


安全資料表

一、化學品與廠商資料

化學品名稱：氫氟酸 (HF) HYDROFLUORIC ACID	
其他名稱：UR-Reagent EC-8013	
建議用途及限制使用：烷化，異構化，縮合，脫水，聚合等之催化劑。無機及有機反應之氟化劑；氟及氟化鋁之生產。液態火箭推進劑之添加料；鈾之精製。	
製造者、輸入者或供應者名稱：友和貿易股份有限公司	
製造者、輸入者或供應者地址：新北市林口區文化一路一段93號3樓之2	
製造者、輸入者或供應者電話：(02) 2600-0611	製造者、輸入者或供應者傳真：(02) 2600-0799
緊急連絡電話：(02) 2600-0611	緊急連絡傳真：(02) 2600-0799

二、危害辨識資料：

化學品危害分類：急毒性物質第3級（吸入）、金屬腐蝕物第1級、腐蝕／刺激皮膚物質第1級、嚴重損傷／刺激眼睛物質第1級、特定標的器官系統毒性物質～重複暴露第1級
標示內容： 象徵符號：腐蝕、骷髏與兩根交叉骨、健康危害 
警示語：危險
危害警告訊息：1.吸入有毒2.可能腐蝕金屬3.造成嚴重皮膚灼傷和眼睛損傷4.造成嚴重眼睛損傷5.長期或重複暴露會對器官造成傷害
危害防範措施：1.若與眼睛接觸，立刻以大量的水洗滌後洽詢醫療2.如遇意外或覺得不適，立即洽詢醫療3.穿戴適當的防護衣物、手套、戴眼罩／護面罩4.緊蓋容器、置於通風良好的地方
其他危害：--

三、成份辨識資料

純物質：

中英文名稱：氫氟酸 (HF) HYDROFLUORIC ACID
同義名稱：氫氟酸、Fluorohydric acid、Anhydrous hydrofluoric acid、HF、Anhydrous hydrogen fluoride
化學文摘社登記號碼 (CAS No.)：7664-39-3
危害成份(成份百分比)：49%

混合物：

化學性質：--	
危害成分之中英文名稱	濃度或濃度範圍 (成分百分比)
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四、急救措施

安全資料表

不同暴露途徑之急救方法：

- 吸入：**1.援助時需穿戴合適、安全的保護裝備，以確保自己的安全。2.移除污染源或將患者移至新鮮空氣處。3.若呼吸停止，立即由受訓過人員施予人工呼吸或心肺復甦術。4.避免口對口接觸，最好在醫生的指示下，由受訓過之人員來施予氧氣。5.立即就醫。
- 皮膚接觸：**1.避免直接與該化學品接觸，必要時需戴防滲手套。2.儘速用緩和流動的溫水沖洗患部20分鐘以上。並在沖水時脫去污染物。3.將受傷處浸於冰的0.2% Hyamine 1622 水溶液(1：500)或冰的0.13% Zephiran，若無法直接浸泡，可使用繃帶，每兩分鐘更換一次。4.若敏感組織(唇或口)被燒傷，可敷2.5%的葡萄糖酸鈣膠，立即就醫。
- 眼睛接觸：**1.立即撐開眼皮，用緩和流動的溫水沖洗污染的眼睛20分鐘。2.小心勿使洗液沾染未受污染的眼睛。3.若無法立即就醫，可滴1 或2 滴0.5%的Pontocaine"鹽酸溶液(Winthrop Labora-tories)。" 4.立即就醫，眼睛灼傷不可用皮膚處理的方式處理。
- 食入：**1.若患者即將喪失意識、已失去意識或痙攣，勿經口餵食任何東西。2.用冷水徹底地漱口。3.切勿催吐。4.讓患者喝下240-300ml 的10%葡萄糖酸鈣溶液，以稀釋胃中的物質。5.若患者自發性嘔吐，讓患者身體向前以避免吸入嘔吐物之危險。6.反覆給患者喝水。7.立即就醫。

