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

1.1 Product identifier

Identification of the substance: 9-Fluorenylmethoxycarbonyl chloride

Article number: 2201

Registration number (REACH): This information is not available.

EC number: 249-313-6

CAS number: 28920-43-6

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

Identified uses: laboratory chemical

1.3 Details of the supplier of the safety data sheet

Carl Roth GmbH + Co KG
Schoemperlenstr. 3-5
D-76185 Karlsruhe
Germany

Telephone: +49 (0) 721 - 56 06 0
Telefax: +49 (0) 721 - 56 06 149
E-mail: sicherheit@carlroth.de
Website: www.carlroth.de

Competent person responsible for the safety data sheet: Department Health, Safety and Environment

E-mail (competent person): sicherheit@carlroth.de

1.4 Emergency telephone number

Emergency information service: Poison Centre Munich: +49/(0)89 19240

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 (CLP)

<table>
<thead>
<tr>
<th>Section</th>
<th>Hazard class</th>
<th>Hazard class and category</th>
<th>Hazard statement</th>
</tr>
</thead>
<tbody>
<tr>
<td>3.1O</td>
<td>acute toxicity (oral)</td>
<td>(Acute Tox. 4)</td>
<td>H302</td>
</tr>
<tr>
<td>3.1I</td>
<td>acute toxicity (inhal.)</td>
<td>(Acute Tox. 4)</td>
<td>H332</td>
</tr>
<tr>
<td>3.2</td>
<td>skin corrosion/irritation</td>
<td>(Skin Corr. 1B)</td>
<td>H314</td>
</tr>
<tr>
<td>3.3</td>
<td>serious eye damage/eye irritation</td>
<td>(Eye Dam. 1)</td>
<td>H318</td>
</tr>
</tbody>
</table>
9-Fluorenylmethoxycarbonyl chloride (Fmoc-CI) ≥ 98%

article number: 2201

Remarks
For full text of Hazard- and EU Hazard-statements: see SECTION 16.

2.2 Label elements

Labelling according to Regulation (EC) No 1272/2008 (CLP)

Signal word: Danger

Pictograms

Hazard statements
H302+H332 Harmful if swallowed or if inhaled.
H314 Causes severe skin burns and eye damage.

Precautionary statements
Precautionary statements - prevention
P260 Do not breathe dust.
P270 Do not eat, drink or smoke when using this product.
P280 Wear protective gloves/eye protection.

Precautionary statements - response
P302+P352 IF ON SKIN: Wash with plenty of water.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Labelling of packages where the contents do not exceed 125 ml
Signal word: Danger

Symbol(s)

H314 Causes severe skin burns and eye damage.
P260 Do not breathe dust.
P280 Wear protective gloves/eye protection.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Other hazards

There is no additional information.
Take off immediately all contaminated clothing. Provide fresh air. If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions.

After contact with skin, wash immediately with plenty of water. In case of skin irritation, consult a physician.

In case of contact with eyes flush immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart and consult an ophthalmologist. Protect uninjured eye.

Rinse mouth immediately and drink plenty of water. If swallowed danger of perforation of the esophagus and the stomach (strong corrosive effects). Call a physician immediately.

Irritation, Corrosion, Cough, Headache, Breathing difficulties, Nausea, Vomiting, Gastric perforation, Risk of serious damage to eyes

### SECTION 3: Composition/information on ingredients

#### 3.1 Substances

<table>
<thead>
<tr>
<th>Name of substance</th>
<th>9-Fluorenylmethoxycarbonyl chloride</th>
</tr>
</thead>
<tbody>
<tr>
<td>EC number</td>
<td>249-313-6</td>
</tr>
<tr>
<td>CAS number</td>
<td>28920-43-6</td>
</tr>
<tr>
<td>Molecular formula</td>
<td>C₁₅H₁₁ClO₂</td>
</tr>
<tr>
<td>Molar mass</td>
<td>258,7 g/mol</td>
</tr>
</tbody>
</table>

### SECTION 4: First aid measures

#### 4.1 Description of first aid measures

**General notes**
Take off immediately all contaminated clothing.

**Following inhalation**
Provide fresh air. If breathing is irregular or stopped, immediately seek medical assistance and start first aid actions.

**Following skin contact**
After contact with skin, wash immediately with plenty of water. In case of skin irritation, consult a physician.

**Following eye contact**
In case of contact with eyes flush immediately with plenty of flowing water for 10 to 15 minutes holding eyelids apart and consult an ophthalmologist. Protect uninjured eye.

