

**SIDS INITIAL ASSESSMENT PROFILE**

<b>CAS No.</b>	497-19-8
<b>Chemical Name</b>	Sodium carbonate
<b>Structural Formula</b>	Na <sub>2</sub> CO <sub>3</sub>

**SUMMARY CONCLUSIONS OF THE SIAR**

Sodium carbonate has a melting point of 851°C, it decomposes when heated and therefore a boiling point can not be determined. Sodium carbonate is an inorganic salt and therefore the vapour pressure can be considered negligible. Its water solubility is 215 g/l at 20°C. The average particle size diameter (d<sub>50</sub>) of light sodium carbonate is in the range of 90 to 150 µm and of dense sodium carbonate is in the range of 250 to 500 µm.

**Human Health**

Sodium carbonate is an alkaline substance. The acute oral LD<sub>50</sub> in rats is 2,800 mg/kg bw, while the dermal LD<sub>50</sub> in rats is >2,000 mg/kg bw. The LC50s for inhalation are 800, 1200 and 2300 mg/m<sup>3</sup> for guinea pig, mice and rat respectively. Sodium carbonate has no or a low skin irritation potential but it is considered irritating to the eyes. Due to the alkaline properties an irritation of the respiratory tract is also possible.

No valid animal data are available on repeated dose toxicity studies by oral, dermal, inhalation or by other routes for sodium carbonate. A repeated dose inhalation study, which was not reported in sufficient detail, revealed local effects on the lungs which could be expected based on the alkaline nature of the compound. Under normal handling and use conditions neither the concentration of sodium in the blood nor the pH of the blood will be increased and therefore sodium carbonate is not expected to be systemically available in the body. It can be stated that the substance will neither reach the foetus nor reach male and female reproductive organs, which shows that there is no risk for developmental toxicity and no risk for toxicity to reproduction. This was confirmed by a developmental study with rabbits, rats and mice. An *in vitro* mutagenicity test with bacteria was negative and based on the structure of sodium carbonate no genotoxic effects are expected.

**Environment**

The hazard of sodium carbonate for the environment is mainly caused by the pH effect of the carbonate ion. For this reason the effect of sodium carbonate on the organisms depends on the buffer capacity of the aquatic or terrestrial ecosystem. Also the variation in acute toxicity for aquatic organisms may be explained for a significant extent by the variation in buffer capacity of the test medium. In general, mortality of the test organisms was found at concentrations higher than 100 mg/l but for Amphipoda, salmon and trout lethal effects were already observed at 67-80 mg/l although these studies had a low reliability.

Individual aquatic ecosystems are characterized by a specific pH and bicarbonate concentration and the organisms of the ecosystem are adapted to these specific natural conditions. Because the natural pH, bicarbonate and also the sodium concentration (and their fluctuations in time) varies significantly between aquatic ecosystems, it is not considered useful to derive a generic PNEC or PNEC<sub>added</sub>. To assess the potential environmental effect of a sodium carbonate discharge, the increase in sodium, bicarbonate and pH should be compared with the natural values and their fluctuations and based on this comparison it should be assessed if the anthropogenic addition is acceptable.

The production and use of sodium carbonate could potentially result in an emission of sodium carbonate and it could locally increase the pH in the aquatic environment. However, the pH of effluents is normally measured very

frequently and can be adapted easily and therefore a significant increase of the pH of the receiving water is not expected. If emissions of waste water are controlled by appropriate pH limits and/or dilutions in relation to the natural pH and buffering capacity of the receiving water, adverse effects on the aquatic environment are not expected due to production or use of sodium carbonate.

Aquatic sodium emissions originating from uses of sodium carbonate are probably small compared to other sources. It is clear that an environmental hazard assessment of sodium should not only evaluate all natural and anthropogenic sources of sodium but should also evaluate all other ecotoxicity studies with sodium salts, which is beyond the scope of this report.

### **Exposure**

Sodium carbonate is produced on all continents of the world and the global number of production sites is estimated to be 50-70. The total world demand of sodium carbonate in 1999 was 33.4 million metric tonnes.

Sodium carbonate is used for the production of glass, soaps and detergents and other chemicals and it also used by the 'metals and mining' industry and the 'pulp and paper' industry. Sodium carbonate is not only used by industry but is also used by consumers. It may be used directly in solutions of sodium carbonate for soaking of clothes, dishwashing, floor washing and for degreasing operations but it is also present in a large number of consumer products like cosmetics, soaps, scouring powders, soaking and washing powders. Sodium carbonate is also a food additive.

## **RECOMMENDATION**

The chemical is currently of low priority for further work.

## **RATIONALE FOR THE RECOMMENDATION AND NATURE OF FURTHER WORK RECOMMENDED**

This chemical is currently of low priority for further work because of its low hazard potential. However, reversible eye and respiratory tract irritation is noted.