

## Material Safety Data Sheet

Date Printed: 17/MAY/2005

Date Updated: 14/MAR/2004

Version 1.1

According to 91/155/EEC

Classified as Hazardous according to the criteria of EU Annex 1 and NOHSC.

---

1 - Product and Company Information

---

Product Name                      TRIRUTHENIUM DODECACARBONYL, 99%  
Product Number                    245011

Company                            Sigma-Aldrich Pty, Ltd  
                                     Unit 2, 14 Anella Avenue  
                                     Castle Hill NSW 1765

Technical Phone #                +61 2 9841 0555

Fax                                +61 2 9841 0500

Emergency Phone #               +61 2 9841 0566

---

2 - Composition/Information on Ingredients

---

Product Name	CAS #	EC no	Annex I Index Number
TRI-RUTHENIUM DODECACARBONYL	15243-33-1	239-287-4	None

Formula                            Ru<sub>3</sub>(CO)<sub>12</sub>

Molecular Weight                639.34 AMU

---

3 - Hazards Identification

---

SPECIAL INDICATION OF HAZARDS TO HUMANS AND THE ENVIRONMENT  
Highly flammable. Harmful by inhalation.

---

4 - First Aid Measures

---

## AFTER INHALATION

If inhaled, remove to fresh air. If not breathing give artificial respiration. If breathing is difficult, give oxygen.

## AFTER SKIN CONTACT

In case of contact, immediately wash skin with soap and copious amounts of water.

## AFTER EYE CONTACT

In case of contact, immediately flush eyes with copious amounts of water for at least 15 minutes.

## AFTER INGESTION

If swallowed, wash out mouth with water provided person is conscious. Call a physician.

---

5 - Fire Fighting Measures

---

## EXTINGUISHING MEDIA

Suitable: Water spray. Carbon dioxide, dry chemical powder, or appropriate foam.

## SPECIAL RISKS

Specific Hazard(s): Emits toxic fumes under fire conditions.

## SPECIAL PROTECTIVE EQUIPMENT FOR FIREFIGHTERS

Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes.

---

## 6 - Accidental Release Measures

### PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear respirator, chemical safety goggles, rubber boots, and heavy rubber gloves.

### METHODS FOR CLEANING UP

Sweep up, place in a bag and hold for waste disposal. Avoid raising dust. Ventilate area and wash spill site after material pickup is complete.

---

## 7 - Handling and Storage

### HANDLING

Directions for Safe Handling: Do not breathe dust. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

### STORAGE

Conditions of Storage: Keep tightly closed. Store in a cool dry place.

---

## 8 - Exposure Controls / Personal Protection

### ENGINEERING CONTROLS

Safety shower and eye bath. Mechanical exhaust required.

### GENERAL HYGIENE MEASURES

Wash thoroughly after handling. Wash contaminated clothing before reuse.

### PERSONAL PROTECTIVE EQUIPMENT

Respiratory Protection: Government approved respirator.

Hand Protection: Compatible chemical-resistant gloves.

Eye Protection: Chemical safety goggles.

---

## 9 - Physical and Chemical Properties

Appearance	Form: Fine crystals	
Property	Value	At Temperature or Pressure
pH	N/A	
BP/BP Range	N/A	
MP/MP Range	N/A	
Flash Point	N/A	
Flammability	N/A	
Autoignition Temp	N/A	
Oxidizing Properties	N/A	
Explosive Properties	N/A	
Explosion Limits	N/A	
Vapor Pressure	N/A	
SG/Density	N/A	
Partition Coefficient	N/A	
Viscosity	N/A	

Vapor Density	N/A
Saturated Vapor Conc.	N/A
Evaporation Rate	N/A
Bulk Density	N/A
Decomposition Temp.	N/A
Solvent Content	N/A
Water Content	N/A
Surface Tension	N/A
Conductivity	N/A
Miscellaneous Data	N/A
Solubility	N/A

---

## 10 - Stability and Reactivity

---

### STABILITY

Materials to Avoid: Strong oxidizing agents.

### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

---

## 11 - Toxicological Information

---

### SIGNS AND SYMPTOMS OF EXPOSURE

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

### ROUTE OF EXPOSURE

Multiple Routes: May be harmful by inhalation, ingestion, or skin absorption. May cause irritation.

---

## 12 - Ecological Information

---

No data available.

---

## 13 - Disposal Considerations

---

### SUBSTANCE DISPOSAL

Treat a dilute basic solution (pH 10-11) of the material with a 50% excess of commercial laundry bleach. Control the temperature by the addition rate of bleach and adjust pH if necessary. Let stand overnight. Cautiously adjust solution to pH 7. Vigorous evolution of gas may occur. Filter any solids for burial in a chemical landfill. Precipitate any heavy metals by addition of sulfide and isolate for burial. Additional equivalents of hypochlorite may be needed if the metal can be oxidized to a higher valence state. For metal carbonyls, the reaction should be carried out under nitrogen. Observe all federal, state, and local environmental regulations.

---

## 14 - Transport Information

---

### RID/ADR

UN#: 3178

Class: 4.1

PG: II

Proper Shipping Name: Flammable solid, inorganic, n.o.s.

### IMDG

UN#: 3178

Class: 4.1

PG: II

Proper Shipping Name: FLAMMABLE SOLID, INORGANIC,  
N.O.S.  
Marine Pollutant: No  
Severe Marine Pollutant: No  
Technical Name: Required

#### IATA

UN#: 3178  
Class: 4.1  
PG: III  
Proper Shipping Name: Flammable solid, inorganic,  
n.o.s.  
Inhalation Packing Group I: No  
Technical Name: Required

---

#### 15 - Regulatory Information

---

##### CLASSIFICATION AND LABELING ACCORDING TO EU DIRECTIVES

INDICATION OF DANGER: F Xn  
Highly Flammable. Harmful.  
R-PHRASES: 11 20  
Highly flammable. Harmful by inhalation.

---

#### 16 - Other Information

---

#### WARRANTY

The above information is believed to be correct but does not purport to be all inclusive and shall be used only as a guide. The information in this document is based on the present state of our knowledge and is applicable to the product with regard to appropriate safety precautions. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Inc., shall not be held liable for any damage resulting from handling or from contact with the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.  
Copyright 2005 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

#### DISCLAIMER

For R&D use only. Not for drug, household or other uses.