

Stabilant 22 Contact Enhancer Technical Notes

Tech. Note 20 - Stabilants in Military Applications

General Information about Stabilant 22 in Military Applications

What is Stabilant 22?

Stabilant 22 is an *initially non-conductive* amorphous-semi-conductive block polymer that when used in thin films within contacts acts under the effect of the electric field and *switches to a conductive state*. The electric field gradient at which this occurs is established during its manufacture so that the material will remain *non-conductive* between adjacent contacts in a multiple pin connector environment.

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

Chemically, **Stabilant 22** is a polyoxyethylene-polyoxypropylene block polymer with molecular weight of about 2800. It has a very low vapor pressure and therefore there is no appreciable loss of material from evaporation. It has been in some applications for more than fifteen years without renewal, and it is probably safe to say that in the majority of cases, the equipment on which it is used will be retired for obsolescence before the **Stabilant** must be renewed. In its undiluted form at room temperature (**Stabilant 22**) it has the viscosity of a medium weight motor oil, although it thins out with increasing temperature, starting to decompose into the two polymers it is formed from about 240 ° Celsius.

What is its use?

Stabilant 22 is used to increase the reliability of contacts. Tenfold to one hundred fold increases are not unusual. At the present time it is used in many different type of contacts, including card edge connectors, D-Type connectors, MIL-spec connector signal switches etc.

The material can be used in manufacturing, in service facilities and in the field.

Because of the ease of application, **Stabilants** allow service personnel in the field to catch *and* correct those faults caused by unreliable connector operation; making it unnecessary in many cases, to return the equipment for shop service. Thus, the amount of "float" is significantly reduced.

It also permits the use of a shotgun approach. (i.e. treating all connectors in a system as if they were faulty) In this way, many of the erratic and often non reproducible faults typical of erratic connectors, can be corrected by service personnel who are no expert diagnosticians. This can considerably increase the speed of service as it reduces bottlenecks created by the usual limited availability of diagnostic facilities of expert personnel.

Stabilant 22, **Stabilant 22A**, and **Stabilant 22E** are used in electronics where equipment failure can cost lives; equipment such as biomedical electronics in hospitals, as well as aircraft navigation and instrument landing systems.

What is its service life?

Obviously there will be some loss of the material through attrition, such as when connectors are unplugged; however, the **Stabilant** material has a very low vapor pressure and thus, loss due to evaporation is virtually nonexistent. Accelerants and curing agents that are frequently present in thermoset plastics and rubber compounds do not cause cross linking or "varnishing" of the **Stabilants**. Chemically, the **Stabilants** have a very low reactivity and will not affect the materials used in electronics.

Quite often, electronic systems treated with **Stabilants** are still working by the time when they are replaced as obsolete while the non treated equivalents have been retired as non serviceable. We have had reports of otherwise unreliable equipment which has functioned perfectly for over fifteen years after treatment.

The shelf life of the **Stabilants** (excluding alcohol evaporation caused by loose caps in opened bottles of **Stabilant 22A** or **Stabilant 22E**) is well in excess of fifteen years.

In what forms are they available?

The **Stabilants** are packaged in 5 ml, 15 ml, 50 mL, 100 mL, 250 mL and 500 mL containers for both the Concentrate (**Stabilant 22**) and alcohol diluted (**Stabilant 22A**) The concentrate is also supplied in 1 Liter bottles. Please refer to the section "Sizes and Packaging" for the **Stabilant 22E** version.

Because of the 4:1 dilution of the diluted **Stabilants**, they will generally cost about one fifth the amount of the concentrate, although, obviously, it is the concentrate that does the job. The alcohol is just there as a solvent to "carry" the concentrate into place, once it's there the alcohol evaporates. This version can be applied to socketed IC's without removing them from the sockets. The concentrate on the other hand is often used as an insertion aid when inserting multiple pin IC's because of its lubricating properties.

Is Stabilant "just another contact cleaner"?

No, **Stabilant 22** is an electrically active material which stays *resident* within a contact pair, there enhancing conductivity without causing electrical leakage between adjacent contacts. Thus large quantities of the material do not have to be "hosed on" as is the case with cleaners. While **Stabilant 22** does have a detergent action it is not sold as a cleaner, just as it has a good lubricant action but is not sold as a lubricant.

Stabilants are often used to service older equipment and in many cases, the use of the **Stabilants** to treat all of the system's connectors is sufficient to restore non-functioning electronics to full operational status.

Just how much should be used?

Normally, a film thickness of about 0.5 to 1 mils of the concentrate is more than enough. In other words, you want just enough to fill up the minute gaps within the contacts. Where **Stabilant 22A or Stabilant 22E** is used, be sure to allow for the evaporation of the alcohol which forms 4/5th's of the volume.

Both shop and field application of the material is simple. A small amount is used to coat the pins of the connector. Because it does not short-out between adjacent contacts over application need not be cleaned off the connector body. There is a dropper tip on the 5 ml, the 15 mL and the 50 mL bottle of Stabilant 22A, which may be used. Or the material may be transferred to a brush. On card edge connectors the material may be applied to one end of the connector and fingertip wiped the length of the connector.

When treating socketed IC's, a "bead" of **Stabilant 22A or Stabilant 22E** should be run along the pin and allowed to "Wick" down into the connector. In stubborn cases, the IC may have to be moved a small amount to break the pin to socket contact seal on all pin. Generally, pressing firmly down on the IC to reset it will provide enough movement.

Because of the diagnostic difficulties of isolating connector related fault condition the **Stabilant** materials are often used to treat all the contacts in a system before more sophisticated diagnostic procedures are run; under these circumstances we are told that in many instances, no further repair work is necessary.

Is the material hazardous?

No, it has very low internal toxicity although ingestion should be avoided. External no skin reactions have ever been observed. The undiluted form **Stabilant 22** is of low flammability. In the United States **Stabilants** are not subject to the Toxic Substance Control Act (TSCA) nor are they reportable under SARA Title III.

What is its Identification for Military procurement?

NATO/CAGE Supplier Code 38948

- 15 mL of Stabilant 22A (isopropanol diluted) has NATO Stock # 5999-21-900-6937
- 15 mL of Stabilant 22E (ethanol diluted) has NATO Stock # 5999-21-909-9984
- 15 mL of Stabilant 22 (non diluted) has NATO Stock # 5999-21-909-9981

Revision 2

Stabilants are a product of Dayton Wright research & development and are made in Canada

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

MATERIAL SAFETY DATA SHEETS ARE AVAILABLE ON REQUEST.

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While to our knowledge the information is accurate, prospective users of the material should determine the suitability of the Stabilant materials 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 any consequent damages, howsoever caused, based on the use of this information.

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