



8210 N. Austin Avenue, Morton Grove, IL 60053-0519, U.S.A.  
 847-967-6000 800-323-8144  
 (Monday - Friday: 7:30 a.m. - 4:00 p.m. CST)

**Emergency Contact:**  
 INFOTRAC 800-535-5053 [U.S.A.]

Name: Pentafluoropropionic Anhydride  
 Code: 640110, 640111, 640113, 640114, 640115, 640116

..... **MATERIAL SAFETY DATA SHEET** .....

**SECTION 1 ..... PRODUCT IDENTIFICATION .....**

Name: Pentafluoropropionic Anhydride  
 Code: 640110, 640111, 640113, 640114, 640115, 640116

**SECTION 2 ..... COMPOSITION, INFORMATION ON INGREDIENTS .....**

**Synonyms** PFPA; Pentafluoropropanoic acid, anhydride; Pentafluoropropionic acid, anhydride; 2,2,3,3,3-Pentafluoropropionic anhydride; Pentafluoropropanoic anhydride; Pentafluoropropionic acid anhydride; Pentafluoropropionic anhydride; Pentafluoropropionyl anhydride; Perfluoropropanoic anhydride; Perfluoropropionic acid anhydride; Perfluoropropionic anhydride;  
**CAS #:** 356-42-3 **MF:** C<sub>6</sub>F<sub>10</sub>O<sub>3</sub>

<i>Ingredients</i>	<i>Concentration (%/wt)</i>
Pentafluoropropionic Anhydride (356-42-3).....	NLT 97.0 %
Manufacturing Impurities (High Boilers).....	NMT 3.0 %

**SECTION 3 ..... HAZARDS IDENTIFICATION .....**

**Precautionary Statements** See Sections 8 and 11 for further details.  
 Corrosive. Causes burns.

..... **Emergency Overview** .....

NFPA Ratings (Scale 0-4); Health = 3; Fire = 2; Reactivity = 2; W

Liquid: clear, colorless. Odor: strong pungent  
 Corrosive liquid and vapor--PFPA can decompose on contact with water or moist air.  
 Under fire conditions, hydrofluoric acid may be produced, that in contact with metals can generate flammable/explosive hydrogen gas.  
 Contact with water produces a large evolution of heat and possible violent reaction.  
 Sufficient dilution of water may reduce the acidity of the solution.  
*The properties of this material have not been fully investigated. Use due caution in handling and use of this material.*  
 Corrosive--Cause burns to all body tissues. Permanent eye damage possible. May be fatal or toxic if swallowed or inhaled.  
*Emits toxic fumes under fire conditions*—potential chemical or thermal decomposition products: carbon oxides, hydrogen fluoride  
*Standard chemical handling precautions:* Avoid ingestion or breathing mists. Avoid contact with eyes, skin, and clothing. Wash thoroughly after handling.  
*Target organs:* mucous membranes, skin, eyes, respiratory system, lungs, teeth

See Sections 4, 5, 6, 8, 9, and 10.

**Other Hazard Information**

**This compound has not fully been tested for toxicological, irritation, or similar tendencies.**

Primary Route(s) of Entry: Inhalation, Ingestion, Eye, Skin

**Eye:** Corrosive--Can cause burns. May cause severe irritation, itching, tearing, redness, corneal inflammation, blurred vision, and lens damage. Permanent eye damage possible.  
**Skin:** Corrosive--Can cause burns with redness and possible blistering. May cause severe irritation with itchiness and possible dryness, cracking and dermatitis due to the loss of natural skin oils.  
**Inhalation:** Corrosive--Causes burns or severe irritation to mucous membranes, respiratory tract, nose, throat, and lung damage. May be harmful or fatal if inhaled in large quantities due to spasm,

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inflammation and edema of the larynx and bronchi, chemical pneumonitis, and pulmonary edema (fluid retention/swelling) . Prolonged/repeated inhalation may cause tooth decay.

Ingestion: Can cause burns. May be toxic or fatal if ingested due to mucous membrane corrosion and other tissue in the esophagus and GI tract. Symptoms include sore throat, pain, nausea, vomiting, and diarrhea.

Acute: See above route.  
 Chronic: See above route.  
 Symptoms: See specific route above.  
*Pre-existing conditions that may be aggravated:* skin, eye, respiratory, GI tract

See Section 11 for additional toxicological data.

**SECTION 4 ..... FIRST AID MEASURES .....**

Eye contact: Immediately flush eyes with copious amounts of water or eyewash solution for at least 15 minutes; lift eyelids occasionally. If irritation persists, consult physician.

