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NASA TECH BRIEF

Marshall Space Flight Center

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High Temperature Autoclave Vacuum Seals

A thin sheet of aluminum foil makes an effective sealing film for the pressurized-autoclave curing of parts formed from high-temperature composite materials. Recently developed composites, bonded with materials such as the polyquinoxiline resins, must be cured at temperatures above 700 K. Such curing requires that each part be sealed within an impermeable film, which must be sufficiently flexible to conform to the contours of the part, yet tough enough to retain its integrity at the cure temperature during the application of vacuum and pressure. At cure temperatures above 480 K, various plastic films and mastic sealants are ineffective.

The aluminum sheet, secured at the platen edges by a bolted steel ring, forms an effective sealing film at temperatures up to 728 K. Rings of soft aluminum wire, functioning in the manner of an elastomeric O-ring, provide a positive seal between the foil and platen. For applications at temperatures above the service temperature of the aluminum, stainless steel can be used as the film material, and copper wire as the sealant.

Notes:

1. The only alternative technique that is useable at high temperatures is the considerably slower and less effective method of welding a sealing foil to the platen.
2. No additional documentation is available. Specific questions, however may be directed to:
   Technology Utilization Officer
   Code A&TS-TU
   Marshall Space Flight Center
   Huntsville, Alabama 35812
   Reference: B71-10433

Patent status:

No patent action is contemplated by NASA.

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Category 08

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