



Revision Date May-19-2015

Safety Data Sheet

Item # Multi

Safety Data Sheet 2156

1. PRODUCT AND COMPANY IDENTIFICATION

Product Name PF Etchant
UN/ID No. UN2582
Synonyms PF Etchant - Ferric Chloride, Solution
Recommended Use Metal etching
Uses advised against Consumer uses: Private households (= general public = consumers).

CONTROLLED DOCUMENT
IF STAMPED IN RED

Company Name
PVS Technologies, Inc.
10900 Harper Ave.
Detroit, MI 48213
(313) 571-1100

24 Hour Emergency Phone Number CHEMTRAC 1-800-424-9300

2. HAZARDS IDENTIFICATION

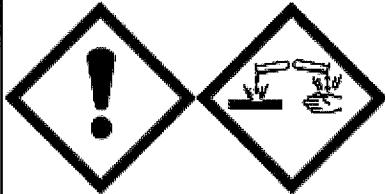
Classification

Acute toxicity - Oral	Category 4
Skin corrosion/irritation	Category 1
Serious eye damage/eye irritation	Category 1

Emergency Overview

DANGER

Hazard statements Causes severe skin burns and eye damage
Harmful if swallowed
Physical hazards Corrosive
May be corrosive to metals



Precautionary statements

Prevention

- Wear eye/face protection
- Wear protective gloves/protective clothing/eye protection/face protection
- Do not breathe dust/fume/gas/mist/vapors/spray
- Do not eat, drink or smoke when using this product
- Wash face, hands and any exposed skin thoroughly after handling
- Immediately call a POISON CENTER or doctor/physician
- Specific treatment (see section 4 on this Safety Data Sheet)
- IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower
- IF SWALLOWED: Rinse mouth. DO NOT induce vomiting
- IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
- Wash contaminated clothing before reuse
- Store in a secure area

Storage

<u>Disposal</u>	• Dispose of contents/container to an approved waste disposal plant
<u>Hazards not otherwise classified (HNOC)</u>	None known.
<u>Other Information</u>	
<u>Other hazards</u>	<ul style="list-style-type: none">• Toxic to aquatic life with long lasting effects• Toxic to aquatic life
Unknown Acute Toxicity	0% of the mixture consists of ingredient(s) of unknown toxicity

3. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical Name	CAS No.	EC No.	Weight-% *
Water	7732-18-5	231-791-2	54-58
Iron trichloride	7705-08-0	231-729-4	42-46
Hydrogen chloride	7647-01-0	231-595-7	0-1

*The exact percentage (concentration) of composition has been withheld as a trade secret

4. FIRST AID MEASURES

General advice	Immediate medical attention is required
Eye contact	<ul style="list-style-type: none">• Immediate medical attention is required• Immediately flush with plenty of water. After initial flushing, remove any contact lenses and continue flushing for at least 15 minutes• Do not rub affected area
Skin Contact	<ul style="list-style-type: none">• Immediate medical attention is required• Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes• Wash contaminated clothing before reuse
Inhalation	<ul style="list-style-type: none">• Call a physician or poison control center immediately• Remove to fresh air• If not breathing, give artificial respiration• If breathing is difficult, give oxygen
Ingestion	<ul style="list-style-type: none">• Call a physician or poison control center immediately• Do NOT induce vomiting• Rinse mouth• Drink 4 to 8 ounces (120-240 ml) of water or milk as soon as possible after ingestion.• Never give anything by mouth to an unconscious person
Note to physician	Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Do not give chemical antidotes. Asphyxia from glottal edema may occur. Marked decrease in blood pressure may occur with moist rales, frothy sputum, and high pulse pressure. Treat symptomatically.
Self-protection for first aid personnel	Use personal protective equipment as required. Avoid contact with skin, eyes or clothing.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	<ul style="list-style-type: none">• Dry chemical, CO₂, water spray or alcohol-resistant foam• Use extinguishing measures that are appropriate to local circumstances and the surrounding environment
-------------------------------------	--

Unsuitable extinguishing media	<ul style="list-style-type: none">• Caution: Use of water spray when fighting fire may be inefficient• Do not use a solid water stream as it may scatter and spread fire
Specific hazards arising from the chemical	<ul style="list-style-type: none">• The product causes burns of eyes, skin and mucous membranes• Thermal decomposition can lead to release of irritating and toxic gases and vapors• In the event of fire and/or explosion, do not breathe fumes
Protective equipment and precautions for firefighters	<ul style="list-style-type: none">• Wear a self-contained breathing apparatus and chemical protective clothing
Flammable properties Explosive properties	<ul style="list-style-type: none">• No information available• No information available

