



**ENVIRONMENTAL IMPACT STUDY FOR  
MAGH NALA MANUFACTURING BUILDING 2**

**Document No:  
112142-EIS-001**

**Revision:  
B**

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08 Mar 2013**

**Appendix 2**

**Raw Materials Data**

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# SAFETY DATA SHEET

## SECTION 1: Identification of the substance/mixture and of the company/undertaking

### 1.1 Product identifier

**Product name:** Eastman(TM) 2-Ethylhexanol

**Product No.:** EAN 903608. 00175-00, P0017500, P0017501, P0017503, P0017504, P0017505, P001750A, P001750B, P0017502, E00175E1, E00175E2, E00175E3, P001750N, E0017504, P0017506, P0017508

**Synonyms, Trade Names:** 2EH, 00175-00

### Additional identification

**Chemical name:** 2-ethylhexanol  
**CAS-No.:** 104-76-7

### 1.2 Relevant identified uses of the substance or mixture and uses advised against

**Identified uses:** Solvent  
**Uses advised against:** None known.

### 1.3 Details of the supplier of the safety data sheet

#### Manufacturer / Supplier

Eastman Chemical Company  
200 South Wilcox Drive  
Kingsport, TN 37660-5280 US  
+14232292000

Visit our website at [www.EASTMAN.com](http://www.EASTMAN.com) or email [emnmsds@eastman.com](mailto:emnmsds@eastman.com)

#### National Supplier

Eastman Chemical B.V.  
Fascinatio Boulevard 602-614  
2909 Capelle aan den IJssel  
The Netherlands  
Telephone: (31) 10 2402 111  
Fax: (31) 10 2402 100

### 1.4 Emergency telephone number:

For emergency health, safety, and environmental information: telephone 800-EASTMAN or 423 229-4511 in the United States; or +44 (0)1235 239 670 in Europe.

For emergency transportation information, call +44(0)1235 239 670; or 800 964214 in England; 01800559700 in Eire; or 423-229-4511 in the United States. Identify the call as a transportation emergency.

## SECTION 2: Hazards identification

**2.1 Classification of the substance or mixture**

The product has been classified according to the legislation in force.

**EU. Directive 67/548/EEC**

Xn: Harmful  
R20: Harmful by inhalation.  
R36/37/38: Irritating to eyes, respiratory system and skin.

**Regulation No. 1272/2008.****Health hazards**

Acute toxicity (Inhalation - vapor)	Category 4	H332: Harmful if inhaled.
Skin corrosion/irritation	Category 2	H315: Causes skin irritation.
Serious eye damage/eye irritation	Category 2	H319: Causes serious eye irritation.
Specific target organ toxicity - single exposure (Inhalation - vapor)	Category 3	H335: May cause respiratory irritation.

**Hazard summary**

**Physical hazards:** Not classified as hazardous.

**Health hazards**

**Inhalation:** Harmful if inhaled. May cause respiratory irritation.

**Eye contact:** Causes serious eye irritation.

**Skin contact:** Causes skin irritation.

**Ingestion:** None known.

**Other Health Effects:** No data available.

**Environmental hazards:** Not classified as hazardous.

**2.2 Label elements**

**Signal words:** WARNING!

**Hazard Statement(s):** H332: Harmful if inhaled.  
 H315: Causes skin irritation.  
 H319: Causes serious eye irritation.  
 H335: May cause respiratory irritation.

**Precautionary statement**

**Prevention:** P261: Avoid breathing dust/fume/gas/mist/vapors/spray. P271: Use only outdoors or in a well-ventilated area. P264: Wash hands thoroughly after handling. P280: Wear protective gloves/protective clothing/eye protection/face protection.

**Response:** P304+P340: IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. P312: Call a POISON CENTER or doctor/physician if you feel unwell. P302+P352: IF ON SKIN: Wash with plenty of soap and water. P332+P313: If skin irritation occurs: Get medical advice/attention. P362: Take off contaminated clothing and wash before reuse. P305+P351+P338: IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. P337+P313: If eye irritation persists: Get medical advice/attention.

**Storage:** P403+P233: Store in a well-ventilated place. Keep container tightly closed. P405: Store locked up.

**Disposal:** P501: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

**2.3 Other hazards:** None known.

**SECTION 3: Composition/information on ingredients**

**3.1 / 3.2 Substances / Mixtures**

**General information:**

Chemical name	Concentration	Additional identification	Notes
2-ethylhexanol	100%	CAS-No.: 104-76-7 EC No.: 203-234-3	

\* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.  
 # This substance has workplace exposure limit(s).  
 PBT: persistent, bioaccumulative and toxic substance.  
 vPvB: very persistent and very bioaccumulative substance.

**Classification**

Chemical name	Classification		Notes
2-ethylhexanol	DSD:	Xn, R20, R36/37/38	
	CLP:	Acute Tox. 4, H332; Skin Corr.2, H315; Eye Dam.2, H319; STOT SE3, H335	

DSD: Directive 67/548/EEC.  
 CLP: Regulation No. 1272/2008.:

The full text for all R-phrases is displayed in section 16.

**SECTION 4: First aid measures****4.1 Description of first aid measures**

- Inhalation:** Move to fresh air. If breathing is difficult, give oxygen. If breathing stops, provide artificial respiration. Get medical attention immediately.
- Eye contact:** Immediately flush with plenty of water for at least 15 minutes. If easy to do, remove contact lenses. Get medical attention. In case of irritation from airborne exposure, move to fresh air. Get medical attention if symptoms persist.
- Skin contact:** Immediately flush with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash contaminated clothing before reuse. Destroy or thoroughly clean contaminated shoes.
- Ingestion:** Seek medical advice.

- 4.2 Most important symptoms and effects, both acute and delayed:** No data available.

**4.3 Indication of any immediate medical attention and special treatment needed**

- Hazards:** None known.
- Treatment:** Treat symptomatically.

**SECTION 5: Firefighting measures**

- General fire hazards:** Combustible liquid and vapor. USE WATER WITH CAUTION. Material will float and may ignite on surface of water.
- 5.1 Extinguishing media**
- Suitable extinguishing media:** Water spray. Dry chemical. Carbon Dioxide. Foam.
- Unsuitable extinguishing media:** None known.
- 5.2 Special hazards arising from the substance or mixture:** None known.
- 5.3 Advice for firefighters**
- Special Fire Fighting Procedures:** Use water spray to keep fire-exposed containers cool.

**Special protective equipment for fire-fighters:** Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

**SECTION 6: Accidental release measures**

- 6.1 Personal precautions, protective equipment and emergency procedures:** Wear appropriate personal protective equipment.
- 6.2 Environmental precautions:** Avoid release to the environment.
- 6.3 Methods and material for containment and cleaning up:** Eliminate sources of ignition. Absorb spill with vermiculite or other inert material, then place in a container for chemical waste. Large Spillages: Flush spill area with water spray. Prevent runoff from entering drains, sewers, or streams. Dike for later disposal.
- Notification Procedures:** In the event of a spill or accidental release, notify relevant authorities in accordance with all applicable regulations.

**SECTION 7: Handling and storage:**

- 7.1 Precautions for safe handling:** Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Use only with adequate ventilation. Wash thoroughly after handling.
- 7.2 Conditions for safe storage, including any incompatibilities:** Keep container closed.
- 7.3 Specific end use(s):** Solvent

**SECTION 8: Exposure controls/personal protection****8.1 Control parameters  
Occupational exposure limits**

If exposure limits have not been established, maintain airborne levels to an acceptable level.

**8.2 Exposure controls****Appropriate engineering controls:**

Good general ventilation (typically 10 air changes per hour) should be used. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

**Individual protection measures, such as personal protective equipment**

**General information:** Eye bath. Washing facilities. Safety shower.

<b>Eye/face protection:</b>	Wear safety glasses with side shields (or goggles). Wear a full-face respirator, if needed.
<b>Skin protection</b>	
<b>Hand protection:</b>	Wear chemical-resistant gloves, footwear, and protective clothing appropriate for the risk of exposure. Contact health and safety professional or manufacturer for specific information.
<b>Other:</b>	No data available.
<b>Respiratory Protection:</b>	If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. Respirator type: Air-purifying respirator with an appropriate, government approved (where applicable), air-purifying filter, cartridge or canister. Contact health and safety professional or manufacturer for specific information.
<b>Hygiene measures:</b>	Observe good industrial hygiene practices.
<b>Environmental Controls:</b>	No data available.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

#### Appearance

<b>Physical State:</b>	Liquid
<b>Form:</b>	Liquid
<b>Color:</b>	Colorless
<b>Odor:</b>	musty
<b>Odor Threshold:</b>	0,07 ppm
<b>pH:</b>	No data available.
<b>Freezing Point:</b>	-76 - -70 °C
<b>Boiling Point:</b>	184 °C
<b>Flash Point:</b>	73,3 °C (Tag closed cup)
<b>Evaporation Rate:</b>	No data available.
<b>Flammability (solid, gas):</b>	No data available.
<b>Flammability Limit - Upper (%)-:</b>	No data available.
<b>Flammability Limit - Lower (%)-:</b>	No data available.
<b>Vapor pressure:</b>	No data available.
<b>Vapor density (air=1):</b>	No data available.
<b>Specific Gravity:</b>	0,833 (20 °C)
<b>Solubility(ies)</b>	
<b>Solubility in Water:</b>	0,1 g/l
<b>Solubility (other):</b>	No data available.
<b>Partition coefficient (n-octanol/water):</b>	Pow: 1.260 log Pow: 3,1
<b>Autoignition Temperature:</b>	No data available.

