| | |
|---|---|
| ISO | 9001 |
| ISO | 14001 |
| ISO | 22000 |
| ISO | 45001 |

MBSA (PTY) LTD
MASTERBATCH SA
we've earned our colours

# TECHNICAL DATA SHEET

| PRODUCT | 2018/08/08 |
|---|---|
| PRODUCT CODE | MS 0665/FR |
| PRODUCT NAME | FLAME RETARDANT |
| FOOD APPROVAL | NO |
| FIELD OF APPLICATION | Extrusion/Moulding |
| | |
| | |
| PROPERTIES | |
| MOISTURE | < 0.2% |
| USAGE | 7% |
| FOOD CONTACT SAFE | NO |
| | |
| POLYMER | |
| CARRIER | Styrene |
| MFI | 9.5 |
| | |
| PIGMENT | |
| TYPE | N/A |
| LIGHT FASTNESS (1-8) | N/A |
| HEAT STABILITY (°C) | N/A |
| WEATHER FASTNESS (1-5) | N/A |
| | |
| ADDITIVES | |
| TYPE | Antioxidant, FR |
| UV CONTENT (%) | N/A |
| | |
| ADDITIONAL DETAIL | |

Designed for use in XPS and EPS Applications.
Additives Flame retardant: Brominated SBS
Additives Antioxidants/Thermal Stabilizers: Acid Scavenger
Recommended Dosage: 7%
TESTING of the final product will need to be conducted by our customer to determine the necessary dosage required for the application and to confirm the flame test results are within the required UL-94 rating specification.

The product above requires no special measures, provided the usual/prescribed precautions for handling chemicals are observed. The above information is given in good faith and to the best of MBSA's knowledge, however, no guarantees with regard to performance of the final product is given or implied.

| | | |
|---|---|---|
| Masterbatch SA<br>13 Spartan Road,<br>Kempton Park<br>Spanner<br>South Africa | Material Safety Data Sheet<br>(MSDS)<br>Product: MS 0665/FR<br>Date of Issue: 7 August 2018<br>Version: 1.0 | MBSA™<br>MASTERBATCH SA<br>we've earned our colours |
| Tel: +27 11 975 0222 | | Document No. QA/P/01/F08 |
| | | Revison No. 0 |
| | | Effective Date: July 2018 |
| | | Review Date: July 2019 |

## 1. Chemical Product and Company Identification

| | |
|---|---|
| Product code: | **MS 0665/FR** |
| Product description: | FLAME RETARDANT |
| Chemical identification: | Blend of Organic and Inorganic Flame Retardant Additives dispersed in HIPS polymer |
| CAS number: | N/A |
| Use: | Cleaning agent for extruders that process polymers/plastics |
| Company Details: | Masterbatch South Africa (Pty) Ltd<br>PO Box 4541<br>Atlasville, 1465<br>Telephone: +27 11 975 0222<br>Fax: +27 11 975 6252 |
| Emergency number | +27 82 782 1051 |

## 2. Hazards Identification

### 2.1 Classification of the substance or mixture

This product has been classified in accordance with SANS ISO 110114:2010 (edition 1) and ISO 11014:2009, (edition 1)

## 3. Composition / Information on Ingredients

**Substance/Mixture:** Mixture

**Chemical nature:** Blend of Organic and Inorganic Flame Retardant Additives dispersed in High Impact PolyStyrene (HIPS) Styrene Butadiene Copolymer. Polymeric masterbatch consists of HIPS, Brominated SBS Flame Retardant, Compatibilizer, and Acid Scavenger.

**Hazardous ingredients:**

| Chemical Name | CAS No. | Concentration |
|---|---|---|
| Brominated SBS / polystyrene-polybutadiene-polystyrene / Benzene, ethenyl-, polymer with 1,3-butadiene, brominated | 1195978-93-8 | <45% |
| Polystyrene with 1,3-butadiene polymer | 9003-55-8 | <10% |
| [Carbonato(2-)]hexadecahydroxybis(aluminium)hexamagnesium | 11097-59-9 | <5% |

The exact percentage concentration of components is being withheld as a trade secret

**4. First Aid Measures**

**Medical attention:**
General advice: consult a physician

**Inhalation:**
If you feel unwell move to fresh air
Consult a physician after significant exposure

**Skin contact:**
Wash affected skin with soap and water

**Ingestion:**
Rinse mouth with water
If swallowed, do not induce vomiting

**5. Fire-Fighting Measures**

**Extinguishing media:**
Water, Foam

**Specific hazards:**
N/A

**Protective equipment:**
Necessary PPE, gloves, respiratory masks, goggles safety shoes and overall

**Additional information:**

**6. Accidental Release Measures**

**Personal precautions:**
Avoid contact with skin and eyes

**Environmental precautions:**
Prevent product entering drain and keep away from fire

**Spillages:**
Sweep and put in disposable bins

**7. Handling and Storage**

**Handling:**
Keep away from sources of ignition

**Storage:**
Store in dry and cool place

**8. Exposure Controls and Personal Protection**

**Workplace hygiene:**

**Protective measures:**
- **respiratory:** N/A
- **hand:** Gloves
- **eye:** Goggles
- **skin:** Overalls

**Other protection:** Necessary PPE

**9. Physical and Chemical Properties**

**Form:** Masterbatch Pellets
**Colour:** Milky White
**Odour:** Odourless to slight smell
**PH value:** N/A
**Boiling point:** N/A
**Melting point:** >135 $^{o}$C
**Flash point:** N/A
**Flammability:** N/A
**Explosive properties:** N/A
**Oxidizing properties:** N/A
**Vapour pressure:** N/A
**Density:** N/A
**Solubility - water:** insoluble
**Solubility - solvent:** N/A

**10. Stability and Reactivity**

**Thermal stability:**
Stable

**Reactivity:**
This material is considered non-reactive under normal ambient and anticipated storage and handling conditions of temperature and pressure

**Chemical stability:**
This material is considered stable under normal ambient and anticipated storage and handling conditions of temperature and pressure

**Hazardous decomposition products:**
Conditions to avoid: Avoid prolonged storage at elevated (60 $^{0}$C) temperatures,

**Materials to avoid:**
Strong oxidizing agents

**Thermal decomposition:**
Depending on the availability of air and intensity of fire:
Intense heat, smoke, hydrogen bromide, styrene monomer, butadiene, aldehydes and organic acids, oxides, cyclic low molecular weight oligomers, carbon monoxide and carbon dioxide.

