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Number 25

## APPLICATION NOTE

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### Use of Stabilant 22A on Plastic Element Potentiometers

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#### Background

While plastic element potentiometers and faders have major advantages over the step type units, they do require some lubrication to extend their trouble-free life. Problems associated with malfunctioning or dirty elements include noise, microphonics, mis-tracking of dual controls, and even dropouts. A mostly neglected concern has been the effect of thin film contamination on the total harmonic distortion of the audio signal, including the tendency of this distortion to lie in the more easily audible high-order harmonics. Stabilant 22 addresses all of these problems.

#### Apparent action of thin-film contaminants

As an alternating current signal voltage passes through the zero voltage state, current ceases to flow (we're assuming a purely resistive load here); if a thin film of contamination is present, current may not start to flow again until sufficient voltage has built up across the contaminant so as to break it down. The result is a small notch in the signal which in sound is not dissimilar to the notch distortion of a class D power amplifier. The characteristic sound ranges from a "grainy" quality up to a harsh "glassy brilliance" overlaying the music. Again, Stabilant 22 prevents this.

#### The use of Stabilant 22/22A

Stabilant 22A is thin enough to distribute the concentrate evenly in a potentiometer, creating a lubricating film. However, the isopropyl alcohol diluent can adversely affect many plastic element types. A suitable water-diluted mixture can be used in this case. Add three parts of hot water to one part of Stabilant 22 (the concentrated form) and allow it to cool before use. Apply a small amount (one drop is usually enough) and vigorously cycle the fader to distribute the film the entire length of the track. If the film thickness is too great, hydroplaning could occur, in which the contacts push a film of the lubricant ahead of them, causing it to increase in thickness until contact is lost between the wiper fingers and the plastic element (partly due to the low contact pressure). This is a case where more is NOT better.

## Simple verification that audible distortion has been reduced

If you want to do a comparison of the distortion effects of thin film-contamination, it is suggested that only one input channel be treated (including all the IC's, switches and connectors which should be treated with Stabilant 22A). and then and compared with an untreated channel. The difference us usually audible as a smoother more musical sound on the treated channel.

## Precautions

Again, keep the film thickness to a minimum. Don't use Stabilant 22A on plastic element faders unless their manufacturer OK's the use of isopropyl alcohol (isopropanol).

## Reference

Please also refer to the following for related details:

- Technical Note 24: "Effects of Stabilant 22 on Harmonic Distortion in Connectors"
- Application Note 4: "Microphone Connectors"
- Application Note 3: "Schadow Switches"
- Application Note 11: "Recording Studios"
- Application Note 12, "Broadcast Equipment"

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**

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