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# NASA TECH BRIEF



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## Organic Reactants Rapidly Produce Plastic Foam

**The problem:** Accelerating the reaction between a polyether resin and toluene diisocyanate to produce a plastic foam of low density and uniform porosity. The reaction must proceed rapidly to completion when the reactants are brought into physical contact. Bulky mixing equipment could not be used. Instantaneous production of the plastic foam was required to provide buoyancy for flotation recovery of instrument packages dropped into the sea from spacecraft.

**The solution:** The speed of the reaction between the organic reactants is significantly increased by adding sufficient trichlorofluoromethane to the polyether resin to reduce the viscosity of the resin solution to a value close to that of the diisocyanate.

**How it's done:** The basic resin solution is prepared by mixing 155 ml of trichlorofluoromethane with 400 ml of a sorbitol base polyether resin. To this solution are also added 3 grams of triethylene diamine and 2 grams of dibutyltin dilaurate as initiating catalysts, and 2 grams of a silicone as a stabilizer. The final solution is stored in one container. A second container, separated from the first by a rupturable diaphragm, is filled with 320 ml of toluene diisocyanate (80% by volume of the 2,4 isomer and 20% by volume of the 2,6

isomer). The plastic foam produced when the diaphragm between the containers is ruptured occupies a volume approximately 30 times that of the reactants.

### Notes:

1. The plastic foam generator is described in NASA Tech Brief B65-10090, April 1965.
2. Inquires concerning this invention may be directed to:

Technology Utilization Officer  
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