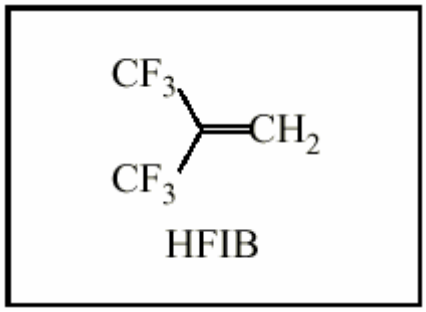
Technical Information

DuPont Chemical Solutions Enterprise



Hexafluoroisobutylene
HFIB

Hexafluoroisobutylene is a colorless, pressurized liquid, used as a monomer in fluoropolymers and other specialty fluorochemicals. When copolymerized with vinylidene fluoride, Hexafluoroisobutylene produces polymers with excellent thermal, chemical and mechanical properties. Other uses are described below.

Specifications

Property	Limit
Hexafluoroisobutylene, wt. %	99.5 min.
Hexafluoropropene, wt %	0.5 max.
Acetone/hexafluoroisovalero lactone, wt %	0.3 max.
H/CH3-substituted hexafluoroisobutylene, wt %	0.5 max.
Trifluoromethane, wt %	.05 max.
Allene/pentadiene isomers, wt %	0.2 max.
Oxygen, wt %	0.02 max.
Perfluoroisobutylene, wt %	not detected

Uses

- **High-Performance Lubricants:**
  Copolymers of HFIB and vinylidene fluoride(VDF) can be used as a thickener in high-end lubricating greases. These greases disperse very little, and therefore produce little dust. This makes them an ideal choice for use in sensitive electronic equipment. Additionally, these greases display long lubrication life, excellent resistance to water, low torque performance and excellent acoustic performance. These greases perform particularly well at high rotational speeds, making them very suitable for usage in hard disk drives and automotive equipment.

- **Chemical and Thermally Resistant Fluoroelastomers:**
  HFIB offers improved surface tension over Hexafluoropropylene (HFP) due to its branched structure. It can be readily polymerized with vinylidene fluoride then cured using an agent such as Bisphenol AF(also available from DuPont). The resulting elastomers exhibit excellent elongation, surface characteristics, and chemical and thermal resistance. HFIB/VDF elastomers are well suited for use in gaskets, pipe sealers, or other manufactured articles requiring high elasticity and high chemical resistance.

  When latexes of an HFP/VDF copolymer are mixed with that of polytetrafluoroethylene (PTFE), the resulting polymer shows increased hardness, without sacrificing elongation and other mechanical, thermal, and chemical properties. Increased hardness and the particularly high chemical resistance to hydrocarbons makes these compositions particularly suitable for use in oil-field applications.

- **Semiconductor Manufacturing Photoresist**
  HFIB can be used as a raw material in next-generation photoresist polymers. Fluoroalcohols based on HFIB allow production of photoresists with transparency at wavelengths of 193 and 157 nm.

  Photolithography is the process by which a micro-machined structure is developed on a silicon wafer. A layer of silicon dioxide is formed on the surface of the wafer by oxidation. It is then coated with a photo-sensitive protective layer, called a photoresist. Due to increasing demands for denser semiconductors, photoresists with superior light transmission at increasingly smaller wavelengths, 193 and 157 nm, are desired.

- **Refrigerant**
  HFIB is a non-ozone depleting fluid that can be used as working fluid in refrigeration applications. HFIB performs similarly to CFC 11.

- **Pharmaceutical Intermediate**
  [3,3,3-trifluoro-2-(trifluoromethyl)propyl]benzene, a pharmaceutical intermediate, can be produced by the reaction of HFIB with benzene. This intermediate can be used in the production of anti-inflammatory agents.

Handling

Hexafluoroisobutylene is supplied as a pressurized liquid, which is toxic by inhalation, and may cause irritation of the nose, throat and lungs. Protect against respiratory exposure. Skin contact may cause frostbite; wear appropriate gloves. Refer to the MSDS for additional handling information.

Packages

HFIB is available in pressurized cylinders of 600-800 kg net and also in sample cylinders of 0.45kg (1 lb). Cylinders used for samples are 300 cc stainless with needle valve throttling and fitting for ¼ inch tubing. They do not require a regulator.

Typical Physical Properties*

Property	Value
CAS Name	3,3,3-Trifluoro-2(trifluoromethyl)-1-propene
CAS Number	382-10-5
Molecular formula	C4H2F6
Molecular weight	164
Boiling Point	14.5°C (58.1°F)
Melting Point	–111°C (232°F)
Volatiles, wt %	100
Form	Pressurized liquid
Critical Temperature	156°C (313°F)
Liquid Density	ρ(g/mL) = 0.614 + 212/T(K) (0–33°C [32–91°F])
Vapor Pressure	log P (psia) = 5.574 – 1270/T(K) (14.5–72°C [58–162°F])
Solubility in Water	2.3×10^{-4} g/g water at 23°C (73°F)

*This table gives typical properties based on historical production performance. DuPont does not make any express or implied warranty that these products will continue to have these typical properties.

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