### SECTION 1: Identification

1. **Identification**
   - **Product form**: Substance
   - **Substance name**: (E)-1,1,1,4,4,4-Hexafluoro-2-butene
   - **CAS No**: 66711-86-2
   - **Product code**: 1300-3-28
   - **Formula**: C4H2F6
   - **Synonyms**: trans-1,1,1,4,4,4-hexafluoro-2-butene, MFCD00798134

1.2. **Relevant identified uses of the substance or mixture and uses advised against**
   - **Use of the substance/mixture**: Laboratory chemicals, Manufacture of substances, Scientific research and development

1.3. **Details of the supplier of the safety data sheet**
   - SynQuest Laboratories, Inc.
   - P.O. Box 309
   - Alachua, FL 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**
   - **Classification (GHS-US)**:
     - **Simple Asphy**: H380 - May displace oxygen and cause rapid suffocation
     - **Liquefied gas**: H280 - Contains gas under pressure; may explode if heated
     - **Skin Irrit. 2**: H315 - Causes skin irritation
     - **Eye Irrit. 2A**: H319 - Causes serious eye irritation
     - **STOT SE 3**: H335 - May cause respiratory irritation, H336 - May cause drowsiness or dizziness, H336 - May cause respiratory irritation

   - Full text of H-phrases: see section 16

2.2. **Label elements**
   - **GHS-US labeling**:
     - **Hazard pictograms (GHS-US)**: ![GHS04](image), ![GHS07](image)
     - **Signal word (GHS-US)**: Warning
     - **Hazard statements (GHS-US)**: H280 - Contains gas under pressure; may explode if heated, H319 - Causes serious eye irritation, H335 - May cause respiratory irritation, H336 - May cause drowsiness or dizziness, H336 - May cause respiratory irritation

   - **Precautionary statements (GHS-US)**: P261 - Avoid breathing fumes, gas, 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, P302+P352 - If on skin: Wash with plenty of soap and water, 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, P312 - Call a POISON CENTER or doctor/physician if you feel unwell, P321 - Specific treatment (see supplemental first aid instructions on this label)
(E)-1,1,1,4,4,4-Hexafluoro-2-butene
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

P332+P313 - If skin irritation occurs: Get medical advice/attention
P337+P313 - If eye irritation persists: Get medical advice/attention
P362+P364 - Take off contaminated clothing and wash it before reuse
P405 - Store locked up
P410+P403 - Protect from sunlight. Store in a well-ventilated place
P501 - Dispose of contents/container to an approved waste disposal plant

2.3. Other hazards
Other hazards not contributing to the classification: May cause frostbite.

2.4. Unknown acute toxicity (GHS US)
Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance
Substance type: Mono-constituent

<table>
<thead>
<tr>
<th>Name</th>
<th>Product identifier</th>
<th>%</th>
<th>Classification (GHS-US)</th>
</tr>
</thead>
<tbody>
<tr>
<td>(E)-1,1,1,4,4,4-Hexafluoro-2-butene (Main constituent)</td>
<td>(CAS No) 66711-86-2</td>
<td>&lt;= 100</td>
<td>Simple Asphy, H380</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>Liquefied gas, H280</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Skin Irrit. 2, H315</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Eye Irrit. 2A, H319</td>
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<tr>
<td></td>
<td></td>
<td></td>
<td>STOT SE 3, H336</td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>STOT SE 3, H335</td>
</tr>
</tbody>
</table>

Full text of H-phrases: see section 16

3.2. Mixture
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: Thaw frosted parts with lukewarm water. Do no rub affected area. Get immediate medical advice/attention.
First-aid measures after eye contact: Remove contact lenses, if present and easy to do. Continue rinsing. Immediately flush eyes thoroughly with water for at least 15 minutes. Get immediate medical advice/attention.
First-aid measures after ingestion: Due to its physical form, exposure to this chemical is not likely. Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth out with water. Get medical advice/attention.

4.2. Most important symptoms and effects, both acute and delayed
Symptoms/injuries: The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11.
Symptoms/injuries after skin contact: Contact with the liquid may cause cold burns/frostbite.
Symptoms/injuries after eye contact: Direct contact with the liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.

