

Materials Tip



Materials Engineering Branch

| Using a Teflon Release Film in the Application of a Thermal Control Compound | | | |
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Thermal control compounds are commonly used to conduct heat across two interfaces to achieve thermal balance in a spacecraft system. Specially formulated greases have been used in the past to achieve this goal, but using these grease compounds should be avoided because of their undesirable properties that can compromise most space experiments.

In the last few years, thermally conductive silicone rubber sheet material and form-in-place, thermally conductive silicone compounds have been used successfully for heat transfer in flight experiments. The pre-formed sheet is simply cut to size and shape and used without further processing. In cases where there are surface irregularities or in packages where bowing might be experienced when bolting two surfaces together, the two-part, form-in-place silicone formulation should usually be employed.

Whenever black boxes or printed wiring boards (PWBs) are assembled and the form-in-place silicone is used, there is always the possibility of the necessity of disassembly one or more times. In the case of PWBs, in particular, there exists the possibility of damage when the disassembly is attempted because of the tenacious nature of the silicone compound. A simple solution to the problem has been developed by the Materials Engineering Branch and that is to place a Teflon release-sheet in the assembly. The thinner the Teflon film, the better. The recommendation is to use 1/2 mil sheet or less if available. The Teflon should be placed against the most sensitive surface. In the case of a PWB and a flat plate, it should be in direct contact with the PWB. It is desirable to place a few, small holes in the Teflon sheet to enhance the heat transfer. This will not affect the workability of the system. Each user of this technique may customize the details to fit the system used. This fix is noncontaminating, safe and effective for flight hardware systems.