## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifier
- **Trade name**: SOLKANE® 365 mfc
- **Chemical name**: 1,1,1,3,3-pentafluorobutane
- **Synonyms**: HFC-365mfc
- **Molecular formula**: C₄H₅F₅

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

**Uses of the Substance / Mixture**
- Foaming agent
- Solvent

### 1.3 Details of the supplier of the safety data sheet

**Company**

SOLVAY FLUORIDES, LLC  
3737 Buffalo Speedway,  
Suite 800,  
Houston, TX 77098  
USA  
Tel: 800-515-6065

### 1.4 Emergency telephone

FOR EMERGENCIES INVOLVING A SPILL, LEAK, FIRE, EXPOSURE OR ACCIDENT, CONTACT CHEMTREC (24-Hour Number): 800-424-9300 within the United States and Canada, or 703-527-3887 for international collect calls.

## SECTION 2: Hazards identification

Although WHMIS has not adopted the environmental portion of the GHS regulations, this document may include information on environmental effects

### 2.1 Classification of the substance or mixture

**Hazardous Products Regulations (WHMIS 2015)**

- **Flammable liquids, Category 2**
- **H225**: Highly flammable liquid and vapor.

### 2.2 Label elements

**Hazardous Products Regulations (WHMIS 2015)**

- **Pictogram**
- **Signal Word**: Danger
- **Hazard Statements**: H225: Highly flammable liquid and vapor.
Precautionary Statements

Preparation
- P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
- P233 Keep container tightly closed.
- P240 Ground and bond container and receiving equipment.
- P241 Use explosion-proof electrical/ ventilating/ lighting/ equipment.
- P242 Use non-sparking tools.
- P243 Take action to prevent static discharges.
- P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.

Response
- P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
- P370 + P378 In case of fire: Use dry sand, dry chemical or alcohol-resistant foam to extinguish.

Storage
- P403 + P235 Store in a well-ventilated place. Keep cool.

Disposal
- P501 Dispose of contents/ container to an approved waste disposal plant.

2.3 Other hazards which do not result in classification

- Highly flammable.
- Hazardous decomposition products formed under fire conditions.
- Gaseous hydrogen fluoride (HF).

SECTION 3: Composition/information on ingredients

3.1 Substance

WHMIS Hazardous Ingredients and Impurities
- No ingredients are hazardous.

3.2 Mixture

Not applicable, this product is a substance.

SECTION 4: First aid measures

4.1 Description of first-aid measures

In case of inhalation
- Remove to fresh air.
- Oxygen or artificial respiration if needed.
- If symptoms persist, call a physician.

In case of skin contact
- Wash off with soap and water.
- If symptoms persist, call a physician.

In case of eye contact
- Rinse thoroughly with plenty of water, also under the eyelids.
4.2 Most important symptoms and effects, both acute and delayed

**In case of inhalation**

**Symptoms**
- narcosis
- At high concentrations:
  - Asphyxia

**In case of skin contact**

**Effects**
- Prolonged skin contact may defat the skin and produce dermatitis.

**In case of eye contact**

**Effects**
- slight irritation

**In case of ingestion**

**Effects**
- Ingestion may cause gastrointestinal irritation, nausea, vomiting and diarrhea.

4.3 Indication of any immediate medical attention and special treatment needed

**Notes to physician**
- When symptoms persist or in all cases of doubt seek medical advice.
- Health injuries are not known or expected under normal use.

SECTION 5: Firefighting measures

5.1 Extinguishing media

**Suitable extinguishing media**
- powder
- Foam
- Aqueous film forming foam (AFFF).
- Carbon dioxide (CO2)

**Unsuitable extinguishing media**
- Water may be ineffective.

5.2 Special hazards arising from the substance or mixture

**Specific hazards during fire fighting**
- Highly flammable liquid and vapor.
- Vapors are heavier than air and may spread along floors.
- Risk of ignition.
- Vapours may form explosive mixtures with air.
- Hazardous decomposition products formed under fire conditions.

**Hazardous combustion products:**
- Gaseous hydrogen fluoride (HF).
- Carbon monoxide

5.3 Advice for firefighters

**Special protective equipment for fire-fighters**
- Wear self-contained breathing apparatus and protective suit.
- Full protective flameproof clothing
- Wear chemical resistant oversuit
- Special protective actions for fire-fighters
- In case of fire, use water spray.
- Keep product and empty container away from heat and sources of ignition.

