

# NASA TECH BRIEF

## *Marshall Space Flight Center*



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### Development of Conformal Coating Materials

Newly developed polymeric compositions show considerable promise as reliable conformal coatings on electronic circuitry operating in rigorous environments. Specifications for the coating materials include: easy application, good adhesion, good transparency, flexibility over a wide temperature range ( $-65^{\circ}$  to  $+100^{\circ}$  C), nonflammability (in oxygen-rich atmospheres), good electrical properties, exertion of minimal stress on electronic components and solder joints when the coating is cured or thermally cycled over the temperature range of  $-65^{\circ}$  to  $+100^{\circ}$  C, and resistance to mechanical vibrations at amplitudes up to 100 g.

Formulation of the conformal coating compositions is based on nitrosofluorocarbon polymers having active cure sites (carboxyl, hydroxyl, and amide groups). One of the more promising formulations consists of a solution of a high-molecular-weight terpolymer of tetrafluoroethylene, nitrosotrifluoromethane, and nitrosoperfluorobutyric acid, a diepoxide curative, and a surfactant. The solvent is a blend of a fluoroether, 1,3-di(trifluoromethyl)benzene, and two different chlorofluorocarbons. This solvent forms stable solutions with the basic constituents (terpolymer, curative, and surfactant). The coating composition has a working life of more than two weeks at ambient temperatures and is easily brushed onto solvent-cleaned surfaces to form tightly adherent films after a precure at room temperature (10 to 15 minutes) followed by a postcure at  $80^{\circ}$  C (15 to 30 minutes).

#### Notes:

1. Some of the compositions investigated may prove useful as chemically resistant, fire-retardant coatings.
2. The following documentation may be obtained from:

National Technical Information Service  
Springfield, Virginia 22151  
Single document price \$3.00  
(or microfiche \$0.95)

#### Reference:

NASA CR-102743 (N70-31661), Development of Conformal Coating Material

#### Patent status:

Inquiries about obtaining rights for the commercial use of this invention may be made to:

Patent Counsel  
Mail Code A&TS-PAT  
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