

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 06.10.2015

Date Updated: 18.03.2008

Version 1.19

Section 1 - Product and Company Information

Product Name DIACETYL
Product Number D3634
Brand SIGMA

Company Sigma-Aldrich
Address 3050 Spruce Street
SAINT LOUIS MO 63103 US

Technical Phone: 800-325-5832
Fax: 800-325-5052
Emergency Phone: 314-776-6555

Section 2 - Composition/Information on Ingredient

Substance Name	CAS #	SARA 313
2,3-BUTANEDIONE	431-03-8	No

Formula C4H6O2
Synonyms Biacetyl * 2,3-Butadione * Diacetyl *
2,3-Diketobutane * Dimethyl diketone *
Dimethylglyoxal * Glyoxal, dimethyl-
RTECS Number: EK2625000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable (USA) Highly Flammable (EU). Harmful.
Harmful by inhalation and if swallowed. Irritating to respiratory
system and skin. Risk of serious damage to eyes.
Stench. Target organ(s): Lungs.

HMIS RATING

HEALTH: 2*
FLAMMABILITY: 3
REACTIVITY: 0

NFPA RATING

HEALTH: 2
FLAMMABILITY: 3
REACTIVITY: 0

*additional chronic hazards present.

For additional information on toxicity, please refer to Section 11.

Section 4 - First Aid Measures

ORAL EXPOSURE

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

INHALATION EXPOSURE

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

DERMAL EXPOSURE

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

EYE EXPOSURE

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

Section 5 - Fire Fighting Measures

FLAMMABLE HAZARDS

Flammable Hazards: Yes

EXPLOSION HAZARDS

Vapor may travel considerable distance to source of ignition and flash back. Container explosion may occur under fire conditions. Forms explosive mixtures in air.

FLASH POINT

44,600 °F 7,000 °C Method: closed cup

EXPLOSION LIMITS

Lower: 2,400 % Upper: 13,000 %

AUTOIGNITION TEMP

345,00 °C

FLAMMABILITY

N/A

Flammable according to the test criteria.

EXTINGUISHING MEDIA

Suitable: For small (incipient) fires, use media such as "alcohol" foam, dry chemical, or carbon dioxide. For large fires, apply water from as far as possible. Use very large quantities (flooding) of water applied as a mist or spray; solid streams of water may be ineffective. Cool all affected containers with flooding quantities of water.

FIREFIGHTING

Protective Equipment: Wear self-contained breathing apparatus and protective clothing to prevent contact with skin and eyes. Specific Hazard(s): Flammable liquid. Emits toxic fumes under fire conditions.

Section 6 - Accidental Release Measures

PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition. Use nonsparking tools.

PROCEDURE(S) OF PERSONAL PRECAUTION(S)

Wear self-contained breathing apparatus, rubber boots, and heavy rubber gloves.

METHODS FOR CLEANING UP

Cover with an activated carbon adsorbent, take up and place in closed containers. Transport outdoors. Ventilate area and wash spill site after material pickup is complete.

Section 7 - Handling and Storage

HANDLING

User Exposure: Do not breathe vapor. Do not get in eyes, on skin, on clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed. Keep away from heat, sparks, and open flame.
Store at 2-8°C

Section 8 - Exposure Controls / PPE

ENGINEERING CONTROLS

Safety shower and eye bath. Use nonsparking tools. Mechanical exhaust required.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory: Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU). Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multi-purpose combination (US) or type ABEK (EN 14387) respirator cartridges as a backup to engineering controls. If the respirator is the sole means of protection, use a full-face supplied air respirator.

Hand: Compatible chemical-resistant gloves.

Eye: Chemical safety goggles.

GENERAL HYGIENE MEASURES

Remove and wash contaminated clothing promptly. Wash thoroughly after handling.

Section 9 - Physical/Chemical Properties

Appearance	Physical State: Liquid Color: Very deep yellow Form: Clear liquid Odor: Stench.	
Property	Value	At Temperature or Pressure
Molecular Weight	86,0900 AMU	
pH	3,2	
BP/BP Range	88,000. - 89,000 °C.	
MP/MP Range	- 2,000 °C.	
Freezing Point	N/A	
Vapor Pressure	52,200000000 mmHg	20,00 °C
Vapor Density	3,000 g/l	
Saturated Vapor Conc.	N/A	
SG/Density	0,9850 g/cm3	
Bulk Density	N/A	
Odor Threshold	N/A	
Volatile%	N/A	
VOC Content	N/A	

Water Content	N/A
Solvent Content	N/A
Evaporation Rate	N/A
Viscosity	N/A
Surface Tension	N/A
Partition Coefficient	Log Kow: - 0,467.
Decomposition Temp.	N/A
Flash Point	44,600 °F 7,000 °C Method: closed cup
Explosion Limits	Lower: 2,400 % Upper: 13,000 %
Flammability	N/A Flammable according to the test criteri a.
Autoignition Temp	345,00 °C
Refractive Index	1,3940
Optical Rotation	N/A
Miscellaneous Data	N/A
Solubility	Solubility in Water:Soluble. 0.2 g/ml H2O

N/A = not available

Section 10 - Stability and Reactivity

STABILITY

Stable: Stable.

