



Number 26

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APPLICATION NOTE

Use of Stabilant 22 in Farm Machinery, Truck & Automotive Service

- *What is 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, when applied to electromechanical contacts, 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 an electronic ignition module, an automotive computer, power door-locks, or even headlights. The use of **Stabilant 22** or its isopropanol-diluted form, **Stabilant 22a**, will make contacts from 10 to 100 times more reliable, eliminating costly call-backs and ensuring customer satisfaction.

- *Where can it be used on farm machinery, trucks, and automobiles?*

While the types of electrical and electronic systems vary substantially between farm machinery, trucks, and automobiles, etc. there is a fundamental similarity in that they all rely on connectors of one form or another to connect the various lights, sensors, modules, and such together. In general it is the connectors which are the weakest link in the system, and many electronic component failures within an electronics package can often be traced to the prior failure of a connector within the system. As connector failures are notorious for their unpredictability and intermittent nature, many service people find it quite difficult to isolate this type of problem and have to resort, under the pressure of cost and time, to replacement of major components which themselves, may not be at fault.

The result is substantial increases in the cost of a service job as well as a degree of uncertainty whether the problem has been cured to the satisfaction of the customer. In those applications where a farmer is absolutely reliant upon a piece of equipment, such as his use of a combine during a harvest period, the failure of a connector can be very expensive. Manufacturers are aware of these problems and spend a disproportionate amount of time in the selection and testing of connectors, but the extreme environmental conditions and problems of field contamination together with the number and diversity of connector types and the need for manufacturing cost effectiveness have made perfect reliability almost impossible to achieve. Even in the most expensive equipment used for bio-medical electronics where cost is no object, connector reliability is still considerably less than the reliability of the other electronic components.

Thus the use of a material such as **Stabilant 22 or 22a**, which provide a tenfold to one hundredfold connector reliability increase can make an even greater difference in the reliability of a system employing hundreds of contacts.

Let's consider some of the potential uses for **Stabilant 22 and 22a**:

Electronic Ignition Systems

Both the main power connectors as well as the individual sensor connections can be treated with the **Stabilants**. Often a "sensor malfunction" error message on a diagnostic computer will occur because of a faulty connection to the sensor. We're sure that if you service this type of equipment that you've replaced sensors only to have the same error message re-occur. In cases where a heavy grease has been used to try and waterproof the connection this should be removed with kerosene, isopropyl alcohol and/or cleaner before applying the Stabilant.

Instrument Clusters

Malfunctioning lights or instruments on/in an instrument cluster are often caused by poor contacts, and this can be cured by the use of the **Stabilants**. Uncoupling the tab type connectors sometimes breaks the wire crimped to the connector, especially on old equipment. You can use **Stabilant 22a** to penetrate the connector without having to uncouple it in these cases. In farm machinery there is an increasing degree of consolidation of engine read-outs into one electronic monitoring system and the **Stabilants** provide a solution to erratic operation of this system when caused by connectors.

Fuses

While the new blade type fuses are more reliable than the older 3AG/AGC types, the use of the **Stabilants** will reduce the possibility of *fuse contact heating* which can cause an fuse to blow *below its rated current* on a circuit that is O.K.

Head Lights, Dome Lights & Indicator Lights

Again it's good practice to use **Stabilant 22a** when replacing light bulbs, as well as using it on the wiring harness connectors. Poor contact in the latter will result in a voltage drop at the connector that can rob the lights of some of their brightness. On older equipment, poor grounding of the light fixture (due to rusting of the attachment point) can often result in dim lights. **Stabilant 22a** applied to the mount can often restore the circuit to peak performance. Whenever quartz-halogen bulbs are used be sure not to handle the bulb itself or get any **Stabilant** on the quartz bulb. Ignition switch lights are often quite difficult to get to, and the time involved in changing a light in an older car often makes it a job where the cost of the work is not appreciated by the customer especially if the new light fails due to a bad contact.

