPER	TEMPERATURE (°F)
PRIMERS, WAX,OVER SPRAY,AND TEMPORARY COATINGS	ALL	WIPE OR SQUIRT-ON	SOLVENT	BUTYL CELL-OSOLVE, METHYL ISOBUTYL KETONE, ETHYL ALCO-HOL, XYLENE, TOLUENE, TURCO 800	ROOM (NOT MORE THAN 90°F)
ALL FINISHES	UNLESS THE STEEL IS HEAT-TREATED ABOVE 220 KSI	SPRAY OR BRUSH-ON	SOLVENT NON-PHENOLIC NON-CHROMATED	CEE BEE A-306B	50-100°F-RECOMMENDED 65-80°F
			SOLVENT NON-PHENOLIC CHROMATED	TURCO 5878 PENNWALT EZ STRIP 19E	50-100°F-RECOMMENDED 65-80°F
ADHESIVES *[1]	ALUMINUM	SPRAY OR BRUSH-ON	SOLVENT	ALCOR LO-2030M, FIBER-RESIN ES1, TURCO 5351 (THICK), TURCO 5351 (THIN)	50-100°F-RECOMMENDED 65-80°F
*[2]	UNLESS THE STEEL IS 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

F. Dry Abrasive Stripping Of Composites

S 127-013

(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.

PREPAINT CLEANING AND TREATMENT - CLEANING/PAINTING

1. General
   A. This procedure contains three 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) Scraper (See AMM 51-31-01/201 for approved scrapers to remove paint and adhesive)
      (2) Spray Equipment (commercially available)
   B. Consumable Materials
      (1) Aluminum Foil Tape
         (a) G00117 Permacel P-112 (AMM 20-30-07/201)
         (b) G00291 Scotch No. 425 (AMM 20-30-07/201)
      (2) Masking Tape
         (a) G00132 3M No. 214 (AMM 20-30-07/201)
      (3) G00301 Gizzard Protex 20V (AMM 20-30-07/201)
         (a) G00366 Permacel P-705 (AMM 20-30-07/201)
         (b) G00367 Mystic 6223 (AMM 20-30-07/201)
      (4) G00111 Plastic Film, Mylar or Polyethylene (AMM 20-30-07/201)
      (5) G00365 Polyethylene Coated Paper - VV-P-272C (AMM 20-30-07/201)
      (6) Cleaning Solvents
         (a) B00135 Naphtha (AMM 20-30-99/201)
         (b) G00148 Methyl Ethyl Ketone (MEK) - TT-M-261 (AMM 20-30-85/201)
         (c) B00151 Methyl Iso-Butyl Ketone (MIBK) - TT-M-268 (AMM 20-30-05/201)
         (d) B00153 Toluene (Toluol) - TT-T-548 or JAN-T-171, Grade A (AMM 20-30-05/201)
            1) 1-to-1 MEK-Toluene Mixture
         (e) B00189 Thinner - TL-52

(7) B00280 Stripper - Turco 5351 (AMM 20-30-05/201)
(8) G00034 Cloth, Process Cleaning Absorbent Wiper (cheesecloth, gauze) - BMS 15-5 (AMM 20-30-07/201)
(9) B00101 Nylon pad, Aluminum Oxide Abrasive, Type F - 240 grit (minimum) (AMM 20-30-02/201)
(10) B00102 Silicon Carbide Abrasive Disc (Bear Tex) - 240 grit (minimum) (AMM 20-30-02/201)
(11) B00107 Scotchbrite, Type A, Aluminum Oxide Abrasive Paper - 240 grit (minimum) (AMM 20-30-07/201)
(12) B00137 Abrasive paper - P-P-121, 240 grit (minimum) (AMM 20-30-02/201)
(13) G00251 Aluminum Oxide Abrasive Paper - 240 grit (minimum) (AMM 20-30-02/201)
(14) B00340 Silicon Carbide Paper - 240 grit (minimum) (AMM 20-30-02/201)

C. References
(1) AMM 20-30-02/201, Cleaners and Polishes - Maintenance Practices
(2) AMM 20-30-05/201, Strippers - Maintenance Practices
(3) AMM 20-30-07/201, Miscellaneous Materials - Maintenance Practices
(4) AMM 20-30-85/201, Airplane Structure Cleaning Solvents (SERIES 85) - Maintenance Practices
(5) AMM 20-30-99/201, Airplane Structure Cleaning Solvents (SERIES 99) - Maintenance Practices
(6) AMM 51-21-01/701, Paint Stripping - Cleaning/Painting
(7) AMM 51-21-04/701, Chemical Conversion Coating - Cleaning/Painting
(8) AMM 51-21-10/701, Decorative Exterior Finishes - Cleaning/Painting
(9) AMM 51-31-01/201, Seals and Sealant - Maintenance Practices

D. Procedure - Clean the Surface

S 917-002

CAUTION: DO NOT APPLY SOLVENTS, CLEANERS, AND ALODINE ON SEALANTS AND LEVELING COMPOUND. SOLVENTS, CLEANERS AND ALODINE CAN MIX CHEMICALLY WITH SEALANTS AND LEVELING COMPOUND AND CAUSE DAMAGE.

(1) Put covers on all adjacent areas.

S 037-003
(2) Remove all temporary finishes from the surface.

S 127-004

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

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 757-53A0092.

(3) Use an approved srcaper to remove bad finishes and unwanted adhesive from the surface.

NOTE: 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 for each minute.

S 117-017

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. 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.

CAUTION: DO NOT USE YOUR FINGER OR A KNIFE TO EXAMINE THE BOND OF THE FILLET. ONLY DO A VISUAL INPSECTION OF THE INTERFACE BETWEEN THE FILLET AND THE SKIN. IF YOU ARE NOT CAREFUL, DAMAGE TO THE FASTENERS, SEAMS, AND LAP JOINTS CAN OCCUR.

(5) Use a soft brush or cheesecloth 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.

S 147-018

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 757-53A0092.

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

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

S 397-008

(7) Repair all the 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 51-21-02-107-002

3. Prepare the Surface

A. Equipment
   (1) Scraper (See AMM 51-31-01/201 for approved scrapers to remove paint and adhesive)
   (2) Soft bristle brush (commercially available)

B. Consumable Materials
   (1) Aluminum Foil Tape
      (a) G00117 Permacel P-112 (AMM 20-30-07/201)
      (b) G00291 Scotch No. 425 (AMM 20-30-07/201)
   (2) Masking Tape
      (a) G00132 3M No. 214 (AMM 20-30-07/201)
      (b) G00301 Gizzard Protex 20V (AMM 20-30-07/201)
      (c) G00366 Permacel P-705 (AMM 20-30-07/201)
      (d) G00367 Mystic 6223 (AMM 20-30-07/201)
   (3) G00111 Plastic Film, Mylar or Polyethylene (AMM 20-30-07/201)
   (4) G00365 Polyethylene Coated Paper - VV-P-272C (AMM 20-30-07/201)
   (5) Cleaning Solvents
      (a) B00135 Naphtha (AMM 20-30-99/201)
      (b) G00148 Methyl Ethyl Ketone (MEK) - TT-M-261 (AMM 20-30-85/201)
      (c) B00151 Methyl IsoButyl Ketone (MIBK) - TT-M-268 (AMM 20-30-05/201)
      (d) B00153 Toluene (Toluol) - TT-T-548 or JAN-T-171, Grade A (AMM 20-30-05/201)
         1) 1-to-1 MEK-Toluene Mixture
      (e) B00189 Thinner - TL-52
   (6) B00280 Stripper - Turco 5351 (AMM 20-30-05/201)
   (7) G00034 Cloth, Process Cleaning Absorbent Wiper (cheesecloth, gauze) - BMS 15-5 (AMM 20-30-07/201)
   (8) B00101 Nylon pad, Aluminum Oxide Abrasive, Type F - 240 grit (minimum) (AMM 20-30-02/201)
   (9) B00102 Silicon Carbide Abrasive Disc (Bear Tex) - 240 grit (minimum) (AMM 20-30-02/201)
   (10) B00107 Scotchbrite, Type A, Aluminum Oxide Abrasive Paper - 240 grit (minimum) (AMM 20-30-07/201)
   (11) B00137 Abrasive paper - P-P-121, 240 grit (minimum) (AMM 20-30-02/201)

(12) G00251 Aluminum Oxide Abrasive Paper - 240 grit (minimum) (AMM 20-30-02/201)
(13) B00340 Silicon Carbide Paper - 240 grit (minimum) (AMM 20-30-02/201)
(14) C00064 Conversion Coating, MIL-C-5541 (Alodine) (AMM 20-30-03/201)

C. References
(1) AMM 20-30-02/201, Cleaners and Polishes - Maintenance Practices
(2) AMM 20-30-05/201, Strippers - Maintenance Practices
(3) AMM 20-30-07/201, Miscellaneous Materials - Maintenance Practices
(4) AMM 20-30-85/201, Airplane Structure Cleaning Solvents (SERIES 85) - Maintenance Practices
(5) AMM 20-30-99/201, Airplane Structure Cleaning Solvents (SERIES 99) - Maintenance Practices
(6) AMM 51-21-01/701, Paint Stripping - Cleaning/Painting
(7) AMM 51-21-04/701, Chemical Conversion Coating - Cleaning/Painting
(8) AMM 51-21-10/701, Decorative Exterior Finishes - Cleaning/Painting
(9) AMM 51-31-01/201, Seals and Sealant - Maintenance Practices

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 Procedure I: (Before you apply wash or epoxy primer system without alodine)
(a) Prepare the alkaline cleaner, mix 1 part (by volume) of cleaner with 3 parts (by volume) of water.

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 757-53A0092.

(b) Use abrasive pads and alkaline cleaner to make the surface rough.
(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 the primer on the surface (AMM 51-21-10/701).

S 377-012

(2) Prepare Procedure II: (before you apply an epoxy primer system with alodine)

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

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 757-53A0092.

(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, 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 (AMM 51-21-10/701).

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:

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 757-53A0092.

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 COURSE 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 HAS BEEN REMOVED, USE PROGRESSIVELY FINER GRITS TO OBTAIN THE REQUIRED SURFACE FINISH.

1) Use abrasive paper or pads to remove surface and loose soil. It is optional to use course 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.

TASK 51-21-02-107-003

4. Clean and Prepare Plastic Surfaces

A. Equipment
(1) Stiff bristle brush (commercially available)
(2) Spray Equipment (commercially available)

B. Consumable Materials
(1) Aluminum Foil Tape
(a) G00117 Permacel P-112 (AMM 20-30-07/201)
(b) G00291 Scotch No. 425 (AMM 20-30-07/201)
(2) Masking Tape
(a) G00132 3M No. 214 (AMM 20-30-07/201)
(3) G00301 Gizzard Protex 20V (AMM 20-30-07/201)
(a) G00366 Permacel P-705 (AMM 20-30-07/201)
(b) G00367 Mystic 6223 (AMM 20-30-07/201)
(4) G00111 Plastic Film, Mylar or Polyethylene (AMM 20-30-07/201)

(5) G00365 Polyethylene Coated Paper - VV-P-272C (AMM 20-30-07/201)
(6) Cleaning Solvents
  (a) B00135 Naphtha (AMM 20-30-99/201)
  (b) G00148 Methyl Ethyl Ketone (MEK) - TT-M-261 (AMM 20-30-85/201)
  (c) B00151 Methyl Iso-Butyl Ketone (MIBK) - TT-M-268 (AMM 20-30-05/201)
  (d) B00153 Toluene (Toluol) - TT-T-548 or JAN-T-171, Grade A (AMM 20-30-05/201)
    1) 1-to-1 MEK-Toluene Mixture
  (e) B00189 Thinner - TL-52
(7) B00280 Stripper - Turco 5351 (AMM 20-30-05/201)
(8) G00034 Cloth, Process Cleaning Absorbent Wiper (cheesecloth, gauze) - BMS 15-5 (AMM 20-30-07/201)
(9) B00101 Nylon pad, Aluminum Oxide Abrasive, Type F - 240 grit (minimum) (AMM 20-30-02/201)
(10) B00102 Silicon Carbide Abrasive Disc (Bear Tex) - 240 grit (minimum) (AMM 20-30-02/201)
(11) B00107 Scotchbrite, Type A, Aluminum Oxide Abrasive Paper - 240 grit (minimum) (AMM 20-30-07/201)
(12) B00137 Abrasive paper - P-P-121, 240 grit (minimum) (AMM 20-30-02/201)
(13) G00251 Aluminum Oxide Abrasive Paper - 240 grit (minimum) (AMM 20-30-02/201)
(14) B00340 Silicon Carbide Paper - 240 grit (minimum) (AMM 20-30-02/201)
(15) C00058 Magna 28-C-1 Static Conditioner (AMM 20-30-03/201)
(16) C00059 Dexter 8-W-5 Surfacer (AMM 20-30-03/201)
  (a) C00061 Hardener - 50-C-3 or 10-C-32
  (b) C00062 Reducer - 66-C-28

C. References
(1) AMM 20-30-02/201, Cleaners and Polishes - Maintenance Practices
(2) AMM 20-30-03/201, Finishing Materials - Maintenance Practices
(3) AMM 20-30-05/201, Strippers - Maintenance Practices
(4) AMM 20-30-07/201, Miscellaneous Materials - Maintenance Practices
(5) AMM 20-30-85/201, Airplane Structure Cleaning Solvents (SERIES 85) - Maintenance Practices

(6) AMM 20-30-99/201, Airplane Structure Cleaning Solvents (SERIES 99) - Maintenance Practices
(7) AMM 51-21-01/701, Paint Stripping - Cleaning/Painting
(8) AMM 51-21-04/701, Chemical Conversion Coating - Cleaning/Painting
(9) AMM 51-21-10/701, Decorative Exterior Finishes - Cleaning/Painting
(10) AMM 51-31-01/201, Seals and Sealant - Maintenance Practices

D. Procedure - Clean the Surface

S 107-014

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

<u>WARNING</u>: DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. 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, 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 abrasive paper (minimum grit number) to remove the glossy finish of the laminate.

<u>NOTE</u>: When you rub the surface, make sure you do not rub through the laminate into 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.

<u>NOTE</u>: 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.

(e) Prepare surface porosity as follows:

CAUTION: THE USE OF FILLERS, PUTTIES, AND SURFACERS ARE EXCELLENT FOR PROVIDING SMOOTH SURFACES HOWEVER, APPLYING EXCESSIVE AMOUNTS OF THOSE MAY CONTRIBUTE TO LONG-TERM PAINT CRACKING.

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).

(f) Use 150-grit abrasive paper (minimum grit number) 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 naptha to remove all remaining particles.

NOTE: If 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.

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 51-21-03-307-001

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
      (4) G00251 Abrasive - Non-Metallic Mats (Scotchbrite Pads)
      (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 357-002

(1) Do these steps to prepare the area for general external skin corrosion:
(a) Put the airplane in a 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 117-010

(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 THERMINAL 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.

(b) Apply the corrosion removal compound at the lowest area and work up into a circular movement.

<u>NOTE</u>: This will give a good layer and dwell time for the compound on the surface. Also compound applied warm (140 degrees Farenheit (60 degrees Centigrade) maximum temperature) on the surface gives better results.

<u>CAUTION</u>: 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:

<u>NOTE</u>: 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 357-003

(3) Do the steps that follow, to remove small quantities of aluminum corrosion from the external surface of the airplane with the phosphoric acid based compound (MIL-C-10578).

<u>NOTE</u>: 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.
(d) Fully flush all of the prepared area and the adjacent areas with water.

CAUTION: Make sure that you flush out all the phosphoric acid water solution from skin seams and all opening or 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 117-011

(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 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.

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 drys, the pumice abrasive powder is wiped off the surface.

(g) Scapers are used primarily for the intial 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 51-21-03-307-008

3. Steel Alloy Corrosion Removal and Control

A. Procedure - Steel Corrosion Removal

S 357-005

(1) Do these steps to remove corrosion from steel parts that are heat-treated to 180 KSI or less:

NOTE: If you do not know the heat-treat of a steel part, prepare the part as if it was heat-treated at 180 KSI or more.

CAUTION: PUT COVERS ON ALL ADJACENT AREAS THAT DO NOT HAVE CORROSION. THE CORROSION REMOVAL PROCEDURES CAN CAUSE DAMAGE TO AREAS WITHOUT PROTECTION.

(a) Remove corrosion with a stainless steel wool and wire brush.

CAUTION: KEEP THE PHOSPHORIC ACID CORROSION REMOVER FOR STEEL ON THE AREA WITH CORROSION. DAMAGE CAN OCCUR IF PHOSPHORIC ACID CORROSION REMOVER IS APPLIED ON THE ADJACENT AREAS.

(b) Remove the remaining corrosion with Phosphoric Acid Corrosion Remover for steel.

NOTE: Make sure 3 parts (by volume) of water were added to the corrosion remover.

(c) Flush the area with clean water.
(d) Clean the area with a cheese cloth that is moist with water.
(e) Let the area dry. Use mechanical devices, if it is necessary.
(f) Apply protective finish as it is necessary.

S 357-004
(2) Do these steps to remove corrosion from steel parts that are heat-treated above 180 KSI:

CAUTION: PUT COVERS ON ALL ADJACENT AREAS THAT DO NOT HAVE CORROSION. THE CORROSION REMOVAL PROCEDURE CAN CAUSE DAMAGE TO AREAS WITHOUT PROTECTION.

(a) Remove the corrosion material with 220-grit (minimum) abrasive paper or use a sandblast equipment (dry).
(b) Clean the area with a cheesecloth that is moist with solvent.
(c) Apply protective finish as it is necessary.

NOTE: Metal surfaces are sensitive after you use the sandblast equipment. Apply primer in 1 hour after you use the sandblast equipment.

S 867-006
(3) Do these steps to remove corrosion from resisting steels (all types), nickle-base alloys and titanium:

WARNING: REMOVE ALL SMALL PARTICLES OF TITANIUM ALLOY. THE TITANIUM PARTICLES CAN EASILY IGNITE AND CAUSE A FIRE. EXTINGUISH SUCH FIRES WITH DRY TALC, CALCIUM CARBONATE, SAND OR GRAPHITE. DO NOT USE WATER, CARBON DIOXIDE, CARBON TETRACHLORIDE, OR AN ORDINARY CHEMICAL FIRE EXTINGUISHER. INJURY AND DAMAGE CAN OCCUR IF YOU DO NOT REMOVE ALL TITANIUM PARTICLES.

CAUTION: PUT COVERS ON ALL ADJACENT AREAS THAT DO NOT HAVE CORROSION. THE CORROSION REMOVAL PROCEDURES CAN CAUSE DAMAGE TO AREAS WITHOUT PROTECTION.

(a) Use a stainless steel wool, a wire brush, abrasive paper or sandblast equipment to remove corrosion.

NOTE: Make sure you remove all the corrosion on the surface.

(b) Polish the surface with 400-grit aluminum oxide paper to remove scratches.
(c) Clean the surface with a cheesecloth that is moist with solvent.
(d) Flush the surface and the adjacent areas.
(e) Let the surface dry.
(f) Apply protective finish as it is necessary.

CHEMICAL CONVERSION COATING - CLEANING/PAINTING

1. General
   A. This procedure contains one task. The task is to apply chemical conversion coating.
   B. A chemical conversion coating is a protective coating and paint base. The solutions used are: Alodine 600, 1000, 1200, and 1200S. Alodine 600 is used in the fuel tank next to BMS 10-20 Type II primer.
   C. In areas where the chemical conversion coating may come in contact with BMS 10-20 Type II primer, only Alodine 600 should be used.

TASK 51-21-04-107-017

2. Apply the Chemical Conversion Coating
   A. Equipment
      (1) Brush, soft-bristle (fiber)
      (2) Container, stainless steel or acid resistant (Do not use lead or glass, polyethylene is recommended)
      (3) Protective Gloves, neoprene or rubber
      (4) Respirators
   B. Consumable Materials
      (1) G02285 Abrasive Wheel - Aluminum Oxide, Scotchbrite Tycro, Type A
      (2) B00137 Abrasive Paper - Aluminum Oxide, 400-grit (minimum)
      (3) Abrasive Fabric or Pad - 400-grit (minimum)
         (a) G00251 Aluminum Oxide - Scotchbrite, Type A, 3M Company
         (b) B00102 Aluminum Oxide - Bear Tex, Norton Company
      (4) C00064 Coating - Chemical Conversion Coating for Aluminum or Aluminum Alloys, (MIL-C-5541).
      (5) G00034 Cheesecloth - New, Clean, Dry, Lint Free
      (6) B00148 Solvent - Methyl Ethyl Ketone (MEK), TT-M-261
      (7) G00116 Sponge, Cellulose (Aircraft Cleaning) L-S-626
      (8) B00107 Chamois Scotchbrite Sheet, Finishing Pads, Type A

(9) G00270 Tape - Masking
(10) G00291 Tape - Aluminum, 3M No. 425
(11) Paper - PH Indication

C. References
(1) AMM 20-30-88/201, Solvent, Series 88
(2) SRM 51-20-05, Repair Sealing
(3) AMM 51-21-03/701, Corrosion Removal and Control

D. Prepare the Alodine Solution

S 377-001

WARNING: DO NOT GET CHEMICAL CONVERSION COATING IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. IMMEDIATELY FLUSH CHEMICAL CONVERSION COATING FROM YOUR SKIN. IF CHEMICAL CONVERSION COATING GETS IN YOUR EYES, IMMEDIATELY FLUSH YOUR EYES WITH WATER FOLLOWED BY AN EYE WASH OF BORIC ACID SOLUTION. MAKE SURE YOU PUT ON A RESPIRATOR AND PROTECTIVE GLOVES WHEN YOU MIX THE CHEMICAL CONVERSION COATING. KEEP THE CHEMICAL CONVERSION COATING AWAY FROM SPARKS, FLAME, AND HEAT. CHEMICAL CONVERSION COATING IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(1) To prepare the Alodine 1000 Solution, do these steps:

NOTE: In areas where Alodine 1000 Solution may come in contact with BMS 10-20 Type II primer, only Alodine 600 should be used.

(a) If you are using Alodine 1000L, do the steps that follow,
1) Put 6 parts (by volume) of water in a clean polyethylene container.
2) Add 4 parts (by volume) of Alodine 1000L liquid concentrate to the water.

(b) If you are using Alodine 1000 powder, add 0.4 ounces of Alodine 1000 powder to water for each gallon of final solution.

(c) Fully mix the chemical conversion coating.

(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 377-002

(2) To prepare the Alodine 600, 1200, or 1200S solution, do these steps:

NOTE: In areas where the chemical conversion coating may come in contact with BMS 10-20 Type II primer, only Alodine 600 should be used.

(a) Put the contents of the Alodine 600, 1200 or 1200S powder on clean paper.

(b) Use a roller to make the Alodine 600, 1200 or 1200S powder smooth and constant.

(c) Put water in a stainless steel or acid-resistant container. Do not use lead or glass containers.

(d) For Alodine 600 or 1200,
add 3 ounces of powder for each gallon of final solution.

(e) For Alodine 1200S,
add 2 ounces of powder for each gallon of final solution.

(f) Fully mix the solution.

(g) Let the solution stay for 1 hour before it is used.

NOTE: A dirty solution is unstatisfactory. Prepare the solution in small quantities and discard when dirty. If you use nondistilled water, add nitric acid to get a pH level from 1.50 to 1.90 for Alodine 1200 or 1200s. For Alodine 600 add 2 percent by volume of Alodine Toner 22 and stir to adjust the pH to between 1.5 and 2.0. Use pHydrion paper to measure the pH level. Do not add wetting agents to this solution.

E. Prepare the Surface

S 957-003

(1) Apply masking tape on all adjacent areas.

NOTE: It is not necessary to apply masking tape on chemical conversion coating surfaces.

S 397-004

(2) Seal all holes and gaps on the assemblies that have honeycomb or foam plastic. Use sealing compounds, caulking compounds or rubber plugs.

