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Number 18

APPLICATION NOTE

Use of Stabilant 22 on Card Edge Connectors

Introducing Stabilant 22

Stabilant 22 is an initially nonconductive block polymer which when used in a thin film between metal contacts becomes conductive under the effect of an electrical field. This occurs at an electric field gradient such that the material will remain nonconductive between adjacent contacts in a multiple pin environment. In addition, Stabilant 22 exhibits surfactant action as well as lubrication ability, providing a single component resident solution to virtually all contact problems.

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

In this Application Note, we provide a solution to problems with card edge connectors, as used in computer systems and other equipment. Stabilant 22 and its alcohol diluted form, Stabilant 22A, allow greater reliability and service life in these types of connectors by preventing corrosion and wear.

Precautions that apply to treatments for card edge connectors

Before using Stabilant 22 (either concentrate or Stabilant 22A) on card edge connectors some precautions should be observed to ensure best results. On equipment that has been in use for some time, in which these connectors may have been cleaned previously with conventional cleaners (or using the old eraser trick), it is important to ensure that the socket in which the card is inserted is cleaned out thoroughly.

There are several notable issues, depending on the history of your connectors:

- Contaminants that accumulate in sockets
- Deposits of solder flux
- Silicone residues
- Prior treatment with oil products

The design of many sockets allows particulate contaminants to accumulate within the connector body, especially in a dusty environment. If Stabilant 22A is used on the card edge connector without removing such an accumulation, the detergency of the Stabilant will loosen that buildup and it may accumulate, as mentioned, especially in the case of vertically mounted units. We have encountered some isolated cases where this has caused erratic operation of the bottom contacts in the card edge row.

We would suggest that in such cases, the socket be cleaned out using isopropyl alcohol or one of the numerous spray cleaners to be sure that all particulate material is removed.

In rare instances, there may be a small residue of solder flux which has been trapped between the connector and the circuit board This is not a major problem with production equipment unless a connector has been replaced. Once again, the surfactant action of the Stabilant could soften this hardened flux and cause it to migrate further into the connector. This would likely occur within the first 7 - 10 days after the connector has been treated.

If erratic operation is noted on card edge connectors after Stabilant treatment we suggest removing the card, recleaning both the male and the female connector parts, reapplying the Stabilant, and reinstalling. This normally solves the problems just mentioned.

If silicone compounds have been used in the past, there is a small probability that a very thin glassy coating will have formed on the contact surfaces – this is an insulating type of contamination and can compromise connections. It may be removed from the card edge component with vigorous cleaning but in some isolated cases the socket must be replaced to eliminate the problem. Again, Stabilant application should be done after this is cleaned up.

Stabilant 22 vs. other contact solutions

There are several ways that contact treatment materials deteriorate over time, and Stabilant 22 was developed to overcome these.

Compounds like dielectric greases used in electronics share basic features with other greases, beginning with an oil base. Oil bases range from traditional hydrocarbon types to PAG types (i.e., polyglycols, more closely related to Stabilant 22). Additives usually include a soap, thickeners, and others related to special applications.

The volatile oil types in some products allow evaporation to occur, however slowly, resulting in a change of composition of the mixture. The benefits of such a mixture are lost over time and residual compounds can behave as contaminants. Stabilant 22 has a very low vapour pressure (low volatility) by design, allowing a very long service life.

Some soap additives (e.g., in lithium greases) can leave residues that become hygroscopic – by attracting water from humidity, these can eventually allow corrosion to begin or worsen.

Some earlier contact treatments contained unsaturated oils, which have unique properties (compared to saturated oils). Under field conditions, these oils had a tendency to cross link, leading to a scummy, almost varnished appearance to the contacts. Crosslinking agents include sulfur (from cutting oils, brass, etc.) and catalysts from such compounds as elastomers (rubber) and plastics.

Even some connectors' insulators could contain these substances. This concern also suggests that the "cleaning" of contacts with rubber erasers can sometimes create a long term problem for card edge connectors. The varnishing problem was sometimes countered by the inclusion of crosslinking inhibiting chemicals in the unsaturated oils. These, however, commonly lost most of their efficacy after six to nine months.

Service personnel should never use penetrating oils (designed for loosening bolts and nuts) to treat connectors. The solvents used in some of these can not only affect many elastomers and plastics, but also introduce the same issues addressed above. For example, some of the oils themselves may be very light unsaturated types. Penetrating oils used for threading metal parts may be derived from high sulfur petroleum sources.

In consideration of the contamination problems described, we always recommend thorough cleaning of connectors, followed by application of Stabilant 22.

Stabilant 22 avoids the problems described by being nonreactive to most chemicals in field or service environments. Its composition remains consistent, and it does not contain (or need) any additives. We emphasize the simplicity of choosing Stabilant products, as many of the newer contact treatments require the user to understand the functions of additives - whether anticorrosion chemicals, conductive nanoparticles, or others, precautions apply.

In the case of conductive additives (including gold or silver particles) one must avoid excesses on insulators, even in low voltage applications. Some of these would be exceedingly difficult to use in card edge connectors and sockets, one of the outstanding applications for Stabilant 22A.

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