1 Identification

Product identifier

Product name: 2-Butanone

Stock number: 31069
CAS Number: 78-93-3
EC number: 201-159-0
Index number: 606-002-00-3

Relevant identified uses of the substance or mixture and uses advised against.
Identified use: SU24 Scientific research and development

Details of the supplier of the safety data sheet

Manufacturer/Supplier: Alfa Aesar
Thermo Fisher Scientific Chemicals, Inc.
30 Bond Street
Ward Hill, MA 01835-8099
Tel: 800-343-0660
Fax: 800-322-4757
Email: tech@alfa.com
www.alfa.com

Information Department: Health, Safety and Environmental Department

Emergency telephone number:
During normal business hours (Monday-Friday, 8am-7pm EST), call (800) 343-0660. After normal business hours, call Carechem 24 at (866) 928-0789.

2 Hazard(s) identification

Classification of the substance or mixture in accordance with 29 CFR 1910 (OSHA HCS)

GHS02 Flame
Flam. Liq. 2 H225 Highly flammable liquid and vapor.

GHS07
Eye Irrit. 2 H319 Causes serious eye irritation.
STOT SE 3 H336 May cause drowsiness or dizziness.

Hazards not otherwise classified No information known.

Label elements

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms

GHS02 GHS07

Signal word Danger

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

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

WHMIS classification
B2 - Flammable liquid
D2B - Toxic material causing other toxic effects

Classification system

HMIS ratings (scale 0-4)
(Hazardous Materials Identification System)

Health (acute effects) = 1
Flammability = 3
Physical Hazard = 1

Other hazards

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

3 Composition/information on ingredients

Chemical characterization: Substances

CAS# Description: 78-93-3 2-Butanone
Identification number(s):
EC number: 201-159-0
Index number: 606-002-00-3

(Contd. on page 2)
### 4 First-aid measures

**Description of 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.

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

**After swallowing**  
Seek medical treatment.

**Information for doctor**

- Most important symptoms and effects, both acute and delayed: No further relevant information available.
- Indication of any immediate medical attention and special treatment needed: No further relevant information available.

### 5 Fire-fighting measures

**Extinguishing media**

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

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

If this product is involved in a fire, the following can be released: Carbon monoxide and carbon dioxide

**Advice for firefighters**

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

### 6 Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

- Wear protective equipment. Keep unprotected persons away.
- Ensure adequate ventilation.
- Keep away from ignition sources.

**Environmental precautions:**

- Do not allow product to reach sewage system or any water course.
- Ensure adequate ventilation.

**Methods and material for containment and cleaning up:**

- Absorb with liquid-binding material (sand, diatomite, acid binders, universal binders, sawdust).
- Ensure adequate ventilation.

**Prevention of secondary hazards:**

- Keep away from ignition sources.

**Reference to other sections**

- 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**

- Precautions 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:**

- Fumes can combine with air to form an explosive mixture.
- Keep ignition sources away.

**Conditions for safe storage, including any incompatibilities**

**Storage**

- Requirements to be met by storerooms and receptacles: Store in a cool location.
- Information about storage in one common storage facility:
  - Store away from strong bases.
  - Store away from oxidizing agents.
  - Store away from reducing agents.
  - Store away from amines.

**Further information about storage conditions:**

- Keep container tightly sealed.
- Store in cool, dry conditions in well sealed containers.

**Specific end use(s):** No further relevant information available.

### 8 Exposure controls/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.

**Control parameters**

**Components with limit values that require monitoring at the workplace:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>PEL (USA)</td>
<td>Long-term: 590 mg/m³, 200 ppm</td>
</tr>
<tr>
<td>REL (USA)</td>
<td>Short-term: 885 mg/m³, 200 ppm</td>
</tr>
<tr>
<td>TLV (USA)</td>
<td>Long-term: 590 mg/m³, 300 ppm</td>
</tr>
<tr>
<td>BEI (USA)</td>
<td>Short-term: 885 mg/m³, 200 ppm</td>
</tr>
<tr>
<td>EL (Canada)</td>
<td>Short-term: 100 ppm</td>
</tr>
<tr>
<td>EV (Canada)</td>
<td>Long-term: 50 ppm</td>
</tr>
<tr>
<td></td>
<td>Short-term: 885 mg/m³, 300 ppm</td>
</tr>
<tr>
<td></td>
<td>Long-term: 590 mg/m³, 200 ppm</td>
</tr>
</tbody>
</table>