S 117-005

(3) Use brush or rags to clean the area with liquid solvent degreaser.

S 917-006

(4) Dry the area with warm air or use a clean dry cloth.

S 147-007

(5) Remove all organic and inorganic finishes from the surface area. Also remove hydraulic fluid resistant finish. Use Scotchbrite Tycro, Type 3A aluminum oxide abrasive wheel attached to a drill motor, 400-grit (minimum) aluminum oxide abrasive fabric, or 400-grit (minimum) aluminum oxide abrasive paper.

S 217-008

(6) Make sure the surface is smooth, constant, and shiny after the removal of all organic and inorganic finishes from the surface.

S 167-009

(7) Remove all remaining particles with a clean dry cheesecloth.

S 117-019

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

(8) Clean the area with a cheesecloth that is moist with solvent, Series 88 (AMM 20-30-88/201).

S 917-011

(9) Let the solvent dry for 15 minutes (minimum).

S 357-012

(10) Remove all corrosion material from the surface (AMM 51-21-03/701).

S 107-013

(11) Refer to the Structural Repair Manual (SRM 51-20-05) to clean and repair parts in the fuel tanks.

F. Procedure - Apply the Chemical Conversion Coating

NOTE: In areas where the chemical conversion coating may come in contact with BMS 10-20 Type II primer, only Alodine 600 should be used.

S 377-016

WARNING: DO NOT GET CHEMICAL CONVERSION COATING IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. IMMEDIATELY FLUSH CHEMICAL CONVERSION COATING FROM YOUR SKIN. IF CHEMICAL CONVERSION COATING GETS IN YOUR EYES, IMMEDIATELY FLUSH YOUR EYES WITH WATER FOLLOWED BY AN EYE WASH OF BORIC ACID SOLUTION. MAKE SURE YOU PUT ON A RESPIRATOR AND PROTECTIVE GLOVES WHEN YOU APPLY THE CHEMICAL CONVERSION COATING. KEEP THE CHEMICAL CONVERSION COATING AWAY FROM SPARKS, FLAME, AND HEAT. CHEMICAL CONVERSION COATING IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(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 CHEMICAL CONVERSION COATING IS FLAMMABLE AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Use a clean cheesecloth to apply the Alodine 1000 solution on the surface of the part.

NOTE: Make sure the room temperature is 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 CHEMICAL CONVERSION COATING IS EASILY DAMAGED.

(d) Air dry the part.

NOTE: Dry at 120 degrees F (optimum), 130 degrees F (maximum).

S 377-015
(2) Do these steps to apply the Alodine 600, 1200 or 1200S solution:

WARNING: DO NOT LET THE ALODINE 1200 OR 1200S SOLUTION DRY ON THE CHEESECLOTH. IMMEDIATELY FLUSH THE CHEESECLOTH WITH WATER AND SOAK IT IN A CONTAINER FILLED WITH WATER. A DRY CHEESECLOTH WITH CHEMICAL CONVERSION COATING IS FLAMMABLE AND CAN CAUSE INJURY TO PERSONS AND DAMAGE TO EQUIPMENT.

(a) Apply Alodine 600, 1200 or 1200S solution with a fiber brush, nylon brush, or a clean cheesecloth.

(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 moist 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 part.

NOTE: Dry at 120 degrees F (optimum), 130 degrees F (maximum).

(g) Refer to Chapter 51 of the Structural Repair Manual to apply a protective finish or adhesive after you dry the part.

NOTE: Use clean gloves when you touch the part to prevent contamination.

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.
   B. Paint should meet the requirements of BMS 10-72 or AMS 3095. In addition to this procedure, Boeing specification D6-1816 provides procedures for Decorative Exterior Paint System Application.

TASK 51-21-10-377-003

2. Decorative Exterior Paint System Application
   A. General
      (1) Do not get paint on the surfaces of the items that follow:
         (a) Decoupled the staic dischargers or retainers on the wing, and the horizontal and vertical stabilizers.
         (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 relief valve doors, or outflow valves.
         (f) Door operating mechanisms, hinge assemblies, and equivalent surfaces.
      (2) Do not allow solvents, cleaners, or overspray to contact polycarbafil plastic parts.
   B. References
      (1) AMM 51-21-02/701, Decorative Exterior Finishes - Cleaning/Painting
   C. Procedure

      S 117-044

   WARNING: DO NOT APPLY PAINT, OR MATERIALS THAT ARE NOT TRANSPARENT TO THE ACRYLIC WINDOWS. DO NOT APPLY OTHER MATERIALS UNLESS THEY ARE APPROVED FOR ACRYLIC WINDOWS. THESE MATERIALS CAN CAUSE DAMAGE TO THE STRUCTURE OF ACRYLIC WINDOWS. THIS CAN MAKE FLIGHT DANGEROUS.

      (1) Do this task: (AMM 51-21-02/701), Clean the Surface.

      S 847-037

      (2) Do this task: (AMM 51-21-02/701), Prepare the Surface.

S 377-038

CAUTION: DO NOT GET FINISHES, CLEANERS, THINNERS, AND SOLVENTS IN YOUR MOUTH, OR YOUR EYES, OR ON YOUR SKIN OR 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.

(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
Coating - Anti-Static	BMS 10-21	BAC 5639
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
Primer - Nonchromated	BMS 10-103	BAC 5325

TASK 51-21-10-377-039

3. Decorative Exterior Paint System Repair

A. Equipment

(1) Scraper (See AMM 51-31-01/201 for approved scrapers to remove paint and adhesive)

B. Consumables
   (1) B00102 Abrasive, aluminum oxide disks and sheets -A-A-1048
   (2) G00034 Cloth, Process Cleaning Absorbent Wiper (cheesecloth, gauze) - BMS 15-5
   (3) B01005 Solvent, Final Cleaning of All Organic Coatings Prior to Painting - Series 85 (AMM 20-30-85/201)

C. References
   (1) AMM 20-30-85/201, Airplane Structure Cleaning Solvents (Series 85) - Maintenance Practices
   (2) AMM 51-21-01/701, Paint Stripping - Cleaning/Painting
   (3) SRM 51-21-01/701, D6-1816 Exterior Decorative Paint Application
   (4) AMM 51-21-00/701 Interior/ Exterior Finishes/Painting

D. Procedure

S 377-041

(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, BMS 15-5 that is moist with solvent, Series 85 (AMM 20-30-85/201).
   (c) Dry the surface with a clean cloth, BMS 15-5.
   (d) Apply the applicable primer and topcoats again, if necessary, as follows:
      1) Apply the decorative exterior paint system as specified by the paint manufacturer's specifications and with the table, (Table 701).
   (e) Feather all edges to get a smooth continuous finish.

S 377-040

(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.

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 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 737-53A1262.

   (a) Rub the surface smooth with abrasive, A-A-1048, or do this task: Paint Stripping (AMM 51-21-01/701).

(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, BMS 15-5 that is moist with solvent, Series 85 (AMM 20-30-85/201).
(d) Dry the surface with a clean cloth, BMS 15-5.
(e) Apply the applicable primer and topcoats as follows:
1) Apply the decorative exterior paint system as specified by the paint manufacturer's specifications and with the table, (Table 701).
(f) Feather the edges to get a smooth continuous finish.

S 377-043
(3) Repair areas with defective paint layers as follows:

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 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 737-53A1262.

(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, BMS 15-5 that is moist with solvent, Series 85 (AMM 20-30-85/201).
(d) Dry the surface with a clean cloth, BMS 15-5.
(e) Apply the applicable topcoats per manufacturer's specification and Table 701.

INTUMESCENT (HEAT PROTECTIVE) FINISH - CLEANING/PAINTING

1. General
    A. This procedure contains one task. The task is to apply intumescent finish on fiberglass material.

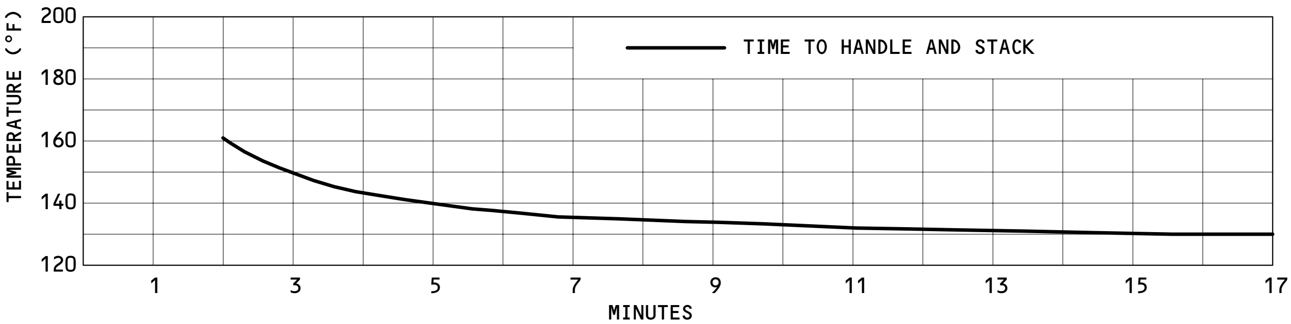
TASK 51-21-11-377-008

2. Apply Intumescent Finish
    A. Equipment
        (1) Spray Equipment
    B. Consumable Materials
        (1) G00215 Brush soft bristle
        (2) B00148 Solvent - Methyl Ethyl Ketone (MEK), TT-M-261
        (3) G00016 Methylene Chloride, Technical - MIL-D-6998
        (4) Abrasive Paper - 240-grit (minimum)
            (a) G00251 Aluminum Oxide, Scotchbrite - Type A
        (5) B00311 Silicon Carbide, Scotchbrite - Type S
        (6) C00371 Intumescent Paint - AVCO 1600 BTX
            (a) Component A (base)
            (b) Component B (hardner)
        (7) C00259 Primer - BMS 10-11, Type I
    C. References
        (1) 51-21-02/701 - Prepaint Cleaning and Treatment
    D. Procedure - Apply the Intumescent Finish

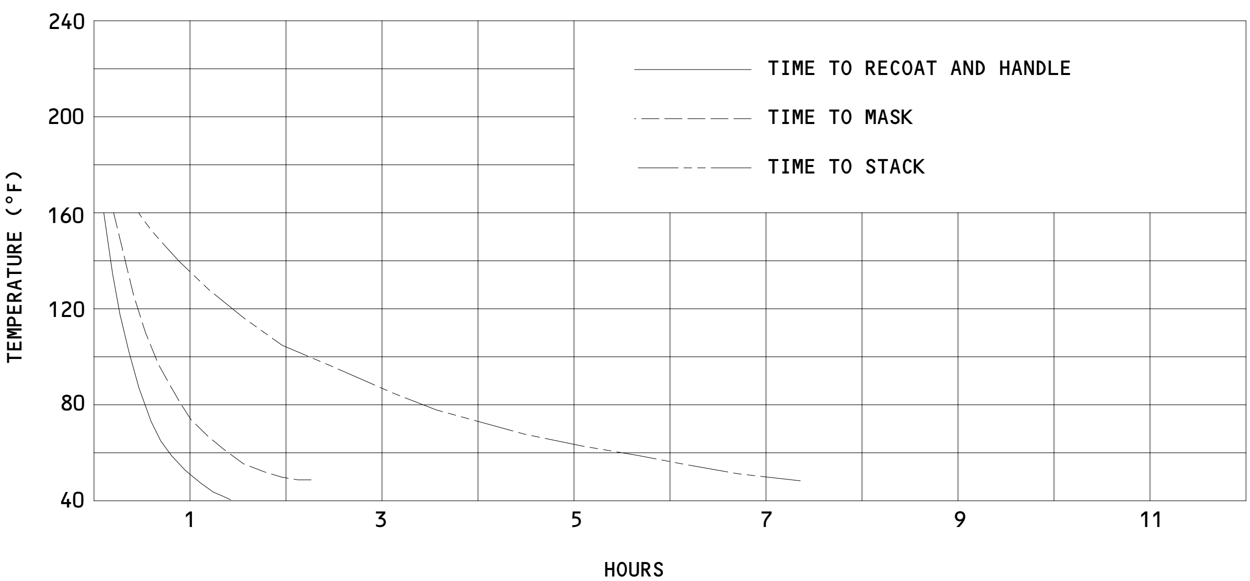
        S 107-001
        (1) Clean and prepare the surface (Ref 51-21-02).

        S 377-002
        (2) Do these steps to prepare the primer:
            (a) Refer to the manufacturer's instructions to mix the primer.
            (b) Let the primer stay for 30 minutes before it is applied.
            (c) Identify the container with a label. Write the date and hour when the primer was mixed and the time when the pot life ends.

                NOTE: The pot life of the primer is 18 hours at a temperature below 80°F, 12 hours between 80°F and 85°F, and 8 hours above 85°F.



INFRARED LAMP CURE



NORMAL AIR CURE

Cure Charts - Primer BMS 10-11, Type I
Figure 701

S 377-010
(3) Apply one layer of the primer with a spray gun.

S 217-014
(4) Make sure the dry thickness is between 0.3 to 0.8 mils (0.0003 to 0.0008 inch).

S 377-011
(5) Let the primer cure before you apply the second layer (Fig. 701).

S 377-012
(6) Apply the second layer.

S 217-015
(7) Make sure the total primer thickness is 1.6 mils (0.0016 inch).

S 377-013

WARNING: DO NOT USE A PAINT SHAKER TO MIX THE AVCO 1600 BTX PAINT. DO NOT GET THE BASE, THE HARDENER, AND THE THINNER 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.

(8) Add 3.4 parts (by weight) of component B (hardener) to 100 parts (by weight) of component A (base).

S 377-009
(9) Mix the components fully.

S 937-017

CAUTION: MAKE SURE YOU USE THE AVCO 1600 BTX MIXTURE BEFORE THE POT LIFE ENDS. THE MIXTURE RATIO BETWEEN COMPONENT A (BASE) AND COMPONENT B (HARDENER) OF AVCO 1600 BTX IS VERY IMPORTANT TO GET A SATISFACTORY FINISH. THE POT LIFE IS ONE HOUR AT 70°F TO 80°F FOR A ONE-QUART VOLUME OF THE MIXED COMPOUND. IF YOU USE THE MIXED COMPOUND AFTER THE POT LIFE HAS ENDED, YOU CAN GET AN UNSATISFACTORY FINISH.

(10) Identify the container with a label. Write the date and hour when the components were mixed and the hour when the pot life ends.

S 377-004
(11) If you use a brush, apply the finish as if it is prepared.

S 377-005
(12) If you use a spray gun, use 60 psi atomization air pressure and 22 psi fluid pressure to apply the finish.

NOTE: You can also add 10% (by weight) methylene chloride and use 45 psi atomization pressure and 15 psi fluid pressure to apply the finish.

S 377-006
(13) Let the finish dry for 48 hours at 70°F before you machine or assemble the part.

NOTE: You can touch the AVCO 1600 BTX finish after 24 hours dry time.

S 217-007
(14) Examine the finish for damage or holes.

S 307-016
(15) Repair the surface porosity (Ref 51-21-02).

MOISTURE RESISTANT SURFACE TREATMENT - CLEANING/PAINTING

1. General
   A. This procedure contains one task. The task is to apply moisture resistant surface treatment.
   B. This procedure is for Kevlar and hybrid composite (Kevlar/graphite) panels. Use this procedure while these panels are installed on the airplane. It is recommended that you do this procedure in a hangar.

TASK 51-21-12-377-031

2. Apply the Moisture Resistant Surface Treatments
   A. General
      (1) You must clean the surface before you apply the moisture resistant finish. Make sure you dry the surface after it is cleaned.
      (2) Keep the temperature of the surface between 60-80° F.
      (3) Apply the thermal blankets or heat lamps at a temperature of 125° F (maximum) to panels that contain water or moisture.
      (4) The applicable surfaces on the wings include the inboard flap cove panels, the aft segments of the flap linkage fairings, and the fixed trailing edge upper panels.
      (5) The applicable surfaces on the horizontal stabilizer include the upper surfaces of the fixed trailing edge panels and the horizontal stabilizer tip.
      (6) The applicable surface on the vertical fin is the vertical fin tip panel.
   B. Equipment
      (1) Gloves, neoprene or rubber - commercially available
      (2) Respirators - commercially available
      (3) Spray equipment, 50 psig minimum - commercially available
   C. Consumable Materials
      (1) G00781 Abrasive Paper - No. 180 (minimum grit number)
      (2) G00034 Cheesecloth - new, clean, dry lint free
      (3) C00033 Enamel - BMS 10-60, Type II
      (4) G00294 Masking tape - Permacel No. 76
      (5) A00246 Sealant - BMS 5-95, Class F
      (6) B00148 Solvent - Methyl Ethyl Ketone (MEK), TT-M-261 or JIS-K-8903
      (7) B00153 Solvent - Toluene (Toluol); TT-T-548, Grade A or JAN-T-171, Grade A
      (8) G00216 Wiper - commercially available

D. References
   (1) 24-22-00/201, Electrical Power - Control
   (2) AMM 27-21-02/401, Rudder System
   (3) 27-51-00/201, Trailing Edge Flap System
   (4) 27-61-00/201, Spoiler/Speedbrake Control System
   (5) 29-11-00/201, Main (Left, Right, and Center) Hydraulic Systems
   (6) 78-31-00/210, Thrust Reverser System

E. Prepare the Wing

S 417-032

CAUTION: MAKE SURE THE THRUST REVERSER COWLING IS CLOSED BEFORE YOU OPERATE THE FLAP/SLAT SYSTEM. IF THE THRUST REVERSER COWLING IS OPEN, DAMAGE TO THE SLATS OR THE COWLING CAN OCCUR.

(1) Close the thrust reverser cowling, if it is open (Ref 78-31-00).

S 417-033

CAUTION: MAKE SURE THE ACCESS DOORS FOR THE ENGINE STRUT ARE CLOSED BEFORE YOU OPERATE THE FLAP/SLAT SYSTEM. DAMAGE TO THE SLATS OR THE ACCESS DOORS CAN OCCUR.

(2) Close the access doors for the engine strut if they are open.

S 867-001

(3) Remove the pressure from the left, center and right hydraulic systems (Ref 29-11-00).

S 867-002

(4) Put these switches that are on the right side panel, P61, to the OFF position and attach DO-NOT-CLOSE tags:
   (a) L FLIGHT CONTROL SHUTOFF
   (b) C FLIGHT CONTROL SHUTOFF
   (c) R FLIGHT CONTROL SHUTOFF

S 217-039

(5) Make sure the amber switch position lights are ON.

S 867-003

(6) Supply electrical power (Ref 24-22-00).

S 047-034

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZERS ARE FULLY POWERED SURFACES. INJURY AND DAMAGE CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(7) Extend the outboard trailing edge (TE) flaps (Ref 27-51-00).

S 047-004
(8) Do the deactivation procedure for the TE flaps (Ref 27-51-00).

S 047-005
(9) Do the deactivation procedure for the spoilers (Ref 27-61-00).

F. Prepare the Horizontal Stabilizer

S 867-006
(1) Supply electrical power (Ref 24-22-00).

S 867-007
(2) Remove the pressure from the left, center and right hydraulic systems (Ref 29-11-00).

S 867-008
(3) Put the horizontal stabilizer to the neutral position.

S 867-040
(4) Put these switches that are on the overhead panel, P5, to the off position and attach DO-NOT-OPERATE tags:
(a) LEFT FLIGHT CONTROL SHUTOFF TAIL VALVE
(b) CENTER FLIGHT CONTROL SHUTOFF TAIL VALVE
(c) RIGHT FLIGHT CONTROL SHUTOFF TAIL VALVE

S 867-009
(5) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11H17, FLIGHT CONTROL SHUTOFF TAIL L
(b) 11H18, FLIGHT CONTROL SHUTOFF TAIL C
(c) 11H28, FLIGHT CONTROL SHUTOFF TAIL R

G. Prepare the Vertical Fin

S 867-010
(1) Supply electrical power (Ref 24-22-00).

S 047-011
(2) Do the deactivation procedure for the rudder system (Ref 27-21-00).

S 867-012
(3) Remove the pressure from the left, center, and right hydraulic systems (Ref 29-11-00).

S 867-013
(4) Put these switches that are on right side panel, P61, to the OFF position and attach DO-NOT-OPERATE tags:
(a) L FLIGHT CONTROL SHUTOFF TAIL

(b) C FLIGHT CONTROL SHUTOFF TAIL
(c) R FLIGHT CONTROL SHUTOFF TAIL

S 217-043
(5) Make sure the amber switch position lights are ON.

S 867-014
(6) Open these circuit breakers on the overhead circuit breaker panel, P11, and attach DO-NOT-CLOSE tags:
(a) 11H17, FLIGHT CONTROL SHUTOFF TAIL L
(b) 11H18, FLIGHT CONTROL SHUTOFF TAIL C
(c) 11H28, FLIGHT CONTROL SHUTOFF TAIL R

H. Procedure - Apply the Moisture Resistant Finish

S 117-045

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

(1) Mix a solvent solution of Methyl Ethyl Ketone (MEK) and toluene to a 1:1 ratio by volume (50/50 MEK/Toluene).

S 117-016
(2) Clean the surface of the panel with a cheesecloth that is moist with the 50/50 MEK/Toluene solvent solution, naphtha, or isopropyl alcohol.

S 127-017
(3) Lightly rub the surface of the panel with the abrasive paper.

NOTE: Make sure you remove the glossy surface.

S 117-018
(4) Clean the surface of the panel again with a clean wiper that is moist with 50/50 MEK/Toluene. naphtha, or isopropyl alcohol.

S 917-036
(5) Dry the surface with a clean dry cheesecloth.

S 957-019
(6) Apply the masking tape around the damaged area.

S 917-020
(7) Mix the sealant and make it thin with 20 percent 50/50 MEK/Toluene.

NOTE: The pot life is approximately 1-1/2 hours at 75°F.

S 397-037
(8) Apply two layers of sealant with a spray gun at 50 psig minimum on the external surface of the panel.

S 397-041
(9) Let each layer dry for 15 to 30 minutes.

NOTE: Each layer must have a net thickness of 5-8 mils (0.005-0.008 inch). The total dry thickness must be 8 ±2 mils (0.008 ± 0.002 inch).

S 917-021
(10) Let the sealant dry for 2 hours at 60°F minimum.

NOTE: Do not let the sealant dry at 80° F or more.

S 377-022
(11) Apply 2 to 3 layers of enamel on the external surface of the panel.

S 377-042
(12) Let each layer of enamel dry for 10 minutes minimum.

NOTE: The total dry thickness must be 2-4 mils (0.002-0.004 inch).

S 957-023
(13) Remove the masking tape.

S 917-024
(14) Let the enamel dry for a minimum of 3 hours at 60°F minimum, before flight.

I. Put the Airplane Back to Its Usual Condition

S 867-025
(1) Supply electrical power (Ref 24-22-00).

S 867-026
(2) Pressurize the left, right and center hydraulic system (Ref 29-11-00).

S 047-035

WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZERS ARE FULLY POWERED SURFACES. INJURY AND DAMAGE CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

(3) Retract the outboard trailing edge flaps, if it was extended, (Ref 27-51-00).

S 867-027

(4) If work was done on the horizontal stabilizer, do the subsequent steps:
   (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) 11H28, FLIGHT CONTROL SHUTOFF TAIL R

   WARNING: KEEP PERSONS AND EQUIPMENT AWAY FROM ALL CONTROL SURFACES WHEN HYDRAULIC POWER IS SUPPLIED. AILERONS, ELEVATORS, RUDDER, FLAPS, SLATS, SPOILERS AND STABILIZERS ARE FULLY POWERED SURFACES. INJURY AND DAMAGE CAN OCCUR WHEN HYDRAULIC POWER IS SUPPLIED.