**Further information**
- Evacuate personnel to safe areas.
- Keep containers and surroundings cool with water spray.
- After the fire, proceed rapidly with cleaning of surfaces exposed to the fumes in order to limit equipment damage.
- Approach from upwind.
- Avoid propagating the fire when directing the extinguishing agent as a jet onto the surface of the burning liquid.

---

**SECTION 6: Accidental release measures**

6.1 Personal precautions, protective equipment and emergency procedures

**Advice for non-emergency personnel**
- Prevent further leakage or spillage if safe to do so.
- Keep away from incompatible products

**Advice for emergency responders**
- Evacuate personnel to safe areas.
- Keep people away from and upwind of spill/leak.
- Remove all sources of ignition.
- Wear self-contained breathing apparatus and protective suit.
- Cover the spreading liquid with foam in order to slow down the evaporation.
- Ventilate the area.

6.2 Environmental precautions
- Should not be released into the environment.
- If the product contaminates rivers and lakes or drains inform respective authorities.

6.3 Methods and materials for containment and cleaning up
- Treat recovered material as described in the section "Disposal considerations".

6.4 Reference to other sections
- Refer to protective measures listed in sections 7 and 8.
SECTION 7: Handling and storage

7.1 Precautions for safe handling

- Used in closed system
- Use only in well-ventilated areas.
- Keep away from heat and sources of ignition.
- Heating can release vapors which can be ignited.
- To avoid ignition of vapors by static electricity discharge, all metal parts of the equipment must be grounded.
- When transferring from one container to another apply grounding measures and use conductive hose material.
- Preferably transfer by pump or gravity.
- Do not use sparking tools.
- Keep away from incompatible products

Hygiene measures

- Eye wash bottles or eye wash stations in compliance with applicable standards.
- When using do not eat, drink or smoke.
- Wash hands before breaks and at the end of workday.
- Handle in accordance with good industrial hygiene and safety practice.
- Gloves, overalls and boots have to be double layered (protection against cold temperature).

7.2 Conditions for safe storage, including any incompatibilities

Technical measures/Storage conditions

- Store in original container.
- Keep container closed.
- Keep in a cool, well-ventilated place.
- Keep in a contained area
- Keep away from heat/sparks/open flames/hot surfaces. No smoking.
- Ensure all equipment is electrically grounded before beginning transfer operations.
- Take measures to prevent the build up of electrostatic charge.
- Keep container tightly closed.
- Keep container closed when not in use.
- Keep tightly closed.
- Keep away from:
- Incompatible products

Packaging material

Suitable material
- glass
- Stainless steel
- Coated steels.

Unsuitable material
- in cardboard box
- Wooden box

7.3 Specific end use(s)
- Contact your supplier for additional information

SECTION 8: Exposure controls/personal protection

Introductory Remarks: These recommendations provide general guidance for handling this product. Because specific work environments and material handling practices vary, safety procedures should be developed for each intended application. Assistance
with selection, use and maintenance of worker protection equipment is generally available from equipment manufacturers.

8.1 Control parameters

- Contains no substances with occupational exposure limit values above their regulatory reporting threshold.

8.2 Exposure controls

Control measures

Engineering measures
- Provide appropriate exhaust ventilation at machinery.
- Apply technical measures to comply with the occupational exposure limits.
- Refer to protective measures listed in sections 7 and 8.

Individual protection measures

Respiratory protection
- Use respirator when performing operations involving potential exposure to vapor of the product.
- Use only respiratory protection that conforms to international/ national standards.
- Use NIOSH approved respiratory protection.
- Self-contained breathing apparatus in confined spaces/insufficient oxygen/in case of large uncontrolled emissions/in all circumstances when the mask and cartridge do not give adequate protection.

Hand protection
- Wear suitable gloves.
- Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).

Suitable material
- Fluoroelastomer

Eye protection
- Chemical resistant goggles must be worn.

Skin and body protection
- Flame-resistant clothing
- Apron
- Boots
- butyl-rubber

Hygiene measures
- Eye wash bottles or eye wash stations in compliance with applicable standards.
- When using do not eat, drink or smoke.
- Wash hands before breaks and at the end of workday.
- Handle in accordance with good industrial hygiene and safety practice.
- Gloves, overalls and boots have to be double layered (protection against cold temperature).
SECTION 9: Physical and chemical properties

Physical and Chemical properties here represent typical properties of this product. Contact the business area using the Product information phone number in Section 1 for its exact specifications.