**Following ingestion**
Rinse mouth immediately and drink plenty of water. If swallowed danger of perforation of the esophagus and the stomach (strong corrosive effects). Call a physician immediately.

#### 4.2 Most important symptoms and effects, both acute and delayed
Irritation, Corrosion, Cough, Headache, Breathing difficulties, Nausea, Vomiting, Gastric perforation, Risk of serious damage to eyes

#### 4.3 Indication of any immediate medical attention and special treatment needed
none
SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Co-ordinate fire-fighting measures to the fire surroundings
dry extinguishing powder, carbon dioxide (CO2), foam

Unsuitable extinguishing media
water

5.2 Special hazards arising from the substance or mixture

Combustible.

Hazardous combustion products
In case of fire may be liberated: carbon monoxide (CO), carbon dioxide (CO2), hydrogen chloride (HCl)

5.3 Advice for firefighters

Fight fire with normal precautions from a reasonable distance. Wear self-contained breathing apparatus. Wear full chemical protective clothing.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel
Do not breathe dust. Avoid contact with skin and eyes. Wear suitable protective clothing.

6.2 Environmental precautions

Keep away from drains, surface and ground water.

6.3 Methods and material for containment and cleaning up

Advices on how to contain a spill
Covering of drains.

Advices on how to clean up a spill
Take up mechanically. Control of dust.

Other information relating to spills and releases
Place in appropriate containers for disposal. Ventilate affected area.

Reference to other sections
SECTION 7: Handling and storage

7.1 Precautions for safe handling
Avoid dust formation. Handle and open container with care. Provide adequate ventilation.

• Measures to prevent fire as well as aerosol and dust generation
Removal of dust deposits.

Advice on general occupational hygiene
Keep away from food, drink and animal feedingstuffs. Wash hands before breaks and after work.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a cool place.

Incompatible substances or mixtures
Observe hints for combined storage.

Consideration of other advice
Keep under inert gas.

• Ventilation requirements
Use local and general ventilation.

• Specific designs for storage rooms or vessels
Recommended storage temperature: 4 °C.

7.3 Specific end use(s)
No information available.

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

National limit values

Occupational exposure limit values (Workplace Exposure Limits)

<table>
<thead>
<tr>
<th>Country</th>
<th>Name of agent</th>
<th>Notation</th>
<th>Identifier</th>
<th>TWA [mg/m³]</th>
<th>STEL [mg/m³]</th>
<th>Source</th>
</tr>
</thead>
<tbody>
<tr>
<td>GB</td>
<td>dust</td>
<td>i</td>
<td>WEL</td>
<td>10</td>
<td></td>
<td>EH40/2005</td>
</tr>
<tr>
<td>GB</td>
<td>dust</td>
<td>r</td>
<td>WEL</td>
<td>4</td>
<td></td>
<td>EH40/2005</td>
</tr>
</tbody>
</table>

Notation

i  Inhalable fraction

r  Respirable fraction

STEL  Short-term exposure limit: a limit value above which exposure should not occur and which is related to a 15-minute period unless otherwise specified

TWA  Time-weighted average (long-term exposure limit): measured or calculated in relation to a reference period of 8 hours time-weighted average

8.2 Exposure controls

Individual protection measures (personal protective equipment)
9-Fluorenylmethoxycarbonyl chloride (Fmoc-Cl) ≥ 98%

article number: 2201

**Eye/face protection**
Use safety goggle with side protection. Wear face protection.

**Skin protection**
- **hand protection**
Wear suitable gloves. Chemical protection gloves are suitable, which are tested according to EN 374. Check leak-tightness/impermeability prior to use. For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.
- **type of material**
NBR (Nitrile rubber)
- **material thickness**
>0,11 mm.
- **breakthrough times of the glove material**
>480 minutes (permeation: level 6)
- **other protection measures**
Take recovery periods for skin regeneration. Preventive skin protection (barrier creams/ointments) is recommended.

**Respiratory protection**
Respiratory protection necessary at: Dust formation. Particulate filter device (EN 143). P2 (filters at least 94 % of airborne particles, colour code: White).