最重要症狀及危害效應：會造成非常疼痛的深度皮膚灼傷。

對急救人員之防護：應穿著C 級防護裝備在安全區實施急救。

對醫師之提示：1.吸入時，給予氧氣。2.皮膚接觸，考慮冰浴。3.避免洗胃或引發嘔吐。

五、滅火措施

適用滅火劑：對於週遭之火災，使用合適之滅火劑來滅火

滅火時可能遭遇之特殊危害：1.水與其接觸有猛烈噴出HF的危險，故水不要直接與打開或洩漏的容器接觸。2.HF儲存於金屬容器時，易燃性的氫氣可能產生並累積。

特殊滅火程序：--

消防人員之特殊防護裝備：消防人員必須配戴A級氣密式化學防護衣、空氣呼吸器。

六、洩漏處理方法

個人應注意事項：1.在污染區尚未完全清理乾淨前，限制人員接近該區。2.確定清理工作是由受過訓練的人員負責。3.提供適當的個人防護裝備。

環境注意事項：1.穿戴供氣式抗酸服以達最大防護效果。2.撲滅或除去所有發火源。3.報告政府安全衛生與環保相關單位。

清理方法：1.勿碰觸洩漏物。2.避免外洩物流入下水道，水溝或其他密閉空間。3.在安全許可狀況下，設法阻止或減少洩漏。4.小量液體洩漏時用不會和外洩物反應的吸收劑吸除並置於適當密閉，有著標示之容器內。5.用水沖洗洩漏區域。6.不要直接加水於洩漏源亦不要讓水流入HF 容器槽內。7.若可能則將外洩容器倒轉，使氣體逸出，代替液體流出。8.若不能阻漏時，將漏洩容器移至安全處所洩空修理。

七、安全處置與儲存方法

處置：1.HF 會與某些容器材質或污染物反應產生爆炸性氫氣。2.開HF 容器時，確定工作區通風良好且無火花或引燃源存在。3.含HF 的製程須極小心操作。4.避免讓釋出的蒸氣進入工作區的空氣中。5.在通風良好的特定區內操作並採最小用量。6.須備隨時可用於滅火及處理洩漏的緊急應變裝置。7.無水HF 應貯存於鋼材壓力容器中。8.風扇及電氣設備應為防爆型設備。9.考慮裝設洩漏偵測和警示系統。10.於適當處張貼警示符號。11.定期檢查有無損毀或洩漏等瑕疵。

儲存：1.所有貯存容器應遠離熱且避免陽光直接射。2.貯存區應有適當且獨立的通風，並遠離熱源及火花。3.貯存區的建材、照明與通風系統應抗腐蝕。4.限量儲存，並限制人員進入儲存區。5.貯存區要與員工密集之工作區域分開。

八、暴露預防措施

工程控制：1.在完全密閉中操作。2.整體換氣或局部排氣裝置。

安全資料表

控制參數			
八小時日時量平均容許濃度 TWA	短時間時量平均容許濃度 STEL	最高容許濃度 CEILING	生物指標 BEIs
3ppm	6ppm	--	上班前尿中每克肌酸酐含氟離子3mg(B、Ns)
<p>個人防護裝備：</p> <p>呼吸防護： 1.30 ppm 以下：含防HF 濾罐的動力型空氣淨化式或全面型化學濾罐式呼吸防護具、含防HF 濾罐的防毒面罩、全面型自攜式或供氣式呼吸防護具吸防護具輔以正壓自攜式呼吸防護具。 2.未知濃度：正壓自攜式呼吸防護具、正壓全面型供氣式呼吸防護具輔以正壓自攜式呼吸防護具。 3.逃生：含防HF 濾罐之氣體面罩、逃生型自攜式呼吸防護具</p> <p>手部防護： 1.防滲手套，材質建議以Saranex、Barricade、Chemrel、Responder 為佳。</p> <p>眼睛防護： 1.化學安全護目鏡、寬緣硬質工作帽附有全面式護面罩。</p> <p>皮膚及身體防護： 1.上述橡膠材質連身式防護衣、工作靴。</p> <p>衛生措施： 1.工作後儘速脫掉污染之衣物，洗淨後才可再穿戴或丟棄，且須告知洗衣人員污染之危害性。 2.工作場所嚴禁抽煙或飲食。 3.處理此物後，須徹底洗手。 4.維持作業場所清潔。</p>			

