

SECTION 1: Identification

1.1. Identification

| | |
|-------------------------------|--|
| Product form | : Substance |
| Substance name | : 1H,1H,2H,2H-Perfluorohexyltrichlorosilane |
| CAS-No. | : 78560-47-1 |
| Product code | : 5181-7-10 |
| Formula | : C6H4Cl3F9Si |
| Synonyms | : 3,3,4,4,5,5,6,6,6-Nonafluorohexyltrichlorosilane; (Perfluorobutyl)ethyl]trichlorosilane; Trichloro(3,3,4,4,5,5,6,6,6-nonafluorohexyl)silane |
| Other means of identification | : MFCD01862821 |

1.2. Recommended use and restrictions on use

| | |
|------------------------------|--|
| Use of the substance/mixture | : Laboratory chemicals Manufacture of substances Scientific research and development |
|------------------------------|--|

1.3. Supplier

SynQuest Laboratories, Inc. Inc.
 P.O. Box 309
 Alachua, FL, Alachua, 32615
 United States of America
 T (386) 462-0788 - F (386) 462-7097
info@synquestlabs.com - www.synquestlabs.com

1.4. Emergency telephone number

| | |
|------------------|---|
| Emergency number | : (844) 523-4086 (3E Company - Account 10069) |
|------------------|---|

SECTION 2: Hazard(s) identification

2.1. Classification of the substance or mixture

GHS US classification

| | | |
|---|------|---|
| Flammable liquids Category 4 | H227 | Combustible liquid |
| Skin corrosion/irritation Category 1A | H314 | Causes severe skin burns and eye damage |
| Serious eye damage/eye irritation Category 1 | H318 | Causes serious eye damage |
| Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation | H335 | May cause respiratory irritation |
| Full text of H statements : see section 16 | | |

2.2. GHS Label elements, including precautionary statements

GHS US labeling

Hazard pictograms (GHS US)



Signal word (GHS US)

: Danger

Hazard statements (GHS US)

: H227 - Combustible liquid
 H314 - Causes severe skin burns and eye damage
 H335 - May cause respiratory irritation

1H,1H,2H,2H-Perfluorohexyltrichlorosilane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Precautionary statements (GHS US) : P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260 - Do not breathe fumes, mist, spray, vapors.
P264 - Wash skin thoroughly after handling
P271 - Use only outdoors or in a well-ventilated area.
P280 - Wear protective gloves/protective clothing/eye protection/face protection.
P301+P330+P331 - If swallowed: rinse mouth. Do NOT induce vomiting.
P303+P361+P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower.
P304+P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P310 - Immediately call a POISON CENTER or doctor/ physician
P321 - Specific treatment (see supplemental first aid instructions on this label)
P363 - Wash contaminated clothing before reuse.
P370+P378 - In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish
P403+P233 - Store in a well-ventilated place. Keep container tightly closed.
P403+P235 - Store in a well-ventilated place. Keep cool.
P405 - Store locked up.
P501 - Dispose of contents/container to an approved waste disposal plant

2.3. Other hazards which do not result in classification

Other hazards which do not result in classification : Reacts violently with water.

2.4. Unknown acute toxicity (GHS US)

No additional information available

SECTION 3: Composition/Information on ingredients

3.1. Substances

Substance type : Mono-constituent

| Name | Product identifier | % | GHS US classification |
|---|---------------------|-------|--|
| 1H,1H,2H,2H-Perfluorohexyltrichlorosilane (Main constituent) | CAS-No.: 78560-47-1 | ≤ 100 | Flam. Liq. 4, H227 Skin Corr. 1A, H314 Eye Dam. 1, H318 STOT SE 3, H335 |

Full text of hazard classes and H-statements : see section 16

3.2. Mixtures

Not applicable

SECTION 4: First-aid measures

4.1. Description of first aid measures

First-aid measures general : In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible). Move the affected personnel away from the contaminated area.
First-aid measures after inhalation : Remove person to fresh air and keep comfortable for breathing. If not breathing, give artificial respiration. Get immediate medical advice/attention.
First-aid measures after skin contact : Wash with plenty of soap and water. Remove contaminated clothing and shoes. Get immediate medical advice/attention.

