1 Identification

· Product identifier
· Trade name: Remifentanil (hydrochloride)
· Article number: 19291
· CAS Number: 132539-07-2
· EC number: 638-766-9
· Application of the substance / the mixture
This product is for research use - Not for human or veterinary diagnostic or therapeutic use.

· Details of the supplier of the safety data sheet
· Manufacturer/Supplier:
  Cayman Chemical Co.
  1180 E. Ellsworth Rd.
  Ann Arbor, MI 48108
  USA
· Information department: Product safety department
· Emergency telephone number:
  During normal opening times: +1 (734) 971-3335
  US/CANADA: 800-424-9300
  Outside US/CANADA: 703-741-5970

2 Hazard(s) identification

· Classification of the substance or mixture

  GHS06 Skull and crossbones
  Acute Tox. 2 H300 Fatal if swallowed.
  Acute Tox. 2 H310 Fatal in contact with skin.
  Acute Tox. 2 H330 Fatal if inhaled.

  GHS08 Health hazard
  Repr. 2 H361 Suspected of damaging fertility or the unborn child.
  STOT SE 1 H370 Causes damage to organs.
  STOT RE 1 H372 Causes damage to organs through prolonged or repeated exposure.
Trade name: Remifentanil (hydrochloride)

(Contd. from page 1)

![GHS07]

Skin Sens. 1 H317 May cause an allergic skin reaction.

- **Label elements**
- **GHS label elements**
  The substance is classified and labeled according to the Globally Harmonized System (GHS).
- **Hazard pictograms**

![GHS06]  
![GHS07]  
![GHS08]

- **Signal word** Danger

- **Hazard-determining components of labeling:**
  Remifentanil (hydrochloride)

- **Hazard statements**
  H300+H310+H330 Fatal if swallowed, in contact with skin or if inhaled.
  H317 May cause an allergic skin reaction.
  H361 Suspected of damaging fertility or the unborn child.
  H370 Causes damage to organs.
  H372 Causes damage to organs through prolonged or repeated exposure.

- **Precautionary statements**
  P201 Obtain special instructions before use.
  P202 Do not handle until all safety precautions have been read and understood.
  P260 Do not breathe dust/fume/gas/mist/vapors/spray.
  P262 Do not get in eyes, on skin, or on clothing.
  P264 Wash thoroughly after handling.
  P270 Do not eat, drink or smoke when using this product.
  P271 Use only outdoors or in a well-ventilated area.
  P272 Contaminated work clothing must not be allowed out of the workplace.
  P280 Wear protective gloves/protective clothing/eye protection/face protection.
  P284 [In case of inadequate ventilation] wear respiratory protection.
  P301+P310 If swallowed: Immediately call a poison center/doctor.
  P302 If on skin: Wash with plenty of water.
  P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
  P308+P313 IF exposed or concerned: Get medical advice/attention.
  P314 Get medical advice/attention if you feel unwell.
  P320 Specific treatment is urgent (see on this label).
  P361+P364 Take off immediately all contaminated clothing and wash before reuse.
  P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
  P403+P233 Store in a well-ventilated place. Keep container tightly closed.
  P405 Store locked up.
  P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

- **Classification system:**
  - **NFPA ratings (scale 0 - 4)**
    - Health = 4
    - Fire = 0
    - Reactivity = 0

(Contd. on page 3)
Trade name: Remifentanil (hydrochloride)

- HMIS-ratings (scale 0 - 4)
  - Health = *4
  - Fire = 0
  - Reactivity = 0

- Other hazards
- Results of PBT and vPvB assessment
  - PBT: Not applicable.
  - vPvB: Not applicable.