9.1 Information on basic physical and chemical properties

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Appearance</strong></td>
<td>Form: Volatile.</td>
</tr>
<tr>
<td></td>
<td>Physical state: liquid</td>
</tr>
<tr>
<td></td>
<td>Color: colorless</td>
</tr>
<tr>
<td><strong>Odor</strong></td>
<td>ether-like</td>
</tr>
<tr>
<td><strong>Odor Threshold</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Molecular weight</strong></td>
<td>148 g/mol</td>
</tr>
<tr>
<td><strong>pH</strong></td>
<td>6.0 (1.7 g/l)</td>
</tr>
<tr>
<td><strong>Melting point/freezing point</strong></td>
<td>Melting point/range: -4 °F (-20 °C)</td>
</tr>
<tr>
<td><strong>Initial boiling point and boiling range</strong></td>
<td>Boiling point/boiling range: 104.2 °F (40.1 °C) (756.81 mmHg (1,009 hPa))</td>
</tr>
<tr>
<td><strong>Flash point</strong></td>
<td>&lt;= -17 °F (&lt;= -27 °C) Method: DIN 51755 Part 1</td>
</tr>
<tr>
<td><strong>Evaporation rate (Butylacetate = 1)</strong></td>
<td>No data available</td>
</tr>
<tr>
<td><strong>Flammability (solid, gas)</strong></td>
<td>Not applicable</td>
</tr>
<tr>
<td><strong>Flammability (liquids)</strong></td>
<td>Highly flammable liquid and vapor.</td>
</tr>
<tr>
<td><strong>Flammability / Explosive limit</strong></td>
<td>Lower flammability/explosion limit: Type: Lower explosion limit 3.60 % (V)</td>
</tr>
<tr>
<td></td>
<td>Upper flammability/explosion limit: Type: Upper explosion limit 13.30 % (V)</td>
</tr>
<tr>
<td></td>
<td>Explosiveness: Not explosive</td>
</tr>
<tr>
<td><strong>Autoignition temperature</strong></td>
<td>1076 °F (580 °C)</td>
</tr>
<tr>
<td><strong>Vapor pressure</strong></td>
<td>324.78 mmHg (433 hPa) (68 °F (20 °C))</td>
</tr>
<tr>
<td><strong>Vapor density</strong></td>
<td>&gt; 5</td>
</tr>
<tr>
<td><strong>Density</strong></td>
<td>Bulk density: Not applicable</td>
</tr>
<tr>
<td><strong>Relative density</strong></td>
<td>1.27 (68 °F (20 °C))</td>
</tr>
</tbody>
</table>
Solubility

Water solubility:
1.7 g/l  (70.2 °F (21.2 °C))

Solubility in other solvents:
miscible with most organic solvents:
log Pow: 1.61 (68 °F (20 °C))

Partition coefficient: n-octanol/water

Viscosity

Viscosity, dynamic: 0.4 mPa.s (77 °F (25 °C))

Explosive properties

No data available

Oxidizing properties

Not considered as oxidizing.

9.2 Other information

Henry's Constant

ca. 3800 Pa.m3 / mol (68 °F (20 °C))
Method: Calculation method
considerable volatility, Air

Surface tension

73.8 mN/m (68 °F (20 °C))

SECTION 10: Stability and reactivity

10.1 Reactivity

- Risk of violent reaction.
- Risk of explosion.

10.2 Chemical stability

- Stable under recommended storage conditions.
- Strong oxidizers, alkali metals and alkaline earth metals may cause fires or explosions.
- Vapors are heavier than air and may spread along floors.

10.3 Possibility of hazardous reactions

- Strong oxidizers, alkali metals and alkaline earth metals may cause fires or explosions.

10.4 Conditions to avoid

- Heat, flames and sparks.

10.5 Incompatible materials

- Light and/or alkaline metals
- Powdered metals
- Alkaline earth metals
- Strong oxidizing agents

10.6 Hazardous decomposition products

- Gaseous hydrogen fluoride (HF).
- Carbon monoxide
SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute oral toxicity No data available
Acute inhalation toxicity No data available
Asphyxiation Hazard This product is a simple asphyxiant.
Acute dermal toxicity No data available
Acute toxicity (other routes of administration) No data available

Skin corrosion/irritation No data available

Serious eye damage/eye irritation No data available

Respiratory or skin sensitization No data available

Mutagenicity

Genotoxicity in vitro No data available
Genotoxicity in vivo No data available

Carcinogenicity No data available

This product does not contain any ingredient designated as probable or suspected human carcinogens by:
ACGIH

Toxicity for reproduction and development

Toxicity to reproduction / fertility No data available
Developmental Toxicity/Teratogenicity No data available