6. ACCIDENTAL RELEASE MEASURES

Personal precautions	<ul style="list-style-type: none">• Evacuate personnel to safe areas• Use personal protective equipment as required• Avoid contact with skin, eyes or clothing• Keep people away from and upwind of spill/leak
Environmental precautions	<ul style="list-style-type: none">• For small spills, absorb material with clay absorbent or other compatible material. Dispose of the waste material according to local, state and governmental requirements.• For large spills, contain the material using barriers of absorbent pigs, clay absorbent or earth dams.• US regulations require reporting spills of this material that could reach any surface waters. The toll-free phone number for the US Coast Guard National Response Center is 1-800-424-8802
Methods for cleaning up	<ul style="list-style-type: none">• Dike far ahead of liquid spill for later disposal• Neutralize with soda ash or lime• Soak up with inert absorbent material• Take up mechanically, placing in appropriate containers for disposal• Clean contaminated surface thoroughly• Prevent product from entering drains
Other Information	<ul style="list-style-type: none">• Spills exceeding the Reportable Quantity (RQ) of 1000 pounds or more must be reported to the National Response Center, (800) 424-8802.

7. HANDLING AND STORAGE

Advice on safe handling	<ul style="list-style-type: none">• Use personal protective equipment as required• Avoid contact with skin, eyes or clothing• Ensure adequate ventilation, especially in confined areas• In case of insufficient ventilation, wear suitable respiratory equipment• Use only with adequate ventilation and in closed systems
Storage Conditions	<ul style="list-style-type: none">• Keep containers tightly closed in a dry, cool and well-ventilated place• Keep in properly labeled containers• Keep out of the reach of children

Incompatible materials Incompatible with strong acids and bases, oxidizers, steel, and most metals

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Chemical Name	ACGIH TLV	OSHA PEL	NIOSH IDLH
Iron trichloride 7705-08-0	TWA: 1 mg/m ³ Fe	-	TWA: 1 mg/m ³ Fe
Hydrogen chloride 7647-01-0	Ceiling: 2 ppm	Ceiling: 5 ppm Ceiling: 7 mg/m ³	IDLH: 50 ppm Ceiling: 5 ppm Ceiling: 7 mg/m ³

Exposure Guidelines

Engineering Controls Ensure adequate ventilation, especially in confined areas.

Individual protection measures, such as personal protective equipment

Respiratory protection	• A respiratory protection program that meets OSHA 1910.134 and ANSI Z88.2 requirements must be followed whenever workplace conditions warrant the use of a respirator.
Eye/Face protection	• Tight sealing safety goggles • Face protection shield
Skin and body protection	• Wear suitable protective clothing • Wear impervious protective clothing, including boots, gloves, lab coat, apron or coveralls, as appropriate, to prevent skin contact
General Hygiene Considerations	• Do not eat, drink or smoke when using this product • Wash contaminated clothing before reuse • Contaminated work clothing should not be allowed out of the workplace • Regular cleaning of equipment, work area and clothing is recommended • Avoid contact with skin, eyes or clothing

9. PHYSICAL AND CHEMICAL PROPERTIES

Information on basic physical and chemical properties

Physical state	Liquid
Appearance	aqueous solution
Color	Red brown
Odor	Slight acidic
Odor threshold	No information available

<u>Property</u>	<u>Values</u>	<u>Remarks • Method</u>
pH	2	
Melting point/Freezing Point	7 °C / 45 °F	
Boiling point / boiling range	110 °C / 230 °F	
Flash point	No information available	
Evaporation rate	No information available	
Flammability (solid, gas)	No information available	
Flammability Limit in Air		
Upper flammability limit (%)	No information available	
Lower flammability limit (%):	No information available	
Vapor pressure	755	
Vapor density	No information available	
Specific Gravity	1.50	
Water solubility	No information available	
Solubility in other solvents	No information available	
Partition coefficient	No information available	
Autoignition temperature	No information available	
Decomposition temperature	No information available	
Kinematic viscosity	No information available	
Dynamic viscosity	No information available	
Explosive properties	No information available	
Oxidizing properties	No information available	
Other Information		
Softening point °C	No information available	
Molecular weight	No information available	
VOC Content (%)	No information available	
Density	No information available	
Bulk density	12.51 Pounds per gallon (lb/gal)	