1H,1H,2H,2H-Perfluorohexyltrichlorosilane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

| | |
|--------------------------------------|---|
| First-aid measures after eye contact | : Immediately flush eyes thoroughly with water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get immediate medical advice/attention. |
| First-aid measures after ingestion | : Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get immediate medical advice/attention. |

4.2. Most important symptoms and effects (acute and delayed)

| | |
|-----------------------------------|---|
| Symptoms/effects | : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11. |
| Symptoms/effects after inhalation | : Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. |

4.3. Immediate medical attention and special treatment, if necessary

Treat symptomatically.

SECTION 5: Fire-fighting measures

5.1. Suitable (and unsuitable) extinguishing media

| | |
|------------------------------|--|
| Suitable extinguishing media | : Alcohol resistant foam. Carbon dioxide. Dry powder. Water spray. Use extinguishing media appropriate for surrounding fire. |
|------------------------------|--|

5.2. Specific hazards arising from the chemical

| | |
|------------------|---|
| Fire hazard | : Thermal decomposition generates: Carbon oxides. Hydrogen chloride. Hydrogen fluoride. Silicon oxides. |
| Explosion hazard | : Risk of explosion if heated under confinement. Use water spray or fog for cooling exposed containers. May form flammable/explosive vapor-air mixture. |

5.3. Special protective equipment and precautions for fire-fighters

| | |
|--------------------------------|--|
| Firefighting instructions | : In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. |
| Protection during firefighting | : Wear gas tight chemically protective clothing in combination with self contained breathing apparatus. For further information refer to section 8: "Exposure controls/personal protection". |

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

| | |
|------------------|---|
| General measures | : Evacuate unnecessary personnel. Ensure adequate air ventilation. Do not breathe gas, fumes, vapor or spray. |
|------------------|---|

6.1.1. For non-emergency personnel

| | |
|----------------------|---|
| Emergency procedures | : Only qualified personnel equipped with suitable protective equipment may intervene. |
|----------------------|---|

6.1.2. For emergency responders

| | |
|----------------------|--|
| Protective equipment | : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection". |
| Emergency procedures | : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level. Consider the risk of potentially explosive atmospheres. Eliminate every possible source of ignition. |

6.2. Environmental precautions

Avoid release to the environment. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

| | |
|-----------------|--|
| For containment | : Stop leak if safe to do so. Dike for recovery or absorb with appropriate material. |
|-----------------|--|

1H,1H,2H,2H-Perfluorohexyltrichlorosilane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Methods for cleaning up : Take up large spills with pump or vacuum and finish with dry chemical absorbent. Use explosion-proof equipment. Take up small spills with dry chemical absorbent. Sweep or shovel spills into appropriate container for disposal. Ventilate area.

Other information : For disposal of solid materials or residues refer to section 13 : "Disposal considerations".

6.4. Reference to other sections

No additional information available

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : Handle empty containers with care because residual vapors are flammable.
Precautions for safe handling : Do not handle until all safety precautions have been read and understood. Ensure good ventilation of the work station. Do not breathe fumes, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes. Keep away from ignition sources (including static discharges). Proper grounding procedures to avoid static electricity should be followed. Use only non-sparking tools.