Sensor Connectors

Frequently, sensors for electronic controls appear to malfunction. This is probably the most common reason for the type of intermittancy that causes dealers problems. Customers do not understand why a dealer cannot make a problem occur "on the bench". Often, replacement of the sensor appears to cure the problem only to have the same problem occur hours, days, or even weeks later. The difficulty is that quite often the problem is the connector itself rather than the sensor. Replacing the sensor "cured" the problem only because the vary act of replacement simply "wiped" the connector. **Stabilant 22a** provides an improvement in the connector contact and will usually eliminate this problem at a cost in time and parts much lower than replacement of a sensor. A drop in the connector is normally all that is required.

Heater & Air conditioning Controls, Thermostats and Electric motor Switches

Caution should be used when using Stabilants on any switch contacts which switch an inductive load. A good rule of thumb is, if there's enough inductive kick to make the switch spark, don't use the Stabilants as they would increase the sparking! However it is OK to use the **Stabilants** in the wiring harness connectors in these circuits.

Electric Rear-view Mirrors

The tab connectors inside the doors are susceptible to contamination from some of the oil/wax rust preventative sprays as well as from road dirt and salt. Usually a drop of **Stabilant 22a** per contact is all that's needed to restore reliability.

Solenoid Door & Trunk Locks, and Power Windows

The same problem as above occurs with Solenoid-operated lock and power-window mechanisms. Some cars rely on the hinge/door latch to provide a ground return for these circuits (which is why on many older cars the power windows only work perfectly when the doors are open and on the "detent") and it may be necessary to run a separate ground wire to restore proper function.

Horn circuits

Nobody likes servicing these because of the possibility of recurring problems. Use **Stabilant 22** to prevent having to do the job a second time.

Tail Lights, Parking Lights and Headlights (Including Trailer connections)

Although the currents involved might be high enough to "punch-thru" some of the contamination on contacts in these circuits, not only can't that be relied upon, but there is often a voltage drop that causes the connectors to over-heat. A little salt contamination with this high-heat condition hastens the corrosion process. Use **Stabilant 22** to stop this and increase the lighting level by the elimination of voltage drops. On trailers, it is not uncommon to have both the tail lights and clearance lights fail because of a bad connector and the **Stabilants** can prevent this problem. Don't forget to treat the external Tab™ connectors on the headlight relays. (Don't use it on the relay contacts themselves if there's any sign of a spark when they open!)

Door Activated Switches

Everyone has run across automobiles and trucks where the dome-light won't function when the doors are opened. **Stabilants** on the switch connectors will usually cure these problems.

Radios, Cassette Decks & Speakers

It's tough to fix stereo speakers when they start to go out of balance because often it's not the fault of the radio or power amplifier, but the interconnects or speaker leads. Several hundred thousand dollars of the **Stabilant** concentrate is used each year in the home audio industry just to ensure reliability and reduce distortion. A drip on the speaker contacts and on the connections to the radio will usually eliminate this out-of-balance condition.

Battery Terminals and Starter Lugs & Terminals

While it is an unusual application, many automotive electricians prefer to "seat" the battery connections using **Stabilant 22** rather than petroleum jelly or electrical grease. A much better contact results and there's no reason you can't cover the completed connection with grease to protect it against battery-fume corrosion.

Voltage Regulators , Alternators, and Generators

Again, **Stabilant 22** is very useful on these devices contacts. Often alternators with bolt-on voltage regulators suffer because of their close proximity to the exhaust manifold, additional heating due to localized contact problems can lead to erratic regulation or premature failure of the voltage regulator. **Stabilant 22/22a** applied to the lug type and Tab™ connectors can result in better regulation and will help prevent dead or dying batteries due to insufficient charging current from the alternator or generator.

Diagnostic Equipment

One of the first uses for **Stabilants** was in the maintenance of electronic test equipment where it has been employed since 1983 in Military, Civilian, not to mention Avionics and Bio-Medical electronics.

- *Isn't it expensive to use?*

Not when you consider the time it saves! How long does it take you to take off a door panel to get to the contacts inside, or pull an instrument cluster for that matter? How much time have you had to spend trying to diagnose an erratic piece of electronics and how often have you had to repeat a job where you thought you had it fixed? The material is easy enough to apply that all the connectors in a system can often be treated in less time than it takes to isolate the problem to one connector! There are about 3000 drops in a 50 ml Bottle kit of **Stabilant 22a** and each drop could save you 5 minutes.

