1. PRODUCT AND COMPANY IDENTIFICATION

1.1 Product identifiers
Product name: Methyl isobutyl ketone
Product Number: V000239
Brand: Vetec
Index-No.: 606-004-00-4
CAS-No.: 108-10-1

1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses: Laboratory chemicals, Synthesis 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 #: +1-703-527-3887 (CHEMTREC)

2. HAZARDS IDENTIFICATION

2.1 Classification of the substance or mixture
GHS Classification in accordance with 29 CFR 1910 (OSHA HCS)
Flammable liquids (Category 2), H225
Acute toxicity, Inhalation (Category 4), H332
Eye irritation (Category 2A), H319
Carcinogenicity (Category 2), H351
Specific target organ toxicity - single exposure (Category 3), Respiratory system, H335

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)
H225: Highly flammable liquid and vapour.
H319: Causes serious eye irritation.
H332: Harmful if inhaled.
H335: May cause respiratory irritation.
H351: Suspected of causing cancer.

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.
P261  Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P264  Wash skin thoroughly after handling.
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.
P305 + P351 + P338  IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313  IF exposed or concerned: Get medical advice/ attention.
P337 + P313  If eye irritation persists: 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
Repeated exposure may cause skin dryness or cracking.
May form explosive peroxides.

3. COMPOSITION INFORMATION ON INGREDIENTS

3.1 Substances

<table>
<thead>
<tr>
<th>Substance</th>
<th>Formula</th>
<th>Molecular weight</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Index-No.</th>
<th>Hazardous components</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Methylpentan-2-one</td>
<td>C₆H₁₂O</td>
<td>100.16 g/mol</td>
<td>108-10-1</td>
<td>203-550-1</td>
<td>606-004-00-4</td>
<td>Flam. Liq. 2; Acute Tox. 4; Eye Irrit. 2A; Carc. 2; STOT SE 3; H225, H319, H332, H335, H351</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. 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
No data available

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.
Use explosion-proof equipment. 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.

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

8. EXPOSURE CONTROLS/PERSOAL PROTECTION
8.1 Control parameters
Components with workplace 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>4-Methylpentan-2-one</td>
<td>108-10-1</td>
<td>STEL</td>
<td>75 ppm</td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
</tr>
<tr>
<td>Remarks</td>
<td></td>
<td></td>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Upper Respiratory Tract irritation</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Headache</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Dizziness</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Substances for which there is a Biological Exposure Index or Indices (see BEI® section)</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>Confirmed animal carcinogen with unknown relevance to humans</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td>50 ppm</td>
<td>205 mg/m3</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>75 ppm</td>
<td>300 mg/m3</td>
<td>USA. OSHA - TABLE Z-1 Limits for Air Contaminants - 1910.1000</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100 ppm</td>
<td>410 mg/m3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The value in mg/m3 is approximate.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>100.000000 ppm</td>
<td>410.000000 mg/m3</td>
<td>USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants</td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
<td></td>
<td>The value in mg/m3 is approximate.</td>
<td></td>
</tr>
<tr>
<td></td>
<td>20 ppm</td>
<td></td>
<td>USA. ACGIH Threshold Limit Values (TLV)</td>
<td></td>
</tr>
<tr>
<td>TWA</td>
<td>50 ppm</td>
<td>205 mg/m3</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>75 ppm</td>
<td>300 mg/m3</td>
<td>USA. NIOSH Recommended Exposure Limits</td>
<td></td>
</tr>
<tr>
<td></td>
<td>50 ppm</td>
<td>205 mg/m3</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
<td></td>
</tr>
<tr>
<td></td>
<td>75 ppm</td>
<td>300 mg/m3</td>
<td>California permissible exposure limits for chemical contaminants (Title 8, Article 107)</td>
<td></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.

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: liquid
b) Odour No data available
c) Odour Threshold No data available
d) pH No data available
e) Melting point/freezing point Melting point/range: -80 °C (-112 °F)
f) Initial boiling point and boiling range 117 - 118 °C (243 - 244 °F) at 1,013 hPa (760 mmHg)
g) Flash point 14 °C (57 °F) - closed cup
h) Evaporation rate No data available
<table>
<thead>
<tr>
<th>i)</th>
<th>Flammability (solid, gas)</th>
<th>No data available</th>
</tr>
</thead>
<tbody>
<tr>
<td>j)</td>
<td>Upper/lower flammability or explosive limits</td>
<td>Upper explosion limit: 8 % (V) Lower explosion limit: 1.2 % (V)</td>
</tr>
<tr>
<td>k)</td>
<td>Vapour pressure</td>
<td>20 hPa (15 mmHg) at 20 °C (68 °F)</td>
</tr>
<tr>
<td>l)</td>
<td>Vapour density</td>
<td>3.46 - (Air = 1.0)</td>
</tr>
<tr>
<td>m)</td>
<td>Relative density</td>
<td>0.800 g/cm³</td>
</tr>
<tr>
<td>n)</td>
<td>Water solubility</td>
<td>ca.20 g/l</td>
</tr>
<tr>
<td>o)</td>
<td>Partition coefficient: n-octanol/water</td>
<td>log Pow: 1.31</td>
</tr>
<tr>
<td>p)</td>
<td>Auto-ignition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>q)</td>
<td>Decomposition temperature</td>
<td>No data available</td>
</tr>
<tr>
<td>r)</td>
<td>Viscosity</td>
<td>No data available</td>
</tr>
<tr>
<td>s)</td>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>t)</td>
<td>Oxidizing properties</td>
<td>No data available</td>
</tr>
</tbody>
</table>

### 9.2 Other safety information

- Surface tension: 23.6 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.
Test for peroxide formation before distillation or evaporation. Test for peroxide formation or discard after 1 year.

