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Number 22

APPLICATION NOTE

Use of Stabilant 22 in High-humidity Conditions, High-Z Circuits

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.

Has Stabilant 22 been used in high-humidity conditions?

Yes, Stabilant 22 has been used extensively in high humidity conditions with excellent performance. These applications range from oceanographic and sonar equipment to airborne connectors in tropical environments and engine-mounted equipment conditions. In tropical countries, Stabilant 22 is used extensively in computer and communications applications. All of these were successfully done without special pre-treatment.

What special precautions apply to high-humidity conditions?

Whenever Stabilant treatment is used on connectors used in high-impedance circuits (typically circuits of 2 Megohms or higher), it is essential to consider the environment. Where 98% relative humidity is encountered and/or thermal cycling occurs under humid conditions, we are concerned with possible moisture condensation on the surface of a circuit board.

Stabilant 22 seals connectors against humidity and contamination, but under extremes (contacts experiencing condensation or immersion in water), equipment may eventually require renewed application of Stabilant.

What precautions have to be taken before using Stabilant 22 in these conditions?

The following applies to those applications where it is important to maintain high surface resistance (> 10^8 ohms/square), such as high impedance circuitry, where very low currents and voltages are used, or where there are very tight specifications on circuit board operations under conditions of high humidity:

When using Stabilant 22 or Stabilant 22A in very-high humidity conditions on applications such as card-edge connectors involving high-impedance circuitry, some precautions should be used to ensure that the material can work to best advantage. Stabilant 22 can hold enough moisture such that surface resistance could drop as low as 2×10^6 ohms/square.

Where such conduction over insulators is unacceptable, pre-treatment of the circuit board surface should be done.

A hydrophobic (water repellent) surface can be achieved between the contacts and/or traces. This can be done by using a fluorocarbon based spray (such as Scotchguard™ from 3M Corp.) to spray the critical area. One can either mask the card-edge connector during spraying or buff the contacts afterward. Apply Stabilant 22 as usual once this is done.

The Stabilant will now be confined to the actual contact area, and the board surface will be sufficiently hydrophobic so as to maintain the required insulation resistance. In this situation we would recommend that the Stabilant be applied only to the male portion of the connector.

An alternative treatment would be to apply the Stabilant material to each contact individually, using only enough to coat the major portion of each one.

Field considerations necessitating this treatment.

Normally, the impedance of most circuitry encountered in computers (TTL or even MOS/CMOS circuits) is such that this specialized treatment will not be necessary. However, where electrometer or photomultiplier or similar circuitry is encountered, or where very low leakage is a requirement (such as on Teflon insulated stay-alive batteries for computer memories) the extra time required to apply the hydrophobic coating can substantially reduce any leakage under high humidity conditions.

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.