

ELEMENTS OF INDUSTRIAL TOXICOLOGY

tion may produce pulmonary edema. Chronic exposures, while not necessarily irritating, may result in accumulation of fluorides in the bones.

See *Hygienic Guide*

Hydrogen peroxide is a clear, waterlike, colorless liquid. In a dilute form, it is widely used in industry as a bleaching compound and oxidizing agent. It is dangerous primarily because of its oxidizing nature, not because of its toxicity, and the 30 per cent solution is capable of causing serious burns.

Because of this strong oxidizing ability, especially in concentrations exceeding 50 per cent by weight, hydrogen peroxide may cause spontaneous combustion if left in contact with readily oxidizable organic materials.

If hydrogen peroxide is swallowed, oxygen may be evolved to cause acute distention of the esophagus or stomach, and the localized action of the chemical may cause internal bleeding.

See *Hygienic Guide*

Hydrogen selenide is a colorless gas with a very disagreeable odor. It is produced by the reaction of acids or water with metal selenides or by the combination of hydrogen with selenium.

Its health hazard is high for both acute and chronic exposures. Eye, nose, and throat irritation, followed by pneumonitis, are the results of acute exposure. Chronic effects include garlicky breath, nausea, vomiting, metallic taste, dizziness, and extreme fatigue. In experimental animals, even brief exposures produced liver damage, weight loss, and general weakness.

See *Hygienic Guide*

Hydrogen sulfide, a colorless gas having the odor of rotten eggs, is rather widely used in industry. It is also commonly produced by the decomposition of sulfur-bearing organic material and is often found in sewers or sewage disposal plants. The gas is flammable and explosive in high concentrations so that precautions against sources of ignition should be taken.

Inhalation of a high concentration of hydrogen sulfide will produce sudden poisoning—the individual falls, apparently unconscious immediately, and may die without

moving again. There is a complete arrest of respiration, which can often be overcome by prompt application of artificial respiration.

In less sudden poisoning, the signs may be nausea, stomach distress, belching, cough, headache, dizziness, irritation of the eyes, and blistering of the lips.

The notoriously bad odor of hydrogen sulfide cannot be taken as a warning sign because sensitivity to this odor disappears rapidly with the breathing of a small quantity of the gas. In regular operations enclosure and a local exhaust system can be provided to keep the concentration within safe limits.

See Industrial Data Sheet 284 and *Hygienic Guide*

Hydroquinone (1,4-benzenediol) is used as a photographic developer, antioxidant for fats and oils, stabilizer, and chemical intermediate. It presents a low health hazard for acute exposure and a moderate one for chronic exposure.

Hydroquinone dust has been reported to cause discolorations, lesions, and other structural changes in the cornea of workers manufacturing hydroquinone or mixing and packaging photographic developers. These effects, however, appear to have resulted from unusual circumstances.

Animal studies show the low chronic toxicity and rapid excretion of hydroquinone. Systemic effects from industrial exposure have not been reported and skin sensitization from the solid and dilute alkaline solutions appears negligible.

See *Hygienic Guide*

Iodine is a purple crystalline solid, that sublimes readily even at room temperature to form a vapor which is irritating to the respiratory system much as is chlorine and, since it is only slightly water-soluble, it readily penetrates the lung to produce pulmonary irritation and edema.

Iodine, however, is much more likely to cause skin irritation from painting of the skin with tincture of iodine, which is a primary irritant, than it is from either drinking of the solution or inhalation of the vapor. The tincture is an excellent skin antiseptic, which must be used with caution, for it may cause reddening, inflammation, and loss of large pieces of skin, par-