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Number 12

APPLICATION NOTE

Use of Stabilant 22 for Broadcast & Recording Studio Equipment

Introducing Stabilant 22

Stabilant 22 is an initially non-conductive block polymer that when used in a thin film within contacts switches to a conductive state under the effect of the electrical field. The field gradient at which this occurs is set such that the material will remain non-conductive between adjacent contacts in a multiple pin connector environment.

Thus, Stabilant 22 provides the connection reliability of a soldered joint without bonding the contacting surfaces together!

Contacts are generally the weakest link in any piece of electrical/electronic equipment whether it be in low current devices found in computers or higher current circuits found in automotive and aviation applications, to name only a few. The use of Stabilant 22 or its isopropanol-diluted form, Stabilant 22A, will make contacts from 10 to 100 times more reliable, eliminating costly service call-backs and ensuring customer satisfaction.

What are its uses in broadcast and recording studio equipment?

Stabilant 22 can be used wherever electrical contacts are used, in most types of connectors, switches and many types of potentiometers. In broadcast and recording 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 employed 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.

TV switchers often suffer from erratic switching as well as noise. Computer controlled mixers often suffer from erratic operation or crashes. Stabilant 22 or 22A will cure these problems.

Microphonics in connectors can be especially troublesome in portable audio, video and RF 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 audio patch bays, Stabilant 22 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 sulphur in the brass, Stabilant 22 is chemically stable and therefore, need not be periodically cleaned off and replaced.

In audio and video patch bays, Stabilant 22 will cut losses and eliminate noise.

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.

We have even been told that some stations are applying Stabilant 22 to the finger stock contacts used on transmitting tubes in order to reduce parasitics.

RF interference is a constant problem. With the passage of time, connectors often build up thin films that act as crude rectifiers. This source of RF interference can be eliminated by using Stabilant 22.

Stabilant 22 can also be used in mastering equipment. Often feedback type cutters suffer inexplicable glitches that can be traced to poor connections in the feedback signal leads. Lead capacitance induced phase shift (because of unexpected resistance in a contact) can cause distortion and even ultrasonic oscillation in the system. Stabilant 22 on the contacts is a cure.

What are some pieces of equipment on which Stabilant has been used?

- McCurdy Consoles - SS 8824e, SS 8400, SS 8448, SS 8700, SS 8600
- Ampex - ATR 100
- ITC Cart Machines - Deltas
- Broadcast Electronics - BE 250
- McMartin - 8801

...and many, many others.

Why should we use Stabilant over less expensive alternatives?

We grant that the material itself is expensive, but it is unique in having a very long useful life. Unlike many other 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.

Consider the experience of long term Stabilant users: Not only will proper connector treatment cure existing contact problems, but it will also prevent others from occurring, 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 routinely run for months at a time without service once Stabilant 22 treatment was used.

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 other words, why should you have the expense of doing a job more than once?

In what forms is Stabilant available?

Stabilant 22 is packaged in 5 mL, 15mL, 50mL, 100mL, 250mL, 500mL and 1 Liter containers. It is available in two forms The concentrate is simply called Stabilant 22, while alcohol-diluted forms are called Stabilant 22A (isopropanol) and 22E (ethanol). Because of the 3:1 dilution, a given size container of Stabilant 22A will cost just over one fourth the amount of a container of Stabilant 22 for it has only one fourth the amount of the concentrate in it. Another packaging form 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 user to add a preferred amount and type of diluent and saves the added costs of shipping isopropyl alcohol. Some users may prefer one of the other solvents used in electronics servicing.

What is the difference in use of the Stabilant 22 vs. 22A?

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 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 material enough to justify the cost of the material that was wasted. In addition, the spray application generally left a film of excess material that had to be cleaned up, whether for practical or appearance considerations.

A further consideration is the fact that although chlorofluorocarbon propellants are no longer generally used in spray cans, a highly inflammable mixture of butane and propane has often been substituted. We note the continuing development of low impact propellants, but we do continue to prefer low VOC product options.

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

What is the 15mL service kit?

This was made up at the request of several manufacturers and electronics equipment service organizations who wanted a standard kit of reasonable dimensions that they could purchase and stock in quantity, issuing it to their field service personnel as required. The service kit 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 larger containers 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 Stabilant 22 works?

Stabilant 22 passed a number of stringent field tests before being issued NATO supplier (CAGE) and item part numbers. The first indication we mention is the success our customers have had in various industries;

We could cite the following established applications of Stabilant 22:

- hospitals use it on biomedical electronics to improve reliability of equipment where lives are in the balance.
- broadcasting networks use it to achieve the last measure of reliability in critical network switching applications.
- navigational aids
- years of use in consumer and pro audio, where users have found the material easy to use and its results impressive.

But we still feel that the best way to find out how well it works is to try it out; samples are available on request.

Can I use Stabilant 22 in other equipment?

It can be used in test equipment, cameras, anywhere there are low voltage signals or control connections. For example, a benefit 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, photo-coupler/isolator connectors, 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-488 bus-controlled equipment, to cut down on the potential for system lock-ups. When used on USB connectors, it improves connection quality for both the signal and power functions.

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.

Is Stabilant 22 hazardous?

Stabilant 22 comes with very minor precautions. It has caused no skin reactions (sensitization) in tests. If orally ingested in small quantities, it will cause bowel looseness while ingestion of large quantities (over 100mL) of the concentrate could cause more serious illness; Stabilant 22 has an LD₅₀ of about 5 grams per kilogram body weight. In the US, it is not subject to the TSCA (Toxic Substance Control Act) nor is it reportable under SARA Title III. In the undiluted form it is non-flammable although if its temperature is raised above 200^o C the decomposition products will burn. Fire safety and other precautions do apply to the alcohols in Stabilant 22A or 22E. Our Safety Data Sheets provide more details.

What is the best way to apply it to contacts?

The 5 mL, 15mL and 50mL containers have a dropper type cap that allows Stabilant 22 or 22A to be applied directly to such components as socketed ICs, 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 provided in 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.

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

Stabilant 22 has been in some 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, so it is not prone to evaporation.

Stabilant 22 concentrate will not affect most elastomers. Some slight swelling can occur on fluorosilicone seals when using Stabilant 22A - the diluent (isopropyl alcohol) is much more likely to cause problems, although it is gone as soon as it evaporates. Nor are plastics generally affected. We don't recommend the use of Stabilants on deposited-carbon-film or resistive-paint-film type potentiometers.

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, when used on connectors having accelerant and curing agents in their elastomer or thermoset plastic parts, or when used on contacts where cross-link promoting agents are present in the environment. This phenomenon of "varnishing" does not occur with Stabilant 22.

NATO CAGE/Supplier Code 38948

5mL Stabilant 22 (Concentrate), NATO Stock Number 5999-20-002-1112

15mL Stabilant 22 (Concentrate), NATO Stock Number 5999-21-909-9981

15mL Stabilant 22A (Isopropanol Diluted), NATO Stock Number 5999-21-900-6937

15mL Stabilant 22E (Ethanol Diluted), NATO Stock Number 5999-21-909-9984

Stabilant products 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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