九、物理及化學性質

外觀(物質狀態、顏色等)：無色澄清液體	氣味：--
嗅覺閾值：--	熔點：--
pH值：--	沸點/沸點範圍：--
易燃性(固體，氣體)：--	閃火點：--
分解溫度：--	測試方法(開杯或閉杯)：--
自燃溫度：--	爆炸界限：--
蒸氣壓：25 mmHg (20 °C)	蒸氣密度：1.27 (空氣=1)
密度：1.16 g/mL at 25 °C(lit.)	溶解度：--
辛醇/水分配係數(log Kow)：--	揮發速率：--

十、安全性及反應性

安全性：正常狀況下安定
特殊狀況下之可能之危害反應：1.鹼(如苛性鈉)：劇烈反應。 2.氟氣：與50% HF 溶液劇烈反應，可能引起火災。 3.三氧化砷：反應產生大量熱。 4.玻璃、陶器、含矽石金屬、天然橡膠及天然皮：此酸可將其溶解。 5.除臘、鉛及白金外大部份金屬：此酸可將其腐蝕。
應避免之狀況：--
應避免之物質：鹼(如苛性鈉)、氟氣、三氧化砷、玻璃、陶器、含矽石金屬、天然橡膠、天然皮、除臘、鉛、白金外大部份金屬
危害分解物：--

十一、毒性資料

暴露途徑：皮膚、吸入、食入、眼睛
症狀：刺激感、皮膚灼傷、骨質弱化及變化(骨質疏鬆症)。

安全資料表

急毒性：

- 皮膚：**1.其氣體或無水液體會造成疼痛難忍的深度皮膚灼傷。2.過量的濺到皮膚會造成死亡。
- 吸入：**1.刺激鼻、咽、眼睛及呼吸道。2.高濃度蒸氣會嚴重的灼傷唇、口、咽及肺。3.可能造成液體蓄積於肺中及死亡。4.122ppm 濃度下暴露1 分鐘會嚴重刺激鼻、咽及呼吸道。5.50ppm 濃度下暴露數分鐘可能致死。
- 食入：**1.不適用於HF 氣體。
- 眼睛：**1.其蒸氣會溶解於眼球表面的水份上而造成刺激。
- LD50(測試動物、吸收途徑)：**--
- LC50(測試動物、吸收途徑)：**1108 ppm/1H(大鼠，吸入)

慢毒性或長期毒性：1.氟化物為骨頭所需的，但過量可能造成氟中毒(使骨質弱化及變性，即骨質硬化症)。2.氟中毒可能會有心臟、神經及腸的問題。3.吸入氟化物的量愈多，造成骨骼氟中毒的量愈多，經過數年後過量氟化物可除去，骨骼氟中毒可能慢慢部份康復。4.尿中氟濃度應小於4mg/l。470ug/m³/4H(懷孕1-22 天雌鼠，吸入)造成胚胎死亡率提高。IARC 將其列為 Group 3：無法判斷為人體致癌性

