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Number 10

## APPLICATION NOTE

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### Environmental Considerations for the use of Stabilant 22

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#### What are the prospects for restrictions on contact cleaning solvents?

The individual service manager is not generally aware of the large amounts of cleaning solvents that are used in the electronics industry. Setting aside those that are used in "closed" systems (where release of solvents to the atmosphere is minimized or virtually eliminated), hundreds of thousands of gallons of cleaning solvents are used each year in the electronics industry. The environmental impact of these is considerable, as a substantial portion of them evaporate into the air.

Not only do solvents present a potential hazard to human health in the workplace they often combine with other chemicals, forming layers of often-phototropic smog. While few solvents have the potential impact of the chlorofluorocarbons, they are nevertheless of considerable concern to environmental authorities and concerted efforts are underway to limit their use. A measure of things to come are California's (and other States) restrictions on the amount of solvents permitted in paints and other coatings and strict regulations governing processes which have the potential to release any solvents into the atmosphere, such as compressed-air based paint spraying.

Manufacturers and service organizations operating coast-to-coast are finding it increasingly difficult to cope with the numerous and differing standards as to what is an acceptable cleaning solvent and its permissible level of usage. This makes the use of "central-stores" purchasing with its attendant economies quite hard to manage. Indeed, what may be legal in one area of a state may well be illegal in another area of the very same state.

#### What is Stabilant 22?

Stabilant 22 is a virtually non-toxic liquid polymer that is applied to electromechanical contacts and left in place. Unlike a cleaner it is not "hosed" on the connector or wiped off. Very little must be used as a coating of less than 2 mils in thickness is usually sufficient to treat the connector.

Unlike cleaners, Stabilant 22 is an initially *non-conductive* material that, under the action of an electric field gradient, switches to a *conductive* state.

This gradient is designed so that the switching action takes place only within the mating contacts and not between adjacent contacts. Thus, there is no leakage current, and the material can be used to coat an entire connector at a single application.

*Generally, Stabilant 22 imparts the reliability of a soldered joint to an electromechanical contact without forming a physical bond.*

The material is available as a concentrate, Stabilant 22 or in an isopropanol-diluted form as Stabilant 22A. The latter has 3 parts of isopropanol to 1 part of Stabilant 22 by volume and is much thinner (less viscous) and therefore easier to apply to contacts such as socketed IC's.

### **What is meant by a piece of electronic equipment's solvent burden/year?**

Solvent burden/year is the average amount of cleaning solvent used per year to keep a piece of electronic equipment operating over its useful life.

### **How did the use of Stabilant 22A change the annual solvent burden?**

In the trial use of a solvent to clean contacts in an older computer, we found that it took about 20 ml of an isopropanol and perchloroethylene based product to clean a 100-contact card-edge connector. Even though some was left on the wiper used, it too evaporated. The equipment became erratic in operation four months later, and the contacts had to be recleaned. In the preceding year, the same approximate pattern had been repeated – enough data to safely say that the annual solvent usage for that set of contacts was about 60 ml. The next time that we had the equipment malfunction we used 2ml of Stabilant 22A which released 1.6 ml of isopropanol to the atmosphere. No further service was needed for three and a half years, (the equipment was sold in working order). Here, the solvent burden of that connector was about 0.46 ml/year – a reduction in solvent burden of 130:1.

Had the concentrate (Stabilant 22) been used there would have been no solvent burden as the vapor pressure of that material is very low. Purely evaporative losses are not an issue, so it has a Volatile Organic Compounds listing of zero. VOC ratings for Stabilant 22A and 22E are listed in their Safety Data Sheets.

### **Do Stabilants contain any Ozone Depleting Chemicals?**

Stabilants do not contain any ODC's such as CFCs, HCFC's or trichloroethylene, nor are such chemicals used in their manufacture.

How about materials that cannot be imported to or sold in some areas?

Neither the Stabilants themselves nor any of the inks used on their labels or packaging contain Lead, Cadmium or Hexavalent Chromium. In addition, many other substances of concern have been addressed in our Safety Data Sheets – Stabilant 22/22A/22E contain none of these.

### **Other factors in the use of Stabilants:**

Stabilant 22 is not subject to the TSCA (Toxic Substance Control Act) nor are they reportable under SARA Title III.

## Are there concerns with disposal of Stabilant 22 or Stabilant-treated equipment?

As noted, Stabilant 22 is not a chelating agent and thus will not cause heavy metals to become concentrated in effluents. And while there is no evidence of toxicity to marine or littoral life, we recommend, subject to local ordinances, that surplus or contaminated Stabilant materials be destroyed by incineration.

Halogen content: 0 ppm (ug/g)

Sulfur content: 0 ppm (ug/g) For United States end-users:

Stabilant 22 is not a hazardous waste when discarded as defined in 40CFR261.337.

Stabilant 22 is not a halogenated solvent when spent as defined in 40CFR261.317. The total Organic Carbon Content (TOC) of Stabilant 22 is 28%.

### Conclusions:

As the useful life of the Stabilants is generally in excess of five years the reduction in solvent burden when using the isopropanol diluted Stabilant 22A could be as much as 200:1, by volume alone, for the connector in a piece of electronic equipment.

While the Mean Time Between Failure of 4 months (for equipment described in the example above) is much shorter than a typical MTBF for most electronic equipment, the amount of solvent used was also minimized by careful application. While even a 50:1 reduction in solvent burden is worthwhile, *the total elimination of solvent burden by the use of the concentrate, Stabilant 22 is even more significant.*

Stabilant 22 is not a chelating agent, a matter of concern to industries that produce heavy metal waste products, and to the nuclear power generating industry.

As Stabilant 22 contains no solvents and has an exceptionally low vapor pressure it is technically not subject to the various rules and regulations governing coatings such as paints and varnishes, and in California's Southwest, the amounts of isopropanol (as a solvent) involved in the use of Stabilant 22A are so small on a daily basis that there is generally no problem in obtaining a letter of exception from the appropriate agencies. As Stabilant 22A is not packaged in quantities sufficient to be affected by the various acts it does not require special labeling in California.

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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