STOT

STOT-single exposure No data available
STOT-repeated exposure No data available

Experience with human exposure No data available
### SECTION 12: Ecological information

#### 12.1 Toxicity

**Aquatic Compartment**

<table>
<thead>
<tr>
<th>Toxicity</th>
<th>Data Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Acute toxicity to fish</td>
<td>No data available</td>
</tr>
<tr>
<td>Acute toxicity to daphnia and other</td>
<td>No data available</td>
</tr>
<tr>
<td>aquatic invertebrates.</td>
<td></td>
</tr>
<tr>
<td>Toxicity to aquatic plants</td>
<td>No data available</td>
</tr>
<tr>
<td>Toxicity to microorganisms</td>
<td>No data available</td>
</tr>
<tr>
<td>Chronic toxicity to fish</td>
<td>No data available</td>
</tr>
<tr>
<td>Chronic toxicity to daphnia and other</td>
<td>No data available</td>
</tr>
<tr>
<td>aquatic invertebrates.</td>
<td></td>
</tr>
<tr>
<td>Chronic Toxicity to aquatic plants</td>
<td>No data available</td>
</tr>
</tbody>
</table>

#### 12.2 Persistence and degradability

<table>
<thead>
<tr>
<th>Process</th>
<th>Data Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Abiotic degradation</td>
<td>No data available</td>
</tr>
<tr>
<td>Physical- and photo-chemical elimination</td>
<td>No data available</td>
</tr>
<tr>
<td>Biodegradation</td>
<td>No data available</td>
</tr>
</tbody>
</table>

#### 12.3 Bioaccumulative potential

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>Bioconcentration factor (BCF)</td>
<td>No data available</td>
</tr>
</tbody>
</table>

#### 12.4 Mobility in soil

<table>
<thead>
<tr>
<th>Parameter</th>
<th>Data Availability</th>
</tr>
</thead>
<tbody>
<tr>
<td>Adsorption potential (Koc)</td>
<td>No data available</td>
</tr>
<tr>
<td>Known distribution to environmental compartments</td>
<td>No data available</td>
</tr>
</tbody>
</table>
12.5 Results of PBT and vPvB assessment  Not applicable

12.6 Other adverse effects

Ozone-Depletion Potential

Regulatory basis: Ozone-Depletion Potential

Ozone-Depletion Potential: 0

Ozone depletion potential; ODP; (R-11 = 1)

no effect on stratospheric ozone

Regulatory basis: Global warming potential

Number on list: GWP = 794

Reference value for carbon dioxide: GWP = 1

GWP (ITH 100 y)

Source IPCC (International Panel on Climate Change)

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product Disposal

- In accordance with local and national regulations.
- Refer to manufacturer/supplier for information on recovery/recycling.
- or
- Must be incinerated in a suitable incineration plant holding a permit delivered by the competent authorities.
- The incinerator must be equipped with a system for the neutralization or recovery of HF.

Advice on cleaning and disposal of packaging

- To avoid treatments, as far as possible, use dedicated containers.

SECTION 14: Transport information

Transportation status: IMPORTANT! Statements below provide additional data on listed transport classification.

The listed Transportation Classification does not address regulatory variations due to changes in package size, mode of shipment or other regulatory descriptors.

TDG

14.1 UN number  UN 1993

14.2 Proper shipping name  FLAMMABLE LIQUID, N.O.S. (Pentafluorobutane)

14.3 Transport hazard class  3

Label(s)  3

14.4 Packing group

Packing group  II

ERG No  128

14.5 Environmental hazards  NO
Marine pollutant

**DOT**

14.1 UN number UN 1993

14.2 Proper shipping name FLAMMABLE LIQUIDS, N.O.S. (Pentafluorobutane)

14.3 Transport hazard class 3

Label(s) 3

14.4 Packing group

Packing group II

ERG No 128

14.5 Environmental hazards Marine pollutant NO

**NOM**

14.1 UN number UN 1993

14.2 Proper shipping name FLAMMABLE LIQUID, N.O.S. (Pentafluorobutane)

14.3 Transport hazard class 3

Label(s) 3

14.4 Packing group

Packing group II

ERG No 128

14.5 Environmental hazards Marine pollutant NO

**IMDG**

14.1 UN number UN 1993

14.2 Proper shipping name FLAMMABLE LIQUID, N.O.S. (Pentafluorobutane)

14.3 Transport hazard class 3

Label(s) 3

14.4 Packing group

Packing group II

14.5 Environmental hazards Marine pollutant NO

14.6 Special precautions for user

EmS F-E, S-E

For personal protection see section 8.
IATA

14.1 UN number UN 1993
14.2 Proper shipping name FLAMMABLE LIQUID, N.O.S. (Pentafluorobutane)
14.3 Transport hazard class 3
   Label(s): 3
14.4 Packing group
   Packing group II
   Packing instruction (cargo aircraft) 364
   Max net qty / pkg 60.00 L
   Packing instruction (passenger aircraft) 353
   Max net qty / pkg 5.00 L
14.5 Environmental hazards NO
14.6 Special precautions for user For personal protection see section 8.

