

November 20, 1962

Mr. Charles L. Cheever
Argonne National Laboratory
9700 South Cass Avenue
Argonne, Illinois

Dear Mr. Cheever:

Therminol FR 1, 2, 3 heat transfer fluids referred to in your letter of November 13, 1962 are chlorinated biphenyls. They are more refined forms of our Aroclors 1242, 1248 and 1254. These compounds are biphenyls, chlorinated to 42, 48 and 54% respectively. There are enclosed three pieces of literature describing these liquids which I think will answer your questions.

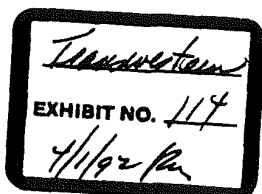
Specifically, the potential fire hazard is not great since the advantage in using these fluids is that they are resistant. Health hazards are minimal except when the fluids are heated in open vessels or containers. We feel that in any application where temperatures exceed 150°F, fluids must be used in a closed system or adequate exhaust ventilation must be provided. I believe you will find the vapor pressure data in the enclosures serve as a basis of this recommendation.

We do not believe protective clothing is necessary to prevent skin contact during transfer of these fluids. They are not skin irritants in the usual sense of the word. They are excellent solvents and will dissolve the normal oils and fats of the skin possibly leading to drying and chapping if exposure is prolonged or repeated. Although the fluids may be absorbed through the skin with resulting systemic effects, this is not a serious hazard unless again, exposure is prolonged and repeated. We feel there is no significant absorption from acute single exposures. Obviously, if workmen spill a Therminol fluid on the hands, it should be removed by washing. Similarly, grossly contaminated clothing should not be worn without laundering.

In experiments where suitable animals were exposed to the decomposition products of such fluids, toxic effects occurred in the animals only at concentrations which humans would not voluntarily endure because of irritation to the eyes and respiratory tract. The chief decomposition products are hydrochloric acid, carbon

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monoxide, carbon dioxide, phenolics and aldehydes. In the studies conducted for us by Kettering Laboratories, fluid was allowed to drop onto Inconel surfaces heated to 1050 and 1250°F. There is essentially no decomposition below 600°F.

In our experience, exposure to these fluids in heated transfer systems has resulted only when the system has been improperly installed. For example, some initial installations have not carried the vent line from the surge tank to the outdoors but have vented vapors of the fluid to workroom areas. In some initial installations, the piping that was used had threaded joints whereas we recommend a system less subject to leaks. Such practices may allow chronic exposure to vapors which must be avoided.

In the history of the use of these fluids, there have been instances when the fluid has been sprayed into open flames or - in the case where the fluids are used as hydraulic fluids - line ruptures have caused the fluid to be sprayed on molten metal. Fires have never occurred under these circumstances. Depending on the amount of fluid involved and the temperatures, the working environment becomes filled with clouds of smoke and vapors such that the area must be vacated. Workmen have always had the opportunity, however, to stay in the area long enough to shut down operations without suffering serious toxic effects.

If I can be of any further assistance, please do not hesitate to let me know.

Very truly yours,

Jack T. Garrett
Industrial Hygienist
Medical Department

JTG:lf

Enclosures

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