

Perfluorocarbons as Halon Replacement Fire Extinguishing Agents

3M Halon Replacement Program Objectives: 3M is committed to developing efficient, safe, viable halon replacement agents which will not contribute to the destruction of stratospheric ozone.

Description: Perfluorocarbons are fully fluorinated compounds which have been manufactured by 3M for over forty years for use as heat transfer fluids, electronic testing fluids and in other applications requiring stable inert fluids. Low molecular weight perfluorocarbons have recently been tested and shown to effectively extinguish fires when used in a similar manner to halon 1301 and halon 1211.

Fire Extinguishing Performance:

Extinguishment Concentration Using Cup Burner Method

<u>Agent</u>	<u>N-Heptane % Volume</u>
Perfluorocarbons	5.5-7.0*
Halon 1301	3.7
Halon 1211	4.1

*Concentration varies depending on particular perfluorocarbon compound tested.

Total Flood Applications: Perfluorocarbons have been tested in total flood applications using standard halon 1301 equipment pressurized to 360 psi with nitrogen. When tested on class A and B fires, the fire performance of a perfluorocarbon compound at a concentration of 7 percent was comparable to halon 1301 at a concentration of 5 percent. On a weight basis, perfluorocarbons require approximately twice the quantity of agent as halon 1301 for similar fire scenarios.

Streaming Applications: Perfluorocarbons have been tested in hand held portable extinguishers and demonstrate potential as a replacement to halon 1211.

Ozone Depletion Potential: Perfluorocarbons do not contain chlorine or bromine and do not contribute to the destruction of the stratospheric ozone. Perfluorocarbons have an ozone depletion potential of zero.

Toxicity: A sub-acute inhalation study on a commercial perfluorocarbon, Fluorinert™ FC-72, indicates the toxicity of FC-72 is low. Although the perfluorocarbons under consideration as halon replacements are similar in chemical structure to FC-72, inhalation studies will be required to determine the toxicity of these halon replacements. These toxicity tests are in progress with initial test results expected in 1991.

Continued on Back Page

Electronic Equipment Compatibility: Perfluorocarbons are electrically nonconductive. Perfluorocarbons are commonly used in direct contact with sensitive electronic components and will not damage these components or leave a residue.

Materials Compatibility and Storage: Perfluorocarbons exhibit excellent materials compatibility with the possible exception of some heavily fluorinated polymers.

Perfluorocarbons are extremely stable and will not degrade during long term storage.

Additional Information: For additional information on 3M perfluorocarbons as halon replacement fire extinguishing agents, please call (612) 733-7937.

Important Notice To Purchaser: All statements, technical information and recommendations contained herein are based on tests conducted with 3M approved equipment, and are believed to be reliable. But the accuracy or completeness thereof is not guaranteed, and the following is made in lieu of all warranties, express or implied, including the implied warranties of merchantability and fitness for purpose:

Seller's and manufacturer's only obligation shall be to replace such quantity of the product proved to be defective. Before using, user shall determine the suitability of the product for its intended use, and user assumes all risk and liability whatsoever in connection there within. NEITHER SELLER NOR MANUFACTURER SHALL BE LIABLE EITHER IN TORT OR IN CONTRACT FOR ANY LOSS OR DAMAGE, DIRECT INCIDENTAL, OR CONSEQUENTIAL, ARISING OUT OF THE USE OF OR THE INABILITY TO USE THE PRODUCT. No statement or recommendation not contained herein shall have any force or effect unless in an agreement signed by officers of seller and manufacturer.