SAFETY DATA SHEET

Ethanol SDA 3C 190 Proof

SECTION 1 IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

<table>
<thead>
<tr>
<th>Trade name</th>
<th>Ethanol SDA 3C 190 Proof</th>
</tr>
</thead>
<tbody>
<tr>
<td>Synonyms</td>
<td>Denatured Alcohol</td>
</tr>
<tr>
<td>Use</td>
<td>Industrial &amp; Institutional cleaning, Industrial use, Intermediate, Paint and Coatings, Pharmaceutical, Process/Extraction Solvent, Raw material for chemical processes, Raw material for cosmetic products, Raw material for industry, Raw material for pharmaceuticals, Solvent</td>
</tr>
<tr>
<td>Company</td>
<td>Sasol Chemicals (USA) LLC</td>
</tr>
<tr>
<td>Address</td>
<td>12120 Wickchester Lane   Houston TX 77079</td>
</tr>
<tr>
<td>Telephone</td>
<td>CHEMTREC North America Transportation Emergency (24-hr) (800) 424-9300</td>
</tr>
<tr>
<td></td>
<td>CHEMTREC World Wide (703) 527-3887</td>
</tr>
<tr>
<td></td>
<td>Other Emergencies (24-hr) (337) 494-5142</td>
</tr>
<tr>
<td></td>
<td>MSDS and Product Information (8:00am-4:30pm CST) (281) 588-3491</td>
</tr>
<tr>
<td></td>
<td>Health and Safety Information (7:30am-4:00pm CST) (281) 588-3492</td>
</tr>
<tr>
<td>E-mail address</td>
<td><a href="mailto:SasolElectronicSDS@us.sasol.com">SasolElectronicSDS@us.sasol.com</a></td>
</tr>
</tbody>
</table>

SECTION 2 HAZARDS IDENTIFICATION

GHS Hazards

- Flammable liquids Category 2
- Eye irritation Category 2A

LABEL ELEMENTS

Hazard symbols

Signal word Danger

Hazard statements

- H225 Highly flammable liquid and vapour.
- H319 Causes serious eye irritation.

Precautionary statements

Prevention

- 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.
SAFETY DATA SHEET

Ethanol SDA 3C 190 Proof

P280  Wear protective gloves/ eye protection/ face protection.
P264  Wash skin thoroughly after handling.

Response
P303 + P361 + P353  IF ON SKIN (or hair): Remove/ Take off immediately all contaminated clothing. Rinse skin with water/ shower.
P370 + P378  In case of fire: Use water spray, alcohol-resistant foam, dry chemical or carbon dioxide for extinction.
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.

Storage
P403 + P235  Store in a well-ventilated place. Keep cool.

Disposal
P501  Dispose of contents/ container to an approved waste disposal plant.

SECTION 3  COMPOSITION/INFORMATION ON INGREDIENTS

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Weight percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>64-17-5</td>
<td>95</td>
</tr>
<tr>
<td>2-Propanol</td>
<td>67-63-0</td>
<td>5</td>
</tr>
</tbody>
</table>

See Section 8 for Exposure Guidelines and Section 15 for Regulatory Classifications.

SECTION 4  FIRST AID MEASURES

Eye contact  Rinse thoroughly with plenty of water for at least 15 minutes and consult a physician.
Skin contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. When symptoms persist or in all cases of doubt seek medical advice. Wash contaminated clothing before re-use.
Inhalation Remove to fresh air. If breathing is irregular or stopped, administer artificial respiration. In case of shortness of breath, give oxygen. Call a physician immediately.
Ingestion If swallowed, call a poison control centre or doctor immediately. Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person.

SECTION 5  FIREFIGHTING MEASURES

FLAMMABLE PROPERTIES
Fire/explosion  Flash back possible over considerable distance. NFPA Class IB flammable liquid.
Suitable extinguishing media Water spray, Alcohol-resistant foam, Dry chemical, Carbon dioxide (CO2)
Protective equipment and precautions for Wear self-contained breathing apparatus and protective suit. Keep containers and surroundings cool with water spray.
SECTION 6  ACCIDENTAL RELEASE MEASURES

Methods and materials for containment and cleaning up

Evacuate personnel to safe areas. Remove all sources of ignition. 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). Do not flush into surface water or sanitary sewer system.

Spill precautions Material can create slippery conditions.

SECTION 7  HANDLING AND STORAGE

Safe handling advice

Ensure all equipment is electrically grounded before beginning transfer operations. Keep away from heat and sources of ignition.