**Other data:** No decomposition if stored and applied as directed

**11. Toxicological Information**

**Acute oral toxicity:**
Presumed non toxic
**Skin contact:**
Non-Irritating
**Eye contact**:
No eye irritation
**Carcinogenicity:**
No carcinogenetic reported
**Reproductive hazards:**
No known reproductive hazard.

**12. Ecological Information**

**Aquatic toxicity - fish:**
N/A
**Aquatic toxicity - daphnia:**
N/A
**Aquatic toxicity - algae:**
N/A
**Biodegradability:**
N/A
**Bio-accumulation:**
The product has not been tested. Statements have been derived from the properties of individual components.

**13. Disposal Considerations**

**Disposal methods:**
Must be disposed of or incinerated in accordance with local regulations.
**Disposal of packaging:**
Recycling is preferable, otherwise same disposal as contents.

**14. Transport Information**

Not classified as hazardous under transport regulations (ADR/RID, IMDG, ANDR)
**Tremcard no:**
N/A

**15. Regulatory Information**

**National legislation:** No local regulations available

**16. Other Information**

This product is NOT suitable for food contact applications.

**The information contained herein is based on the present state of our knowledge and does not therefore guarantee certain properties. Recipients of our products must take responsibility for observing existing laws and regulations.**

# Dimethyl Ether

## Safety Data Sheet P-4589

This SDS conforms to U.S. Code of Federal Regulations 29 CFR 1910.1200, Hazard Communication.

Date of issue: 01/01/1979 Revision date: 10/17/2016 Supersedes: 02/20/2015

## SECTION: 1. Product and company identification

### 1.1. Product identifier

Product form : Substance

Name : Dimethyl Ether

CAS No : 115-10-6

Formula : C2H6O

### 1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Industrial use. Use as directed.

### 1.3. Details of the supplier of the safety data sheet

Praxair, Inc.
10 Riverview Drive
Danbury, CT 06810-6268 - USA
T 1-800-772-9247 (1-800-PRAXAIR) - F 1-716-879-2146
www.praxair.com

### 1.4. Emergency telephone number

Emergency number : Onsite Emergency: 1-800-645-4633

CHEMTREC, 24hr/day 7days/week
— Within USA: 1-800-424-9300, Outside USA: 001-703-527-3887
(collect calls accepted, Contract 17729)

## SECTION 2: Hazard identification

### 2.1. Classification of the substance or mixture

**GHS-US classification**

Flam. Gas 1 H220
Liquefied gas H280
STOT SE 3 H336

### 2.2. Label elements

**GHS-US labeling**

Hazard pictograms (GHS-US) :

GHS02 GHS04 GHS07

Signal word (GHS-US) : DANGER

Hazard statements (GHS-US) :
H220 - **EXTREMELY FLAMMABLE GAS**
H280 - CONTAINS GAS UNDER PRESSURE; MAY EXPLODE IF HEATED
H336 - MAY CAUSE DROWSINESS OR DIZZINESS
OSHA-H01 - MAY DISPLACE OXYGEN AND CAUSE RAPID SUFFOCATION
CGA-HG04 - MAY FORM EXPLOSIVE MIXTURES WITH AIR
CGA-HG01 - MAY CAUSE FROSTBITE

Precautionary statements (GHS-US) :
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from Heat, Open flames, Sparks, Hot surfaces. - No smoking
P261 - Avoid breathing gas
P262 - Do not get in eyes, on skin, or on clothing
P264 - Wash hands thoroughly after handling
P271+P403 - Use and store only outdoors or in a well-ventilated place
P280 - Wear protective gloves, protective clothing, eye protection, face protection
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P381 - Eliminate all ignition sources if safe to do so
CGA-PG05 - Use a back flow preventive device in the piping

CGA-PG06 - Close valve after each use and when empty
CGA-PG11 - Never put cylinders into unventilated areas of passenger vehicles
CGA-PG02 - Protect from sunlight when ambient temperature exceeds 52°C (125°F)

### 2.3. Other hazards

Other hazards not contributing to the classification : Contact with liquid may cause cold burns/frostbite.

### 2.4. Unknown acute toxicity (GHS US)

No data available

## SECTION 3: Composition/Information on ingredients

### 3.1. Substance

| Name | Product identifier | % |
|---|---|---|
| Dimethyl Ether (Main constituent) | (CAS No) 115-10-6 | 100 |

### 3.2. Mixture

Not applicable

## SECTION 4: First aid measures

### 4.1. Description of first aid measures

First-aid measures after inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

First-aid measures after skin contact : The liquid may cause frostbite. For exposure to liquid, immediately warm frostbite area with warm water not to exceed 105°F (41°C). Water temperature should be tolerable to normal skin. Maintain skin warming for at least 15 minutes or until normal coloring and sensation have returned to the affected area. In case of massive exposure, remove clothing while showering with warm water. Seek medical evaluation and treatment as soon as possible.

First-aid measures after eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes. Hold the eyelids open and away from the eyeballs to ensure that all surfaces are flushed thoroughly. Contact an ophthalmologist immediately.

First-aid measures after ingestion : Ingestion is not considered a potential route of exposure.

### 4.2. Most important symptoms and effects, both acute and delayed

No additional information available

### 4.3. Indication of any immediate medical attention and special treatment needed

None. Obtain medical assistance.

## SECTION 5: Firefighting measures

### 5.1. Extinguishing media

Suitable extinguishing media : Carbon dioxide, Dry chemical, Water spray or fog.

