

according to Regulation (EC) No. 1907/2006 as amended by (EC) No. 2015/830 and US OSHA HCS 2015

Section 1. Identification of the Substance/Mixture and of the Company/Undertaking

- 1.1 Product Code:** 15584
Product Name: Formoterol (hemifumarate)
Synonyms: rel-N-[2-hydroxy-5-[(1R)-1-hydroxy-2-[[[(1R)-2-(4-methoxyphenyl)-1-methylethyl]amino]ethyl]phenyl]-formamide, 2E-butenedioate (2:1); CGP 25827A; Foradil; NSC 299587; YM-08316;
- 1.2 Relevant identified uses of the substance or mixture and uses advised against:**
Relevant identified uses: For research use only, not for human or veterinary use.
- 1.3 Details of the Supplier of the Safety Data Sheet:**
Company Name: Cayman Chemical Company
 1180 E. Ellsworth Rd.
 Ann Arbor, MI 48108
Web site address: www.caymanchem.com
Information: Cayman Chemical Company +1 (734)971-3335
- 1.4 Emergency telephone number:**
Emergency Contact: CHEMTREC Within USA and Canada: +1 (800)424-9300
 CHEMTREC Outside USA and Canada: +1 (703)527-3887

Section 2. Hazards Identification

- 2.1 Classification of the Substance or Mixture:**
Acute Toxicity: Oral, Category 4
Carcinogenicity, Category 2
Toxic To Reproduction, Category 2
Specific Target Organ Toxicity (single exposure), Category 1
Specific Target Organ Toxicity (repeated exposure), Category 1

2.2 Label Elements:



GHS Signal Word: **Danger**

GHS Hazard Phrases:

- H302: Harmful if swallowed.
 H351: Suspected of causing cancer.
 H361: Suspected of damaging fertility or the unborn child.
 H370: Causes damage to organs {cardiovascular}.
 H372: Causes damage to organs {heart} through prolonged or repeated exposure.

GHS Precaution Phrases:

- 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/vapours/spray}.
 P264: Wash {hands} thoroughly after handling.
 P280: Wear {protective gloves/protective clothing/eye protection/face protection}.

GHS Response Phrases:

- P301+312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.
 P308+311: If exposed or concerned: Call a {POISON CENTER/Doctor/...}.
 P313: Get medical advice/attention.
 P314: Get medical attention/advice if you feel unwell.

P321: Specific treatment {see ... on this label}.

P330: Rinse mouth.

GHS Storage and Disposal Phrases:

Please refer to Section 7 for Storage and Section 13 for Disposal information.

2.3 Adverse Human Health Causes damage to organs {heart} through prolonged or repeated exposure.

Effects and Symptoms: Harmful if swallowed.
 Material may be irritating to the mucous membranes and upper respiratory tract.
 May be harmful by inhalation or skin absorption.
 May cause eye, skin, or respiratory system irritation.
 Suspected of causing cancer.
 Suspected of damaging fertility or the unborn child.
 To the best of our knowledge, the toxicological properties have not been thoroughly investigated.

Section 3. Composition/Information on Ingredients

| CAS # / RTECS # | Hazardous Components (Chemical Name)/ REACH Registration No. | Concentration | EC No./ EC Index No. | GHS Classification |
|-------------------------|--|---------------|----------------------|---|
| 43229-80-7 LQ2988000 | Formamide, N-[2-hydroxy-5-[(1R)-1-hydroxy-2-[(1R)-2-(4-methoxyphenyl)-1-methylethyl]amino]ethyl]phenyl]-, rel-, (2E)-2-butenedi | 100.0 % | 610-119-5 NA | Acute Tox.(O) 4: H302 Toxic Repro. 2: H361 STOT (SE) 1: H370 STOT (RE) 1: H372 Carcinogen 2: H351 H373 |

Section 4. First Aid Measures

4.1 Description of First Aid Measures:

In Case of Inhalation: Remove to fresh air. If not breathing, give artificial respiration or give oxygen by trained personnel. Get immediate medical attention.

In Case of Skin Contact: Immediately wash skin with soap and plenty of water for at least 15 minutes. Remove contaminated clothing. Get medical attention if symptoms occur. Wash clothing before reuse.

