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APPLICATION NOTE

Use of Stabilant 22 in Model and Hobby Applications

What is Stabilant 22?

Stabilant 22 is an initially non-conductive liquid polymer which when used in a very thin film with electro-mechanical connections has the property of switching over to a conductive state under the action of an electric field. Thus, it imparts the reliability of a soldered connection without forming a mechanical bond. It is thus termed a contact-enhancer. It is also available as an alcohol-diluted version, Stabilant 22A (75% isopropyl alcohol and 25% concentrate).

How is Stabilant 22 used in the model and hobby field?

In this age of electronics, many models are dependent upon complex electronic controls for their proper function. These controls usually operate at very low signal levels, and, to conserve battery power, at very low power levels as well. This makes them very prone to malfunctions due to failures in the connector systems or in the switches used. It takes only a minuscule amount of contaminant to cause problems with such a circuit. Stabilant 22 was developed as a contact enhancer, specifically to improve the reliability of electro-mechanical contacts. It is being used in many fields from bio-medical electronics in hospitals to computer & peripheral equipment. It has a long-term reliability factor unequaled by any simple contact cleaner. That's because Stabilant 22 is a resident treatment. This means that you leave it in place within the contact, where it will last for many years, usually more than the design life of the equipment. Increases in connector reliability of from 70 to 700 times are not unusual.

What are the differences between Stabilant 22 and Stabilant 22a?

The Stabilants come in two forms. The basic material or concentrate is called Stabilant 22, while the isopropanol diluted form is designated Stabilant 22a. This is a isopropanol-dilution (by volume) and is much easier to apply. When used at normal room temperatures or higher, the isopropanol will evaporate after the application, leaving a thin film of the concentrate in place. In some applications such as socketed IC's it is not even necessary to unplug the IC to treat the connection.

The dilute form should be used to treat existing crimp type joints between multiple stranded wire and the contact as well as for card-edge and other connectors. As Stabilant 22 is also an excellent contact lubricant, it can be used on all rotating joints which have to pass electrical currents, such as model-railroad-car bearings. For this reason, the dilute form, Stabilant 22A is preferably used on model-train-layout rails, where it should be wiped on the rail to insure a very thin residual film!

Will Stabilant 22 short out multiple pins?

No, for the reason that Stabilant 22 is semiconductive in its action, becoming conductive at a desired field strength within a contact-pair, but not conducting between adjacent contacts. Thus, the material can be applied to a multiple-pin connector without worrying about getting it on the insulation or causing leakage!

Is there any place I shouldn't use it?

Stabilant products are not recommended for use on switches for inductive loads (which spark upon breaking contact) or generally for very high voltages. The momentary high temperatures of the spark would decompose the Stabilant film, negating its benefits and causing a moderate carbon buildup. Thus, don't use it on motor commutators which do tend to spark!

What about its use on connectors?

Obviously, connector reliability is very important for trouble-free operation of models, more so when intermittent connectors could cause the crash or loss of a remote-controlled model airplane. The Stabilants have had extensive use on, for example, biomedical electronics and avionics where they are "TSO'd". In both cases absolute reliability of the connectors in the equipment is extremely important.

Stabilants are also used on cameras, especially on battery contacts. In this application they are employed in hearing-aids.

Can it be used on switches?

The reliability of switches is generally greater than connectors if only because their wiping action sometimes is able to keep the contacts clean. Nevertheless, switches, like connectors, are among the least reliable components used in electronic equipment. Because Stabilant 22 is an excellent lubricant, it can often increase the mechanical reliability of switches. One caveat: power switches and others used to interrupt inductive loads (such as motors) can cause sparking across switch contacts. While Stabilant 22 can lessen this effect, the decomposition of this product under the heat of the spark can lead to an accumulation of carbon. It is best to use a "snubber" with such switches – for example, a reverse-diode across a switch handling DC potentials - as a design concern, or as a service retro-fit. This would eliminate sparking and allow trouble-free, long-lasting use of Stabilant 22.

Is it useful on transmitters for remote controls?

Stabilant 22 is used extensively in the maintenance of transmitters in professional applications, both for remote control and for communications. It can be used on everything from EPROM's to crystal sockets.

Can it be used on microprocessor-based controllers?

Again, Stabilant 22 has been used in computers for decades and is a standard stores items for many OEM's and third-party service organizations. Stabilant 22 first received a "User Product of the Year" award from Byte magazine in 1985 and have been "highly recommended" by Dr. Jerry Pournelle on numerous occasions since that award. Since those early successes the use of Stabilant products in this field and others has grown.

Can it be used on servos?

Because of the reliability advantage of Stabilant-treated connections at micro-power levels, Stabilant 22 can substantially increase the reliability of servos. While the material can be used on potentiometers used in some servo controls, the isopropanol diluent of Stabilant 22A should NOT be used on conductive-plastic potentiometers as it can extract the plasticizer. Instead, one can use the concentrate, Stabilant 22, diluted 10:1 with hot water. Apply only the smallest amount to the plastic element of the potentiometer and cycle through its maximum stroke to distribute the material!

Can it be used on model railroads?

Stabilant products can be used on switch-machine contacts, controller boards and pulse code modulation equipment. Also, many model railroaders are employing it on their tracks in order to reduce the stalling voltage of locomotives thus obtaining better slow-speed characteristics.

Stabilant treatment can be especially useful on complex control panels and their wiring, including slide and rotary switches, mechanical/electrical sensors, relay and switch machine contacts, wirewound rheostats, and phone jacks.

In "Command-Control" systems, Stabilant 22A is essential for lasting trouble-free operation.

What is the most common size?

The most popular product is the 15 mL service kit of Stabilant 22A. This has about 700 to 900 drops per bottle. The kit includes the dropper bottle, micro-brush applicators and instructions, in a convenient capped tube - ideal for toolbox or bench. This diluted form Stabilant 22A will even wick into socketed IC's and assembled connectors. Because it is necessary to use very little of the material, a drop can go a very long way!

Available sizes of Stabilant 22 concentrate are 5mL, 15mL, 50mL, 100mL, 250mL, 500mL and 1L.

NATO CAGE/Supplier Code 38948

15ml Stabilant 22 (Concentrate), NATO Part # 5999-21-909-9981

15ml Stabilant 22A (Isopropanol Diluted), NATO Part # 5999-21-900-6937

15ml Stabilant 22E (Ethanol Diluted), NATO Part # 5999-21-909-9984

The Stabilants 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

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