   (b) Remove the DO-NOT-OPERATE tags and put these switches that are on the P5 panel to the ON position:
      1) LEFT FLIGHT CONTROL SHUTOFF TAIL VALVE
      2) CENTER FLIGHT CONTROL SHUTOFF TAIL VALVE
      3) RIGHT FLIGHT CONTROL SHUTOFF TAIL VALVE

S 867-028

(5) If work was done on the vertical fin, do the subsequent steps:
   (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) 11H28, FLIGHT CONTROL SHUTOFF TAIL R
   (b) Remove the DO-NOT-OPERATE tags and put these switches that are on the P61 panel to the ON position:
      1) L FLIGHT CONTROL SHUTOFF TAIL

2) C FLIGHT CONTROL SHUTOFF TAIL
3) R FLIGHT CONTROL SHUTOFF TAIL

S 867-029
(6) Remove electrical power if it is not necessary (Ref 24-22-00).

S 867-030
(7) Remove the pressure from the left, right, and center hydraulic systems if it is not necessary (Ref 29-11-00).

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. References
      (1) AMM 20-30-98/201, Solvent - Series 98
   B. 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) Sealant - Resin Mix 3
      (9) B00148 Solvent - Methyl Ethyl Ketone (MEK), TT-M-261
   C. 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 117-009

WARNING: DO NOT GET SOLVENTS IN YOUR MOUTH OR EYES, OR ON YOUR SKIN. DO NOT BREATHE THE FUMES FROM SOLVENTS. SOLVENTS ARE HAZARDOUS MATERIALS. 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 6 to 8 hours at a temperature of 70°F.

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 6 to 8 hours at a temperature of 70°F.
   (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.

CORROSION PROTECTIVE FINISHES - DESCRIPTION AND OPERATION

1. General
   A. Procedures are provided for application of finishes for protection of aluminum, steel, titanium and nonmetalic surfaces from contamination from chemicals and other environments.
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) Clear fire resistant hydraulic fluid resistant finish is used to protect surfaces other than titanium at 250°F and above, from hydraulic fluid contamination.
      (3) A conductive coating system for exterior fiberglass is used to prevent static electricity buildup.
      (4) Abrasion-resistant teflon finish is used to protect faying surfaces from chafing.
      (5) 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.
      (6) Corogard or BMS 10-100 (Aeroflex/Ultaflex) paint systems are used to protect against corrosion on wing upper and lower inspar skins and horizontal stabilizer upper and lower inspar skins.
      (7) High temperature coating for titanium is used to protect titanium from fire resistant hydraulic fluid at 250°F and above.
      (8) Nonskid surface coating is used to provide nonskid surfaces in required areas on the airplane.
      (9) Decorative paint system is a polyurethane system recommended for exterior decorative markings. It also provides corrosion protection in some areas.
      (10) BMS 3-23, BMS 3-26, BMS 3-29, and BMS 3-35 are used as a corrosion preventive compounds.
      (11) MIL-C-11796 Class 3 corrosion preventive compound is used to protect all surfaces of countersunk, counterbored, or recessed holes in substructure beneath or behind access doors and panels. Protective compound is applied immediately before installing door or panel fasteners and is not used as a lubricant. Where lubricative and corrosion inhibiting properties are required, BMS 3-33 (preferred) or BMS 3-24 (alternative) lubricant can be applied.

           NOTE: Application of MIL-C-11796 Class 3 corrosion preventive compound is limited to areas not exposed to hydraulic fluid contamination and temperatures exceeding 130°F.

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.

HYDRAULIC FLUID RESISTANT FINISH - CLEANING/PAINTING

1. General
   A. This procedure contains one task. The task is to apply hydraulic fluid resistant coating.

TASK 51-24-01-377-002

2. Apply the Hydraulic Fluid Resistant Coating

   A. Consumable Materials
      (1) Paper, Abrasive - 280 grit or a higher quality
         (a) G00251 Aluminum Oxide, Scotchbrite, Type A
         (b) B00102 Aluminum Oxide, Bear Tex
      (2) B00192 Solvent, General Purpose - BMS 3-2, Type I
      (3) Cleaner, Alkaline - Manual Cleaning
      (4) G00027 Cheesecloth, Boiled - Rymple Cloth No. 308
      (5) C00272 Finish, Protective, Hydraulic Fluid Resistant - BMS 3-11 Resistant
         (a) C00179 Finch 683-3-2 (Base)
         (b) C00180 Finch X-310 (Catalyst)
   B. Prepare the Surface

      S 147-003
      (1) Rub the high gloss plastic and painted surfaces with 280 grit abrasive paper. Do not rub the painted surfaces around the decals when a clear hydraulic fluid resistant coating is used as an edge sealer.

         NOTE: When the coating is applied on the sealant, let the sealant dry until you can touch it.

      S 117-005
      (2) Manually clean the decals, placards and stencils with a cheesecloth soaked in an alkaline cleaner (Ref 12-25-01).

      S 117-006
      (3) Clean all the other surfaces as follows:
         (a) Clean the surface with a clean cheesecloth soaked with a solvent.
         (b) Before the solvent becomes dry, rub the surface with a clean dry cheesecloth.
         (c) Clean the surface again until no signs of soil are found on the clean cheesecloth.

C. Prepare the Hydraulic Fluid Resistant Coating.

S 947-007

(1) Mix the base component with the catalyst as follows:

CAUTION: MIX THE COMPONENTS IN CLEAN CONTAINERS. DO NOT USE CONTAINERS WITH ORGANIC COATINGS. ORGANIC COATINGS CAN CAUSE CONTAMINATION.

(a) Mix 1 part of X-310 with 2 parts of 683-3-2, by volume.
(b) Make sure that the components are fully mixed.

S 937-008

(2) Immediately label the container with the date and hour when the components were mixed and the hour when the pot life ends.

NOTE: Catalyzed coating material has a pot life of four hours at 70°F. Discard all catalyzed coating material that has expired. Keep all uncatalyzed coatings at a temperature between 40°F and 90°F. The shelf life of the uncatalyzed coating is 12 months from the date of manufacture.

D. Procedure - Apply the Hydraulic-Fluid Resistant Coating

S 377-009

(1) Apply the hydraulic fluid resistant coating with a spray gun or brush.

NOTE: Make sure that air flows freely through the work area and keep the temperature at and above 65°F with a relative humidity of 85%.

S 377-011

(2) Make sure that the total thickness is between 1 to 2 mils (0.001 to 0.002 inch).

S 637-010

(3) Add a 1/4 inch layer of coating to make sure that the surface is fluid-tight. For edge decals, add a 1/4 inch layer to cover both the decal and the adjacent surface.

NOTE: You must clean and repair damaged coating.

S 377-012

(4) Cure the surface for 4 hours at 65°F (minimum) before you move the airplane.

NOTE: A complete cure takes 14 days at 65°F (minimum).

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 surfaces.
   B. It is necessary to apply conductive coating on all fiberglass and kevlar surfaces.
   C. For radome see (AMM 53-12-01).

TASK 51-24-02-377-001

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
      (3) Bare Metal Strips (two strips with the same dimensions and properties)
   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 Metalic, 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 117-014

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 (Ref 51-21-02).

S 377-002

(2) Prepare the BMS 10-21 Type III conductive coating with the steps as follows:

(a) Refer to the manufacturer's instructions to mix the conductive coating.

(b) Fully shake each conductive coating component.

NOTE: The conductive coating is supplied with two components, the base component and the catalyst.

(c) Put a label on the container with, the data that follows, immediately after it is mixed:

1) The date and time it was mixed.

2) The pot life expiration time is as follows:

a) 4 hours if the temperature is less than 81 degrees Fahrenheit (27 degrees centigrade).

b) 2 hours if the temperature is 81 degrees Fahrenheit (27 degrees centigrade) to 100 degrees Fahrenheit (38 degrees Centigrade).

(d) Let the conductive coating compound stay for at least 30 minutes before it is used.

S 377-015

CAUTION: 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.

(a) 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 perfered temperature is 50 degrees Fahrenheit (10 degrees Centigrade) to 90 degrees Fahrenheit (32 degrees Centigrade).

(b) The dry film thickness after it has been cured must be 0.0006 ±0.0002 inches (0.0152 ±0.0051 mm).

S 377-009

(4) Cure the BMS 10-21 Type III conductive coating with the one of the steps that follow: (Figure 701)

(a) 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. Measure the resistivity of the conductive coating:

(b) Air dry the surface of the conductive coating for 2 hours at 60 degrees Fahrenheit (16 degrees Centigrade).

(c) To cure the conductive coating quickly, apply a minimum temperature of 140 degrees (60 degrees Centigrade) before you do the resistivity measurements (Figure 701).

<u>NOTE</u>: The increased drying time as shown in Figure 701 is not a full cure.

(d) The flash-off time necessary before the higher temperature cure is 15 minutes minimum at 75 ±15 degrees Fahrenheit (24 ±8 degrees Centigrade).

(e) The cool-off time necessary before subsequent processing the cure is 15 minutes minimum at 75 ±15 degrees Fahrenheit (24 ±8 degrees Centigrade).

S 767-017

(5) Do the steps that follow to measure the resistivity of the conductive coating (Fastener-to-Conductive Surface Test Method):

<u>NOTE</u>: The resistivity of the conductive coating after it is cured must be no more than 300,000 ohms/square.

<u>NOTE</u>: Let the conductive coat cure for the specified time as shown in Figure 701 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.

<u>NOTE</u>: 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.

S 707-018
(6) Do the steps that follow to measure the resistivity of the conductive coating on uninstalled panels (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 702.
(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 703 (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.
(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 ±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.

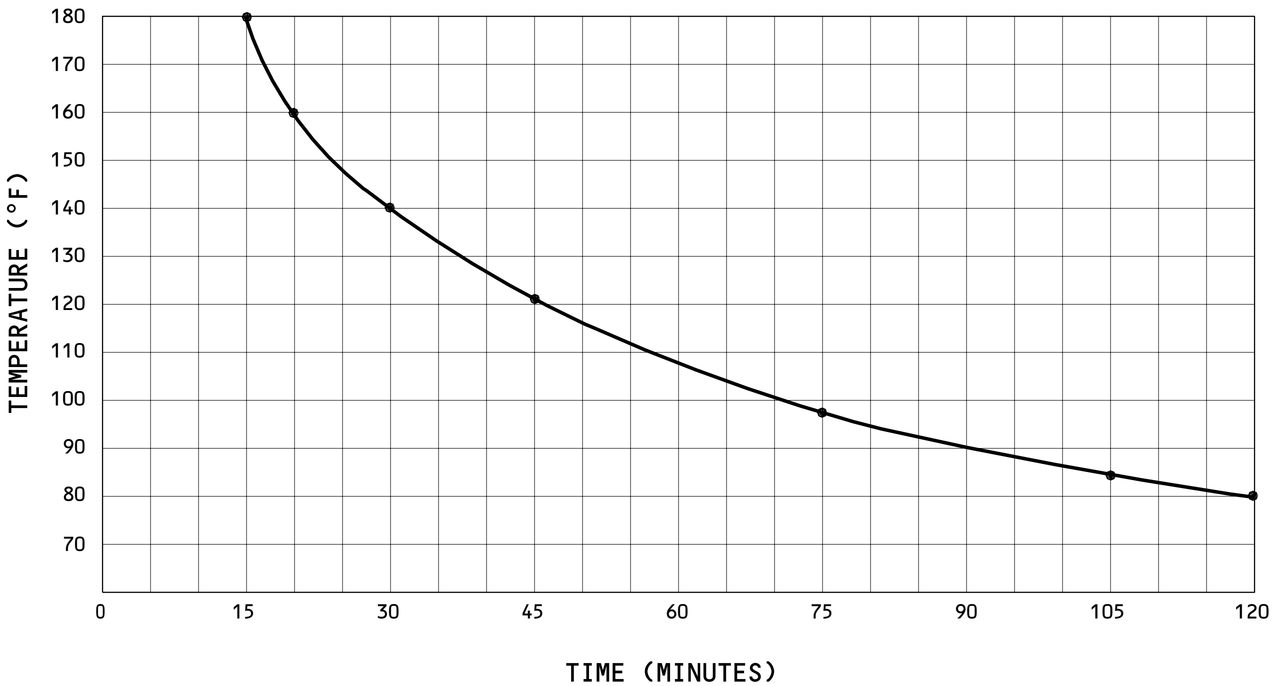
 NOTE: The term ohms/square is used because it gives the resistance in ohms of current passing from one side of a square region to the opposite side, regardless of the size of the square.

 NOTE: The maximum permitted resistivity is 300,000 Ohms/square.

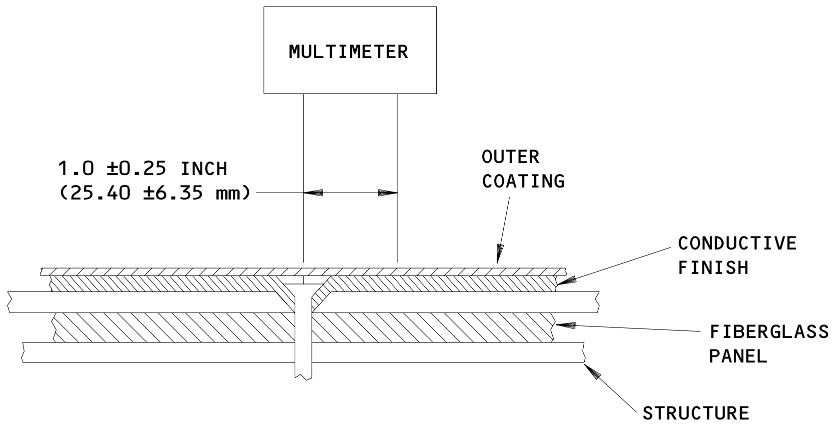
(e) Remove the 3M 1181 copper foil tape, from the surface.

S 107-012

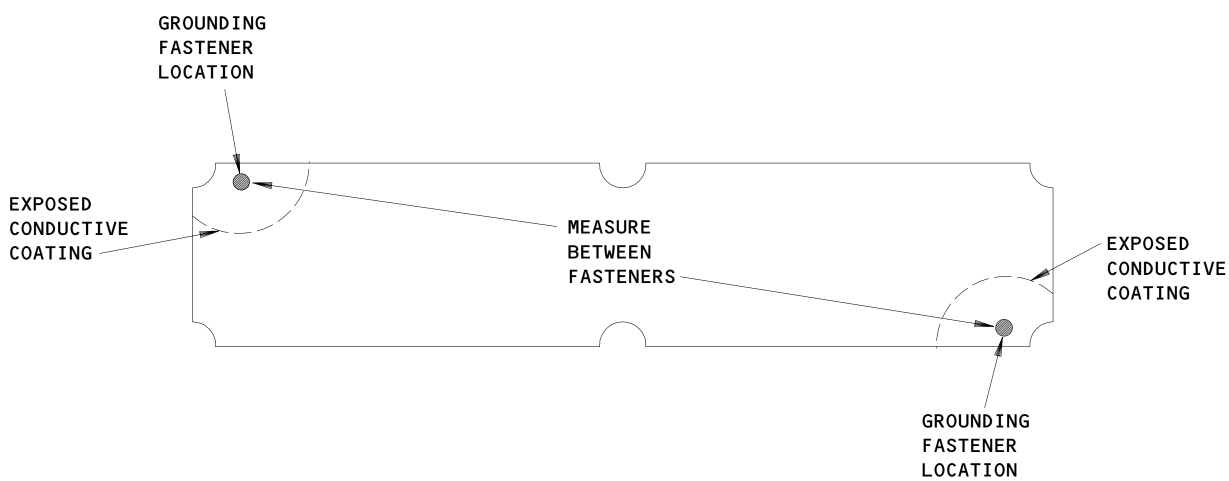
(8) Do these steps if the resistivity of the conductive coating is more than 300,000 ohms/square:
 (a) Use the abrasive paper to remove the conductive coating.
 (b) Remove the remaining particles with a clean cotton wiper that is moist with aliphatic naphtha solvent.
 (c) Dry the surface with a clean 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.



Dry Time - BMS 10-21, Type III
Figure 701

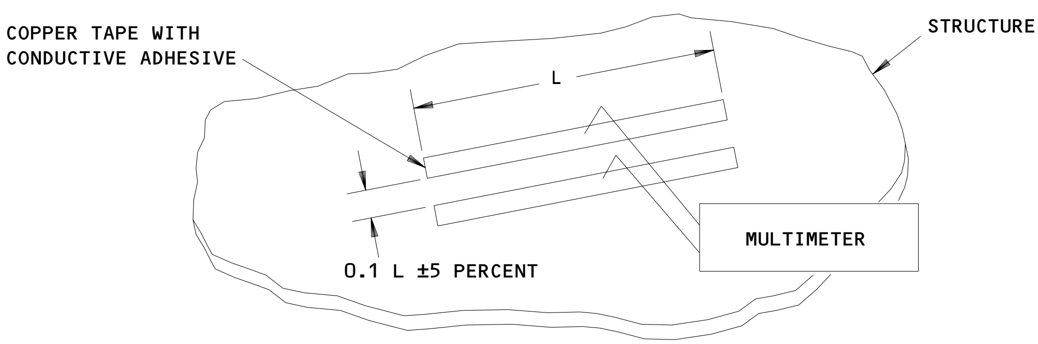


RESISTANCE MEASUREMENT
OF CONDUCTIVE FINISH



RESISTANCE MEASUREMENT
OF CONDUCTIVE FINISH
WITH EXPOSED FASTENERS

Resistance Measurement of Conductive Finish
Figure 702



Measuring Resistance of Conductive Finish by the Ohms Per Square Procedure
Figure 703

CORROSION INHIBITING COMPOUND - CLEANING AND 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

TASK 51-24-03-917-006

2. Prepare the Surface to Apply the Corrosion Inhibiting Compound.
   A. Consumable Materials
      (1) B00074 Solvent, Degreasing - MIL-PRF-680
      (2) B00083 Solvent, Aliphatic Naphtha - TT-N-95
      (3) B00090 Solvent, Trichloroethane 1.1.1 - MIL-T-81533
      (4) B00093 Solvent, Tetrachloroethylene (Perchloroethylene) - O-T-236
      (5) B00046 Solvent, Methyl Ethyl Ketone - TT-M-261
      (6) B00634 Solvent, Limonene BMS 11-10 Type 1, 2, or 3
      (7) G00034 Cloth, Process Cleaning Absorbant Wiper (cheesecloth, gauze) - BMS15-5
      (8) G00252 Material, Plastic Sheeting (polyethylene) - L-P-512
      (9) G00270 Tape, Masking, General Purpose - A-A-883
   B. Procedure

      S 917-007
      (1) Prepare the surface to apply the corrosion inhibiting compound.
         (a) Clean the surface with one of the steps that follows:
            1) Clean the surface with a vacuum cleaner.
            2) Use a cloth to wipe the surface to remove moisture or other foreign materials.

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, Methyl Ethyl Ketone.
3) Solvent, Degreasing.
4) Solvent, Trichloroethane.
5) Solvent, Tetrachloroethylene (Perchloroethylene).
6) Solvent, Limonene.

S 607-015

(2) Apply masking tape or polyethylene film, to the area where you will not apply the corrosion inhibiting compound.

S 607-016

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 287-017

(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 compound.

(d) Bare surfaces that get a layer of primer and paint.

NOTE: It is not easy to apply primer and paint on the corrosion inhibiting compound. The corrosion inhibiting compound gets in the surface and can bleed-out. This can cause the primer and paint to have an unsatisfactory bond.

1) Let the primer and enamel dry for a minimum of 8 hours before you apply the corrosion inhibiting compound.

(e) Sliding pins and other mechanical joints in a sliding surface contact.
(f) Actuator rods.

NOTE: Corrosion preventive 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 287-018

(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) Rubber seals.
(f) Mechanical silicone seals.
(g) Insulation blankets.
(h) Wire bundles, coax connectors.
(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.

TASK 51-24-03-377-008

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 BMS3-35 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) B00083 Solvent, Aliphatic Naphtha - TT-N-95

(2) B00634 Solvent, Limonene - BMS 11-10 Type 1, 2, and 3
(3) G00034 Cloth, Process Cleaning Absorbent Wiper (cheesecloth, gauze) - BMS15-5

C. Procedure

S 917-009

(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 Table 701		
Corrosion Inhibiting	Coating Thickness	Coating Thickness
Compound	Dry	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)

 (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 Faharenheit (66 degress 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 wipe up puddles if puddles block drain holes or cross drains.

(k) Make sure you have a good flow of air in the areas where the corrosion inhibiting compound was applied.

<u>NOTE</u>: The air flow times are recommended minimum times. A longer air flow time to get 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 airflow to the area for a minimum of one hour before you close-up the area.

<u>NOTE</u>: 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 airflow 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 sufficiently dried. 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.

S 217-020
(2) Visually inspect and make sure that the insulation blankets are not contaminated with corrosion inhibiting compound.

<u>NOTE</u>: These compounds can decrease the ability of the insulation blankets to repel water.

(a) If contamination occurs along a seam, the blanket must be replaced.
(b) For contamination in all other areas, remove the corrosion inhibiting compound using aliphatic naphtha or limonene solvent BMS 11-10.

<u>NOTE</u>: When you cannot remove the contamination, you must replace the blanket.

S 947-021

(3) Ventilate BMS3-23 and BMS3-35 after application in enclosed areas for an hour minimum before enclosing or covering to allow evaporation of volatile solvents. Enclosed areas treated with BMS3-29 or BMS3-26 must be ventilated 4 hours minimum before enclosing or covering. Maintain the temperature within the application limits for the materials used (cavity air and assembly).

NOTE: Ventilation times are recommended minimums. Longer ventillation times to achieve satisfactory evaporation are recommended for lower temperatures, high humidity, and excess application.

TASK 51-24-03-917-010

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 757-019

(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 in. (0.051 mm) to 0.006 in. (0.152 mm) in thickness.

(b) Press the polyethylene film against the 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.

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 51-24-03-917-011

5. Repair of the Corrosion Inhibiting Compound

A. General

(1) The limits of the damage or bubbles in the application of BMS3-23, BMS3-26, BMS3-29, and BMS3-35 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).

(2) All damage or bubbles in the cured BMS3-23, BMS3-26, BMS3-29 and BMS3-35 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) B00083 Solvent, Aliphatic Naphtha -TT-N-95
(2) B00634 Solvent, Limonene BMS 11-10 Type 1, 2, or 3.
(3) G00034 Cloth, Process Cleaning Absorbent Wiper (cheesecloth, gauze) BMS15-5

C. Procedure

S 917-012

(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 51-24-03-917-013

6. Removal of the Corrosion Inhibiting Compound

A. Consumable Materials
(1) B00074 Solvent, Degreasing - MIL-PRF-680
(2) B00083 Solvent, Aliphatic Naphtha -TT-N-95
(3) B00634 Solvent, Limonene BMS 11-10 Type 1, 2, or 3
(4) B00090 Solvent, Trichloroethane 1.1.1 - MIL-T-81533
(5) B00093 Solvent, Tetrachloroethylene (Perchloroethylene) - O-T-236
(6) G00034 Cloth, Process Cleaning Absorbent Wiper (cheesecloth, gauze) - BMS15-5

B. Procedure

S 917-014

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.

