

NASA TECH BRIEF

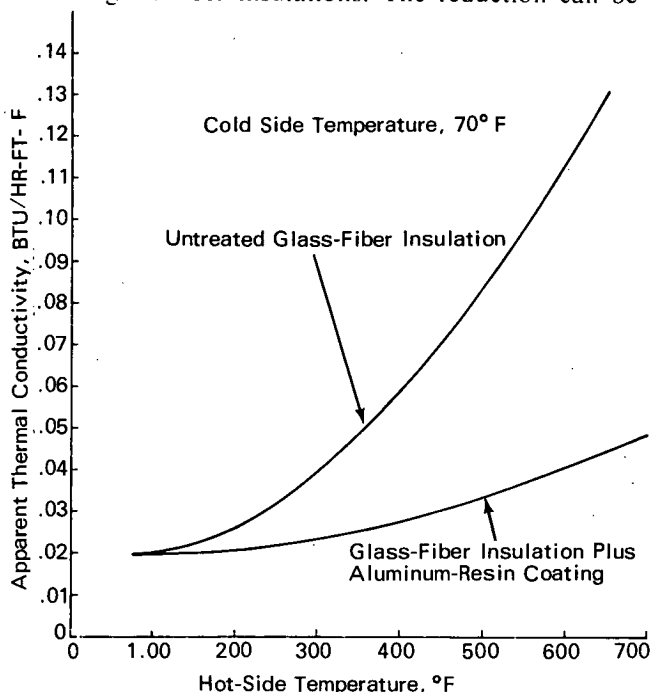
Lewis Research Center



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Opacified Fibrous Thermal Insulation

A lightweight, opacified, glass fiber batting for high temperature insulation in cryogenic tanks has a lower apparent thermal conductivity than untreated glass fiber insulations. The reduction can be



threefold or more, at a temperature difference of 600° F or greater between the outer insulation faces. The decrease results from impeding the transmission of radiant energy without increasing the solid conductance of the material. When large temperature differences exist between the outer insulation faces, such radiant energy represents a large portion of the total energy transferred.

The glass fiber batting is opacified with an aluminum powder dispersed through the material.

The powder dispersion method was previously proposed for increasing the thermal reflectivity of fabrics, but prior applications to glass fibers for high temperature insulations were not known.

Test results for a 0.6 lb/ft³ glass fiber batting were as shown in the figure, with the hot-side temperature given on the abscissa. The cold side was exposed to quiet, room-temperature air. The glass fiber batting was composed of 0.004 in. diameter fibers, which were simultaneously coated with a silicone resin and aluminum powder and were then compacted to the desired density.

An alternative opacification method would involve electroless plating of the fibers in the already formed batting.

Note:

No additional documentation is available. Technical questions, however, may be directed to:

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 Reference: B71-10406

Patent status:

No patent action is contemplated by NASA.

Source: R. E. Chambellan of Lewis Research Center, and Dr. J. L. McGrew of Martin Marietta Corp. under contract to Lewis Research Center (LEW-11235)

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