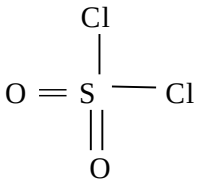
SIDS INITIAL ASSESSMENT PROFILE

CAS No.	7791-25-5
Chemical Name	Sulfuryl chloride
Structural Formula	

SUMMARY CONCLUSIONS OF THE SIAR

Human Health

The acute toxicity of sulfuryl chloride following inhalation is high. In male Sprague-Dawley rats with head-only exposure to vapor a 4 h-LC50 of 878 mg/m^3 was calculated. Clinical signs included nasal discharge and eye irritation.

In humans, pulmonary edema of delayed onset has been reported after inhalation of sulfuryl chloride vapor.

Sulfuryl chloride hydrolyzes slowly in moist air and reacts violently with water, forming chlorosulfonic acid, hydrochloric acid and sulfuric acid. Due to this hydrolytic reaction, sulfuryl chloride is corrosive to the skin, eyes and respiratory tract.

Studies with sulfuryl chloride concerning sensitizing properties are not available. The hydrolysis products sulfuric acid and hydrochloric acid gave no indication for a sensitizing potential in humans and experimental animals.

From a 14-day inhalation study with sulfuryl chloride in rats, a NOAEC could not be derived, since pneumonitis was still observed at the lowest exposure level of 17 mg/m^3. The reported effects are in line with all other evidence regarding the chemical and biological properties, i.e. corrosivity of sulfuryl chloride and its hydrolysis products hydrochloric acid, sulfuric acid, and chlorosulfonic acid. Studies performed with sulfuric acid gave LOAECs in the range of 0.3 mg/m^3, the LOAEC found in a 90-day study with hydrochloric acid was 15 mg/m³. All findings were confined to the site of first contact and can be explained by the irritating/corrosive properties of the acid.

Sulfuryl chloride as well as the hydrolysis products hydrochloric acid, sulfuric acid and chlorosulfonic acid are all classified as corrosive and hydrochloric acid and chlorosulfonic acid are classified as irritant to the respiratory tract. No primary systemic effects were reported.

Sulfuryl chloride did not show mutagenic activity in Ames tests with *Salmonella typhimurium*. A slight mutagenic activity was observed in only one tester strain without metabolic activation. However, this result was found to be not reproducible in further tests. As sulfuryl chloride decomposes to acids, the resulting change in pH may induce genotoxic effects such as chromosomal aberrations and other DNA damage *in vitro* and *in vivo* at the portal-of-entry.

No carcinogenicity studies with sulfuryl chloride were identified. The hydrolysis products hydrochloric acid and sulfuric acid gave no clear indications for an increased tumor incidence after life-time exposure in laboratory animals.

Studies with sulfuryl chloride concerning effects on fertility and development were not available and there were also no data on fertility effects for the hydrolysis products sulfuric acid and hydrochloric acid. Concerning developmental toxicity, the hydrolysis product sulfuric acid gave no indication for adverse effects in mice and rabbits after exposure via inhalation. Because sulfuryl chloride is a toxicant acting at the portal-of-entry, and because it is unlikely to reach the reproductive organs or the embryo/fetus, toxicity to reproduction or developmental toxicity in mammals are not likely to occur following exposure to sulfuryl chloride by any route.

In humans, several epidemiological studies have suggested a relationship between exposure to strong inorganic acid mists containing sulfuric acid and an increased incidence of laryngeal cancer. IARC (1992) has concluded that "occupational exposure to strong-inorganic-acid mists containing sulfuric acid is carcinogenic to humans" (Group 1). Concerns have been raised that confounding factors could not be fully excluded. The effects might be a secondary finding to be expected after prolonged exposure to strong acid due to the cytotoxicity and consequent stimulus to increased cell proliferation.

Environment

Sulfuryl chloride is a moisture/water sensitive fluid which hydrolyses completely and decomposes on heating above the boiling point (69°C) from 100°C on. It reacts violently with water. The vapor pressure is given with 148 hPa at 20°C, the log Kow cannot be determined due to hydrolysis.

If sulfuryl chloride is released to water, degradation occurs through hydrolysis to sulfuric and hydrochloric acid. A guideline test on hydrolysis at room temperature under stirring shows the substance to be completely hydrolyzed within 5 min. For assessment of the environmental impact of the hydrolysis products it is referred to the validated results of the hazard assessments on sulfuric acid (CAS-No. 7664-93-9) and hydrochloric acid (CAS-No. 7647-01-0) within the OECD HPV Chemicals Programme. Both acids are strong mineral acids, which dissociate readily in water to sulfate or chloride ions resp. and the hydrated protons, and they are miscible with water. The total ionization will imply also that both acids themselves, will not adsorb on particulate matters or surfaces, and will not accumulate in living tissues.

The hydrolysis products of sulfuryl chloride have been tested in a number of aquatic species. All effects are accounted to acidification.

Lepomis macrochirus showed an acute toxicity (96 h LC50) when a pH value of 3.5 to 3.25 was reached. Chronic testing with early life stages of fish gave NOECs at pH 6.0 (*Jordanella floridae*, exposure for 45 d) and 5.56 (*Salvelinus fontinalis* , exposure for 10 months).

Exposure

About 10,000 to 20,000 t/a sulfuryl chloride were produced by about 7 producers world wide in 2001. Sulfuryl chloride is a basic chemical which is processed chemically to other intermediates in different fields of application. A direct use besides in hermetically sealed batteries for special uses is not known. Due to the production and processing conditions, as well as the rapid hydrolysis property of sulfuryl chloride, no emission to the environment has been identified at the production site in the Sponsor country. There is no information about environmental emission at other production and processing sites.

Sulfuryl chloride is produced in closed systems. To protect workers from exposure during maintenance and repair work precautionary measures like engineering controls and personnel training is used. Sulfuryl chloride has a high vapour pressure and may react violently with water. Hence, workers may potentially be exposed through the inhalation of vapour or dermally by splashing from liquid.

There is no exposure of the general public in the Sponsor country.

RECOMMENDATION

The chemical is currently of low priority for further work.

RATIONALE FOR THE RECOMMENDATION AND NATURE OF FURTHER WORK RECOMMENDED

Human Health: The corrosive properties indicate a hazard for human health. No further work is recommended, if sufficient control measures are in place to avoid significant human exposure, including prevention of accidental exposure. In situations where this is not the case, risk assessment and, if necessary, risk reduction measures are recommended.

Environment: The chemical is currently of low priority for further work as it hydrolyses very fast and therefore environmental releases of sulfuryl chloride are not likely to occur. The degradation products sulfuric acid and hydrochloric acid have already been assessed within the OECD SIDS-Program.