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

1.1 Product identifiers
- Product name: Ethanol
- Product Number: 46139
- Brand: Sigma-Aldrich
- Index-No.: 603-002-00-5
- CAS-No.: 64-17-5

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 Inc.
  3050 SPRUCE ST
  ST. LOUIS MO  63103
  UNITED STATES
- Telephone: +1 314 771-5765
- Fax: +1 800 325-5052

1.4 Emergency telephone
- Emergency Phone #: 800-424-9300 CHEMTREC (USA) +1-703-527-3887 CHEMTREC (International) 24 Hours/day; 7 Days/week

SECTION 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
  - Eye irritation (Category 2A), H319
- For the full text of the H-Statements mentioned in this Section, see Section 16.

2.2 GHS Label elements, including precautionary statements
- Pictogram: Flammable liquid and vapor
- Signal word: Danger
- Hazard statement(s)
  - H225: Highly flammable liquid and vapor.
  - H319: Causes serious eye irritation.
Precautionary statement(s)
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.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ eye protection/ face protection.
P303 + P361 + P353 IF ON SKIN (or hair): 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.
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 to extinguish.
P403 + P235 Store in a well-ventilated place. Keep cool.
P501 Dispose of contents/ container to an approved waste disposal plant.

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

SECTION 3: Composition/information on ingredients

3.1 Substances
Synonyms: Ethyl alcohol

<table>
<thead>
<tr>
<th>Component</th>
<th>Classification</th>
<th>Concentration</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethanol</td>
<td>Flam. Liq. 2; Eye Irrit. 2A; H225, H319</td>
<td>&lt;= 100 %</td>
</tr>
</tbody>
</table>

Concentration limits:
>= 50 %: Eye Irrit. 2A, H319;

For the full text of the H-Statements mentioned in this Section, see Section 16.
SECTION 4: First aid measures

4.1 Description of first-aid measures

General advice
Consult a physician. Show this material 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

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media
Dry powder
Dry sand

Unsuitable extinguishing media
Do NOT use water jet.

5.2 Special hazards arising from the substance or mixture
Carbon oxides
Combustible.

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.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Use personal protective equipment. Avoid breathing vapors, mist or gas. Ensure adequate ventilation. Remove all sources of ignition. Evacuate personnel to safe areas. Beware of vapors accumulating to form explosive concentrations. Vapors 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 non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and place in container for disposal according to local / national regulations (see section 13).

6.4 **Reference to other sections**
For disposal see section 13.

**SECTION 7: Handling and storage**

7.1 **Precautions for safe handling**
Avoid contact with skin and eyes. Avoid inhalation of vapor 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.

Hygroscopic.
Storage class (TRGS 510): 3: Flammable liquids

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

**SECTION 8: Exposure controls/personal protection**

8.1 **Control parameters**

<table>
<thead>
<tr>
<th>Ingredients with workplace control parameters</th>
</tr>
</thead>
<tbody>
<tr>
<td>Component</td>
</tr>
<tr>
<td>-----------</td>
</tr>
<tr>
<td>ethanol</td>
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<td>Remarks</td>
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<td>STEL</td>
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Sigma-Aldrich - 46139
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.

Full contact
Material: butyl-rubber
Minimum layer thickness: 0.3 mm
Break through time: 480 min
Material tested:Butoject® (KCL 897 / Aldrich Z677647, Size M)

Splash contact
Material: Nitrile rubber
Minimum layer thickness: 0.2 mm
Break through time: 38 min
Material tested:Dermatril® P (KCL 743 / Aldrich Z677388, 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 EC 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
Impervious clothing, 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).
SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

a) Appearance
   Form: liquid
   Color: colorless

b) Odor
   Pungent

c) Odor Threshold
   No data available

d) pH
   7.0 at 10 g/l at 20 °C (68 °F)

e) Melting point/freezing point
   Melting point/freezing point: -144.0 °C (-227.2 °F) at 1,013.25 hPa

f) Initial boiling point and boiling range
   78.29 °C 172.92 °F at 1,013 hPa

g) Flash point
   13 °C (55 °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: 13.5 % (V)
   Lower explosion limit: 2.5 % (V)

k) Vapor pressure
   0.57 hPa at 19.6 °C (67.3 °F)

l) Vapor density
   1.6

m) Relative density
   0.79 g/cm3 at 20 °C (68 °F)

n) Water solubility
   1,000 g/l at 20 °C (68 °F) - completely miscible

o) Partition coefficient: n-octanol/water
   log Pow: -0.35 at 24 °C (75 °F) - Bioaccumulation is not expected.

p) Autoignition temperature
   455 °C (851 °F) at 1,013 hPa - DIN 51794

q) Decomposition temperature
   Distillable in an undecomposed state at normal pressure.

r) Viscosity
   No data available

s) Explosive properties
   No data available

t) Oxidizing properties
   No data available

9.2 Other safety information

Conductivity
   < 1 µS/cm

Surface tension
   72.75 mN/m at 20 °C (68 °F)

Relative vapor density
   1.6
SECTION 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
   Vapors may form explosive mixture with air.

