Product name

1. PRODUCT AND COMPANY IDENTIFICATION

Revision Date 10/24/2008 Print Date 03/17/2009

Material Safety Data Sheet

Product Number 11038 Brand Fluka

2,3-Butanedione

CANADA

Company : Sigma-Aldrich Canada, Ltd. 2149 Winston Park Drive OAKVILLE ON L6H 6J8

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2. COMPOSITION/INFORMATION ON INGREDIENTS : C4H6O2 Formula.

Molecular Weight : 86.09 g/mol

CAS-No. EC-No. Butanedione 431-03-8 207-069-8

3. HAZARDS IDENTIFICATION

Index-No.

Flammable Liquid

Moderate skin irritant

Moderate eye irritant

Emergency Overview OSHA Hazards Warning: Can cause eye, skin, nose and throat irritation, Danger: Can cause damage to respiratory tract and lungs if inhaled, Highly flammable

## Target Organs Nose, Throat., Lungs

## Stench.

Other hazards which do not result in classification

WHMIS Classification B2 Flammable Liquid D1A

D2B

HMIS Classification Health Hazard:

Chronic Health Hazard:

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Physical hazards: Potential Health Effects

4. FIRST AID MEASURES

General advice

In case of skin contact

In case of eye contact

5. FIRE-FIGHTING MEASURES

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Flammability:

Wash off with soap and plenty of water. Consult a physician.

Inhalation Toxic if inhaled. Causes respiratory tract irritation. May be harmful if absorbed through skin. Causes skin irritation. Eyes Causes eye irritation. Ingestion Harmful if swallowed.

Consult a physician. Show this safety data sheet to the doctor in attendance. Move out of dangerous area.

Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult

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

If breathed in, move person into fresh air. If not breathing give artificial respiration Consult a physician.

Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.

7 °C (45 °F) - closed cup

water may be ineffective. Cool all affected containers with flooding quantities of water.

Flammable properties Flash point Ignition temperature 345 °C (653 °F) Suitable extinguishing media

If swallowed

a physician.

Wear self contained breathing apparatus for fire fighting if necessary. Further information Use water spray to cool unopened containers.

Special protective equipment for fire-fighters

concentrations. Vapours can accumulate in low areas.

Environmental precautions Prevent further leakage or spillage if safe to do so. Do not let product enter drains. Methods for cleaning up Contain spillage, and then collect with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

7. HANDLING AND STORAGE

Handling

Personal precautions

6. ACCIDENTAL RELEASE MEASURES

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Use with local exhaust ventilation. Avoid contact with skin and eyes. Avoid inhalation of vapour or mist.

sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive

Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. Storage Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Store in cool place.

Engineering measures

Eye protection Safety glasses

Hygiene measures

of workday.

Colour Odour

Safety data pН

Respiratory protection

Skin and body protection

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Contains no substances with occupational exposure limit values.

place.Long sleeved clothing, Preventive skin protection

dark yellow

345 °C (653 °F)

2.4 %(V)

0.981 g/mL

3.45

Oxidizing agents, Strong bases, Reducing agents, Metals

Stable under recommended storage conditions.

Stench.

3.2

enclosure to avoid accidental contact. Personal protective equipment

Where risk assessment shows air-purifying respirators are appropriate use a full-face respirator with multipurpose 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. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

Handle with gloves. Handle with gloves, butyl-rubber Teflon (R) Handle with gloves.

Appearance Form clear, liquid

9. PHYSICAL AND CHEMICAL PROPERTIES

Melting point no data available Boiling point 88 °C (190 °F) 7 °C (45 °F) - closed cup Flash point

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Choose body protection according to the amount and concentration of the dangerous substance at the work

Density Fluka - 11038

> n-octanol/water Relative vapour

10. STABILITY AND REACTIVITY

density

Storage stability

Conditions to avoid Heat, flames and sparks.

Materials to avoid

Acute toxicity

threshold.

Sensitisation no data available Chronic exposure

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Vapour pressure

Ignition temperature

Lower explosion limit

Upper explosion limit 13 %(V)

Water solubility 200 g/l at 20 °C (68 °F) - soluble Partition coefficient: log Pow: -0.467

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

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)., 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

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May be harmful if absorbed through skin. Causes skin irritation.

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. Contact a licensed

EMS-No: F-E, S-D

Flammable Liquid

Highly toxic by inhalation

Moderate skin irritant Moderate respiratory irritant

Moderate eye irritant

Toxic if inhaled. Causes respiratory tract irritation.

Causes eye irritation.

Harmful if swallowed.

Nose, Throat., Lungs,

Elimination information (persistence and degradability)

229.0 hPa (171.8 mmHg) at 50 °C (122 °F) 69.6 hPa (52.2 mmHg) at 20 °C (68 °F)

Hazardous decomposition products formed under fire conditions. - Carbon oxides Hazardous reactions Vapours may form explosive mixture with air.

11. TOXICOLOGICAL INFORMATION

LD50 Oral - rat - 1,580 mg/kg

Irritation and corrosion Skin - rabbit - Skin irritation

Hazardous decomposition products

IARC: No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC. Genotoxicity in vivo - rat - Oral

LC50 Inhalation - rat - 4 h - 2,250 - 5,200 mg/m3

LD50 Dermal - rabbit - > 5,000 mg/kg

Eyes - rabbit - Severe eye irritation

Unscheduled DNA synthesis

Nausea, Headache, Vomiting

Potential Health Effects

Inhalation

Ingestion

no data available

Product

Ecotoxicity effects no data available

Target Organs

Additional Information RTECS: EK2625000

12. ECOLOGICAL INFORMATION

Skin

Eyes

Signs and Symptoms of Exposure

butter and vanilla flavorings containing diacetyl.

Further information on ecology no data available 13. DISPOSAL CONSIDERATIONS

> Contaminated packaging Dispose of as unused product.

14. TRANSPORT INFORMATION

15. REGULATORY INFORMATION

D1A

D2B

IATA UN-Number: 2346 Class: 3 Packing group: II Proper shipping name: Butanedione

WHMIS Classification

DOT (US) UN-Number: 2346 Class: 3 Packing group: II Proper shipping name: Butanedione Marine pollutant: No Poison Inhalation Hazard: No UN-Number: 2346 Class: 3 Packing group: II Proper shipping name: BUTANEDIONE Marine pollutant: No

professional waste disposal service to dispose of this material.

OSHA Hazards Warning: Can cause eye, skin, nose and throat irritation, Danger: Can cause damage to respiratory tract and lungs if inhaled, Highly flammable DSL Status All components of this product are on the Canadian DSL list.

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the above product. See reverse side of invoice or packing slip for additional terms and conditions of sale.

Flammable Liquid В2

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Concentration

Highly toxic by inhalation Moderate respiratory irritant

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Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all

Page 2 of

This compound should be handled in a closed system. All operations should be carried out in a glove bag or similar

Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end

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