

Fluorosilicate Toxicity and Worker Safety

“Hydrofluosilic Acid (HFS) is an extremely hazardous chemical and poses significant health and safety risk to City’s staff.”

City of Hamilton Board of Health July 9, 2008



Hydrofluorosilicic acid is **“man-made”** in the smoke stacks of the phosphate fertilizer industry.

Brenntag Canada Inc. - Material Safety Data Sheet

“Corrosive effects on the skin and eyes **may be delayed** and **damage may occur without the sensation or onset of pain.**”

“May cause pulmonary oedema, fluorosis, exostoses, hypocalcemia, shock, central nervous system (CNS) depression, coma and death. CNS depression is characterized by headache, dizziness, drowsiness, nausea, vomiting and incoordination.”



Case Study 1

“Burns caused by hydrofluoric acid can be life-threatening. Of special significance is the often underestimated local and sometimes delayed deep action of the highly diffusible free fluoride ions and the accompanying systemic toxicity... Because of the extreme danger of systemic toxicity even after seemingly trivial injuries, monitoring in the intensive care station, especially by measuring the calcium concentration in blood and electrocardiography, and therapy is recommended.” *Richter H, Hollenberg S, Sachs HJ, Oeltjenbruns J, Weimann J. 2005 Hydrofluoric Acid Burns: A rare chemical emergency situation. Anaesthesist Feb;54(2):123-6. [in German].*

Case Study 2

“Accidental hydrofluoric acid (HF) splashes often occur in industrial settings. HF easily penetrates into tissues by initial acid action allowing fluoride ions to penetrate deeply, chelating calcium and magnesium. Resultant hypocalcemia and hypomagnesemia can be fatal.” *Soderberg K, Kuusinen P, Mathieu L, Hall AH. 2004 An Improved Method for Mergent Decontamination of Ocular and Dermal Hydrofluoric Acid Splashes. Vet Hum Toxicol Aug;46(4):216-8.*



Case Study 3

A 37-year-old male laboratory technician...knocked over a small quantity (100–230 mL of the hydrofluoric acid onto his lap, splashing both thighs. He sustained burns to 9% of his body surface area, despite washing his legs with water from a makeshift plumbing arrangement that supplied water at low pressure... Following flushing, because he was still in severe pain and shock, he immersed himself in a chlorinated swimming pool at the rear of the workplace, where he remained for approximately 35–40 min before ambulance help arrived. At that time he was hypothermic and hypocalcaemic on admission to an intensive care unit at a nearby hospital, and soon became unconscious. His condition continued to deteriorate despite subcutaneous injections of calcium gluconate and administration of intravenous calcium and magnesium. His right leg was amputated seven days after the incident. He subsequently died from multi-organ failure 15 days after the spill. *Muriale L, Lee E, Genovesef J, Trend S. 1996 Fatality due to acute fluoride poisoning following dermal contact with hydrofluoric acid in a palynology laboratory. Annals of Occupational Hygiene 1996; 40(6):705-10.*