### 5.2. Special hazards arising from the substance or mixture

Fire hazard : **EXTREMELY FLAMMABLE GAS**. If venting or leaking gas catches fire, do not extinguish flames. Flammable vapors may spread from leak, creating an explosive reignition hazard. Vapors can be ignited by pilot lights, other flames, smoking, sparks, heaters, electrical equipment, static discharge, or other ignition sources at locations distant from product handling point. Explosive atmospheres may linger. Before entering an area, especially a confined area, check the atmosphere with an appropriate device.

Explosion hazard : **EXTREMELY FLAMMABLE GAS**. Forms explosive mixtures with air and oxidizing agents.

Reactivity : No reactivity hazard other than the effects described in sub-sections below.

### 5.3. Advice for firefighters

Firefighting instructions : Evacuate all personnel from the danger area. Use self-contained breathing apparatus (SCBA) and protective clothing. Immediately cool containers with water from maximum distance. Stop flow of gas if safe to do so, while continuing cooling water spray. Remove ignition sources if safe to do so. Remove containers from area of fire if safe to do so. On-site fire brigades must comply with OSHA 29 CFR 1910.156 and applicable standards under 29 CFR 1910 Subpart L—Fire Protection.

Protection during firefighting : Compressed gas: asphyxiant. Suffocation hazard by lack of oxygen.

| | | |
|---|---|---|
| Special protective equipment for fire fighters | : | Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters. |
| Specific methods | : | Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas containers to rupture. Cool endangered containers with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems<br><br>Stop flow of product if safe to do so<br><br>Use water spray or fog to knock down fire fumes if possible<br><br>Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire. |

## SECTION 6: Accidental release measures

### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : **DANGER: Flammable, liquefied gas.** FORMS EXPLOSIVE MIXTURES WITH AIR. Immediately evacuate all personnel from danger area. Use self-contained breathing apparatus where needed. Remove all sources of ignition if safe to do so. Reduce vapors with fog or fine water spray, taking care not to spread liquid with water. Shut off flow if safe to do so. Ventilate area or move container to a well-ventilated area. Flammable vapors may spread from leak and could explode if reignited by sparks or flames. Explosive atmospheres may linger. Before entering area, especially confined areas, check atmosphere with an appropriate device. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

#### 6.1.1. For non-emergency personnel

No additional information available

#### 6.1.2. For emergency responders

No additional information available

### 6.2. Environmental precautions

Try to stop release. Reduce vapor with fog or fine water spray. Prevent waste from contaminating the surrounding environment. Prevent soil and water pollution. Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

### 6.3. Methods and material for containment and cleaning up

No additional information available

### 6.4. Reference to other sections

See also sections 8 and 13.

## SECTION 7: Handling and storage

### 7.1. Precautions for safe handling

Precautions for safe handling : Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Use only non-sparking tools. Use only explosion-proof equipment

All piped systems and associated equipment must be grounded

Leak-check system with soapy water; never use a flame

Wear leather safety gloves and safety shoes when handling cylinders. Protect cylinders from physical damage; do not drag, roll, slide or drop. While moving cylinder, always keep in place removable valve cover. Never attempt to lift a cylinder by its cap; the cap is intended solely to protect the valve. When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders. Never insert an object (e.g, wrench, screwdriver, pry bar) into cap openings; doing so may damage the valve and cause a leak. Use an adjustable strap wrench to remove over-tight or rusted caps. Slowly open the valve. If the valve is hard to open, discontinue use and contact your supplier. Close the container valve after each use; keep closed even when empty. Never apply flame or localized heat directly to any part of the container. High temperatures may damage the container and could cause the pressure relief device to fail prematurely, venting the container contents. For other precautions in using this product, see section 16.

### 7.2. Conditions for safe storage, including any incompatibilities

Storage conditions : Store only where temperature will not exceed 125°F (52°C). Post "No Smoking/No Open Flames" signs in storage and use areas. There must be no sources of ignition. Separate packages and protect against potential fire and/or explosion damage following appropriate codes and requirements (e.g, NFPA 30, NFPA 55, NFPA 70, and/or NFPA 221 in the U.S.) or according to requirements determined by the Authority Having Jurisdiction (AHJ). Always secure containers upright to keep them from falling or being knocked over. Install valve protection cap, if provided, firmly in place by hand when the container is not in use. Store full and empty containers separately. Use a first-in, first-out inventory system to prevent storing full containers for long periods. For other precautions in using this product, see section 16

**OTHER PRECAUTIONS FOR HANDLING, STORAGE, AND USE:** When handling product under pressure, use piping and equipment adequately designed to withstand the pressures to be encountered. Never work on a pressurized system. Use a back flow preventive device in the piping. Gases can cause rapid suffocation because of oxygen deficiency; store and use with adequate ventilation. If a leak occurs, close the container valve and blow down the system in a safe and environmentally correct manner in compliance with all international, federal/national, state/provincial, and local laws; then repair the leak. Never place a container where it may become part of an electrical circuit.

### 7.3. Specific end use(s)

None.

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

| Dimethyl Ether (115-10-6) | |
|---|---|
| ACGIH | Not established |
| USA OSHA | Not established |

### 8.2. Exposure controls

Appropriate engineering controls : Use an explosion-proof local exhaust system. Local exhaust and general ventilation must be adequate to meet exposure standards. MECHANICAL (GENERAL): **Inadequate - Use only in a closed system.** Use explosion proof equipment and lighting.

Hand protection : Wear working gloves when handling gas containers.