Note: The above regulatory prescriptions are those valid on the date of publication of this sheet. Given the possible evolution of transportation regulations for hazardous materials, it would be advisable to check their validity with your sales office.
SECTION 15: Regulatory information

15.1 Notification status

<table>
<thead>
<tr>
<th>Inventory Information</th>
<th>Status</th>
</tr>
</thead>
<tbody>
<tr>
<td>United States TSCA Inventory</td>
<td>- Listed on Inventory</td>
</tr>
<tr>
<td>Mexico INSQ (INSQ)</td>
<td>- One or more components not listed on inventory</td>
</tr>
<tr>
<td>Canadian Domestic Substances List (DSL)</td>
<td>- Listed on Inventory</td>
</tr>
<tr>
<td>New Zealand. Inventory of Chemical Substances</td>
<td>- In compliance with the inventory</td>
</tr>
<tr>
<td>Australia Inventory of Chemical Substances (AICS)</td>
<td>- Listed on Inventory</td>
</tr>
<tr>
<td>Japan. CSCL - Inventory of Existing and New Chemical Substances</td>
<td>- Listed on Inventory</td>
</tr>
<tr>
<td>Korea. Korean Existing Chemicals Inventory (KECI)</td>
<td>- Listed on Inventory</td>
</tr>
<tr>
<td>China. Inventory of Existing Chemical Substances in China (IECSC)</td>
<td>- Listed on Inventory</td>
</tr>
<tr>
<td>Philippines Inventory of Chemicals and Chemical Substances (PICCS)</td>
<td>- One or more components not listed on inventory</td>
</tr>
<tr>
<td>EU. European Registration, Evaluation, Authorisation and Restriction of Chemical (REACH)</td>
<td>- If product is purchased from Solvay in Europe it is in compliance with REACH, if not please contact the supplier.</td>
</tr>
</tbody>
</table>

15.2 National Regulations

Canada. CEPA 1999 Significant New Activity (SNAc) List:
- No substances are subject to a Significant New Activity Notification.

SECTION 16: Other information

Revision Date:
01/18/2018

NFPA (National Fire Protection Association) - Classification

<table>
<thead>
<tr>
<th>Health</th>
<th>0 minimal</th>
</tr>
</thead>
<tbody>
<tr>
<td>Flammability</td>
<td>3 serious</td>
</tr>
<tr>
<td>Instability or Reactivity</td>
<td>1 slight</td>
</tr>
<tr>
<td>Special Notices</td>
<td>None</td>
</tr>
</tbody>
</table>
HMIS (Hazardous Materials Identification System (Paint & Coating)) - Classification

<table>
<thead>
<tr>
<th>Classification</th>
<th>HMIS Code</th>
<th>Description</th>
</tr>
</thead>
<tbody>
<tr>
<td>Health</td>
<td>0</td>
<td>minimal</td>
</tr>
<tr>
<td>Flammability</td>
<td>3</td>
<td>serious</td>
</tr>
<tr>
<td>Reactivity</td>
<td>1</td>
<td>slight</td>
</tr>
<tr>
<td>PPE</td>
<td>Determined by User; dependent on local conditions</td>
<td></td>
</tr>
</tbody>
</table>

- ACGIH: American Conference of Governmental Industrial Hygienists
- OSHA: Occupational Safety and Health Administration
- NTP: National Toxicology Program
- IARC: International Agency for Research on Cancer
- NIOSH: National Institute for Occupational Safety and Health

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information, and belief at the date of its publication. Such information is only given as a guidance to help the user handle, use, process, store, transport, dispose, and release the product in satisfactory safety conditions and is not to be considered as a warranty or quality specification. It should be used in conjunction with technical sheets but do not replace them. Thus, the information only relates to the designated specific product and may not be applicable if such product is used in combination with other materials or in any other manufacturing process, unless otherwise specifically indicated. It does not release the user from ensuring he is in conformity with all regulations linked to its activity.