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

#### 10.4 Conditions to avoid
Heat, flames and sparks. Extremes of temperature and direct sunlight.

#### 10.5 Incompatible materials
Oxidizing agents, Strong bases

#### 10.6 Hazardous decomposition products
Hazardous decomposition products formed under fire conditions. - Carbon oxides
In the event of fire: see section 5

### 11. TOXICOLOGICAL INFORMATION

#### 11.1 Information on toxicological effects

**Acute toxicity**
LD50 Oral - Rat - 2,080 mg/kg
LC50 Inhalation - Rat - 4 h - 8.2 - 16.4 mg/m³
LD50 Dermal - Rabbit - > 16,000 mg/kg
No data available

**Skin corrosion/irritation**
Skin - Rabbit
Result: Mild skin irritation - 24 h
Serious eye damage/eye irritation
Eyes - Rabbit
Result: Moderate eye irritation - 24 h

Respiratory or skin sensitisation
No data available

Germ cell mutagenicity
No data available

Carcinogenicity
IARC: 2B - Group 2B: Possibly carcinogenic to humans (4-Methylpentan-2-one)
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
No data available

Developmental Toxicity - Mouse - Inhalation
Effects on Embryo or Fetus: Fetotoxicity (except death, e.g., stunted fetus). Effects on Embryo or Fetus: Fetal death.

Specific Developmental Abnormalities: Central nervous system. Specific Developmental Abnormalities: Musculoskeletal system. Specific Developmental Abnormalities: Cardiovascular (circulatory) system.

Specific target organ toxicity - single exposure
May cause respiratory irritation.

Specific target organ toxicity - repeated exposure
No data available

Aspiration hazard
No data available

Additional Information
RTECS: SA9275000
Blurred vision, Dermatitis, 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 LC0 - Leuciscus idus melanotus - 480 mg/l - 48 h
Toxicity to daphnia and other aquatic invertebrates EC50 - Daphnia magna (Water flea) - 1,550 - 3,623 mg/l - 24 h
Toxicity to algae EC50 - Desmodesmus subspicatus (green algae) - 980 - 2,000 mg/l - 48 h

12.2 Persistence and degradability
Biodegradability Biotic/Aerobic - Exposure time 7 d

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: 1245  Class: 3  Packing group: II
Proper shipping name: Methyl isobutyl ketone
Reportable Quantity (RQ): 5000 lbs

Poison Inhalation Hazard: No

IMDG
UN number: 1245  Class: 3  Packing group: II  EMS-No: F-E, S-D
Proper shipping name: METHYL ISOBUTYL KETONE

IATA
UN number: 1245  Class: 3  Packing group: II
Proper shipping name: Methyl isobutyl 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
The following components are subject to reporting levels established by SARA Title III, Section 313:

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Methylpentan-2-one</td>
<td>108-10-1</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

SARA 311/312 Hazards
Fire Hazard, Acute Health Hazard, Chronic Health Hazard

Massachusetts Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Methylpentan-2-one</td>
<td>108-10-1</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

Pennsylvania Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Methylpentan-2-one</td>
<td>108-10-1</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

New Jersey Right To Know Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Methylpentan-2-one</td>
<td>108-10-1</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

California Prop. 65 Components
WARNING! This product contains a chemical known to the State of California to cause cancer.

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>4-Methylpentan-2-one</td>
<td>108-10-1</td>
<td>2011-11-18</td>
</tr>
</tbody>
</table>
16. OTHER INFORMATION

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

<table>
<thead>
<tr>
<th>Acute Tox.</th>
<th>Acute toxicity</th>
</tr>
</thead>
<tbody>
<tr>
<td>Carc.</td>
<td>Carcinogenicity</td>
</tr>
<tr>
<td>Eye Irrit.</td>
<td>Eye irritation</td>
</tr>
<tr>
<td>Flam. Liq.</td>
<td>Flammable liquids</td>
</tr>
<tr>
<td>H225</td>
<td>Highly flammable liquid and vapour.</td>
</tr>
<tr>
<td>H319</td>
<td>Causes serious eye irritation.</td>
</tr>
<tr>
<td>H332</td>
<td>Harmful if inhaled.</td>
</tr>
<tr>
<td>H335</td>
<td>May cause respiratory irritation.</td>
</tr>
<tr>
<td>H351</td>
<td>Suspected of causing cancer.</td>
</tr>
<tr>
<td>STOT SE</td>
<td>Specific target organ toxicity - single exposure</td>
</tr>
</tbody>
</table>

**HMIS Rating**

- Health hazard: 2
- Chronic Health Hazard: *
- Flammability: 3
- Physical Hazard: 0

**NFPA Rating**

- Health hazard: 2
- Fire Hazard: 3
- Reactivity Hazard: 0

**Further information**

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slip for additional terms and conditions of sale.

**Preparation Information**

Sigma-Aldrich Corporation
Product Safety – Americas Region
1-800-521-8956

Version: 5.6 Revision Date: 09/23/2016 Print Date: 03/21/2018