Hygiene measures : Handle in accordance with good industrial hygiene and safety procedures. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Comply with applicable regulations.
Storage conditions : Keep container closed when not in use. Keep away from ignition sources. Moisture sensitive. Keep contents under inert gas.
Incompatible materials : Refer to Section 10 on Incompatible Materials.
Storage area : Store in dry, cool, well-ventilated area.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

1H,1H,2H,2H-Perfluorohexyltrichlorosilane (78560-47-1)

No additional information available

8.2. Appropriate engineering controls

Appropriate engineering controls : Ensure good ventilation of the work station. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

8.3. Individual protection measures/Personal protective equipment

Hand protection:

protective gloves. 29 CFR 1910.138: Hand Protection

Eye protection:

Chemical goggles or safety glasses. Face shield. 29 CFR 1910.133: Eye and Face Protection

Skin and body protection:

Wear suitable protective clothing

Respiratory protection:

In case of inadequate ventilation wear respiratory protection. 29 CFR 1910.134: Respiratory Protection

1H,1H,2H,2H-Perfluorohexyltrichlorosilane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Personal protective equipment symbol(s):



Other information:

Safety shoes. 29 CFR 1910.136: Foot Protection.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

| | |
|---|---------------------------|
| Physical state | : Liquid |
| Color | : No data available |
| Odor | : No data available |
| Odor threshold | : No data available |
| pH | : No data available |
| Melting point | : No data available |
| Freezing point | : No data available |
| Boiling point | : 70 – 72 °C (@ 15 mm Hg) |
| Flash point | : No data available |
| Relative evaporation rate (butyl acetate=1) | : No data available |
| Flammability (solid, gas) | : No data available |
| Vapor pressure | : No data available |
| Relative vapor density at 20 °C | : No data available |
| Relative density | : No data available |
| Density | : 1,542 g/ml (@ 25 °C) |
| Molecular mass | : 381,53 g/mol |
| Solubility | : No data available |
| Partition coefficient n-octanol/water (Log Pow) | : No data available |
| Auto-ignition temperature | : No data available |
| Decomposition temperature | : No data available |
| Viscosity, kinematic | : No data available |
| Viscosity, dynamic | : No data available |
| Explosion limits | : No data available |
| Explosive properties | : No data available |
| Oxidizing properties | : No data available |

9.2. Other information

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Reacts with water, generates gases or heat. Reacts on exposure to water with some metals to release highly explosive/flammable hydrogen gas.

10.2. Chemical stability

The product is stable at normal handling and storage conditions.

10.3. Possibility of hazardous reactions

Reacts violently with water.

1H,1H,2H,2H-Perfluorohexyltrichlorosilane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

10.4. Conditions to avoid

Keep away from heat, sparks and flame. Moisture.

10.5. Incompatible materials

Acids. Alcohols. Bases. Strong oxidizing agents. Water.

10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced. Hazardous decomposition products in case of fire, see Section 5.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

| | |
|-----------------------------------|---|
| Acute toxicity (oral) | : Not classified |
| Acute toxicity (dermal) | : Not classified |
| Acute toxicity (inhalation) | : Not classified |
| Skin corrosion/irritation | : Causes severe skin burns. |
| Serious eye damage/irritation | : Causes serious eye damage. |
| Respiratory or skin sensitization | : Not classified |
| Germ cell mutagenicity | : Not classified |
| Carcinogenicity | : Not classified |
| Reproductive toxicity | : Not classified |
| STOT-single exposure | : May cause respiratory irritation. |
| STOT-repeated exposure | : Not classified |
| Aspiration hazard | : Not classified |
| Viscosity, kinematic | : No data available |
| Symptoms/effects | : The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11. |
| Symptoms/effects after inhalation | : Material is destructive to tissue of the mucuous membranes and upper respiratory tract. Cough, shortness of breath, headache, nausea. |

SECTION 12: Ecological information

12.1. Toxicity

No additional information available

12.2. Persistence and degradability

1H,1H,2H,2H-Perfluorohexyltrichlorosilane (78560-47-1)

| | |
|-------------------------------|---|
| Persistence and degradability | Not readily biodegradable. May cause long-term adverse effects in the environment. PBT - Persistent, Bioaccumulative and Toxic. |
|-------------------------------|---|

12.3. Bioaccumulative potential

1H,1H,2H,2H-Perfluorohexyltrichlorosilane (78560-47-1)

| | |
|---------------------------|---|
| Bioaccumulative potential | Perfluorinated alkanes (PFAs, "forever chemicals") are long lasting, widely used chemicals that break down slowly over time. The potential hazards of PFAs are under investigation and have not been established. |
|---------------------------|---|

