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Number 8

# APPLICATION NOTE

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## Use of Stabilant 22 in CATV Distribution Equipment

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- *What is Stabilant 22?*

**Stabilant 22** is an *initially non-conductive* block polymer that under the effect of an electrical field and/or when used in a very narrow gap between metal contacts, becomes *conductive*. The electric field gradient at which this occurs is set so that the material will remain *non-conductive* between adjacent contacts in a multiple pin environment.

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

While **Stabilant 22** exhibits surfactant action it is *not* sold as a contact cleaner. Equally, it exhibits quite good lubricating properties but is *not* sold as a contact lubricant. Its metier is in its *active properties* when used in a connection and the other properties are a bonus.

- *What are its uses in CATV equipment?*

**Stabilant 22** can be used wherever electrical contacts are used, whether this is in connectors, or in switches. In cable equipment its most frequent use is in the co-axial connections on the Main Line/Distribution amplifiers such as the Lindsey Equipment Models 10-40 and 961 or on the case joints in the Jerrold units. By eliminating the effects of corroded connections it restores service in much less time than conventional methods. In many cases it eliminates the need to replace line amplifiers having badly corroded connectors. On case joints it eliminates the need for the cleaning and metal scraping of the joint as well as the need for the over-tightening that often strips the case screws. Because **Stabilant 22's** use in a contact enhances the performance of that contact beyond that of an equivalent new contact, the performance improvements are often dramatic. We have been told that it makes the quality of the signal at the end of a long series of amplifiers more nearly equal that of the beginning of the chain!

In head-end equipment the improvement often obtained in color accuracy and signal to noise ratio even with brand new equipment is sufficient justification for the material's use!

The **Stabilant's** performance in subscriber taps and in splices is one of improving the reliability of the connections eliminating many costly service calls and improving customer satisfaction.

**Stabilant 22** is also a preferred contact treatment in TV Security systems. Many installations are not easy to service and because of the nature of the use of the system many customers are extremely critical of any erratic operation of these systems. We have been told that there is often a marked improvement in the quality of the picture and that details are much easier to see!

- *Why should we use Stabilant over less expensive alternatives?*

Granted that the material itself is expensive. However it is unique in having a very long useful life once in place. Unlike other so-called contact treatments **Stabilant 22** will not cross-link (becoming varnish-like) under the action of sulphur based curing agents in elastomers, cutting oil residues, or the sulphur-bearing free-machining metal alloys used in some contacts. In most types of service work, the cost of the time involved in removing and replacing an amplifier will be much greater than the cost of the **Stabilant** used to treat the connectors. Here, what is important is that not only will proper connector treatment cure existing contact problems, it will prevent others from occurring thus eliminating the necessity of repeating the treatment at a later date! Amplifiers which had to be serviced every two to three weeks are now running for months at a time without service. The increase in customer satisfaction has been considerable! In other words, why should you have the expense of doing a job more than once?

In addition, as **Stabilant** is one of the very few alternatives to repeated use of environmentally unfriendly solvent-cleaning, it is not subject to the increasing restrictions that are being placed on the use of solvents.

- *In what forms is Stabilant available?*

**Stabilant 22** is packaged in 15mL, 50mL, 100mL, 250mL, 500mL and 1 Liter containers. **Stabilant 22** is available in two forms; as a concentrate **Stabilant 22**, and as an isopropyl alcohol-diluted form called **Stabilant 22A**. Because of the 4:1 dilution, a given size container of **Stabilant 22A** will cost about one-fifth the amount of a container of **Stabilant 22** for it has only one-fifth the amount of the concentrate in it. A third packaging is available for industrial-bulk users. **Stabilant 22S** packages the concentrate such that it occupies one-fifth the volume of an otherwise empty container. This allows the end-user to add his own diluant and saves the added costs of shipping isopropyl alcohol, as well as allowing the end-user to use an alternate diluant such as trichloroethylene, or even one of the other solvents used in electronics.

- *What is the difference in use of the Stabilants?*

The concentrate, **Stabilant 22** is most useful where the connections are out in the open such as exposed RF connectors. Where the connections are not too easy to get at or where the user wishes to apply the material to something such as a socketed IC (without removing the IC from its socket) it is easier to use the alcohol diluted form, **Stabilant 22A**. The isopropyl alcohol diluant serves *only* to carry the concentrate into the connector. **Stabilant 22** can also be used as an insertion lubricant for multi-pin IC's. **Stabilant 22a** can be used to service amplifier case problems in the field, as it will often penetrate the joint without having to loosen the case screws.

- *Is it available in a spray can?*

Not at present. During the initial stages of our market research we did provide spray cans of the material, but the users found that in most cases it did not ease the

application of the material, wasted many times the amount that actually got on the contact areas, and generally left a film of excess material that had to be cleaned up for appearances sake.

A further consideration is the fact that chlorofluorocarbon propellants are no longer generally used in spray cans, a highly inflammable mixture of Butane and Propane often being substituted. Remember, very little **Stabilant 22** is necessary to treat a contact, so why waste it?

- *Is Stabilant just another contact cleaner?*

No, it is important to remember that **Stabilant 22** is an *electrically active* material which enhances conductivity within a contact without causing leakage between adjacent contacts. Thus large quantities of the material do not have to be "hosed" on as is the case with cleaners.

