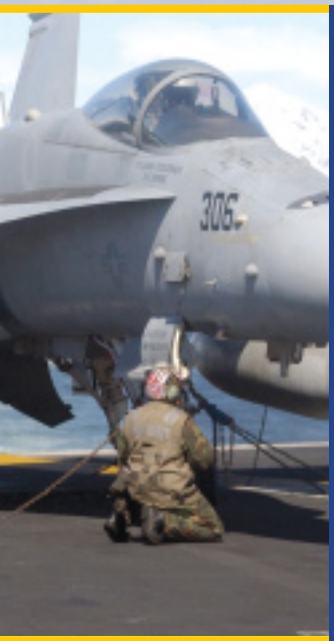
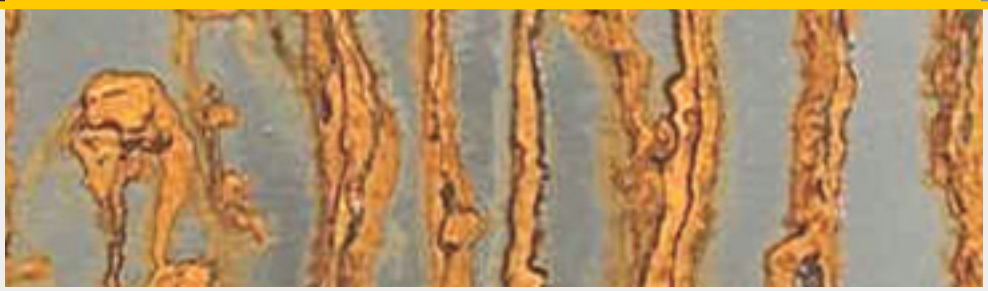
NAVAIR

ENVIRONMENTAL PROGRAM



Advances in Products for Corrosion Control

Using Authorized Products is a Must



Corrosion control is the single most important preventative measure that can be taken to combat degradation of the Fleet's aircraft and support equipment. Maintenance personnel should only be using qualified systems to perform touch-up painting. When unauthorized products are used, they can enhance corrosive damage to equipment and components and significantly impact system performance and reliability.

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Advances in Products for Corrosion Control

Preval Paint Sprayer set up.

PreVal Sprayer easily adapts to a 2 oz. touch-up paint kit

One ounce single component paint with brush applicator

New Qualified Products Available for Corrosion Control

The Naval Air System Command (NAVAIR) continuously searches for and evaluates innovative technologies and solutions to help ease the burden of maintenance personnel. Below are examples of new solutions for corrosion-inhibitors that have demonstrated at the Environmental Information Exchanges (EIE), site visits and other venues in recent years.

1 Preval Sprayer and Touch-Up Kits to Replace Unauthorized Aerosol Paints and Primers

The Preval Paint Sprayer is a small disposable hand-held sprayer that easily adapts to a 2-ounce touch-up paint kit and is approved for use when performing spot corrosion repairs on aircraft and support equipment. A 4-ounce bottle contains a base and catalyst. To mix, remove the small vial inside the 4-ounce bottle and pour it into the 4-ounce bottle, replace the cap and shake. The final admix quantity would be 2 ounces. DO NOT shake the contents while attached to the Preval Paint Sprayer. To properly spray the contents, paint at an angle no greater than 45 degrees. The Preval paint system is also available in a single component polyurethane. The Preval Paint Sprayer is available via National Stock Number (NSN) 8020-01-496-2473. Training for proper use is available through the Naval Air Technical Data and Engineering Service Command (NATEC) or NAVAIR's Fleet Outreach Program.

The benefits of using the Preval Paint Sprayer are:

- An increase in productivity by enabling the maintenance worker to use small amounts of premixed paint quickly and easily,
- A reduction in hazardous waste by eliminating the need to mix quantities larger than necessary, and
- A sprayer can spray up to 3 (2-ounce) touch-up kits before being disposed of and repairs areas of up to 36 square inches at one time. (Note: It is recommended that one sprayer be used to spray the contents of no more than two touch-up kits. A third kit may cause the sprayer to "spit and sputter" due to a lack of propellant.)