Skin contact: Immediately remove contaminated clothing and shoes, then wash skin with soap and copious amounts of water. If irritation persists, consult physician.

Inhalation: Remove to fresh air. If not breathing, give artificial respiration and keep person warm and at rest. If breathing is difficult, give oxygen; consult physician.

Ingestion: Wash out mouth with water provided person is conscious; give large amounts of water or milk. Repeat if vomiting occurs. Ingested corrosive should be diluted approximately 100 times to render it harmless to tissues (Dreisbach & Robertson; Handbook of Poisoning; 12th Ed.); consult physician; DO NOT induce vomiting without first consulting physician. If vomiting occurs, keep head lower than hips to help prevent aspiration. Maintain airway and respiration. Treat symptomatically and supportively.

*Wash contaminated clothing before reuse. Discard contaminated footwear.*

Physician note: Symptomatic and supportive care. No specific antidote, but treatment may be similar to that of hydrofluoric acid burns. Treatment based on physician judgment in response to reactions of the patient.

**SECTION 5 ..... FIRE FIGHTING MEASURES .....**

Flash Point: >149°F (>65°C)                      Method: cc                      Autoignition: NE  
 OSHA Flammability Class: IIIA                      Explosion Limits: upper: NE  
 NFPA: See Section 3 **Hazards Identification Emergency Overview** above.                      lower: NE

**Extinguishing Media**

Water spray, carbon dioxide, dry chemical powder, or appropriate foam. Do NOT use straight water streams.

**Special Fire Fighting Procedures**

Self-contained breathing apparatus (SCBA) and protective clothing to prevent contact with skin and eyes should be worn in fighting large fires involving chemicals.

**Standard Fire and Explosion Hazards**

Avoid inhalation of material or combustion by-products.

**Unusual Fire and Explosion Hazards**

Corrosive, combustible liquid and vapor--PFPA can decompose on contact with water or moist air to produce pentafluoropropionic acid. Under fire conditions, hydrofluoric acid may be produced, that in contact with metals can generate flammable/explosive hydrogen gas.

Contact with water produces a large evolution of heat and possible violent reaction. Sufficient dilution of water may reduce the acidity of the solution.

Containers may build pressure or rupture when heated.

Water spray may be used to cool fire-exposed containers. Emits toxic fumes under fire conditions.

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*Hazardous Combustion or Decomposition Products*  
 carbon oxides, hydrogen fluoride

**SECTION 6 ..... ACCIDENTAL RELEASE MEASURES .....**

Eliminate all ignition sources. Use spark proof tools.  
 Evacuate unnecessary people from area. Isolate spilled material.  
 Ventilate area.  
 Wear protective clothing to prevent contact with skin and eyes (lab coat, gloves, and safety glasses).  
 Wear NIOSH/MSHA approved respirator for organic/acid gas, dust, and mists to prevent inhalation of mists.  
 Contain and recover material when possible.  
 Use chemically compatible spill pillows, or similar adsorbent material.  
 Sweep up, seal in appropriate hazardous waste container, and hold for proper waste disposal.  
 (If possible to do so safely, neutralize waste to pH 6-9 prior to disposal.)  
 Avoid raising contaminated dust.  
 Wash spill site after material pickup is complete.  
 Standard chemical precautions: Keep out of water supplies and sewers.

**SECTION 7 ..... HANDLING AND STORAGE.....**

*General Handling Measures*  
 See Section 8 Below.

*General Storage Measures*  
 Store in a cool, dry place with adequate ventilation, in a storage area suitable for corrosives and combustibles.

*Special Storage Instructions*  
 Do not store in metal containers. Store tightly closed under inert gas.  
 Empty containers retain product residue, (liquid/vapor), and can be dangerous.

*Special Handling Instructions*  
 Use appropriate precautions for handling corrosive and combustible liquids.  
 Wash thoroughly after handling.  
 Immediately remove contaminated clothing, because material is **very corrosive to body tissues**.

**SECTION 8 ..... EXPOSURE CONTROLS, PERSONAL PROTECTION.....**

<i>Airborne Exposure Limits</i>		TWA (8H)		STEL/VPEL		Ceiling Limit		Ceiling (skin)	
		ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>	ppm	mg/m <sup>3</sup>
Pentafluoropropionic Anhydride 356-42-3	OSHA PEL	NE	NE	NE	NE	NE	NE	NE	NE
	ACGIH - TLV	NE	NE	NE	NE	NE	NE	NE	NE
<i>Hydrogen Fluoride*</i>	OSHA PEL	3	2	6	NE	NE	NE	NE	NE
	ACGIH - TLV	NE	NE	NE	NE	3	NE	NE	NE

\* Hydrogen fluoride may be formed on contact with humid air or water.

