1 Identification of substance:

Product details:

Product name: 2-Propanol

Stock number: 36644

Manufacturer/Supplier:
Alfa Aesar, A Johnson Matthey Company
Johnson Matthey Catalog Company, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Emergency Phone: (978) 521-6300
CHEMTREC: (800) 424-9300
Web Site: www.alfa.com

Information Department: Health, Safety and Environmental Department
Emergency information:
During normal hours the Health, Safety and Environmental Department. After normal hours call Chemtrec at (800) 424-9300.

2 Composition/Data on components:

Chemical characterization:
Description: (CAS#)
2-Propanol (CAS# 67-63-0): 100%
Identification number(s):
EINECS Number: 200-746-9
EU Number: 603-117-00-0

3 Hazards identification

Hazard description:

Xi Irritant
F Highly flammable

Information pertaining to particular dangers for man and environment
R 11 Highly flammable.
R 36 Irritating to eyes.
R 67 Vapours may cause drowsiness and dizziness
Classification system
HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

Health (acute effects) = 1
Flammability = 3
Reactivity = 0

4 First aid measures

After inhalation
Supply fresh air. If required, provide artificial respiration. Keep patient warm.
Seek immediate medical advice.

After skin contact
Immediately wash with water and soap and rinse thoroughly.
Seek immediate medical advice.

(Contd. on page 2)
### Material Safety Data Sheet

acc. to OSHA and ANSI

**Product name:** 2-Propanol

(Contd. of page 1)

**After eye contact**
Rinse opened eye for several minutes under running water. Then consult a doctor.

**After swallowing** Seek immediate medical advice.

**Information for doctor**
The following symptoms may occur:
- Unconsciousness
- Cramp
- Nausea
- Gastric or intestinal disorders.
- Headache

---

### 5 Fire fighting measures

**Suitable extinguishing agents**
Carbon dioxide, extinguishing powder or water spray. Fight larger fires with water spray or alcohol resistant foam.

**Special hazards caused by the material, its products of combustion or resulting gases:**
- In case of fire, the following can be released:
  - Carbon monoxide and carbon dioxide

**Protective equipment:**
- Wear self-contained respirator.
- Wear fully protective impervious suit.

---

### 6 Accidental release measures

**Person-related safety precautions:**
- Wear protective equipment. Keep unprotected persons away.
- Ensure adequate ventilation
- Keep away from ignition sources

**Measures for environmental protection:**
- Do not allow material to be released to the environment without proper governmental permits.

**Measures for cleaning/collecting:**
- Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
- Ensure adequate ventilation.
- Keep away from ignition sources.

**Additional information:**
- See Section 7 for information on safe handling
- See Section 8 for information on personal protection equipment.
- See Section 13 for disposal information.

---

### 7 Handling and storage

**Handling**

**Information for safe handling:**
- Keep container tightly sealed.
- Store in cool, dry place in tightly closed containers.
- Ensure good ventilation at the workplace.

**Information about protection against explosions and fires:**
- Keep ignition sources away.
- Protect against electrostatic charges.
- Fumes can combine with air to form an explosive mixture.

(Contd. on page 3)
Material Safety Data Sheet
acc. to OSHA and ANSI

Product name: 2-Propanol

Storage
Requirements to be met by storerooms and receptacles:
Store in a cool location.
Information about storage in one common storage facility:
Do not store together with oxidizing and acidic materials.
Store away from halogens.
Further information about storage conditions:
Keep container tightly sealed.
Store in cool, dry conditions in well sealed containers.

8 Exposure controls and personal protection

Additional information about design of technical systems:
Properly operating chemical fume hood designed for hazardous chemicals
and having an average face velocity of at least 100 feet per minute.

