TRANSLATION

Prof. Guenther Malorny M.D.
University Pharmacological
Institute

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Pharmacological-Toxicological Evaluation

of the fire resistant fluid PYDRAUL A-200

(To be submitted to the Dortmund Mining Board)

PYDRAUL A-200 was tested at the request of Firma KÖHNK, Hamburg, in accordance with the mining hygienic standards, established in two reports of the Permanent Committee for Operating Safety in coal mines (Luxemburg, 1963) , in animal experiments and in connection with its compatibility on human skin.

1. Acute Toxicity

In white mice, the average lethal dose in oral administration by means of a probang, was determined to be 2.0 g of PYDRAUL A-200 per kilo of body weight. Time of observation: 48 hours.

2. Chronic Toxicity

In tests on albino rats, after a daily feeding of 1.0 g of A-200 per kilo the average time of survival was 5 days, when fed 0.1 g A-200 per kilo (thinned with olive oil at 1:10) on the contrary, it was 27 days.

In the case of fowl, after daily oral administration of 1.0 g A-200 per kilo by means of a probang, after 4-5 days they showed strong evidences of paralysis, which led to the death of the fowl 3-4 days later. Therefore, on the whole they showed the same picture as in the case of the rats. The so called TOCP-Test (Poultry test of the American Army Specification I MIL-H 19457 A (SCHIFFE)), since in view of the paralysis observed, the admixtures of tri-o-cresylphosphate are suspect. The TOCP value observed for A-200 on the 21st day was 18.3%. Since it was less than 25%, consequently there is no danger of injurysbrought on by TOCP.

3. Irritation of the Ocular Conjunctiva

After dropping 1 drop of PYDRAUL A-200 in the conjunctival s sack for three consecutive days, after 48 hours the conjunctiva

of the rabbits' eyes showed redness, watering and edema of the lids. After 72 hours the same picture and loss of a few eyelashes. After an additional 5 days full vision returned. No permanent damage to the eyes.

3. Irritation of the Skin

After a 24 hour contact with a strip of wadding steeped in A-200, no reddening of the skin was observed on the shaved abdomen of the guinea pigs, on the other hand there was a softening of the epidermis. No permanent damage to the skin after an additional 5 day period of observation. PYDRAUL A-200 does not penetrate into the skin, as tests made with a sample to which Rhodamine B was added as fluorescent dye have shown.

In order to test the sensitivity of the skin of albino guinea pigs, a 1% solution of A-200 (thinned with olive oil) was applied daily for 4 weeks, with a brush, to the shaved flanks; a later test of the untreated skin gave no indication of sensitization.

After a 24 hour effect on the inner membranes of the rabbit's ears, with a strip of wadding steeped in A-200, a moderate hyperemia was noticed, along with a slight edema of the uppermost layers of skin. The surface of the skin was not injured and showed no secretion.

We limited ourselves to painting the inner skin of the ear and continued this procedure for 3 consecutive days, and the general result was a light infection with moist eczema, manifested by itching irritation. However, after a a f15- day observation period, this also cleared up.

With the aid of patch-tests on 30 men with sensitive skins (eczema carriers), after 24 hours of contact of pure PYDRAUL A-200 Fluid on the healthy back skin, no reaction was found, nor after an additional 24 hours.

5. Effects of cold and hot Aerosol

White rats were exposed twice on the same day, for 3 hours, to cold Aerosol of PYDRAUL A-200 (50°C). With a spray output of the nozzle of 4.1 g A-200 per hour, after a 6 hour contact we noticed a reddening of the eyes and secretion of mucus in the nose. On the next day and after the following 5 days, no irritation and evidences of intoxication were noticeable.

The results after a 6 hour application of hot Aerosol (150° C) with a spray output of the nozzle of 8.5 g of A-200 per hour on the animals, were the same as those obtained with the cold Aerosol.

Long exposure to Aerosol vapors produces headaches in humans, which disappear when again exposed to fresh air.

6. Effects of Gaseous Decomposition Products

The waste gases produced by continued fine sprays of PYDRAUL A-200 on a V2A iron block heated to 700°C with the aid of an acetylene torch, thinned with fresh air at the rate of 1:10, were conducted for 3 hours into a slowly rotating test cylinder, in which 3 rats were placed. The animals showed evidences of fatigue and flow of tears. After they were removed from the container, they showed quick revival and recovery. The chemical analysis of the decomposition products by means of the diphenyl urea method, showed no phosgene. The gases which irritated the mucous membranes contained mainly uncombined chlorine and small amounts of free HCl-vapors. Carbon monoxide was detectable only in very small amounts. The animals in the test cylinder came in contact with only 5 ppm CO.

Final Evaluation

The following conditions must be met for the underground use of PYDRAUL A-200.

Only especially trained technical personnel should be employed for the maintenance of hydraulic machines and equipment, as well as for the filling and draining of HYDRAULIC fluid A-200.

The employees should be instructed to avoid frequent contact of the product with the skin. If this cannot be avoided, leather gloves should be worn, and changed when wet.

Do not permit foods to come in contact with HYDRAULIC fluids.

In the event that sprayed fluid falls into the eyes, wash immediately with clear water. Consult a physician as soon as possible, to treat any possible eye burns with drops of an 0.5% solution of Pantocain.

Although as shown by the animal experiments hot vapors and decomposition products are not acutely hazardous, prolonged exposure (more than 1 charge) of large amounts of sprays of A-200 should be avoided.

If the necessary safety measures are observed, there should be no hesitancy in testing and using PYDRAUL A-200 in industrial plants, so far as occupational toxicity is concerned.

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