

**A GENERALIZED ANALYTICAL MODEL FOR RADIATIVE TRANSFER
IN VACUUM THERMAL INSULATION OF SPACE VEHICLES**

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ABSTRACT. The previously developed spectral model for radiative transfer in vacuum thermal insulation of space vehicles is generalized to take into account possible thermal contact between a fibrous spacer and one of the neighboring aluminum foil layers. An approximate analytical solution based on slightly modified two-flux approximation for radiative transfer in a semi-transparent fibrous spacer is derived. It was shown that thermal contact between the spacer and adjacent foil may decrease significantly the quality of thermal insulation because of an increase in radiative flux to/from the opposite aluminum foil. Theoretical predictions are confirmed by comparison with new results of laboratory experiments.