- *In what forms is it available?*

The **Stabilants** are available in both a Isopropanol-diluted (**Stabilant 22a**) and a Concentrated (**Stabilant 22**) versions. Because of the 4:1 dilution of the former, it will generally cost about $\frac{1}{5}$ the amount of the concentrate, although, obviously, it is the concentrate that remains that does the job. The isopropanol is just there as a solvent to "carry" the concentrate into place, once its there the isopropanol evaporates. The concentrate is used whenever lubrication is as important as contact performance.

- *Is it available in a spray can?*

No, for the reason that users found that they were wasting 60% to 70% of the material on overspray, and existing propellant systems are either highly inflammable or ozone-layer depleaters.

- *Is Stabilant just another contact cleaner?*

No, **Stabilant 22** is an *electrically active* material which enhances conductivity within a contact without causing electrical leakage between adjacent contacts. Thus large quantities of the material do not have to be "hosed on" as is the case with cleaners. **Stabilant 22** does have a detergent action but it is not sold as a cleaner. It is used and *left in place*, forming a *resident* enhancement system.

- *Just how much should be used and how do I apply it?*

Normally, a film thickness of about $\frac{1}{2}$ to 1 mil of the concentrate is more than enough. In other words, you need just enough to fill up the minute gaps within the contacts. But when time is important, you can flood the connector pins with **Stabilant 22a**. The dropper-bottle allows it to be dribbled onto the pins, or in the

case of a plastic shielded tab connector, you can flood the plastic sleeve. On the rectangular automotive type multiple-pin plastic-bodied connectors, a connector which is free of grease can be treated by applying a enough **Stabilant 22a** to each wire entry in the back of a coupled connector so that it will run down into the contact area. When in doubt, unplug the connector and apply **Stabilants** to the pins or the sockets. If the connector is full of grease or oil, flush it clean before applying **Stabilants**. Avoid using gasoline, penetrating oils or light machine oils on connectors as they can damage the plastic or rubber materials.

- *Is the material hazardous?*

No skin reactions have ever been observed. In the undiluted form at room temperature it is non-flammable, however if the temperature of the material is raised above 200°C the resulting decomposition products will support combustion. The concentrate is non-toxic. As such the concentrate itself (**Stabilant 22**) is considered a Non-Hazardous material. When diluted with isopropyl alcohol (isopropanol) as **Stabilant 22a** the material is flammable. Please note that comprehensive Material Safety Data Sheets are available for both forms of the material.

- *Can it be used by untrained personnel?*

Yes, because it does not short circuit adjacent contacts, a connector body can be flooded with the material. And even the dilute version is virtually non-toxic.

- *Does the action of the Stabilants deteriorate with age?*

It has been in use in field trial applications in excess of twelve years now without showing any sign of reduced effectiveness. The material has a high molecular weight and a very low vapor pressure. Thus it is not prone to losses to evaporation. Unlike some other contact protection oils, **Stabilant 22** will not cross-link when exposed to certain material such as high-sulphur (free-machining) brass alloys, cutting oil or sour-crude-based lubricants, neither will it cross-link when contact with thermoset/catalysed plastics or elastomers containing ultra-accelerators, curing agents or other cross-linking agents. Thus the phenomenon of "varnishing", so common with some of the oil-based protective films will *not* occur with the **Stabilants**. Nor will the **Stabilants** adversely affect elastomers or plastics used in connectors.

NATO Supply Code 38948 - 15 mL of S22a has NATO Part # 5999-21-900-6937
The **Stabilants** are patented. Canada - 1987: & U.S. Patent number 4696832. World-wide patents have been applied for. Because the patents also cover contacts treated with the material, a Point-of-sale License is granted with each purchase of the material.

MATERIAL SAFETY DATA SHEETS ARE AVAILABLE ON REQUEST

NOTICE - LIMITED WARRANTY

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. The warranty is limited to the purchase price of the material. Neither D.W. Electrochemicals Ltd., their distributors, or their dealers assume any liability for damages to equipment and/or consequent damages, howsoever caused based on the use of this information.

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