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Number 004

APPLICATION NOTE

Stabilant 22 in Aviation Electrical/Electronic Service

Introducing Stabilant 22

Stabilant 22 is an initially nonconductive liquid block polymer which when used in a thin film between metal contacts becomes conductive under the effect of an electrical field. This occurs at an electric field gradient such that the material will remain nonconductive between adjacent contacts in a multiple pin environment. In addition, Stabilant 22 exhibits surfactant action as well as lubrication ability, providing a single component resident solution to virtually all contact problems.

When applied to electromechanical contacts, Stabilant 22 provides the connection reliability of a soldered joint without bonding the contact surfaces together.

In this Application Note, we address the use of Stabilant 22 throughout the aviation field. Later, a few common questions are answered about the product - for a more complete list of these, please see Application Note #001. A further exploration of avionic/navigational systems applications is found in Note #17.

Applications for Stabilant 22 in aviation

The operating environments for aircraft and aviation are among the most variable and extreme, including temperature, pressure, vibration, humidity and corrosive contaminants. Electrical connectors are subject to degradation of their performance and mechanical integrity. Stabilant 22 is used by aviation service organizations around the world to prolong the service life of everything electrical/electronic.

The value of reliability in aircraft cannot be overstated. Electrical connectors from the cockpit to sensors to engine wiring harnesses are critical. Modern connector systems are designed with this in mind. Every connector has a designated service life, measured in terms of connect/disconnect cycles and Mean Time Between Failures. These statistical values are backed up by field tests that allow a component to be put in service. However, as normal wear causes contacts to corrode and increase their resistance, intermittent faults can develop that do not show up on the ground. In flight, a connector glitch can trigger an alarm or a malfunction of controls and displays.

Concerns that affect wiring connectors also apply to switches, from those in the cockpit to landing gear limit switches. The latter type of switch serves a vital sensing function and is naturally more vulnerable to weather extremes than an instrument panel control switch. Stabilant 22 treatment improves the service life and reliability of any switch that does not have arcing (i.e., with inductive loads being switched off).

Modern connectors use special plating materials to achieve proper current handling, corrosion resistance and mechanical durability. Some gold plated contacts (especially the thinner plating types) have a compromise of these qualities, being more vulnerable to mechanical wear (fretting) in a high vibration environment. Stabilant 22 reduces this wear as well as any typical lubricant, while preventing corrosion from starting or advancing. Some customers in the aircraft service industry report a many fold reduction in the replacement rate of gold plated connectors of all grades.

The method of applying a Stabilant 22 coating to contacts varies with the type of connector or switch. Openly accessible contacts can be painted with the concentrated liquid directly. For harder to reach spaces, we offer a product called Stabilant 22A, containing 75% isopropyl alcohol to allow better flow and penetration. It is also more convenient to apply at low temperatures, as the concentrate is quite viscous.

The use of Stabilant 22A on some multipin connectors allows faster work, but with one precaution. Cannon types, for example, that employ a fluorosilicone seal must be given adequate time for the alcohol to dry and escape from the seal before reassembling the connector, as alcohol can swell certain elastomers. Application Note #36 and Technical Note #21 have more specifics regarding these concerns.

In what forms is Stabilant available?

Stabilant 22 is provided as a concentrate (simply 'Stabilant 22'), as an alcohol diluted form called Stabilant 22A (with isopropanol) or as Stabilant 22E (diluted with ethanol). It is packaged in 5mL, 50mL, 100mL, 250mL, 500mL and 1 Litre containers. The Stabilant 22A 15mL Service Kit, including the 15mL bottle, microbrush applicators and instructions, is our most popular product.

An additional packaging form, Stabilant 22S, is available for industrial/bulk users. Here the concentrate occupies one fifth the volume of an otherwise empty container, allowing end users to add their own diluent. This saves the added costs of shipping the alcohol, as well as allowing the choice of an alternate diluent such as one of the other solvents used in electronics.

How can I be sure that Stabilant 22 works?

Stabilant 22 initially passed a number of stringent field tests before being issued a NATO supply code number. It has been in use by aircraft service organizations for many years and has been TSO'd by a major avionics manufacturer. Even audio service techs and consumers found the material easy to use and its results impressive. However, we still feel that the best way to find out just how well it works is to try it out - that's why we have samples available. We recommend that you use Stabilant 22A on your oldest and most troublesome equipment for a quick turnaround test or use the material in field service to satisfy yourself of its effectiveness and ease of use.

Does the action of Stabilant 22 deteriorate with age?

Stabilant products have been in some field applications for over twelve years (as of this writing) without showing any sign of reduced effectiveness. The aviation industry has provided some of the most rigorous validation in challenging conditions. Our published shelf life is 15 years, but customers report good results with Stabilant products after 20+ years on hand! Stabilant 22 features low reactivity, eliminating most causes of deterioration or either the material itself or of components to which it is applied. The high molecular weight and very low vapor pressure and so is not prone to evaporation. Unless removed by cleaning, it will probably outlast the usefulness of the electronic equipment on which it is used.

NATO CAGE/Supplier Code 38948

5mL Stabilant 22 (Concentrate), NATO Stock Number 5999-20-002-1112

15mL Stabilant 22 (Concentrate), NATO Stock Number 5999-21-909-9981

15mL Stabilant 22A (Isopropanol Diluted), NATO Stock Number 5999-21-900-6937

15mL Stabilant 22E (Ethanol Diluted), NATO Stock Number 5999-21-909-9984

Stabilant products are patented. Because the patents cover contacts treated with the material a Point-of-Sale license is granted with each sale of the material.

SAFETY DATA SHEETS ARE AVAILABLE ON REQUEST

NOTICE

This data has been supplied for information purposes only. While to our knowledge it is accurate, users should determine the suitability of the material for their application by running their own tests. Neither D.W. Electrochemicals Ltd., their distributors, or their dealers assume any responsibility or liability for damages to equipment and/or consequent damages, howsoever caused, based on the use of this information. This note is based on the original work of William Michael Dayton-Wright and includes updates by D.W.E. staff.

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