



Materials Engineering Branch

TIP*



No. 113 Precaution on the Use of Methanol for Cleaning Space
Flight Hardware

Author(s): Fred C. Gross

Contact: (301) 286-6882

Methanol (methyl alcohol) has, for many years, been a common and useful chemical in the chemist's repertoire and the chemical industry. Millions of tons are produced and used every year for a multitude of products as well as for the pure chemical itself. It is a member of a series of alcohols that are somewhat similar in properties but do vary slightly from one member to the next in the series, a fact that can be significant. It is this very difference between methanol and its relatives, ethanol and iso-propanol, on which this TIP focuses its attention. Small molecules, such as methanol, tend to be more highly reactive than their larger relatives since they are more easily dissociated, thus exposing their reactive parts.

Methanol will always be an important tool in the hand of a chemist and for the use of controlled chemical processes. It is this author's opinion that methanol, in general, should not be used for cleaning space-related hardware for the following reasons:

- It is highly flammable and, to some degree, explosive.
- In the presence of trace amounts of water, aldehydes, acids and chlorine/chloride containing compounds, methanol has been known to react with such metals as titanium, magnesium, aluminum, and even some types of steels.
- It is a relatively poisonous and/or hazardous material to those who must work with it, so that appropriate safety measures must be taken to avoid personnel exposure or use an alternate material.

If cleaning hardware with alcohol is indicated, the use of reagent grade, or equivalent ethanol or iso-propanol, is recommended.