<b>Decomposition Temperature:</b>	(DSC) No exotherm to 500°C
<b>Dynamic Viscosity:</b>	No data available.
<b>Kinematic viscosity:</b>	No data available.
<b>Explosive properties:</b>	No data available.
<b>Oxidizing properties:</b>	No data available.

**SECTION 10: Stability and reactivity**

<b>10.1 Reactivity:</b>	None known.
<b>10.2 Chemical stability:</b>	Stable
<b>10.3 Possibility of hazardous reactions:</b>	None at ambient temperatures.
<b>10.4 Conditions to avoid:</b>	Heat, sparks, flames.
<b>10.5 Incompatible materials:</b>	Strong oxidizing agents.
<b>10.6 Hazardous decomposition products:</b>	Carbon Dioxide. Carbon Monoxide.

**SECTION 11: Toxicological information****Information on likely routes of exposure**

<b>Inhalation:</b>	Harmful if inhaled. May cause respiratory irritation.
<b>Ingestion:</b>	None known.
<b>Skin contact:</b>	Causes skin irritation.
<b>Eye contact:</b>	Causes serious eye irritation.

**11.1 Information on toxicological effects****Acute Toxicity****Oral**

**Product:** No data available.

**Specified substance(s)**

2-ethylhexanol Oral LD-50: (Rat): 3.290 mg/kg

**Dermal**

**Product:** No data available.

**Specified substance(s)**

2-ethylhexanol Dermal LD-50: (Rat): > 3.000 mg/kg

**Inhalation**

**Product:** No data available.

<b>Specified substance(s)</b> 2-ethylhexanol	LC50 (Rat, 6 h): 1,2 mg/l
<b>Repeated dose toxicity</b> <b>Product:</b>	No data available.
<b>Specified substance(s)</b> 2-ethylhexanol	No data available.
<b>Skin corrosion/irritation:</b> <b>Product:</b>	No data available.
<b>Specified substance(s)</b> 2-ethylhexanol	(Rabbit, 24 h): moderate
<b>Serious eye damage/eye irritation:</b> <b>Product:</b>	No data available.
<b>Specified substance(s)</b> 2-ethylhexanol	(Rabbit): moderate
<b>Respiratory or skin sensitization:</b> <b>Product:</b>	No data available.
<b>Specified substance(s)</b> 2-ethylhexanol	Skin Sensitization, (Human) - Not a skin sensitizer.
<b>Germ cell mutagenicity</b> <b>In vitro</b> <b>Product:</b>	No data available.
<b>Specified substance(s)</b> 2-ethylhexanol	No data available.
<b>In vivo</b> <b>Product:</b>	No data available.
<b>Specified substance(s)</b> 2-ethylhexanol	No data available.
<b>Carcinogenicity</b> <b>Product:</b>	No data available.
<b>Specified substance(s)</b> 2-ethylhexanol	No data available.
<b>Reproductive toxicity</b> <b>Product:</b>	No data available.
<b>Specified substance(s)</b> 2-ethylhexanol	No data available.

**Specific target organ toxicity - single exposure****Product:** No data available.

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<b>Specified substance(s)</b>	
2-ethylhexanol	No data available.
<b>Specific target organ toxicity - repeated exposure</b>	
<b>Product:</b>	No data available.
<b>Specified substance(s)</b>	
2-ethylhexanol	No data available.
<b>Aspiration hazard</b>	
<b>Product:</b>	No data available.
<b>Specified substance(s)</b>	
2-ethylhexanol	No data available.
<b>Other adverse effects:</b>	No data available.

**SECTION 12: Ecological information****12.1 Toxicity****Acute toxicity****Fish**

<b>Product:</b>	No data available.
<b>Specified substance(s)</b>	
2-ethylhexanol	LC-50 (Fathead Minnow, 96 h): 28,2 mg/l

**Aquatic invertebrates**

<b>Product:</b>	No data available.
<b>Specified substance(s)</b>	
2-ethylhexanol	EC-50 (daphnid, 48 h): 39 mg/l

**Chronic Toxicity****Fish**

<b>Product:</b>	No data available.
<b>Specified substance(s)</b>	
2-ethylhexanol	No data available.

**Aquatic invertebrates**

<b>Product:</b>	No data available.
<b>Specified substance(s)</b>	
2-ethylhexanol	No data available.

**Toxicity to Aquatic Plants**

<b>Product:</b>	No data available.
<b>Specified substance(s)</b>	
2-ethylhexanol	No data available.

**12.2 Persistence and degradability**

## Biodegradation

**Product:** No data available.

### Specified substance(s)

2-ethylhexanol 100 % (14 d)

## Biological Oxygen Demand:

**Product** No data available.

### Specified substance(s)

2-ethylhexanol 767 mg/g  
2.180 mg/g

## Chemical Oxygen Demand:

**Product** No data available.

### Specified substance(s)

2-ethylhexanol No data available.

## BOD/COD ratio

**Product** No data available.

### Specified substance(s)

2-ethylhexanol No data available.

## 12.3 Bioaccumulative potential

**Product:** No data available.

### Specified substance(s)

2-ethylhexanol No data available.

## 12.4 Mobility in soil:

No data available.

## Known or predicted distribution to environmental compartments

2-ethylhexanol No data available.

## 12.5 Results of PBT and vPvB assessment:

No data available.

2-ethylhexanol

No data available.

## 12.6 Other adverse effects:

No data available.

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

**General information:** No data available.

#### Disposal Methods:

Dispose of waste and residues in accordance with local authority requirements. Incinerate. Since emptied containers retain product residue, follow label warnings even after container is emptied.

#### European Waste Codes

Comply with requirements of waste disposal legislation and any local authority requirements.

**SECTION 14: Transport information**

*Important Note: Shipping descriptions may vary based on mode of transport, quantities, package size, and/or origin and destination. Consult your company's Hazardous Materials/Dangerous Goods expert for information specific to your situation.*

**ADR/RID**

Class not regulated

*Possible Shipping Description(s):*

not regulated

**IMDG - International Maritime Dangerous Goods Code**

Class not regulated

*Possible Shipping Description(s):*

not regulated

**IATA**

Class not regulated

*Possible Shipping Description(s):*

not regulated

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**SECTION 15: Regulatory information**

**15.1 Safety, health and environmental regulations/legislation specific for the substance or mixture:**

**TSCA (US Toxic Substances Control Act):** This product is listed on the TSCA inventory. Any impurities present in this product are exempt from listing.

**DSL (Canadian Domestic Substances List) and CEPA (Canadian Environmental Protection Act):** This product is listed on the DSL. Any impurities present in this product are exempt from listing.

**AICS / NICNAS (Australian Inventory of Chemical Substances and National Industrial Chemicals Notification and Assessment Scheme):** This product is listed on AICS or otherwise complies with NICNAS.

**MITI (Japanese Handbook of Existing and New Chemical Substances):** This product is listed in the Handbook or has been approved in Japan by new substance notification.

**ECL (Korean Toxic Substances Control Act):** This product is listed on the Korean inventory or otherwise complies with the Korean Toxic Substances Control Act.KE-13766

**Philippines Inventory (PICCS):** This product is listed on the Philippine Inventory or otherwise complies with PICCS.

**Inventory of Existing Chemical Substances in China:** All components of this product are listed on the Inventory of Existing Chemical Substances in China (IEGSC).

**15.2 Chemical safety assessment:** None.

## SECTION 16: Other information

**Revision Information:** Not relevant.

**Key literature references and sources for data:** No data available.

**Wording of the R-phrases and H-statements in section 2 and 3:**

Xn = Harmful  
R20 = Harmful by inhalation.  
R36/37/38 = Irritating to eyes, respiratory system and skin.

Acute Tox. = Acute toxicity  
Skin Corr. = Skin corrosion/irritation  
Eye Dam. = Serious eye damage/eye irritation  
STOT SE = Specific target organ toxicity - single exposure  
4 = Category 4  
2 = Category 2  
2 = Category 2  
3 = Category 3  
H332= Harmful if inhaled.  
H315= Causes skin irritation.  
H319= Causes serious eye irritation.  
H335= May cause respiratory irritation.

**Training information:** No data available.

**Issue Date:** 22.05.2012  
**SDS No:**

**Disclaimer:**

This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

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# WACKER BIOSOLUTIONS

## Safety Data Sheet

Material: 60004327

Acetyl Acetone

Version: 1.12 (REG\_EUROPE)

Date of print: 25.07.2012

Date of last alteration: 06.05.2011

### 1. Identification of the substance/preparation and company

#### 1.1 Name of substance/preparation

Commercial product name: Acetyl Acetone

#### 1.2 Use of substance / preparation

Industrial.

Intermediate chemical.

All other areas of application to be agreed with the Application Engineering/ Technical Marketing Department of the manufacturer.

#### 1.3 Company name

Manufacturer/distributor: Wacker Chemie AG  
Street/POB-No.: Hanns-Seidel-Platz 4  
State/postal code/city: D 81737 München  
Telephone: +49 89 6279-0  
Telefax: +49 89 6279-1770

Information about the Safety Data Sheet:

Telephone  
Telefax  
eMail

+49 8677 83-4888  
+49 8677 886-9722  
WLCP-MSDS@wacker.com

#### 1.4 Emergency telephone number

Emergency Information:  
Emergency Information (internat.):

plant fire brigade  
National Response Center

+49 8677 83-2222  
+49 621 60-43333

### 2. Hazards identification

#### 2.1 Classification

Classification (67/548/EEC, 1999/45/EC):

R-Phrase	Description
R10	Flammable.
R22	Harmful if swallowed.