4.3. Indication of any immediate medical attention and special treatment needed
No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

5.2. Special hazards arising from the substance or mixture
Explosion hazard: Contains gas under pressure; may explode if heated. Use water spray or fog for cooling exposed containers.

5.3. Advice for firefighters
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. May cause suffocation by reducing oxygen available for breathing. 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.

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.

Methods for cleaning up: 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: Pressurized container: Do not pierce or burn, even after use. Close valve after each use and when empty.

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, gas, mist, spray, vapors. Wear personal protective equipment. Avoid contact with skin and eyes.

Safe handling of the gas receptacle: Securely chain cylinders when in use and protect against physical damage.

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: Protect from sunlight. Do not expose to temperatures exceeding 50 °C. Keep container closed when not in use.

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

No additional information available

8.2. Exposure 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. Systems under pressure should be regularly checked for leakage. Oxygen detectors should be used when asphyxiating gases may be released.


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.


Thermal hazard protection: Cold insulating gloves.

### SECTION 9: Physical and chemical properties

#### 9.1. Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Physical state</td>
<td>Gas</td>
</tr>
<tr>
<td>Color</td>
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</tr>
<tr>
<td>Odor</td>
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</tr>
<tr>
<td>Odor threshold</td>
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</tr>
<tr>
<td>pH</td>
<td>No data available</td>
</tr>
<tr>
<td>Melting point</td>
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</tr>
<tr>
<td>Freezing point</td>
<td>No data available</td>
</tr>
<tr>
<td>Boiling point</td>
<td>8.5 °C</td>
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<tr>
<td>Flash point</td>
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<tr>
<td>Relative evaporation rate</td>
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<tr>
<td>Flammability (solid, gas)</td>
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</tr>
<tr>
<td>Explosion limits</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Oxidizing properties</td>
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</tr>
<tr>
<td>Vapor pressure</td>
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</tr>
<tr>
<td>Relative density</td>
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<tr>
<td>Relative vapor density at 20 °C</td>
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</tr>
<tr>
<td>Specific gravity / density</td>
<td>1.356 g/ml</td>
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<td>Molecular mass</td>
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<td>Solubility</td>
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<td>Auto-ignition temperature</td>
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<tr>
<td>Decomposition temperature</td>
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<tr>
<td>Viscosity</td>
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<tr>
<td>Viscosity, kinematic</td>
<td>No data available</td>
</tr>
<tr>
<td>Viscosity, dynamic</td>
<td>No data available</td>
</tr>
</tbody>
</table>

#### 9.2. Other information

No additional information available

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

No additional information available

#### 10.2. Chemical stability

The product is stable at normal handling and storage conditions.

#### 10.3. Possibility of hazardous reactions

May polymerize.

#### 10.4. Conditions to avoid

Protect from sunlight. Do not expose to temperatures exceeding 50 °C. Keep away from heat, sparks and flame.

#### 10.5. Incompatible materials

Alkali metals. Finely divided metals (Al, Mg, Zn). Strong oxidizing agents.

#### 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: Not classified
- Skin corrosion/irritation: Causes skin irritation.
- Serious eye damage/irritation: Causes serious eye irritation.
(E)-1,1,1,4,4,4-Hexafluoro-2-butene
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Respiratory or skin sensitization: Not classified
Germ cell mutagenicity: Not classified
Carcinogenicity: Not classified
Reproductive toxicity: Not classified
Specific target organ toxicity (single exposure): May cause drowsiness or dizziness. May cause respiratory irritation.
Specific target organ toxicity (repeated exposure): Not classified
Aspiration hazard: Not classified
Symptoms/injuries after skin contact: Contact with the liquid may cause cold burns/frostbite.
Symptoms/injuries after eye contact: Direct contact with the liquefied gas may cause severe and possibly permanent eye injury due to frostbite from rapid liquid evaporation.

SECTION 12: Ecological information
12.1. Toxicity
No additional information available
12.2. Persistence and degradability
No additional information available
12.3. Bioaccumulative potential
No additional information available
12.4. Mobility in soil
No additional information available
12.5. Other adverse effects
No additional information available

SECTION 13: Disposal considerations
13.1. Waste treatment methods
Waste treatment methods: Remove to an authorized incinerator equipped with an afterburner and a flue gas scrubber.
Waste disposal recommendations: Dispose of contents/container in accordance with licensed collector’s sorting instructions.
Additional information: Recycle the material as far as possible.