Materials to Avoid: Oxidizing agents, Strong bases, Reducing agents, Metals.

HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide.

HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

Section 11 - Toxicological Information

ROUTE OF EXPOSURE

Skin Contact: Causes skin irritation.

Skin Absorption: May be harmful if absorbed through the skin.

Eye Contact: Causes severe eye irritation.

Inhalation: Material is irritating to mucous membranes and upper respiratory tract. Harmful if inhaled.

Ingestion: Harmful if swallowed.

TARGET ORGAN(S) OR SYSTEM(S)

Lungs.

SIGNS AND SYMPTOMS OF EXPOSURE

Animals exposed to diacetyl experienced damage to the nose and upper airways, including severe damage to cells lining the respiratory tract. NIOSH has reported that employees exposed to butter flavorings containing diacetyl are at risk of developing occupational lung diseases and that in one instance, similar illnesses have been found among employees producing butter and vanilla flavorings containing diacetyl. For additional studies, review OSHA literature on Diacetyl and flavorings (www.OSHA.gov) and NIOSH publication 2004-110d and other NIOSH literature regarding flavorings (www.NIOSH.gov). Nausea,

headache, and vomiting. Exposure can cause:

TOXICITY DATA

Inhalation

Rat

*

LC50

Oral

Rat

1580,000000 mg/kg

LD50

Remarks: Behavioral:Somnolence (general depressed activity).
Behavioral:Convulsions or effect on seizure threshold.

Intraperitoneal

Rat

400 MG/KG

LD50

Remarks: Behavioral:Change in motor activity (specific assay).
Vascular:Regional or general arteriolar or venous dilation.
Behavioral:Convulsions or effect on seizure threshold.

Skin

Rabbit

> 5000,000000 mg/kg

LD50

Oral

Guinea pig

990,000000 mg/kg

LD50

Remarks: Behavioral:Coma. Lungs, Thorax, or Respiration:Dyspnea.
Behavioral:Ataxia.

IRRITATION DATA

Eyes

Rabbit

Remarks: Severe irritation effect

Skin

Rabbit

500,000000 mg

24H

Remarks: Moderate irritation effect

CHRONIC EXPOSURE - MUTAGEN

Species: Rat

Route: Oral

Dose: 1500 MG/KG

Mutation test: Unscheduled DNA synthesis

Section 12 - Ecological Information

No data available.

Section 13 - Disposal Considerations

APPROPRIATE METHOD OF DISPOSAL OF SUBSTANCE OR PREPARATION

Contact a licensed professional waste disposal service to dispose of this material. Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Observe all federal, state, and local environmental regulations.

Section 14 - Transport Information

DOT

Proper Shipping Name: Butanedione
UN#: 2346
Class: 3
Packing Group: Packing Group II
Hazard Label: Flammable liquid
PIH: Not PIH

IATA

Proper Shipping Name: Butanedione
IATA UN Number: 2346
Hazard Class: 3
Packing Group: II

Section 15 - Regulatory Information

EU ADDITIONAL CLASSIFICATION

Symbol of Danger: F-Xn
Indication of Danger: Highly Flammable. Harmful.
R: 11-20/22-37/38-41
Risk Statements: Highly flammable. Harmful by inhalation and if swallowed. Irritating to respiratory system and skin. Risk of serious damage to eyes.
S: 26-39
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable (USA) Highly Flammable (EU). Harmful.
Risk Statements: Harmful by inhalation and if swallowed. Irritating to respiratory system and skin. Risk of serious damage to eyes.
Safety Statements: In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear eye/face protection.
US Statements: Stench. Target organ(s): Lungs.

UNITED STATES REGULATORY INFORMATION

SARA LISTED: No
TSCA INVENTORY ITEM: Yes

CANADA REGULATORY INFORMATION

WHMIS Classification: This product has been classified in accordance with the hazard criteria of the CPR, and the MSDS contains all the information required by the CPR.
DSL: Yes
NDSL: No

Section 16 - Other Information

DISCLAIMER

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

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 2010 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.