十二、生態資料

生態毒性：

- LC50(魚類)：**--
- EC50(水生無脊椎動物)：**--
- 生物濃縮係數(BCF)：**--

持久性及降解性：1.氟離子會儲存在骨頭中，但可在數年後排出。

- 半衰期(空氣)：**--
- 半衰期(水表面)：**--
- 半衰期(地下水)：**--
- 半衰期(土壤)：**--

生物蓄積性：--

土壤中之流動性：--

其他不良效應：--

十三、廢棄處置方法

廢棄處置方法：1.依廢棄物清理法相關規定處理。2.向產品供應商諮詢。

十四、運送資料

聯合國編號：1052

聯合國運輸名稱：氟化氫

運輸危害分類：第8 類腐蝕性物質

包裝類別：I

海洋污染物(是/否)：否

特殊運送方法及注意事項：--

安全資料表

十五、法規資料

適用法規：1. 職業安全衛生法。
2. 危害性化學品標示及通識規則。
3. 特定化學物質危害預防標準。
4. 勞工作業場所容許暴露標準。
5. 道路交通安全規則。
6. 事業廢棄物貯存清除處理方法及設施標準。
7. 毒性化學物質管理法。
8. 公共危險物品及可燃性高壓氣體設置標準暨安全管理辦法。
9. 毒性化學物質標示及安全資料表管理辦法。
10. 勞工作業環境監測實施辦法。
11. 勞工健康保護規則。

十六、其他資料

參考文獻	1.Aldrich Sigma RDH Fluka 之MSDS英文版 2.CHEMINFO 資料庫，CCINFO 光碟，2005-3 3.RTECS 資料庫，TOMES PLUS 光碟，Vol.65，2005 4.HSDB 資料庫，TOMES PLUS 光 碟，Vol.65，2005 5.危害化學物質中文資料庫，環保署 6.ChemWatch 資料庫，2005-1	
製表單位	名稱：友和貿易股份有限公司	
	地址：新北市林口區文化一路一段93號3樓	電話：(02) 2600-0611
製表人	職稱：經理	姓名(簽章)：張淑杏
製表日期	民國 104 年 1 月 7 日	
備註	上述資料中符號 "-" 代表目前查無此資料，而 "/" 則代表此欄位對該物質並不適用。	

Praxair Material Safety Data Sheet

1. Chemical Product and Company Identification

Product Name: Hydrogen fluoride	Trade Name: Hydrogen fluoride
Product Use: Many.	
Chemical Name: Hydrogen fluoride	Synonym: Anhydrous hydrofluoric acid, Hydrofluoride, Fluorohydric acid gas, Hydrofluoric acid gas, HF-A.
Chemical Formula: HF	Chemical Family: Inorganic Acid Anhydride
Telephone: Emergencies: * 1-800-363-0042	Supplier /Manufacture: Praxair Canada Inc. 1 City Centre Drive Suite 1200 Mississauga, ON L5B 1M2 Phone: 905-803-1600 Fax: 905-803-1682

**Call emergency numbers 24 hours a day only for spills, leaks, fire, exposure, or accidents involving this product. For routine information, contact your supplier or Praxair sales representative.*

2. Hazards Identification

Emergency Overview



DANGER! Toxic, corrosive, oxidizing liquid and gas under pressure. Harmful if inhaled. Causes eye, skin, and respiratory tract burns. May cause liver and kidney damage. Contact with organic or silica materials may cause fire. Contact with water may cause violent reaction. Self-contained breathing apparatus must be worn by rescue workers.

ROUTES OF EXPOSURE: Inhalation. Swallowing. Skin absorption. Skin contact. Eye contact.

EFFECTS OF A SINGLE (ACUTE) OVEREXPOSURE:

INHALATION: Overexposure to vapour concentrations moderately above the Threshold Limit Value (TLV) of 3 ppm is irritating to the upper respiratory tract. Intolerable concentrations are in the range of 120 ppm for 1 minute exposure, which results in irritation of the eyes and respiratory tract. Inhalation of high causes choking, coughing, burning of the throat, and severe irritation of the upper respiratory tract; additionally, there is the possibility of pulmonary edema, general lung injury, bronchitis, and death. Symptoms may progress for 1 – 2 days and gradually diminish over 2 – 3 months.

SKIN CONTACT: May cause severe irritation and chemical burns associated with severe pain and deeply penetrating tissue destruction.. This process of tissue destruction may persist for several days.