- *Just how much should be used?*

Normally, a final film thickness of from 1 to 2 mils of the concentrate is all that is necessary. In other words you want just enough to fill up the interstices between the contact's faces. Where you're using **Stabilant 22A**, you'll have to use enough so that once the isopropyl alcohol evaporates the desired 1 to 2 mil film of **Stabilant 22** remains.

- *What is the 15mL service kit?*

This was made up at the request of several manufacturers who wanted a standard kit of reasonable dimensions that they could issue to their field service personnel. It consists of a 15mL container of **Stabilant 22A** and some soft-tipped applicators, all in a small capped tube. The applicators are reusable.

- *Why would anyone want to buy quantities of the concentrate?*

Many manufacturers and larger cable companies prefer to make large volume purchases, diluting the material and issuing it, as required, for specific field service requirements.

Many end users have found that the material cuts their service costs so much that it is more economical to purchase **Stabilant 22** in the larger container sizes rather than run any risk of being without the material. The number of different applications tends to increase as users discover the large number of problems that can be solved by the material.

- *How can I be sure that the material works?*

Quite apart from the fact that **Stabilant 22** has passed a number of stringent field tests before being issued a NATO supply code number, we could cite the fact that **Stabilant 22** is used by many hospitals on their bio-medical electronics to improve reliability of the equipment where lives are in the balance, we could cite the use of **Stabilant 22** by many broadcasting networks to achieve the last measure of reliability in critical network switching applications, we could cite its use in navigational aids, or we could cite the years of use in the audio field where even consumers found the material easy to use and its results impressive; but 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. Almost every service shop or manufacturer has equipment avail-

able where the switches or connectors have become erratic over the years. Use **Stabilant 22A** on them for a quick turnaround test, or use the material in field service and satisfy yourself.

- *Will it work on UHF equipment?*

**Stabilant 22** is being used at *satellite communication frequencies on waveguide flanges up to 5 GHz and co-ax connectors as well*, so yes, it will operate on UHF equipment and at UHF frequencies.

- *Can I use Stabilant 22 on connectors and switches in other equipment?*

Of course. As we indicated, many end-users start out by trying it out on erratic test equipment. Audio/RF Function and Signal generators, distortion, spectrum, and waveform analyzers, reflectance equipment, Oscilloscopes, Vector Scopes; all types of test gear can be made more reliable using the material. One note of caution though; because **Stabilant 22/22a** switches to the conductive state under applied electric field gradients (in the open) of from 9,000 to 13,000 volts per inch, don't use it on high voltage connectors. As a rule-of-thumb, it can be used on circuits of under 100 volts with impunity. Where higher voltages are involved it may be necessary to calculate the electric field gradient across the insulating surface to determine if the material can be used. If however, the material can be applied **ONLY** to the contacts, and no excess is used, it can be used at much higher voltages.

When used on socketed IC's, photo-couplers/isolators, rotary, push button (such as the ITT Schadow # FE switch), or slide switches, or even on BNC connectors, the net effect is usually to make the proper operation of the equipment less erratic, and in the case of IEEE-488 bus-controlled equipment, to cut down on the potential for system lock-ups. The effect of **Stabilant 22** in Computers is to reduce the number of times the system locks-up or crashes, sometimes it even eliminates non-software crashes completely. On equipment using internal microprocessor control, **Stabilant 22/22a** has an obvious use on socketed IC's, card-edge connectors, and both parallel (Centronics Standard) and Serial (RS-232C etc.) Ports.

- *Is the material hazardous?*

**Stabilant 22** has caused no skin reactions in tests, and is, in the undiluted form, non-flammable, although if its temperature is raised above 200° C the decomposition products would burn. If orally ingested in small amounts it will cause bowel looseness while ingestion of amounts in the order of 100 ml of the concentrate could lead to systemic collapse! **Stabilant 22** has an LD<sub>50</sub> of about 5 grams per kilogram body weight. No skin reaction has been noted in tests, save that **Stabilant's** detergency can remove skin oils under conditions of constant exposure, increasing the skin's susceptibility to chafing. **Stabilant 22a** is diluted with isopropyl alcohol so the safety precautions appropriate to that material should also be considered. A safety data sheet is available; to obtain it request Tech Note # 1 & #4.

- *What is the best way to apply it to a contact?*

The 15mL and 50 mL containers have a "dropper" type caps that allow **Stabilant 22A** to be applied directly to such components as socketed IC's, switches, connectors, etc. Some end users prefer to buy larger quantities and use industrial syrettes to apply the material onto connections. Camel's hair or sable brushes can be used to brush it on card-edge connectors. Cards can also have their edge connectors dipped into the dilute material. If **Stabilant 22** is used as an IC insertion aid, a small piece

of conductive foam epoxied to the inside of a flat tin can be saturated with **Stabilant 22** and the IC pins thrust into the foam to coat them.

- *Does the action of Stabilant 22/22a deteriorate with age?*

**Stabilants** have been in some field trial applications for over twelve years now without showing any sign of reduced effectiveness. The material has a high molecular weight and a very low vapor pressure, thus it is not prone to evaporation.

Once again let us emphasize the point that unlike some other contact treatments containing oils, **Stabilant 22** will not cross-link when exposed to certain materials such as high sulphur brass, on connectors having bodies made of elastomers or thermosetting resins containing accelerants or curing agents, or when used on contacts where these cross-link promoting agents are present in the environment. This phenomena of "varnishing" does not occur with **Stabilant 22**.

NATO Supply 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 sale of the material.

**A MATERIAL SAFETY DATA SHEET IS 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.

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