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

1.1 Product identifiers

Product name: DL-α-Difluoromethylornithine hydrochloride hydrate

Product Number: D193

Brand: Sigma

REACH No.: A registration number is not available for this substance as the substance or its uses are exempted from registration, the annual tonnage does not require a registration or the registration is envisaged for a later registration deadline.

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

Identified uses: Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet

Company: Sigma-Aldrich Inc.
3050 SPRUCE ST
ST. LOUIS MO 63103
UNITED STATES

Telephone: +1 314 771-5765
Fax: +1 800 325-5052

1.4 Emergency telephone

Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Not a hazardous substance or mixture according to Regulation (EC) No 1272/2008.

2.2 Label elements

Not a hazardous substance or mixture according to Regulation (EC) No 1272/2008.

2.3 Other hazards - none
SECTION 3: Composition/information on ingredients

3.1 Substances
Synonyms: DFMOhydrochloridehydrate
2-(Difluoromethyl)ornithinehydrochloridehydrate
Formula: C₆H₁₂F₂N₂O₂·xHCl·yH₂O
Molecular weight: 182.17 g/mol
No components need to be disclosed according to the applicable regulations.

SECTION 4: First aid measures

4.1 Description of first-aid measures
If inhaled
If breathed in, move person into fresh air. If not breathing, give artificial respiration.
In case of skin contact
Wash off with soap and plenty of water.
In case of eye contact
Flush eyes with water as a precaution.
If swallowed
Never give anything by mouth to an unconscious person. Rinse mouth with water.

4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media
Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Nitrogen oxides (NOx)
Hydrogen chloride gas
Hydrogen fluoride

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
No data available

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Avoid dust formation. Avoid breathing vapors, mist or gas.
For personal protection see section 8.

6.2 Environmental precautions
Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Sweep up and shovel. Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
For disposal see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on protection against fire and explosion
Provide appropriate exhaust ventilation at places where dust is formed. Normal measures for preventive fire protection.

Hygiene measures
General industrial hygiene practice.
For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Storage conditions
Store in cool place. Keep container tightly closed in a dry and well-ventilated place.

Storage class
Storage class (TRGS 510): 13: Non Combustible Solids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

8.2 Exposure controls

Personal protective equipment

Eye/face protection
Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.

The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it.

Body Protection
Choose body protection in relation to its type, to the concentration and amount of dangerous substances, and to the specific work-place. The type of protective
equipment must be selected according to the concentration and amount of the
dangerous substance at the specific workplace.

**Respiratory protection**
Respiratory protection is not required. Where protection from nuisance levels of
dusts are desired, use type N95 (US) or type P1 (EN 143) dust masks. Use
respirators and components tested and approved under appropriate government
standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Do not let product enter drains.

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**SECTION 9: Physical and chemical properties**

**9.1 Information on basic physical and chemical properties**

<table>
<thead>
<tr>
<th>a) Physical state</th>
<th>solid</th>
</tr>
</thead>
<tbody>
<tr>
<td>b) Color</td>
<td>white</td>
</tr>
<tr>
<td>c) Odor</td>
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</tr>
<tr>
<td>d) Melting point/freezing point</td>
<td>Melting point/range: 235 °C</td>
</tr>
<tr>
<td>e) Initial boiling point and boiling range</td>
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</tr>
<tr>
<td>f) Flammability (solid, gas)</td>
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<tr>
<td>g) Upper/lower flammability or explosive limits</td>
<td>No data available</td>
</tr>
<tr>
<td>h) Flash point</td>
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</tr>
<tr>
<td>i) Autoignition temperature</td>
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</tr>
<tr>
<td>j) Decomposition temperature</td>
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</tr>
<tr>
<td>k) pH</td>
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</tr>
<tr>
<td>l) Viscosity</td>
<td>Viscosity, kinematic: No data available</td>
</tr>
<tr>
<td></td>
<td>Viscosity, dynamic: No data available</td>
</tr>
<tr>
<td>m) Water solubility</td>
<td>No data available</td>
</tr>
<tr>
<td>n) Partition coefficient: n-octanol/water</td>
<td>No data available</td>
</tr>
<tr>
<td>o) Vapor pressure</td>
<td>No data available</td>
</tr>
<tr>
<td>p) Density</td>
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</tr>
<tr>
<td></td>
<td>Relative density</td>
</tr>
<tr>
<td>q) Relative vapor density</td>
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</tr>
<tr>
<td>r) Particle characteristics</td>
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</tr>
</tbody>
</table>
s) Explosive properties  No data available  
t) Oxidizing properties  No data available

9.2  Other safety information  
No data available

SECTION 10: Stability and reactivity

10.1 Reactivity  No data available

10.2 Chemical stability  
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions  No data available

10.4 Conditions to avoid  No data available

10.5 Incompatible materials  
Strong oxidizing agents

10.6 Hazardous decomposition products  
In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity  
Oral: No data available  
Inhalation: No data available  
Dermal: No data available

Skin corrosion/irritation  No data available

Serious eye damage/eye irritation  No data available

Respiratory or skin sensitization  No data available

Germ cell mutagenicity  No data available

Carcinogenicity  No data available

Reproductive toxicity  
Laboratory experiments have shown teratogenic effects.

Specific target organ toxicity - single exposure  No data available

Specific target organ toxicity - repeated exposure  No data available
Aspiration hazard
No data available

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

SECTION 12: Ecological information

12.1 Toxicity
No data available

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Endocrine disrupting properties
No data available

12.7 Other adverse effects
No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product
Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging
Dispose of as unused product.

SECTION 14: Transport information

14.1 UN number

<table>
<thead>
<tr>
<th>ADR/RID</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
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</table>

14.2 UN proper shipping name

<table>
<thead>
<tr>
<th>ADR/RID</th>
<th>IMDG</th>
<th>IATA</th>
</tr>
</thead>
<tbody>
<tr>
<td>Not dangerous goods</td>
<td>Not dangerous goods</td>
<td>Not dangerous goods</td>
</tr>
</tbody>
</table>

14.3 Transport hazard class(es)

<table>
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<th>ADR/RID</th>
<th>IMDG</th>
<th>IATA</th>
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14.4 Packaging group

<table>
<thead>
<tr>
<th>ADR/RID</th>
<th>IMDG</th>
<th>IATA</th>
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</tbody>
</table>
14.5 Environmental hazards
ADR/RID: no  IMDG Marine pollutant: no  IATA: no

14.6 Special precautions for user

Further information
Not classified as dangerous in the meaning of transport regulations.

SECTION 15: Regulatory information

15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture
This material safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006.
International Chemical Weapons Convention (CWC) Schedules of Toxic Chemicals and Precursors:
Restrictions on the marketing and use of certain dangerous substances:
Regulation (EC) No 649/2012 of the European Parliament and the Council concerning the export and import of dangerous chemicals:
Candidate List of Substances of Very High Concern for Authorisation:

15.2 Chemical Safety Assessment
For this product a chemical safety assessment was not carried out.

SECTION 16: Other information

Further information
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