



## Materials Engineering Branch

### TIP\*



No. 039 Non-hazardous Joining Method for Nylon

Author(s): Benjamin Seidenberg

Contact: (301) 286-6882

---

The bonding of Nylon to itself and other substrates normally requires the use of m-cresol or phenol solutions, both of which are health hazards. Toxicity data for m-cresol and phenol indicate that the former is moderately toxic and the latter is highly toxic for acute exposure<sup>1</sup>. As a result we recommend the following non-toxic process for bonding Nylon:

#### Formula:

- 10 parts by weight of powdered Nylon 6/6 (fine enough to pass a 10 mesh screen)
- 22.5 parts by weight of calcium chloride ( $\text{CaCl}_2$ )
- 67.5 parts by weight of analytical grade ethanol

#### Procedure:

Disperse the  $\text{CaCl}_2$  into the ethanol and shake for two hours or until the  $\text{CaCl}_2$  is completely dissolved. Filter through a fritted glass funnel to achieve a completely clear solution. Add the Nylon powder and stir for about 16 hours. A syrupy clear liquid will result. Apply by brush to both surfaces to be joined. Allow a 30 second exposure to air, then mate the two surfaces, making sure that there is only contact pressure for 30 minutes. After this point the joined parts may be handled. Full mechanical properties will be achieved in 24 hours.

For further information, the reader can consult DuPont's bulletin on Nylon.

**NOTE:** Nylon is unsuitable for many space flight applications. For example, it is notorious for absorbing water at ambient conditions. The subsequent loss of moisture in space vacuum can result in dimensional changes in the Nylon and potential contamination concerns for moisture sensitive components. There are several polymers that are preferred over Nylon, for space flight applications, such as Delrin (a high molecular weight crystalline form of polyoxymethylene).

---

<sup>1</sup> "Dangerous Properties of Industrial Materials", by N. Irving Sax, 3<sup>rd</sup> Edition, 1968.