10. STABILITY AND REACTIVITY

Item # Multi PF Etchant

Stability • Stable under recommended storage conditions

Conditions to avoid • Exposure to air or moisture over prolonged periods

Incompatible materials • Incompatible with strong acids and bases, oxidizers, steel, and most metals

Hazardous Decomposition Products • Thermal decomposition can lead to release of irritating and toxic gases and vapors
• Hydrogen chloride

Possibility of Hazardous Reactions • None under normal processing and storage

11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure

Principle Routes of Exposure	Inhalation, Skin Contact, Eye contact
Inhalation	May cause irritation of respiratory tract. Avoid breathing vapors or mists.
Ingestion	May cause adverse kidney effects. May cause adverse liver effects.
Skin Contact	Contact causes severe skin irritation and possible burns.
Eye contact	Corrosive to the eyes and may cause severe damage including blindness.

Chemical Name	Oral LD50	Dermal LD50	Inhalation LC50
Iron trichloride 7705-08-0	= 450 mg/kg (Rat)	>2000 mg/kg (rat)	-
Hydrogen chloride 7647-01-0	= 700 mg/kg (Rat)	> 5010 mg/kg (Rabbit)	= 3124 ppm (Rat) 1 h

Information on toxicological effects

Symptoms	Vomiting, Hypoxemia (reduced O ₂ in the blood), Metabolic Acidosis
Delayed and immediate effects as well as chronic effects from short and long-term exposure	

Sensitization	No information available.
Germ cell mutagenicity	No information available.
Carcinogenicity The table below indicates whether each agency has listed any ingredient as a carcinogen.	

Chemical Name	ACGIH	IARC	NTP	OSHA
Hydrogen chloride 7647-01-0	-	Group 3	-	-

IARC (International Agency for Research on Cancer)

Not classifiable as a human carcinogen

Reproductive toxicity	No information available.
STOT - single exposure	No information available.
STOT - repeated exposure	No information available.
Chronic toxicity	Chronic exposure to corrosive fumes/gases may cause erosion of the teeth followed by jaw necrosis. Bronchial irritation with chronic cough and frequent attacks of pneumonia are common. Gastrointestinal disturbances may also be seen. Avoid repeated exposure. Possible risk of irreversible effects. May cause adverse liver effects.
Target Organ Effects	Eyes, Gastrointestinal tract (GI), Liver, Respiratory system, Skin.
Aspiration hazard	No information available.

Numerical measures of toxicity - Product Information

Unknown Acute Toxicity	0% of the mixture consists of ingredient(s) of unknown toxicity
The following values are calculated based on chapter 3.1 of the GHS document	

12. ECOLOGICAL INFORMATION

Ecotoxicity

Ecotoxicity	Toxic to aquatic life with long lasting effects
0.6% of the mixture consists of components(s) of unknown hazards to the aquatic environment	

Chemical Name	Algae/aquatic plants	Fish	Crustacea
---------------	----------------------	------	-----------

Item # Multi PF Etchant

Iron trichloride 7705-08-0	-	20.95 - 22.56: 96 h Pimephales promelas mg/L LC50 semi-static 20.26: 96 h Lepomis macrochirus mg/L LC50 semi-static	27.9: 48 h Daphnia magna mg/L EC50 9.6: 48 h Daphnia magna mg/L EC50 Static
-------------------------------	---	--	---

Persistence and degradability No information available.
Bioaccumulation No information available

Chemical Name	Partition coefficient
Iron trichloride 7705-08-0	-4

Other adverse effects No information available

13. DISPOSAL CONSIDERATIONS

Disposal of wastes	• This material, as supplied, is a hazardous waste according to federal regulations (40 CFR 261)
Contaminated packaging	• Do not reuse container
US EPA Waste Number	• D002

This product contains one or more substances that are listed with the State of California as a hazardous waste.

Chemical Name	California Hazardous Waste Status
Iron trichloride 7705-08-0	Toxic Corrosive

14. TRANSPORT INFORMATION**DOT**

Proper shipping name	FERRIC CHLORIDE, SOLUTION
Hazard Class	8
UN/ID No.	UN2582
Packing Group	III
RQ (lbs)(dry)	1000
RQ as is (lbs)(wet)	2222 (45% Ferric Chloride)
Description	UN2582, Ferric chloride, solution, 8, III
Special Provisions	B15, IB3, T4, TP1
Emergency Response Guide Number	154

IATA

UN/ID No.	UN2582
Proper shipping name	FERRIC CHLORIDE SOLUTION
Hazard Class	8
Packing Group	III
ERG Code	8L
Special Provisions	A3