**Ingredients with biological limit values:**

<table>
<thead>
<tr>
<th>Component</th>
<th>Limit Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>BET (USA)</td>
<td>2 mg/L Medium: urine Time: end of shift Parameter: MEK</td>
</tr>
</tbody>
</table>

**Additional information:** No data
Exposure controls
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.
Avoid contact with the eyes.
Avoid contact with the eyes and skin.
Maintain an ergonomically appropriate working environment.
Breathing equipment: Use suitable respirator when high concentrations are present.
Recommended filter device for short term use:
Use a respirator with multi-purpose combination (US) or type ABEK (EN 14387) as a backup to engineering controls. Risk assessment should be performed to determine if air-purifying respirators are appropriate. Only use equipment tested and approved under appropriate government standards such as NIOSH (USA) or CEN (EU).
Protection of hands:
Impervious gloves
Check protective gloves prior to each use for their proper condition.
The selection of suitable gloves not only depends on the material, but also on quality. Quality will vary from manufacturer to manufacturer.
Material of gloves Butyl rubber, BR
Penetration time of glove material (in minutes) 292
Glove thickness 0.3 mm
Eye protection: Safety glasses
Body protection: Protective work clothing.

9 Physical and chemical properties
Information on basic physical and chemical properties
General Information
Appearance:
Form: Liquid
Color: Colorless
Odor: Characteristic
Odor threshold: Not determined.
pH-value: Not determined.
Change in condition
Melting point/Melting range: -87 °C (-125 °F)
Boiling point/Boiling range: 80 °C (176 °F)
Sublimation temperature / start: Not determined
Flash point: -3 °C (27 °F)
Flammability (solid, gaseous) Not determined.
Ignition temperature: 514 °C (957 °F)
Decomposition temperature: Not determined
Auto igniting: Not determined.
Danger of explosion: Product is not explosive. However, formation of explosive air/vapor mixtures is possible.
Explosion limits:
Lower: 1.8 Vol %
Upper: 11.5 Vol %
Vapor pressure at 20 °C (68 °F): 101 hPa (76 mm Hg)
Density at 20 °C (68 °F): 0.805 g/cm³ (6.718 lbs/gal)
Relative density Not determined.
Vapor density Not determined.
Evaporation rate Not determined.
Solubility in / Miscibility with
Water at 20 °C (68 °F): 290 g/l
Partition coefficient (n-octanol/water): Not determined.
Viscosity:
dynamic at 15 °C (59 °F): 0.423 mPas
kinematic: Not determined.
Other information No further relevant information available.

10 Stability and reactivity
Reactivity No information known.
Chemical stability Stable under recommended storage conditions.
Thermal decomposition / conditions to be avoided: Decomposition will not occur if used and stored according to specifications.
Possibility of hazardous reactions Reacts with strong oxidizing agents
Conditions to avoid No further relevant information available.
Incompatible materials:
Oxidizing agents
Bases
Reducing agents
Amines
Hazardous decomposition products: Carbon monoxide and carbon dioxide

11 Toxicological information
Information on toxicological effects
Acute toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains acute toxicity data for this substance.
LD/LC50 values that are relevant for classification:
Oral LD50 2737 mg/kg (rat)
Dermal LD50 6480 mg/kg (rabbit)
Skin irritation or corrosion: Repeated exposure may cause skin dryness or cracking.
Eye irritation or corrosion: Causes serious eye irritation.
Sensitization: No sensitizing effects known.
Germ cell mutagenicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains mutation data for this substance.
Carcinogenicity: No classification data on carcinogenic properties of this material is available from the EPA, IARC, NTP, OSHA or ACGIH.
Reproductive toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains reproductive data for this substance.
Specific target organ system toxicity - repeated exposure: No effects known.

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Product name: 2-Butanone

Specific target organ system toxicity - single exposure:
May cause drowsiness or dizziness.
May cause respiratory irritation.

Aspiration hazard: No effects known.

Subacute to chronic toxicity: The Registry of Toxic Effects of Chemical Substances (RTECS) contains multiple dose toxicity data for this substance.

Additional toxicological information: To the best of our knowledge the acute and chronic toxicity of this substance is not fully known.

Carcinogenic categories
OSHA-Ca (Occupational Safety & Health Administration) Substance is not listed.

12 Ecological information

Toxicity
Aquatic toxicity: No further relevant information available.