Typical corrosion found on an F-18 upper communications antenna aircraft mating surface.

Intergranular and exfoliation corrosion found on F-18 antenna baseplate.

Application of the AVDEC™ conductive gasket and protective gel on an F-18 antenna.

Below is reference information on touch-up kits currently available for use with the Preval Paint Sprayer.

Touch-Up Paint Kits Currently Available

Paint System	Military Specification	Shelf-Life Of Kit	National Stock Number
Primers	MIL-PRF-23377	6 months	Due to the number of paint kits available, please refer to the Interim Rapid Action Change (IRAC) #27 of the Aircraft Weapons Systems Cleaning and Corrosion Manual (NA-01-1A-509) to identify those authorized for use.
Topcoats	MIL-PRF-85582	6 months	
Two Component Polyurethane	MIL-PRF-85285	6 months	
Single Component Polyurethane	MIL-PRF-81352 Type III	1 year	

(Note: Topcoats are available in all platform colors.)

2 AvDEC™ Conductive Gasket Helps Prevent Corrosion and Precipitation Static on Naval Aircraft.

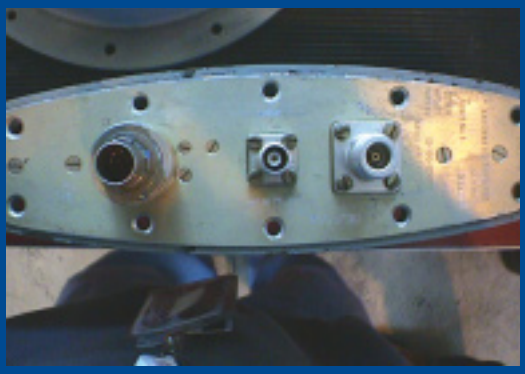
A solution to alleviate the problem of corrosive degradation of communication systems and the need for frequent hardware replacement has been found. A commercial off-the-shelf technology (COTS), produced by Aviation Devices and Electronic Components (AvDEC™), is a conductive gasket that consists of a cured polyurethane gel encapsulating an aluminum wire mesh. This product has been identified to provide improved electrical bonding between aircraft aluminum substrate and the mounting base of aircraft antennas and static discharger mounts.

The design of the conductive gasket is to prevent the ingress of moisture into areas between the base of the antenna/static discharger mount and the aircraft surface. Therefore, the intent of the gasket is to seal and protect mating areas against moisture and subsequent corrosion, while at the same time provide a mechanism for electrical bonding and grounding. As a result, once the mounting screws are installed and torqued down, the compression squeezes some of the polyurethane gel to the outside perimeter of the antenna mount providing a small perimeter seal.

The benefits of using the AvDEC™ conductive gasket include:

- Elimination of hazardous material and hazardous waste disposal cost by eliminating the need to apply a polysulfide sealant, which contains hexavalent chromium (a known carcinogen) as a corrosion inhibitor,
- Reduction in labor required and health risks for maintenance personnel, and
- Elimination of airborne communication precipitation static (P-static) discrepancies caused by corrosion.

Note the perimeter seal formed when AVDEC™ gasket and protective gel is applied to this F18 communication antenna



H-60 communications antenna before AvDEC™ gasket installation, August 2002.

The same H-60 antenna after 546 hours of flight time while deployed aboard the USS HARRY S. TRUMAN, June 2003.

In addition, gaskets do not have a shelf-life expiration date and no cure time is required once the gasket is applied.

Field evaluations are complete and the NAVAIR Aerospace Materials Division issued a letter (Ser AIR-43400A/7.4737 dated 18 December 2003) authorizing the use of the AvDEC™ conductive gasket on all NAVAIR aviation platforms. Additionally, the Naval Air Warfare Center – Weapons Division China Lake, CA has issued Interim Rapid Action Change (IRAC) # 7, DTG 221450Z April 04 to the Avionics Cleaning and Corrosion Prevention Control Manual (NAVAIR 16-1-540) authorizing the use of AvDec™.