3 Composition/information on ingredients

- Chemical characterization: Substances
- CAS No. Description
  - 132539-07-2 Remifentanil (hydrochloride)
- Identification number(s)
  - EC number: 638-766-9

4 First-aid measures

- Description of first aid measures
  - General information:
    - Immediately remove any clothing soiled by the product.
    - Symptoms of poisoning may even occur after several hours; therefore medical observation for at least 48 hours after the accident.
    - Remove breathing apparatus only after contaminated clothing have been completely removed.
    - In case of irregular breathing or respiratory arrest provide artificial respiration.
  - After inhalation:
    - Supply fresh air or oxygen; call for doctor.
    - In case of unconsciousness place patient stably in side position for transportation.
  - After skin contact:
    - Immediately wash with water and soap and rinse thoroughly.
  - After eye contact:
    - Rinse opened eye for several minutes under running water. Then consult a doctor.
  - After swallowing:
    - Do not induce vomiting; immediately call for medical help.
  - Information for doctor:
    - Most important symptoms and effects, both acute and delayed
      - May cause anemia, cough, CNS depression, drowsiness, headache, heart damage, lassitude (weakness, exhaustion), liver damage, narcosis, reproductive effects, teratogenic effects.
      - No further relevant information available.
    - Indication of any immediate medical attention and special treatment needed
      - No further relevant information available.

5 Fire-fighting measures

- Extinguishing media
- Suitable extinguishing agents:
  - Use fire fighting measures that suit the environment.
  - A solid water stream may be inefficient.
- Special hazards arising from the substance or mixture
  - 67-56-1 During heating or in case of fire poisonous gases are produced.
Trade name: Remifentanil (hydrochloride)

6 Accidental release measures

- Personal precautions, protective equipment and emergency procedures
  Mount respiratory protective device.
- Environmental precautions: Do not allow to enter sewers/surface or ground water.
- Methods and material for containment and cleaning up:
  Dispose contaminated material as waste according to item 13. Ensure adequate ventilation.
- Reference to other sections
  See Section 7 for information on safe handling.
  See Section 8 for information on personal protection equipment.
  See Section 13 for disposal information.
- Protective Action Criteria for Chemicals
  - PAC-1:
    Substance is not listed.
  - PAC-2:
    Substance is not listed.
  - PAC-3:
    Substance is not listed.

7 Handling and storage

- Handling:
  - Precautions for safe handling
    Thorough dedusting.
    Ensure good ventilation/exhaustion at the workplace.
    Open and handle receptacle with care.
  - Information about protection against explosions and fires:
    Keep respiratory protective device available.
- Conditions for safe storage, including any incompatibilities
- Storage:
  - Requirements to be met by storerooms and receptacles: No special requirements.
  - Information about storage in one common storage facility: Not required.
  - Further information about storage conditions: Keep receptacle tightly sealed.
  - Specific end use(s) No further relevant information available.

8 Exposure controls/personal protection

- Additional information about design of technical systems: No further data; see item 7.
- Control parameters
  - Components with limit values that require monitoring at the workplace: Not required.
- Additional information: The lists that were valid during the creation were used as basis.
· Exposure controls
· Personal protective equipment:
· General protective and hygienic measures:
  Keep away from foodstuffs, beverages and feed.
  Immediately remove all soiled and contaminated clothing.
  Wash hands before breaks and at the end of work.
  Store protective clothing separately.
· Breathing equipment:
  In case of brief exposure or low pollution use respiratory filter device. In case of intensive or longer
  exposure use respiratory protective device that is independent of circulating air.
· Protection of hands:

Protective gloves

The glove material has to be impermeable and resistant to the product/ the substance/ the preparation.
Due to missing tests no recommendation to the glove material can be given for the product/ the
preparation/ the chemical mixture.
Selection of the glove material on consideration of the penetration times, rates of diffusion and the
degradation
· Material of gloves
  The selection of the suitable gloves does not only depend on the material, but also on further marks of
  quality and varies from manufacturer to manufacturer.
· Penetration time of glove material
  The exact break through time has to be found out by the manufacturer of the protective gloves and has
  to be observed.
· Eye protection:

Tightly sealed goggles

9 Physical and chemical properties

· Information on basic physical and chemical properties
· General Information
· Appearance:
  Form: Solid
  Color: Not determined.
· Odor: Characteristic
· Structural Formula C20H28N2O5 • HCl
· Molecular Weight 412.9 g/mol
· Odor threshold: Not determined.
· pH-value: Not applicable.
· Change in condition
  Melting point/Melting range: Undetermined.
  Boiling point/Boiling range: Undetermined.
· Flash point: Not applicable.
### 10 Stability and reactivity

- **Reactivity**: No further relevant information available.
- **Chemical stability**
  - **Thermal decomposition / conditions to be avoided**: No decomposition if used according to specifications.
  - **Possibility of hazardous reactions**: No dangerous reactions known.
  - **Conditions to avoid**: No further relevant information available.
  - **Incompatible materials**: No further relevant information available.
  - **Hazardous decomposition products**: carbon dioxide, carbon monoxide, hydrogen chloride, nitrogen oxides

### 11 Toxicological information

- **Information on toxicological effects**
- **Acute toxicity**:
  - **LD/LC50 values that are relevant for classification**:
    - **ATE (Acute Toxicity Estimate)**
      - Oral LD50: 5 mg/kg
      - Dermal LD50: 50 mg/kg
Trade name: Remifentanil (hydrochloride)

Inhalative LC50/4 h 0.05 mg/l

- Primary irritant effect:
  - on the skin: No irritant effect.
  - on the eye: No irritating effect.
- Sensitization: Sensitization possible through skin contact.
- Additional toxicological information:

- Carcinogenic categories
  - IARC (International Agency for Research on Cancer)
    Substance is not listed.
  - NTP (National Toxicology Program)
    Substance is not listed.
  - OSHA-Ca (Occupational Safety & Health Administration)
    Substance is not listed.

12 Ecological information

- Toxicity
- Aquatic toxicity: No further relevant information available.
- Persistence and degradability: No further relevant information available.
- Behavior in environmental systems:
- Bioaccumulative potential: No further relevant information available.
- Mobility in soil: No further relevant information available.
- Additional ecological information:
  - General notes:
    Water hazard class 1 (Self-assessment): slightly hazardous for water
    Do not allow undiluted product or large quantities of it to reach ground water, water course or sewage system.
  - Results of PBT and vPvB assessment
    - PBT: Not applicable.
    - vPvB: Not applicable.
  - Other adverse effects: No further relevant information available.

13 Disposal considerations

- Waste treatment methods
  - Recommendation:
    Must not be disposed of together with household garbage. Do not allow product to reach sewage system.
- Uncleaned packagings:
  - Recommendation: Disposal must be made according to official regulations.
  - Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

- UN-Number
- DOT, IMDG, IATA: UN2811
### UN proper shipping name
- **DOT**: Toxic solids, organic, n.o.s. (Remifentanil (hydrochloride))
- **IMDG**: TOXIC SOLID, ORGANIC, N.O.S. (Remifentanil (hydrochloride))
- **IATA**: Toxic solid, organic, n.o.s. (Remifentanil (hydrochloride))

### Transport hazard class(es)
- **DOT**: Class 6.1 Toxic substances
  - Label 6.1
- **IMDG, IATA**: Class 6.1 Toxic substances
  - Label 6.1

### Packing group
- **DOT, IMDG, IATA**: I

### Environmental hazards:
- Not applicable.

### Special precautions for user
- **Hazard identification number (Kemler code)**: 66
- **EMS Number**: F-A,S-A
- **Stowage Category**: B

### Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
- Not applicable.