*Special/Other Control Measures*  
 Odor threshold: NE

*Personal Protective Equipment (PPE)*  
 OSHA/ANSI approved chemical safety eyewear or goggles

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Compatible chemical-resistant gloves: Rubber (e.g., natural rubber, neoprene, nitrile, or equivalent), Silver Shield<sup>®</sup>, Viton<sup>®</sup>, or 4H<sup>®</sup>

Wear NIOSH/MSHA approved respirator for organic/acid gas, dust, and mists to prevent inhalation.

Protective Clothing (e.g., lab coat)

*Other Standard Safety Equipment and Engineering Preventive Measures*

Safety shower and eye wash

Mechanical exhaust required. Hood recommended. Use adequate general and/or local exhaust ventilation to keep airborne concentrations below the permissible exposure limits.

*General Precautions and Handling Measures*

Avoid ingestion, inhalation and contact with eyes, skin, and clothing.

Avoid prolonged or repeated exposure. Wash thoroughly after handling.

Wash contaminated clothing before reuse. Discard contaminated footwear.

**Material is very destructive to body tissues.**

**SECTION 9 ..... PHYSICAL AND CHEMICAL PROPERTIES .....**

*Chemical Family:* Halogenated, organic acid anhydride

*Use:* Analytical Derivatization Acylation Reagent for GC

*Appearance, Odor, and Other Properties*

*Appearance:* clear, colorless liquid

*Odor:* pungent, strong

*Freeze/MP:* NE

*Water Reactive:* yes

*bp (1atm):* 69-70°C (156-157°F) @735mmHg

*Water Solubility:* soluble/decomposes

*FW:* 310.05

*Specific Gravity (H<sub>2</sub>O = 1.0):* 1.571

*VP (mmHg):* NE

*Vapor Density (air=1):* NE

*% Volatiles:* 100%

*Evap. Rate (BuAc = 1.0):* NE

*pH:* NE

*Refractive Index (n<sub>D</sub><sup>20</sup>):* <1.300

*Soluble in Organic Solvents:* soluble in halogenated solvents; insoluble in polar solvents

**SECTION 10 ..... STABILITY AND REACTIVITY .....**

*Stability*

Stable if stored tightly sealed under inert gas away from heat or ignition sources.

*Incompatibilities*

Alkalies or metals

Strong acids or bases

Strong oxidizers or reducing agents

Water or moist air--HFBA can decompose on contact with water or moist air to produce heptafluorobutyric acid.

Under fire conditions, hydrofluoric acid may be produced, that in contact with metals can generate flammable/explosive hydrogen gas.

*Precautions*

Avoid incompatibilities.

Protect from heat, flames, sparks, and ignition sources.

Keep out of water supplies and sewers.

*Hazardous Combustion or Decomposition Products*

carbon oxides, hydrogen fluoride

*Hazardous Polymerization*

None

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**SECTION 11 ..... TOXICOLOGICAL INFORMATION.....**

To the best of our knowledge, the chemical, physical, and toxicological properties have not been thoroughly investigated.

RTECS #

CAS #

AJ9800000	Pentafluoropropionic Anhydride	356-42-3
MW7875000	Hydrogen Fluoride	7664-39-3

Only selected Registry of Toxic Effects of Chemical Substances data (RTECS) is presented here.  
 See actual entry in RTECS for complete information.

Irritation Data

	eye	skin
Pentafluoropropionic Anhydride	eye rbt 5mg/24H sev	Irr skn 750 ug/24H sev
Hydrogen Fluoride	eye hmn 50 mg sev	NDA

Toxicity Data

	oral	inhalation	dermal
Pentafluoropropionic Anhydride	NDA	NDA	NDA
Hydrogen Fluoride	orl man TDLo 143mg/kg	ihl man TCLo 100 mg/m <sup>3</sup> /1M ihl hmn LCLo 50ppm/30M ihl rat LC50 1276ppm/1H	skn mus LDLo 500mg/kg

Carcinogenicity

	OSHA	IARC	NTP	ACGIH	NIOSH	Notes
Pentafluoropropionic Anhydride	NL	NL	NL	NL	NL	None
Hydrogen Fluoride	NL	NL	NL	NL	NL	IARC Group 3--Not classifiable as a carcinogen

**Teratogenicity and Reproductive Effects**

Lab studies reported in RTECS indicate that HF may cause adverse fetal effects and reproductive effects.

