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APPLICATION NOTE

Using Stabilant 22 in Model & Hobby Applications

- *What is Stabilant 22?*

Stabilant 22 is an *initially non-conductive* non-toxic 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 can virtually impart the reliability of a soldered connection without forming any sort of a mechanical bond. It is thus termed a *contact-enhancer*.

- *What is its use 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*. It was developed *specifically* to improve the reliability of electro-mechanical contacts, and as such, is being used in many fields from bio-medical electronic equipment (in hospitals), to computer & peripheral equipment. It has a long-term reliability factor presently unequalled 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. There it will last for a very long time; usually more than the design life of the equipment. Increases in connector reliability of from 10 to 100 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 4:1 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 for treating existing crimp type joints between multiple stranded wire and the contact as well as for card-edge and other connectors. As **Stabilant 22**, the concentrate, is an excellent 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!

- **But won't Stabilants short out multiple pins?**

No, for the reason that **Stabilants** are *semiconductive* in their action, switching at a desired field strength within a contact-pair, but not switching-on 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?**

The **Stabilants** are not recommended for use on circuits which, due to inductive loads, spark upon breaking contact. The momentary high temperatures of the spark would decompose the **Stabilants** causing a moderate rate of carbon buildup. Thus, don't use it on motor commutators which 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, bio-medical 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 the least reliable components used in electronic equipment. Because **Stabilants** are excellent lubricants, they can often increase the reliability of switches. One caveat; where switches do not have back-emf "snubbers" and are used to interrupt highly reactive loads, such load interruption, can cause sparking of the switch. While **Stabilants** can lessen this effect, their decomposition under the heat of the spark can lead to an accumulation of carbon. It is best to use a reverse-diode across a switch handling DC potentials as a first step thus eliminating the spark *before* using **Stabilants**.

- **Is it useful on transmitters for remote controls?**

Stabilants are 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, **Stabilants** have been used in computers for over ten years and are standard-stores items for many OEM's and third-party service organizations. **Stabilants** 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.

- *Can it be used on servos?*

Because of the reliability-advantage of **Stabilant**-treated connections at micro-power levels, **Stabilants** can substantially increase the reliability of servos. While the material can be used on the potentiometers in servo controls, the isopropanol-diluant of **Stabilant 22A** should NOT be used on conductive-plastic potentiometers as it can extract the plasticizer. Instead, 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?*

Stabilants can not only be used on switch-machine contacts, controller-boards and pulse-code modulation equipment, but many model railroaders are employing it on their tracks in order to reduce the stalling-voltage of locomotives thus obtaining better slow-speed characteristics.

Obviously, it 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 almost essential for trouble-free operation.

- *What is the most common size?*

The most popular size is the 15 mL service kit of **Stabilant 22A**. This has about 700 to 900 drops per bottle. Because it is necessary to use very little of the material, a drop can go a very long way! The dilute material, **Stabilant 22A**, will even wick into socketed IC's.

Larger sizes are available.

NATO/CAGE Supplier Code 38948
15 mL of S22A has NATO Part # 5999-21-900-6937

The **Stabilants** are patented in Canada - 1987; US Patent number 4696832. World-wide patents applied for. Because the patents cover contacts treated with the material, a Point-of-sale License is granted with each purchase.

MATERIAL SAFETY DATA SHEETS ARE AVAILABLE ON REQUEST

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