#### 2.2 Labelling

Labelling (67/548/EEC, 1999/45/EC):

	Xn	Harmful
---	----	---------

R-Phrase	Description
R10	Flammable.
R22	Harmful if swallowed.

S-Phrase	Description
S21	When using do not smoke.
S23	Do not breathe vapour.
S24/25	Avoid contact with skin and eyes.

EC-No.: 204-634-0

Hazard ingredients (labelling EC):

2,4-Pentanedione

Special identification instructions:

EC label.

**Safety Data Sheet**

Material: 60004327

Acetyl Acetone

Version: 1.12 (REG\_EUROPE)

Date of print: 25.07.2012

Date of last alteration: 06.05.2011

**3. Composition/information on ingredients****3.1 Chemical characterization (substance)**

EC-No.	CAS No.	Chemical characteristics
204-634-0	123-54-6	ketone

**3.2 Hazardous ingredients**

EC-No.	CAS No.	Material	Content %	Warning Label (EC)	
				Symbol	R-Phrases*
204-634-0	123-54-6	2,4-Pentanedione	<=100	Xn	R10-22

\*Classification codes are explained in section 16.

**4. First-aid measures****4.1 General information:**

Take persons to a safe place. Observe self-protection for first aid. Always seek medical advice in the event of contact with this substance.

**4.2 After inhalation**

Keep the patient calm. If unconscious place in stable sideways position. Protect against loss of body heat. If breathing stops, administer artificial respiration. Seek medical advice immediately and clearly identify substance.

**4.3 After contact with the skin**

Remove contaminated clothes at once. Wash off with plenty of water or water and soap immediately for 10-15 minutes. In serious cases, use emergency shower immediately. Seek medical advice immediately and clearly identify substance.

**4.4 After contact with the eyes**

Rinse immediately with plenty of water for 10-15 minutes. Keep eyelids well open to rinse the whole eye surface and eyelids with water. Seek medical advice and clearly identify substance.

**4.5 After swallowing**

If conscious, give several small portions of water to drink. Do not induce vomiting. Seek medical advice immediately and clearly identify substance.

**4.6 Advice for the physician**

Symptoms of poisoning may not become apparent until after many hours - medical monitoring is therefore required for at least 48 hours after any accident.

**5. Fire-fighting measures****5.1 General information:**

Cool endangered containers with water.

**5.2 Suitable extinguishing media**

water spray , extinguishing powder , alcohol-resistant foam , carbon dioxide .

**5.3 Extinguishing media which must not be used for safety reasons**

water jet .

**5.4 Special exposure hazards arising from the substance or preparation itself, combustion products, resulting gases**

organic decomposition products .

**5.5 Special protective equipment for fire fighting**

Use respiratory protection independent of recirculated air.

**Safety Data Sheet**

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Acetyl Acetone

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**6. Accidental release measures****6.1 Personal precautions**

Wear personal protection equipment (see section 8). Avoid inhaling mists and vapours.

**6.2 Environmental precautions**

Contain any fluid that runs out using suitable material (e.g. earth). Prevent material from entering sewers or surface waters. Dispose of in prescribed marked containers. Observe local/state/federal regulations.

**6.3 Methods for cleaning up**

Absorb with a liquid binding material such as diatomaceous earth and dispose of according to local/state/federal regulations. Contain larger amounts and pump up into suitable containers.

**6.4 Further information:**

Eliminate all sources of ignition.

**7. Handling and storage****7.1 Handling**

**Precautions for safe handling:**  
Ensure adequate ventilation.

**Precautions against fire and explosion:**

Keep away from sources of ignition and do not smoke. Flammable vapors may accumulate and form explosive mixtures with air in containers, process vessels, including partial, empty and uncleaned containers and vessels, or other enclosed spaces. During transfusion electrostatic charging possible. Take precautionary measures against electrostatic charging. Keep away from heat, sparks and flame.

**7.2 Storage**

**Conditions for storage rooms and vessels:**  
Do not store in iron containers.

**Advice for storage of incompatible materials:**

Do not store together with fire-promoting and spontaneously inflammable substances or with highly inflammable solids.

**Further information for storage:**

Keep in the original container in a cool well ventilated place. Keep container dry and tightly closed.

**8. Exposure controls and personal protection equipment****8.1 Exposure limits****8.2 Exposure limited and controlled****8.2.1 Exposure in the work place limited and controlled**

**General protection and hygiene measures:**

Do not eat, drink or smoke when handling. Do not breathe vapours.

**Personal protection equipment**

**Respiratory protection**

gas mask filter ABEK . In case of long or strong exposure: positive pressure self contained breathing apparatus .

**Hand protection**

Protective gloves made of butyl rubber Wear gloves for short periods only < 10 mins.

**Eye protection**

tight fitting protective goggles .

**Skin protection**

protective clothing

**Safety Data Sheet**

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Acetyl Acetone

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**8.2.2 Exposure to the environment limited and controlled**

Prevent material from entering surface waters and soil.

**8.3 Further information for system design and engineering measures**

Observe information in section 7.

**9. Physical and chemical properties****9.1 General information**

Physical state / form .....: liquid  
Colour .....: colourless  
Odour .....: ester-like

**9.2 Important information about the protection of health, safety and the environment**

Property:	Value:	Method:
Melting point / melting range .....	-47,5 - -17,6 °C	(EG-RL.A.1)
Boiling point / boiling range .....	139,5 °C	(EU-GL.A.2)
Flash point.....	34 °C	(DIN 51755)
Ignition temperature .....	383 °C	(EU-GL.A.15)
Auto-ignition temperature.....	not applicable	
Formation of flammable gases .....	not applicable	
Oxidizing properties .....	no	
Explosive properties .....	not applicable	
Lower explosion limit (LEL) .....	2,4 Vol-%	
Upper explosion limit (UEL).....	11,4 Vol-%	
Vapour pressure.....	40,4 hPa at 50 °C	(OECD 104)
Vapour pressure.....	21,8 hPa at 38 °C	(OECD 104)
Vapour pressure.....	7,9 hPa at 20 °C	(OECD 104)
Density .....	0,9732 g/cm <sup>3</sup> at 20 °C	(EU-GL.A.3)
Water solubility / miscibility.....	154,5 g/l at 20 °C	(OECD 105)
pH-Value .....	3,2 at 22 °C (175 g/l H <sub>2</sub> O)	
Distribut. coeff. n-octanol/water.....	0,68 (Log p <sub>ow</sub> )	(EU-GL.A.8)
Viscosity (dynamic) .....	not determined	

**9.3 Other information**

Odour limit.....: 13 mg/m<sup>3</sup>  
Thermal decomposition.....: 293 - 389 °C

**10. Stability and reactivity****10.1 General information:**

If stored and handled in accordance with standard industrial practices no hazardous reactions are known.

**10.2 Conditions to avoid**

none known .

**10.3 Materials to avoid**

oxidizing agents , amines , strong bases .

**10.4 Hazardous decomposition products**

If stored and handled properly: none known .

**10.5 Further information:**

In use, may form flammable/explosive vapour-air mixture.

**Safety Data Sheet**

Material: 60004327

Acetyl Acetone

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**11. Toxicological information**

**11.1 General information:**

Note indications of danger and safety advice (R- and S-phrases) in section 15.

**11.2 Toxicological tests**

**Acute toxicity (LD50/LC50-values relevant to classification):**

Exposition	Value/value range	Species	Source
oral	570 mg/kg	rat	test report
dermal	790 mg/kg	rat	test report
by inhalation	5,1 mg/l; 4 h (gas / vapour)	rat	test report

**Primary irritation:**

Exposition	Effect	Species/Test system	Source
to skin	not irritating	rabbit	test report
to eyes	not irritating	rabbit	test report

**Sensitization:**

Exposition	Effect	Test method	Species	Source
to skin	not sensitizing	LLNA (local lymph node assay)	mouse	test report

**Further information:**

In animal tests: Not mutagenic following acute inhalation.

**Subacute to chronic toxicity:**

Species	Test method	End point	Value	Source
rat	Subchronic Inhalation Toxicity: 90-day Study	NOAEC (gas / vapour)	0,42 mg/l/6h/d	test report
rat	Repeated Dose Dermal Toxicity: 21/28-day study	NOAEL	244 mg/kg/d	test report

**Additional information (subacute/chronic):**

Tests on animals have revealed changes in the following organs/tissues: (following inhalative exposure) central nervous system , blood and bloodforming system .

**Reference points for mutagenic potential:**

Test system	Effect	Source
Bacterial Reverse Mutation Test	not mutagenic	test report
Genetic Toxicology: In vitro Sister Chromatid Exchange Assay in Mammalian Cells	mutagenic	test report
In vitro Mammalian Chromosomal Aberration Test	mutagenic	literature
in vitro Mammalian Cell Gene Mutation Test	not mutagenic	test report
Mammalian Erythrocyte Micronucleus Test	mutagenic	test report
Mammalian Spermatogonial Chromosome Aberration Test	not mutagenic	test report
Mammalian Bone Marrow Chromosomal Aberration Test	not mutagenic	test report
Genetic Toxicology: Rodent Dominant Lethal Test	indifferent	test report

**Carcinogenic / reproductive effect**

Species	Test method	End point	Value	Source
rat	Teratogenicity	NOAEC (gas / vapour)	0,21 mg/l/6h/d	test report

**Further information (carcinogenic/harms the reproductive system):**

Animal tests have shown no indications of possibility of damage to embryo.

