

Material Safety Data Sheet

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND COMPANY/UNDERTAKING

Material Name : **Crude Industrial Ethanol (CIE)**
Product Code : S2001

Manufacturer/Supplier : **Shell Chemicals Europe B.V.**
PO Box 8610
3009 AP Rotterdam
Netherlands

Telephone : +31 (0)10 231 7000
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2. COMPOSITION/INFORMATION ON INGREDIENTS

CAS No. : 64-17-5
INDEX No. : 603-002-00-5
EINECS No. : 200-578-6

Hazardous Components

| Chemical Name | CAS | EINECS | Symbol(s) | R-phrases) | Conc. |
|----------------------|------------|---------------|------------------|-------------------|--------------|
| Ethanol | 64-17-5 | 200-578-6 | F | R11 | >= 90.00 % |
| Water | 7732-18-5 | 231-791-2 | | | <= 10.00 % |

3. HAZARDS IDENTIFICATION

Health Hazards : Vapours may cause drowsiness and dizziness. Vapours expected to be slightly irritating. May cause moderate irritation to skin. Repeated exposure may cause skin dryness or cracking. Moderately irritating to eyes. Possibility of organ or organ system damage from prolonged exposure; see Chapter 11 for details. Target organ(s): Liver.

Signs and Symptoms : Eye irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blurred vision. Skin irritation signs and symptoms may include a burning sensation, redness, swelling, and/or blisters. Respiratory irritation signs and symptoms may include a temporary burning sensation of the nose and throat, coughing, and/or difficulty breathing. Liver damage may be indicated by loss of appetite, jaundice (yellowish skin and eye colour), fatigue, bleeding or easy bruising and sometimes pain and swelling in the upper right abdomen. Breathing of high vapour concentrations may cause central nervous system (CNS) depression resulting in dizziness, light-headedness, headache, nausea and loss of

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| | coordination. Continued inhalation may result in unconsciousness and death. If material enters lungs, signs and symptoms may include coughing, choking, wheezing, difficulty in breathing, chest congestion, shortness of breath, and/or fever. |
| Aggravated Medical Condition | : Pre-existing medical conditions of the following organ(s) or organ system(s) may be aggravated by exposure to this material: Liver. |
| Safety Hazards | : Flammable liquid and vapour. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. |

4. FIRST AID MEASURES

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| General Information | : In general no treatment is necessary, however, obtain medical advice. |
| Inhalation | : Remove to fresh air. If rapid recovery does not occur, transport to nearest medical facility for additional treatment. |
| Skin Contact | : Remove contaminated clothing. Flush exposed area with water and follow by washing with soap if available. |
| Eye Contact | : Immediately flush eyes with large amounts of water for at least 15 minutes while holding eyelids open. Transport to the nearest medical facility for additional treatment. |
| Ingestion | : If swallowed, do not induce vomiting: transport to nearest medical facility for additional treatment. If vomiting occurs spontaneously, keep head below hips to prevent aspiration. |
| Advice to Physician | : Causes central nervous system depression. Consult a Poison Control Centre for guidance. |

5. FIRE FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

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| Specific Hazards | : Carbon monoxide may be evolved if incomplete combustion occurs. The vapour is heavier than air, spreads along the ground and distant ignition is possible. |
| Extinguishing Media | : Alcohol-resistant foam, water spray or fog. Dry chemical powder, carbon dioxide, sand or earth may be used for small fires only. Do not discharge extinguishing waters into the aquatic environment. |
| Unsuitable Extinguishing Media | : Do not use water in a jet. |
| Protective Equipment for Firefighters | : Wear full protective clothing and self-contained breathing apparatus. |
| Additional Advice | : Keep adjacent containers cool by spraying with water. |

6. ACCIDENTAL RELEASE MEASURES

Observe all relevant local and international regulations.

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| Protective measures | : Avoid contact with spilled or released material. Immediately remove all contaminated clothing. For guidance on selection of personal protective equipment see Chapter 8 of this Material |
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according to EC directive 2001/58/EC

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| | <p>Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet. Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area. Use appropriate containment to avoid environmental contamination. Prevent from spreading or entering drains, ditches or rivers by using sand, earth, or other appropriate barriers. Attempt to disperse the vapour or to direct its flow to a safe location for example by using fog sprays. Take precautionary measures against static discharge. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Monitor area with combustible gas indicator.</p> |
| Clean Up Methods | : For large liquid spills (> 1 drum), transfer by mechanical means such as vacuum truck to a salvage tank for recovery or safe disposal. Do not flush away residues with water. Retain as contaminated waste. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. For small liquid spills (< 1 drum), transfer by mechanical means to a labelled, sealable container for product recovery or safe disposal. Allow residues to evaporate or soak up with an appropriate absorbent material and dispose of safely. Remove contaminated soil and dispose of safely. |
| Additional Advice | : See Chapter 13 for information on disposal. Notify authorities if any exposure to the general public or the environment occurs or is likely to occur. Vapour may form an explosive mixture with air. |