Eye protection : Wear safety glasses with side shields. Wear safety glasses with side shields or goggles when transfilling or breaking transfer connections.

| | |
|---|---|
| Respiratory protection | : When workplace conditions warrant respirator use, follow a respiratory protection program that meets OSHA 29 CFR 1910.134, ANSI Z88.2, or MSHA 30 CFR 72.710 (where applicable). Use an air-supplied or air-purifying cartridge if the action level is exceeded. Ensure that the respirator has the appropriate protection factor for the exposure level. If cartridge type respirators are used, the cartridge must be appropriate for the chemical exposure. For emergencies or instances with unknown exposure levels, use a self-contained breathing apparatus (SCBA). |
| Thermal hazard protection | : Wear cold insulating gloves when transfilling or breaking transfer connections. None necessary. |
| Environmental exposure controls | : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment. Refer to local regulations for restriction of emissions to the atmosphere. |
| Other information | : Consider the use of flame resistant anti-static safety clothing. Wear safety shoes while handling containers. |

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

| | |
|---|---|
| Physical state | : Gas |
| Molecular mass | : 46 g/mol |
| Color | : Colorless. |
| Odor | : Ethereal. Poor warning properties at low concentrations. |
| Odor threshold | : No data available |
| pH | : Not applicable. |
| Relative evaporation rate (butyl acetate=1) | : No data available |
| Relative evaporation rate (ether=1) | : Not applicable. |
| Melting point | : -141.5 °C |
| Freezing point | : No data available |
| Boiling point | : -24.8 °C |
| Flash point | : Not applicable. |
| Critical temperature | : 126.9 °C |
| Auto-ignition temperature | : 350 °C |
| Decomposition temperature | : No data available |
| Flammability (solid, gas) | : 3.4 - 18 |
| Vapor pressure | : 510 kPa |
| Critical pressure | : 5370 kPa |
| Relative vapor density at 20 °C | : No data available |
| Relative density | : 0.73 |
| Density | : 668.3 kg/m³ (at 20 °C) |
| Relative gas density | : 1.6 |
| Solubility | : Water: No data available |
| Log Pow | : 0.1 |
| Log Kow | : Not applicable. |
| Viscosity, kinematic | : Not applicable. |
| Viscosity, dynamic | : Not applicable. |
| Explosive properties | : Not applicable. |
| Oxidizing properties | : None. |
| Explosion limits | : No data available |

### 9.2. Other information

| | |
|---|---|
| Gas group | : Liquefied gas |
| Additional information | : Gas/vapor heavier than air. May accumulate in confined spaces, particularly at or below ground level |

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

No reactivity hazard other than the effects described in sub-sections below.

### 10.2. Chemical stability

Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

May occur. The presence of oxygen or prolonged standing in or exposure to direct sunlight may lead to formation of unstable peroxides, which may explode spontaneously or when heated.

### 10.4. Conditions to avoid

High temperature. direct sunlight.

### 10.5. Incompatible materials

Oxidizing agents. Halogens. Acids. carbon monoxide. Aluminum hydride. Lithium aluminium hydride.

### 10.6. Hazardous decomposition products

Thermal decomposition may produce : Carbon monoxide. Carbon dioxide.

## SECTION 11: Toxicological information

### 11.1. Information on toxicological effects

Acute toxicity : Not classified

| Dimethyl Ether ( \f )115-10-6 | |
|---|---|
| LC50 inhalation rat (mg/l) | 308.5 mg/l/4h |
| LC50 inhalation rat (ppm) | 163754 ppm/1h |
| ATE US (vapors) | 308.500 mg/l/4h |
| ATE US (dust, mist) | 308.500 mg/l/4h |

Skin corrosion/irritation : Not classified

pH: Not applicable.

Serious eye damage/irritation : Not classified

pH: Not applicable.

Respiratory or skin sensitization : Not classified

Germ cell mutagenicity : Not classified

Carcinogenicity : Not classified

Reproductive toxicity : Not classified

Specific target organ toxicity (single exposure) : MAY CAUSE DROWSINESS OR DIZZINESS.

Specific target organ toxicity (repeated exposure) : Not classified

Aspiration hazard : Not classified

## SECTION 12: Ecological information

### 12.1. Toxicity

Ecology - general : No ecological damage caused by this product.

### 12.2. Persistence and degradability

| Dimethyl Ether (115-10-6) | |
|---|---|
| Persistence and degradability | Not readily biodegradable. |

### 12.3. Bioaccumulative potential

| Dimethyl Ether (115-10-6) | |
|---|---|
| Log Pow | 0.1 |
| Log Kow | Not applicable. |

| Dimethyl Ether (115-10-6) | |
|---|---|
| Bioaccumulative potential | Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9. |

### 12.4. Mobility in soil

| Dimethyl Ether (115-10-6) | |
|---|---|
| Mobility in soil | No data available. |
| Ecology - soil | Because of its high volatility, the product is unlikely to cause ground or water pollution. |

### 12.5. Other adverse effects

Other adverse effects : May cause pH changes in aqueous ecological systems.

Effect on ozone layer : None

Global warming potential [CO2=1] : 1

Effect on the global warming : No known effects from this product

## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Waste disposal recommendations : Dispose of contents/container in accordance with local/regional/national/international regulations. Contact supplier for any special requirements.

## SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1033 Dimethyl ether, 2.1

UN-No.(DOT) : UN1033

Proper Shipping Name (DOT) : Dimethyl ether

Class (DOT) : 2.1 - Class 2.1 - Flammable gas 49 CFR 173.115

Hazard labels (DOT) : 2.1 - Flammable gas


DOT Special Provisions (49 CFR 172.102) : T50 - When portable tank instruction T50 is referenced in Column (7) of the 172.101 Table, the applicable liquefied compressed gases are authorized to be transported in portable tanks in accordance with the requirements of 173.313 of this subchapter

### Additional information

Emergency Response Guide (ERG) Number : 115

Other information : No supplementary information available.

Special transport precautions : Avoid transport on vehicles where the load space is not separated from the driver's compartment. Ensure vehicle driver is aware of the potential hazards of the load and knows what to do in the event of an accident or an emergency. Before transporting product containers: - Ensure there is adequate ventilation. - Ensure that containers are firmly secured. - Ensure cylinder valve is closed and not leaking. - Ensure valve outlet cap nut or plug (where provided) is correctly fitted. - Ensure valve protection device (where provided) is correctly fitted.