**11.3 Experience with man**

Vapour may cause headache and/or nausea. Human patch test: No indication for skin sensitization.

**11.4 Further toxicological information**

Harmful by inhalation, in contact with skin and if swallowed.

**Safety Data Sheet**

Material: 60004327

Acetyl Acetone

Version: 1.12 (REG\_EUROPE)

Date of print: 25.07.2012

Date of last alteration: 06.05.2011

**12. Ecological information****12.1 Ecotoxicity**

Species	Test method	Exp. time	Result	Source
minnow ( <i>Pimephales promelas</i> )	acute	96 h	104 mg/l (LC50)	literature
<i>Daphnia magna</i>	acute	48 h	25,9 mg/l (EC50)	test report
<i>Pseudokirchneriella subcapitata</i>	acute	72 h	83,2 mg/l (IC50)	test report

Harmful to aquatic organisms.

**Effects in sewage treatment plants (bacteria toxicity: respiration-/reproduction inhibition):**

Test system	Exp. time	Result	Source
<i>Pseudomonas putida</i>	3 h	13,2 mg/l (EC10)	test report
<i>Pseudomonas putida</i>	3 h	107,6 mg/l (EC50)	test report

**12.2 Mobility****12.3 Persistence and degradability****Biodegradation:**

Method	Degree of elimination	Classification	Source
Modified MITI Test (I)	> 80 %, in 28 day(s)	readily biodegradable	literature

**Further information:****12.4 Bio-accumulation potential**

Bioaccumulation is not expected to occur.

**12.5 Other harmful effects****12.6 Additional information****BOD5-Value:** 1340 mg O<sub>2</sub>/l Substance (test report)**COD-Value:** 1787 mg O<sub>2</sub>/g Substance (test report)**BOD5/COD:** 0,75**General information:**

Prevent material from entering surface waters and soil. Only introduce into water purification plants in diluted state.

**13. Disposal considerations****13.1 Material****Recommendation:**

Dispose of according to regulations by incineration in a special waste incinerator. Observe local/state/federal regulations.

**13.2 Uncleaned packaging****Recommendation:**

Completely discharge containers (no tear drops, no powder rest, scraped carefully). Containers may be recycled or re-used. Observe local/state/federal regulations. Uncleaned packaging should be treated with the same precautions as the material.

**Safety Data Sheet**

Material: 60004327

Acetyl Acetone

Version: 1.12 (REG\_EUROPE)

Date of print: 25.07.2012

Date of last alteration: 06.05.2011

**14. Transport information****14.1 Land transport ADR and RID****Road ADR:**

Valuation .....: Hazardous product  
Class .....: 3  
Subsidiary risk .....: 6.1  
Packaging Group .....: III  
Hazard No. ....: 36  
UN no. ....: 2310  
Proper Shipping Name .....: Pentan-2,4-dion

**Railway RID:**

Valuation .....: Hazardous product  
Class .....: 3  
Packaging Group .....: III  
UN no. ....: 2310

**14.2 Transport by sea IMDG-Code**

Valuation .....: Hazardous product  
Class .....: 3  
Subsidiary risk .....: 6.1  
Packaging Group .....: III  
UN no. ....: 2310  
Proper Shipping Name .....: Pentane-2,4-dione  
Marine Pollutant .....: no

**14.3 Air transport ICAO-TI/IATA-DGR**

Valuation .....: Hazardous product  
Class .....: 3  
Subsidiary risk .....: 6.1  
Packaging Group .....: III  
UN no. ....: 2310  
Proper Shipping Name .....: Pentane-2,4-dione

Informing dept. ref. to heading 14. Transport information:

Department Hazardous Materials Service, Telefax: +49/(0) 8677/83-5589, Telephone: +49/(0) 8677/83-4950

**15. Regulatory information****15.1 National regulations**

National and local regulations must be observed.

For information on labelling please refer to section 2 of this document.

**15.2 Other international regulations****Details of international registration status:**

Listed on or in accordance with the following inventories:

IECSC - China  
ENCS - Japan  
AICS - Australia  
PICCS - Philippines  
ECL - Korea  
DSL - Canada  
TSCA - USA  
EINECS - Europe

REACH registration number:

01-2119458968-15-0000

**Safety Data Sheet**

Material: 60004327

Acetyl Acetone

Version: 1.12 (REG\_EUROPE)

Date of print: 25.07.2012

Date of last alteration: 06.05.2011

**16. Other information****16.1 Material**

The above information describes exclusively the safety requirements of the product(s) and is based on our present-day knowledge. It does not represent a guarantee for the properties of the product(s) described in terms of the legal warranty regulations. Properties of the product are to be found in the respective product leaflet.

**16.2 Further information:**

Commas appearing in numerical data denote a decimal point. Vertical lines in the left-hand margin indicate changes compared with the previous version. This version supersedes all previous versions.

R-Phrase	Description
R10 R22	Flammable. Harmful if swallowed.

**- End of Safety Data Sheet -**

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# SAFETY DATA SHEET

Creation Date 01-Sep-2009

Revision Date 16-Apr-2012

Revision Number 6

## SECTION 1. IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

**Product Identifier**

**Product Description:** Isopropanol  
**Reach Registration Number** 01-2119457558-25  
**Cat No.** 383920000; 383920025; 383920010  
**Synonyms** 2-Propanol; IPA; Isopropyl alcohol; Propan-2-ol

**Relevant identified uses of the substance or mixture and uses advised against**

**Recommended Use** Laboratory chemicals  
**Uses advised against** No Information available

**Details of the supplier of the safety data sheet**

**Company**  
Acros Organics BVBA  
Jahssen Pharmaceuticalaan 3a  
2440 Geel, Belgium  
**E-mail address** begel.sdsdesk@thermofisher.com

**Emergency Telephone Number**

For information in the US, call: 001-800-ACROS-01  
For information in Europe, call: +32 14 57 52 11

Emergency Number, Europe: +32 14 57 52 99  
Emergency Number, US: 001-201-796-7100

CHEMTREC Phone Number, US: 001-800-424-9300  
CHEMTREC Phone Number, Europe: 001-703-527-3887

## SECTION 2. HAZARDS IDENTIFICATION

**Classification of the substance or mixture  
REGULATION (EC) No 1272/2008**

Serious Eye Damage/Eye Irritation	Category 2
Specific target organ systemic toxicity (single exposure)	Category 3
Flammable liquids.	Category 2

**Classification according to EU Directives 67/548/EEC or 1999/45/EC**

For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16

**Symbol(s)** Xi - Irritant  
F - Highly flammable  
**R-phrases(s)** R11 - Highly flammable  
R36 - Irritating to eyes  
R67 - Vapors may cause drowsiness and dizziness



# SAFETY DATA SHEET

Isopropanol

Revision Date 16-Apr-2012

## SECTION 2. HAZARDS IDENTIFICATION

### Label Elements



### Signal Word

**Danger**

### Hazard Statements

- H336 - May cause drowsiness or dizziness
- H319 - Causes serious eye irritation
- H225 - Highly flammable liquid and vapor

### Precautionary Statements - EU (§28, 1272/2008)

- P261 - Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray
- P280 - Wear protective gloves/ protective clothing/ eye protection/ face protection
- P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
- P210 - Keep away from heat/sparks/open flames/hot surfaces. - No smoking
- P240 - Ground/Bond container and receiving equipment

### Other Hazards

No information available.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Component	EC-No:	Weight-%	CAS-No:	67/548/EEC Classification	CLP Classification - Regulation (EC) No. 1272/2008	REACH-No:
Isopropyl alcohol 67-63-0	EEC No. 200-661-7	>95	67-63-0	F; R11 Xi; R36 R67	Eye Irrit. 2 (H319) STOT SE 3 (H336) Flam. Liq. 2 (H225)	01-2119457558-25

For the full text of the R-phrases and H-Statements mentioned in this Section, see Section 16

ACR38392



# SAFETY DATA SHEET

Isopropanol

Revision Date 16-Apr-2012

## SECTION 4: FIRST AID MEASURES

### Description of first aid measures

<b>Eye Contact</b>	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Obtain medical attention.
<b>Skin Contact</b>	Wash off immediately with plenty of water for at least 15 minutes. Obtain medical attention.
<b>Ingestion</b>	Do not induce vomiting. Obtain medical attention.
<b>Inhalation</b>	Move to fresh air. If breathing is difficult, give oxygen. Obtain medical attention.
<b>Notes to Physician</b>	Treat symptomatically

## SECTION 5: FIRE-FIGHTING MEASURES

### Extinguishing media

#### Suitable Extinguishing Media

CO<sub>2</sub>, dry chemical, dry sand, alcohol-resistant foam. Cool closed containers exposed to fire with water spray.

#### Extinguishing media which must not be used for safety reasons

No information available.

#### Special hazards arising from the substance or mixture

Flammable. Risk of ignition. Vapors may form explosive mixtures with air. Vapors may travel to source of ignition and flash back. Containers may explode when heated.

#### Advice for fire-fighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

## SECTION 6: ACCIDENTAL RELEASE MEASURES

### Personal precautions, protective equipment and emergency procedures

Use personal protective equipment. Remove all sources of ignition. Take precautionary measures against static discharges. Avoid contact with skin, eyes and clothing.

