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**Number 11**

## **APPLICATION NOTE**

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### **Use of Stabilant 22 in Recording Studio 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 strength is in its *active properties* when used in a connection and the other properties are a bonus.

#### **What are its uses in recording studio equipment?**

Stabilant 22 can be used wherever electrical contacts are used, whether this is in connectors. or in switches. In recording studio applications, the number of places where Stabilant 22 or 22A can be employed are almost too numerous to list. When an entire audio mixer is treated (including socketed ICs and card-edge connectors) it is not unusual to find that the distortion and signal-to-noise figures are improved substantially as well as increasing the reliability of the mixer.

Many consoles employ ITT-Schadow switches; these can be serviced very quickly using Stabilant 22A, by first flushing them out with isopropyl alcohol and then injecting the switch with Stabilant 22A.

Computer controlled mixers often suffer from erratic operation or crashes. Stabilant 22 or 22A can often cure these problems.

Microphonics in connectors can be especially troublesome in portable equipment. Stabilant 22 or 22A will stop this.

In critical audio work involving long signal runs, Stabilant 22 on the XLR connectors will not only cut noise, but will, in many cases, improve the sound by stopping high order harmonic distortion caused by thin film rectification effects.

In patch bays, Stabilant is recommended for ring, tip, and sleeve plugs and jacks. Unlike some of the other protective oils which will cross-link (varnish) under the effects of the free sulfur in the brass, Stabilant 22 is chemically stable and therefore, need not be periodically cleaned off and replaced.

In recording equipment, the connections to the playback heads can be a source of distortion and noise. Stabilant 22A can be applied to the connectors to eliminate these problems.

RF interference can be a problem in recording, especially with the number of illegally high-powered RF power amplifiers being used in the heyday of CB radio. With the passage of time, connectors often build up thin films that act as crude rectifiers. This source of RF interference can often be eliminated by using Stabilant 22.

Stabilant 22 can also be used in mastering equipment. Often feedback type cutters suffer because of inexplicable glitches that can be traced to poor connections in the feedback signal leads. Distortion or lead-capacitance-induced phase shift (because of unexpected resistance in a contact) will do much to eliminate the benefits of a feedback type cutter and can actually cause ultrasonic oscillation in the system. Stabilant 22 on the contacts is a cure.

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

Granted, Stabilant 22 itself is expensive, but 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 sulfur based curing agents in elastomers, cutting oil residues, or the sulfur-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.* What is important is that not only will proper connector treatment cure existing contact problems, it will prevent recurrence of these problems, thus eliminating the necessity of repeating the treatment at a later date! Taking an example from the broadcast industry, video switchers which had to be serviced every two to three weeks are now running for months at a time without service! And in location recording where industrial pollutants can sometimes pose problems consider that Stabilant products are used in process-control computers to keep them operating reliably in high-contaminant-level environments such as metal refining. Many end users tell us that whenever they tear down a piece of equipment for any service reason whatsoever, they treat all the contacts with Stabilant 22 or 22A simply because they have found that they never have to worry about connector-caused problems again!

## **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 diluent and saves the added costs of shipping isopropyl alcohol, as well as allowing the end-user to use an alternate diluent such as one of the other solvents used in electronics service.

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

The concentrate, Stabilant 22 is most useful where the connections are out in the open such as card edge 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 diluent serves *only* to carry the concentrate into the connector.

## **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 speed the application of the Stabilants enough to offset the added cost of the material that was wasted. The spray can generally left a film of excess material that had to be cleaned up, for the sake of appearance or practical necessity.

A further consideration is the fact that because of their degradation of the ozone layer chlorofluorocarbon propellants are no longer generally used in spray cans, a highly inflammable mixture of butane and propane often being substituted. Again, 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.

## **How much Stabilant 22 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 15 mL 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 micro-brush applicators, all in a small capped tube. The applicators are reusable.

## **Why would anyone want to buy a larger container of the concentrate?**

It is obvious why 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, but in recording studios, many maintenance engineers have found that the material cuts their service costs so much that it is more economical to purchase Stabilant 22 in the 500mL or 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 Stabilant 22 works?**

Quite apart from the fact that Stabilant 22 has passed a number of stringent field tests before being issued a NATO supplier number (CAGE code), we could cite the fact that Stabilant 22 is used by many hospitals on their biomedical 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 air and marine navigational aids, or the years of use in the audio field where even consumers found the material easy to use and its results impressive. 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 studio has equipment available 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.

## **Can I use Stabilant 22 in other equipment?**

It can be used in test equipment, cameras, just about everywhere there's a low voltage signal or control connection. For example, 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.

When used on socketed IC's, connections for photo-couplers/isolators, rotary, push button, 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-488A bus-controlled equipment, to cut down on the potential for system lockups.

## **Is Stabilant 22 hazardous?**

Stabilant 22 has some minor precautions in normal use. It caused no skin reactions (sensitization) in tests. If ingested in small amounts, it will cause bowel looseness while ingestion of large amounts (over 100mL) of the concentrate could cause more serious illness; the tested LD<sub>50</sub> of about 5 grams per kilogram body weight. In the undiluted form, it is non-flammable, although if its temperature is raised above 200° C the decomposition products will burn. In the diluted forms, Stabilant 22A or 22E, one must observe precautions appropriate to the alcohol (isopropanol or ethanol, respectively).

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

The 15mL container has a dropper type cap that allows 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.

Natural bristle brushes or the micro-brushes supplied with our Service Kits can be used to brush it on card- edge connectors.

Cards can also have their edge connectors dipped into the dilute material.

We can also supply sources for manual or electrical batching applicators. Where a large number of IC's have to be treated use of one of these devices will speed up the job and ensure that no material is wasted.

## **Does the action of Stabilant 22/22A deteriorate with age?**

Stabilant 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 and so 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-sulfur brass, or where catalytic agents are present in the environment. This phenomenon, called "varnishing" does not occur with Stabilant 22.

## **How long has Stabilant 22 been in use?**

Stabilant 22 has been used since its introduction in the audio industry in 1982, then under the brand name Tweek™. Expansion to many other industries followed, with sales of Stabilant products now being used world-wide.

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**

#### **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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