Materials Engineering Branch

TIP*

No. 080 A Method for Cutting Open Cell Polyurethane Foams

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Open-cell polyurethane foam materials, ranging in thickness, have a variety of uses in the fabrication, shipping, and storage of space flight hardware. Regardless of the application, the usage configuration generally requires that the material be cut to conform to a particular shape. Anyone who has attempted to cut open cell polyurethane foam materials has discovered that it is difficult to make the desired cuts using any of the typical cutting tools such as scissors, razor blade, or a sharp knife. This is especially true for the thicker (greater than ½ inch) foam materials which when cut with any of the above tools usually look uneven and often lack the desired degree of conformity necessary to provide the proper fit.

The key to successful cutting of open cell foam materials is to avoid compressing (squeezing) the material during the cutting operation. A simple, inexpensive, yet effective method for achieving professional looking cuts in open cell foam materials that meet the desired shape is to use of a typical household electric knife. The writer used a Hamilton Beach Model #275-1. With the exception of a straight edge to ensure a straight-line cut, no other tools (or special talents) are required.

Be aware that foam materials, in general, pose a particulate contamination problem unless they are properly treated before use. Many of the open cell foam materials, in the "as-purchased" condition, fail to meet the acceptable vacuum outgassing criteria required for space flight hardware. They can also transfer contamination to flight hardware by direct contact. Materials TIP 086 describes an effective technique for cleaning some foam materials.

To avoid such problems and to ensure purchase of material that is either acceptable “as-purchased” or can be made acceptable by solvent cleaning and/or baking, refer to the Materials Engineering Branch Outgassing Database on-line[1]. You can also contact the Branch directly for assistance.

[1] The address is: http://outgassing.nasa.gov