In Case of Eye Contact: Hold eyelids apart and flush eyes with plenty of water for at least 15 minutes. Have eyes examined and tested by medical personnel.

In Case of Ingestion: Wash out mouth with water provided person is conscious. Never give anything by mouth to an unconscious person. Get medical attention. Do NOT induce vomiting unless directed to do so by medical personnel.

Section 5. Fire Fighting Measures

5.1 Suitable Extinguishing Media: Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray.
 Use water spray to cool fire-exposed containers.

Unsuitable Extinguishing Media: A solid water stream may be inefficient.

5.2 Flammable Properties and Hazards: No data available.
 No data available.

Flash Pt: No data.

Explosive Limits: LEL: No data. UEL: No data.

Autoignition Pt: No data.

5.3 Fire Fighting Instructions: As in any fire, wear self-contained breathing apparatus pressure-demand (NIOSH approved or equivalent), and full protective gear to prevent contact with skin and eyes.

Section 6. Accidental Release Measures

- 6.1 Protective Precautions, Protective Equipment and Emergency Procedures:** Avoid raising and breathing dust, and provide adequate ventilation. As conditions warrant, wear a NIOSH approved self-contained breathing apparatus, or respirator, and appropriate personal protection (rubber boots, safety goggles, and heavy rubber gloves).
- 6.2 Environmental Precautions:** Take steps to avoid release into the environment, if safe to do so.
- 6.3 Methods and Material For Containment and Cleaning Up:** Contain spill and collect, as appropriate. Transfer to a chemical waste container for disposal in accordance with local regulations.

Section 7. Handling and Storage

- 7.1 Precautions To Be Taken in Handling:** Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid prolonged or repeated exposure.
- 7.2 Precautions To Be Taken in Storing:** Keep container tightly closed. Store in accordance with information listed on the product insert.

Section 8. Exposure Controls/Personal Protection

- 8.1 Exposure Parameters:**
- 8.2 Exposure Controls:**
- 8.2.1 Engineering Controls (Ventilation etc.):** Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
- 8.2.2 Personal protection equipment:**
- Eye Protection:** Safety glasses
- Protective Gloves:** Compatible chemical-resistant gloves
- Other Protective Clothing:** Lab coat
- Respiratory Equipment (Specify Type):** NIOSH approved respirator, as conditions warrant.
- Work/Hygienic/Maintenance Practices:** Do not take internally. Facilities storing or utilizing this material should be equipped with an eyewash and a safety shower. Wash thoroughly after handling. No data available.

Section 9. Physical and Chemical Properties

- 9.1 Information on Basic Physical and Chemical Properties**
- Physical States:** Gas Liquid Solid
- Appearance and Odor:** A solid
- pH:** No data.
- Melting Point:** No data.
- Boiling Point:** No data.
- Flash Pt:** No data.
- Evaporation Rate:** No data.
- Flammability (solid, gas):** No data available.
- Explosive Limits:** LEL: No data. UEL: No data.
- Vapor Pressure (vs. Air or mm Hg):** No data.
- Vapor Density (vs. Air = 1):** No data.

| | |
|--|---|
| Specific Gravity (Water = 1): | No data. |
| Solubility in Water: | No data. |
| Solubility Notes: | ~50 mM in DMSO; |
| Octanol/Water Partition | No data. |
| Coefficient: | |
| Autoignition Pt: | No data. |
| Decomposition Temperature: | No data. |
| Viscosity: | No data. |
| 9.2 Other Information | |
| Percent Volatile: | No data. |
| Molecular Formula & Weight: | C ₁₉ H ₂₄ N ₂ O ₄ • 1/2C ₄ H ₄ O ₄ 402.5 |

Section 10. Stability and Reactivity

| | |
|---|---|
| 10.1 Reactivity: | No data available. |
| 10.2 Stability: | Unstable [] Stable [X] |
| 10.3 Stability Note(s): | Stable if stored in accordance with information listed on the product insert. |
| Polymerization: | Will occur [] Will not occur [X] |
| 10.4 Conditions To Avoid: | No data available. |
| 10.5 Incompatibility - Materials | strong oxidizing agents |
| To Avoid: | |
| 10.6 Hazardous | carbon dioxide |
| Decomposition or | carbon monoxide |
| Byproducts: | nitrogen oxides |

