



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: Heptafluorobutyric Anhydride
 Code: 270851, 270853

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

SECTION 1 PRODUCT IDENTIFICATION

Name: Heptafluorobutyric Anhydride
 Code: 270851, 270853

SECTION 2 COMPOSITION, INFORMATION ON INGREDIENTS

Synonyms HFBA; Heptafluorobutanoic acid, anhydride; Heptafluorobutyric acid, anhydride; Heptafluorobutanoic anhydride; Heptafluorobutyric acid anhydride; Heptafluorobutyryl anhydride; Perfluorobutanoic anhydride; Perfluorobutyric anhydride
CAS #: 336-59-4 **MF:** C₈F₁₄O₃

Ingredients **Concentration (%/wt)**
 Heptafluorobutyric Anhydride (336-59-4)..... NLT 90.0 %
 Manufacturing Impurities..... NMT 10.0 %

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 = 1; Reactivity = 1; ~~W~~

Liquid: clear, colorless. Odor: strong pungent stench; sharp acidic
 Corrosive liquid and vapor--HFBA 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.

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

Abbreviations: NA—not applicable; NE—not established; U—unknown/not available; NL—not listed; N—no; Y—yes.; NDA—No data available.



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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.

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 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 ³	ppm	mg/m ³	ppm	mg/m ³	ppm	mg/m ³
Heptafluorobutyric Anhydride 336-59-4	OSHA PEL	NE	NE	NE	NE	NE	NE	NE	NE
	ACGIH - TLV	NE	NE	NE	NE	NE	NE	NE	NE
Hydrogen Fluoride*	OSHA PEL	3	2	6	NE	NE	NE	NE	NE
	ACGIH - TLV	NE	NE	NE	NE	3	NE	NE	NE

NE = Not established; * 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
 Compatible chemical-resistant gloves: Rubber (e.g., natural rubber, neoprene, nitrile, or equivalent), Silver Shield®, Viton®, or 4®



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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.

Material is very destructive to body tissues.

Wash contaminated clothing before reuse. Discard contaminated footwear.

SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

Chemical Family: Halogenated, organic acid anhydride

Use: Analytical Derivatization Acylation Reagent for GC

Appearance, Odor, and Other Properties

<i>Appearance:</i> clear, colorless liquid	<i>Odor:</i> pungent, strong stench, sharp acidic
<i>Freeze/MP:</i> -43°C (-45.4°F)	<i>Water Reactive:</i> yes
<i>bp (1atm):</i> 108-109°C (226-228°F)	<i>Water Solubility:</i> soluble/decomposes
<i>FW:</i> 410.06	<i>Specific Gravity (H₂O = 1.0):</i> 1.653
<i>VP (mmHg):</i> NE	<i>Vapor Density (air=1):</i> 1.612
<i>% Volatiles:</i> 100%	<i>Evap. Rate (BuAc = 1.0):</i> NE
<i>pH:</i> NE	<i>Refractive Index (n_D²⁰):</i> 1.2870
<i>Soluble in Organic Solvents:</i> NE	

SECTION 10 STABILITY AND REACTIVITY

Stability

Stable if stored tightly sealed under inert gas.

Incompatibilities

Alkalies
 Metals
 Strong acids and bases
 Strong oxidizers and 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

SECTION 11 TOXICOLOGICAL INFORMATION.....

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

Abbreviations: NA—not applicable; NE—not established; U—unknown/not available; NL—not listed; N—no; Y—yes.; NDA-No data available.



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MATERIAL SAFETY DATA SHEET

RTECS #

CAS #

not assigned	Heptafluorobutyric Anhydride	336-59-4
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
Heptafluorobutyric Anhydride	NDA	NDA
Hydrogen Fluoride	eye hmn 50 mg sev	NDA

NDA = No data available

Toxicity Data

	oral	inhalation	dermal
Heptafluorobutyric Anhydride	NDA	NDA	NDA
Hydrogen Fluoride	orl man TDLo 143mg/kg	ihl man TCLo 100 mg/m3/1M ihl hmn LCLo 50ppm/30M ihl rat LC50 1276ppm/1H	skn mus LDLo 500mg/kg

Carcinogenicity

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

NL = Not Listed as a carcinogen;

Teratogenicity and Reproductive Effects

Laboratory studies reported in RTECS indicate that hydrofluoric acid 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

Heptafluorobutyric 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. (heptafluorobutyric acid anhydride)
 Hazard Class or Division: 8, Subsidiary Class: none
 ID Number: UN1760
 Packing Group: II
 Labeling: Corrosive Liquid

SECTION 15 REGULATORY INFORMATION

Reviews, Standards, and Regulations

..... Heptafluorobutyric Anhydride
 CAS number 336-59-4
 TSCA: Y
 This compound is sold strictly for FDA or research and development use.
 EINECS: Y
 Number 206-410-8
 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

Hazard Classes

Sara Title III	Acute	Chronic	Fire	Pressure	Reactivity
	Y	N	N	N	Y

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	Health	Flammability	Reactivity	Special Hazards
NFPA	3	1	1	W
HMIS	3	1	1	None

Risk Phrases:

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

Corrosive

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:

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 abbreviations in the footer and format.

by: Jon Pilli

07/24/2008