### Environmental precautions

Should not be released into the environment.

### Methods and material for containment and cleaning up

ACR38392

Page 3 / 10



# SAFETY DATA SHEET

Isopropanol

Revision Date 16-Apr-2012

Remove all sources of ignition. Soak up with inert absorbent material. Use spark-proof tools and explosion-proof equipment. Keep in suitable, closed containers for disposal.. Take precautionary measures against static discharges.

## SECTION 7. HANDLING AND STORAGE

### Precautions for Safe Handling

Wear personal protective equipment. Keep away from open flames, hot surfaces and sources of ignition. Use explosion-proof equipment. Use only non-sparking tools. Take precautionary measures against static discharges. Do not get in eyes, on skin, or on clothing. Do not breathe vapors or spray mist.

### Conditions for safe storage, including any incompatibilities

Keep containers tightly closed in a dry, cool and well-ventilated place. Keep away from heat and sources of ignition. Flammables area.

### Specific End Uses

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### Control parameters

#### Exposure limits

Component  
Isopropyl alcohol

European Union	The United Kingdom	France	Belgium	Spain
	STEL: 500 ppm 15 min STEL: 1250 mg/m <sup>3</sup> 15 min TWA: 400 ppm 8 hr TWA: 999 mg/m <sup>3</sup> 8 hr	VLCT: 400 ppm VLCT: 980 mg/m <sup>3</sup>	TWA: 200 ppm 8 uren TWA: 500 mg/m <sup>3</sup> 8 uren STEL: 400 ppm 15 minuten STEL: 1000 mg/m <sup>3</sup> 15 minuten	VLA-EC: 500 ppm 15 minutos VLA-EC: 1250 mg/m <sup>3</sup> 15 minutos VLA-ED: 400 ppm 8 horas VLA-ED: 998 mg/m <sup>3</sup> 8 horas

#### Component

Isopropyl alcohol

Italy	Germany	Portugal	The Netherlands	Finland
	MAK: 200 ppm 8 Stunden. MAK: 500 mg/m <sup>3</sup> 8 Stunden. Peak: 400 ppm Peak: 1000 mg/m <sup>3</sup> TWA: 200 ppm 8 Stunden, exposure factor 2 TWA: 500 mg/m <sup>3</sup> 8 Stunden, exposure factor 2	STEL: 400 ppm 15 minutos TWA: 200 ppm 8 horas		TWA: 200 ppm 8 tunteina TWA: 500 mg/m <sup>3</sup> 8 tunteina STEL: 250 ppm 15 minuutteina STEL: 620 mg/m <sup>3</sup> 15 minuutteina

ACR38392



# SAFETY DATA SHEET

Isopropanol

Revision Date 16-Apr-2012

**Component**  
Isopropyl alcohol

Austria	Denmark	Switzerland	Poland	Norway
STEL: 800 ppm 15 Minuten STEL: 2000 mg/m <sup>3</sup> 15 Minuten TWA: 200 ppm 8 Stunden TWA: 500 mg/m <sup>3</sup> 8 Stunden	TWA: 200 ppm 8 timer TWA: 490 mg/m <sup>3</sup> 8 timer	STEL: 400 ppm 15 Minuten STEL: 1000 mg/m <sup>3</sup> 15 Minuten MAK: 200 ppm 8 Stunden MAK: 500 mg/m <sup>3</sup> 8 Stunden	NDSCh: 1200 mg/m <sup>3</sup> 15 minutach NDS: 900 mg/m <sup>3</sup> 8 godzinach	TWA: 100 ppm 8 timer TWA: 245 mg/m <sup>3</sup> 8 timer STEL: 150 ppm 15 minutter. STEL: 306.25 mg/m <sup>3</sup> 15 minutter.

**Component**  
Isopropyl alcohol

Bulgaria	Croatia	Ireland	Cyprus	Czech Republic
TWA: 980.0 mg/m <sup>3</sup> STEL: 1225.0 mg/m <sup>3</sup>	TWA: 400 ppm 8 satima. TWA: 999 mg/m <sup>3</sup> 8 satima. STEL: 500 ppm 15 minutama. STEL: 1250 mg/m <sup>3</sup> 15 minutama.	TWA: 200 ppm 8 hr. STEL: 400 ppm 15 min Skin		TWA: 500 mg/m <sup>3</sup> 8 hodinách. Potential for cutaneous absorption Ceiling: 1000 mg/m <sup>3</sup>

**Component**  
Isopropyl alcohol

Estonia	Gibraltar	Greece	Hungary	Iceland
TWA: 150 ppm 8 tundides. TWA: 350 mg/m <sup>3</sup> 8 tundides. STEL: 250 ppm 15 minutites. STEL: 600 mg/m <sup>3</sup> 15 minutites.		STEL: 500 ppm STEL: 1225 mg/m <sup>3</sup> TWA: 400 ppm TWA: 980 mg/m <sup>3</sup>	STEL: 2000 mg/m <sup>3</sup> 15 percekben. TWA: 500 mg/m <sup>3</sup> 8 órában. potential for cutaneous absorption	TWA: 200 ppm 8 klukkustundum. TWA: 490 mg/m <sup>3</sup> 8 klukkustundum. Skin notation Ceiling: 400 ppm Ceiling: 980 mg/m <sup>3</sup>

**Component**  
Isopropyl alcohol

Latvia	Lithuania	Luxembourg	Malta	Romania
STEL: 600 mg/m <sup>3</sup> TWA: 350 mg/m <sup>3</sup>	TWA: 150 ppm TWA: 350 mg/m <sup>3</sup> STEL: 250 ppm STEL: 600 mg/m <sup>3</sup>			TWA: 81 ppm 8 ore TWA: 200 mg/m <sup>3</sup> 8 ore STEL: 203 ppm 15 minute STEL: 500 mg/m <sup>3</sup> 15 minute

**Component**  
Isopropyl alcohol

Russia - TWA	Slovak Republic	Slovenia	Sweden	Turkey
TWA: 10 mg/m <sup>3</sup> STEL: 50 mg/m <sup>3</sup> vapor	200 500	TWA: 200 ppm 8 urah TWA: 500 mg/m <sup>3</sup> 8 urah STEL: 800 ppm 15 minutah STEL: 2000 mg/m <sup>3</sup> 15 minutah	STV: 250 ppm 15 minuter STV: 600 mg/m <sup>3</sup> 15 minuter LLV: 150 ppm 8 timmar. LLV: 350 mg/m <sup>3</sup> 8 timmar.	

**Biological limit values**

**Component**  
Isopropyl alcohol

European Union	United Kingdom	France	Spain	Germany
				Acetone: 50 mg/L whole blood end of shift Acetone: 50 mg/L urine end of shift

ACR38392



# SAFETY DATA SHEET

Isopropanol

Revision Date 16-Apr-2012

Component	Bulgaria	Gibraltar	Latvia	Luxembourg	Romania
Isopropyl alcohol					Acetone: 50 mg/L urine end of shift

Component	Slovak Republic	Turkey
Isopropyl alcohol	Acetone: 50 mg/L blood end of exposure or work shift Acetone: 50 mg/L urine end of exposure or work shift	

**Derived No Effect Level (DNEL)** No information available.  
**Predicted No Effect Concentration (PNEC)** No information available.

**Exposure controls**

**Engineering Measures** Ensure that eyewash stations and safety showers are close to the workstation location Use explosion-proof electrical/ventilating/lighting/equipment

**Personal protective equipment**

**Eye Protection** Safety glasses with side-shields  
**Hand Protection** Protective gloves  
**Skin and body protection** Wear appropriate protective gloves and clothing to prevent skin exposure  
**Respiratory Protection** Follow the OSHA respirator regulations found in 29 CFR 1910.134 or European Standard EN 149. Use a NIOSH/MSHA or European Standard EN 149 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced

**Hygiene Measures** Handle in accordance with good industrial hygiene and safety practice  
**Environmental exposure controls** No information available.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

<b>Physical State</b>	Liquid
<b>Appearance</b>	Colorless
<b>odor</b>	Alcohol-like
<b>pH</b>	7.1% aq. sol.
<b>Vapor Pressure</b>	43 mmHg @ 20 °C
<b>Vapor Density</b>	2.1 (Air = 1.0)
<b>Viscosity</b>	2.27 mPa.s at 20 °C
<b>Boiling Point/Range</b>	81 - 83°C / 177.8 - 181.4°F @ 760 mmHg
<b>Melting Point/Range</b>	-89.5°C / -129.1°F
<b>Flash Point</b>	12°C / 53.6°F
<b>Autoignition Temperature</b>	425°C / 797°F
<b>Explosion Limits</b>	
Lower	2 Vol%
Upper	12 Vol%
<b>Evaporation Rate</b>	1.7 (Butyl Acetate = 1.0)
<b>Water Solubility</b>	miscible

ACR38392



# SAFETY DATA SHEET

Isopropanol

Revision Date 16-Apr-2012

Specific Gravity	0.785
Molecular Formula	C3 H8 O
Molecular Weight	60.1

## SECTION 10: STABILITY AND REACTIVITY

### Reactivity

### Chemical Stability

Hygroscopic.

### Possibility of Hazardous Reactions

Hazardous Polymerization	Hazardous polymerization does not occur.
Hazardous Reactions .	None under normal processing..

