

# NASA TECH BRIEF

## *Marshall Space Flight Center*



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### Phase-Change Materials Handbook

Phase-change materials are a particular group of substances with the unique ability to absorb and liberate large quantities of heat without an appreciable temperature change. To date, the major effort in phase-change materials technology has been largely confined to preliminary theoretical and empirical research; however, to determine the practicality of the technique, flight systems using phase-change materials have been scheduled for testing in a major space effort. The materials handbook provides the theory and data needed by the thermal design engineer to bridge the gap between research achievements and actual systems.

The handbook describes the relationship between phase-change materials and more conventional thermal control techniques. Also, the handbook discusses numerous space and terrestrial applications of the materials. Material properties of the most promising phase-change materials are provided, along with the purposes and use of metallic filler materials in phase-change material composites. Information on packaging problems, the effects of bubble formation, supercooling, and other design and performance considerations are included. In

addition, methods of obtaining data not currently available are presented. A discussion of computational tools useful to the designer is also included in the handbook.

#### Note:

Requests for further information may be directed to:  
Technology Utilization Officer  
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Code A&TS-TU  
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Reference: B72-10464

#### Patent status:

No patent action is contemplated by NASA.

Source: D. V. Hale, M. J. Hoover, and M. J. O'Neill of  
Lockheed Missiles and Space Company  
under contract to  
Marshall Space Flight Center  
(MFS-22064)