

SIDS INITIAL ASSESSMENT PROFILE

CAS No.	79-34-5
Chemical Name	1,1,2,2-Tetrachloroethane
Structural Formula	Cl ₂ HC - CCl ₂ H

SUMMARY CONCLUSIONS OF THE SIAR

1,1,2,2-Tetrachloroethane is a colourless volatile liquid with chloroform-like odour.

Human Health

Based on the large body of past human experience, 1,1,2,2-tetrachloroethane can be considered as very toxic to humans exposed acutely. It is irritating to skin and eye. Repeated exposure observations in laboratory animals and cases reported in humans indicate that it is mainly toxic to the liver and the kidney; it can also damage the nervous system and the hematological system. No standard reproductive toxicity studies in laboratory animals are available. The available data are conflicting and no conclusion can be made regarding effects of 1,1,2,2-tetrachloroethane on reproductive organs. The database for developmental toxicity is poor and adverse developmental effects were reported in rats and mice at doses known to be clearly toxic to pregnant females. It is not possible to draw a valid assessment from these studies on developmental toxicity. Some potential for genotoxicity of 1,1,2,2-tetrachloroethane has been demonstrated *in vitro*. The overall results observed *in vivo* and *in vitro* indicate that 1,1,2,2-tetrachloroethane might have some genotoxic potential. In an oral long term bioassay, 1,1,2,2-tetrachloroethane has been shown to induce hepatocellular carcinoma in mice but it was not carcinogenic in rats.

From the past experience, the threshold chronic toxicity by inhalation in human has been estimated around 70 mg/m³, a value ten time higher than the current occupational exposure limit and several thousand times higher than the ambient and indoor air for the general population. The lowest oral threshold dose in rats was found around 3 mg/kg bw/day indicating large margins of safety when comparing with the trace levels of 1,1,2,2-tetrachloroethane when it is detected in food or drinking water in northern America.

Environment

Based on its physico-chemical properties, (vapor pressure: 6 hPa; solubility: 2.9 g/l) 1,1,2,2-tetrachloroethane released to the environment will mainly partition into the atmosphere. It has an average atmospheric lifetime of 92 days. Its impact on stratospheric ozone, its greenhouse effect and its contribution to the formation of tropospheric ozone is expected to be low. Observed intermediate products formed during the atmospheric oxidation are phosgene, C(=O)ClH and dichloroacetylchloride. Decomposition in the atmosphere of phosgene and C(=O)ClH should lead to the formation of HCl and CO₂ by hydrolysis in atmospheric water whereas, dichloroacetylchloride will form HCl and dichloroacetic acid which will be further removed from the atmosphere by rain water.

If released to water, 1,1,2,2-tetrachloroethane will be removed rapidly by volatilization. It is not readily biodegradable. It is expected to undergo dehydrochlorination under hydrolytic alkaline conditions to trichloroethylene (see SIDS for trichloroethylene: CAS No. 75-01-6) and to biodegrade under anaerobic conditions. Based on its partition coefficient (logK_{ow} = 2.39) and its bioconcentration factor (BCF = 4.2-13.2), it is not likely to bioaccumulate. Due to its low K_{oc} value of 46, it is not expected to adsorb to suspended solids, sediments and soils.

1,1,2,2-Tetrachloroethane is toxic to aquatic organisms, *Daphnia magna* being the most sensitive species with a 48h EC₅₀ of 9.3 mg/l. On the basis of the NOEC determined from the chronic tests (32 day NOEC *Pimephales promelas*

= 1.4 mg/l; 28 day NOEC *Daphnia magna* = 6.9 mg/l; 72h EC10 *Scenedesmus subspicatus* = 9.8 mg/l), a PNEC of 140 µg/l is proposed applying a factor of 10 to the lowest NOEC available with fish.

Exposure

The historic production level of 1,1,2,2-tetrachloroethane in the 1960–70's was over a hundred thousand tonnes/year. Since then, because of its disappearance as a solvent, the production has dramatically decreased. The substance is no longer on the market but it is exclusively produced and consumed on site. There are no publicly available production data but it is estimated that the current production level is between 10,000 and 100,000 tons/year. According to the Sponsor country, 1,1,2,2-tetrachloroethane is only used in OECD countries as a feedstock in closed system for the production of other chlorinated hydrocarbons. It may also be an incidental by-product of other production processes for chlorinated hydrocarbons such as the production of vinyl chloride.

Personal exposure monitoring conducted during production, processing and maintenance activities shows that potential for exposure of workers to 1,1,2,2-tetrachloroethane is extremely low. The available monitoring data range from 0.01 to 0.2 ppm. These values are well below the Occupational Exposure Limit (TWA/8h) of 1 ppm (7 mg/m³).

The recent data from the US and the European Union show that the release of 1,1,2,2-tetrachloroethane into the environment through its production and uses is low. Its concentration in surface water was found far below the Predicted No Effect Concentration (PNEC) of 140 µg/l proposed for the substance.

RECOMMENDATION

The chemical is currently of low priority for further work.

RATIONALE FOR THE RECOMMENDATION AND NATURE OF FURTHER WORK RECOMMENDED

The chemical possesses properties indicating a hazard for human health. Based on data presented by the Sponsor country, exposure to humans is anticipated to be low, and therefore this chemical is currently of low priority for further work. Countries may desire to investigate any exposure scenarios that were not presented by the Sponsor country.