NONGLARE FINISH - CLEANING/PAINTING

1. General
   A. This procedure contains one task. The task is to apply nonglare finish.

TASK 51-24-04-377-001

2. Apply Nonglare Finish
   A. Equipment
      (1) Spray Equipment
   B. Consumable Materials
      (1) Solvents
         (a) B00153 Toluene (Toluol) TT-T-548
         (b) B00344 Xylene (Xylol) ASTAA-845 or -846
         (c) B00151 Methyl Isobutyl Ketone (MIBK) TT-M-268
         (d) B00148 Solvent - Methyl Ethyl Ketone (MEK), TT-M-261
      (2) Abrasive Paper - Aluminum Oxide
      (3) G00251 Abrasive pad - Aluminum Oxide, Scotchbrite, Type A
      (4) G00034 Cheesecloth
      (5) C00334 Finish - Nonreflective Nextel Suede 3101
         (a) Primer - 911-P4
         (b) 3101 Base Component I
         (c) 3101 Catalyst Component II
         (d) 3101 Promoter Component III
      (6) G00132 Masking Tape - 3M #214
   C. References
      (1) 51-21-02/701 - Prepaint Cleaning and Treatment
   D. Procedure - Apply Nonglare Finish

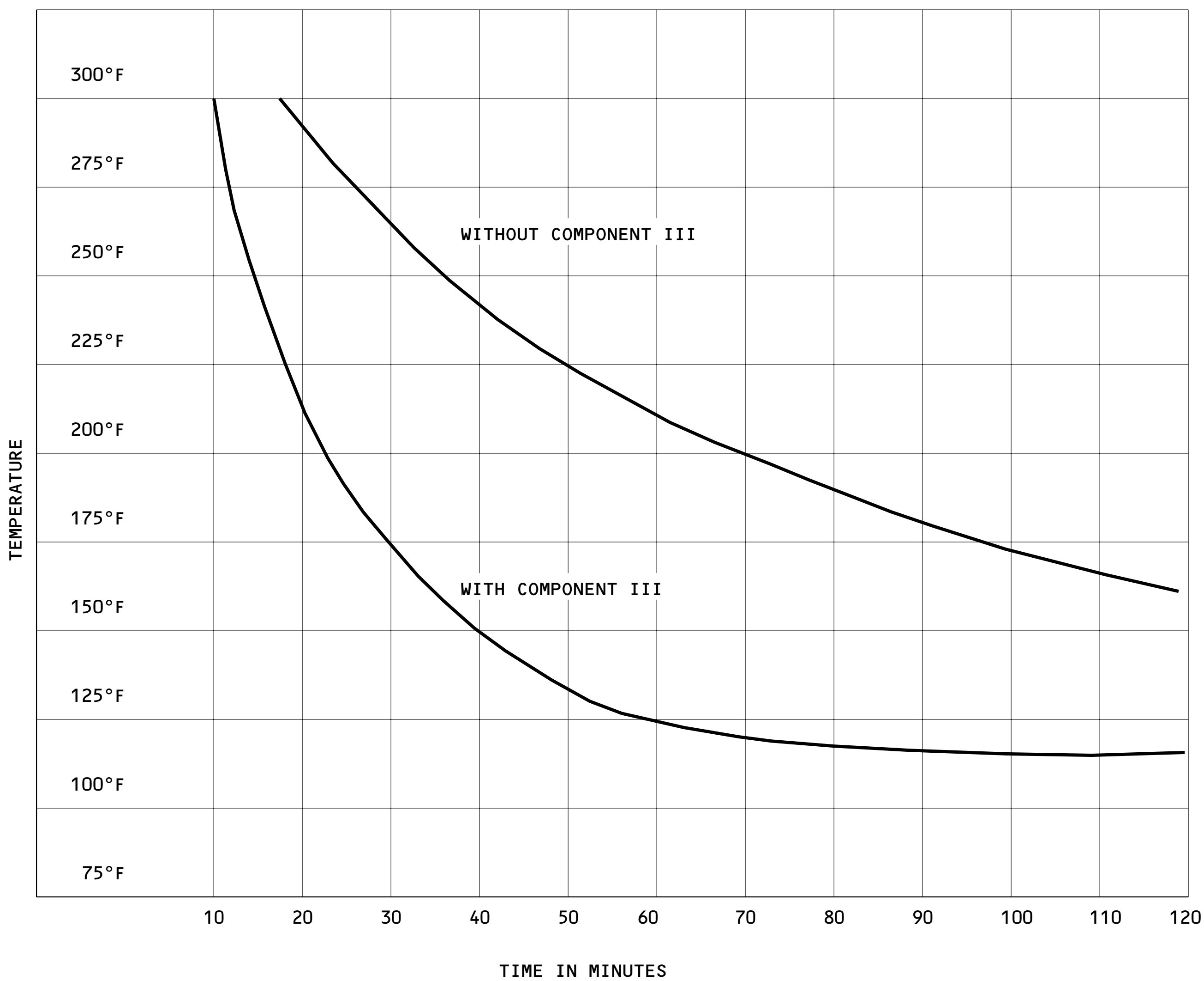
      S 107-002
      (1) Clean and prepare the surface (Ref 51-21-02).

      S 377-003
      (2) Do these steps to apply the primer on the surface:

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

         (a) To mix the primer, add 2 parts (by volume) of the base component to 1 part (by volume) of the thinner.

            NOTE: You can use a 50/50 mixture of two solvents (MIBK, Toluene and MEK) to make the base thinner. Toluene has the longest flash time and MIBK has the shortest flash time.



Topcoat Cure Chart - Nextel Suede 3101
Figure 701

(b) Apply the primer on the prepared surface with a spray gun.
(c) Make sure the primer thickness is between 0.4 to 1.0 mils (0.0004 to 0.001 inch).

S 377-004

(3) Do these steps to apply the Nextel Suede 3101 finish on the surface:
(a) Add 1 part (by volume) of the catalyst component II to 8 parts (by volume) of the base component I.
(b) Shake the mixture for 15 minutes before you add the thinner.
(c) Refer to the manufacturer's instruction to add the promoter component III to the mixture.
(d) Add 1/3 part (by volume) of the thinner to the mixture.

NOTE: The thinner can be MEK or Xylene or a 50/50 mixture of MEK and Xylene.

(e) Mix the mixture until it is smooth and constant.
(f) After 15 minutes, you can use the mixture.

NOTE: The usual pot life of the mixture without promoter component III is 8 hours. When you add the promoter component III, the pot life decreases to 4 to 6 hours.

(g) Make sure the mixed materials are equally and constantly mixed.
(h) Identify the container with a label. Write the date and hour when the mixture was mixed and the time when the pot life ends.
(i) Apply the Nextel Suede 3101 finish on the prepared surface with a spray gun. Make sure the dry thickness is between 2 to 3 mils (0.002 to 0.003 inch).
(j) Let the Nextel Suede 3101 finish cure (Fig. 701).

HIGH TEMPERATURE COATING (TITANIUM) - CLEANING/PAINTING

1. General
    A. This procedure contains one task. The task is to apply high temperature coating on titanium parts.

TASK 51-24-07-377-011

2. Apply High Temperature Coating
    A. Equipment
        (1) Rubber gloves
        (2) White cotton gloves
        (3) Mild steel tanks and related equipment (for Turco 4338 solution)
        (4) Spray equipment
        (5) Sand blast equipment
    B. Consumable Materials
        (1) C00314 High Temperature Coating - BMS 10-82 (Storage 40-80°F)
        (2) Solvent
            (a) B00075 Stoddard Type I
            (b) B00076 Stoddard Type II
            (c) B00184 BMS 11-7
            (d) B00094 Toluene, TT-T-548
            (e) B00092 JAN-T-171
        (3) E00003 Stripper - Turco 4338
        (4) B00007 Cleaner - Oakite 61
        (5) Distilled or deionized water
        (6) G00034 Cheesecloth
        (7) B00312 Coarse aluminum wool
        (8) Cellulose sponges
        (9) G00268 Bristle brushes (soft and high quality)
        (10) B00107 Scotchbrite sheet, Finishing Type A (aluminum oxide grit)
    C. Prepare the Titanium Parts

S 147-001

(1) Use the sand blast equipment to remove all the contamination and finish materials from the titanium parts.

NOTE: You can remove high temperature coating from titanium parts while they are installed on the airplane. You can use the stripping method to remove high temperature coating on titanium parts that are removed from the airplane.

Make sure you do not remove the finish materials on the adjacent areas.

S 967-002
(2) Replace all parts that have metal corrosion.

S 027-003
(3) Remove the titanium parts from the airplane, if you will use the stripping method.

S 107-004
(4) Do these steps to remove hydraulic fluid contamination:

NOTE: A light glossy brown film, a matt black material, or a bare surface are signs of skydrol contamination. Make sure you know the difference between the matt black material and the black inorganic finish for titanium parts.

(a) Clean the titanium parts with a cheesecloth or aluminum wool pad that is moist with Oakite 61.

NOTE: If you use an aluminum wool pad, it must be sufficiently coarse to get a surface that is not shiny.

(b) Clean the titanium parts with a cellulose sponge that is soaked with water.
(c) Remove unwanted moisture from the titanium parts with a dry cheesecloth.
(d) Clean the titanium parts again until there is a continous layer of water (no drops of water) on the titanium part.

S 107-005
(5) Do these steps to remove all the remaining particles:
(a) Clean the titanium parts with a cheesecloth that is moist with Stoddard solvent.
(b) Flush the titanium parts with water. Use a high pressure flush if it is possible.
(c) Clean the titanium parts again until there is a continous layer of water (no drops of water) on the titanium part.
(d) Dry the titanium parts with a clean dry cheesecloth.

S 107-006

(6) Stripping method:

(a) Refer to the manufacturer's instructions to prepare the Turco 4338 stripper.

NOTE: Do not use a high temperature coating stripper. A high temperature coating stripper can cause corrosion to occur on the titanium parts.

(b) Soak the titanium parts in the Turco 4338 stripper for 30 to 40 minutes.

(c) Flush the titanium parts with water.

(d) Clean the titanium parts again until all the finish material is removed.

S 377-007

(7) Let the titanium parts dry before you apply the protective finish.

S 627-008

CAUTION: AFTER YOU CLEAN THE TITANIUM PARTS, MAKE SURE YOU DO NOT TOUCH THE PARTS WITH YOUR BARE HANDS. USE CLEAN WHITE COTTON GLOVES IF YOU MUST TOUCH A PART. SALT DEPOSITS FROM YOUR HANDS CAN CAUSE CORROSION.

(8) Be careful when you touch the titanium parts. Put on clean white cotton gloves to prevent contamination to the titanium parts.

D. Procedure - Apply High Temperature Coating

S 377-009

(1) Fully mix the high temperature coating.

S 377-012

(2) Use a spray gun to apply the high temperature coating. Apply a sufficient number of layers until you get a transparent red, smooth and constant layer.

NOTE: Use an atomizing air pressure of 10 to 25 pounds. Let each layer of finish dry for 5 to 10 minutes.

S 377-010

(3) Put the titanium parts in an oven at 825 ±25°F for 10 to 15 minutes.

NOTE: Use an oven that has a good flow of air to permit removal of smoke and fumes.

S 217-013

(4) Make sure the high temperature coating has a yellow gold color and has no surface defects.

S 427-014

(5) Use the necessary precautions to prevent contamination when you install the parts.

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 51-24-09-377-001

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
         (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 377-002

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.

S 377-005
(4) Use one of these materials to make the mixture thin for airspray:

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 BAC10-100 Coating

S 377-006
(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 377-007
(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 airspray. The pot life of this mixture is 8 hours. There is no temperature limit.

F. Procedure - Apply the Corrosion Inhibiting Coating

S 377-008
(1) Apply BMS 10-11 or BMS 10-79 primer on the surface.

S 377-009
(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.

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).

<u>NOTE</u>: 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 377-013

(6) Cure the mixture for 24 hours before flight.

<u>NOTE</u>: You can decrease the cure time if you apply heat on the surface. Apply heat at 125 ±5°F for 2 hours.

G. Repair and Rework - Corrosion Inhibiting Coating

S 357-014

(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 377-015

(2) Apply the BMS10-100 coating to the repaired area.
   (a) Feather all the edges.
   (b) Use a brush for small damages.

S 227-016

(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).

ABRASION-RESISTANT TEFLON FINISH - CLEANING/PAINTING

1. General
   A. This procedure contains one task. The task is to apply abrasion-resistant teflon finish.
   B. 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 51-24-13-377-001

2. Apply Abrasion-Resistant Teflon Finish
   A. Equipment
      (1) Spray Equipment
      (2) Stiff bristle brush
      (3) Vacuum Cleaner
      (4) Wooden or plastic scraper
   B. Consumable Materials
      (1) Laminar teflon coating kit, colors white or gray
         (a) C00002 X-500 Coating Kit, Color W (White)

	SPRAY	BRUSH
Resin Component	7-W-27	7-W-27FC
Hardener	10-C-81	10-C-81

      (2) C00009 C-500 Coating Kit, Color G (Gray)

	SPRAY	BRUSH
Resin Component	7-X-74	7-X-74FC
Hardener	10-C-81	10-C-81

      (3) Reducer
         (a) C00007 66-C-28 (white)
         (b) C00000 66-C-20 (Gray)
      (4) Solvents
         (a) B00153 Toluene, TT-T-548 (JAN-T-171, Grade A, optional)
         (b) B00151 Methyl Isobutyl Ketone (MIBK), TT-M-268
      (5) B00192 Cleaning Solvent, General Purpose BMS 3-2, optional: Aliphatic Naphtha, TT-N-95
         (a) B00148 Methyl Ethyl Ketone (MEK), TT-M-261
      (6) C00261 Primer - Corrosion Preventive, BMS 10-79
      (7) G00021 Cheesecloth
      (8) G00251 Abrasive Fabric-Aluminum Oxide, Scotchbrite, Type A; Optional: Abrasive Fabric - Aluminum Oxide, Bear Tex, Norton Company
      (9) C00172 Etchant - Tec 361
      (10) C00064 Alodine 1000
      (11) Abrasive Paper - Silicon Carbide, 180 to 325 grit
   C. References
      (1) AMM 20-30-89/201, Solvent - Series 89
      (2) AMM 51-21-01/701, Paint Stripping
      (3) AMM 51-21-02/701, Prepaint Cleaning and Treatment
      (4) AMM 51-21-04/701, Alodine Coating

(5) AMM 51-21-10/701, Decorative Exterior Finishes

D. Procedure - Apply Abrasion - Resistant Teflon Finish

S 377-002

(1) Do these steps to clean metal surfaces that are not painted:

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

(a) Clean the surface with a clean cheesecloth that is moist with solvent, Series 89 (AMM 20-30-89/201) .

(b) Dry the surface with a clean dry cheesecloth before the solvent dries.

(c) Remove all unwanted material from the surface. Use a wooden or plastic scrapper to clean around fasteners, seams, and lap joints. Use abrasive paper or Scotchbrite sheets if it is necessary.

NOTE: If you cannot use this procedure to clean the surface, use the stripping procedure (AMM 51-21-01/701). Use Turco 5351 stripper.

(d) Rub the metal surfaces with a Scotchbrite sheet that is moist with solvent, Series 89 (AMM 20-30-89/201).

NOTE: Do not rub the honeycomb and anodized aluminum surfaces with abrasive fabric.

(e) Rub the stainless steel and titanium surfaces with 180-325 grit silicone carbide abrasive fabric.

(f) Clean the surface again with a cheesecloth that is moist with the solvent, Series 89 (AMM 20-30-89/201).

(g) Dry the surface with a clean dry cheesecloth before the solvent dries.

(h) Apply etchant on the metal surfaces. Do not apply the etchant on the honeycomb, anodized aluminum, stainless steel and titanium surfaces.

(i) Keep the surface wet with etchant for 5 to 6 minutes.

(j) Rub the surface with a cheesecloth that is soaked with water. Make sure you remove all unwanted particles.

(k) Dry the surface with a clean dry cheesecloth.

(l) Apply Alodine 1000 solution (AMM 51-21-04/701).

(m) Use a vacuum to remove the remaining liquid material from the surface seams and lap joints.

(n) Dry the surface with a clean dry cheesecloth.

(o) Let the surface fully dry before you apply the primer.

S 377-003

(2) Do these steps to clean the metal surfaces that have paint:
   (a) Manually clean the surface with a cheesecloth that is moist with toluene.
   (b) Rub the surface with 320-grit (minimum) abrasive fabric.
   (c) Clean the surface again with a cheesecloth that is moist with MIBK.

S 377-004

(3) Clean the plastic laminate surfaces (AMM 51-21-02/701).

S 377-005

(4) Apply one layer of primer (AMM 51-21-10/701).

S 377-006

(5) Do these steps to apply abrasion-resistant teflon finish with a spray gun:
   (a) Clean all equipment before you mix the abrasion-resistant teflon finish.

WARNING: DO NOT GET THE ABRASION-RESISTANT TEFLON FINISH 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. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

   (b) Add 3 parts (by weight) of the resin component 7-W-27 or 7-X-74 to 1 part (by weight) of the hardneer 10-C-81.

      NOTE: Make sure you mix the correct quantity of abrasion-resistant teflon finish. You must apply all of the abrasion-resistant teflon finish before its pot life ends. The pot life is 1-1/2 hours at 70°F.

   (c) If thinner is necessary, add 1 part (by weight) of the thinner-reducer 66-C-28 to 3 parts (by weight) of the mixture.
   (d) Fully mix the components. Do not shake the mixture. Do not get air bubbles in the mixture.
   (e) Let the mixture stay for 5 minutes before you use it.
   (f) Apply masking tape on all adjacent areas.
   (g) Use a spray gun to apply the mixture. Apply four to five layers.

      NOTE: If you cannot use a spray gun to apply the mixture, then use a brush.

   (h) Let each layer of mixture dry for 5 minutes.
   (i) Make sure the total dry thickness is between 5 to 10 mils (0.005 to 0.010 inch).

(j) Let the mixture dry for 2 hours before you touch the surface.
(k) Let the mixture cure before flight (Fig. 701).
(l) Remove the masking tape.
(m) Remove all sharp paint edges with a hard wood stick, 180-grit (minimum) abrasive paper, or use a spray gun with the mixture.

S 377-007

(6) Do these steps to apply the abrasion-resistant teflon finish with a brush:

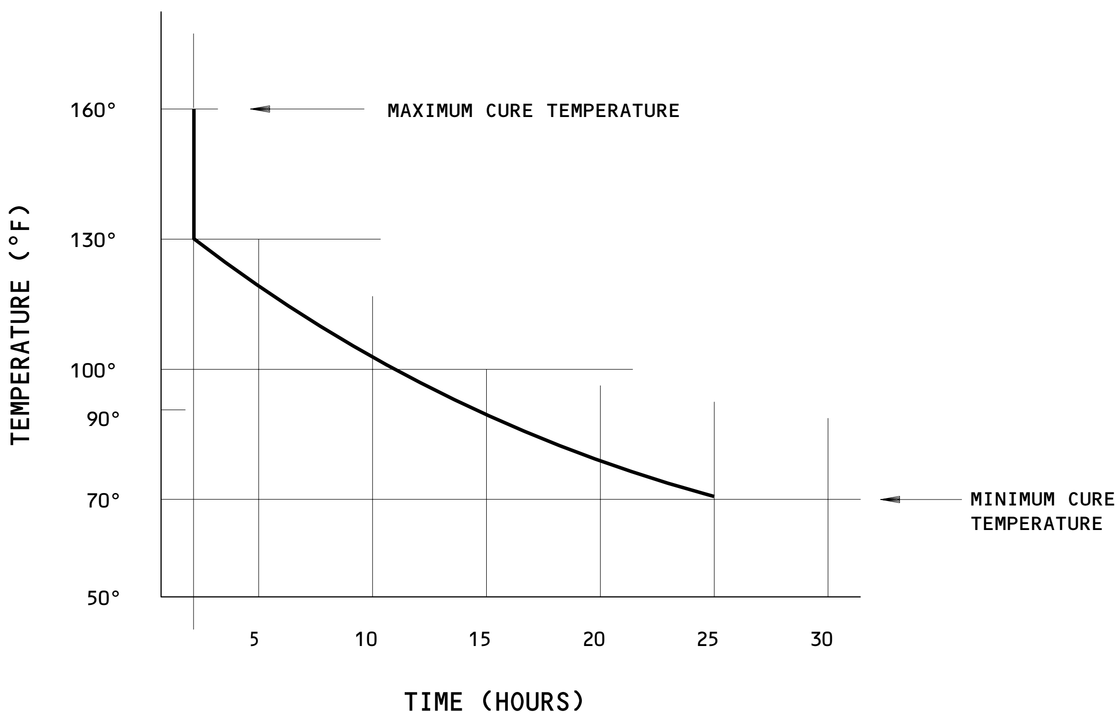
WARNING: DO NOT GET THE ABRASION-RESISTANT TEFLON FINISH IN YOUR MOUTH, IN YOUR EYES, ON YOUR SKIN, OR ON YOUR CLOTHES. DO NOT BREATHE THE FUMES FROM THIS MATERIAL. MAKE SURE THE AIR FLOWS FREELY THROUGH THE WORK AREA. KEEP THIS MATERIAL AWAY FROM SPARKS, FLAME, AND HEAT. THIS MATERIAL IS POISONOUS AND FLAMMABLE AND CAN CAUSE INJURY OR DAMAGE.

(a) Add 3 parts (by weight) of the resin component 7-W-27 FC or 7-X-27 FC to 1 part (by weight) of the hardener 10-C-81.

NOTE: Make sure you mix the correct quantity of abrasion-resistant teflon finish. You must apply all of the abrasion-resistant teflon finish before the pot life ends. The pot life is 45 minutes at 70°F.

(b) If a thinner is necessary, add 1 part (by weight) of thinner-reducer 66-C-20 to 4 parts (by weight) of the mixture.
(c) Fully mix the components. Do not shake the mixture. Do not get air bubbles in the mixture.
(d) Let the mixture stay for 5 minutes before you apply it.
(e) Immediately apply the mixture with a brush in one direction.
(f) Make sure the total dry thickness is between 6 to 8 mils (0.006 to 0.008 inch).
(g) Let the mixture dry for 8 hours at 70°F before flight.

NOTE: You can apply 140°F heat to decrease the dry time to 2 hours.



NOTE: DO NOT USE THIS CHART WITH FC MATERIALS (BRUSH TEFLON)

Cure Chart for Teflon Finish
Figure 701

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) Reducer - 66-C-20
      (2) B00094 Solvent - Toluene
      (3) G00034 Cheesecloth
      (4) G02168 Abrasive Paper - 280-grit (minimum)
      (5) Masking Tape
   B. References
      (1) 51-24-13/701 - Abrasion-Resistant Teflon Finish
   C. Procedure

S 958-002

(1) Apply masking tape around the damaged area.

S 128-003

(2) Rub the damaged area with 280-grit (minimum) abrasive paper.

S 118-007

WARNING: DO NOT GET THE 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.

(3) Clean the area with a clean cheesecloth that is moist with toluene or reducer.

S 168-005
(4) Dry the surface with a clean dry cheesecloth.

S 378-006
(5) Apply the abrasion-resistant teflon finish on the damaged area (Ref 51-24-13).

NOTE: Primer is not necessary unless bare metal shows on the damaged area.

S 038-008
(6) Remove the masking tape.

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. Gaps between wing/body fairing panels are designed as drainage paths for water. The rippled surface of composite panels leave cracks for water seapage when bolted to fairing structure. Sealant is only applied between fairing panels in areas which are aerodynamically critical.
   C. Fasteners and fastener holes in composite panels must be primed and sealed if the fastener is removed or disturbed in order to prevent water penetration of the composite.
   D. Installation drawings for specific items may require sealing beyond the sealing requirements contained in this section.
   E. 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) Non O-ring type nutplates - sealed around nutplate flange.
      (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.
   F. Unless otherwise specified, all sealing shall be accomplished per 51-31-01.
   G. Priming and sealing fasteners and fastener holes in composite panels shall be accomplished per 51-31-02.
   H. 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.

SEALS AND SEALING - MAINTENANCE PRACTICES

1. General
   A. This procedure contains these tasks:
      (1) Prepare the surface for the sealing procedure.
      (2) Apply a Non-removable faying (mated) surface seal.
      (3) Apply a removable faying (mated) surface seal and form-to-place gaskets.
      (4) Apply an injection seal.
      (5) Apply a hole and slot seal.
      (6) Apply a fillet seal.
      (7) Apply a fastener seal.
      (8) Apply aerodynamic smoother.
      (9) Apply an electrical fitting seal.
      (10) Apply a fuel seal.
      (11) Protection of sealing materials.
      (12) Accelerated curing.
      (13) 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, refer to AMM 20-30-01/201.