7. HANDLING AND STORAGE

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| General Precautions | : Avoid breathing of or contact with material. Only use in well ventilated areas. Wash thoroughly after handling. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. Use the information in this data sheet as input to a risk assessment of local circumstances to help determine appropriate controls for safe handling, storage and disposal of this material. |
| Handling | : Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Ensure electrical continuity by bonding and grounding (earthing) all equipment. Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (≤ 10 m/sec). Avoid splash filling. Do NOT use compressed air for filling, discharging, or handling operations. Extinguish any naked flames. Do Not smoke. Remove ignition sources. Avoid sparks. Handling Temperature: Ambient. |
| Storage | : Keep away from aerosols, flammables, oxidizing agents, corrosives and from products harmful or toxic to man or to the environment. Must be stored in a well-ventilated area, away from sunlight, ignition sources and other sources of heat. Storage Temperature: Ambient. |
| Product Transfer | : Keep containers closed when not in use. Do not use compressed air for filling, discharging or handling. |
| Recommended Materials | : For container paints, use epoxy paint, zinc silicate paint. For |

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containers, or container linings use mild steel, stainless steel.

Unsuitable Materials : Aluminium if > 50 °C. Most plastics. Neoprene rubber.

Container Advice : Containers, even those that have been emptied, can contain explosive vapours. Do not cut, drill, grind, weld or perform similar operations on or near containers.

8. EXPOSURE CONTROLS/PERSONAL PROTECTION
Occupational Exposure Limits

| Material | Source | Type | ppm | mg/m3 | Notation |
|----------|--------|------|-----------|-------|----------|
| Ethanol | ACGIH | TWA | 1,000 ppm | | |

Additional Information : Wash hands before eating, drinking, smoking and using the toilet.

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| Material | Source | Hazard Designation |
| Ethanol | ACGIH | Not classifiable as a human carcinogen. |

Exposure Controls : The level of protection and types of controls necessary will vary depending upon potential exposure conditions. Select controls based on a risk assessment of local circumstances. Appropriate measures include: Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Eye washes and showers for emergency use.

Personal Protective Equipment : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers.

Respiratory Protection : If engineering controls do not maintain airborne concentrations to a level which is adequate to protect worker health, select respiratory protection equipment suitable for the specific conditions of use and meeting relevant legislation. Check with respiratory protective equipment suppliers. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter. Select a filter suitable for organic gases and vapours [boiling point >65 °C (149 °F)] meeting EN141. Where air-filtering respirators are unsuitable (e.g., airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus.

Hand Protection : Where hand contact with the product may occur the use of gloves approved to relevant standards (e.g. Europe: EN374, US: F739) made from the following materials may provide suitable chemical protection:
Longer term protection: Natural rubber. Butyl rubber. Incidental contact/Splash protection: Neoprene rubber. Viton. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, glove thickness, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced.

Eye Protection : Chemical splash goggles (chemical monogoggles). Monogoggles (EN166)

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| Protective Clothing | : Use protective clothing which is chemical resistant to this material. Safety shoes and boots should also be chemical resistant. |
| Monitoring Methods | : Monitoring of the concentration of substances in the breathing zone of workers or in the general workplace may be required to confirm compliance with an OEL and adequacy of exposure controls. For some substances biological monitoring may also be appropriate. Examples of sources of recommended air monitoring methods are given below or contact supplier. Further national methods may be available. National Institute of Occupational Safety and Health (NIOSH), USA: Manual of analytical Methods http://www.cdc.gov/niosh/nmam/nmammenu.html Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods http://www.osha-slc.gov/dts/sltc/methods/toc.html Health and Safety Executive (HSE), UK: Methods for the Determination of Hazardous Substances http://www.hsl.gov.uk/search.htm |
| Environmental Exposure Controls | : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour. |

9. PHYSICAL AND CHEMICAL PROPERTIES

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| Appearance | : Clear. Liquid. |
| Odour | : Ethereal. |
| Odour threshold | : 0.136 ppm |
| Boiling point | : 91 °C / 196 °F |
| Flash point | : 16 °C / 61 °F |
| Explosion / Flammability limits in air | : 3.1 - 23.5 %(V) |
| Vapour pressure | : 67 hPa at 20 °C / 68 °F |
| Density | : 0.8164 g/cm ³ |
| Water solubility | : at 20 °C / 68 °F Completely miscible. |
| n-octanol/water partition coefficient (log Pow) | : < 1 |
| Evaporation rate (nBuAc=1) | : 1.4 |
| Molecular weight | : 46.07 g/mol |

10. STABILITY AND REACTIVITY

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| Stability | : Stable under normal conditions of use. Reacts with strong oxidising agents. Reacts with strong acids. |
| Conditions to Avoid | : Avoid heat, sparks, open flames and other ignition sources. |
| Materials to Avoid | : Strong oxidising agents. Strong acids. |
| Hazardous Decomposition Products | : Thermal decomposition is highly dependent on conditions. A complex mixture of airborne solids, liquids and gases, including carbon monoxide, carbon dioxide and other organic compounds will be evolved when this material undergoes combustion or thermal or oxidative degradation. |

