FACT SHEET

HYRODGEN FLUORIDE AND OTHER SOLUBLE INORGANIC FLUORIDES

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This fact sheet provides a summary of the Development Support Document (DSD) created by the Toxicology Division (TD) of the Texas Commission on Environmental Quality (TCEQ) for the development of Regulatory Guidelines (ESL and ReVs) for ambient exposure to this chemical. For more detailed information, please see the DSD or contact the TD by phone (1-877-992-8370) or e-mail (tox@tceq.texas.gov).

What are hydrogen fluoride and inorganic soluble fluorides?

Inorganic soluble fluorides (F) exist in the atmosphere as both gas and particulates and are used in the production of aluminum, steel, phosphate fertilizers, phosphoric acid, glass, ceramic, and brick products. Hydrogen fluoride (HF) is widely used in the production of fluorocarbon chemicals. Anhydrous HF is used as a catalyst in the production of most fluorine-containing chemicals; as a fluorinating agent in the production of fluorine and aluminum fluoride; and in refining uranium. It is used in the production of refrigerants, herbicides, pharmaceuticals, high-octane gasoline, aluminum, plastics, electrical components, and fluorescent light bulbs. Aqueous hydrofluoric acid is used in stainless steel pickling, glass etching, metal coatings, exotic metal extraction, and quartz purification.

How are HF and soluble F released into ambient air?

Naturally-occurring F including HF can be released into the air through volcanic activity, dust from soils, and sea-water droplets, then carried into the atmosphere by winds. However, most of the airborne F is generated through the burning of F-containing fuels and from industrial sources. Major sources of industrial HF and F emissions are aluminum production and phosphate fertilizer plants. HF is released from other industries such as chemical production, steel, magnesium, and brick and clay tile products plants. The general population is typically exposed to very low levels of gaseous F.

How can HF and/or soluble F affect my health?

Permitted levels of HF and/or soluble F should not cause adverse health effects. Well-conducted human studies were available for developing the short-term health protective values. Short-term (one hour or less) inhalation exposure of humans to high concentrations of HF and/or soluble F can result in eye, nose and respiratory irritation, and inflammation of the airways.

Long-term inhalation exposure of humans to high concentrations of HF and/or soluble F can result in skeletal fluoride fluorosis (e.g., changes in bone density; restricted joint movement; stiffness and immobility; and rheumatic pains in the back and extremities) and respiratory effects (e.g., nose irritation and discharge; coughing and wheezing; abnormal lung function; asthma).

No data on carcinogenicity were located in animals following inhalation exposure. No specific epidemiologic evidence on the potential carcinogenic effects to humans of airborne F or HF was available. The International Agency for Research on Cancer and the United States Environmental Protection Agency have not yet evaluated F and HF for potential human carcinogenicity.

Is HF or soluble F odorous or harmful to plants or livestock?

HF may have a pungent odor at moderate levels. HF and/or soluble F salts have been shown to have an adverse effect on the growth, development, and productivity of vegetation (e.g., soybean, tomato, corn). Consumption of pasture or cured forage contaminated with HF and/or inorganic F may cause chronic fluoride intoxication (fluorosis) in domestic livestock.

Why does the TCEQ set Regulatory Guidelines for HF and/or soluble F?

The TCEQ has set various air quality guideline levels (ESLs and ReVs) to protect human health and welfare. Please see Definitions of ESLs, ReVs, and AMCVs located on the TCEQ DSD webpage for more information. The ESLs and ReVs for HF and/or soluble F have been designed to protect the general public from short-term and long-term adverse health and welfare effects. The general public includes children, the elderly, pregnant women and people with preexisting health conditions. If you would like to know more about the specific ESLs and ReVs developed, what the values are and what they are used for, please see the DSD.