Storage/Transport pressure

Ambient

Load/Unload temperature

Ambient

SECTION 8  EXPOSURE CONTROLS/PERSONAL PROTECTION

ENGINEERING MEASURES

Ensure adequate ventilation, especially in confined areas.

PERSONAL PROTECTIVE EQUIPMENT

Eyes Wear as appropriate: Goggles, Face-shield

Skin Wear suitable protective clothing, gloves and eye/face protection.

Inhalation Respiratory protection is normally not required except in emergencies or when conditions cause excessive airborne levels of mists or vapors. Use NIOSH approved respiratory protection.

EXPOSURE GUIDELINES

<table>
<thead>
<tr>
<th>Components</th>
<th>Exposure limit(s)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Ethanol</td>
<td>ACGIH STEL 1,000 ppm</td>
</tr>
<tr>
<td></td>
<td>OSHA PEL 1,000 ppm 1,900 mg/m3</td>
</tr>
<tr>
<td>2-Propanol</td>
<td>OSHA PEL 400 ppm 980 mg/m3</td>
</tr>
<tr>
<td></td>
<td>ACGIH TLV (8-hour) 200 ppm</td>
</tr>
<tr>
<td></td>
<td>ACGIH STEL 400 ppm</td>
</tr>
</tbody>
</table>

PEL= Permissible Exposure Limits  TWA= Time Weighted Average (8 hr.)
TLV= Threshold Limit Value  STEL= Short Term Exposure Limit (15 min.)
EL= Excursion Limit  WEEL= Workplace Environmental Exposure Level
### SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
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</thead>
<tbody>
<tr>
<td>Appearance</td>
<td>liquid;</td>
</tr>
<tr>
<td>Colour</td>
<td>clear</td>
</tr>
<tr>
<td>Form</td>
<td>liquid</td>
</tr>
<tr>
<td>Odour</td>
<td>alcohol-like</td>
</tr>
<tr>
<td>Odour Threshold</td>
<td>no data available</td>
</tr>
<tr>
<td>Flash point</td>
<td>17 °C, 63 °F;</td>
</tr>
<tr>
<td>Flammability</td>
<td>Upper explosion limit: 20 %(V)</td>
</tr>
<tr>
<td></td>
<td>Lower explosion limit: 4 %(V)</td>
</tr>
<tr>
<td>Boiling point/boiling range</td>
<td>74 - 80 °C, 165.2 - 176 °F;</td>
</tr>
<tr>
<td>Melting point/range</td>
<td>ca. -114 °C, -173 °F; Ethanol</td>
</tr>
<tr>
<td>Auto-ignition temperature</td>
<td>ca. 400 °C, 752 °F; ASTM D 2155;</td>
</tr>
<tr>
<td>Decomposition temperature</td>
<td>no data available</td>
</tr>
<tr>
<td>Flammability (solid, gas)</td>
<td>no data available</td>
</tr>
<tr>
<td>Vapour pressure</td>
<td>ca. 66.661 hPa @ 20 °C, 68 °F;</td>
</tr>
<tr>
<td>Vapour density</td>
<td>no data available</td>
</tr>
<tr>
<td>Density</td>
<td>0.81 g/cm³ @ 15.5 °C, 60 °F; (190 pf)</td>
</tr>
<tr>
<td>Specific gravity</td>
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</tr>
<tr>
<td>Water solubility</td>
<td>miscible</td>
</tr>
<tr>
<td>Viscosity</td>
<td>no data available</td>
</tr>
<tr>
<td>pH</td>
<td>no data available</td>
</tr>
<tr>
<td>Evaporation rate</td>
<td>no data available</td>
</tr>
<tr>
<td>Partition coefficient: n-octanol/water</td>
<td>no data available</td>
</tr>
</tbody>
</table>
### SECTION 10  STABILITY AND REACTIVITY

- **Reactivity**
  Stable at normal ambient temperature and pressure.

- **Chemical stability**
  No decomposition if stored and applied as directed.

- **Conditions to avoid**
  Keep away from heat and sources of ignition.

- **Hazardous decomposition products**
  Combustion products include carbon dioxide, carbon monoxide and possibly other unidentified organic compounds.

- **Materials to avoid**
  Can react with strong oxidizers, inorganic acids, and halogens.

- **Hazardous polymerisation**
  None.