TASK 51-31-01-302-001

2. Prepare for Sealing

A. Equipment

(1) Sealant Removal Tool

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 - Wooden, P/N SHR0272, PnJ Machining, Inc., Puyallup, WA (use with P/N DFD5019, P/N SCD5019, P/N SFD7519, or P/N DAD5013 scraper)

(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

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
   (6) G00771 Peelable Parting Agent, BAC5000 PSD 6-186

C. Reference
   (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.

<u>NOTE</u>: 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

<u>CAUTION</u>: 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.

<u>NOTE</u>: Refer to AMM 20-30-01/201 for the type of sealants that are available.

S 362-007

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 737-53A0092.

(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.
  - 1) If necessary, do these steps to sharpen the scraper:
    - a) Sharpen the scraper with 220-grit or fine aluminum oxide paper by hand or by metal sharpening wheel.
    - b) If you sharpen the scraper by hand, rub the sharpened scraper on qualified wiper to remove loose sanding particles.
    - c) 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.
(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 smoothing, fairing, and sealing materials 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

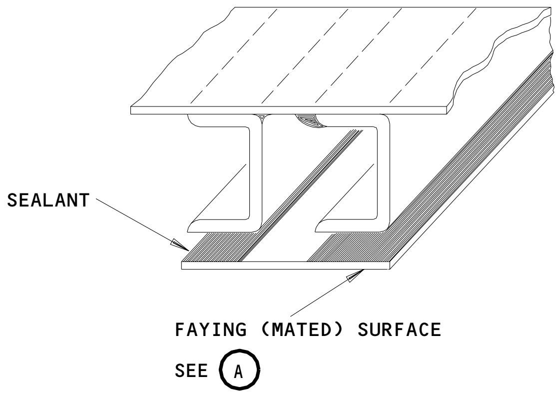
(1) Do the Surface Sealing Preparation task.

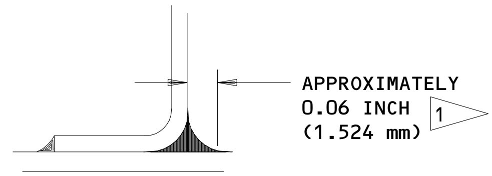
S 392-015

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.

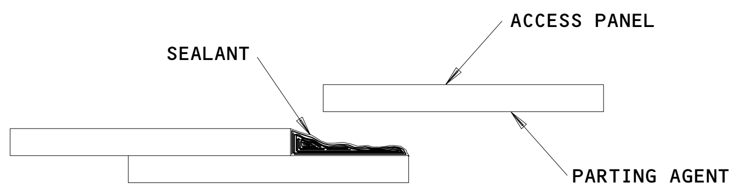
NOTE: The thickness of the sealing compound must be 1/32 inch.



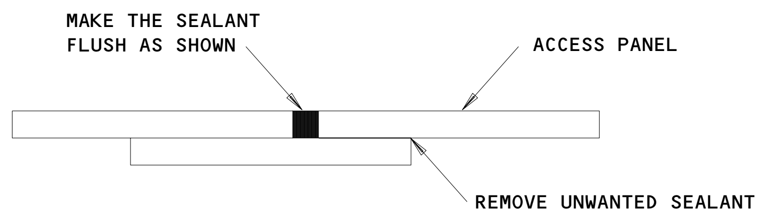


FAYING (MATED) SURFACE

A

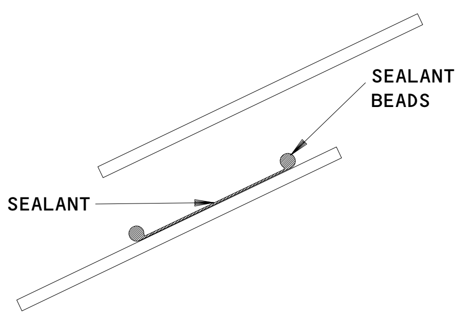


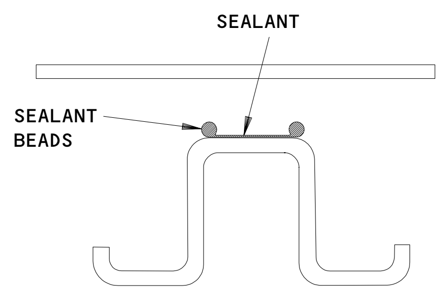
STEP 1



STEP 2

REMOVABLE SEALS
(THE SEALANT IS APPLIED IMMEDIATELY
BEFORE THE ACCESS PANEL IS INSTALLED)

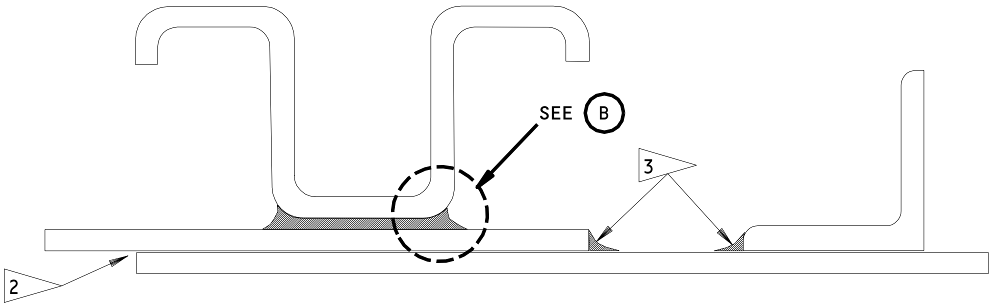


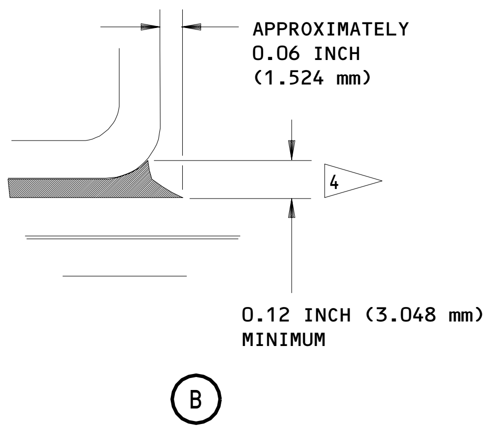


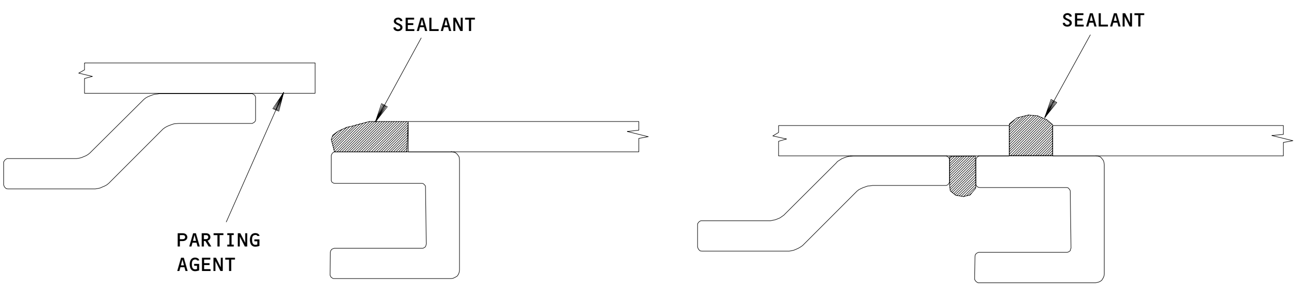
FAYING SURFACE SEALANT WITH SEALING BEADS ADDED

1 AFTER ASSEMBLY OF THE PARTS, THE SEALANT MUST AGREE WITH THIS DIMENSION

Faying Surface Seal
Figure 201 (Sheet 1)







STEP 1

STEP 2

2 EXTERNAL BODY SECTION AND FUEL SIDE OF WING SPAR.

3 MAKE SURE THE FAIRED-OUT EXTRUDED SEALANT IS APPROXIMATELY AS SHOWN.

4 THIS SHOWS SEALANT EXTRUDED AFTER THE ASSEMBLY AND FAIRED WITH A FAIRING TOOL.

Faying Surface Seal
Figure 201 (Sheet 2)

S 432-016
(3) Put the component parts together.

NOTE: Assemble the component parts after the curing agent is dry to the touch.

(a) Install the necessary fasteners.

S 212-017
(4) If you 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.
(a) Make sure the faying (mated) surface is smooth and the squeeze out depth is approximately 0.06 inch along the joint.

TASK 51-31-01-392-081
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 smoothing, fairing, and sealing materials 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. Consumable Materials

(1) G50365 Agent - Parting, Peelable, AC962-73C. BAC5000 PSD 6-187
(2) G50366 Agent - Parting, Peelable, AZ 534-2B. BAC5000, 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) G00771 Parting Agent - Green strippable Vinyl Coating 4A-183 (formerly 598-5002) (Boeing raw material code 5542000301)

D. Procedure

S 302-082

(1) Do the Surface Sealing Preparation task.

S 392-083

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.

NOTE: If one of the mating surfaces is acrylic, apply the parting agent to the non-acrylic surface.

S 392-093

(3) When the parting agent is sufficiently dry to touch, apply the sealant to the opposite mating surface.

S 902-094

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.

S 432-085

(5) Put the component parts together.

NOTE: Assemble the component parts after the curing agent is dry to the touch.

(a) Install the necessary fasteners.

S 212-086

(6) If you seal the fasteners, make sure you install them during the pot life of the sealing compound.

S 492-087

(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 392-088

(8) Install the permanent fasteners with the new sealant. Apply the sealant on the fastener or in the hole.

S 212-089

(9) Remove the unwanted sealant with an approved sealant removal tool.

S 222-090

(10) Make sure the faying (mated) surface is smooth and the squeeze out is approximately 0.06 inch along the joint.

TASK 51-31-01-392-024

5. Injection Seal Application (Fig. 202)

A. Equipment

(1) Sealing gun and nozzles

B. Procedure

S 302-025

(1) Do the Surface Sealing Preparation task.

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.

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.

NOTE: 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 (Fig. 202)

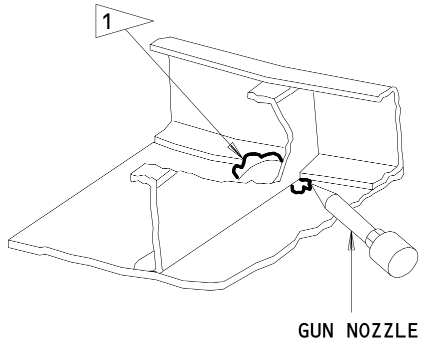
A. Equipment
   (1) Spatula made of wood or plastic (Ref. ST982)
   (2) Sealing gun and nozzles

B. Consumable Materials
   (1) G00138 Masking Tape - Permacel No. 70 or 85, American Tuck No. 210

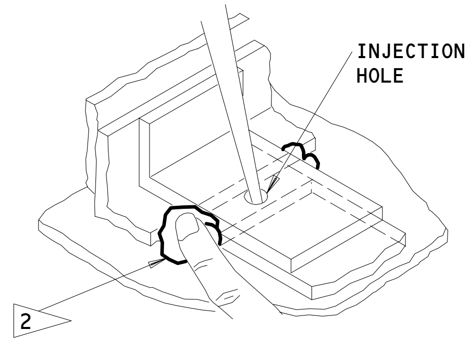
C. Procedure

S 302-030

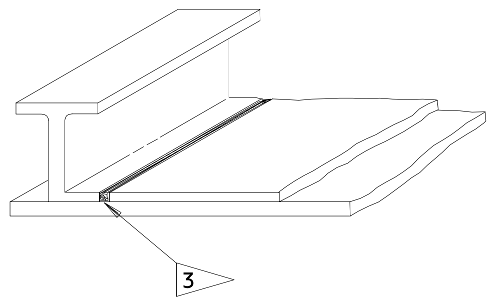
(1) Do the Surface Sealing Preparation task.



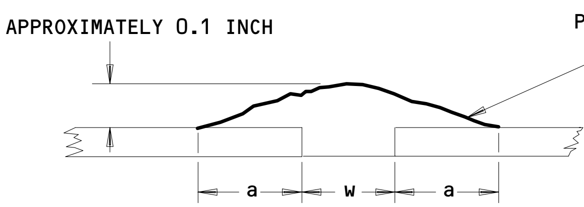
INJECTION SEAL

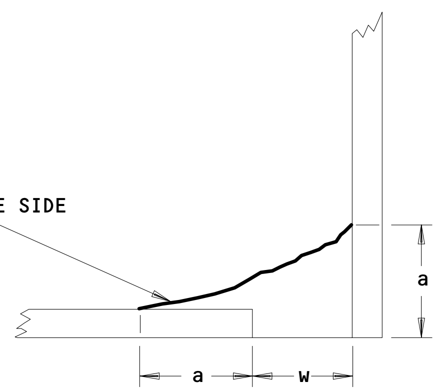


INJECTION SEAL



SLOT SEAL





NOTE: a = 0.25 INCH 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 COMPLETELY FILL THE SLOT

Injection Seal
Figure 202

S 392-058
(2) Apply the sealant on all the tool and coordination holes that are not riveted.

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.

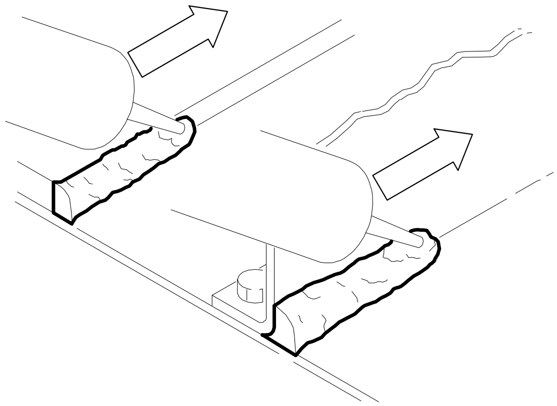
S 392-036
(7) Apply the compound to the pressure side of the hole with a spatula or applicable tool.

S 392-037
(8) Apply the compound tightly into the hole or slot.

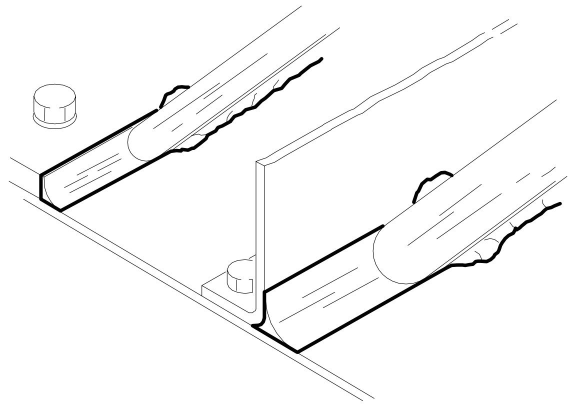
S 392-038
(9) Make the compound smooth with the adjacent surfaces.

TASK 51-31-01-392-039
7. Fillet Seal Application (Fig. 203)
A. Equipment
(1) Fillet Fairing Tools
(2) Sealing gun and nozzles
B. Procedure

S 302-040
(1) Do the Surface Sealing Preparation task.

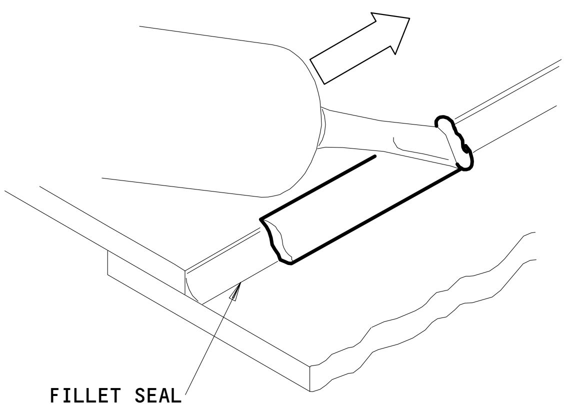


STEP 1 1
(APPLICATION)



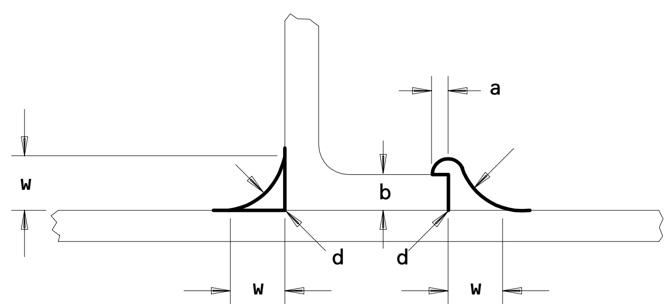
STEP 2 2
(FINISH)

FILLET SEAL



APPLICATION OF FILLET
FULL BODY SEAL

a = 0.04 TO 0.15 INCH EXCEPT a = 0 WHEN
b = 0.15 INCH OR MORE
d = 0.08 INCH MINIMUM
w = 0.12 TO 0.25 INCH



FILLET SEAL
FINISHED DIMENSIONS

1 APPLY SEALANT WITH A FLOW GUN
2 USE AN UNLUBRICATED FAIRING TOOL TO PUSH THE SEALANT INTO POSITION

Fillet Seal
Figure 203

S 392-078
(2) Apply the sealant with a flow gun.

S 392-042
(3) Put the nozzle tip into the seam.

S 212-074
(4) Make sure the sealant is applied in a straight line.

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.
(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

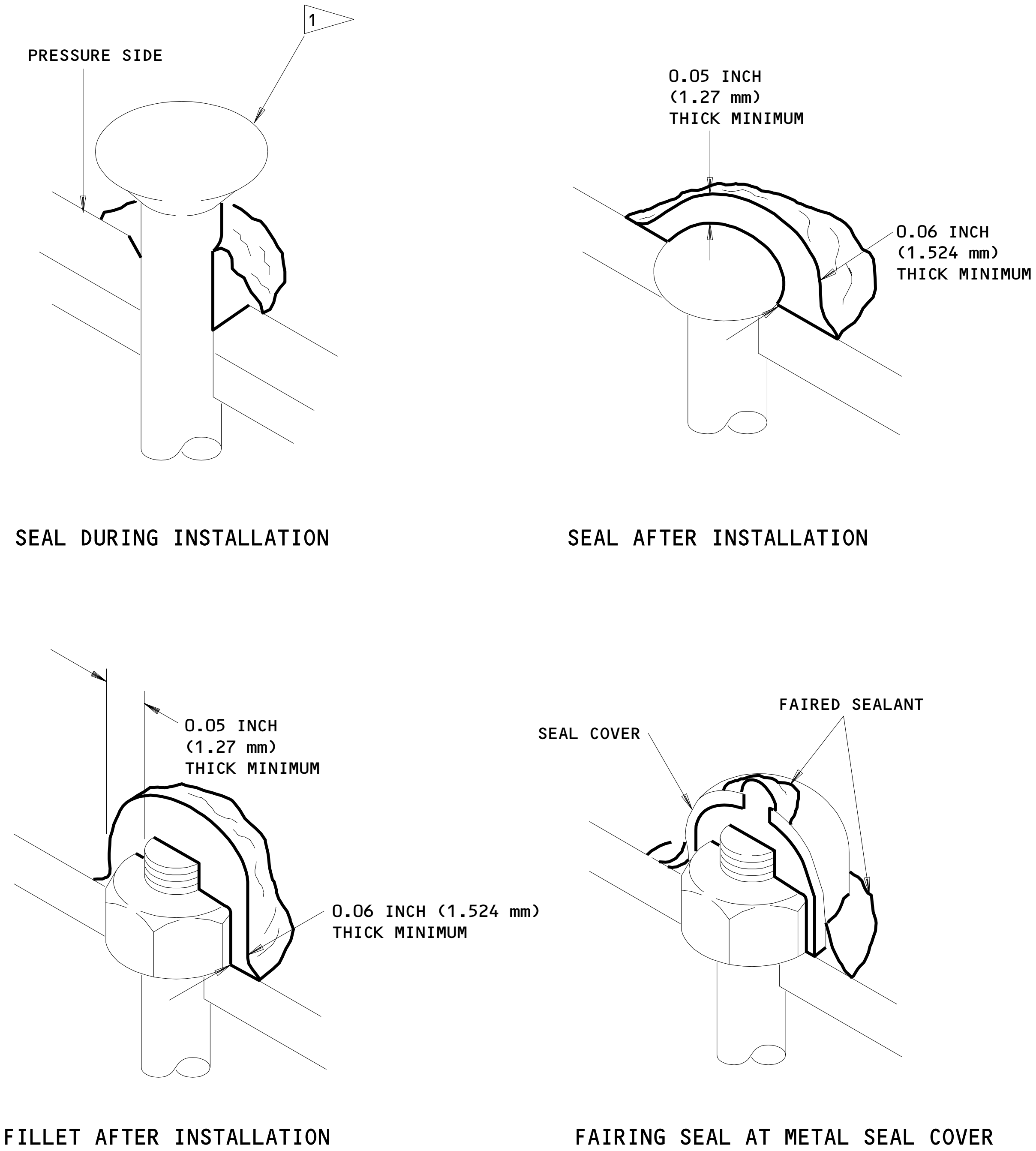
S 302-049
(1) Do the Surface Sealing Preparation task.

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.

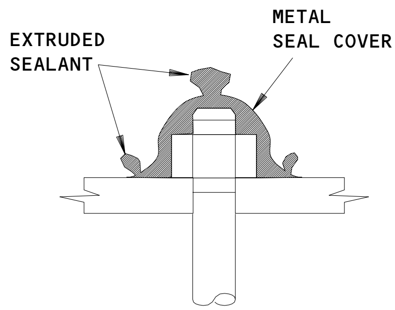
(2) Use one of these procedures to seal the fasteners that are installed through faying surface. Use these procedures when the sealant pot life has ended or when no faying surface sealant is used (Fig. 204):
(a) Apply the sealant to the fastener or hole at the installation.
(b) Apply the sealant to the 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 1/2 to 2/3 full of sealant.
(b) Push the metal cover down on the fastener until the flange touches the structure.

