

# NASA TECH BRIEF



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## Improved Adhesive for Cryogenic Applications Cures at Room Temperature

### The problem:

To formulate an adhesive that will cure at room temperature and provide an effective adhesive bond over the range from room temperature down to the temperature of liquid hydrogen ( $-423^{\circ}\text{F}$ ).

### The solution:

An adhesive consisting of 1 part of 200-mesh powdered nylon filler to 2 parts of an epoxy-polyamine resin.

The added nylon filler markedly improves the adhesive strength (tensile shear) and adhesive toughness (T-peel strength) of the epoxy-polyamine resin. The filled adhesive can be cured at room temperature, whereas the unfilled resin requires a  $250^{\circ}\text{F}$  curing cycle. When applied to 7075-T6 bare aluminum, the bond strengths of the filled and unfilled adhesives cured under contact pressure at room temperature are as follows:

Adhesive	Tensile Shear (Psi)			T-Peel (Lb/in.)		
	Rm Temp.	$-320^{\circ}\text{F}$	$-423^{\circ}\text{F}$	Rm Temp.	$-320^{\circ}\text{F}$	$-423^{\circ}\text{F}$
Unfilled Epoxy-Polyamine	2334	1514	1552	0	0	0
Nylon-Filled Epoxy-Polyamine	3127	2710	2552	3.9	3.5	3.0

### Note:

Inquiries concerning this innovation may be directed to:

Technology Utilization Officer  
Western Operations Office  
150 Pico Boulevard  
Santa Monica, California, 90406  
Reference: B66-10185

### Patent status:

No patent action is contemplated by NASA.

Source: M. B. Smith and Harry J. Klinger  
of Telecomputing Corporation  
under contract to  
Western Operations Office  
(WOO-132)

Category 03



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## Electronically Controlled Valve



The valve is controlled by a pulse-width modulated (PWM) signal. The signal is applied to the control unit, which in turn actuates the valve. The valve is designed to operate at a pressure of 100 psi and a flow rate of 10 gpm. The control unit is a simple electronic circuit that can be easily modified to suit different applications. The valve is made of stainless steel and is suitable for use in a wide range of environments. The control unit is made of aluminum and is protected against corrosion. The valve is a simple and reliable device that can be used in a variety of applications. It is a good example of the use of electronics in fluid control systems.

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