### SECTION 11  TOXICOLOGICAL INFORMATION

- **Acute dermal toxicity**
  LD50 rabbit: > 2,000 mg/kg; OECD Test Guideline 402
  Test substance: Ethanol; (literature value)

  LD50 rabbit: > 2,000 mg/kg
  Test substance: Isopropanol; (literature value)

- **Acute inhalation toxicity**
  LC50 mouse (4 hours): > 20 mg/l
  Test substance: Ethanol; (literature value)

  LC50 rat (8 hours): > 20 mg/l
  Test substance: Isopropanol; (literature value)

- **Acute oral toxicity**
  LD50 rat: 2,000 mg/kg; OECD Test Guideline 401
  Test substance: Ethanol; (literature value)

  LD50 rat: > 2,000 mg/kg
  Test substance: Isopropanol; (literature value)

- **Skin corrosion/irritation**
  (rabbit): OECD Test Guideline 404
  Test substance: Ethanol
  Not irritating, (literature value)

  (rabbit)
  Test substance: Isopropanol
  Not irritating, (literature value)

- **Eye damage/irritation**
  (rabbit): OECD Test Guideline 405
  Test substance: Ethanol
  Irritating, (literature value)

  (rabbit)
  Test substance: Isopropanol
  Irritating, (literature value)
Respiratory or skin sensitization

- guinea pig: not sensitizing; Maximisation Test
  - Ethanol, (literature value)
- guinea pig: not sensitizing; Buehler Test
  - Isopropanol, (literature value)

Germ cell mutagenicity

**Genotoxicity in vitro:**
- Type: Ames test; OECD Test Guideline 471
- System: Salmonella typhimurium; with and without metabolic activation
- Result: In vitro tests did not show mutagenic effects.
- Test substance: Ethanol (literature value)
- Type: Ames test
- System: Salmonella typhimurium; with and without metabolic activation
- Result: In vitro tests did not show mutagenic effects.
- Test substance: Isopropanol (literature value)

**Genotoxicity in vivo:**
- no data available

**Assessment Mutagenicity:**
- Based on available data, the classification criteria are not met.

Reproductive toxicity

**Reproductive toxicity:**
- no data available

**Assessment Reproductive toxicity:**
- no data available

**Teratogenicity:**
- no data available

**Assessment teratogenicity:**
- no data available

**STOT - single exposure**
- The substance or mixture is not classified as specific target organ toxicant, single exposure.

**STOT - repeated exposure**
- rat; Oral; 90-day;
  - NOAEL: 1,730 mg/kg
  - LOAEL: 3,160 mg/kg
  - Test substance: Ethanol
  - Based on available data, the classification criteria are not met.
- rat; Oral; 90-day;
  - NOAEL: 1,730 mg/kg
  - LOAEL: 3,160 mg/kg
  - Test substance: Isopropanol
  - Based on available data, the classification criteria are not met.

**Aspiration toxicity**
- no data available
SAFETY DATA SHEET

Ethanol SDA 3C 190 Proof

Carcinogenicity

Assessment carcinogenicity:
Contains no ingredient listed as a carcinogen

SECTION 12 ECOLOGICAL INFORMATION

Toxicity to fish

LC50 (Pimephales promelas (fathead minnow)) 96 hours: > 100 mg/l; flow-through test
Test substance: Ethanol
(literature value)

LC50 (Pimephales promelas (fathead minnow)) 96 hours: > 100 mg/l; flow-through test
Test substance: Isopropanol
(literature value)

Toxicity to aquatic invertebrates

EC50 (Ceriodaphnia Dubia (water flea)) 48 hours: > 100 mg/l; static test
Test substance: Ethanol
(literature value)

EC50 (Daphnia magna (Water flea)) 24 hours: > 100 mg/l; static test
Test substance: Isopropanol
(literature value)

Toxicity to algae

EC50 (Chlorella vulgaris) 72 hours: > 100 mg/l; static test; OECD Test Guideline 201
Test substance: Ethanol
(literature value)

EC50 (Scenedesmus quadricauda (Green algae)) 7 d: > 100 mg/l; static test
Test substance: Isopropanol
(literature value)

Chronic toxicity to aquatic invertebrates

NOEC (Ceriodaphnia Dubia (water flea)) 10 d: 9.6 mg/l; semi-static test
Test substance: Ethanol
(literature value)

Biodegradation

Readily biodegradable.

OECD Test Guideline 301B (28 d): > 60%
Test substance: Ethanol
(literature value)

BOD5 (5 d): 53%
Test substance: Isopropanol
(literature value)

Bioaccumulation

Test substance: Ethanol
No bioaccumulation is to be expected (log Pow <= 4).

Test substance: Isopropanol
No bioaccumulation is to be expected (log Pow <= 4).