Furthermore, NSNs will be assigned for each type antenna and static wick footprint and procurement will occur through the normal supply channels. Basic training is required to ensure the proper installation of the gasket technology and is available through the Fleet Outreach Program, and the Air System's Electromagnetic Interference Corrective Action Program (ASEMICAP).

3 Magnesium Treatment Kits for Corrosion Prevention

The processes and materials for pretreatment and prevention of corrosion on magnesium alloy SAE AMS-M-3171 Type VI (Society of Automotive Engineering, Aerospace Materials Specification (formerly MIL-M-3171 Type VI)) are specified in the Aircraft Cleaning and Corrosion Control Manual (NAVAIR 01-1A-509). This material is primarily used to touch-up and repair small areas on magnesium parts such as transmission housings and gearboxes. It provides a corrosion resistant, surface treatment to the magnesium parts prior to repainting without the use of a chromate conversion coating. Lacking this protection, these parts can easily corrode causing irreversible damage.

Until now, this magnesium treatment material has not been readily available in premixed form. Instructions required users to "make" this material themselves by mixing hazardous chemicals or obtaining the premixed materials from Depot-level activities. These requirements often led to long process delays while maintenance personnel waited for the appropriate materials to be prepared. Lack of material availability can have a serious and direct impact on readiness. Magnesium surface treatment, as specified in many technical procedures for touch-up repair of magnesium alloys, has been particularly difficult to obtain, particularly in limited quantities, for corrosion repair of small areas at Fleet-level activities. In addition to safety and environmental concerns, the existing instructions for the proper touch-up repair of magnesium alloys were deficient.

A kit of materials for treating magnesium alloys for the prevention of corrosion and surface treatment prior to repainting is now available. This kit is easy to use, affordable, is sold in cases (12 kits per case) and readily available via NSN 8030-01-512-2416. The kit contains products conforming to SAE AMS-M-3171 Type VI (formerly MIL-M-3171 Type VI) Magnesium Surface Treatment.

Example of corrosion touch-up on CH53E magnesium gearbox.

Magnesium Treatment Kit

Contents of Magnesium Treatment Kit

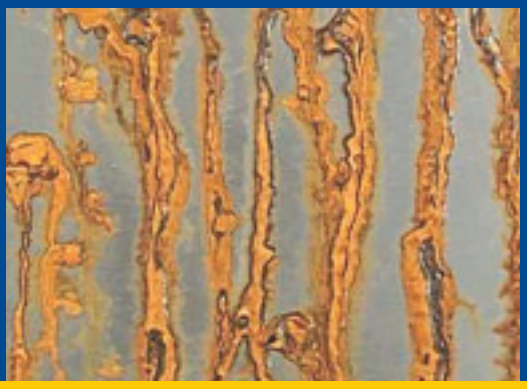
Quantity	Description
1	8 ounce bottle, magnesium treatment
2	Beaker, polyethylene, 250-militer
1	16 ounce spray bottle (empty) for water rinsing
2	Acid brush (disposable)

The Search for New Sealant Removal Tools Continues

Sealant removal is necessary to facilitate the repair of old sealant from various types of aircraft surfaces. However, the current sealant removal methods, which mostly involve manual scraping with plastic scrapers, are inefficient and marginally effective. Recently, two pneumatics tools were evaluated but did not performed as well as expected. Therefore, recommendations for improvements have been made to the manufacturer for redesign. As a result, NAVAIR will continue to seek and evaluate other solutions that will better accommodate aircraft sealant removal requirements.

Conclusion

In support of NAVAIR's goal to "provide cost-wise readiness and support emerging Fleet requirements," NAVAIR is committed to enhancing fleet readiness while reducing environmental safety occupational and health risks to maintenance personnel.



Example of test panel used to determine acceptable pass/fail criteria for corrosion test

Extensive corrosion damage due to improper preservation and storage

For more information about the NAVAIR environmental program, visit www.enviro-navair.navy.mil.

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