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Number 39

APPLICATION NOTE

Use of Stabilant 22 on PLCC Packages and Sockets

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 primary strength is in its *active properties* when used in a connection and the other properties are a bonus.

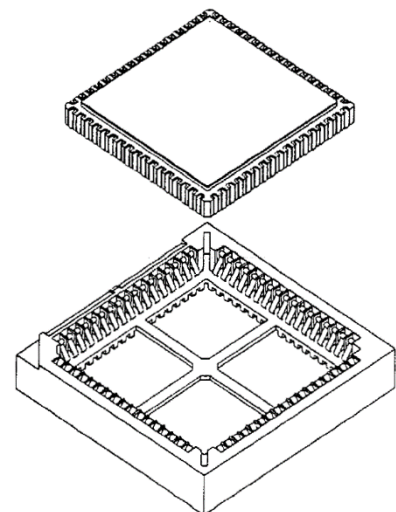
Stabilant 22A is a convenient diluted product with 25% Stabilant 22 concentrate and 75% isopropyl alcohol – this is less viscous and offers ease of application in many cases.

How can Stabilant 22A improve the performance of PLCC's?

Stabilant 22A provides a quick and effective way of increasing the reliability of PLCC devices through improvement and protection of the device's electrical connections.

Application of Stabilant 22A is easy using the dropper bottle (15 mL or 50 mL). Apply a small amount to the connection leads on the edges of the device and/or on the contacts in the socket before insertion of the device.

A micro-brush (supplied with our 15mL Stabilant 22A Service Kit) or a soft natural bristle brush can also be used to spread the material at some saving in the amount that has to be applied.



Just after application, the alcohol in Stabilant 22A will evaporate, leaving a thin film of the concentrate as a protective coating on the contacts. Note that from 0.25 to 0.5 Mil film-thickness of the concentrate is all that is required. The concentrate will not evaporate, as it has a very low vapour pressure. Stabilant 22 has been shown to have a service life of over 12 years; our published shelf life for Stabilant products is 15 years.

During application the usual precautions should be taken against static discharge, as with most IC's, and good ventilation is recommended when using isopropyl alcohol.

Is Stabilant 22 just another contact cleaner?

No. Stabilant 22 is a resident electrically active material, applied to electrical or electronic contact surfaces. It works through a synergistic combination of effects to enhance conductivity within a contact interface without causing leakage between adjacent contacts. The use of Stabilant 22A (with isopropanol) offers some cleaning of the contacts as it is applied, allowing the concentrate to immediately coat the metal surfaces. This may be all that is needed, especially on newer equipment - thus large quantities of the material do not have to be "hosed" on as is the case with many other contact cleaners.

Is Stabilant 22 cost effective?

As Stabilant 22 can be quickly applied to all contacts and connectors in a system, the often difficult diagnostic determination as to which one of many contacts are erratic, can often be eliminated. This can significantly reduce service time in the field and in many cases eliminates the need to return boards for shop service or re manufacturing. As any service manager knows, the diagnosis of electronic problems, especially where intermittent failures are concerned, is more difficult than the actual part replacement, often requiring service personnel of exceptional caliber. In many cases the use of Stabilant 22/22A can thus increase the efficiency of existing staff and allow connector-related problems to be handled at a much lower overall cost.

How does Stabilant 22 work?

Contact failure is rarely caused by a single factor. Treatments that solve only one problem don't necessarily offer a reliable long term solution. For example, cleaners do not prevent the re-entry of contaminants or the reformation of contaminant films, nor do they offer any lubrication. They must be used each time a connector gets contaminated enough to cause trouble. Lubricants in themselves are rarely cleaners. Corrosion inhibitors are neither cleaners nor lubricants and are often specific to one type of metal or plating. Unsaturated oils used as contact treatments can cross-link under the influence of elastomer or thermoset plastic curing agents and accelerants.

While resident in the connector, Stabilant 22 performs all of these functions. Its very presence in the contact gap will prevent the entry of outside contaminants. It has sufficient surfactant action to lift surface contaminants and hold them in suspension. In cases where corrosion products are present Stabilant 22 will penetrate them and prevent rectification effects from causing signal distortion.

Due to its high dielectric constant, it will act to form a capacitive layer in parallel with whatever residual resistance exists in the contact increasing the passage of AC signals - in addition to its ability to minimize DC resistance.

Is it environmentally acceptable?

Yes. Stabilant 22 itself has negligible toxicity, while only the isopropanol diluent in Stabilant 22A represents a notable hazard - flammability and some toxicity.

Even Stabilant 22A has only about 1/200th the solvent impact as conventional contact cleaning solvents over a three year time span. As Stabilant 22 contains no solvent it has absolutely minimal environmental impact and is, therefore, becoming the treatment of choice for many service organizations! (We note that biodegradability has been studied for polyethylene glycols and polypropylene glycols, while Stabilant 22 contains the same components).

Can Stabilant be used by untrained personnel?

Thousands of applications of the consumer version of Stabilant 22 have been made over a period of many years now without any reported problems.

What is the best way to apply Stabilant to contacts?

The 15ml container has a dropper type cap that allows Stabilant 22A to be applied directly to such components as socketed ICs, switches, connectors, etc. Our Service Kits include micro-brush applicators to simplify the process. Natural bristle brushes can also be used. Some end users prefer to use industrial syrettes to apply the material. Card-edge connectors can be dipped into the dilute material, or it can be brushed on. Metering-type liquid dispensing systems can be used as well.

Does the action of Stabilant deteriorate with age?

No. Stabilant 22 was used in military applications for almost ten years and subsequently became a treatment of choice in avionics, flight instrumentation, computers, automotive, process controls, bio-medical electronics, and telecommunications. These are but a few of the fields where it have been used to meet major reliability requirements. There, Stabilant products have proven themselves as an efficient, long-term solution to both eliminating and preventing connection problems.

In some field trial applications lasting over twelve years Stabilant 22 has shown no sign of reduced effectiveness. With a high molecular weight and a very low vapor pressure, it is not prone to loss by evaporation. Unlike some other contact protectants containing non-saturated oils, Stabilant 22 will not cross-link when exposed to free-machining materials such as high-sulfur brass, or when used on contacts where cross-linking promoters from of thermosets or elastomers are present in the environment or in the actual connector components. Unlike these oils, Stabilant 22 does not "varnish".

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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