SKIN ABSORPTION: Prolonged or widespread skin contact with the liquid may result in the absorption of harmful amounts of material.

SWALLOWING: Highly toxic. May cause chemical burns of the mouth, throat, esophagus, stomach, and small bowel with severe abdominal pain, nausea, diarrhea, vomiting, dizziness, weakness and collapse. Large doses of the material may cause central nervous system involvement, with muscle spasms, tremors, and coma.

EYE CONTACT: May cause pain, tearing, conjunctivitis, and corneal burns. Vapour may be moderately to severely irritating, experienced as excess tear production, discomfort, blinking, and excess redness of the conjunctiva.

EFFECTS OF REPEATED (CHRONIC) OVEREXPOSURE:

Prolonged or repeated exposure may cause decalcification of the bones, nasal congestion, bronchitis, weight loss, anemia, weakness, and stiffness of the joints. Repeated overexposure may also cause damage to the lungs, liver, and kidneys.

OTHER EFFECTS OF OVEREXPOSURE:

None known.

MEDICAL CONDITIONS AGGRAVATED BY OVEREXPOSURE:

Inhalation may aggravate asthma and inflammatory or fibrotic pulmonary disease. Because of its irritating properties, this material may aggravate an existing dermatitis.

SIGNIFICANT LABORATORY DATA WITH POSSIBLE RELEVANCE TO HUMAN HEALTH HAZARD EVALUATION:

Not available.

CARCINOGENICITY:

Not listed as carcinogen by OSHA, NTP or IARC.

3. Composition and Information on Ingredients

COMPONENTS	CAS NUMBER	CONCENTRATION % by Mole
Hydrogen fluoride	7664-39-3	100

4. First Aid Measures

INHALATION:

If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention immediately. Keep patient warm.

SKIN CONTACT:

Immediately flush affected areas with water for at least 15 minutes while removing contaminated clothing and shoes. Keep affected area immersed in water. Discard clothing and shoes. Keep patient warm. Call a physician.

SWALLOWING:

Give at least two glasses of water or milk at once. Do not induce vomiting. Keep patient warm. Call a physician.

EYE CONTACT:

For contact with the liquid, immediately flush eyes thoroughly with warm water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. See a physician, preferably an ophthalmologist, immediately.

NOTES TO PHYSICIAN:

In case of severe exposure, oxygen should be administered under pressure immediately and continued as long as necessary. Close observations should be continued 24 to 48 hours for pulmonary edema. For skin exposure, the affected areas should be covered with 20% magnesium oxide in glycerin. If the solution was more than 20%, a 10% solution of calcium gluconate should be injected around and underneath the affected area.

5. Fire Fighting Measures

FLAMMABLE : No. **IF YES, UNDER WHAT CONDITIONS?** Not applicable.

EXTINGUISHING MEDIA:

This material cannot catch fire. Use media appropriate for surrounding fire.

PRODUCTS OF COMBUSTION:

Not applicable.

PROTECTION OF FIREFIGHTERS:

DANGER! Evacuate all personnel from danger area. Do not approach area without self-contained breathing apparatus, protective clothing, and eye protection. Immediately cool containers with water spray from maximum distance until cool, then move cylinders away from fire area if without risk. If containers are leaking, reduce vapours with water spray or fog. Reverse flow into cylinders may cause rupture. Shut off leak if without risk. Move containers away from fire area if without risk.

SPECIFIC PHYSICAL AND CHEMICAL HAZARDS:

Nonflammable, toxic, corrosive gas. Heat of fire can build pressure in cylinder and cause it to rupture. Vapours are extremely irritating. Contact may cause burns to skin and eyes. No part of cylinder should be subjected to a temperature higher than 52 C. Contact with most metals in the presence of moisture, produces hydrogen.

SENSITIVITY TO IMPACT:

Avoid impact against container.

SENSITIVITY TO STATIC DISCHARGE:

Not applicable.

