



## Meeting DoD's Environmental Challenges

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### **Demonstration/Validation of High Performance Corrosion Preventive Compound for Interior Aircraft Applications (WP-200615)**

#### **Objectives of the Demonstration**

It is known that the corrosion of metallic surfaces has a significant impact on the U.S. Economy, including infrastructure, transportation, utilities, production and manufacturing, and government. Corrosion has become a very costly factor in the Department of Defense (DoD); many aircraft and defense equipment are becoming old and corrosion is becoming a life-limiting factor on some of these aircraft. As aircraft age, corrosion often occurs in internal structures which are not easily inspected or treated. Fogging corrosion preventive compounds (CPCs) into internal spaces of airframes has been shown to be effective in combating metal degradation. However, the CPC must be reapplied several times annually, using time-consuming procedures. Most CPCs contain carrier solvents, which evaporate to deposit the protective film. However, the use of solvent is regulated in many locations either by content (e.g. grams per liter volatile organic compounds (VOC) or by vapor pressure). In addition to solvent limitations, additives previously used for their exceptional performance, such as barium sulfonates, are sometimes cited for their heavy metal content.

The main objective of this project was the demonstration and validation of a newly developed high performance corrosion preventive compound (NAVGUARD) in a long term airframe application to minimize environmental effects on aging aircraft.

#### **Demonstration Results**

Field demonstrations consisted of applying NAVGUARD on operational assets and comparing the performance to assets using currently qualified CPCs (MIL-C-81309F specification). Even after two years of evaluation at Navy, Army and Marine Corps sites, maintenance inspections for the platforms used in the demonstration/validation program (F/A-18, EA-6B, H-60, and EFV) have detected no sign of corrosion (with the exception of some minor surface corrosion on one EA-6B aircraft) in the areas where NAVGUARD was applied. As a result, it is proposed that corrosion inspection frequencies be reduced for legacy F/A-18 (series A through D) aircraft, which currently have an 84-day cycle. Reduction of inspection frequencies will minimize the use of aircraft CPC, reduce the corrosion maintenance workload, minimize the cost of corrosion maintenance, reduce the use of hazardous materials, and reduce solvent emissions. Similar savings may be expected for other applications where the labor involved in opening and closing access panels (or other time consuming operations) is the main component of maintenance cost and where NAVGUARD has proven effective for multiple inspection intervals. In addition, it was found that removal of NAVGUARD was easily achieved in a



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field environment using aircraft cleaning compound qualified to MIL-PRF-85570. This is an important finding since it allows easy cleanup of unintended drips or leaks from weep holes and any cleaning necessary prior to inspection.

### Implementation Issues

NAVGUARD was listed on the QPL for MIL-PRF-81309F Type II in September 2008 and was incorporated into the Tri-Service Aircraft Cleaning and Corrosion Control Manual (NAVAIR 01-1A-509-4) in July 2009. National Stock Numbers (NSN) were assigned for NAVGUARD Type II through GSA for both the gallon and quart sizes. Two vendors are currently licensed to manufacture NAVGUARD for DoD and commercial applications (Armick Chemicals, Grand Rapids, MI and Corrosion Technologies, Dallas, TX).

It is anticipated that NAVGUARD will be a significant contribution in the fight against corrosion and its application is expected to impact DoD in the following ways:

- Reduced work load resulting from frequent maintenance
- Cost savings from the reduced work load
- Reduced hazardous materials use
- Improved worker safety
- Reduced solvent emissions
- Elimination of a heavy metal in the use of CPCs

At this point, implementation will be an issue for fleet support coordinators and how best to modify current maintenance schedules.

### Points of Contact

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### Related Documents

- [Final Report - Limited Distribution Statement D](#)



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-  [Cost and Performance Report - Limited Distribution Statement D](#)