Persistence and degradability No further relevant information available.

Bioaccumulative potential No further relevant information available.

Mobility in soil No further relevant information available.

Additional ecological information:

General notes:
Do not allow undiluted product or large quantities to reach ground water, water course or sewage system.
Avoid transfer into the environment.

Results of PBT and vPvB assessment
PBT: Not applicable.
vPvB: Not applicable.

Other adverse effects No further relevant information available.

13 Disposal considerations

Waste treatment methods
Recommendation Consult state, local or national regulations to ensure proper disposal.

Uncleaned packagings:
Recommendation: Disposal must be made according to official regulations.

14 Transport information

UN-Number
DOT, IMDG, IATA UN1193

UN proper shipping name
DOT Ethyl methyl ketone (Methyl ethyl ketone)
IMDG, IATA ETHYL METHYL KETONE (METHYL ETHYL KETONE)

Transport hazard class(es)

DOT

Class Label 3 Flammable liquids.
Class Label 3 (F1) Flammable liquids

IMDG, IATA

Class Label 3 Flammable liquids.

Packing group
DOT, IMDG, IATA II

Environmental hazards:
Not applicable.

Special precautions for user
EMS Number: Warning: Flammable liquids
F-E-S-D

Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.

Transport/Additional information:

DOT Marine Pollutant (DOT): No

UN “Model Regulation”: UN1193, Ethyl methyl ketone (Methyl ethyl ketone), 3, II

15 Regulatory information

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

GHS label elements The product is classified and labeled in accordance with 29 CFR 1910 (OSHA HCS)

Hazard pictograms

GHS02 GHS07

Signal word Danger

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

Precautionary statements
P210 Keep away from heat/sparks/open flames/hot surfaces. - No smoking.
P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P303+P361+P353 IF ON SKIN (or hair): Remove/Take off immediately all contaminated clothing. Rinse skin with water/shower.
P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

(Contd. on page 5)
Product name: 2-Butanone

P405 Store locked up.
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.

National regulations
All components of this product are listed in the U.S. Environmental Protection Agency Toxic Substances Control Act Chemical substance Inventory. All components of this product are listed on the Canadian Domestic Substances List (DSL).

SARA Section 313 (specific toxic chemical listings)
78-93-3 2-Butanone

California Proposition 65
Prop 65 - Chemicals known to cause cancer Substance is not listed.
Prop 65 - Developmental toxicity Substance is not listed.
Prop 65 - Developmental toxicity, female Substance is not listed.
Prop 65 - Developmental toxicity, male Substance is not listed.

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

Other regulations, limitations and prohibitive regulations
Substance of Very High Concern (SVHC) according to the REACH Regulations (EC) No. 1907/2006. Substance is not listed.
The conditions of restrictions according to Article 67 and Annex XVII of the Regulation (EC) No 1907/2006 (REACH) for the manufacturing, placing on the market and use must be observed.
Substance is not listed.
Annex XIV of the REACH Regulations (requiring Authorisation for use) Substance is not listed.

Chemical safety assessment: A Chemical Safety Assessment has not been carried out.

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 SDS: Global Marketing Department
Date of preparation / last revision 01/21/2016 / -

Abbreviations and acronyms:
ADR: Accord européen sur le transport des marchandises dangereuses par Route (European Agreement concerning the International Carriage of Dangerous Goods by Road)
ADNAC: International Maritime Code for Dangerous Goods
DOT: US Department of Transportation
IMDG: International Air Transport Association
EINECS: European Inventory of Existing Commercial Chemical Substances
CAS: Chemical Abstracts Service (division of the American Chemical Society)
HMIS: Hazardous Materials Identification System (USA)
WHMIS: Workplace Hazardous Materials Information System (Canada)
LC50: Lethal concentration, 50 percent
LD50: Lethal dose, 50 percent
vPvB: very Persistent and very Bioaccumulative
ACGIH: American Conference of Governmental Industrial Hygienists (USA)
OSHA: Occupational Safety and Health Administration (USA)
NTP: National Toxicology Program (USA)
IARC: International Agency for Research on Cancer
EPA: Environmental Protection Agency (USA)
Flam. Liq. 2: Flammable liquids, Hazard Category 2
Eye Irrit. 2: Serious eye damage/eye irritation, Hazard Category 2
STOT SE 3: Specific target organ toxicity - Single exposure, Hazard Category 3