Components with limit values that require monitoring at the workplace:

Isopropyl alcohol (2-Propanol)

<table>
<thead>
<tr>
<th>Country</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>ACGIH TLV</td>
<td>400; 500-STEEL</td>
</tr>
<tr>
<td>Austria MAK</td>
<td>400</td>
</tr>
<tr>
<td>Belgium TWA</td>
<td>400; 500-STEEL</td>
</tr>
<tr>
<td>Denmark TWA</td>
<td>200</td>
</tr>
<tr>
<td>France VLE</td>
<td>400</td>
</tr>
<tr>
<td>Germany MAK</td>
<td>400</td>
</tr>
<tr>
<td>Ireland TWA</td>
<td>400; 500-STEEL (skin)</td>
</tr>
<tr>
<td>Japan TWA</td>
<td>400-STEEL</td>
</tr>
<tr>
<td>Korea TWA</td>
<td>400; 500-STEEL</td>
</tr>
<tr>
<td>Netherlands MAC-TGG</td>
<td>400 (skin)</td>
</tr>
<tr>
<td>Norway TWA</td>
<td>100</td>
</tr>
<tr>
<td>Poland TWA</td>
<td>900; 1200-STEEL</td>
</tr>
<tr>
<td>Russia TWA</td>
<td>400-STEEL</td>
</tr>
<tr>
<td>Sweden NGV</td>
<td>150; 250-STEEL</td>
</tr>
<tr>
<td>Switzerland MAK-W</td>
<td>400</td>
</tr>
<tr>
<td>United Kingdom TWA</td>
<td>400; 500-STEEL</td>
</tr>
<tr>
<td>OSHA PEL</td>
<td>400</td>
</tr>
</tbody>
</table>

Additional information: No data

Personal protective equipment

General protective and hygienic measures
The usual precautionary measures for handling chemicals should be followed.
Keep away from foodstuffs, beverages and feed.
Remove all soiled and contaminated clothing immediately.
Wash hands before breaks and at the end of work.

Breathing equipment:
Use suitable respirator when high concentrations are present.

Protection of hands: Impervious gloves
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties:

General Information

Form: Liquid

(Contd. of page 2)
Material Safety Data Sheet
acc. to OSHA and ANSI

Product name: 2-Propanol

(Contd. of page 3)

<table>
<thead>
<tr>
<th>Color:</th>
<th>Colorless</th>
</tr>
</thead>
<tbody>
<tr>
<td>Odor:</td>
<td>Alcohol-like</td>
</tr>
</tbody>
</table>

**Change in condition**
- Melting point/Melting range: -89.5°C (-129°F)
- Boiling point/Boiling range: 82.4°C (180°F)
- Sublimation temperature / start: Not determined

**Flash point:** 12°C (54°F)

**Flammability (solid, gaseous):** Highly flammable

**Ignition temperature:** 750°C (1382°F)

**Decomposition temperature:** Not determined

**Danger of explosion:** Product is not explosive. However, formation of explosive air/vapor mixtures is possible.

**Explosion limits:**
- Lower: 2.5 Vol %
- Upper: 12 Vol %

**Vapor pressure at 20°C (68°F):** 43.9 hPa (33 mm Hg)

**Density at 20°C (68°F):** 0.785 g/cm³

**Solubility in / Miscibility with Water:** Fully miscible

10 Stability and reactivity

**Thermal decomposition / conditions to be avoided:** Decomposition will not occur if used and stored according to specifications.

**Materials to be avoided:**
- Oxidizing agents
- Acids
- Halogens
- Acid anhydrides
- Hydrogen peroxide

**Dangerous reactions**
- Reacts with strong oxidizing agents
- May form explosive peroxides.

**Dangerous products of decomposition:** Carbon monoxide and carbon dioxide

11 Toxicological information

**Acute toxicity:**

<table>
<thead>
<tr>
<th>LD/LC50 values that are relevant for classification:</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Oral</strong></td>
</tr>
<tr>
<td>LD50</td>
</tr>
<tr>
<td>4797 mg/kg (dog)</td>
</tr>
<tr>
<td>3600 mg/kg (mus)</td>
</tr>
<tr>
<td>5000 mg/kg (rat)</td>
</tr>
<tr>
<td>6410 mg/kg (rbd)</td>
</tr>
<tr>
<td>6 mL/kg (cat)</td>
</tr>
<tr>
<td>1537 mg/kg (dog)</td>
</tr>
<tr>
<td><strong>LDLo</strong></td>
</tr>
</tbody>
</table>

