

according to Regulation (EC) No. 1907/2006 as amended by (EC) No. 1272/2008

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

- 1.1 Product Code:** 14962  
**Product Name:** Ryanodine  
**Synonyms:** (3S,4R,4aR,6S,6aS,7S,8R,8aS,8bR,9S,9aS)-dodecahydro-4,6,7,8a,8b,9a-hexahydroxy-3,6a,9-trimethyl-7-(1-methylethyl)-6,9-methanobenzo[1,2]pentaleno[1,6-bc]furan-8-yl ester-1H-pyrrole-2-carboxylic acid;
- 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:**  
**2.1.1 Classification according to Regulation (EC) No 1272/2008 [CLP]:**  
**Acute Toxicity: Oral, Category 4**  
**Aquatic Toxicity (Acute), Category 1**  
**Aquatic Toxicity (Chronic), Category 1**  
**2.1.2 Classification according to Directive 1999/45/EC:**  
**Xn: Harmful**  
**N: Dangerous for the environment**  
**Risk Phrases: R21/22, R50/53**  
**For full text of R- phrases: see SECTION 15.**
- 2.2 Label Elements:**  
**2.2.1 Labeling according to Regulation (EC) No 1272/2008 [CLP]:**



**GHS Signal Word:** Warning

**GHS Hazard Phrases:**

H302: Harmful if swallowed.

H400: Very toxic to aquatic life.

H410: Very toxic to aquatic life with long lasting effects.

**GHS Precaution Phrases:**

P264: Wash {hands} thoroughly after handling.

P273: Avoid release to the environment.

**GHS Response Phrases:**

P301+312: IF SWALLOWED: Call a POISON CENTER or doctor/physician if you feel unwell.

P330: Rinse mouth.

P391: Collect spillage.

**GHS Storage and Disposal Phrases:**

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

### 2.2.2 Labeling according to Directive 1999/45/EC:



Xn



N

### 2.3 Adverse Human Health Harmful if swallowed.

**Effects and Symptoms:** 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.  
Very toxic to aquatic life with long lasting effects.  
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.	Risk Phrases/ GHS Classification
15662-33-6 VM4025000	Ryanodol, 3-(1h-Pyrrole-2-carboxylate)	100.0 %	239-732-2 613-061-00-9	Xn;N; R21/22-50/53 Acute Tox.(O) 4: H302 Acute Tox.(D) 4: H312 Aquatic (A) 1: H400 Aquatic (C) 1: H410

## Section 4. First Aid Measures

### 4.1 Description of First AidNo data available.

#### 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 Use alcohol-resistant foam, carbon dioxide, water, or dry chemical spray.

**Media:** 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.

**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,** Avoid raising and breathing dust, and provide adequate ventilation.  
**Protective Equipment and Emergency Procedures:** 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:

CAS #	Partial Chemical Name	Britain EH40	France VL	Europe
15662-33-6	Ryanodol, 3-(1h-Pyrrole-2-carboxylate)	No data.	No data.	No data.
CAS #	Partial Chemical Name	OSHA TWA	ACGIH TWA	Other Limits
15662-33-6	Ryanodol, 3-(1h-Pyrrole-2-carboxylate)	No data.	No data.	No data.

#### 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.

### Section 9. Physical and Chemical Properties

#### 9.1 Information on Basic Physical and Chemical Properties

**Physical States:** ☐ Gas ☐ Liquid ☒ Solid  
**Appearance and Odor:** A crystalline solid  
**Melting Point:** No data.  
**Boiling Point:** No data.  
**Flash Pt:** No data.  
**Evaporation Rate:** No data.  
**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:** ~10 mM EtOH;  
**Autoignition Pt:** No data.

#### 9.2 Other Information

**Percent Volatile:** No data.  
**Molecular Formula & Weight:** C<sub>25</sub>H<sub>35</sub>NO<sub>9</sub> 493.6

### Section 10. Stability and Reactivity

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

### Section 11. Toxicological Information

**11.1 Information on Toxicological Effects:** The toxicological effects of this product have not been thoroughly studied.  
 Ryanodine - Toxicity Data: Oral LDLO (human): 143 mg/kg; Oral LD50 (rat): 750 mg/kg; Intraperitoneal LD50 (rat): 320 µg/kg; Oral LD50 (mouse): 650 mg/kg; Intraperitoneal LD50 (mouse): 100 µg/kg; Oral LD50 (rabbit): 650 mg/kg; Skin LD50 (rabbit): >4 g/kg;  
**Chronic Toxicological Effects:** Only select Registry of Toxic Effects of Chemical Substances (RTECS) data is presented here. See actual entry in RTECS for complete information.  
 Ryanodine RTECS Number: VM4025000  
**Carcinogenicity:** NTP? No IARC Monographs? No OSHA Regulated? No

### Section 12. Ecological Information

**12.1 Toxicity:** Avoid release into the environment.  
Runoff from fire control or dilution water may cause pollution.

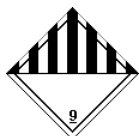
### Section 13. Disposal Considerations

**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:** Environmentally hazardous substance, solid, n.o.s. (Ryanodine)  
**DOT Hazard Class:** 9 CLASS 9  
**UN/NA Number:** 3077 **Packing Group:** III



#### 14.1 LAND TRANSPORT (European ADR/RID):

**ADR/RID Shipping Name:** Environmentally hazardous substance, solid, n.o.s. (Ryanodine)  
**UN Number:** 3077 **Packing Group:** III  
**Hazard Class:** 9 - CLASS 9

#### 14.3 AIR TRANSPORT (ICAO/IATA):

**ICAO/IATA Shipping Name:** Environmentally hazardous substance, solid, n.o.s. (Ryanodine)  
**UN Number:** 3077 **Packing Group:** III  
**Hazard Class:** 9 - CLASS 9 **IATA Classification:** 9

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

### 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)
15662-33-6	Ryanodol, 3-(1h-Pyrrole-2-carboxylate)	No	No	No

CAS #	Hazardous Components (Chemical Name)	Other US EPA or State Lists
15662-33-6	Ryanodol, 3-(1h-Pyrrole-2-carboxylate)	CAA HAP,ODC: No; CWA NPDES: No; TSCA: Inventory; CA PROP.65: No

### European Community Hazard Symbol codes:



**Xn**



**N**

### European Community Risk and Safety Phrases:

R21/22	Harmful in contact with skin and if swallowed.
R50/53	Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
S24/25	Avoid contact with skin and eyes.
S36/37/39	Wear suitable protective clothing, gloves and eye/face protection.
S60	This material and its container must be disposed of as hazardous waste.
S61	Avoid release to the environment. Refer to special instructions / safety data sheets.

**Regulatory Information Statement:** This SDS was prepared in accordance with Regulation (EC) No.1272/2008 and European Directive 67/548/EEC as amended.

## Section 16. Other Information

**Revision Date:** 04/11/2014

**Additional Information About This Product:** No data available.

### 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.