PROTECTIVE EQUIPMENT AND PRECAUTIONS FOR FIREFIGHTERS:

Firefighters should wear self-contained breathing apparatus and full fire-fighting turnout gear.

FLAMMABLE LIMITS IN AIR, % by volume:

LOWER: Not applicable. **UPPER:** Not applicable.

FLASH POINT: Not applicable.

AUTOIGNITION TEMPERATURE: Not applicable.

6. Accidental Release Measures

STEPS TO BE TAKEN IF MATERIAL IS RELEASED OR SPILLED:

Personal Precautions:

DANGER! Corrosive, toxic gas. Use self-contained breathing apparatus and protective clothing where needed. Reduce vapours with fog or fine water spray. Reverse flow into cylinder may cause rupture. Shut off leak if without risk. Ventilate area of leak or move leaking container to well ventilated area. Prevent runoff from contaminating surrounding environment. Corrosive, toxic vapours may spread from spill. Before entering area, especially confined areas, check atmosphere with appropriate device.

Environmental Precautions:

Prevent waste from contaminating the surrounding environment. Keep personnel away. Discard any product, residue, disposable container, or liner in an environmentally acceptable manner, in full compliance with federal, provincial, and local regulations. If necessary, call your local supplier for assistance.

7. Handling and Storage

PRECAUTIONS TO BE TAKEN IN HANDLING:

Protect cylinders from damage. Use a suitable hand truck to move cylinders; do not drag, roll, slide, or drop. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. Never insert an object (e.g., wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Open valve slowly. If valve is hard to open, discontinue use and contact your supplier. For other precautions, see Section 16.

For additional information on storage and handling, refer to Compressed Gas Association (CGA) pamphlet P-1, *Safe Handling of Compressed Gases in Containers*, available from the CGA. Refer to Section 16 for the address and phone number along with a list of other available publications.

PRECAUTIONS TO BE TAKEN IN STORAGE:

Store and use with adequate ventilation. Separate flammable cylinders from oxygen, chlorine, and other oxidizers by at least 6 m or use a barricade of non-combustible material. This barricade should be at least 1.5 m high and have a fire resistance rating of at least ½ hour. Firmly secure cylinders upright to keep them from falling or being knocked over. Screw valve protection cap firmly in place by hand. Post "No Smoking or Open Flames" signs in storage and use areas. There must be no sources of ignition. All electrical equipment in storage areas must be explosion-proof. Storage areas must meet national electric codes for Class 1 hazardous areas. Store only where temperature will not exceed 52 C. Store full and empty cylinders separately. Use a first-in, first-out inventory system to prevent storing full cylinders for long periods.

OTHER HAZARDOUS CONDITIONS OF HANDLING, STORAGE, AND USE:

Toxic, corrosive high-pressure gas. Do not breathe gas. Do not get vapour in eyes, on skin, or on clothing. Have safety showers and eyewash fountains immediately available. Use only in a closed system. Use piping and equipment adequately designed to withstand pressures to be encountered. Store and use with adequate ventilation. Close valve after each use; keep closed even when empty. **Prevent reverse flow.** Reverse flow into cylinder may cause rupture. Use a check valve or other protective device in any line or piping from the cylinder. **When returning cylinder to supplier,** be sure valve is closed, then install valve outlet plug tightly. **Never work on a pressurized system.** If there is a leak, close the cylinder valve. Vent the system down in a safe and environmentally sound manner in compliance with all federal, provincial, and local laws; then repair the leak. **Never place a compressed gas cylinder where it may become part of an electrical circuit.**

RECOMMENDED PUBLICATIONS:

Additional information on storage, handling, and use of this product is provided in **NFPA 55: Standard for the Storage, Use, and Handling of Compressed and Liquefied Gases in Portable Cylinders**, published by the National Fire Protection Association.

See also Praxair publication P-14-153, *Guidelines for Handling Gas Cylinders and Containers*. Obtain from your local supplier.