**Transport by sea**

UN-No. (IMDG) : 1033

Proper Shipping Name (IMDG) : Dimethyl Ether

Class (IMDG) : 2 - Gases

MFAG-No : 115

**Air transport**

UN-No. (IATA) : 1033

Proper Shipping Name (IATA) : Dimethyl ether

| | |
|---|---|
| Class (IATA) | : 2 |
| Civil Aeronautics Law | : Gases under pressure/Gases flammable under pressure |

## SECTION 15: Regulatory information

### 15.1. US Federal regulations

| Dimethyl Ether (115-10-6) | |
|---|---|
| Listed on the United States TSCA (Toxic Substances Control Act) inventory | |
| SARA Section 311/312 Hazard Classes | Immediate (acute) health hazard<br>Delayed (chronic) health hazard<br>Sudden release of pressure hazard<br>Fire hazard |

### 15.2. International regulations

**CANADA**

| Dimethyl Ether (115-10-6) |
|---|
| Listed on the Canadian DSL (Domestic Substances List) |

**EU-Regulations**

| Dimethyl Ether (115-10-6) |
|---|
| Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances) |

#### 15.2.2. National regulations

| Dimethyl Ether (115-10-6) |
|---|
| Listed on the AICS (Australian Inventory of Chemical Substances)<br>Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)<br>Listed on the Japanese ENCS (Existing & New Chemical Substances) inventory<br>Listed on the Korean ECL (Existing Chemicals List)<br>Listed on NZIoC (New Zealand Inventory of Chemicals)<br>Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)<br>Listed on INSQ (Mexican National Inventory of Chemical Substances)<br>Listed on CICR (Turkish Inventory and Control of Chemicals) |

### 15.3. US State regulations

| Dimethyl Ether(115-10-6) | |
|---|---|
| U.S. - California - Proposition 65 - Carcinogens List | No |
| U.S. - California - Proposition 65 - Developmental Toxicity | No |
| U.S. - California - Proposition 65 - Reproductive Toxicity - Female | No |
| U.S. - California - Proposition 65 - Reproductive Toxicity - Male | No |
| State or local regulations | U.S. - Massachusetts - Right To Know List<br>U.S. - New Jersey - Right to Know Hazardous Substance List<br>U.S. - Pennsylvania - RTK (Right to Know) List |

## SECTION 16: Other information

Other information : When you mix two or more chemicals, you can create additional, unexpected hazards. Obtain and evaluate the safety information for each component before you produce the mixture. Consult an industrial hygienist or other trained person when you evaluate the end product. Before using any plastics, confirm their compatibility with this product

Praxair asks users of this product to study this SDS and become aware of the product hazards and safety information. To promote safe use of this product, a user should (1) notify employees, agents, and contractors of the information in this SDS and of any other known product hazards and safety information, (2) furnish this information to each purchaser of the product, and (3) ask each purchaser to notify its employees and customers of the product hazards and safety information

The opinions expressed herein are those of qualified experts within Praxair, Inc. We believe that the information contained herein is current as of the date of this Safety Data Sheet. Since the use of this information and the conditions of use are not within the control of Praxair, Inc, it is the user's obligation to determine the conditions of safe use of the product

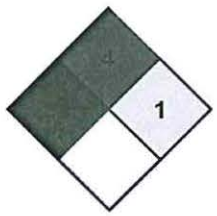
Praxair SDSs are furnished on sale or delivery by Praxair or the independent distributors and suppliers who package and sell our products. To obtain current SDSs for these products, contact your Praxair sales representative, local distributor, or supplier, or download from www.praxair.com. If you have questions regarding Praxair SDSs, would like the document number and date of the latest SDS, or would like the names of the Praxair suppliers in your area, phone or write the Praxair Call Center (Phone: 1-800-PRAXAIR/1-800-772-9247; Address: Praxair Call Center, Praxair, Inc, P.O. Box 44, Tonawanda, NY 14151-0044)



NFPA health hazard : 1 - Exposure could cause irritation but only minor residual injury even if no treatment is given.

NFPA fire hazard : 4 - Will rapidly or completely vaporize at normal pressure and temperature, or is readily dispersed in air and will burn readily.

NFPA reactivity : 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.




**HMIS III Rating**

Health : 1 Slight Hazard - Irritation or minor reversible injury possible

Flammability : 4 Severe Hazard

Physical : 2 Moderate Hazard

SDS US (GHS HazCom 2012) - Praxair

*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.*

| PUREGAS | SAFETY DATA SHEET | Revised edition no : 2<br>Date : 12/05/2014 |
|---|---|---|
| | Dimethyl Ether | PG 002 |

## SECTION 1. IDENTIFICATION OF THE PRODUCT AND COMPANY UNDERTAKING

| | |
|---|---|
| **Product name** : | Dimethyl Ether, aerosol grade |
| **Synonyms:** | DME |
| **Product Use Description:** | Chemical intermediate, Aerosol propellants, Foaming (blowing) agents |
| **Company:** | PUREGAS (Pty) Ltd<br>PO Box 123884, Alrode, 1451, South Africa<br>**Tel :** (011) 903 9760<br>**Fax:** (011) 903 9766<br>**Cellphone:** 082 889 6946 (1st)<br>082 885 7475 (2nd)<br>**Email:** info@puregas.co.za<br>**Emergency Tel**: 0800 172 743 (Rapid Spill Response) |

## SECTION 2. HAZARDS IDENTIFICATION

| | |
|---|---|
| **Classification** | Flammable gases, Category 1<br>Gases under pressure, Liquefied gas |
| **Pictograms** |  |
| **Signal Word** | Danger |
| **Hazard statements** | H220 Extremely flammable gas.<br>H280 Contains gas under pressure; may explode if heated. |
| **Precautionary statements**<br>**Prevention** | **P210** Keep away from heat/sparks/open flames/hot surfaces. No smoking |
| **Response** | **P377** Leaking gas fire: Do not extinguish, unless leak can be stopped safely.<br>**P381** Eliminate all ignition sources if safe to do so |
| **Storage** | **P410 + P403** Protect from sunlight. Store in a well-ventilated place. |
| **Other hazards which do not result in classification** | No further data available |

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

| Component | CAS No. |
|---|---|
| Dimethyl Ether | 115-10-6 |
| Contains no hazardous ingredients according to GHS | |

