Chlorine trifluoride is a gas made of chlorine and fluorine atoms. The global electronics industry uses chlorine trifluoride to make semiconductor chips for everyday applications in communications, entertainment, transportation and healthcare.

**Uses and benefits**

Chlorine trifluoride is used for cleaning process chambers that are used in the manufacture of semiconductors. Chlorine trifluoride removes solid residues from the walls of the process chamber without dismantling the tool or risking personnel exposure to the hazardous residues or cleaning agents. The use of chlorine trifluoride also allows cleaning to be accomplished at relatively low temperatures.

**Physical and chemical properties**

Chlorine trifluoride is shipped and stored as a liquefied, compressed gas. It is colorless and has a bleach-like odor. Chlorine trifluoride is considered to be toxic, corrosive and an oxidizer.

**Health effects**

Chlorine trifluoride must be handled with caution. Inhalation of even low concentrations of chlorine trifluoride can irritate the respiratory tract, causing coughing, labored breathing and potentially fatal lung disorders. On contact with moisture, chlorine trifluoride forms hydrofluoric acid. Exposure to hydrofluoric acid can produce severe chemical burns that you might not see or feel immediately.

Exposure to the eyes and skin can also cause thermal and chemical burns.
**Environmental effects**

Chlorine trifluoride can be manufactured, used, and disposed of safely, without harming the environment. Electronics manufacturers commonly use a scrubber to abate chlorine trifluoride emissions.

**Exposure potential and risk management measures**

**Industrial use**

Chlorine trifluoride is shipped in cylinders as a liquefied gas. Workers should use sturdy work gloves as well as safety glasses with side shields and safety shoes when handling chlorine trifluoride cylinders. For other operations, a face shield over safety glasses, a splash suit and leather inner gloves covered with chemical-resistant gloves are recommended. All chemical protection equipment must be clean and dry. According to the U.S. Occupational Safety and Health Administration, the permissible exposure limit (ceiling) for chlorine trifluoride in the workplace, which should never be exceeded, is 0.1 ppm.

Engineering controls are recommended when working with chlorine trifluoride. These may include gas cabinet enclosures and automatic gas panels for purging systems when cylinders are changed. Continuous gas monitors are recommended. Delivery systems and equipment must be kept clean and dry to avoid acid formation. Equipment used with chlorine trifluoride must be made of corrosion-resistant materials.

**Consumer use**

Air Products does not sell chlorine trifluoride directly to consumers.

**Regulatory information**

Several regulations govern the manufacture, sale, transportation and use of chlorine trifluoride. These laws vary by country and geographic region. You can find general regulatory information in the Material Safety Data Sheet.

**Sources for additional information**

- Air Products — Material Safety Data Sheet
- Compressed Gas Association
- Air Products’ Safetygrams
  - Safetygram 39 — Chlorine Trifluoride
  - Safetygram 29 — Medical Treatment Protocol for Hydrofluoric Acid Burns
  - Safetygram 30 — Handling Liquefied Compressed Gas

**Conclusion**

The electronics industry uses chlorine trifluoride as a cleaning agent in their manufacturing processes. The industry can handle it safely with minimal environmental, health, and safety effects when industry and company guidelines are followed.

**For more information, please contact us at:**

**Emergency Response System**
T 800-523-9374 (Continental U.S. and Puerto Rico)  
T 610-481-7711 (other locations)  
24 hours a day, 7 days a week for assistance involving Air Products and Chemicals, Inc. gases and equipment

**Technical Information Center**
T 800-752-1597 (U.S.)  
T 610-481-8565 (other locations)  
Monday–Friday, 8:00 a.m.–5:00 p.m. EST  
F 610-481-8690  
gastech@airproducts.com

We developed this Product Stewardship Summary to give you a general overview of the chemical. This Summary is not meant to provide emergency response or medical treatment information. You can find in-depth safety and health information on the Material Safety Data Sheet for the product.