SECTION 14: Transport information
Department of Transportation (DOT)
In accordance with DOT
Transport document description: UN3163 Liquefied gas, n.o.s., 2.2
UN-No.(DOT): UN3163
Proper Shipping Name (DOT): Liquefied gas, n.o.s.
Transport hazard class(es) (DOT): 2.2 - Class 2.2 - Non-flammable compressed gas 49 CFR 173.115
Hazard labels (DOT): 2.2 - Non-flammable gas

DOT Packaging Non Bulk (49 CFR 173.xxx): 304
DOT Packaging Bulk (49 CFR 173.xxx): 314,315
DOT Symbols: G - Identifies PSN requiring a technical name
DOT Special Provisions (49 CFR 172.102): T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter.
DOT Packaging Exceptions (49 CFR 173.xxx): 306
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27): 75 kg
(E)-1,1,1,4,4,4-Hexafluoro-2-butene
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75): 150 kg

DOT Vessel Stowage Location: A - The material may be stowed “on deck” or “under deck” on a cargo vessel and on a passenger vessel.

Other Information: No supplementary information available.

TDG
No additional information available

Transport by sea
UN-No. (IMDG): 3163
Proper Shipping Name (IMDG): LIQUEFIED GAS, N.O.S.
Class (IMDG): 2 - Gases

Air transport
UN-No. (IATA): 3163
Proper Shipping Name (IATA): Liquefied gas, n.o.s.
Class (IATA): 2

SECTION 15: Regulatory information

15.1. US Federal regulations

All components of this product are listed, or excluded from listing, on the United States Environmental Protection Agency Toxic Substances Control Act (TSCA) inventory except for:

(E)-1,1,1,4,4,4-Hexafluoro-2-butene CAS No 66711-86-2 100%

This product or mixture does not contain a toxic chemical or chemicals in excess of the applicable de minimis concentration as specified in 40 CFR §372.38(a) subject to the reporting requirements of section 313 of Title III of the Superfund Amendments and Reauthorization Act of 1986 and 40 CFR Part 372.

15.2. International regulations

CANADA
No additional information available

EU-Regulations
No additional information available

National regulations
No additional information available

15.3. US State regulations

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

SECTION 16: Other information

Full text of H-phrases:

<table>
<thead>
<tr>
<th>H- Phrase</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Eye Irrit. 2A</td>
<td>Serious eye damage/eye irritation Category 2A</td>
</tr>
<tr>
<td>Liquefied gas</td>
<td>Gases under pressure Liquefied gas</td>
</tr>
<tr>
<td>Simple Asphy</td>
<td>Simple Asphyxiant</td>
</tr>
<tr>
<td>Skin Irrit. 2</td>
<td>Skin corrosion/irritation Category 2</td>
</tr>
<tr>
<td>STOT SE 3</td>
<td>Specific target organ toxicity (single exposure) Category 3</td>
</tr>
<tr>
<td>STOT SE 3</td>
<td>Specific target organ toxicity (single exposure) Category 3</td>
</tr>
<tr>
<td>H280</td>
<td>Contains gas under pressure; may explode if heated</td>
</tr>
<tr>
<td>H315</td>
<td>Causes skin irritation</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation</td>
</tr>
<tr>
<td>H336</td>
<td>May cause drowsiness or dizziness</td>
</tr>
<tr>
<td>H380</td>
<td>May displace oxygen and cause rapid suffocation</td>
</tr>
</tbody>
</table>
(E)-1,1,1,4,4,4-Hexafluoro-2-butene
Safety Data Sheet
according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

NFPA health hazard: 3 - Short exposure could cause serious temporary or residual injury even though prompt medical attention was given.
NFPA fire hazard: 0 - Materials that will not burn.
NFPA reactivity: 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.

HMS III Rating
Health: 2 Moderate Hazard - Temporary or minor injury may occur
Flammability: 0 Minimal Hazard - Materials that will not burn
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.

SDS US (GHS HazCom 2012)

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is offered solely for your consideration, investigation, and verification. It does not represent any guarantee of the properties of the product nor that the hazard precautions or procedures described are the only ones which exist. SynQuest shall not be held liable or any damage resulting from handling or from contact with the above product.