12.4. Mobility in soil

No additional information available

1H,1H,2H,2H-Perfluorohexyltrichlorosilane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

12.5. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Disposal methods

| | |
|--|---|
| Waste treatment methods | : Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber. |
| Sewage disposal recommendations | : See the EPA's Interim Guidance on PFAS Destruction and Disposal. |
| Product/Packaging disposal recommendations | : Dispose of contents/container in accordance with licensed collector's sorting instructions. |
| Additional information | : Recycle the material as far as possible. |
| Ecology - waste materials | : This material is considered to be a "Forever chemical". Prevent any possible release to the environment. Do not discharge into drains. Take all necessary measures to prevent accidental discharge of products into drains and waterways due to the rupture of containers or transfer systems, or emergency response. |

SECTION 14: Transport information

14.1. UN number

| | |
|---------------|------------------|
| DOT NA No | : UN2987 |
| UN-No. (TDG) | : Not applicable |
| UN-No. (IMDG) | : 2987 |
| UN-No. (IATA) | : 2987 |

14.2. UN proper shipping name

| | |
|-----------------------------|------------------------------------|
| Proper Shipping Name (DOT) | : Chlorosilanes, corrosive, n.o.s. |
| Proper Shipping Name (TDG) | : Not applicable |
| Proper Shipping Name (IMDG) | : CHLOROSILANES, CORROSIVE, N.O.S. |
| Proper Shipping Name (IATA) | : Chlorosilanes, corrosive, n.o.s. |

14.3. Transport hazard class(es)

DOT

| | |
|----------------------------------|-----|
| Transport hazard class(es) (DOT) | : 8 |
| Hazard labels (DOT) | : 8 |



TDG

| | |
|----------------------------------|------------------|
| Transport hazard class(es) (TDG) | : Not applicable |
|----------------------------------|------------------|

IMDG

| | |
|-----------------------------------|-----|
| Transport hazard class(es) (IMDG) | : 8 |
| Hazard labels (IMDG) | : 8 |



IATA

| | |
|-----------------------------------|-----|
| Transport hazard class(es) (IATA) | : 8 |
|-----------------------------------|-----|

1H,1H,2H,2H-Perfluorohexyltrichlorosilane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Hazard labels (IATA) : 8



14.4. Packing group

Packing group (DOT) : II
Packing group (TDG) : Not applicable
Packing group (IMDG) : II
Packing group (IATA) : II

14.5. Environmental hazards

Other information : No supplementary information available.

14.6. Special precautions for user

DOT

UN-No.(DOT) : UN2987
DOT Special Provisions (49 CFR 172.102) : B2 - MC 300, MC 301, MC 302, MC 303, MC 305, and MC 306 and DOT 406 cargo tanks are not authorized.
T14 - 6 mm Prohibited 178.275(g)(3).
TP2 - a. The maximum degree of filling must not exceed the degree of filling determined by the following: (image) Where: t_r is the maximum mean bulk temperature during transport, t_f is the temperature in degrees celsius of the liquid during filling, and a is the mean coefficient of cubical expansion of the liquid between the mean temperature of the liquid during filling (t_f) and the maximum mean bulk temperature during transportation (t_r) both in degrees celsius. b. For liquids transported under ambient conditions may be calculated using the formula: (image) Where: d_{15} and d_{50} are the densities (in units of mass per unit volume) of the liquid at 15 C (59 F) and 50 C (122 F), respectively.
TP7 - The vapor space must be purged of air by nitrogen or other means.
TP13 - Self-contained breathing apparatus must be provided when this hazardous material is transported by sea.
TP27 - A portable tank having a minimum test pressure of 4 bar (400 kPa) may be used provided the calculated test pressure is 4 bar or less based on the MAWP of the hazardous material, as defined in 178.275 of this subchapter, where the test pressure is 1.5 times the MAWP.
DOT Packaging Exceptions (49 CFR 173.xxx) : None
DOT Packaging Non Bulk (49 CFR 173.xxx) : 206
DOT Packaging Bulk (49 CFR 173.xxx) : 242
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27) : Forbidden
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75) : 30 L
DOT Vessel Stowage Location : C - The material must be stowed "on deck only" on a cargo vessel and on a passenger vessel.
DOT Vessel Stowage Other : 40 - Stow "clear of living quarters"