## SECTION 4. FIRST AID MEASURES

| | |
|---|---|
| **General advice** | When symptoms persist or in all cases of doubt seek medical advice. |
| **Inhalation** | Provide fresh air, warmth and rest, preferably in a comfortable upright sitting |

| | |
|---|---|
| | position.<br>Give oxygen or artificial respiration if needed.<br>Seek medical advice after significant exposure. |
| **Skin contact** | May cause frostbite.<br>Wash frost-bitten areas with plenty of water. Do not remove clothing.<br>Thaw frosted parts with lukewarm water. Do no rub affected area.<br>Seek medical advice. |
| **Eye contact** | Rinse thoroughly with plenty of water, also under the eyelids.<br>Keep eye wide open while rinsing.<br>Seek medical advice after significant exposure. |
| **Ingestion** | Not likely to occur |
| **Notes to physician** | |
| **Symptoms** | Frostbite |
| **Treatment** | Treat symptomatically |

## SECTION 5. FIRE-FIGHTING MEASURES

| | |
|---|---|
| **Suitable extinguishing media** | Dry Chemical Powder |
| **Unsuitable extinguishing media** | None |
| **Specific hazards during Fire fighting / Specific hazards arising from the chemical** | Vapours may form explosive mixtures with air.<br>Vapours may travel to areas away from work site before igniting/flashing back to vapour source. |
| **Special protective equipment for fire-fighters** | In the event of fire, wear self-contained breathing apparatus. |
| **Further information** | Use water spray to cool unopened containers |

## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | |
|---|---|
| **Personal precautions** | Ensure adequate ventilation<br>Remove all sources of ignition<br>Beware of vapours accumulating to form explosive concentrations<br>Vapours can accumulate in low areas |
| **Environmental precautions** | Prevent product from entering drains |
| **Methods for cleaning up / Methods for containment** | Evacuate area<br>Ventilate the area |
| **Additional advice** | For personal protection see section 8. |

## SECTION 7. HANDLING AND STORAGE

| | |
|---|---|
| **Advice on safe handling** | For personal protection see section 8.<br>Use only with adequate ventilation.<br>Use the indicated respiratory protection if the occupational exposure limit is exceeded and/or in case of product release. |
| **Advice on protection against fire and explosion** | Keep away from sources of ignition - No smoking.<br>Take measures to prevent the build-up of electrostatic charge.<br>Vapours are heavier than air and may spread along floors.<br>Vapours may travel to areas away from work site before igniting/flashing back to vapour source. |
| **Storage**<br>**Requirements for storage areas and containers** | Store away from heat.<br>Keep away from direct sunlight.<br>Keep in a well-ventilated place. |

## SECTION 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

**Components with workplace control parameters**

Contains no substances with occupational exposure limit values.

**Engineering Controls**

Effective exhaust ventilation system

| | |
|---|---|
| **Personal protective equipment** | |
| Respiratory protection | In case of insufficient ventilation, wear suitable respiratory equipment |
| Hand protection | Neoprene |
| Eye protection | Tightly fitting safety goggles |
| Skin and body protection | Protective suit |
| Hygiene measures | Handle in accordance with good industrial hygiene and safety practice.<br>Wash hands before breaks and at the end of workday. |
| **Environmental exposure controls** | |
| General advice | Prevent product from entering drains. |

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | |
|---|---|
| **Appearance**<br>**Form** | Liquefied gas |
| **Colour** | colourless |
| **Odour** | Almost odourless. |
| **Odour Threshold** | no data available |
| **Safety data**<br>**pH** | not applicable |

| | |
|---|---|
| **Freezing point** | -141 °C |
| **Boiling point/Boiling range** | -24.8 °C |
| **Flash point** | - 41 °C |
| **Evaporating rate** | no data available |
| **Flammability (solid, gas)** | Extremely flammable |
| **Lower Explosion Limit** | 3.3 %(V) |
| **Upper explosion limit** | 18.6 %(V) |
| **Vapour pressure** | 470 kPa at 25 °C<br>1040 kPa at 50 °C |
| **Relative vapour density** | 1.59 (Air = 1.0) |
| **Density** | 668 *kg*/m$^3$ at 20 °C<br>Liquid |
| **Water solubility** | 328 g/l at 20 °C<br>at 410kPaLiquefied gas, Closed system |
| **Solubility in other solvents** | Organic solvents. |
| **Partition coefficient: n-octanol/water** | log pow: 0.07<br>at 25 °C |
| **Auto-ignition temperature** | 350 °C (235 °C,BAM, DIN 51 794) |
| **Decomposition temperature** | no data available |
| **Viscosity, dynamic** | not applicable |
| **Viscosity, kinematic** | not applicable |
| **Explosive properties** | Vapours may form explosive mixtures in air |
| **Oxidizing properties** | Not classified as oxidising. |
| **Peroxide content** | not applicable |

**This safety datasheet only contains information relating to safety and does not replace any product information or product specification.**

## SECTION 10. STABILITY AND REACTIVITY

| | |
|---|---|
| **Conditions to avoid** | Heat, flames and sparks. |
| **Material to avoid** | Hydrogen fluoride<br>Strong oxidizing agents<br>Oxygen<br>Rubber products |

| | |
|---|---|
| | Viton (R) |
| **Hazardous decomposition products**. | In case of fire hazardous decomposition products may be produced such as:<br>Carbon dioxide (CO2), carbon monoxide (CO), oxides of nitrogen (NOx), dense black smoke. |
| **Thermal decomposition** | no data available |
| **Reactivity** | Stable under recommended storage conditions. |
| **Chemical stability** | Stable under recommended storage conditions. |
| **Hazardous reactions** | No dangerous reaction known under conditions of normal use. |

## SECTION 11. TOXICOLOGICAL INFORMATION

| | |
|---|---|
| **Hazard Summary**<br>Inhalation | May cause irritation of respiratory tract. |
| Skin | May cause frostbite. |
| Eyes | May cause eye irritation. |
| **Toxicology Assessment**<br>Further information | Solvents may degrease the skin. |

## SECTION 12. ECOLOGICAL INFORMATION

| | |
|---|---|
| **Ecotoxicology Assessment**<br>Additional ecological information | None known |