Mobility in soil

No data available
Other adverse effects  no data available

SECTION 13  DISPOSAL CONSIDERATIONS

| Waste Code | D001 - Ignitability (RQ 100 LB). This product has the RCRA characteristic of ignitability. Re-evaluation of the product may be required by the user at the time of disposal, since the product uses, transformations, mixtures, contamination, and spillage may change the classification. |
| Disposal methods | Dispose only in accordance with local, state, and federal regulations. Do not contaminate any lakes, streams, ponds, groundwater or soil. |
| Empty containers | Empty containers retain product residue (liquid and/or vapor) and can be dangerous. DO NOT PRESSURIZE, CUT, WELD, BRAZE, SOLDER, DRILL, GRIND, OR EXPOSE SUCH CONTAINERS TO HEAT, FLAME, SPARKS, STATIC ELECTRICITY, OR OTHER SOURCES OF IgnITION; THEY MAY EXPLODE AND CAUSE INJURY OR DEATH. Empty drums should be completely drained, triple-rinsed, properly bunged and promptly returned to a drum reconditioner, or properly disposed. |

SECTION 14  TRANSPORT INFORMATION

| DOT | UN 1170, Ethanol solutions, 3, II |
| IATA | UN 1170, Ethanol solutions, 3, II |
| IMDG | UN 1170, Ethanol solutions, 3, II |

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

Remarks  no data available

SECTION 15  REGULATORY INFORMATION

U.S. FEDERAL REGULATIONS

OSHA Hazards (HCS 1994)
Flammable liquid, Eye irritation, Skin irritation

TSCA Inventory Listing

| Components | CAS-No. |
| Ethanol | 64-17-5 |
| 2-Propanol | 67-63-0 |

SARA 302 Status

| Components | CAS-No. | Weight percent |
| SARA 302: No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302. | | |
SAFETY DATA SHEET

Ethanol SDA 3C 190 Proof

SARA 311/312 Classification
"Immediate (acute) health hazard", "Fire hazard"

SARA 313 Chemical Components

<table>
<thead>
<tr>
<th>Component</th>
<th>CAS-No.</th>
<th>Weight percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>2-Propanol</td>
<td>67-63-0</td>
<td>5%</td>
</tr>
</tbody>
</table>

US. EPA CERCLA Hazardous Substances (40 CFR 302)

<table>
<thead>
<tr>
<th>Component</th>
<th>Reportable Quantity</th>
<th>Weight percent</th>
</tr>
</thead>
<tbody>
<tr>
<td>none</td>
<td></td>
<td></td>
</tr>
</tbody>
</table>

INTERNATIONAL REGULATIONS

WHMIS Classification
- Class B, Division 2: Flammable liquid.
- Class D, Division 2, Subdivision B: Toxic material.

European Union
- Classification according to Regulation (EU) 1272/2008.
  - Flammable liquids, Category 2
  - Eye irritation, Category 2

Australia. Inventory of Chemical Substances (AICS) Listed

Japan. Inventory of Existing and New Chemical Substances (ENCS) Listed

Japan. Industrial Safety & Health Law (ISHL) Inventory Listed

Canada. Domestic Substances List (DSL) Inventory Listed

Canadian Non-Domestic Substance Listing (NDSL) Not listed

European Inventory of Existing Commercial Chemical Substances (EINECS) Listing Listed

Philippines. Inventory of Chemicals / Chemical Substances (PICCS) Listed

Korea. Existing Chemicals Inventory (KECI) Listed

China. Inventory of Existing Chemical Substances (IECSC) Listed

Mexico. National Inventory of Chemical Substances (INSQ) Listed

New Zealand. Inventory of Chemicals (NZIoC) Listed

Switzerland. Inventory of Notified New Substances (CHINV) Listed

Taiwan. National Existing Chemical Inventory (NECI) Listed
SAFETY DATA SHEET

Ethanol SDA 3C 190 Proof

Please note: The names and CAS numbers which are used for this product in the stated inventories may deviate from the information which is listed in Section 3.

STATE REGULATIONS

California Prop. 65
Components none

SECTION 16 OTHER INFORMATION

HAZARD RATINGS

<table>
<thead>
<tr>
<th></th>
<th>Health</th>
<th>Flammability</th>
<th>Physical Hazard/ Instability</th>
</tr>
</thead>
<tbody>
<tr>
<td>HMIS®</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
<tr>
<td>NFPA</td>
<td>2</td>
<td>3</td>
<td>0</td>
</tr>
</tbody>
</table>

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