Section 11. Toxicological Information

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|---------------------------------------|---|
| 11.1 Information on | The toxicological effects of this product have not been thoroughly studied. |
| Toxicological Effects: | Formoterol (hemifumarate) - Toxicity Data: Oral LD50 (rat): 3130 mg/kg; Intraperitoneal LD50 (rat): 170 mg/kg; Subcutaneous LD50 (rat): 1 g/kg; Oral LD50 (mouse): 6700 mg/kg; Intraperitoneal LD50 (mouse): 210 mg/kg; Subcutaneous LD50 (mouse): 640 mg/kg; |
| Chronic Toxicological Effects: | Formoterol (hemifumarate) - Investigated as a drug and reproductive effector. Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here. See actual entry in RTECS for complete information. Formoterol (hemifumarate) RTECS Number: LQ2988000 |

| CAS # | Hazardous Components (Chemical Name) | NTP | IARC | ACGIH | OSHA |
|------------|---|------|------|-------|------|
| 43229-80-7 | Formamide, N-[2-hydroxy-5-[(1R)-1-hydroxy-2-[[[(1R)-2-(4-methoxyphenyl)-1-methylethyl]amino]ethyl]phenyl]-, rel-, (2E)-2-butenedi | n.a. | n.a. | n.a. | n.a. |

Section 12. Ecological Information

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|---|--|
| 12.1 Toxicity: | Avoid release into the environment. Runoff from fire control or dilution water may cause pollution. |
| 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: | No data available. |



SAFETY DATA SHEET

Formoterol (hemifumarate)

Revision: 08/08/2018
Supersedes Revision: 02/04/2015

12.6 Other adverse effects: No data available.

Section 13. Disposal Considerations

13.1 Waste Disposal Method: Dispose in accordance with local, state, and federal regulations.

Section 14. Transport Information

14.1 LAND TRANSPORT (US DOT):

DOT Proper Shipping Name: Not dangerous goods.

DOT Hazard Class:

UN/NA Number:

14.1 LAND TRANSPORT (European ADR/RID):

ADR/RID Shipping Name: Not dangerous goods.

UN Number:

Hazard Class:

14.3 AIR TRANSPORT (ICAO/IATA):

ICAO/IATA Shipping Name: Not dangerous goods.

Additional Transport Information: Transport in accordance with local, state, and federal regulations.

Section 15. Regulatory Information

EPA SARA (Superfund Amendments and Reauthorization Act of 1986) Lists

| CAS # | Hazardous Components (Chemical Name) | S. 302 (EHS) | S. 304 RQ | S. 313 (TRI) |
|------------|---|--------------|-----------|--------------|
| 43229-80-7 | Formamide, N-[2-hydroxy-5-[(1R)-1-hydroxy-2-[[[(1R)-2-(4-methoxyphenyl)-1-methylethyl]amino]ethyl]phenyl]-, rel-, (2E)-2-butenedi | No | No | No |

| CAS # | Hazardous Components (Chemical Name) | Other US EPA or State Lists |
|------------|---|--|
| 43229-80-7 | Formamide, N-[2-hydroxy-5-[(1R)-1-hydroxy-2-[[[(1R)-2-(4-methoxyphenyl)-1-methylethyl]amino]ethyl]phenyl]-, rel-, (2E)-2-butenedi | CAA HAP,ODC: No; CWA NPDES: No; TSCA: No; CA PROP.65: No |

Regulatory Information Statement: This SDS was prepared in accordance with 29 CFR 1910.1200 and Regulation (EC) No.1272/2008.

Section 16. Other Information

Revision Date: 08/08/2018

Additional Information About This Product: No data available.

This Product:

Company Policy or Disclaimer: DISCLAIMER: This information is believed to be accurate and represents the best information currently available to us. However, we make no warranty of merchantability or any other warranty, express or implied, with respect to such information, and we assume no liability resulting from its use. Users should make their own investigations to determine the suitability of the information for their particular purposes.