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H. A. Gilbert - WILMINGTON
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(314) WYdown 3-1000

May 26, 1966

Therminol FR-1

Mr. William Ashby
E. I. DU PONT COMPANY
Design Division
P. O. Box 71
Chattanooga, Tennessee

Dear Mr. Ashby:

Here is the additional toxicity data you requested for Monsanto's THERMINOL FR heat transfer liquids.

1. Toxicity Data

The acute oral toxicity in rats for THERMINOL FR-1 and FR-2 is approximately 9 grams per kilogram and 12 grams per kilogram respectively. When applied to the skin of rabbits, the minimum lethal dose is approximately 1 gram per kilogram for either THERMINOL. It is not unusual to see greater sensitivity in the rabbit with this type of material. Animals of several species (cat, guinea pigs, mice and rats) survived without signs of intoxication when exposed to air laden with THERMINOL FR-2 for seven hours per day for four days. The concentration of the vapor was maintained at 43.1 milligrams per cubic meter. Inhalation of vapors at this high concentration caused a mild non-specific pneumonitis. There was some evidence of systemic toxicity but microscopic pathology showed this to be reversible.

2. Detrimental effects on personnel resulting from overexposure

No serious acute detrimental effects on personnel would be expected during the normal handling and use of this fluid. The vapor concentration which might cause nausea, vertigo, & temporary liver damage are so irritating to the eyes, nose, and throat that workers would not be expected to voluntarily subject themselves to such an exposure. Equally important, however, is the possibility of systemic injury resulting from day-in and day-out chronic exposures - either by vapor inhalation or continuous skin exposure.

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3. Symptoms of overexposure

In addition to the items mentioned in (2) above, prolonged and repeated skin exposure to the fluid may result in a solvent action on the skin followed by drying, chapping, and cracking. If the exposure is sufficiently great and prolonged sufficiently, chloracne may develop.

4. Maximum allowable concentration.

The maximum allowable concentration for THERMINOL FR-1 is 1 milligram per cubic meter. ~~As you undoubtedly know, this fluid is a specially refined grade of chlorinated biphenyl (chlorinated to 42% by weight).~~ In the case of THERMINOL FR-2, ~~this is a specially refined grade of chlorinated biphenyl (chlorinated to 48% by weight). The~~ maximum allowable concentration ~~has been established for this compound, however,~~ is ~~we would suggest~~ 0.5 milligram per cubic meter of air.

Summarizing all of the animal toxicity data and many years experience with this type of chemical, our evaluation is as follows:

1. The daily use of this product in ~~this~~ recommended application presents no hazards when one follows the recommended precautions, such as the use of the medium in a completely sealed system where there will be no leakage of liquid or the vapors when the material is heated.

2. The loss of fluid at a high temperature or by being sprayed onto heated surfaces (as the result of a broken line) presents a hazard to humans no more critical than with other type fluids. In either event, the vapors or decomposed products would be so irritating that workmen would not remain in the contaminated atmosphere without respirators or gas masks. In those instances where breaks have occured, exposure to the workers long enough to shut off the system and evacuate the premises has not resulted in any ill effects.

3. Skin contact with THERMINOL ~~FR-2~~ at normal temperatures does not present a hazard in terms of immediate or subsequent systemic effects if normal personal hygiene practices are followed. In other words, if there is massive skin exposure, workmen should, within a reasonable time, remove contaminated clothing and bathe thoroughly.

4. Repeated or prolonged daily skin contact should be avoided in order to prevent possible irritation to the skin and possible systemic effects. Again, normal personal hygiene should suffice as long as it is understood that workmen must not smear the liquid on the skin and allow it to remain.

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If there is additional information required, by all means let us know. You may contact our Mr. Elmer P. Wheeler, Manager in our Medical Department who would be much more prolific relative to these discussions than I. He too, is located here in St. Louis.

The Fluids Specialist for your area is Mr. Richard Hamil who can be contacted at Monsanto Company, 3390 Peachtree Road, N.E., Atlanta, Georgia 30326, telephone (404) 231-4320. I know Dick, too, will be most happy to help.

Sincerely,

S. Shaw
Market Specialist
Functional Fluids

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Du Pont increases nylon tire-yarn capacity; cement firm builds $22-million plant

A 40-million-lbs. increase in nylon tire yarn capacity at **Du Pont's** Chattanooga, Tenn., plant will soon be under way. The new installation will produce, interchangeably, N-44 or standard industrial nylon yarn. The Chattanooga expansion, added to the company's present production capabilities at Richmond, Va., will put N-44 availability over the 100-million-lbs./year level. N-44, which became fully commercial late in '65 after four years of development and testing, is claimed by Du Pont to be an improved nylon that effectively reduces flat-spotting.

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