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C1Po2A-07 [18]: Use of Galinstan as a Contact Agent for Additively Manufactured Components in Cryogenic Engineering

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A heat switch originally developed by ESA/Twente has been modified for use with superfluid helium in the 1 K temperature range as part of a variable temperature insert in an NMR type magnet system. The key challenge was to develop a process that allows to removably contact the additively manufactured switch to a copper surface with nearly no temperature gradient build up. The experiments at GE GRC were conducted over a period of several months and satisfied the design constraints. Galinstan was the choice for this application. The use of Galinstan as an industrial material for use in cryogenic applications and in particular for additively manufacture components is reviewed and explained. Thermal contact conductance values are presented for dissimilar materials, this study has not been investigated before.

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