(Contd. on page 5)
Material Safety Data Sheet
acc. to OSHA and ANSI

Product name: 2-Propanol

Lungs, Thorax, or Respiration - respiratory depression
Nutritional and Gross Metabolic - weight loss or decreased weight gain.
Peripheral Nerve and Sensation - spastic paralysis with or without sensory change.
Peripheral Nerve and Sensation - sensory change involving peripheral nerve.
Peripheral Nerve and Sensation - recording from peripheral motor nerve.
Related to Chronic Data - death.
Reproductive - Paternal Effects - spermatogenesis (including genetic material, sperm morphology, motility, and count).
Reproductive - Maternal Effects - menstrual cycle changes or disorders.
Reproductive - Fertility - litter size (e.g. # fetuses per litter; measured before birth).
Reproductive - Effects on Embryo or Fetus - fetotoxicity (except death, e.g., stunted fetus).
Reproductive - Effects on Embryo or Fetus - fetal death.
Reproductive - Fertility - pre-implantation mortality (e.g. reduction in number of implants per female; total number of implants per corpora lutea)
Reproductive - Fertility - post-implantation mortality (e.g. dead/or resorbed implants per total number of implants).
Reproductive - Specific Developmental Abnormalities - musculoskeletal system.
Reproductive - Maternal Effects - other effects.
Reproductive - Specific Developmental Abnormalities - other developmental abnormalities.
Reproductive - Effects on Newborn - viability index (e.g., # alive at day 4 per # born live).
Reproductive - Effects on Newborn - growth statistics (e.g.%, reduced weight gain).
Sense Organs and Special Senses (Eye) - effect, not otherwise specified.
Sense Organs and Special Senses (Eye) - optic nerve neuropathy.
Vascular - BP lowering not characterized in autonomic section.

Additional toxicological information:
In addition to local irritant manifestations, there is a narcotic effect when inhaling high concentrations, with the danger of central respiratory arrest.
To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.
IARC-3: Not classifiable as to carcinogenicity to humans.
ACGIH A4: Not classifiable as a human carcinogen: Inadequate data on which to classify the agent in terms of its carcinogenicity in humans and/or animals.

12 Ecological information:
General notes:
Do not allow material to be released to the environment without proper governmental permits.

13 Disposal considerations
Product:
Recommendation
Consult state, local or national regulations to ensure proper disposal.

(Contd. on page 7)
Material Safety Data Sheet
acc. to OSHA and ANSI

Product name: 2-Propanol

<table>
<thead>
<tr>
<th>Dermal</th>
<th>LD50</th>
<th>3570 mg/kg (hmn)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Inhalative</td>
<td>LC50</td>
<td>12800 mg/kg (rbt)</td>
</tr>
<tr>
<td></td>
<td>LC50/8H</td>
<td>53000 mg/m3 (mus)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>72600 mg/m3 (rat)</td>
</tr>
<tr>
<td>Irritation of skin</td>
<td>mild</td>
<td>16000 ppm/8H (rat)</td>
</tr>
<tr>
<td>Irritation of eyes</td>
<td>moderate</td>
<td>500 mg (rbt)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>10 mg (rbt)</td>
</tr>
<tr>
<td></td>
<td></td>
<td>100 mg (24H) (rbt)</td>
</tr>
</tbody>
</table>

Primary irritant effect:
on the skin: Irritant to skin and mucous membranes.
on the eye: Irritating effect.

Sensitization: No sensitizing effects known.

Other information (about experimental toxicology):
Reproductive effects have been observed on tests with laboratory animals.
Mutagenic effects have been observed on tests with laboratory animals.

Subacute to chronic toxicity:
2-Propanol may act as a local irritant and in high concentrations as a
narcotic with symptoms such as headache, nausea, dizziness, vomiting,
mental depression, anesthesia, and coma. Similar symptoms may be caused
by ingestion. It can cause corneal burns on contact with the eyes.

