1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers
Product name : 2-Hexanone
Product Number : 103004
Brand : Sigma-Aldrich
Index-No. : 606-030-00-6
CAS-No. : 591-78-6

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses : Laboratory chemicals, Manufacture of substances

1.3 Details of the supplier of the safety data sheet
Company : Sigma-Aldrich
3050 Spruce Street
SAINT LOUIS MO  63103
USA
Telephone : +1 800-325-5832
Fax : +1 800-325-5052

1.4 Emergency telephone number
Emergency Phone # : (314) 776-6555

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture

GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 3), H226
Reproductive toxicity (Category 2), H361
Specific target organ toxicity - single exposure (Category 3), Central nervous system, H336
Specific target organ toxicity - repeated exposure (Category 1), H372

For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements

Pictogram

Signal word : Danger

Hazard statement(s)
H226 : Flammable liquid and vapour.
H336 : May cause drowsiness or dizziness.
H361 : Suspected of damaging fertility or the unborn child.
H372 : Causes damage to organs through prolonged or repeated exposure.

Precautionary statement(s)
P201 : Obtain special instructions before use.
P202 : Do not handle until all safety precautions have been read and understood.
P210 : Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P233 : Keep container tightly closed.
P240  Ground/bond container and receiving equipment.
P241  Use explosion-proof electrical/ ventilating/ lighting/ equipment.
P242  Use only non-sparking tools.
P243  Take precautionary measures against static discharge.
P260  Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
P264  Wash skin thoroughly after handling.
P270  Do not eat, drink or smoke when using this product.
P271  Use only outdoors or in a well-ventilated area.
P280  Wear protective gloves/ eye protection/ face protection.
P281  Use personal protective equipment as required.
P303 + P361 + P353  IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P304 + P340 + P312  IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing. Call a POISON CENTER or doctor/ physician if you feel unwell.
P308 + P313  IF exposed or concerned: Get medical advice/ attention.
P370 + P378  In case of fire: Use dry sand, dry chemical or alcohol-resistant foam for extinction.
P403 + P233  Store in a well-ventilated place. Keep container tightly closed.
P403 + P235  Store in a well-ventilated place. Keep cool.
P405  Store locked up.
P501  Dispose of contents/ container to an approved waste disposal plant.

2.3  Hazards not otherwise classified (HNOC) or not covered by GHS - none

3. COMPOSITION/INFORMATION ON INGREDIENTS

3.1  Substances
Synonyms  :  Butyl methyl ketone

Formula  :  C₆H₁₂O
Molecular weight  :  100.16 g/mol
CAS-No.  :  591-78-6
EC-No.  :  209-731-1
Index-No.  :  606-030-00-6

Hazardous components

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl butyl ketone</td>
<td>Flam. Liq. 3; Repr. 2; STOT SE 3; STOT RE 1; H226, H336, H361, H372</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

For the full text of the H-Statements mentioned in this Section, see Section 16.

4. FIRST AID MEASURES

4.1  Description of first aid measures

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

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

In case of skin contact
Wash off with soap and plenty of water. Take victim immediately to hospital. Consult a physician.

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

If swallowed
Do NOT induce vomiting. Never give anything by mouth to an unconscious person. Rinse mouth with water. Consult a physician.
4.2 Most important symptoms and effects, both acute and delayed
The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed
No data available

5. FIREFIGHTING MEASURES

5.1 Extinguishing media
Suitable extinguishing media
Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide.

5.2 Special hazards arising from the substance or mixture
Carbon oxides

5.3 Advice for firefighters
Wear self-contained breathing apparatus for firefighting if necessary.

5.4 Further information
Use water spray to cool unopened containers.

6. ACCIDENTAL RELEASE MEASURES

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapours, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapours accumulating to form explosive concentrations. Vapours can accumulate in low areas. For personal protection see section 8.

6.2 Environmental precautions
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

6.3 Methods and materials for containment and cleaning up
Contain spillage, and then collect with an electrically protected vacuum cleaner or by wet-brushing and place in container for disposal according to local regulations (see section 13).

6.4 Reference to other sections
For disposal see section 13.

7. HANDLING AND STORAGE

7.1 Precautions for safe handling
Avoid contact with skin and eyes. Avoid inhalation of vapour or mist. Keep away from sources of ignition - No smoking. Take measures to prevent the build up of electrostatic charge. For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities
Keep container tightly closed in a dry and well-ventilated place. Containers which are opened must be carefully resealed and kept upright to prevent leakage. Storage class (TRGS 510): Flammable liquids

7.3 Specific end use(s)
Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

8. EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1 Control parameters

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Value</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl butyl ketone</td>
<td>591-78-6</td>
<td>TWA</td>
<td>100 ppm 410 mg/m3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
</tr>
</tbody>
</table>

Remarks: The value in mg/m3 is approximate.
The value in mg/m³ is approximate.