10.4 Conditions to avoid
   Heat, flames and sparks.

10.5 Incompatible materials
   rubber, various plastics

10.6 Hazardous decomposition products
   Other decomposition products - No data available
   Hazardous decomposition products formed under fire conditions. - Carbon oxides
   In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

   Acute toxicity
   LD50 Oral - male and female - 10,470 mg/kg
   (OECD Test Guideline 401)
   LC50 Inhalation - male and female - 4 h - 124.7 mg/l
   (OECD Test Guideline 403)
   Dermal: No data available
   No data available

   Skin corrosion/irritation
   Skin - Rabbit
   Result: No skin irritation - 24 h
   (OECD Test Guideline 404)

   Serious eye damage/eye irritation
   Eyes - Rabbit
   Result: Causes serious eye irritation.
   (OECD Test Guideline 405)

   Respiratory or skin sensitization
   Maximization Test - Guinea pig
   Result: negative
   (OECD Test Guideline 406)
   Remarks: (in analogy to similar products)

   Germ cell mutagenicity
   Ames test
   Salmonella typhimurium
   Result: negative
   In vitro mammalian cell gene mutation test
   mouse lymphoma cells
   Result: negative
   OECD Test Guideline 478
The life science business of Merck KGaA, Darmstadt, Germany operates as MilliporeSigma in the US and Canada

Mouse - male
Result: Positive results were obtained in some in vivo tests.

**Carcinogenicity**

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

NTP: No ingredient 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 on OSHA’s list of regulated carcinogens.

**Reproductive toxicity**
No data available

**Specific target organ toxicity - single exposure**
No data available

**Specific target organ toxicity - repeated exposure**
No data available

**Aspiration hazard**
No data available

**Additional Information**
Repeated dose toxicity - Rat - male - Oral - NOAEL (No observed adverse effect level) - 1,730 mg/kg - LOAEL (Lowest observed adverse effect level) - 3,200 mg/kg
RTECS: KQ6300000

irritant effects, respiratory paralysis, Dizziness, narcosis, inebriation, euphoria, Nausea, Vomiting
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

**SECTION 12: Ecological information**

**12.1 Toxicity**

Toxicity to fish
flow-through test LC50 - Pimephales promelas (fathead minnow) - 15,300 mg/l - 96 h (US-EPA)

Toxicity to daphnia and other aquatic invertebrates
static test LC50 - Ceriodaphnia dubia (water flea) - 5,012 mg/l - 48 h
Remarks: (ECHA)

Toxicity to algae
static test ErC50 - Chlorella vulgaris (Fresh water algae) - 275 mg/l - 72 h (OECD Test Guideline 201)

Toxicity to bacteria
static test IC50 - activated sludge - > 1,000 mg/l - 3 h (OECD Test Guideline 209)

**12.2 Persistence and degradability**

Biodegradability aerobic - Exposure time 15 d
Result: ca.95 % - Readily biodegradable.  
(OECD Test Guideline 301E)

<table>
<thead>
<tr>
<th><strong>Biochemical Oxygen Demand (BOD)</strong></th>
<th>930 - 1,670 mg/g</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Remarks:</strong></td>
<td>(Lit.)</td>
</tr>
<tr>
<td><strong>Theoretical oxygen demand</strong></td>
<td>2,100 mg/g</td>
</tr>
<tr>
<td><strong>Remarks:</strong></td>
<td>(Lit.)</td>
</tr>
</tbody>
</table>

12.3 **Bioaccumulative potential**  
Due to the distribution coefficient n-octanol/water, accumulation in organisms is not expected.

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**  
Additional ecological information  
No data available

SECTION 13: Disposal considerations

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

**Contaminated packaging**  
Dispose of as unused product.

SECTION 14: Transport information

**DOT (US)**

- **UN number:** 1170  
- **Class:** 3  
- **Packing group:** II  
- **Proper shipping name:** Ethanol  
- **Reportable Quantity (RQ):**  
- **Poison Inhalation Hazard:** No

**IMDG**

- **UN number:** 1170  
- **Class:** 3  
- **Packing group:** II  
- **Proper shipping name:** ETHANOL  
- **EMS-No:** F-E, S-D

**IATA**

- **UN number:** 1170  
- **Class:** 3  
- **Packing group:** II  
- **Proper shipping name:** Ethanol
SECTION 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, 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>ethanol</td>
<td>64-17-5</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

No components are subject to the Massachusetts Right to Know Act.

Pennsylvania Right To Know Components
<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Revision Date</th>
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New Jersey Right To Know Components
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<tr>
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<th>CAS-No.</th>
<th>Revision Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>ethanol</td>
<td>64-17-5</td>
<td>1993-04-24</td>
</tr>
</tbody>
</table>

SECTION 16: Other information

Further information
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Version: 6.3   Revision Date: 09/14/2020   Print Date: 07/30/2022