## SECTION 13. DISPOSAL CONSIDERATIONS

| | |
|---|---|
| **Product** | Dispose of in accordance with local regulations |
| **Contaminated packaging** | Empty remaining contents.<br>Empty pressure vessels should be returned to the supplier.<br>Do not burn, or use a cutting torch on, the empty drum. |

## SECTION 14. TRANSPORT INFORMATION

| | |
|---|---|
| **IATA** | |
| UN number | 1033 |
| Proper shipping name | Dimethyl ether |
| Class | 2.1 |
| Labels | 2.1 |
| Packing instruction (cargo aircraft) | 200 |
| **IATA_P** | |
| UN number | 1033 |
| Class | 2.1 |
| Environmentally hazardous | No |

| | |
|---|---|
| **IMDG** | |
| UN number | 1033 |
| Proper shipping name | DIMETHYL ETHER |
| Class | 2.1 |
| Labels | 2.1 |
| EmS Number 1 | F-D |
| EmS Number 2 | S-U |
| Marine Pollutant | No |
| Other information | Handle with care |

## SECTION 15. REGULATORY INFORMATION

| | |
|---|---|
| **EEC Hazard Classification** | F+ Extremely Flammable |
| **Risk Phrases** | R12 – Extremely Flammable<br>R18 – In use may form flammable explosive vapour-air mixture.<br>R44 – Risk of explosion if heated under confinement. |
| **Safety Phrases** | S2 Keep out of reach of children<br>S3 Keep in cool place<br>S9 Keep container in well ventilated place<br>S15 Keep away from heat<br>S29 Do not empty into drains<br>S16 Keep away from sources of ignition<br>S33 Keep away from static discharge<br>S41 in case of fire and/or explosion do not breath fumes<br>Refer to SANS 10265 for explanation of the above. |
| **Legislation** | Ensure national/local regulations are observed |

## SECTION 16. OTHER INFORMATION

Further information

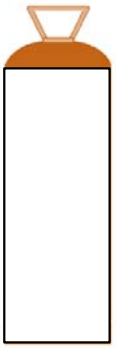
The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.

# PUREGAS PRODUCT DATA SHEET

## Dimethyl Ether (DME)

**Description**

Formula $C_2H_6O$



**Gas Specifications**

| PRODUCT | UNIT WT % | WATER (PPM) | METHANOL (PPM) | C1/C4 (PPM) | RESIDUE (PPM) |
|---|---|---|---|---|---|
| Dimethyl Ether (DME) | >99.9 | <100 | <1 | <50 | <10 |

**Shipping Information**

CAS Number 115-10-6

UN Number UN 1033

ADR Class 2.1


**Characteristics**

Liquefied, colourless gas
Extremely flammable
Flammability Range in Air (% Volume) 3% to 18.6%
Vapour heavier than air and may accumulate in confined spaces
Pressure 4.7 @ 25°C
Density 0.668 @ 25°C

**Health Risks**

Refer to the Puregas MSDS for DME for further information

Ozone Friendly PUREGAS PROPELLANTS

PUREGAS PROPELLANTS

*For further information on products and services available from Puregas, please contact us on +27 (0)11-903-9760, e-mail your enquiry to info@puregas.co.za, or visit our website at www.puregas.co.za*

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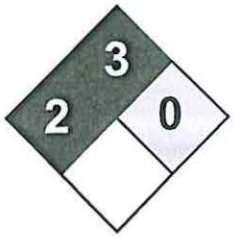


| | |
|---|---|
| Health | 2 |
| Fire | 3 |
| Reactivity | 0 |
| Personal Protection | E |

# Material Safety Data Sheet
## Ethyl alcohol 200 Proof MSDS

### Section 1: Chemical Product and Company Identification

**Product Name:** Ethyl alcohol 200 Proof

**Catalog Codes:** SLE2248, SLE1357

**CAS#:** 64-17-5

**RTECS:** KQ6300000

**TSCA:** TSCA 8(b) inventory: Ethyl alcohol 200 Proof

**CI#:** Not applicable.

**Synonym:** Ethanol; Absolute Ethanol; Alcohol; Ethanol 200 proof; Ethyl Alcohol, Anhydrous; Ethanol, undenatured; Dehydrated Alcohol; Alcohol

**Chemical Name:** Ethyl Alcohol

**Chemical Formula:** CH3CH2OH

**Contact Information:**

**Sciencelab.com, Inc.**
14025 Smith Rd.
Houston, Texas 77396

US Sales: **1-800-901-7247**
International Sales: **1-281-441-4400**

Order Online: ScienceLab.com

**CHEMTREC (24HR Emergency Telephone), call:** 1-800-424-9300

**International CHEMTREC, call:** 1-703-527-3887

**For non-emergency assistance, call:** 1-281-441-4400

### Section 2: Composition and Information on Ingredients

**Composition:**

| Name | CAS # | % by Weight |
|---|---|---|
| Ethyl alcohol 200 Proof | 64-17-5 | 100 |

**Toxicological Data on Ingredients:** Ethyl alcohol 200 Proof: ORAL (LD50): Acute: 7060 mg/kg [Rat]. 3450 mg/kg [Mouse]. VAPOR (LC50): Acute: 20000 ppm 8 hours [Rat]. 39000 mg/m 4 hours [Mouse].

### Section 3: Hazards Identification

**Potential Acute Health Effects:**
Hazardous in case of skin contact (irritant), of eye contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

**Potential Chronic Health Effects:**
Slightly hazardous in case of skin contact (sensitizer). CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified PROVEN for human. DEVELOPMENTAL TOXICITY: Classified Development toxin [PROVEN]. Classified Reproductive system/toxin/female, Reproductive system/toxin/male [POSSIBLE]. The substance is toxic to blood, the reproductive system, liver, upper respiratory tract, skin, central nervous system (CNS). Repeated or prolonged exposure to the substance can produce target organs damage.

## Section 4: First Aid Measures

**Eye Contact:**
Check for and remove any contact lenses. Immediately flush eyes with running water for at least 15 minutes, keeping eyelids open. Cold water may be used. Get medical attention.

**Skin Contact:**
In case of contact, immediately flush skin with plenty of water. Cover the irritated skin with an emollient. Remove contaminated clothing and shoes. Cold water may be used.Wash clothing before reuse. Thoroughly clean shoes before reuse. Get medical attention.