<table>
<thead>
<tr>
<th>TWA</th>
<th>100.000000 ppm</th>
<th>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>410.000000 mg/m³</td>
<td></td>
</tr>
</tbody>
</table>

US. ACGIH Threshold Limit Values (TLV)

Testicular damage
Peripheral neuropathy
Substances for which there is a Biological Exposure Index or Indices (see BEI® section)
Danger of cutaneous absorption

TWA 5 ppm

The value in mg/m³ is approximate.

<table>
<thead>
<tr>
<th>TWA</th>
<th>5.000000 ppm</th>
<th>USA. ACGIH Threshold Limit Values (TLV)</th>
</tr>
</thead>
</table>

US. ACGIH Threshold Limit Values (TLV)

Testicular damage
Peripheral neuropathy
Substances for which there is a Biological Exposure Index or Indices (see BEI® section)
Danger of cutaneous absorption

TWA 10 ppm

US. ACGIH Threshold Limit Values (TLV)

Testicular damage
Peripheral neuropathy
Substances for which there is a Biological Exposure Index or Indices (see BEI® section)
Danger of cutaneous absorption

STEL 10 ppm

US. ACGIH Threshold Limit Values (TLV)

Testicular damage
Peripheral neuropathy
Substances for which there is a Biological Exposure Index or Indices (see BEI® section)
Danger of cutaneous absorption

STEL 1 ppm

US. ACGIH Threshold Limit Values (TLV)

Testicular damage
Peripheral neuropathy
Substances for which there is a Biological Exposure Index or Indices (see BEI® section)
Danger of cutaneous absorption

TWA 5 ppm

US. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000

TWA 1.000000 ppm

US. NIOSH Recommended Exposure Limits

Biological occupational exposure limits

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Parameters</th>
<th>Value</th>
<th>Biological specimen</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>Methyl butyl ketone</td>
<td>591-78-6</td>
<td>2,5-Hexanedione</td>
<td>0.4000 mg/l</td>
<td>In urine</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td></td>
<td>End of shift at end of workweek</td>
</tr>
</tbody>
</table>

8.2 Exposure controls

Appropriate engineering controls
Handle in accordance with good industrial hygiene and safety practice. Wash hands before breaks and at the end of workday.

Personal protective equipment

Eye/face protection
Face shield and safety glasses. Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).

Skin protection
Handle with gloves. Gloves must be inspected prior to use. Use proper glove removal technique (without touching glove's outer surface) to avoid skin contact with this product. Dispose of contaminated gloves after use in accordance with applicable laws and good laboratory practices. Wash and dry hands.
Splash contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 60 min
Material tested: Butoject® (KCL 897 / Aldrich Z677647, Size M)

data source: KCL GmbH, D-36124 Eichenzell, phone +49 (0)6659 87300, e-mail sales@kcl.de, test method: EN374
If used in solution, or mixed with other substances, and under conditions which differ from EN 374, contact the supplier of the CE approved gloves. This recommendation is advisory only and must be evaluated by an industrial hygienist and safety officer familiar with the specific situation of anticipated use by our customers. It should not be construed as offering an approval for any specific use scenario.

**Body Protection**
Complete suit protecting against chemicals, Flame retardant antistatic protective clothing. The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.

**Respiratory protection**
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. Use respirators and components tested and approved under appropriate government standards such as NIOSH (US) or CEN (EU).

**Control of environmental exposure**
Prevent further leakage or spillage if safe to do so. Do not let product enter drains.

### 9. PHYSICAL AND CHEMICAL PROPERTIES

#### 9.1 Information on basic physical and chemical properties

- **a)** Appearance
  - Form: clear, liquid
  - Colour: colourless

- **b)** Odour
  - No data available

- **c)** Odour Threshold
  - No data available

- **d)** pH
  - No data available

- **e)** Melting point/freezing point
  - Melting point/range: -57 °C (-71 °F) - lit.

- **f)** Initial boiling point and boiling range
  - 127 °C (261 °F) - lit.

- **g)** Flash point
  - 23 °C (73 °F) - closed cup

- **h)** Evaporation rate
  - No data available

- **i)** Flammability (solid, gas)
  - No data available

- **j)** Upper/lower flammability or explosive limits
  - Upper explosion limit: 8.1 % (V)
  - Lower explosion limit: 1.3 % (V)

- **k)** Vapour pressure
  - 1,013 hPa (760 mmHg) at 127.5 °C (261.5 °F)
  - 13 hPa (10 mmHg) at 39 °C (102 °F)

- **l)** Vapour density
  - 3.46 - (Air = 1.0)

- **m)** Relative density
  - 0.812 g/cm3 at 25 °C (77 °F)

- **n)** Water solubility
  - Slightly soluble

- **o)** Partition coefficient: n-octanol/water
  - log Pow: 1.38

- **p)** Auto-ignition temperature
  - No data available

- **q)** Decomposition
  - No data available
temperature

r) Viscosity No data available
s) Explosive properties No data available
t) Oxidizing properties No data available