TDG

No data available

IMDG

Limited quantities (IMDG) : 0
Excepted quantities (IMDG) : E0
Packing instructions (IMDG) : P010
Tank instructions (IMDG) : T14
Tank special provisions (IMDG) : TP2, TP7, TP13, TP27
EmS-No. (Fire) : F-A - FIRE SCHEDULE Alfa - GENERAL FIRE SCHEDULE
EmS-No. (Spillage) : S-B - SPILLAGE SCHEDULE Bravo - CORROSIVE SUBSTANCES
Stowage category (IMDG) : C

1H,1H,2H,2H-Perfluorohexyltrichlorosilane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

IATA

| | |
|--|-------------|
| PCA Excepted quantities (IATA) | : E0 |
| PCA Limited quantities (IATA) | : Forbidden |
| PCA limited quantity max net quantity (IATA) | : Forbidden |
| PCA packing instructions (IATA) | : Forbidden |
| PCA max net quantity (IATA) | : Forbidden |
| CAO packing instructions (IATA) | : 876 |
| CAO max net quantity (IATA) | : 30L |
| Special provision (IATA) | : A1 |
| ERG code (IATA) | : 8L |

14.7. Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Not applicable

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are present and listed as Active on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory, except for:

| | | |
|---|--------------------|------|
| 1H,1H,2H,2H-Perfluorohexyltrichlorosilane | CAS-No. 78560-47-1 | 100% |
|---|--------------------|------|

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

National regulations

1H,1H,2H,2H-Perfluorohexyltrichlorosilane (78560-47-1)

Listed on the Japanese ENCS (Existing New Chemical Substances) inventory

15.3. US State regulations

California Proposition 65 - This product does not contain any substances known to the state of California to cause cancer, developmental and/or reproductive harm

SECTION 16: Other information

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

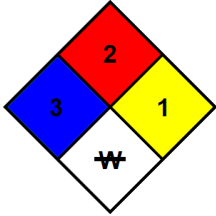
Revision date : 18.12.2023

| Full text of H-phrases | |
|------------------------|---|
| H227 | Combustible liquid |
| H314 | Causes severe skin burns and eye damage |
| H318 | Causes serious eye damage |
| H335 | May cause respiratory irritation |

1H,1H,2H,2H-Perfluorohexyltrichlorosilane

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

| | | |
|----------------------|--|---|
| NFPA health hazard | : 3 - Materials that, under emergency conditions, can cause serious or permanent injury. |  |
| NFPA fire hazard | : 2 - Materials that must be moderately heated or exposed to relatively high ambient temperatures before ignition can occur. | |
| NFPA reactivity | : 1 - Materials that in themselves are normally stable but can become unstable at elevated temperatures and pressures. | |
| NFPA specific hazard | : W - Materials that react violently or explosively with water. | |
| Hazard Rating Health | : 3 Serious Hazard - Major injury likely unless prompt action is taken and medical treatment is given | |
| Flammability | : 2 Moderate Hazard - Materials which must be moderately heated or exposed to high ambient temperatures before ignition will occur. Includes liquids having a flash point at or above 100 F but below 200 F. (Classes II IIIA) | |
| Physical | : 1 Slight Hazard - Materials that are normally stable but can become unstable (self-react) at high temperatures and pressures. Materials may react non-violently with water or undergo hazardous polymerization in the absence of inhibitors. | |

Safety Data Sheet (SDS), USA