### Conditions to Avoid

Incompatible products, Heat, flames and sparks, Exposure to moist air or water.

### Incompatible Materials

Strong oxidizing agents, Acids, Halogens, Acid anhydrides.

### Hazardous Decomposition Products

Carbon monoxide (CO). Carbon dioxide (CO<sub>2</sub>). peroxides.

## SECTION 11: TOXICOLOGICAL INFORMATION

### Information on Toxicological Effects

### Acute Toxicity

### Component Information

#### Component

Isopropyl alcohol

	LD50 Oral	LD50 Dermal	LC50 Inhalation
Isopropyl alcohol	4396 mg/kg ( Rat )	12800 mg/kg ( Rat ) 12870 mg/kg ( Rabbit )	72.6 mg/L ( Rat ) 4 h

### Chronic Toxicity

#### Carcinogenicity

There are no known carcinogenic chemicals in this product

#### Sensitization

No information available.

#### Mutagenic Effects

Mutagenic effects have occurred in experimental animals.

ACR38392



# SAFETY DATA SHEET

Isopropanol

Revision Date 16-Apr-2012

**Reproductive Effects** Experiments have shown reproductive toxicity effects on laboratory animals  
**Developmental Effects** Developmental effects have occurred in experimental animals  
**Teratogenicity** Teratogenic effects have occurred in experimental animals.  
**Target Organs** Skin Respiratory system Eyes Central nervous system (CNS) Liver Kidney  
**Other Adverse Effects** See actual entry in RTECS for complete information  
**Endocrine Disruptor Information** None known

## SECTION 12. ECOLOGICAL INFORMATION

### Toxicity

**Ecotoxicity effects** Do not empty into drains

Component	Freshwater Algae	Freshwater Fish	Microtox	Water Flea
Isopropyl alcohol	1000 mg/L EC50 > 72 h 1000 mg/L EC50 > 96 h	1400000 µg/L LC50 96 h 9640 mg/L LC50 96 h 11130 mg/L LC50 96 h	= 35390 mg/L EC50 Photobacterium phosphoreum 5 min	13299 mg/L EC50 = 48 h

### Persistence and degradability

Expected to be biodegradable

### Bioaccumulative potential

No information available.

Component	log Pow
Isopropyl alcohol	0.05

### Mobility in soil

### Results of PBT and vPvB assessment

### Other adverse effects

No information available

## SECTION 13. DISPOSAL CONSIDERATIONS

### Waste treatment methods

**Waste from Residues / Unused Products** Dispose of in accordance with local regulations

**Contaminated Packaging** Empty containers should be taken to local recyclers for disposal

ACR38392



# SAFETY DATA SHEET

Isopropanol

Revision Date 16-Apr-2012

## SECTION 14. TRANSPORT INFORMATION

### IMDG/IMO

UN-No UN1219  
 Hazard Class 3  
 Packing Group II  
 Proper Shipping Name Isopropanol (Isopropyl alcohol)

### ADR

UN-No UN1219  
 Hazard Class 3  
 Packing Group II  
 Proper Shipping Name Isopropanol (Isopropyl alcohol)

### IATA

UN-No UN1219  
 Hazard Class 3  
 Packing Group II  
 Proper Shipping Name Isopropanol

## SECTION 15. REGULATORY INFORMATION

### Safety, health and environmental regulations/legislation specific for the substance or mixture

#### International Inventories

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDL	PICCS	ENCS	CHINA	AICS	KECL
Isopropyl alcohol	200-661-7	-		X	X	-	X	X	X	X	X

#### Legend

- TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
- EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
- DSL/NDL - Canadian Domestic Substances List/Non-Domestic Substances List
- PICCS - Philippines Inventory of Chemicals and Chemical Substances
- ENCS - Japan Existing and New Chemical Substances
- CHINA - China Inventory of Existing Chemical Substances
- AICS - Inventory of Chemical Substances
- KECL - Existing and Evaluated Chemical Substances

ACR38392



# SAFETY DATA SHEET

Isopropanol

Revision Date 16-Apr-2012

## Chemical Safety Assessment

### SECTION 16: OTHER INFORMATION

#### Full text of R-phrases referred to under sections 2 and 3

- R11 - Highly flammable
- R36 - Irritating to eyes
- R67 - Vapors may cause drowsiness and dizziness

#### Full text of H-Statements referred to under sections 2 and 3

- H225 - Highly flammable liquid and vapor
- H319 - Causes serious eye irritation
- H336 - May cause drowsiness or dizziness

Revision Date 16-Apr-2012

#### Revision Summary

Reason for revision (M)SDS sections updated, 1, 3, 8, 9

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006

#### Disclaimer

The information provided on this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guide for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered as a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other material or in any process, unless specified in the text.

End of Safety Data Sheet

ACR38392

Page 10 / 10

STORAGE ABOVE 20°C. SOLIDIFICATION @ 14°C

SIGMA-ALDRICH

MATERIAL SAFETY DATA SHEET

Date Printed: 02/28/2007

Date Updated: 02/08/2007

Version 1.5

Section 1 - Product and Company Information

Product Name TITANIUM(IV) ISOPROPOXIDE, 97%  
Product Number 205273  
Brand ALDRICH

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
TETRA-ISO-PROPYL ORTHOTITANATE	546-68-9	No

Formula  $Ti [OCH(CH_3)_2]_4$   
Synonyms Isopropyl orthotitanate \* Isopropyl titanate(IV)  
\* Tetraisopropoxide titanium \*  
Tetraisopropoxytitanium \* Tetraisopropyl  
orthotitanate \* Tetraisopropyl titanate \*  
Tetrakis(isopropoxy)titanium \* Titanium(4+)  
isopropoxide \* Titanium isopropylate \* Titanium  
tetraisopropoxide \* Titanium tetraisopropylate \*  
Titanium tetra-n-propoxide \* Tyzor TPT

RTECS Number: NT8060000

Section 3 - Hazards Identification

EMERGENCY OVERVIEW

Flammable. Irritant.  
Irritating to eyes.

HMIS RATING

HEALTH: 1  
FLAMMABILITY: 3  
REACTIVITY: 1

NFPA RATING

HEALTH: 1  
FLAMMABILITY: 3  
REACTIVITY: 1

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.

##### FLASH POINT

113 °F 45 °C Method: closed cup

##### AUTOIGNITION TEMP

N/A

##### FLAMMABILITY

N/A

##### 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

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##### PROCEDURE TO BE FOLLOWED IN CASE OF LEAK OR SPILL

Evacuate area. Shut off all sources of ignition.

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

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

##### METHODS FOR CLEANING UP

Cover with dry-lime, sand, or soda ash. Place in covered containers using non-sparking tools and transport outdoors. Ventilate area and wash spill site after material pickup is complete.

---

#### Section 7 - Handling and Storage

---

##### HANDLING

User Exposure: Avoid breathing vapor. Avoid contact with eyes, skin, and clothing. Avoid prolonged or repeated exposure.

STORAGE

Suitable: Keep tightly closed. Keep away from heat, sparks, and open flame. Handle and store under nitrogen.

SPECIAL REQUIREMENTS

Readily hydrolyzed.

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

Wash thoroughly after handling. Wash contaminated clothing before reuse.

Section 9 - Physical/Chemical Properties

Property	Value	At Temperature or Pressure
Appearance	Physical State: Clear liquid Color: Very faintly yellow	
Molecular Weight	284.26 AMU	Atomic Mass Unit = g/mol
pH	N/A	
BP/BP Range	104 °C	10 mmHg
MP/MP Range	14 °C	
Freezing Point	N/A	
Vapor Pressure	N/A	
Vapor Density	N/A	
Saturated Vapor Conc.	N/A	
SG/Density	0.97 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	N/A	
Decomposition Temp.	N/A	
Flash Point	113 °F 45 °C	Method: closed cup
Explosion Limits	N/A	
Flammability	N/A	
Autoignition Temp	N/A	

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$\times$  Heat of Vaporisation = 61.6 kJ/mol  
 $M_r = 284.26 \text{ g/mol}$   
 $= 0.28426 \text{ kg/mol}$   
 $= 3.52 \text{ mol/kg}$   
 $61.6 \text{ kJ/mol} \times 3.52 \text{ mol/kg} = 216.7 \text{ kJ/kg}$

Refractive Index 1.466  
Optical Rotation N/A  
Miscellaneous Data N/A  
Solubility N/A

N/A = not available

---

#### Section 10 - Stability and Reactivity

---

##### STABILITY

Conditions of Instability: May decompose on exposure to moist air or water.

Materials to Avoid: Strong oxidizing agents, Strong acids.

##### HAZARDOUS DECOMPOSITION PRODUCTS

Hazardous Decomposition Products: Carbon monoxide, Carbon dioxide, Titanium/titanium oxides.

##### HAZARDOUS POLYMERIZATION

Hazardous Polymerization: Will not occur

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#### Section 11 - Toxicological Information

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##### ROUTE OF EXPOSURE

Skin Contact: May cause skin irritation.

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

Eye Contact: Causes eye irritation.

Inhalation: May be harmful if inhaled. Material is irritating to mucous membranes and upper respiratory tract.

Ingestion: May be harmful if swallowed.

##### SIGNS AND SYMPTOMS OF EXPOSURE

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

##### TOXICITY DATA

Oral  
Rat  
7460 UL/KG  
LD50

Skin  
Rabbit  
>16 ML/KG  
LD50

##### IRRITATION DATA

Skin  
Rabbit  
500 mg  
24H  
Remarks: Mild irritation effect

Eyes  
Rabbit  
20 mg  
24H  
Remarks: Moderate irritation effect

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#### Section 12 - Ecological Information

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No data available.