**Environmental exposure controls**
Keep away from drains, surface and ground water.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

**Appearance**
- Physical state: solid (powder, crystalline)
- Colour: whitish yellow
- Odour: this information is not available
- Odour threshold: No data available

**Other physical and chemical parameters**
- pH (value): This information is not available.
- Melting point/freezing point: 62 - 64 °C
- Initial boiling point and boiling range: This information is not available.
- Flash point: This information is not available.
- Evaporation rate: no data available
- Flammability (solid, gas): No information available
9-Fluorenylmethoxycarbonyl chloride (Fmoc-Cl) ≥ 98%

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Explosive limits
• lower explosion limit (LEL) this information is not available
• upper explosion limit (UEL) this information is not available
Explosion limits of dust clouds these information are not available
Vapour pressure This information is not available.
Density This information is not available.
Vapour density This information is not available.
Relative density Information on this property is not available.
Solubility(ies)
Water solubility no data available
Partition coefficient
n-octanol/water (log KOW) This information is not available.
Auto-ignition temperature Information on this property is not available.
Decomposition temperature no data available
Viscosity not relevant (solid matter)
Explosive properties shall not be classified as explosive
Oxidising properties none

9.2 Other information
There is no additional information.

SECTION 10: Stability and reactivity

10.1 Reactivity
Dust explosibility.

10.2 Chemical stability
Moisture-sensitive.

10.3 Possibility of hazardous reactions
Violent reaction with: Oxidisers, Alcohols, Amines, Bases,
After contact with water: => Hydrochloric acid

10.4 Conditions to avoid
Humidity.

10.5 Incompatible materials
There is no additional information.

10.6 Hazardous decomposition products
Hazardous combustion products: see section 5.
SECTION 11: Toxicological information

11.1 Information on toxicological effects

Skin corrosion/irritation
Causes severe burns.

Serious eye damage/eye irritation
Causes serious eye damage.

Respiratory or skin sensitisation
Shall not be classified as a respiratory or skin sensitiser.

Summary of evaluation of the CMR properties
Shall not be classified as a germ cell mutagenic, carcinogenic nor as a reproductive toxicant

• Specific target organ toxicity - single exposure
Shall not be classified as a specific target organ toxicant (single exposure).

• Specific target organ toxicity - repeated exposure
Shall not be classified as a specific target organ toxicant (repeated exposure).

Aspiration hazard
Shall not be classified as presenting an aspiration hazard.

Symptoms related to the physical, chemical and toxicological characteristics

• If swallowed
If swallowed danger of perforation of the esophagus and the stomach (strong corrosive effects), vomiting

• If in eyes
causes burns, Causes serious eye damage, risk of blindness

• If inhaled
headache, cough, nausea, corrosive to the respiratory tract, breathing difficulties, pulmonary oedema

• If on skin
irritation, corrosion, causes poorly healing wounds

Other information
Substance not yet fully tested

SECTION 12: Ecological information

12.1 Toxicity
acc. to 1272/2008/EC: Shall not be classified as hazardous to the aquatic environment.

12.2 Process of degradability
Theoretical Oxygen Demand: 2,041 mg/mg
Theoretical Carbon Dioxide: 2,552 mg/mg

12.3 Bioaccumulative potential
Data are not available.
9-Fluorenylmethoxycarbonyl chloride (Fmoc-CI) ≥ 98%

12.4 Mobility in soil
Data are not available.

12.5 Results of PBT and vPvB assessment
Data are not available.

12.6 Other adverse effects
Data are not available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods
This material and its container must be disposed of as hazardous waste. Dispose of contents/container in accordance with local/regional/national/international regulations.

**Sewage disposal-relevant information**
Do not empty into drains.

**Waste treatment of containers/packagings**
It is a dangerous waste; only packagings which are approved (e.g. acc. to ADR) may be used.

13.2 Relevant provisions relating to waste
The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process.

13.3 Remarks
Waste shall be separated into the categories that can be handled separately by the local or national waste management facilities. Please consider the relevant national or regional provisions.

SECTION 14: Transport information

14.1 UN number
1759

14.2 UN proper shipping name
CORROSIVE SOLID, N.O.S.

**Hazardous ingredients**
9-Fluorenylmethoxycarbonyl chloride

14.3 Transport hazard class(es)
Class 8 (corrosive substances)

14.4 Packing group
II (substance presenting medium danger)

14.5 Environmental hazards
none (non-environmentally hazardous acc. to the dangerous goods regulations)

14.6 Special precautions for user
Provisions for dangerous goods (ADR) should be complied within the premises.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code
The cargo is not intended to be carried in bulk.

