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NASA TECH BRIEF

Manned Spacecraft Center

A New Vibration Dampening Adhesive

The problem:

When a relatively delicate component is glued to a base which may vibrate, an energy absorbing adhesive is used to lessen the shock. Because of their low shear strength and tendency to deform under stress or heat, many adhesives previously used for this purpose failed to hold the components tightly in place.

The solution:

A formulation of polymers has been devised which is both thixotropic and thermosetting; that is, when vibrated, the adhesive becomes more fluid (thixotropic) to better absorb the shock and, when warmed, will actually hold its shape better (thermosetting) rather than deform.

How it's done:

The formulation consists of:

(1) 70 parts by weight of a commercially available thermosetting polyamide,

(2) 30 parts by weight of a commercially available bonding epoxy resin,

(3) 17 parts by weight of a commercially available thixotropic polymer, and

(4) 2 parts by weight of diethylene triamine as a curing agent.

To make up the adhesive, mix (1) and (2), add (3) and mix, add (4) and mix; then cure the mixture for 12 hours at room temperature or for one hour at 355K (180°F).

The shear strength of this adhesive is from 4.8×10^6 to 6.9×10^6 N/m^2 (700-1000 psi) as compared to 5.5×10^5 N/m^2 (80 psi) for previously used adhesives.

Notes:

1. This adhesive may be of interest to those in the electronics, automotive, and marine industries, and as a sealant in reverse osmosis filtration processes for water purification.
2. No additional documentation is available. Specific questions, however, may be directed to:

   Technology Utilization Officer
   Manned Spacecraft Center
   Code JM7
   Houston, Texas 77058
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Patent status:

No patent action is contemplated by NASA.

Source: Stanley Y. Yoshino of
North American Rockwell Corp.
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Category 04