### Transport/Additional information:
- **DOT**
  - **Quantity limitations**: On passenger aircraft/rail: 5 kg
    On cargo aircraft only: 50 kg
- **IMDG**
  - **Limited quantities (LQ)**: 0
  - **Excepted quantities (EQ)**: Code: E5
    Maximum net quantity per inner packaging: 1 g
    Maximum net quantity per outer packaging: 300 g
- **IATA**

(Contd. on page 9)
### Trade name: Remifentanil (hydrochloride)

<table>
<thead>
<tr>
<th>Remarks:</th>
<th>When sold in quantities of less than or equal to 1 mL, or 1 g, with an Excepted Quantity Code of E1, E2, E4, or E5, this item meets the De Minimis Quantities exemption, per IATA 2.6.10. Therefore packaging does not have to be labeled as Dangerous Goods/Excepted Quantity.</th>
</tr>
</thead>
<tbody>
<tr>
<td>UN &quot;Model Regulation&quot;:</td>
<td>UN 2811 TOXIC SOLID, ORGANIC, N.O.S. (REMIFENTANIL (HYDROCHLORIDE)), 6.1, I</td>
</tr>
</tbody>
</table>

### 15 Regulatory information

- **Safety, health and environmental regulations/legislation specific for the substance or mixture**
  - No further relevant information available.
- **Sara**
  - **Section 355 (extremely hazardous substances):** Substance is not listed.
  - **Section 313 (Specific toxic chemical listings):** Substance is not listed.
- **TSCA (Toxic Substances Control Act):** Substance is not listed.
- **Hazardous Air Pollutants** Substance is not listed.
- **Proposition 65**
  - **Chemicals known to cause cancer:** Substance is not listed.
  - **Chemicals known to cause reproductive toxicity for females:** Substance is not listed.
  - **Chemicals known to cause reproductive toxicity for males:** Substance is not listed.
  - **Chemicals known to cause developmental toxicity:** Substance is not listed.
- **Carcinogenic categories**
  - **EPA (Environmental Protection Agency)** Substance is not listed.
  - **TLV (Threshold Limit Value)** Substance is not listed.
  - **NIOSH-Ca (National Institute for Occupational Safety and Health)** Substance is not listed.
- **Chemical safety assessment:** A Chemical Safety Assessment has not been carried out.

### 16 Other information

All chemicals may pose unknown hazards and should be used with caution. This SDS applies only to the material as packaged. If this product is combined with other materials, deteriorates, or becomes contaminated, it may pose hazards not mentioned in this SDS. Cayman Chemical Company assumes no responsibility for incidental or consequential damages, including lost profits, arising from the use of...
these data. It shall be the user's responsibility to develop proper methods of handling and personal protection based on the actual conditions of use. While this SDS is based on technical data judged to be reliable, Cayman Chemical Company assumes no responsibility for the completeness or accuracy of the information contained herein.

- **Department issuing SDS:** Environment protection department.
- **Contact:** -
- **Date of preparation / last revision** 02/07/2022 / -
- **Abbreviations and acronyms:**
  - IMDG: International Maritime Code for Dangerous Goods
  - DOT: US Department of Transportation
  - IATA: International Air Transport Association
  - EINECS: European Inventory of Existing Commercial Chemical Substances
  - CAS: Chemical Abstracts Service (division of the American Chemical Society)
  - NFPA: National Fire Protection Association (USA)
  - HMIS: Hazardous Materials Identification System (USA)
  - VOC: Volatile Organic Compounds (USA, EU)
  - LC50: Lethal concentration, 50 percent
  - LD50: Lethal dose, 50 percent
  - PBT: Persistent, Bioaccumulative and Toxic
  - vPvB: very Persistent and very Bioaccumulative
  - NIOSH: National Institute for Occupational Safety
  - OSHA: Occupational Safety & Health
  - TLV: Threshold Limit Value
  - PEL: Permissible Exposure Limit
  - REL: Recommended Exposure Limit
  - Acute Tox. 2: Acute toxicity – Category 2
  - Skin Sens. 1: Skin sensitisation – Category 1
  - Repr. 2: Reproductive toxicity – Category 2
  - STOT SE 1: Specific target organ toxicity (single exposure) – Category 1
  - STOT RE 1: Specific target organ toxicity (repeated exposure) – Category 1
- * Data compared to the previous version altered.