Subacute to chronic toxicity:
The Registry of Toxic Effects of Chemical Substances (RTECS) reports the
following effects in laboratory animals:
Behavioral - coma.
Behavioral - ataxia.
Behavioral - hallucinations, distorted perceptions.
Behavioral - somnolence (general depressed activity).
Behavioral - irritability.
Behavioral - altered sleep time (including change in righting reflex).
Biochemical - Enzyme inhibition, induction, or change in blood or tissue
levels - multiple enzyme effects.
Biochemical - Effect of specific coenzyme - B vitamins including folate.
Biochemical - Enzyme inhibition, induction, or change in blood or tissue
levels - true cholinesterase.
Behavioral - general anesthetic.
Blood - changes in serum composition (e.g. TP, bilirubin, cholesterol).
Blood - pigmented or nucleated red blood cells.
Brain and Coverings - changes in brain weight.
Brain and Coverings - other degenerative changes.
Cardiac - pulse rate.
Cardiac - arrhythmias (including changes in conduction).
Endocrine - effect on menstrual cycle.
Gastrointestinal - nausea or vomiting.
Kidney, Ureter, Bladder - other changes.
Kidney, Ureter, Bladder - other changes in urine composition.
Kidney, Ureter, Bladder - changes in bladder weight.
Kidney, Ureter, Bladder - changes in tubules (including acute renal
failure, acute tubular necrosis).
Liver - other changes.
Liver - changes in liver weight.
Liver - multiple effects.
Lungs, Thorax, or Respiration - dyspnea.
Lungs, Thorax, or Respiration - other changes.
Lungs, Thorax, or Respiration - chronic pulmonary edema.
15 Regulations

*Product related hazard informations:*

*Hazard symbols:*
- X1 Irritant
- F Highly flammable

*Risk phrases:*
- 11 Highly flammable.
- 36 Irritating to eyes.
- 67 Vapours may cause drowsiness and dizziness

*Safety phrases:*
- 7 Keep container tightly closed.
- 16 Keep away from sources of ignition - No smoking.
- 24/25 Avoid contact with skin and eyes.
- 26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.

*National regulations*
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory.

*Information about limitation of use:*
For use only by technically qualified individuals.

16 Other information:

Employers should use this information only as a supplement to other information gathered by them, and should make independent judgement of suitability of this information to ensure proper use and protect the health and safety of employees. This information is furnished without warranty, and any use of the product not in conformance with this Material Safety Data Sheet, or in combination with any other product or process, is the responsibility of the user.

*Department issuing MSDS: Health, Safety and Environmental Department.*

*Contact: Darrell R. Sanders*
Material Safety Data Sheet
acc. to OSHA and ANSI

Printing date 08/28/2006
Reviewed on 08/25/2006

Product name: 2-Propanol

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.
Recommended cleansing agent: Water, if necessary with cleansing agents.

14 Transport information

DOT regulations:

| Hazard class: | 3 |
| Identification number: | UN1219 |
| Packing group: | II |
| Proper shipping name (technical name): | ISOPROPANOL (ISOPROPYL ALCOHOL) |
| Label | flammable liquid |

Land transport ADR/RID (cross-border)

| ADR/RID class: | 3 (F1) Flammable liquids |
| Danger code (Kemler): | 33 |
| UN-Number: | 1219 |
| Packaging group: | II |
| Description of goods: | 1219 ISOPROPANOL (ISOPROPYL ALCOHOL) |

Maritime transport IMDG:

| IMDG Class: | 3 |
| UN Number: | 1219 |
| Label | 3 |
| Packaging group: | II |
| Proper shipping name: | ISOPROPANOL (ISOPROPYL ALCOHOL) |

Air transport ICAO-TI and IATA-DGR:

| ICAO/IATA Class: | 3 |
| UN/ID Number: | 1219 |
| Label | 3 |
| Packaging group: | II |
| Proper shipping name: | ISOPROPANOL (ISOPROPYL ALCOHOL) |