TOXICITY DATA

THERMINOL® 66 Heat Transfer Liquid
THERMINOL® 55 Heat Transfer Liquid

THERMINOL 66 (hydrogenated terphenyl) has an oral LD_{50} of 10.2 g/kg to albino rats and a dermal LD_{50} of approximately 6.8 g/kg to albino rabbits. This material is considered to be practically non-toxic by ingestion in single doses and by single dermal applications.

The undiluted product is a moderate irritant to rabbit skin (average score 3.1 on a scale of 8), but practically non-irritating to the rabbit eye (average score 6.4 on a scale of 110). Human patch tests on 200 subjects indicate that THERMINOL 66 is neither a primary irritant nor a sensitizer.

The product was fed to groups of albino rats, 15 males and 15 females per group, for 90 days at dietary concentrations of 100 ppm, 300 ppm, and 1,000 ppm. A similar group of 30 animals served as controls. There was no untoward behavior among these animals, and there were no deaths which could be attributed to ingestion of the product. Comparisons of final body weight and total weight gains revealed no statistically significant differences between test and control animals. There was a similar lack of outstanding differences between test and control rats in food consumption, blood parameters (hematocrit, hemoglobin, erythrocyte count, and total and differential leukocyte counts), clinical chemical values (blood urea nitrogen, blood glucose, and serum alkaline phosphatase and serum glutamic-pyruvic transaminase activities), and the results of urinalyses (pH, specific gravity, glucose and albumin concentrations, and microscopic examination).

At the end of the feeding period, all surviving animals were sacrificed and given a thorough gross autopsy during which the weights of liver, kidneys, spleen, gonads, heart, and brain were determined and recorded. Females fed 1,000 ppm of the product had statistically significant increases of absolute liver, kidney, and brain weights and the corresponding organ to body weight ratios. The 300-ppm group of females had a statistically significant increase of liver to body weight ratio, but the absolute liver weights were not sifnigicantly elevated. Although some statistically significant intergroup differences were noted in other groups, none of these differences could be related to ingestion of the product. Gross pathological examination did not reveal outstanding differences between test and control rats. Tissues and organs (approximately 30 per animal) from ten rats of each sex in both the control and 1,000 ppm group were examined microscopically. No lesions were observed which could be related to ingestion of THERMINOL 66.

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Limited studies indicate that THERMINOL 66 undergoes primary biodegradation and that it would not be a persistent aquatic pollutant if small amounts inadvertently entered waterways. Additional support for this view can be obtained from two published articles dealing with the environmental effects of HB-40. (An earlier designation for THERMINOL 66 was HB-40). The first is by J. E. Guthrie and O. E. Acres, Toxicity to Fish of Two Organic Reactor Coolants, Bull. Environ. Contam. & Toxicol. 5 (No. 2): 145-151 (1970). It states that ".... less than 25% of the fish (trout fry) died within 48 hours in HB-40 suspensions containing 100 mg/l or less....". The second is by J. L. Weeks, An Organic Cooled Nuclear Reactor and Its Environment, Arch. Environ. Health, 23: 123-128 (1971). This article has a general discussion of the environmental problem and concludes that HB-40 has not adversely affected the environment after 5½ years of use in a reactor in Manitoba, Canada.

THERMINOL 55 (alkylated benzene) has an oral LD_{50} of 15.8 g/kg to albino rats and a dermal LD_{50} of 7.94 g/kg to albino rabbits. This product is considered to be practically non-toxic by ingestion in single doses and by single dermal applications.

The undiluted product is a slight irritant to rabbit skin (average score of 1.0 on a scale of 8) but practically non-irritating to the rabbit eye (average score of 6.0 on a scale of 110). A group of male rats survived a six-hour exposure to air near saturation with vapor of this material at room temperature. They exhibited no adverse signs during the exposure and a subsequent 10-day observation period.

The biodegradability of THERMINOL 55 has not been studied. We believe its biodegradability would be similar to that of crude oil, and consequently recommend that the spent fluid be treated as such.

The preceding information was judged to be adequate for the safe use and handling of these two products when they were introduced. Subsequently, since the commercial possibilities for these fluids have increased, we have initiated additional toxicity tests which are currently underway.

THERMINOL 66. A rat feeding study has been designed to determine whether tissue residues occur when this material is ingested. In addition, reproduction studies with chickens have been initiated.

THERMINOL 55. A 90-day feeding to rats with a determination of whether tissue residues occur and chicken reproduction studies are in progress with this material. When these have been completed, we should have essentially the same amount of toxicity information on each of these products.

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