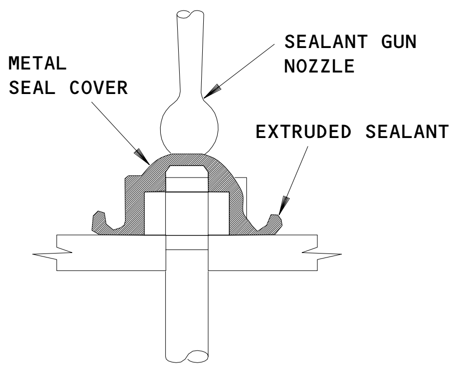


1 YOU CAN APPLY THE SEALANT TO THE HOLE OR THE FASTENER

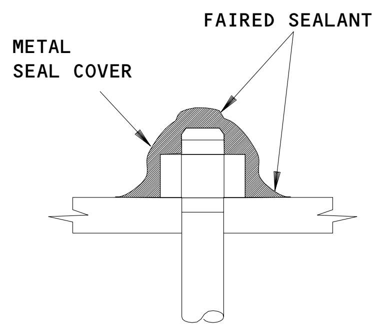
Fastener Seal
Figure 204 (Sheet 1)



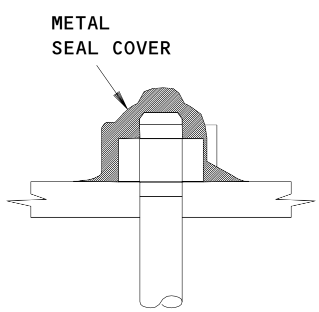
SEAL COVER AFTER
AFTER INJECTION



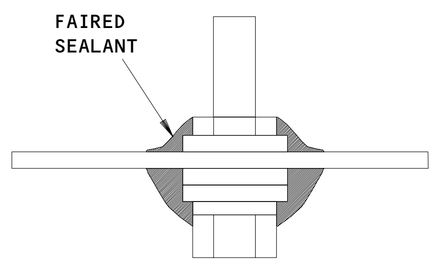
INJECTING SEALING
SELF-CENTERING SEAL COVER



SEAL COVER
AFTER FAIRING

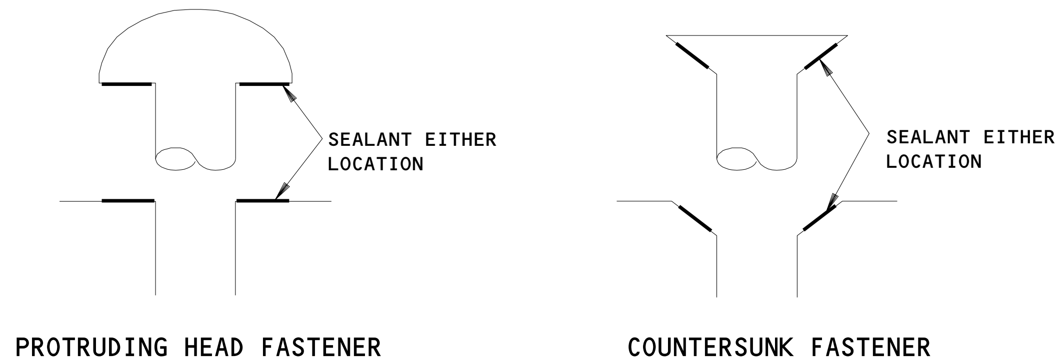


AFTER FAIRING
SELF-CENTERING SEAL COVER

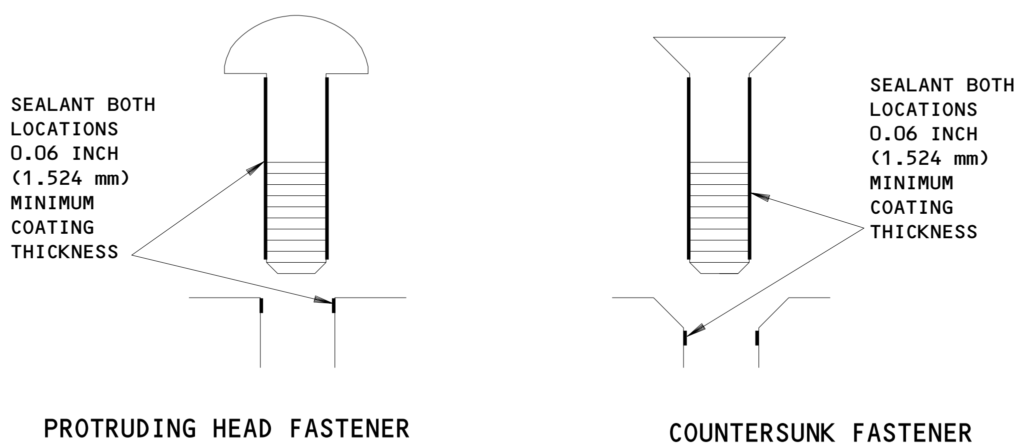


SEALING OF
STANDARD GROUND STUD

Fastener Seal
Figure 204 (Sheet 2)



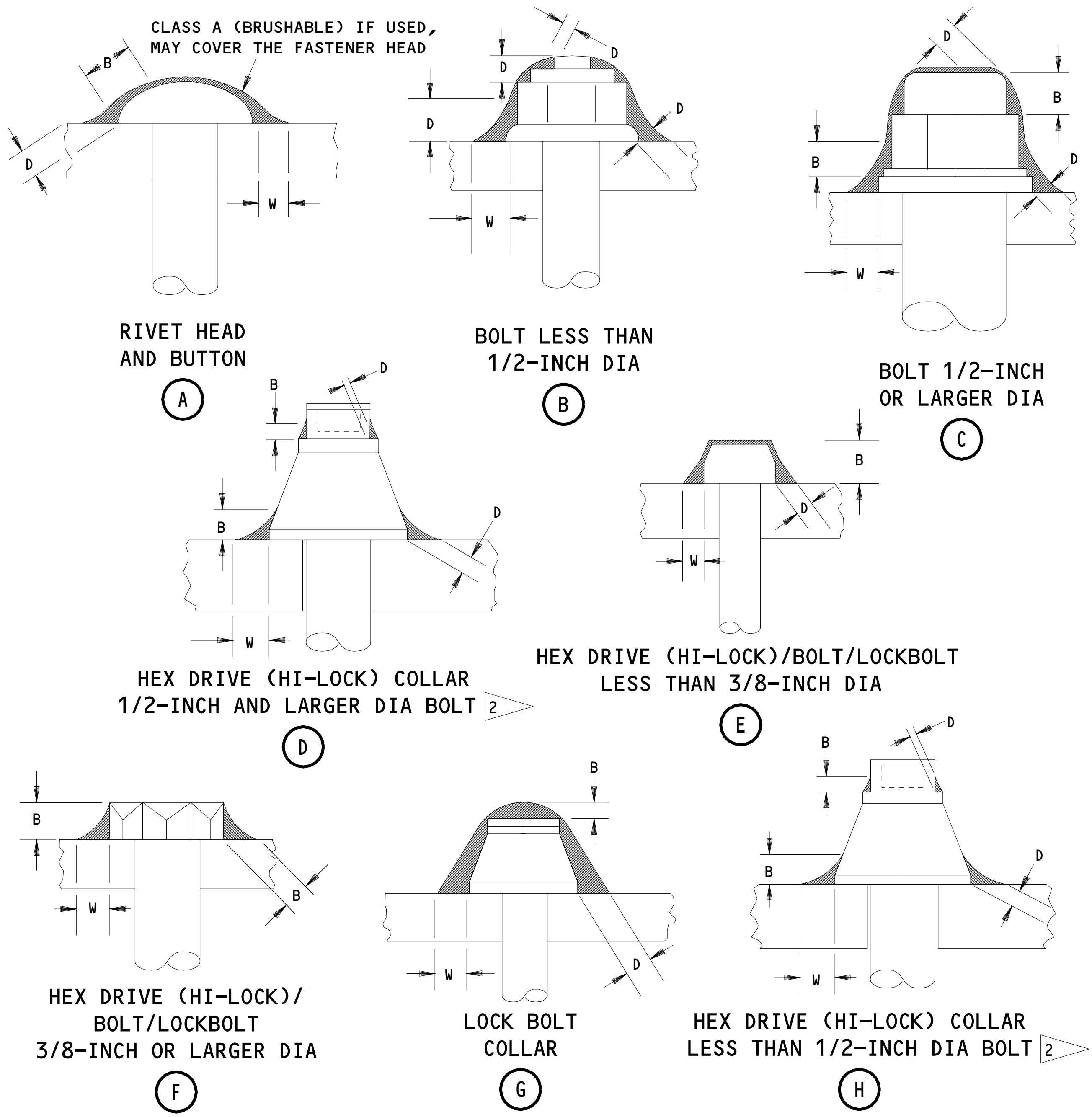
PROCEDURE 1



PROCEDURE 2

TYPICAL FASTENER SEALING FOR CORROSION PROTECTION

Fastener Seal
Figure 204 (Sheet 3)



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 4)

(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 102-096
(1) Clean the surface, do Prepare the Surface.

S 392-097
(2) Procedure 1 - corrosion protection below the head area of the fasteners:
(a) Apply sealant to all surfaces and countersinks below the fastener head.
(b) Install the fastener.
(c) A continous extrusion of sealant is necessary around the fastener.
(d) Clean off unwanted sealant with an approved sealant removal tool.

S 392-098
(3) Procedure 2 - corrosion protection below the head area and shank of the fasteners:
(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 fastener and nut or collar.
(c) Clean off unwanted sealant with an approved sealant removal tool.

S 392-099
(4) Procedure 3 - corrosion protection below the head area and shank of the fasteners and the bottom attaching hardware:
(a) Apply sealant to the entire shank and thread of the fastener.
(b) Install the 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.

(e) Clean off unwanted sealant with an approved sealant removal tool.

S 392-100

(5) Apply 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 are met.

TASK 51-31-01-392-052

9. Aerodynamic Smoother Application (Fig. 205)

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

(2) Aerodynamic Smoother

C. Reference

(1) 51-41-00/201, Airframe Drainage

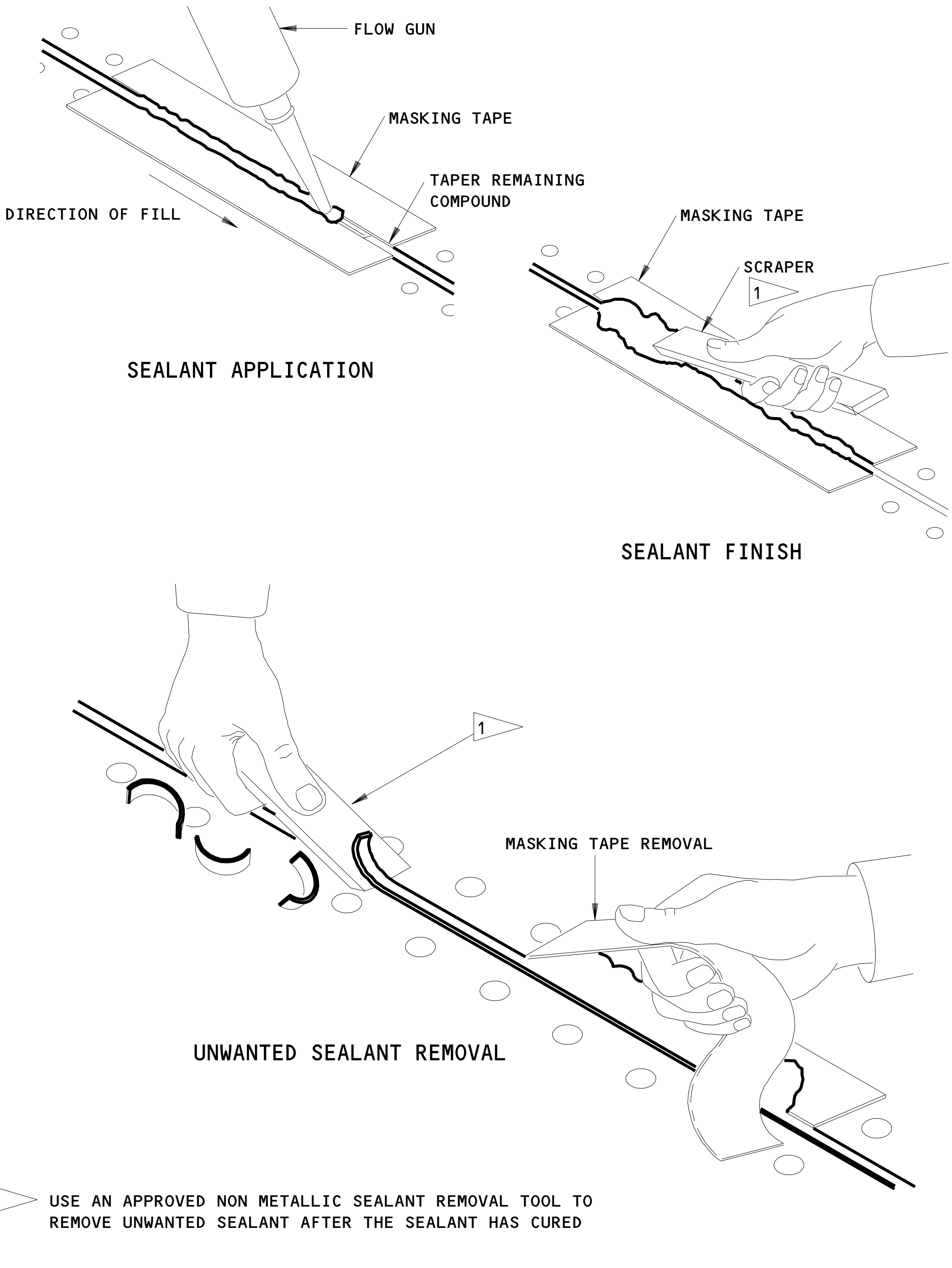
D. Procedure

S 302-053

(1) Do the Surface Sealing Preparation task.

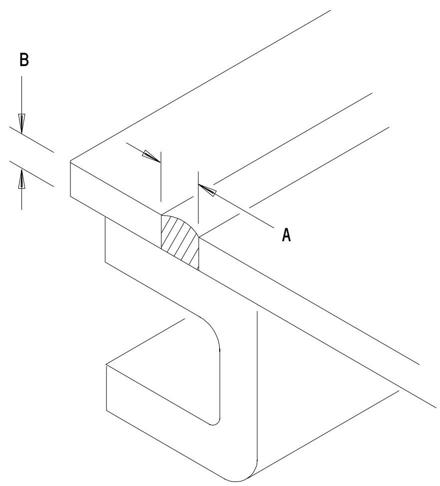
S 952-054

(2) Apply the masking tape to the surface that is adjacent to the damaged area.



1 USE AN APPROVED NON METALLIC SEALANT REMOVAL TOOL TO REMOVE UNWANTED SEALANT AFTER THE SEALANT HAS CURED

Aerodynamic Sealer
Figure 205 (Sheet 1)



WIDTH B INCHES (mm)	WIDTH A INCHES (mm)
0.10 (2.54) MAXIMUM	0.02-0.03 (0.508-0.762)
0.25 (6.35) MAXIMUM	0.03-0.05 (0.762-1.27)
0.50 (12.7) MAXIMUM	0.05-0.10 (1.27-2.54)
0.75 (19.05) MAXIMUM	0.10-0.15 (2.54-3.81)

SLOT WIDTH AND DEPTH

Aerodynamic Sealer
Figure 205 (Sheet 2)

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.

CAUTION: 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.

S 392-072

(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 sealant 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 for the curing time.

S 392-073

(7) Make the edges of the seal smooth. Remove all the unwanted compound with and approved sealant removal tool.

TASK 51-31-01-392-060

10. Electrical Fitting Seal Application (Fig. 206)

A. General

(1) BMS 5-37 sealant is the recommended sealant for the electrical seal fittings. BMS 5-45, BMS 5-32, and BMS 5-95 sealants will do the same function as the BMS 5-37. But, BMS 5-45, BMS 5-32, 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.

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. Consumable Materials

(1) G00138 Masking Tape - Permacel No. 70 or 85, American Tuck No. 210, 3/4 inch wide and 1-1/2 inch wide

D. Procedure

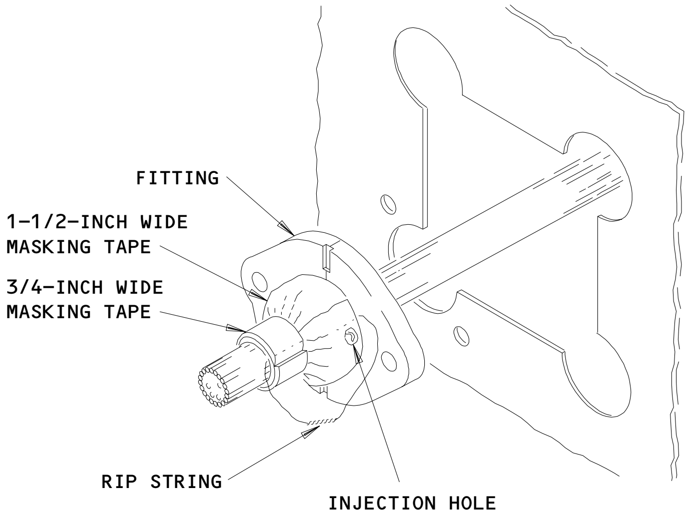
S 302-061

(1) Do the Sealing Surface Preparation task.

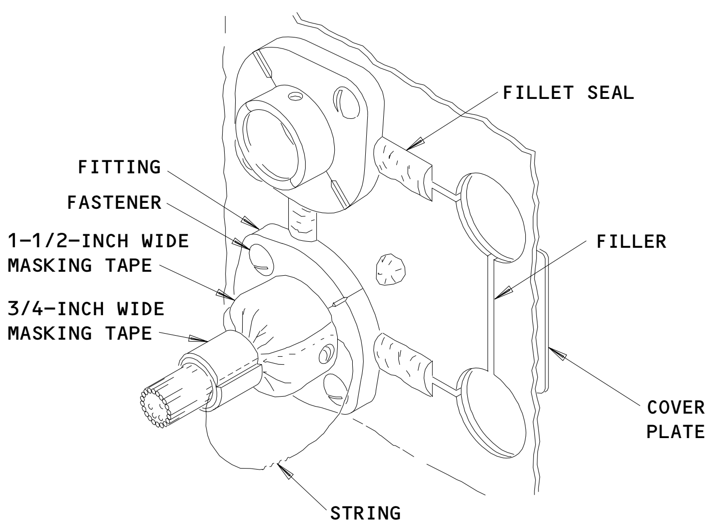
S 392-074

(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.

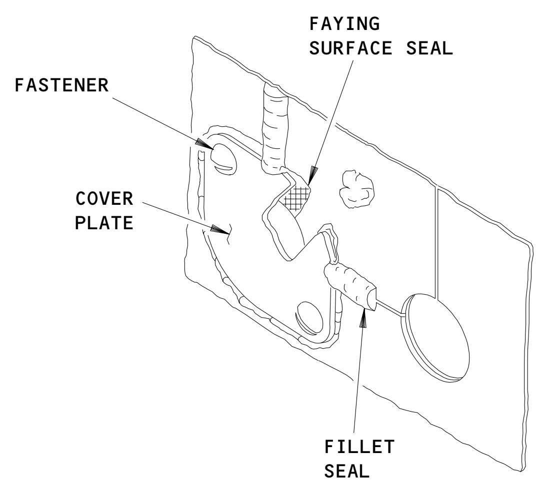
      NOTE: A fitting is made of two halves.



BULKHEAD FITTING

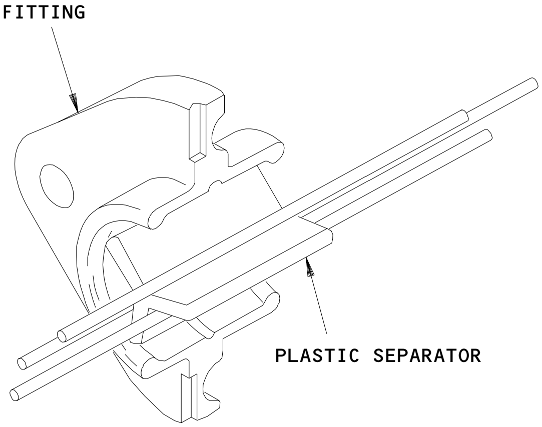


INSTALLATION OF BULKHEAD FITTING

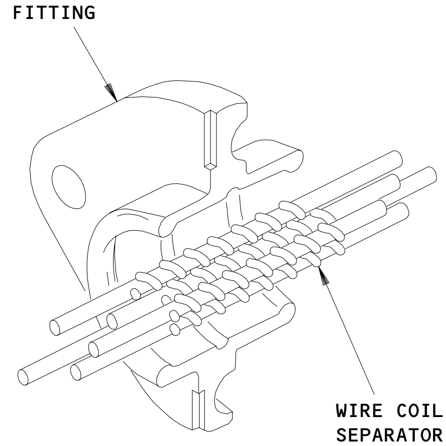


INSTALLATION OF COVER PLATE

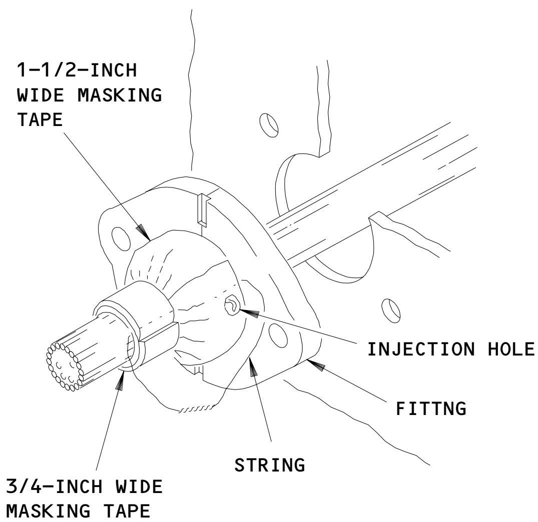
Electrical Fitting Seal
Figure 206 (Sheet 1)



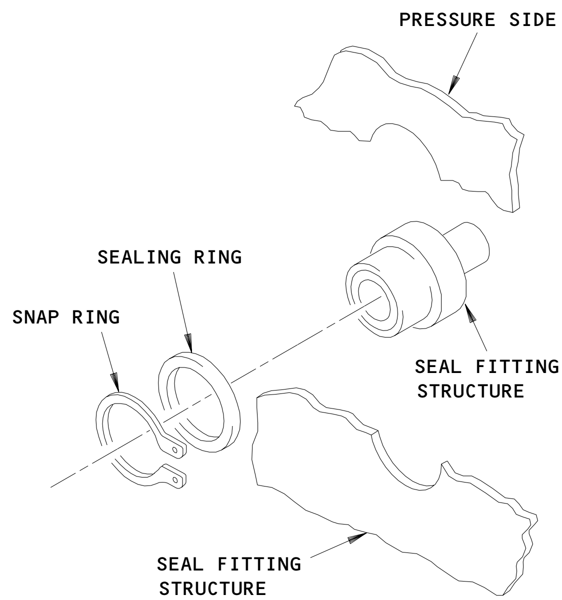
PLASTIC SEPARATOR
INSTALLATION



WIRE COIL SEPARATOR
INSTALLATION

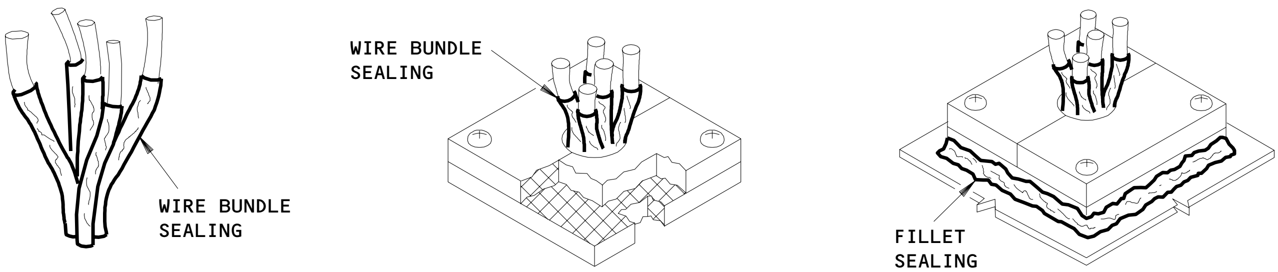


BULKHEAD FITTING
(BACS45A)



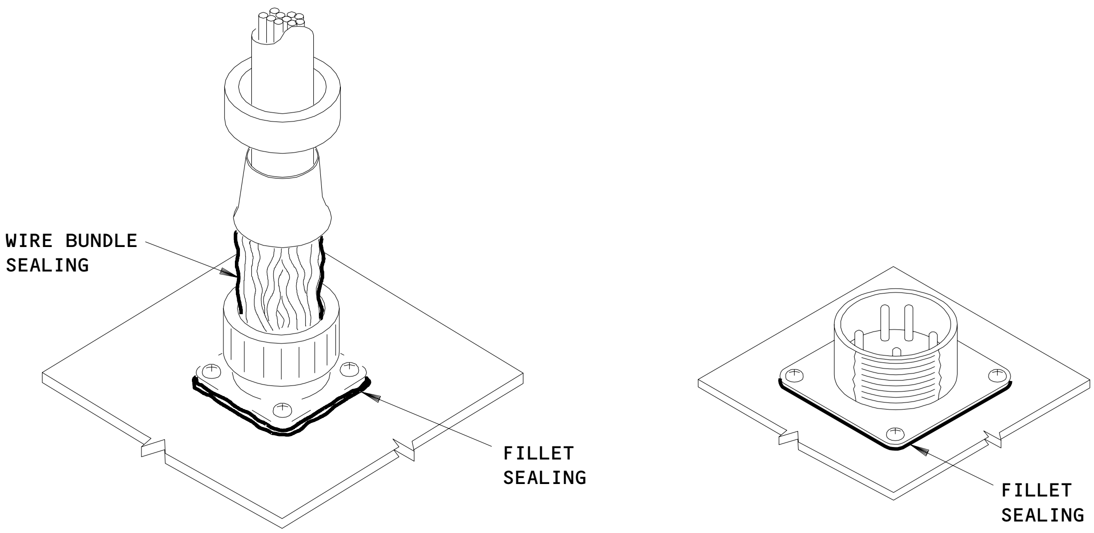
BULKHEAD FITTING
(BACS45B)

Electrical Fitting Seal
Figure 206 (Sheet 2)



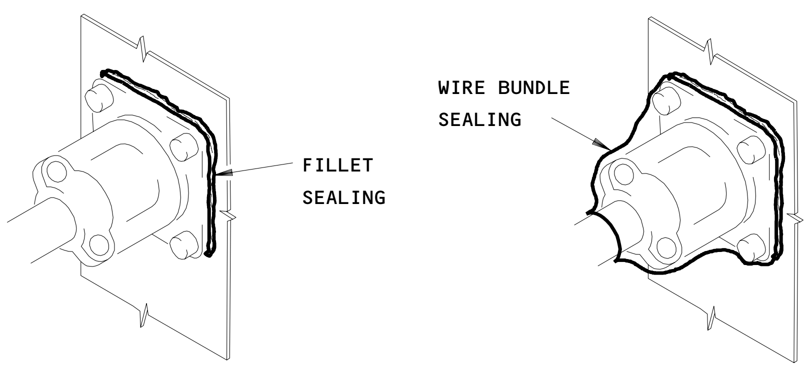
STEP 1 STEP 2 STEP 3

EXAMPLE A



(WITH CONNECTOR)
EXAMPLE B

(WITHOUT CONNECTOR)
EXAMPLE B



STEP 1 STEP 2

EXAMPLE C

WIRE BUNDLE SEALING

Electrical Fitting Seal
Figure 206 (sheet 3)

(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 wide masking tape around the fitting.
(g) Crimp the 1-1/2 inch 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 wide masking tape around the 1-1/2 inch wide masking tape.
(i) Put the bulkhead fitting, cover plate and the filler in position on the unpreesurized size of the airplane. Install the fasteners.
(j) Make an injection hole in the 1-1/2 inch wide masking tape at an applicable location.
(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. Reference
(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 392-079

(1) Use one of these steps to accelerate the cure:

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 51-31-01-002-108

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 022-109

(1) Remove the sealant with an approved scraper and scraper handle.