**Neurotoxicity**

No data available.

**Mutagenicity**

RTECS reports mutation data on hydrogen fluoride.

**Miscellaneous**

No data available.

**Acute and Chronic Effects**

Section 3 **Hazards Identification** above.

**SECTION 12 ..... ECOLOGICAL INFORMATION.....**

**Environmental Fate and Ecotoxicity Data**

Pentafluoropropionic Anhydride: No data available.

**Standard Chemical Precautions**

Keep out of air, water, and soil

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**SECTION 13 ..... DISPOSAL CONSIDERATIONS.....**

*That which cannot be recovered or recycled, should be disposed of in accordance with all applicable Federal, State, and local environmental regulations.*

RCRA waste code(s): D002 RCRA Hazard Class (40CFR 261): Corrosive

**SECTION 14 ..... TRANSPORT INFORMATION.....**

*Ship in accordance with all applicable local, State, Federal, and International transportation regulations.*  
 The following is a summary only. Check regulations for complete information:

U. S. Department of Transportation (49CFR171.101)  
 Shipping Name: Corrosive liquid, n.o.s. (Pentafluoropropionic acid anhydride)  
 Hazard Class or Division: 8, Subsidiary Class: none  
 ID Number: UN1760  
 Packing Group: I  
 Labeling: Corrosive Liquid

**SECTION 15 ..... REGULATORY INFORMATION .....**

*Reviews, Standards, and Regulations*

.....Pentafluoropropionic Anhydride  
 CAS number .....356-42-3  
 TSCA:..... Y  
 This compound is sold strictly for FDA or research and development use.  
 EINECS:..... Y  
 Number .....206-604-2  
 CERCLA [Section 103 (40 CFR 302.4)]: .....NL  
 RQ (lbs) ..... NA  
 RCRA Waste Code..... NA  
 OSHA Process Safety [29 CFR 1910.119]: .....NL  
 TQ (lbs)..... NA  
 Clean Air Act  
 [Section 112r (40 CFR 68)]:.....NL  
 TQ (lbs)..... NA  
 Contains Ozone Depleters (Class I or Class II) .....N  
 SARA Title III Notification [40 CFR 302.4]:  
 Section 302/304 (EHS) Ingredient  
 [40 CFR 355.3] .....NL  
 TPQ (lbs)..... NA  
 RQ (lbs) ..... NA  
 Section 313 Ingredient [40 CFR 372.65].....NL  
 State Lists: .....NL  
 States.....NL  
 On CA 65 Significant Risk Level .....NL

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**Hazard Classes**

Sara	Acute	Chronic	Fire	Pressure	Reactivity
Title III	Y	N	Y	N	Y
	Health	Flammability	Reactivity	Special Hazards	
NFPA	3	2	2	W	
HMIS	3	2	2	None	

**Risk Phrases:**

**Caution: The properties of this material have not been fully investigated.**

- Corrosive, combustible
- R20/21/22..... Harmful by inhalation, in contact with skin and if swallowed
- R34..... Causes burns.
- R36/37/38..... Irritating to eyes (severely), respiratory system, and skin.
- R40..... Possible risk of irreversible effects.
- R41..... Risk of serious damage to eyes.

**Safety Phrases:**

- S16..... Keep away from sources of ignition--No Smoking.
- S23/24/25..... Do not breath vapors. Avoid contact with skin and eyes
- S26/28..... In case of contact with eyes or skin, rinse immediately with plenty of water and seek medical advice.
- S27..... Take off immediately all contaminated clothing.
- S36/37/39..... Wear suitable protective clothing, gloves, and eye/face protection.
- S44..... If you feel unwell, seek medical advice immediately (show the label where possible.)

**SECTION 16 ..... OTHER INFORMATION .....**

**Miscellaneous**

The health and toxicological hazards of this compound have not been fully investigated; therefore, this substance must be handled only by, or under close supervision of those qualified in the handling and use of potentially hazardous substances.

**This MSDS was revised as follows:**

This is a new MSDS format. Consider all sections to contain new information.

**Disclaimer**

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Approved of by: MBF

***This is the last page of this MSDS.***

Reviewed and re-approved of with minor changes to the footer abbreviations and format.  
 by: Jon Pilli

08/05/2008