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Corrosion Preventive Compounds Lifetime Testing

Topic Area: Corrosion

Stephanie M. Hale, Materials Engineer
United Space Alliance, USK-507, Kennedy Space Center, FL 32899
Phone (321) 861-4615; Fax (321) 861-7465
Stephanie.M.Hale@usa-spaceops.com

Catherine C. Kammerer, Materials & Processes Engineering Manager
United Space Alliance, USK-507, Kennedy Space Center, FL 32899
Phone (321) 861-8123; Fax (321) 861-7465
Catherine.Kammerer-1@ksc.nasa.gov

Tracy Copp, Materials Engineer
United Space Alliance, USK-807, Kennedy Space Center, FL 32899
Phone (321) 853-9731; Fax (321) 853-9519
Tracy.L.Copp@usa-spaceops.com

Abstract:

Lifetime Testing of Corrosion Preventive Compounds (CPCs) was performed to quantify performance in the various environments to which the Space Shuttle Orbiter is exposed during a flight cycle. Three CPCs are approved for use on the Orbiter: HD Calcium Grease, Dinitrol AV-30, and Braycote 601 EF. These CPCs have been rigorously tested to prove that they mitigate corrosion in typical environments, but little information is available on how they perform in the unique combination of the coastal environment at the launch pad, the vacuum of low-earth orbit, and the extreme heat of reentry. Currently, there is no lifetime or reapplication schedule established for these compounds that is based on this combination of environmental conditions. Aluminum 2024 coupons were coated with the three CPCs and exposed to conditions that simulate the environments to which the Orbiter is exposed. Uncoated Aluminum 2024 coupons were exposed to the environmental conditions as a control. Visual inspection and Electro-Impedance Spectroscopy (EIS) were performed on the samples in order to determine the effectiveness of the CPCs. The samples were processed through five mission life cycles or until the visual inspection revealed the initiation of corrosion and EIS indicated severe degradation of the coating.

CONFERENCE:
Aging Aircraft 2007
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