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APPLICATION NOTE

Proper use of Stabilant 22 on complex Process-control Equipment

- *What precautions have to be taken in using Stabilant 22 on complex systems?*

Whenever a complex process control system is treated using **Stabilant 22** or **Stabilant 22a** to prevent system malfunction or crashes, the user must be aware that erratic operation of the system may be the result of a bad connection anywhere in the system. While many custom programs have a built-in tolerance of a peripheral error, and deliver a warning of a peripheral malfunction; others, when faced with "input-output device error" may cause the whole system to "hang" or otherwise mis-behave.

For this reason we recommend that all connections in a system be cleaned and treated. Where protocol converters, MUX's, or other complex peripherals are involved it is important to remember that any one of these might be causing the problem. Generally we have found that the equipment operating in the most contaminated area or under the most environmentally severe conditions will be the first to cause problems. This can apply to a lesser degree even when the equipment is in hermetically sealed cases, if it has been in use for some period of time.

- *Can RF cause problems?*

The possibility of system malfunction due to electromagnetic pulse or even Radio Frequency interference should also be considered. Frequently thin film contamination is encountered in connectors, not only on the pins themselves, but on the outer shielding shells. Thin films of contaminants could result in RF voltages being developed between surfaces that should be connected together. Where corrosion is present it is not unusual for many of the metal corrosion products to act as semiconductors; these can rectify RF signals, or even cause electromagnetic pulses to modulate the signal lines.

- *What about grounding of equipment?*

Complex systems are especially prone to problems caused by poor signal or power supply grounds. It is important to be sure that the grounding of the equipment is functioning properly. Cases where equipment has been grounded to water pipes and where the pipes have later been removed from service and are themselves no longer grounded are not unusual. Even dedicated grounds made to copper-plated rods in the ground should be inspected for loose clamps, or corroded wires. **Stabilant 22** can improve the reliability and lower the resistance of these connections.

It is also important to check to see if some other piece of equipment has been installed which might be sharing a supposedly dedicated ground. Electricians do not

always appreciate that a ground system from a computer or controller may be dedicated (isolated from other grounds) for a reason.

- *Can new equipment cause problems?*

Sometimes process-control equipment malfunctions only after some other piece of equipment has been installed in the plant. Often this malfunction can be eliminated by using a "Power-Conditioning" device in the electrical supply line feeding the controlling computer alone. Problems can also be caused by peripheral equipment operating off a different power source than the controller/computer when signal isolating interfaces are not used. The problems are caused by the creation of ground loop conditions that can affect the integrity of the data or control signals. It has to be recognised that all power-supply outlets are not low impedance. The transients from one piece of equipment can often affect another's operation. For example, if a dot-matrix printer is installed on the same UPS (Uninterruptable Power Supply) as the computer/controller, some problems might be encountered due to the current pulses from the printer's hammer-wire solenoids getting into the computer, especially if the UPS is being pushed to the limit of its current specifications!

- *Are there any potential connector incompatibilities?*

Occasionally, on conventional (untreated) connectors you may encounter connector pairs where one connector's pins are gold-plated, while the matching socket is solder-alloy-plated (or the reverse). Unless the connector design is such as to maintain a high contact pressure there is a galvanic-action corrosion and potential problem here caused by the mismatched materials. Under certain conditions of heat and humidity a poorly-conductive black deposit will be formed within the contact pair. This problem cannot be totally cured by the use of the **Stabilant 22/22a** although the reliability of the contact can usually be increased. One of the connectors should be changed over to match the plating material on the other. The **Stabilants** will function on either the gold-to-gold, or the solder-alloy-to-solder-alloy contacts.

- *What's the bottom line?*

Simply that **Stabilant 22 & Stabilant 22a** are not cure-alls. While in most applications they can substantially reduce the erratic operation of a system, to be effective on hard-to-isolate problems in a complex system, they must be used throughout the system as part of the maintenance program.

NATO Supply Code 38948 - 15 mL of S22a has NATO Part # 5999-21-900-6937

The **Stabilants** are patented in Canada - 1987; US Patent number 4696832. World-wide patents applied for. Because the patents cover contacts treated with the material, a Point-of-sale License is granted with each sale of the material.

MATERIAL SAFETY DATA SHEETS ARE AVAILABLE ON REQUEST

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