TRANSLATION

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Pharmacological-toxicology Reports

On the fire resistant fluid PYDRAUL 625

(For submission to the Dortmund Board of Mines)

At the request of Firma KÖHNK, a submitted sample of PYDRAUL 625 was tested in animal experiments, and on human skin, in accordance with the Mining Hygiene Criteria, which are given in two reports of the Permanent Committee for Operating Safety in Coal Mines (Luxembourg, 1963).

1. Acute Toxicity

The average lethal dose was determined on white mice. In oral administration by means of a probang, it was 34.5 g of PYDRAUL 625 per kilo. Time of observation - 48 hours.

2. Chronic Toxicity

A group of 10 adult white rats were administered a dose of 1 ga PYDRAUL 625 per kilo, per day. The average survival time was 17 days. By reducing the daily dose to 0.1 g per kilo, 90% of the animals used survived a period of 28 days. Other than a general decrease in weight, there were no detectable signs of permanent injury.

In the case of chickens, after a daily administration of 1 g of Pydraul 625 per kilo, after 5-6 days the animals showed inertia, forced motion and drooping wings. After a total of 9 feedings, the animals died up to 12 days later. The TOCP-Test, which gave a value of 18.3% for PYDRAUL A-200, was not made on PYDRAUL 625, but it was on the similarly compounded substance, PYDRAUL F-9. In accordance with the prescriptions of the American Army Specification I MIL-H 19457 A (VESSELS), during a 21 day period of observation a value of 20.1% for TOCP was determined for F-9. Since a limit value of 25% of pure Tri-o-cresylphosphate (TOCP) is required for the TOCP-test, there is no danger of injury caused by TOCP in the case of PYDRAUL F-9.

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The experiments conducted with PYDRAUL 625 showed that the effects of these substances show a marked similarity to PYDRAUL F-9. Both substances are synthesized from a phosphate ester base.

3. Irritation of ocular conjunctiva

1 drop of PYDRAUL 625 hydraulic fluid was dropped on 3 successive days in the eyes of the rabbits, and in 2 days a slight redness of the conjunctiva and a slight swelling of the eyelids was noticed. After 5 days all evidences of irritation diminished. No permanent injury to the eyes.

4. Irritation of the Skin

A 24 hours of contact with a strip of wadding steeped in PYDRAUL 625, no redness of the skin was observed, on the shaved Peritoneum of Guinea Pigs. No permanent injury to the skin, after 5 days of further observation. PYDRAUL 625 did not penetrate into the skin, as shown in tests made using a sample of Rhodamin B as fluorescence dye.

In order to test the sensitizing capability of the skin of albino guinea pigs, a 1% solution of PYDRAUL 625 (thinned with olive oil) was painted on daily on the shaved peritoneum for four weeks; subsequent tests on the untreated skin gave no indication of sensitizing.

On the inner skin of the ears of the rabbits, no evidences of skin irritation were found after 24 hours application of a wadding strip steeped in PYDRAUL 625. This also applies to the case when the inner skin of the ear was painted on three successive days with PYDRAUL 62. After 5 days of observation, no evidences of irritation were noticeable.

With the aid of small patch tests on 30 men with sensitive skin (eczema carriers), after 24 hour application of pure PYDRAUL 625 fluid on the healthy skin on the back, no reaction was observed, likewise after an additional 24 hours.

5. Effect of cold and hot Aerosol

Albino rats were exposed twice for 3 hours on the same day to cold Aerosol of PYDRAUL 625 (50°C). With a nozzle spray capacity of 4.1 g PYDRAUL 625 per hour, after 6 hour influence, reddening of the eyes and mucus secretions from the nose were observed. On the next day and even after 5 additional days, no irritation and evidences of injury were found.

After 6 days influence of the hot Aerosols (150°C), with a nozzle spray capacity of 8.5 g PYDRAUL 625 per hour on the animals, the results were the same as with the cold Aerosol.

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6. Effect of gaseous Decomposition Products

By continued spraying of the finely divided PYDRAUL 625 on a V2A-iron block heated to 700°C with the aid of an acetylene torch, the exhaust gases were thinned with fresh air in the ratio of 1:10, and conducted for three hours in a slowly rotating test cylinder with 3 rats. The animals showed evidences of fatigue and tears. After being removed from the container, fast recovery and full revival. The chemical analysis of the decomposition products, by means of the diphenyl urea method, showed no phosgene. Essentially the gases which irritate the mucous membranes contain decomposition products and small amounts on free HCl vapors. Carbon monoxide was detectable only in very small quantities. In the experimental container, only 5 - 10 ppm CO affected the animals.

Closing Evaluation

The following conditions must be fulfilled for the technical application of PYDRAUL 625:

Maintenance of the hydraulic machines and plants, as well as the filling and decantation of the 625 Hydraulic Fluid should be undertaken only by especially trained technical personnel.

The personnel should be warned, that frequent wetting of the human skin should be avoided. If this cannot be avoided, leather gloves should be worn, and changed when wet.

Food should not come in contact with the hydraulic fluid.

In the event fluid comes in contact with the eyes, wash immediately with clear water.

Although the vapors and decomposition products are not acutely hazardous, as shown by the animal experiments, prolonged exposure to large amounts of PYDRAUL 625 sprays should be avoided.

By observing the necessary safety measures, there should be no hesitancy in testing PYDRAUL 625 in technical plants, so far as industrial toxicity is concerned.

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