9.2 Other safety information

Surface tension 25.49 mN/m at 20 °C (68 °F)
Relative vapour density 3.46 - (Air = 1.0)

10. STABILITY AND REACTIVITY

10.1 Reactivity
No data available

10.2 Chemical stability
Stable under recommended storage conditions.

10.3 Possibility of hazardous reactions
Vapours may form explosive mixture with air.

10.4 Conditions to avoid
Heat, flames and sparks.

10.5 Incompatible materials
Oxidizing agents, Strong bases

10.6 Hazardous decomposition products
Other decomposition products - No data available
In the event of fire: see section 5

11. TOXICOLOGICAL INFORMATION

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - 2,590 mg/kg
LC50 Inhalation - Rat - 4 h - 8000 ppm
LD50 Dermal - Rabbit - 4,800 mg/kg
No data available

Skin corrosion/irritation
Skin - Rabbit
Result: Mild skin irritation - 24 h

Serious eye damage/eye irritation
Eyes - Rabbit
Result: Mild eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

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

ACGIH: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

NTP: No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.
OSHA: No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by OSHA.

Reproductive toxicity
Suspected human reproductive toxicant
Reproductive toxicity - Rat - Inhalation
Effects on Newborn: Live birth index (# fetuses per litter; measured after birth). Effects on Newborn: Growth statistics (e.g., reduced weight gain). Effects on Newborn: Behavioral.

Overexposure may cause reproductive disorder(s) based on tests with laboratory animals.

Developmental Toxicity - Rat - Inhalation
Specific Developmental Abnormalities: Gastrointestinal system. Specific Developmental Abnormalities: Urogenital system.

Specific target organ toxicity - single exposure
May cause drowsiness or dizziness.

Specific target organ toxicity - repeated exposure
Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard
No data available

Additional Information
RTECS: MP1400000

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

Stomach - Irregularities - Based on Human Evidence
Stomach - Irregularities - Based on Human Evidence

12. ECOLOGICAL INFORMATION
12.1 Toxicity
Toxicity to fish  
LC50 - Pimephales promelas (fathead minnow) - 428 mg/l - 96 h

12.2 Persistence and degradability
No data available

12.3 Bioaccumulative potential
No data available

12.4 Mobility in soil
No data available

12.5 Results of PBT and vPvB assessment
PBT/vPvB assessment not available as chemical safety assessment not required/not conducted

12.6 Other adverse effects
No data available

13. DISPOSAL CONSIDERATIONS
13.1 Waste treatment methods

Product
Burn in a chemical incinerator equipped with an afterburner and scrubber but exert extra care in igniting as this material is highly flammable. Offer surplus and non-recyclable solutions to a licensed disposal company. Contact a licensed professional waste disposal service to dispose of this material.

Contaminated packaging
Dispose of as unused product.

14. TRANSPORT INFORMATION

DOT (US)
UN number: 1224  Class: 3  Packing group: III
Proper shipping name: Ketones, liquid, n.o.s. (Methyl butyl ketone)
Reportable Quantity (RQ):

Poison Inhalation Hazard: No

IMDG
UN number: 1224  Class: 3  Packing group: III  EMS-No: F-E, S-D
Proper shipping name: KETONES, LIQUID, N.O.S. (Methyl butyl ketone)

IATA
UN number: 1224  Class: 3  Packing group: III
Proper shipping name: Ketones, liquid, n.o.s. (Methyl butyl ketone)

15. REGULATORY INFORMATION

SARA 302 Components
No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

SARA 313 Components
This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

SARA 311/312 Hazards
Fire Hazard, Chronic Health Hazard

Massachusetts Right To Know Components
Methyl butyl ketone  CAS-No.  591-78-6  Revision Date  1993-04-24

Pennsylvania Right To Know Components
Methyl butyl ketone  CAS-No.  591-78-6  Revision Date  1993-04-24

New Jersey Right To Know Components
Methyl butyl ketone  CAS-No.  591-78-6  Revision Date  1993-04-24

California Prop. 65 Components
WARNING: This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.
Methyl butyl ketone

16. OTHER INFORMATION

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

Flam. Liq.  Flammable liquids
H226  Flammable liquid and vapour.
H336  May cause drowsiness or dizziness.
H361  Suspected of damaging fertility or the unborn child.
H372  Causes damage to organs through prolonged or repeated exposure.
Repr.  Reproductive toxicity
STOT RE  Specific target organ toxicity - repeated exposure
STOT SE  Specific target organ toxicity - single exposure

HMIS Rating
Health hazard:  1
Chronic Health Hazard:  *
Flammability:  3
Physical Hazard  0
NFPA Rating
Health hazard: 0
Fire Hazard: 3
Reactivity Hazard: 0

Further information
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Preparation Information
Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

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