8. Exposure Controls/Personal Protection

INGREDIENTS	CAS NUMBER	LD ₅₀ (Species & Routes)	LC ₅₀ (Rat, 4 hrs.)	Exposure Limits
Hydrogen fluoride	7664-39-3	Not available.	966 ppm (1hr)	ACGIH TLV Skin TWA: 0.5 ppm, 8 hours

IMMEDIATELY DANGEROUS TO LIFE AND HEALTH (IDLH): Not available.

VENTILATION/ENGINEERING CONTROLS:**LOCAL EXHAUST:** Not applicable.**MECHANICAL (General):** Inadequate.
See SPECIAL.**SPECIAL:** Use only in a closed system.
A corrosion-resistant, forced-draft fume hood is preferred.**OTHER:** See SPECIAL.**PERSONAL PROTECTION:****RESPIRATORY PROTECTION:** For concentrations up to 10 times the applicable exposure limit any NIOSH/MSHA approved supplied air respirator is recommended. Up to 50 times the TLV, a NIOSH/MSHA approved respirator with a full-face piece or self-contained breathing apparatus is recommended. For higher concentration us only self-contained breathing apparatus operated in the pressure demand mode.**SKIN PROTECTION:** Neoprene gloves. Nitrile gloves. Natural rubber gloves.**EYE PROTECTION:** Select in accordance with the current CSA standard Z94.3, "Industrial Eye and Face Protection", and any provincial regulations, local bylaws or guidelines.**OTHER PROTECTIVE EQUIPMENT:** Metatarsal shoes for cylinder handling. Protective clothing where needed. Cuffless trousers should be worn outside the shoes. Select in accordance with the current CSA standard Z195, "Protective Foot Wear", and any provincial regulations, local bylaws or guidelines.**9. Physical and Chemical Properties**

PHYSICAL STATE: Gas.	FREEZING POINT: -83.57°C (-118.4°F)	pH: Not applicable.
BOILING POINT 19.52°C (67.1°F)	VAPOUR PRESSURE 103.4 kPa (@ 20°C)	MOLECULAR WEIGHT: 20.01 g/mole
SPECIFIC GRAVITY: LIQUID (Water = 1) 0.987 @ 20 C	SOLUBILITY IN WATER, Complete.	
SPECIFIC GRAVITY: VAPOUR (air = 1) 1.858 g/ml @ 19.5 C	EVAPORATION RATE (Butyl Acetate=1): >1 compared to (Butyl Acetate = 1)	COEFFICIENT OF WATER/OIL DISTRIBUTION: Not applicable.
VAPOUR DENSITY: 0.0032 g/ml @ 19.5 C	% VOLATILES BY VOLUME: 100% (v/v).	ODOUR THRESHOLD: Not available.

APPEARANCE & ODOUR: Colourless fuming liquid and gas. Odour: sharp, penetrating. (Strong.)

10. Stability and Reactivity

STABILITY:	Sable.
CONDITIONS OF CHEMICAL INSTABILITY:	None known.
INCOMPATIBILITY (materials to avoid):	Bases, moisture, organic compounds, silica bearing compounds, concrete, aluminum and its alloys, titanium, tin, austenitic stainless steels, tantalum, sodium, metal oxides, glass, acids.
HAZARDOUS DECOMPOSITION PRODUCTS:	Decomposition may produce hydrogen and fluorine or fluorides.
HAZARDOUS POLYMERIZATION:	Will not occur.
CONDITIONS TO AVOID:	None known.
CONDITIONS OF REACTIVITY:	None known.

11. Toxicological Information

ACUTE DOSE EFFECTS: See section 2.

STUDY RESULTS:

None known.

12. Ecological Information

May cause pH changes in aqueous ecological systems. This product does not contain any Class I or Class II ozone-depleting chemicals. The components of this mixture are not listed as marine pollutants by TDG Regulations.

13. Disposal Considerations

WASTE DISPOSAL METHOD: Do not attempt to dispose of residual or unused quantities. Return cylinder to supplier.