S 952-110

(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 942-111

(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

S 112-112

(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 112-113

(5) After chemical stripping is complete, remove stripper by thoroughly washing with a water-based alkaline cleaner (Ref 20-30-02, Maintenance Practices).

S 172-114

(6) Rinse area thoroughly with water.

FASTENERS AND FASTENER HOLES IN COMPOSITES - MAINTENANCE PRACTICES

1. General
   A. This procedure contains one task. The task is to do maintenance on the fasteners and the fastener holes in composite panels.
   B. There are three procedures to repair the fastener and fastener holes:
      (1) The repair of graphite panels that are installed on graphite panels or on graphite structural components.
      (2) The repair of graphite panels that are installed on an aluminum structure or on aluminum repair plates.
      (3) The repair of aramid, fiberglass on graphite panels that are installed on panels with graphite and aluminum components.

TASK 51-31-02-302-001

2. Repair the Fasteners and Fastener Holes in Composite Panels
   A. Consumable Materials
      (1) Primer (use one of these primers)
         (a) C00259 BMS 10-11 Type I
         (b) C00584 BMS 10-79 Type II
      (2) A00247 Sealant - BMS 5-95
   B. Procedure

      S 332-007

      (1) Do these steps to repair the graphite panels that are installed on the graphite panels or on the graphite structural components:
         (a) Remove the damaged or loose fasteners. Replace the damaged fasteners with new fasteners.
         (b) Apply the primer to the fastener holes and countersinks.
         (c) Let the primer dry.
         (d) Install the steel or titanium fasteners on the airplane.
         (e) For the permanent fasteners, do these steps:
            1) Apply the primer or sealant on the permanent fasteners.
            2) Install the permanent fasteners.

      S 332-003

      (2) Do these steps to repair the graphite panels that are installed in an aluminum structure or on aluminum repair plates:
         (a) Remove the damaged or loose fasteners. Replace the damaged fasteners with new fasteners.

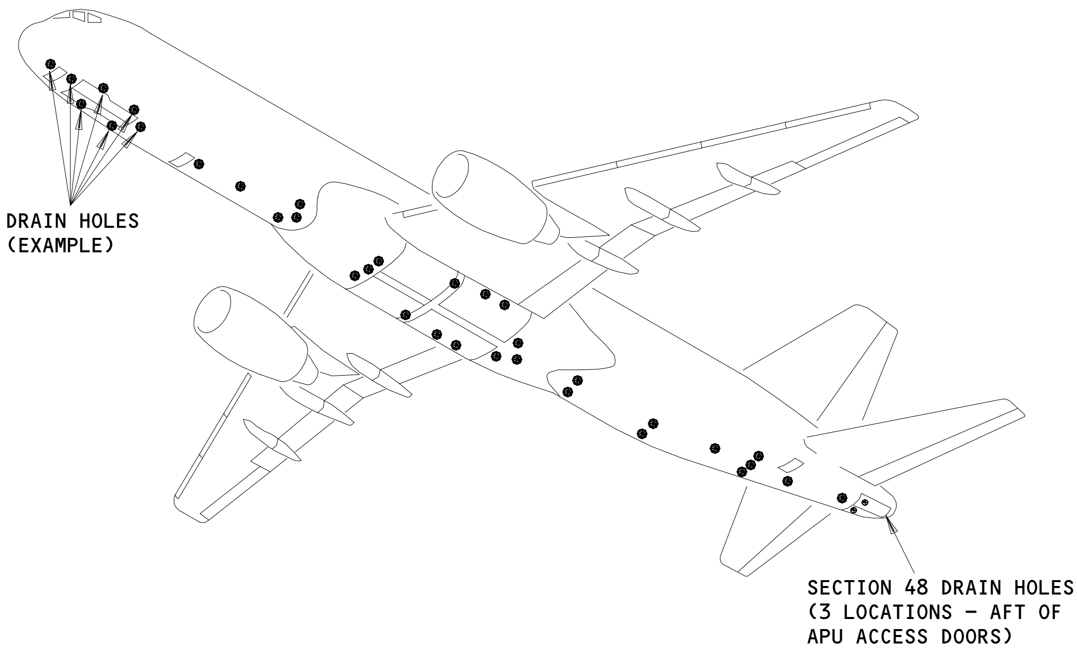
(b) Apply the primer to the fastener holes and countersinks.
(c) Let the primer dry.
(d) Apply the sealant on the mating surfaces.
(e) Apply the sealant on the fasteners.
(f) Install the fasteners.
(g) Apply the sealant on the fastener heads, nuts, and washers that extend out of the surface.

S 332-004

(3) Do these steps to repair the aramid, fiberglass or graphite panels that are installed in the panels with graphite and aluminum components:
(a) Remove the damaged and loose fasteners. Replace the damaged fasteners with new fasteners.
(b) Apply the primer to the fastener holes and countersinks.
(c) Let the primer dry.
(d) For the fasteners that you can remove, do these steps:
1) Apply the primer on the fasteners.
2) Install the fasteners.
(e) For the permanent fasteners, do these steps:
1) Apply the primer or sealant on the fasteners.
2) Install the permanent fasteners.

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 (Fig. 1). Self-leveling compound is used to ensure proper drainage in sloping areas.
   B. Bilge drain 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 and are used to drain such areas as wing/body fairing and empennage.



Airframe Drain Holes
Figure 1

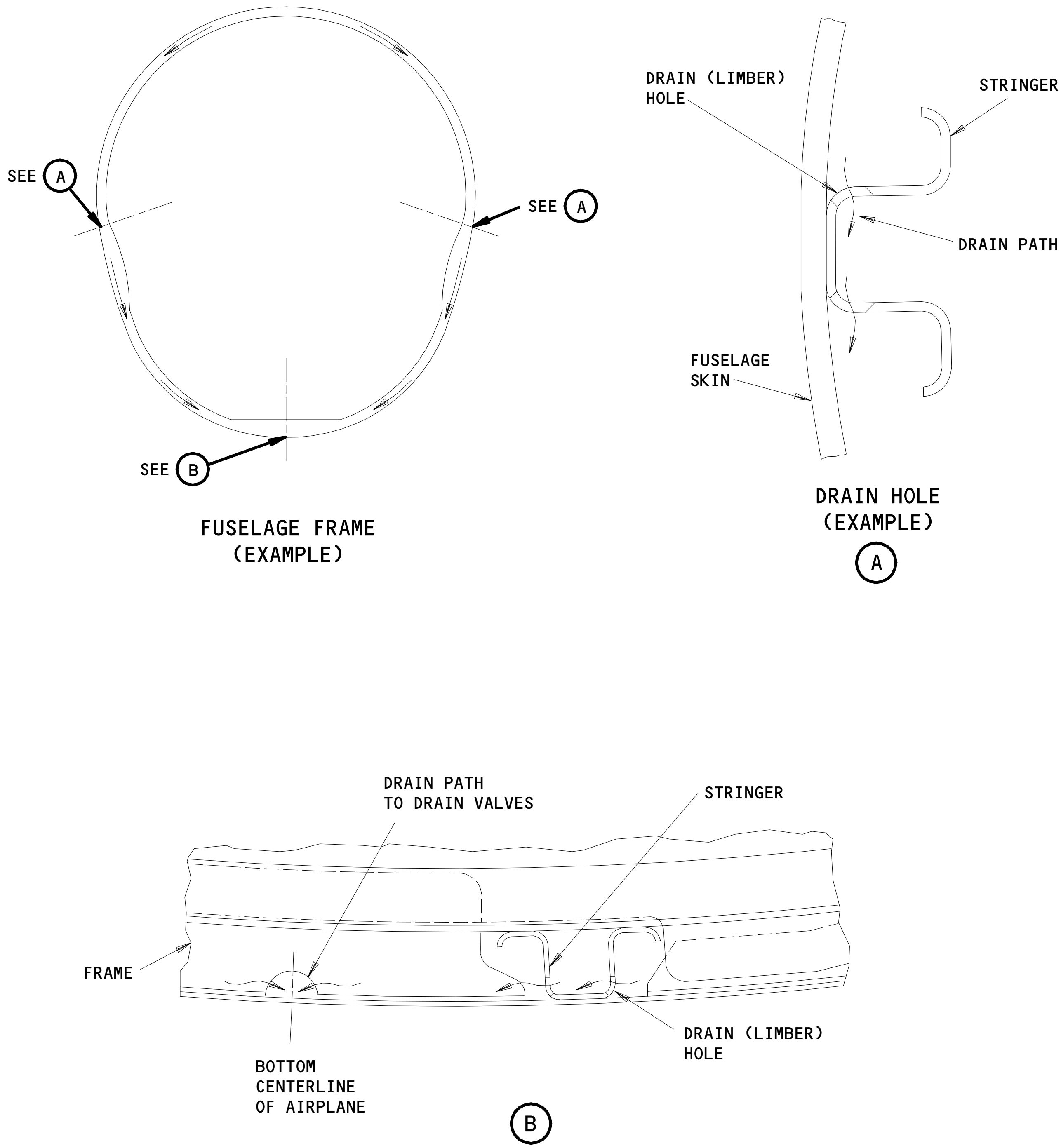
D. Gaps between wing-body fairing panels and support framework are used as drain paths. The uneven surface of composite panels leave small gaps where panels contact support framework. These small gaps are used to drain fluid out of the fairing cavity. To ensure adequate drainage, use of aerodynamic sealant between wing-body fairing panels is limited (Fig. 2).

3. Internal Drain Paths and Drain Holes (Fig. 2)

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 and frame from one bay to the next, eventually terminating at a drain valve.

C. Internal structure is provided with tubes, dams, channels and drain holes to direct flow of fluids toward external drainage points.



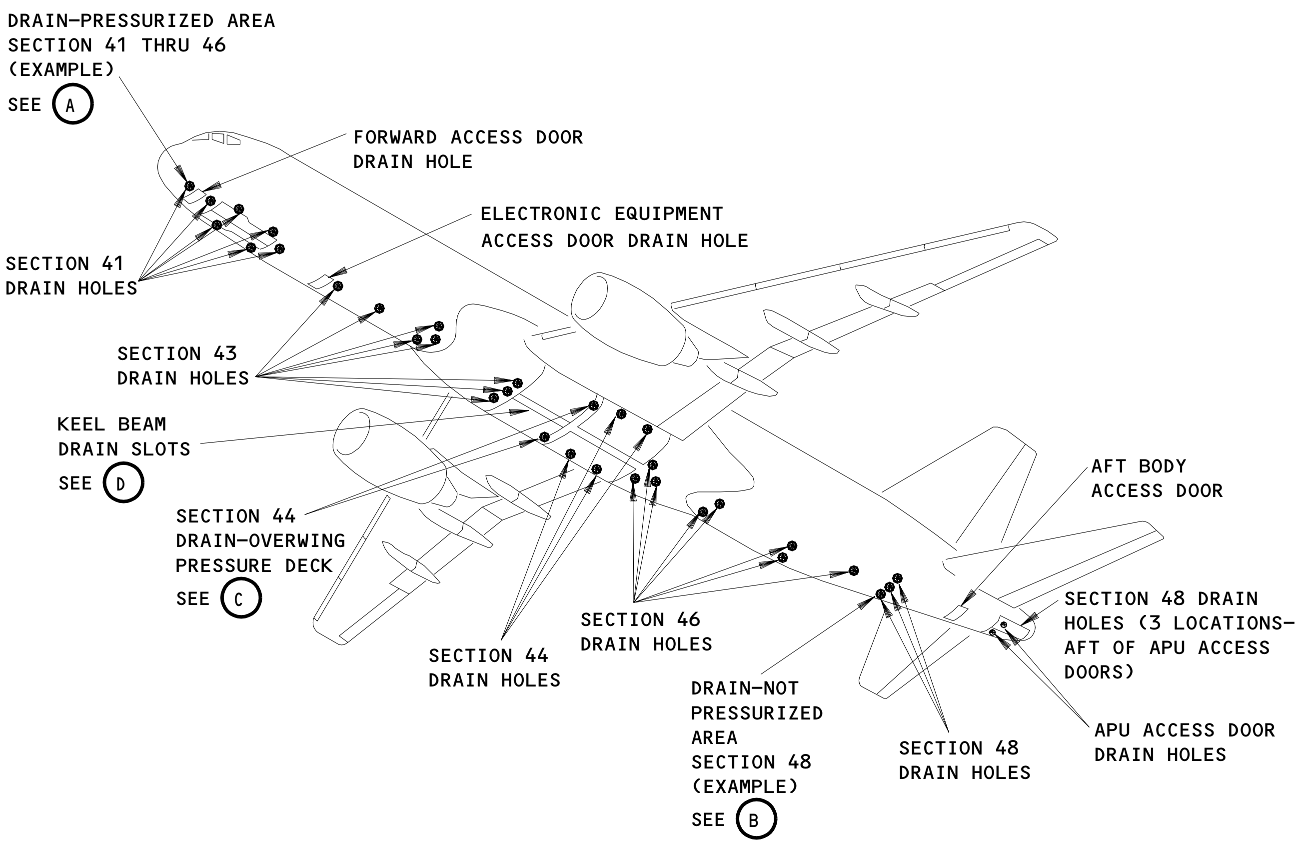
Internal Drain Paths
Figure 2

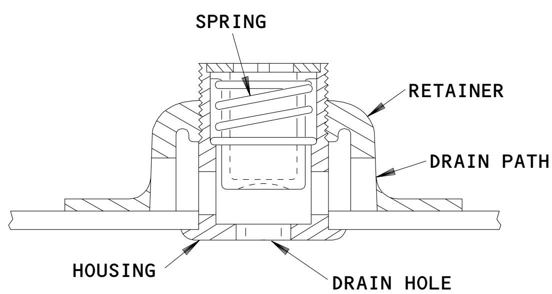
AIRFRAME DRAINAGE - MAINTENANCE PRACTICES

1. General
   A. This procedure contains four tasks:
      (1) The first task examines the drain holes.
      (2) The second task examines the wing-body fairings.
      (3) The third task examines the internal drain paths.
      (4) The fourth task is the repair of the self-leveling compound.
   B. Fluids and condensate in the structure are drained overboard to prevent possible fire or corrosion.
   C. Overboard drainage is through drain holes and slots in the lower part of the fuselage (Fig. 201). Pressure-actuated valves close above the drain holes to prevent a decrease of cabin pressure in flight. The valves open to permit drainage when the fuselage is not pressurized.
   D. Overboard drainage from the wing-body fairing cavity is through small clearances between the panels and support framework. These clearances occur when composite panels of different thickness are attached to the fairing support structure. Do not use too much aerodynamic sealant between the wing-body fairing panels (Fig. 202). If too much sealant is used, an unsatisfactory drain system can result.
   E. Holes in the fuselage frames and stringers make internal drain paths. The use of self-leveling compounds help the fluids move down to the overboard drains (Fig. 203).
   F. Examine and remove all blockages from the drain holes and slots in the fuselage. Make sure that the drain holes are clean.
   G. Examine the valves at the drain holes in the pressurized areas of the fuselage for correct operation.
   H. Examine the wing-body fairing panels for too much aerodynamic sealant (Fig. 202).
   I. Examine and remove all blockages from the internal drain paths to make sure there is a good drain system (Fig. 203).
   J. Repair the damaged self-leveling compound, as necessary. Refer to the Repair Self-Leveling Compound procedure.

TASK 51-41-00-212-001

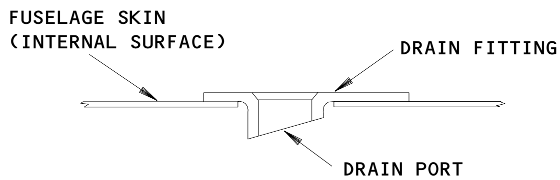
2. Examine the Drain Holes
   A. Access
      (1) Location Zone
          100   Lower Half of Fuselage



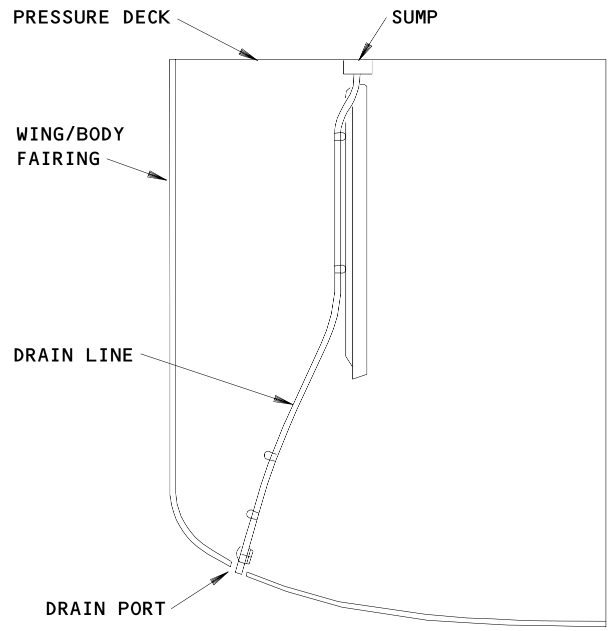


DRAIN - PRESSURIZED AREAS
(BILGE DRAIN VALVE)
A

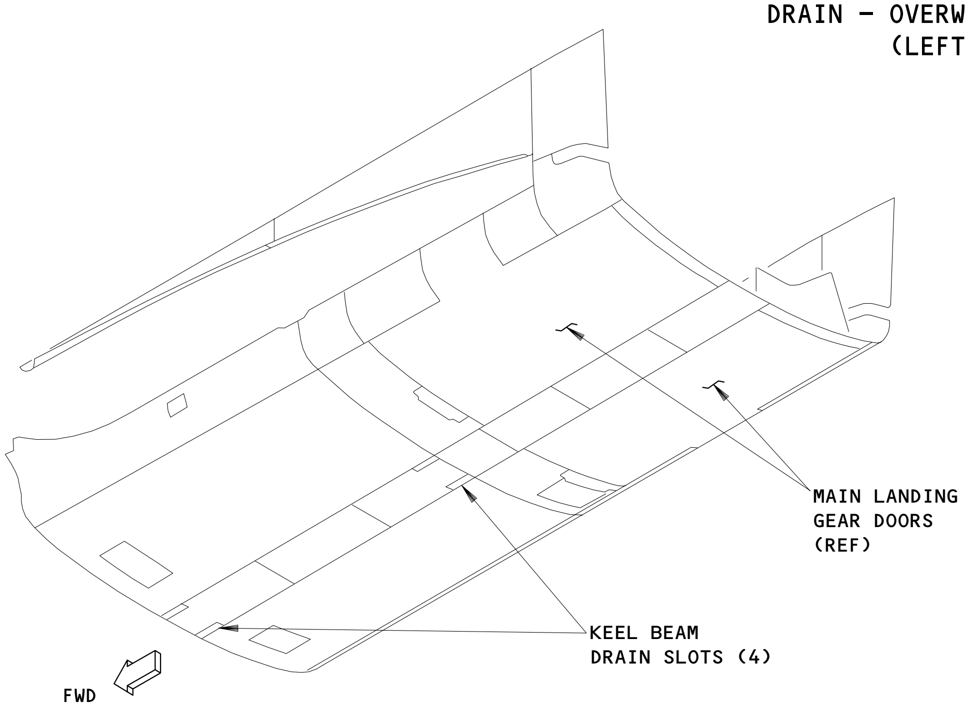
Airframe Drain Holes
Figure 201 (Sheet 1)



DRAIN - NOT PRESSURIZED AREAS
B

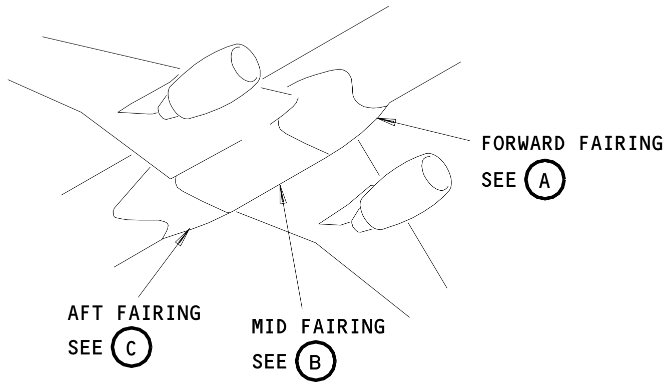


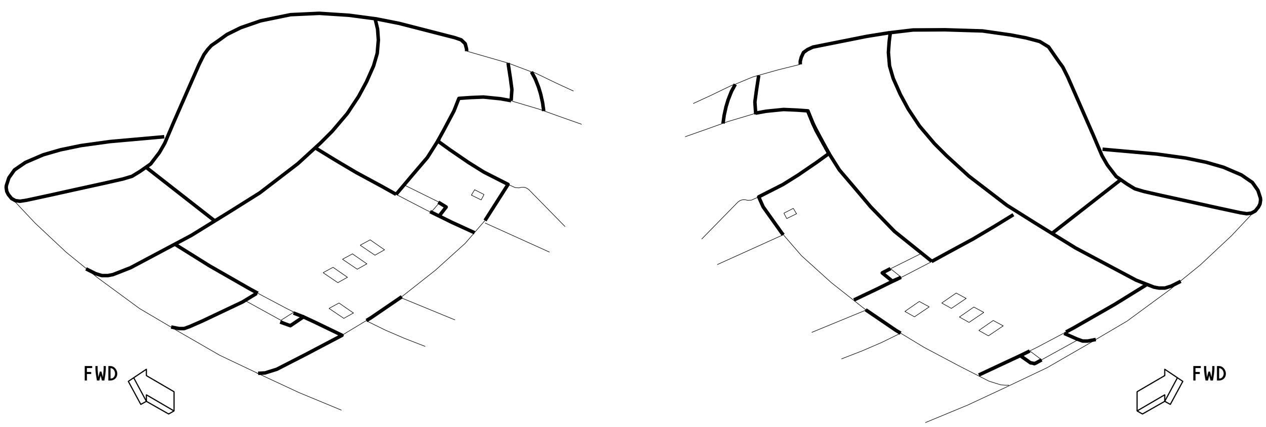
DRAIN - OVERWING PRESSURE DECK
(LEFT REAR VIEW)
C



KEEL BEAM DRAIN SLOTS
D

Airframe Drain Holes
Figure 201 (Sheet 2)



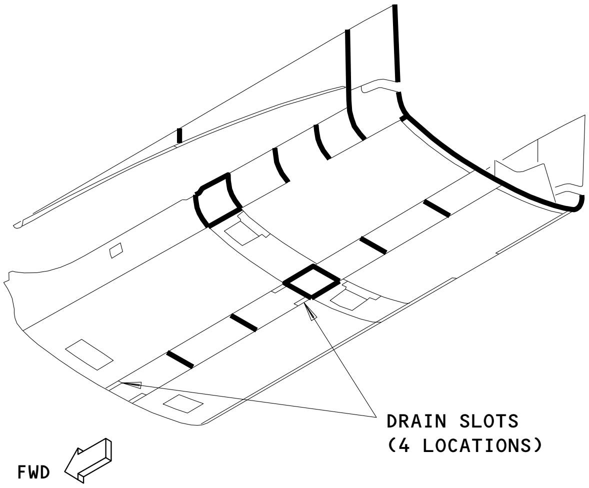


FORWARD FAIRING
(LEFT SIDE)
A

FORWARD FAIRING
(RIGHT SIDE)
A

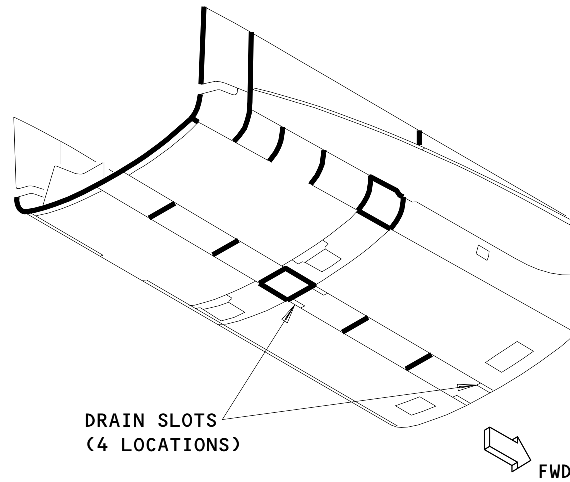
NOTE: THE THICK LINES SHOW THE AREAS WHERE THE SEALANT MUST BE APPLIED. THE SEALANT MUST BE APPLIED ONLY TO THESE AREAS. CLEARANCES BETWEEN ADJACENT PANELS ARE NECESSARY TO PERMIT WATER TO DRAIN OUT OF THE WING/BODY FAIRING.