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Section 13 - Disposal Considerations

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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

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DOT

Proper Shipping Name: Flammable liquids, n.o.s.  
UN#: 1993  
Class: 3  
Packing Group: Packing Group II  
Hazard Label: Flammable liquid  
PIH: Not PIH

IATA

Proper Shipping Name: Flammable liquid, n.o.s.  
IATA UN Number: 1993  
Hazard Class: 3  
Packing Group: II

---

Section 15 - Regulatory Information

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EU ADDITIONAL CLASSIFICATION

Symbol of Danger: Xi  
Indication of Danger: Irritant.  
R: 10-36  
Risk Statements: Flammable. Irritating to eyes.  
S: 16-26-36/37/39  
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection.

US CLASSIFICATION AND LABEL TEXT

Indication of Danger: Flammable. Irritant.  
Risk Statements: Irritating to eyes.  
Safety Statements: Keep away from sources of ignition - no smoking. In case of contact with eyes, rinse immediately with plenty of water and seek medical advice. Wear suitable protective clothing, gloves, and eye/face protection.

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

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Section 16 - Other Information

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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 2007 Sigma-Aldrich Co. License granted to make unlimited paper copies for internal use only.

-24 cal/g

100J/g

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# Material Safety Data Sheet

## Zinc Metal Pigment

### 1. Chemical product and company identification

**Common name** : Zinc Metal Pigment  
**Trade name** : 4P16 ; 4P32 ; 4P64 ; 4P645 ; MP20 ; Larvik Super Extra ; Larvik Super Fine ; Larvik Standard 5 ; Larvik Standard 7 ; Larvik ZS ; EE/F ; EE/C ; EE/RS ; ZP90 ; Microfine ; GMQ ; BZM-1 ; BZM-2  
**Material uses** : Anti-corrosion paint  
 Manufacture of chemicals.  
**IPDS Code** : 93682668  
**e-mail address of person responsible for this SDS** : info.ipds@umicore.com Canada  
**Validation date** : 3/07/2012.  
**in case of emergency** : For transport in the USA and Canada: 1-877 986 4267  
 For transport in Europe, Central- and South America, Israel and Africa (Non-Arabic speaking countries): +32 3 213 15 70  
 For transport in the Middle East (Israel excluded) & Arabic speaking Africa: +32 3 213 33 79  
 For transport in Asia and the Pacific (China excluded): +65 62 64 78 36  
 For transport in China: 400 88 71 190  
**Supplier or representative of supplier** : Umicore Zinc Chemicals  
 Rue de Chênée 53  
 4031 Angleur  
 BE Belgium  
 Phone : +32 43666411

### 2. Hazards identification

**Physical state** : Solid. [Very fine powder.]  
**Odor** : Odorless.  
**OSHA/HCS status** : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).  
**Emergency overview** :  
 CONTAINS MATERIAL THAT CAN CAUSE TARGET ORGAN DAMAGE.  
 Handling and/or processing of this material may generate a dust which can cause mechanical irritation of the eyes, skin, nose and throat. Contains material that can cause target organ damage.  
**Routes of entry** : Not available.  
**Potential acute health effects**  
**Eyes** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.  
**Skin** : No known significant effects or critical hazards.  
**Inhalation** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the nose, throat and lungs.  
**Ingestion** : No known significant effects or critical hazards.  
**Potential chronic health effects**

## 2. Hazards identification

**Carcinogenic effects** : No known significant effects or critical hazards.

**Mutagenic effects** : No known significant effects or critical hazards.

**Teratogenicity /  
Reproductive toxicity** : No known significant effects or critical hazards.

**Medical conditions  
aggravated by over-  
exposure** : Pre-existing disorders involving any target organs mentioned in this MSDS as being at risk  
may be aggravated by over-exposure to this product.

See toxicological information (Section 11)

**Additional hazards** : Handling and/or processing of this material may generate a dust which can cause mechanical  
irritation of the eyes, skin, nose and throat.

## 3. Composition/information on ingredients

Name	CAS number	%
Zinc.	7440-66-6	94 - 98
zinc oxide	1314-13-2	<6

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

## 4. First aid measures

**Eye contact** : Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Get medical attention if irritation occurs.

**Skin contact** : In case of contact, immediately flush skin with plenty of water. Remove contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention if irritation occurs.

**Inhalation** : If inhaled, remove to fresh air. If breathing is difficult, give oxygen. If not breathing, give artificial respiration. Get medical attention.

**Ingestion** : Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. If potentially dangerous quantities of this material have been swallowed, call a physician immediately.

**Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation.

## 5. Fire-fighting measures

**Flammability of the product** : No specific fire or explosion hazard.

**Hazardous combustion products** : None.

### Extinguishing media

**Suitable** : Use dry chemical, CO2 or sand.

**Not suitable** : Do not use water or foam.

**Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

**Special protective equipment for fire-fighters** : See Section 11 for more detailed information on health effects and symptoms. Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

## 5. Fire-fighting measures

- Special remarks on fire hazards** : Original packaging can be wetted using water for extinguishing surrounding fire in well ventilated areas.  
Wetted powder will heat and release gases (hydrogen)  
Isolate wetted packaging and powder from combustible materials and dry powder and store in an excellent ventilated area.  
Avoid runoff to sewers.
- Special remarks on explosion hazards** : May present an explosion hazard when material is suspended in air in confined areas or equipment and subjected to spark, heat or flame.

## 6. Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing dust. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Water polluting material. May be harmful to the environment if released in large quantities.
- Large spill** : Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Vacuum or sweep up material and place in a designated, labeled waste container. Avoid creating dusty conditions and prevent wind dispersal. Dispose of via a licensed waste disposal contractor. Note: see section 1 for emergency contact information and section 13 for waste disposal.
- Small spill** : Move containers from spill area. Vacuum or sweep up material and place in a designated, labeled waste container. Dispose of via a licensed waste disposal contractor.

## 7. Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Do not ingest. Avoid contact with eyes, skin and clothing. Avoid breathing dust. Avoid release to the environment. Refer to special instructions/safety data sheet. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.  
Keep away from sources of ignition. Keep away from heat.
- Additional information** : Use explosion-proof electrical (ventilating, lighting and material handling) equipment.  
Keep area clean and tidy.  
Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame).  
Keep container dry.

## 8 . Exposure controls/personal protection

Occupational exposure limits		TWA (8 hours)			STEL (15 mins)			Ceiling			
Ingredient	List name	ppm	mg/m <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	Other	ppm	mg/m <sup>3</sup>	Other	Notations
Zinc.	US ACGIH 1/2009	-	10	-	-	-	-	-	-	-	[a]
		-	3	-	-	-	-	-	-	-	[b]
zinc oxide	US ACGIH 2/2010	-	2	-	-	10	-	-	-	-	[c][A]
	AB 4/2009	-	2	-	-	10	-	-	-	-	[d]
	BC 9/2010	-	2	-	-	10	-	-	-	-	[d]
	ON 7/2010	-	2	-	-	10	-	-	-	-	[c]
	QC 6/2008	-	5	-	-	10	-	-	-	-	[e]

Form: [a]Inhalable; Particulates (Insoluble) Not Otherwise Specified (PNOS) [b]Respirable; Particulates (Insoluble) Not Otherwise Specified (PNOS) [c]Respirable fraction [d]Respirable [e]fume

Notes: [A]Respirable fraction; see Appendix C, paragraph C. ACGIH 2003 Adoption

Consult local authorities for acceptable exposure limits.

**Engineering measures** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.

### Personal protection

**Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If operating conditions cause high dust concentrations to be produced, use dust goggles.

**Skin protection / Hand protection** : Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

**Respiratory** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.

**Personal protective equipment (Pictograms)** :

**Hygiene measures**

**General information** : Eating, drinking and smoking should be prohibited in area where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking.

## 9 . Physical and chemical properties

**Physical state and Appearance** : Solid. [Very fine powder.]

**Color** : Gray.

**Odor** : Odorless.

**Boiling/condensation point** : 908°C (1666,4°F)

**Melting/freezing point** : 420°C (788°F)

**Relative density** : 7,14

**VOC** : 0 % (w/w)

**Oxidizing properties** : Not available.

**Solubility** : Insoluble in the following materials: cold water.

**Flammability of the product** : May be combustible at high temperature.

**10 . Stability and reactivity**

- Stability** : The product is stable.
- Possibility of hazardous reactions** : Under normal conditions of storage and use, hazardous reactions will not occur.
- Materials to avoid** : Reactive or incompatible with the following materials: oxidizing materials and acids.  
Use explosion-proof electrical (ventilating, lighting and material handling) equipment.  
Keep area clean and tidy.  
Avoid the creation of dust when handling and avoid all possible sources of ignition (spark or flame).  
Keep container dry.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.
- Conditions of reactivity** : May present an explosion hazard when material is suspended in air in confined areas or equipment and subjected to spark, heat or flame.  
Highly flammable in the presence of the following materials or conditions: oxidizing materials.  
Original packaging can be wetted using water for extinguishing surrounding fire in well ventilated areas.  
Wetted powder will heat and release gases (hydrogen)  
Isolate wetted packaging and powder from combustible materials and dry powder and store in an excellent ventilated area.  
Avoid runoff to sewers.