14. Transport Information

TDG/IMO SHIPPING NAME: Hydrogen fluoride, anhydrous

HAZARD CLASS: CLASS 2.3 (8): Toxic and corrosive gas.	IDENTIFICATION #: UN1052	PRODUCT REPORTABLE QUANTITY (PRQ): Any accidental release in a quantity that could pose a danger to public safety or any sustained release of 10 minutes or more.
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SHIPPING LABEL(s): Toxic gas primary label, corrosive material subsidiary label.

PLACARD (When Required): Toxic gas.

SPECIAL SHIPPING INFORMATION:

Cylinders should be transported in a secure position, in a well-ventilated vehicle. Cylinders transported in an enclosed, non-ventilated compartment of a vehicle can present serious safety hazards.

15. Regulatory Information

The following selected regulatory requirements may apply to this product. Not all such requirements are identified. Users of this product are solely responsible for compliance with all applicable federal, provincial, and local regulations. This product has been classified in accordance with the hazard criteria of the CPR and the MSDS contains all the information required by the CPR.

WHMIS (Canada): CLASS A: Compressed gas.
CLASS D-1A: Material causing immediate and serious toxic effects (VERY TOXIC).
CLASS E: Corrosive liquid.

This product is on the DSL list.

International Regulations:

EINECS: Not available.

DSCL (EEC): R23- Toxic by inhalation.

International Lists: No products were found.

16. Other Information

MIXTURES:

When two or more gases, or liquefied gases are mixed, their hazardous properties may combine to create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an Industrial Hygienist, or other trained person when you make your safety evaluation of the end product. Remember, gases and liquids have properties which can cause serious injury or death.

HAZARD RATING SYSTEM:

HMIS RATINGS:

HEALTH 3

FLAMMABILITY 0

PHYSICAL HAZARD 2

STANDARD VALVE CONNECTIONS FOR U.S. AND CANADA:

THREADED: CGA-670

PIN-INDEXED YOKE: Not available.

ULTRA-HIGH-INTEGRITY CONNECTION: CGA-638

Use the proper CGA connections. **DO NOT USE ADAPTERS.** Additional limited-standard connections may apply. See CGA pamphlets V-1 and V-7 listed below.

Ask your supplier about free Praxair safety literature as referred to in this MSDS and on the label for this product. Further information about this product can be found in the following pamphlets published by the Compressed Gas Association, Inc. (CGA), 4221 Walney Road, 5th Floor, Chantilly, VA 20151-2923, Telephone (703) 788-2700, Fax (703) 961-1831, website: www.cganet.com.

- AV-1 Safe Handling and Storage of Compressed Gas
- P-1 Safe Handling of Compressed Gases in Containers
- P-14 Accident Prevention in Oxygen-Rich, Oxygen-Deficient Atmosphere
- SB-2 Oxygen-Deficient Atmospheres
- V-1 Compressed Gas Cylinder Valve Inlet and Outlet Connections
- V-7 Standard Method of Determining Cylinder Valve Outlet Connections for Industrial Gas Mixtures
- Handbook of Compressed Gases, Fifth Edition

Praxair asks users of this product to study this MSDS and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this MSDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information.

PREPARATION INFORMATION:

DATE: October 15, 2016
DEPARTMENT: Safety and Environmental Services
TELEPHONE: 905-803-1600

The opinions expressed herein are those of qualified experts within Praxair Canada Inc. We believe that the information contained herein is current as of the date of this Material Safety Data Sheet. Since the use of this information and the conditions of use of the product are not within the control of Praxair Canada Inc., it is the user's obligation to determine the conditions of safe use of the product.

Praxair Canada Inc. requests the users of this product to study this Material Data Sheet (MSDS) and become aware of product hazards and safety information. To promote safe use of this product, a user should (1) notify its employees, agents and contractors of the information on this MSDS and any product hazards and safety information, (2) furnish this same information to each of its customers for the product, and (3) request such customers to notify their employees and customers for the product of the same product hazards and safety information.

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