STABILANT 22

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APPLICATION NOTE

Use of Stabilant 22 in Automobile & Marine Stereo Systems

What is Stabilant 22/22A?

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. Likewise, 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.

Stabilant 22A is a convenient form that is diluted with isopropyl alcohol (75% isopropanol and 25% Stabilant 22 concentrate). This is much less viscous than the concentrate and allows a penetrating/cleaning effect for some applications in which contact areas are hard to reach. The alcohol evaporates, leaving the protective film of Stabilant 22 on contact surfaces.

What are the benefits of Stabilant 22 for Stereo Systems?

In general, Stabilant 22 can be used wherever electrical contacts are used, including connectors, switches, socketed IC's, fuses, etc. In home stereo system applications, the number of places where Stabilant 22 or 22A can be employed are almost too numerous to list. When connectors and signal switches throughout a stereo system are treated, the distortion and signal-to-noise figures are substantially improved. Noise in volume, tone and balance potentiometers is also possible. (There are exceptions for cheap pot types – see below).

Where and how do I apply Stabilant 22?

High current supply connectors: With increasing power levels in amplifiers, the current supplied to those amplifiers is getting so high that contamination-caused heating of connectors and fuse blocks can become a major problem. With each successive heating/cooling cycle, the parts involved expand and may actually stretch some metal parts, lowering the contact pressure and thus increasing heating and corrosion problems.

This can cause erratic operation of the power amplifier and increased transient distortion and eventually could lead to burn-out of the connection. The use of Stabilant 22 or Stabilant 22A on these connections (such as alternator, fuse block etc.) will not only lead to lower distortion but can prevent these burn-outs. Stabilant 22 can be used on high-current contacts up-to and including battery connectors. In industrial service it has been used in systems carrying currents as high as 30,000 amps.

Preamplifier controls: Audiophiles should note the fact that preamplifiers use switches that handle signals and that these switches are also a potential source of distortion and noise. Rotary switches are usually the easiest to treat although it may be necessary to use a micro-brush (supplied with our Service Kits) or a toothpick to transfer a drop of Stabilant 22A from the dropper bottle to the switch contacts. Slide switches may be treated by placing a drop in one end of the switch and cycling the switch to distribute it on the contacts.

Push button type switches, especially the ITT-Schadow type, may contain a lubricant that must be removed before Stabilant 22A is used. We have found that if the switch is flushed out with isopropanol (99% isopropyl alcohol) or one of the proprietary contact cleaners it does not have to be disassembled. Several drops of Stabilant 22A should be run into the switch body through the slot on the upper side (ITT Schadow type).

We do not recommend the use of Stabilant 22A on volume or balance controls unless they are of the wirewound or stepped-metal-contact type as some controls use a resistive paint for the element. In some cases, Stabilant 22A will damage this resistance element through softening of the paint by the alcohol in that product.

All of the input and output jacks can be treated with Stabilant 22A.

Do not treat power-interrupting switches that spark on opening!

Cassette Decks: Stabilant 22A may be used on cassette decks. If spring contacts are used on the playback and recording heads these should be treated in the same way as the connections on a phono cartridge. Anywhere there are card-edge connections, Stabilant 22A can be used. It should also be used on any microphone or headphone connectors.

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.

CD Players: Treat the output connectors with Stabilant 22A.

Interconnect Cables: RCA-type connectors on interconnect cables should be treated. making sure that both the inner pin (signal) and outer shell (ground) of each connector are treated. On DIN-type connectors be sure that grounded outer shells as well as all the pins are treated.

Power Amplifiers: In some transistor power amplifiers the output transistors are installed in sockets - the contact pins and metal casing contact can be treated. Some filter capacitors also have detachable connectors that should be treated. Also use Stabilant 22 on any tab-type connectors or card-edge connectors. It is suggested that this be done by a qualified service technician.

Loudspeaker Connectors: Loudspeaker connections should be treated with Stabilant 22A. We do suggest that you treat all the low-level signal contacts first as otherwise there will be less beneficial effect when treating *only* the speaker connections. Tab-type slide-on connectors that are commonly used are quite vulnerable to both vibration and corrosion. For example, especially in the winter months, both moisture and salt can penetrate speaker installation areas within the car's doors. Many problems attributed to damaged speakers are actually due to the speaker connections and can be prevented with Stabilant 22.

General Antenna Use: Stabilant 22A can be used on the antenna connectors to reduce signal loss or impedance mismatch in those connections. In addition, when used on the grounding connections in antenna installations it will often cut ignition noise pick-up.

Radio Frequency Interference: RF interference in stereo systems can be a recurring problem – both through the antenna and via internal wiring. 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.

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 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 ICs, connectors 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 IEEE488 bus-controlled equipment, to cut down on the potential for system lockups.

Why use Stabilant over less expensive alternatives?

We grant that Stabilant 22 is more expensive by volume than many competing products. However, a small amount goes a long way, and it is unique in having a very long useful life once in place. Unlike some other 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, time involved in removing and replacing a module, plug-in component, or IC will be much more costly than the Stabilant used to treat the connectors. Here, what is important is that Stabilant 22 treatment cures existing contact problems, and continues to prevent other contact problems from occurring, thus eliminating the necessity of repeating the treatment at a later date.

In other words, why waste the time and expense of doing a job more than once?

In what forms is Stabilant available?

For automobile stereo system use by the consumer, we would suggest the use of the 15 mL service kit size of Stabilant 22A (isopropyl alcohol diluted form). It includes micro-brush applicators and instructions with the bottle, in a capped tube that is easily kept in a tool kit. This is the most popular size for use by system installers. However, Stabilant 22 is also available in 5mL, 15mL, 50mL, 100mL, 250mL and 500mL sizes, used by customers whose installers wish to bulk treat component assemblies.

What is the difference in the 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 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.

Another consideration is that although chlorofluorocarbon propellants are longer generally used in spray cans, a highly inflammable mixture of butane and propane has become popular. 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.

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.

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.

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 22/22A 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 the years of use in the audio field where consumers 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.

Is the material hazardous?

Stabilant 22 has caused no skin reactions (sensitization) in tests. In the undiluted form it is non-flammable, although if heated above 200°C, its decomposition products will burn. Fire and exposure concerns for Stabilant 22A (isopropanol-diluted form) are primarily for the alcohol content in that product. If ingested in small amounts, Stabilant 22 will cause bowel looseness, but in very large amounts (e.g., over 100mL), more serious illness may result; Stabilant 22 has an LD_{50} of about 5 grams per kilogram body weight and is therefore toxicity is considered negligible. If it gets into the eyes, it should be flushed out with running water. Please consult our Safety Data Sheets for more information (available on request).

Does the action of Stabilant 22 deteriorate with age?

Stabilant products were tested in field trial applications for over twelve years without showing any sign of reduced effectiveness, while customers report reliable effectiveness for years beyond our published shelf life of 15 years. The material has a high molecular weight and a very low vapor pressure and so is not prone to loss by 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, rubber insulation or other elastomers, thermo-setting plastics 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

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.