11. TOXICOLOGICAL INFORMATION

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| Basis for Assessment | : Information given is based on product testing, and/or similar |
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| Acute Oral Toxicity | : products, and/or components. Low toxicity: LD50 >2000 mg/kg , Rat Aspiration into the lungs when swallowed or vomited may cause chemical pneumonitis which can be fatal. |
| Acute Dermal Toxicity | : Low toxicity: LD50 >2000 mg/kg , Rabbit |
| Acute Inhalation Toxicity | : Low toxicity: LC50 >20 mg/l / 4 hours, Rat High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued inhalation may result in unconsciousness and/or death. |
| Skin Irritation | : Moderately irritating to skin (but insufficient to classify). Prolonged/repeated contact may cause defatting of the skin which can lead to dermatitis. |
| Eye Irritation | : Moderately irritating to eyes (but insufficient to classify). |
| Respiratory Irritation | : Inhalation of vapours or mists may cause irritation to the respiratory system. |
| Sensitisation | : Not a skin sensitiser. |
| Repeated Dose Toxicity | : Liver: can cause liver damage. |
| Mutagenicity | : Not expected to be mutagenic. |
| Carcinogenicity | : Not carcinogenic in animal studies. |
| Reproductive and Developmental Toxicity | : Causes foetotoxicity in animals at doses which are maternally toxic. Ethanol, a component of this material, may cause birth defects and/or miscarriages. |

12. ECOLOGICAL INFORMATION

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| Acute Toxicity | |
| Fish | : Low toxicity: LC/EC/IC50 > 1000 mg/l |
| Aquatic Invertebrates | : Low toxicity: LC/EC/IC50 > 1000 mg/l |
| Algae | : Low toxicity: LC/EC/IC50 > 1000 mg/l |
| Microorganisms | : Low toxicity: LC/EC/IC50 > 1000 mg/l |
| Mobility | : Dissolves in water. If product enters soil, it will be highly mobile and may contaminate groundwater. |
| Persistence/degradability | : Oxidises rapidly by photo-chemical reactions in air. Readily biodegradable. |
| Bioaccumulation | : Does not bioaccumulate significantly. |

13. DISPOSAL CONSIDERATIONS

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| Material Disposal | : Recover or recycle if possible. It is the responsibility of the waste generator to determine the toxicity and physical properties of the material generated to determine the proper waste classification and disposal methods in compliance with applicable regulations. |
| Container Disposal | : Drain container thoroughly. After draining, vent in a safe place away from sparks and fire. Residues may cause an explosion hazard. Do not puncture, cut or weld uncleaned drums. Send to drum recoverer or metal reclaimer. |
| Local Legislation | : Disposal should be in accordance with applicable regional, national, and local laws and regulations. Local regulations may be more stringent than regional or national requirements and |

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must be complied with.

14. TRANSPORT INFORMATION**ADR**

Class : 3
Packing group : II
UN No. : 1170
Danger label (primary risk) : 3
Proper shipping name : ETHYL ALCOHOL SOLUTION

RID

Class : 3
Packing group : II
Classification code : F1
Hazard identification no. : 33
UN No. : 1170
Danger label (primary risk) : 3
Proper shipping name : ETHYL ALCOHOL SOLUTION

IMDG

Identification number : UN 1170
Proper shipping name : ETHYL ALCOHOL SOLUTION
Class / Division : 3
Packing group : II
Marine pollutant: No

IATA (Country variations may apply)

UN No. : 1170
Proper shipping name : Ethyl alcohol solution
Class / Division : 3
Packing group : II

15. REGULATORY INFORMATION

The regulatory information is not intended to be comprehensive. Other regulations may apply to this material.

EC label/EC Number : 200-578-6
EC Annex I Number : 603-002-00-5
EC Symbols : F Highly flammable.
EC Risk Phrases : R11 Highly flammable.
EC Safety Phrases : S2 Keep out of reach of children.
S7 Keep container tightly closed.
S16 Keep away from sources of ignition - no smoking.
AICS : Listed.
DSL : Listed.
INV (CN) : Listed.
ENCS (JP) : Listed. (2)-202

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TSCA : Listed.
EINECS : Listed. 200-578-6
KECI (KR) : Listed. KE-13217
PICCS (PH) : Listed.

National Legislation
OE_HP V : Listed.

ECMON : 52800
Listed.

16. OTHER INFORMATION

Additional Information : This material safety data sheet refers to the regulatory requirements for the EU and does not contain any country specific legislation.
The information contained herein is based on our current knowledge of the underlying data and is intended to describe the product for the purpose of health, safety and environmental requirements only. No warranty or guarantee is expressed or implied regarding the accuracy of these data or the results to be obtained from the use of the product.
For further information, contact your local Shell company or agent.

R-phrases(s)

R11 Highly flammable.

MSDS Version Number : 1.5

MSDS Effective Date : 21.02.2005

MSDS Revisions : A vertical bar (|) in the left margin indicates an amendment from the previous version.

MSDS Regulation : The content and format of this safety data sheet is in accordance with Commission Directive 2001/58/EC of 27 July 2001, amending for the second time Commission Directive 91/155/EEC.

MSDS Distribution : The information in this document should be made available to all who may handle the product

Disclaimer : This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product.