Wing/Body Fairing Drainage
Figure 202 (Sheet 1)



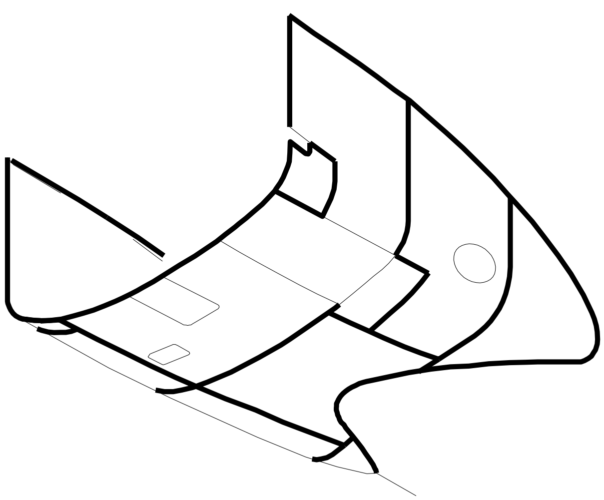
MID FAIRING
(LEFT SIDE)

B



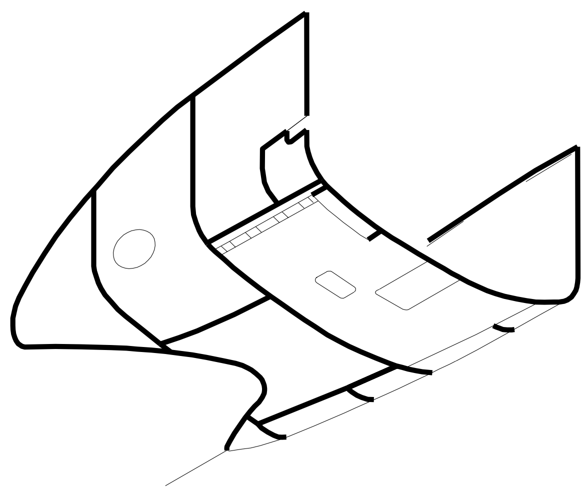
MID FAIRING
(RIGHT SIDE)

B



AFT FAIRING
(LEFT SIDE)

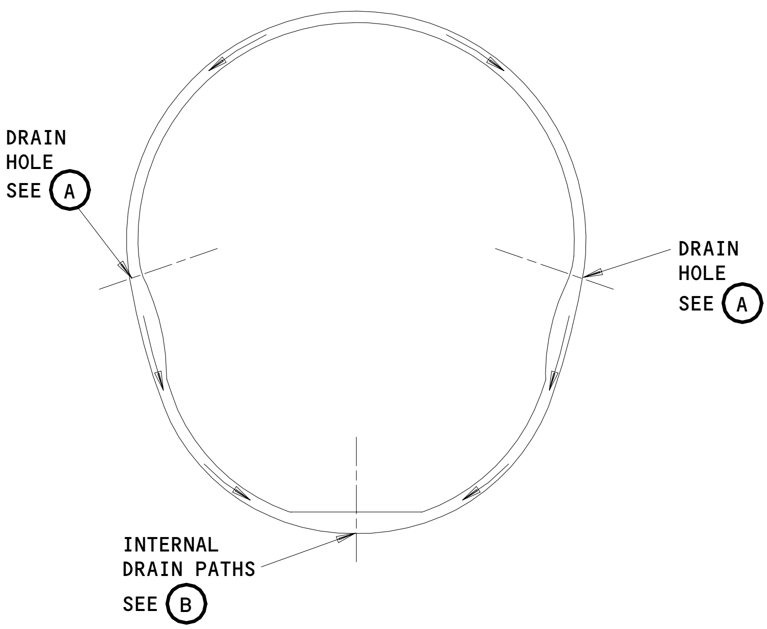
C



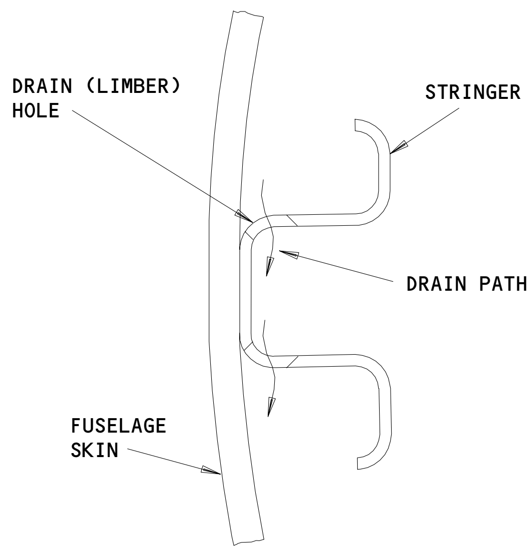
AFT FAIRING
(RIGHT SIDE)

C

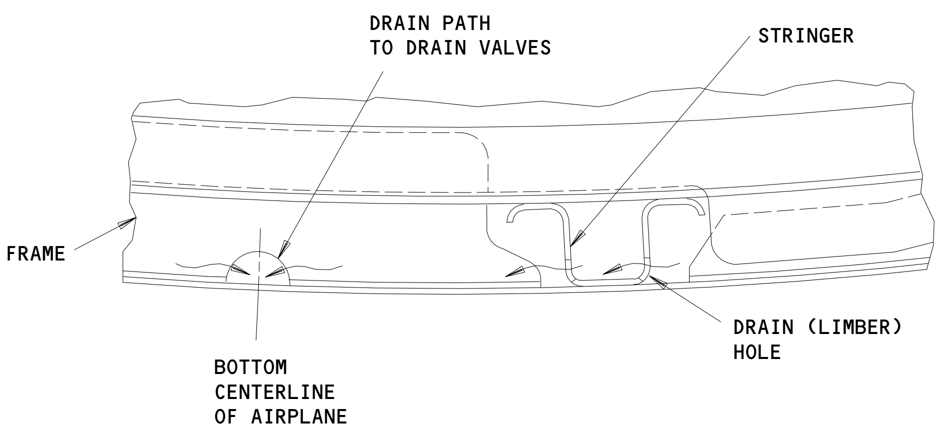
Wing/Body Fairing Drainage
Figure 202 (Sheet 2)



FUSELAGE FRAME (EXAMPLE)



DRAIN HOLE (EXAMPLE)
A



INTERNAL DRAIN PATHS
B

Internal Drain Paths
Figure 203

B. Procedure

S 212-002

(1) Make sure all drain holes, slots, and tubes are clean.

S 162-003

(2) Remove all blockages.

S 212-004

(3) If the drain holes are in a pressurized area of the airplane fuselage, make sure that the valves are clean and can operate freely.

(a) Visually examine the internal surface of the valve housing for contamination or blockage.

NOTE: You can remove the valve assembly to visually examine the valve assembly.

S 212-005

(4) Make sure that the drain holes are clean. If necessary, clean the drains with a cloth moistened with a mild solution of cleaner.

TASK 51-41-00-212-007

3. Examine the Wing-Body Fairing (Fig. 202)

A. Access

(1) Location Zone

100 Lower Half of Fuselage

B. Procedure

S 212-008

(1) Make sure that the aerodynamic sealant is applied only to the areas shown in Fig. 202.

NOTE: There are clearances between the adjacent wing-body fairing panels. These clearances permit the fluids and condensate into the fairing cavity to drain out. Apply the sealant only to the clearances identified in Fig. 202.

S 162-009

(2) Remove the sealant that is applied to all other joints between adjacent fairing panels.

TASK 51-41-00-212-010

4. Examine the Internal Drain Paths (Fig. 203)

A. Access

(1) Location Zone

100 Lower Half of Fuselage

B. Procedure

S 212-011

(1) Make sure that the drain (limber) holes in the stringers and frames are clean and free of blockage. If necessary, clean the holes with a cloth that is moist with a weak solution of cleaner.

S 212-012

(2) Make sure that the self-leveling compound is in good condition. Repair the self-leveling compound if it is necessary.

TASK 51-41-00-352-013

5. Repair the Self-Leveling Compound

A. References

(1) AMM 20-30-01/201, Adhesives, Sealers, and Cements

(2) AMM 20-30-89/201, Solvent - Series 89

B. Equipment

(1) Brush, stiff-bristle - commercially available

(2) Hardwood tool - commercially available

C. Consumable Materials

(1) B00003 Cleaner - GMC 528B

(2) G00034 Cheesecloth

(3) A00302 BMS 5-125, Type II, Compound, Self-Leveling, for Fluid Drainage

(a) A00247 Optional: BMS 5-95, Class B

(4) B00148 Solvent - Methyl Ethyl Ketone (MEK), TT-M-261

D. Access
(1) Location Zone
100 Lower Half of Fuselage

E. Procedure

S 032-014
(1) Use a hardwood tool to loosen and remove the damaged self-leveling compound.

S 032-015
(2) Remove all the loose pieces of compound with a stiff bristle brush.

S 112-020

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(3) Clean the airplane structure with solvent, Series 89 (AMM 20-30-89/201).

S 952-018

CAUTION: MAKE SURE THAT THE AIRPLANE IS LEVEL AND IS NOT MOVED WHEN THE SELF-LEVELING COMPOUND IS APPLIED AND DURING THE GEL TIME (6 HOURS MINIMUM AT 72 ±5°F). IF THE AIRPLANE IS NOT LEVEL OR IS MOVED, THE COMPOUND CAN ENTER AND CAUSE BLOCKAGE TO THE INTERNAL DRAIN PATHS. IF THERE IS BLOCKAGE, FLUID CAN COLLECT AND CAUSE DAMAGE TO THE AIRPLANE.

(4) Apply the self-leveling compound as follows (AMM 20-30-01/201):
(a) Obey the manufacturer's instructions to mix the base and the curing agents.
(b) Pour the leveling compound until it is level with the bottom of the valve housing drain hole.

(c) The leveling compound will dry fully as follows:
   1) 7 days at 72 ±5°F
   2) 24 hours at 72 ±5°F then 2 hours at 140 ±10°F.

FUSELAGE DRAIN VALVE - REMOVAL/INSTALLATION

1. General
   A. This procedure contains two tasks:
      (1) The first task is the removal of the fuselage drain valve.
      (2) The second task is the installation of the fuselage drain valve.
   B. You must remove or install the fuselage drain valve from the outer surface of the airplane.

TASK 51-41-01-004-002

2. Remove the Drain Valve (Fig. 401)
   A. Equipment
      (1) Drain Valve Installation Tool 2024
          Stewart Industries Inc.
          5210 14th Avenue NW
          Seattle, WA 98107-3795
   B. References
      (1) IPC 51-41-01 Fig. 03
   C. Access
      (1) Location Zone
          100 Lower Half of Fuselage

   D. Procedure

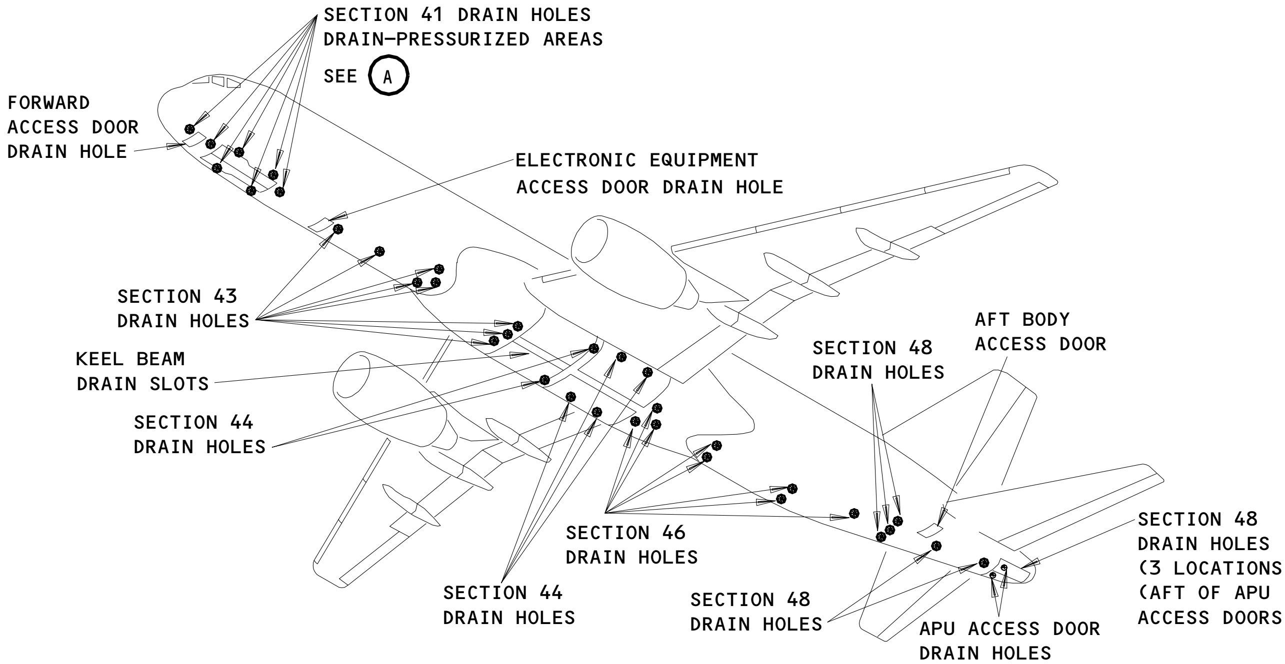
      S 024-003
      (1) Remove the drain valve assembly (1).

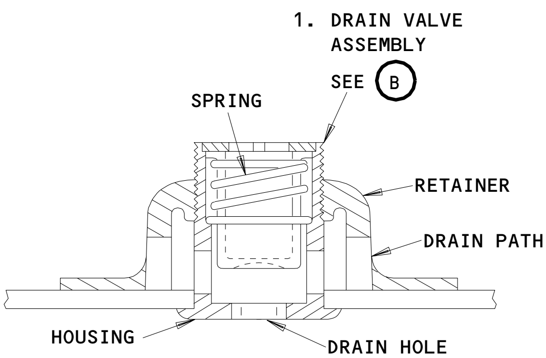
TASK 51-41-01-404-004

3. Install the Drain Valve (Fig. 401)
   A. Equipment
      (1) Drain Valve Installation Tool 2024
          Stewart Industries Inc.
          5210 14th Avenue NW
          Seattle, WA 98107-3795
   B. Parts

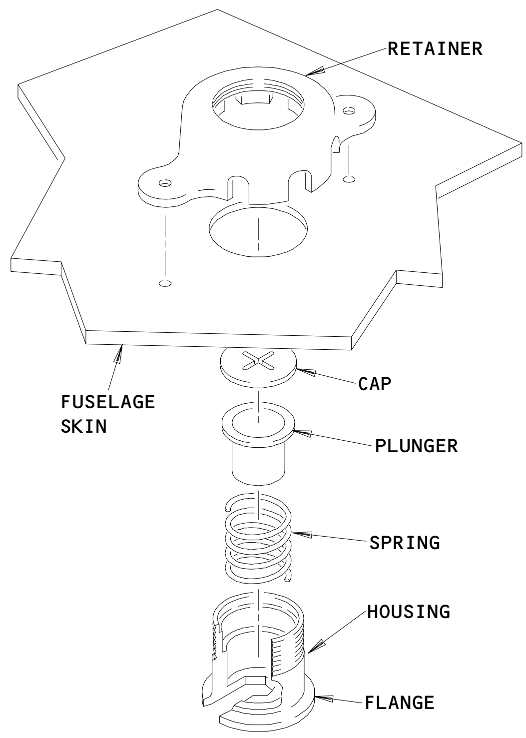
MM			IPC		
FIG	ITEM	NOMENCLATURE	SUBJECT	FIG	ITEM
401	1	Valve Assembly	51-41-01	03	20

   C. Access
      (1) Location Zone
          100 Lower Half of Fuselage





DRAIN - PRESSURIZED AREAS
(BILGE DRAIN VALVE)
A



DRAIN VALVE ASSEMBLY
B

Drain Valve Installation
Figure 401

D. Procedure

S 214-001

(1) Make sure that the drain valve assembly is clean.

NOTE: Use a weak solution of detergent to clean the drain valve assembly.

S 424-005

(2) Install the drain valve assembly (1).

S 424-006

(3) Tighten the drain valve with the installation tool until flange of the drain valve assembly is tight against the airplane surface.

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. References
      (1) AMM 20-30-80/201, Solvent - Series 80
      (2) AMM 20-30-88/201, Solvent - Series 88
      (3) AMM 20-30-98/201, Solvent - Series 98
   B. Equipment
      (1) Sealing gun
      (2) Spatula
      (3) Hardwood or Plastic Wedge
      (4) Two Heat lamps, 250 watts
      (5) Thermocouples
      (6) Rubber or cotton gloves
   C. Consumable Materials
      (1) Abrasive paper or cloth, 100-grit (minimum grit number)
      (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) Solvents
         (a) B00148 Methyl Ethyl Ketone (MEK), TT-M-261
         (b) B00153 Toluene (Toluol), TT-F-548
         (c) B00135 Naphtha
         (d) B00184 BMS 11-7
   D. Procedure - Repair Bonded Phenolic Rub Pads (Heat Source Available)

      S 162-002
      (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:

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1) Remove all loose soil, grease or oil from the surface with a clean cheesecloth.

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2) Clean the surface with a clean cheeseloth that is moist with solvent, Series 98-1 (AMM 20-30-98/201), or naphtha.
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 the 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), or naphtha until all of the remaining particles are removed.
7) Immediately dry the surface with a clean cheesecloth.
8) 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 the 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 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 surface if the BMS 10-11 primer was applied in less than 6 hours.

1) For surfaces that have the primer applied between 6 to 48 hours, clean the surface with a cheesecloth that is moist with naphtha.
2) Immediately dry the surface with a clean cheesecloth.
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 adhesive on the mating surfaces:

(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 a hardwood or plastic wedge.

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(e) Clean the area with a clean cheesecloth that is moist with solvent, Series 88 (AMM 20-30-88/201).
(f) Immediately dry the area with a clean cheesecloth.

(g) Refer to the manufacturer's instruction to mix the base component and the curing agent. Make sure the mixture is smooth and constant. Keep the 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 at 70°F. Keep the mixed components at -20°F or lower. If the mixture is kept at temperatures from 20°F to 30°F, the mixture has a pot life of 7 days. If the mixture is kept at temperatures from -30°F 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 THE ADHESIVE IF THE TEMPERATURE OF THE STRUCTURE IS BELOW 50°F. AT TEMPERATURES BELOW 50°F, THE PERFORMANCE OF THE ADHESIVE IS UNSATISFACTORY.

(h) Apply a thin constant finish (approximately 50 grams for each square foot) of the mixed material on each mating surface. 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 an appropriate solvent. Do not let the solvent go into the 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.

6) Cure the phenolic pads that are bonded to aluminum surfaces at a constant pressure of 5 to 14 PSI.
Refer to the subsequent charts.

Cure 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 the Cure Pressure		

*[1] More time on the cure pressure is necessary to heat the adhesive from 70 degrees to 180 degrees F.
*[2] Optional cure temperature and time. You can use the optional cure temperature and time with Pro Seal 890 only.

(k) Remove unwanted cure adhesive with a hardwood or plastic wedge.

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(l) Remove the remaining adhesive from the aluminum surface with a clean cheesecloth that is moist with solvent, Series 80 (AMM 20-30-80/201) .

E. Procedure - Repair Bonded Phenolic Rub Pads (No Heat Source Available)

S 342-004

(1) Refer to the steps in the first procedure to apply adhesive on the mating surfaces.

S 862-005

(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 weight) of BMS 5-45, Pro Seal 890 B-2 with activator to 100 parts (by weight) 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 finish of adhesive (approximately 50 grams for each square foot) to 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.

F. Procedure - Repair Bonded Phenolic Rub Pads (field repairs with a heat source available)

S 342-005

(1) Refer to the steps in the first procedure to apply adhesive on the mating surface.

S 862-006

(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 weight) of BMS 5-45, Pro Seal 890 B-2 with activator to 100 parts (by weight) 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 finish of adhesive (approximately 50 grams for each square foot) to 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 when you cure the adhesive.
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 20 minutes (minimum) 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.

LIGHTNING STRIKE PROTECTION - DESCRIPTION AND OPERATION

1. General
   A. The basic metal airframe of the airplane acts as a protective shield around the people, fuel system, and avionics systems.
   B. 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 stroke is stopped.
   C. 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

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