**11 . Toxicological information****Canada****Acute toxicity**

Product/ingredient name	Result	Species	Dose	Exposure
Zinc.	LD50 Oral	Rat	>2000 mg/kg	-
zinc oxide	LC50 Inhalation Dusts and mists	Rat	>5700 mg/m <sup>3</sup>	4 hours
Zinc Metal Pigment	LD50 Oral LC50 Inhalation Dusts and mists	Rat	15000 mg/kg >5,4 mg/l	- 4 hours
	LD50 Oral	Rat	>2000 mg/kg	-

**Chronic toxicity**

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

**Irritation/Corrosion**

Product/ingredient name	Result	Species	Score	Exposure	Observation
Not available.					

**Conclusion/Summary** : Not available.

**Skin** : Non-irritating to the skin.

**Eyes** : Non-irritating to the eyes.

**Respiratory** : Based on the read-across from ZnO, the product is not a skin or respiratory sensitizer

**Sensitizer**

Product/ingredient name	Route of exposure	Species	Result
Not available.			

**Conclusion/Summary** : Not available.

**11 . Toxicological information**

Skin : Not sensitizing

Respiratory : Not sensitizing

**Carcinogenicity**

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

**Conclusion/Summary** : Based on read across from ZnSO4: No data indicating any concern for carcinogenicity. No classification required.

**Classification**

Product/ingredient name	ACGIH	IARC	EPA	NIOSH	NTP	OSHA
zinc oxide	A4	-	-	-	-	-

**Mutagenicity**

Product/ingredient name	Test	Experiment	Result
Not available.			

**Teratogenicity**

Product/ingredient name	Result	Species	Dose	Exposure
Not available.				

**Reproductive toxicity**

Product/ingredient name	Maternal toxicity	Fertility	Development toxin	Species	Dose	Exposure
Not available.						

**Conclusion/Summary** : Based on read across from ZnO: No classification required.

**Chronic effects on humans** : **CARCINOGENIC EFFECTS:** Classified A4 (Not classifiable for humans or animals.) by ACGIH [zinc oxide].

Contains material which causes damage to the following organs: lungs, upper respiratory tract.

**Other toxic effects on humans** : No specific information is available in our database regarding the other toxic effects of this material to humans.

**Sensitization**

**Ingestion** : No known significant effects or critical hazards.

**Inhalation** : No known significant effects or critical hazards.

**Eyes** : Exposure to airborne concentrations above statutory or recommended exposure limits may cause irritation of the eyes.

**Skin** : No known significant effects or critical hazards.

**Synergistic products** : Not available.

**12 . Ecological information****Aquatic ecotoxicity**

Product/ingredient name	Test	Result	Species	Exposure

**12 . Ecological information**

Zinc.	-	Acute LC50 109 ug/L Fresh water	Crustaceans - Water flea - Ceriodaphnia dubia - Neonate	48 hours
	-	Acute LC50 238 to 269 ug/L Fresh water	Fish - Fathead minnow - Pimephales promelas - Newly or recently hatched - <24 hours	96 hours
	-	Chronic NOEC 72,9 ug/L Fresh water	Algae - Green algae - Pseudokirchneriella subcapitata - Exponential growth phase	72 hours
	-	Chronic NOEC 143 ug/L Fresh water	Daphnia - Water flea - Daphnia magna - <24 hours	21 days
	-	Chronic NOEC 172 ug/L Fresh water	Fish - Mottled sculpin - Cottus bairdi - 35 mm - 0,442 g	30 days
zinc oxide	(growth rate)	Acute EC50 0,17 mg/l	Algae - Selenastrum Capricornutum	72 hours
	-	Acute LC50 1,1 to 2,5 ppm Fresh water	Fish - Rainbow trout, donaldson trout - Oncorhynchus mykiss	96 hours
	-	Chronic NOEC 0,017 mg/L Fresh water	Algae - Green algae - Pseudokirchneriella subcapitata - Exponential growth phase	72 hours

**Biodegradability**

Product/ingredient name  
Not available.

Test

Result

Dose

Inoculum

**Environmental precautions** : Water polluting material. May be harmful to the environment if released in large quantities.

**Mobility** : Not available.

**Other adverse effects** : No known significant effects or critical hazards.

**13 . Disposal considerations**

**Waste disposal** : The generation of waste should be avoided or minimized wherever possible. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements.

This product is recyclable. Consideration of disposal via this route should be given.

**13 . Disposal considerations**

Disposal should be in accordance with applicable regional, national and local laws and regulations. Local regulations may be more stringent than regional or national requirements.

The information presented below only applies to the material as supplied. The identification based on characteristic(s) or listing may not apply if the material has been used or otherwise contaminated. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste identification and disposal methods in compliance with applicable regulations.

Refer to Section 7: HANDLING AND STORAGE and Section 8: EXPOSURE CONTROLS/PERSONAL PROTECTION for additional handling information and protection of employees.

**14 . Transport information**

Regulatory information	UN number	Proper shipping name	Class	Packing group	Label	Additional information
DOT Classification	UN3077	Environmentally hazardous substance, solid, n.o.s. (Zinc., mixture)	9	III		<b>Limited quantity</b> Yes.  <b>Special provisions</b> 8, 146, 335, B54, IB8, IP3, N20, T1, TP33
TDG Classification	UN3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc., zinc oxide). Marine pollutant (Zinc., zinc oxide)	9	III	 	<b>Explosive Limit and Limited Quantity Index</b> 5  <b>Special provisions</b> 16
Mexico Classification	UN3077	SUSTANCIA SOLIDA POTENCIALMENTE PELIGROSA PARA EL MEDIO AMBIENTE, N.E.P. (Zinc., zinc oxide). Marine pollutant (Zinc., zinc oxide)	9	III	 	<b>Special provisions</b> 179, 274
ADR/RID Class	UN3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc., zinc oxide)	9	III	 	<b>Hazard identification number</b> 90  <b>Limited quantity</b> 5 kg  <b>Special provisions</b> 274 335 601  <b>Tunnel code</b> (E)

**14 . Transport information**

IMDG Class	UN3077	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (Zinc., zinc oxide). Marine pollutant (Zinc., zinc oxide)	9	III	 	<b>Emergency schedules (EmS)</b> F-A, S-F
IATA-DGR Class	UN3077	Environmentally hazardous substance, solid, n.o.s. (Zinc., zinc oxide)	9	III	 	<b>Passenger and Cargo Aircraft</b> Quantity limitation: 400 kg Packaging instructions: 956 <b>Cargo Aircraft Only</b> Quantity limitation: 400 kg Packaging instructions: 956 <b>Limited Quantities - Passenger Aircraft</b> Quantity limitation: 30 kg Packaging instructions: Y956

RQ (Lbs/Kg): CERCLA: Hazardous substances.: Zinc.: 1000 lbs. (454 kg); zinc oxide;

Remarks : The product qualities covered by this MSDS have been tested according to the criteria for classes 4.1, 4.2 and 4.3. The test results show that these qualities don't meet the criteria for classification as dangerous goods in the classes 4.1, 4.2 or 4.3 for transport: BAM, 2005 Report II.2-916/04.

Remarks : DOT classification applies only if at least one RQ relevant substance equals or exceeds its RQ-threshold. Only substances indicated by a quantity in lbs/kg are RQ relevant. The RQ is limited to pieces of the metal having a diameter smaller than 100 micrometers (0.004 inches)

**15 . Regulatory information**

WHMIS (Canada) : Not controlled under WHMIS (Canada).

CEPA Toxic substances: None of the components are listed.

Canadian ARET: None of the components are listed.

Canadian NPRI: The following components are listed: Zinc; Zinc

Alberta Designated Substances: None of the components are listed.

Ontario Designated Substances: None of the components are listed.

Quebec Designated Substances: None of the components are listed.

Canada inventory : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

**EU regulations**

## 15 . Regulatory information

Hazard symbol or symbols :



Risk phrases : R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases : 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 sheet.

### International regulations

International lists : Australia inventory (AICS): All components are listed or exempted.

China inventory (IECSC): All components are listed or exempted.

Japan inventory: At least one component is not listed.

Korea inventory: All components are listed or exempted.

New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.

Philippines inventory (PICCS): All components are listed or exempted.

USA : TSCA 8(a) IUR Exempt/Partial exemption: Not determined

United States inventory (TSCA 8b): All components are listed or exempted.

## 16 . Other information

Hazardous Material Information System (U.S.A.)

Health	0
Flammability	0
Physical hazards	0

Caution: HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. Although HMIS® ratings are not required on MSDSs under 29 CFR 1910.1200, the preparer may choose to provide them. HMIS® ratings are to be used with a fully implemented HMIS® program. HMIS® is a registered mark of the National Paint & Coatings Association (NPCA). HMIS® materials may be purchased exclusively from J. J. Keller (800) 327-6868.

The customer is responsible for determining the PPE code for this material.

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Indicates information that has changed from previously issued version.

### Notice to reader

To the best of our knowledge, the information contained in this Material Safety Data Sheet is accurate and reliable on presently available resources. However, neither the seller nor any of its subsidiaries assumes any responsibility or liability whatsoever for the accuracy or completeness of the information contained herein.

This Material Safety Data Sheet shall not constitute a guarantee for any specific product features. Final determination of suitability of this material is the sole responsibility of the user.

All materials may present unknown hazards and should be used and handled with caution and following reasonable safety procedures. Consequently the buyer assumes all risks in connection with the use and handling of this material.