IMDG

UN/ID No.	UN2582
Proper shipping name	FERRIC CHLORIDE, SOLUTION
Hazard Class	8
Packing Group	III
EmS-No.	F-A, S-B
Special Provisions	223

15. REGULATORY INFORMATION**US Federal Regulations****SARA 311/312 Hazard Categories**

Acute health hazard	Yes
Chronic Health Hazard	Yes
Fire hazard	No

Item # Multi PF Etchant

Sudden release of pressure hazard No
Reactive Hazard No

SARA 313

Section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 (SARA). This product does not contain any chemicals which are subject to the reporting requirements of the Act and Title 40 of the Code of Federal Regulations, Part 372

CWA (Clean Water Act)

This product contains the following substances which are regulated pollutants pursuant to the Clean Water Act (40 CFR 122.21 and 40 CFR 122.42)

Chemical Name	CWA - Reportable Quantities	CWA - Toxic Pollutants	CWA - Priority Pollutants	CWA - Hazardous Substances
Iron trichloride 7705-08-0	1000 lb	-	-	X
Hydrogen chloride 7647-01-0	5000 lb	-	-	X

CERCLA

This material, as supplied, contains one or more substances regulated as a hazardous substance under the Comprehensive Environmental Response Compensation and Liability Act (CERCLA) (40 CFR 302)

Chemical Name	Hazardous Substances RQs	CERCLA/SARA RQ	RQ (lbs)(dry)
Iron trichloride 7705-08-0	1000 lb	-	RQ 1000 lb final RQ RQ 454 kg final RQ
Hydrogen chloride 7647-01-0	5000 lb	5000 lb	RQ 5000 lb final RQ RQ 2270 kg final RQ

US State Regulations**California Proposition 65**

This product does not contain any Proposition 65 chemicals

U.S. State Right-to-Know Regulations

Chemical Name	New Jersey	Massachusetts	Pennsylvania
Iron trichloride 7705-08-0	X	X	X
Hydrogen chloride 7647-01-0	X	X	X

Chemical Name	U.S. - DEA - List I or Precursor Chemicals	U.S. - DEA - List II or Essential Chemicals
Hydrogen chloride 7647-01-0	-	50 gallon, Export Volume 27 kg, Export Weight 0 kg, Domestic Sales Weight

International Inventories

TSCA	Complies
DSL/NDSL	Complies
EINECS/ELINCS	Complies
ENCS	Does not comply
IECSC	Complies
KECL	Complies
PICCS	Complies
AICS	Complies

Legend:

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory

DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List

EINECS/ELINCS - European Inventory of Existing Chemical Substances/European List of Notified Chemical Substances

ENCS - Japan Existing and New Chemical Substances

IECSC - China Inventory of Existing Chemical Substances

KECL - Korean Existing and Evaluated Chemical Substances

PICCS - Philippines Inventory of Chemicals and Chemical Substances

AICS - Australian Inventory of Chemical Substances

16. OTHER INFORMATION

<u>NFPA</u>	Health hazards 3	Flammability 0	Instability 0	Physical and Chemical Properties -
<u>HMIS</u>	Health hazards 3	Flammability 0	Physical hazards 0	Personal protection D

Item # Multi
Safety Data Sheet 2156
Revision Date May-19-2015
Issue Date May-29-2015
Version 1
Revision Note *** Updated value on SDS.

Disclaimer
All information, statements, data, advice, and/or recommendations, including, without limitation, those relating to storage, loading/unloading, piping, and transportation (collectively referred to herein as "information") are believed to be accurate, reliable, and based on reliable industry and regulatory references. However, no representation or warranty, express or implied, is made as to its completeness, accuracy, fitness for a particular purpose or any other matter, including, without limitation, that the practice or application of any such information is free of patent infringement or other intellectual property misappropriation. The Company providing this SDS is not engaged in the business of providing technical, operational, engineering, or safety information for a fee, and therefore, any such information provided herein has been furnished as an accommodation and without charge. All information provided herein is intended for use by persons having requisite knowledge, skill, and experience in the chemical industry. The Company providing this SDS shall not be responsible or liable for the use, application, or implementation of the information provided herein, and all such information is to be used at the risk, and in the sole judgment and discretion of such persons, their employees, advisors, and agents. This safety data sheet (SDS) is offered for your information, consideration, and investigation as required by federal hazardous products act and related legislation.

End of Safety Data Sheet