14.8 Information for each of the UN Model Regulations

• Transport of dangerous goods by road, rail and inland waterway (ADR/RID/ADN)

<table>
<thead>
<tr>
<th>UN number</th>
<th>1759</th>
</tr>
</thead>
<tbody>
<tr>
<td>Proper shipping name</td>
<td>CORROSIVE SOLID, N.O.S.</td>
</tr>
<tr>
<td>Particulars in the transport document</td>
<td>UN1759, CORROSIVE SOLID, N.O.S., (9-Fluorenylmethoxycarbonyl chloride), 8, II, (E)</td>
</tr>
<tr>
<td>Class</td>
<td>8</td>
</tr>
<tr>
<td>Classification code</td>
<td>C10</td>
</tr>
</tbody>
</table>
**9-Fluorenylmethoxycarbonyl chloride (Fmoc-Cl) ≥ 98%**

**article number:** 2201

| Packing group | II |
| Danger label(s) | 8 |
| Special provisions (SP) | 274 |
| Excepted quantities (EQ) | E2 |
| Limited quantities (LQ) | 1 kg |
| Transport category (TC) | 2 |
| Tunnel restriction code (TRC) | E |
| Hazard identification No | 80 |

**Emergency Action Code**

- **International Maritime Dangerous Goods Code (IMDG)**
  - UN number: 1759
  - Proper shipping name: CORROSIVE SOLID, N.O.S.
  - Particulars in the shipper's declaration: UN1759, CORROSIVE SOLID, N.O.S., (9-Fluorenylmethoxycarbonyl chloride), 8, II
  - Class: 8
  - Packing group: II
  - Danger label(s): 8
  - Special provisions (SP): 274
  - Excepted quantities (EQ): E2
  - Limited quantities (LQ): 1 kg
  - EmS: F-A, S-B
  - Stowage category: A

**SECTION 15: Regulatory information**

15.1 **Safety, health and environmental regulations/legislation specific for the substance or mixture**

**Relevant provisions of the European Union (EU)**

- Regulation 649/2012/EU concerning the export and import of hazardous chemicals (PIC)
- Not listed.
9-Fluorenlymethoxycarbonyl chloride (Fmoc-CI) ≥ 98%

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- Regulation 1005/2009/EC on substances that deplete the ozone layer (ODS)
  Not listed.
- Regulation 850/2004/EC on persistent organic pollutants (POP)
  Not listed.
- Restrictions according to REACH, Annex XVII
  not listed
- List of substances subject to authorisation (REACH, Annex XIV)
  not listed
- Directive 2011/65/EU on the restriction of the use of certain hazardous substances in electrical and electronic equipment (RoHS) - Annex II
  not listed
- Regulation 166/2006/EC concerning the establishment of a European Pollutant Release and Transfer Register (PRTR)
  not listed
- Directive 2000/60/EC establishing a framework for Community action in the field of water policy (WFD)
  not listed

National inventories
Substance is listed in the following national inventories:

- EINECS/ELINCS/NLP (Europe)

15.2 Chemical Safety Assessment
No Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

Abbreviations and acronyms

<table>
<thead>
<tr>
<th>Abbr.</th>
<th>Descriptions of used abbreviations</th>
</tr>
</thead>
<tbody>
<tr>
<td>ADN</td>
<td>Accord européen relatif au transport international des marchandises dangereuses par voies de navigation intérieures (European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways)</td>
</tr>
<tr>
<td>ADR</td>
<td>Accord européen relatif au transport international des marchandises dangereuses par route (European Agreement concerning the International Carriage of Dangerous Goods by Road)</td>
</tr>
<tr>
<td>CAS</td>
<td>Chemical Abstracts Service (service that maintains the most comprehensive list of chemical substances)</td>
</tr>
<tr>
<td>CLP</td>
<td>Regulation (EC) No 1272/2008 on classification, labelling and packaging of substances and mixtures</td>
</tr>
<tr>
<td>CMR</td>
<td>Carcinogenic, Mutagenic or toxic for Reproduction</td>
</tr>
<tr>
<td>EINECS</td>
<td>European Inventory of Existing Commercial Chemical Substances</td>
</tr>
<tr>
<td>ELINCS</td>
<td>European List of Notified Chemical Substances</td>
</tr>
<tr>
<td>EmS</td>
<td>Emergency Schedule</td>
</tr>
<tr>
<td>GHS</td>
<td>“Globally Harmonized System of Classification and Labelling of Chemicals” developed by the United Nations</td>
</tr>
<tr>
<td>IMDG</td>
<td>International Maritime Dangerous Goods Code</td>
</tr>
<tr>
<td>MARPOL</td>
<td>International Convention for the Prevention of Pollution from Ships (abbr. of “Marine Pollutant)</td>
</tr>
<tr>
<td>NLP</td>
<td>No-Longer Polymer</td>
</tr>
<tr>
<td>PBT</td>
<td>Persistent, Bioaccumulative and Toxic</td>
</tr>
</tbody>
</table>
The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.