**Serious Skin Contact:**
Wash with a disinfectant soap and cover the contaminated skin with an anti-bacterial cream. Seek medical attention.

**Inhalation:**
If inhaled, remove to fresh air. If not breathing, give artificial respiration. If breathing is difficult, give oxygen. Get medical attention if symptoms appear.

**Serious Inhalation:**
Evacuate the victim to a safe area as soon as possible. Loosen tight clothing such as a collar, tie, belt or waistband. If breathing is difficult, administer oxygen. If the victim is not breathing, perform mouth-to-mouth resuscitation. Seek medical attention.

**Ingestion:**
Do NOT induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention if symptoms appear.

**Serious Ingestion:** Not available.

## Section 5: Fire and Explosion Data

**Flammability of the Product:** Flammable.

**Auto-Ignition Temperature:** 363°C (685.4°F)

**Flash Points:** CLOSED CUP: 12.78°C (55°F). OPEN CUP: 17.78°C (64°F) (Cleveland).

**Flammable Limits:** LOWER: 3.3% UPPER: 19%

**Products of Combustion:** These products are carbon oxides (CO, CO2).

**Fire Hazards in Presence of Various Substances:**
Highly flammable in presence of open flames and sparks, of heat. Slightly flammable to flammable in presence of oxidizing materials.

**Explosion Hazards in Presence of Various Substances:**
Risks of explosion of the product in presence of mechanical impact: Not available. Slightly explosive in presence of open flames and sparks, of heat, of oxidizing materials, of acids.

**Fire Fighting Media and Instructions:**
Flammable liquid, soluble or dispersed in water. SMALL FIRE: Use DRY chemical powder. LARGE FIRE: Use alcohol foam, water spray or fog.

**Special Remarks on Fire Hazards:**
Containers should be grounded. CAUTION: MAY BURN WITH NEAR INVISIBLE FLAME Vapor may travel considerable distance to source of ignition and flash back. May form explosive mixtures with air. Contact with Bromine pentafluoride is likely to cause fire or explosion. Ethanol ignites on contact with chromyl chloride. Ethanol ignites on contact with iodine heptafluoride gas. It ignites than explodes upon contact with nitrosyl perchlorate. Additon of platinum black catalyst caused ignition.

**Special Remarks on Explosion Hazards:**
Ethanol has an explosive reaction with the oxidized coating around potassium metal. Ethanol ignites and then explodes on contact with acetic anhydride + sodium hydrosulfate (ignites and may explode), disulfuric acid + nitric acid, phosphorous(III) oxide platinum, potassium-tert-butoxide+ acids. Ethanol forms explosive products in reaction with the following compound :

ammonia + silver nitrate (forms silver nitride and silver fulminate), iodine + phosphorus (forms ethane iodide), magnesium perchlorate (forms ethyl perchlorate), mercuric nitrate, nitric acid + silver (forms silver fulminate) silver nitrate (forms ethyl nitrate) silver(I) oxide + ammonia or hydrazine (forms silver nitride and silver fulminate), sodium (evolves hydrogen gas). Sodium Hydrazide + alcohol can produce an explosion. Alcohols should not be mixed with mercuric nitrate, as explosive mercuric fulminate may be formed. May form explosive mixture with manganese perchlorate + 2,2-dimethoxypropane. Addition of alcohols to highly concentrate hydrogen peroxide forms powerful explosives. Explodes on contact with calcium hypochlorite

## Section 6: Accidental Release Measures

**Small Spill:**
Dilute with water and mop up, or absorb with an inert dry material and place in an appropriate waste disposal container.

**Large Spill:**
Flammable liquid. Keep away from heat. Keep away from sources of ignition. Stop leak if without risk. Absorb with DRY earth, sand or other non-combustible material. Do not touch spilled material. Prevent entry into sewers, basements or confined areas; dike if needed. Be careful that the product is not present at a concentration level above TLV. Check TLV on the MSDS and with local authorities.

## Section 7: Handling and Storage

**Precautions:**
Keep locked up.. Keep away from heat. Keep away from sources of ignition. Ground all equipment containing material. Do not ingest. Do not breathe gas/fumes/ vapor/spray. Wear suitable protective clothing. In case of insufficient ventilation, wear suitable respiratory equipment. If ingested, seek medical advice immediately and show the container or the label. Avoid contact with skin and eyes. Keep away from incompatibles such as oxidizing agents, acids, alkalis, moisture.

**Storage:**
Store in a segregated and approved area. Keep container in a cool, well-ventilated area. Keep container tightly closed and sealed until ready for use. Avoid all possible sources of ignition (spark or flame). Do not store above 23°C (73.4°F).

## Section 8: Exposure Controls/Personal Protection

**Engineering Controls:**
Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapors below their respective threshold limit value. Ensure that eyewash stations and safety showers are proximal to the work-station location.

**Personal Protection:**
Splash goggles. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Gloves. Use a respirator if the exposure limit is exceeded.

**Personal Protection in Case of a Large Spill:**
Splash goggles. Full suit. Vapor respirator. Boots. Gloves. A self contained breathing apparatus should be used to avoid inhalation of the product. Suggested protective clothing might not be sufficient; consult a specialist BEFORE handling this product.

**Exposure Limits:**
TWA: 1900 (mg/m3) from OSHA (PEL) [United States] TWA: 1000 (ppm) from OSHA (PEL) [United States] TWA: 1900 (mg/m3) from NIOSH [United States] TWA: 1000 (ppm) from NIOSH [United States] TWA: 1000 (ppm) [United Kingdom (UK)] TWA: 1920 (mg/m3) [United Kingdom (UK)] TWA: 1000 STEL: 1250 (ppm) [Canada]Consult local authorities for acceptable exposure limits.

## Section 9: Physical and Chemical Properties

**Physical state and appearance:** Liquid. (Liquid.)

**Odor:**

Mild to strong, rather pleasant; like wine or whiskey. Alcohol-like; Ethereal, vinous.

**Taste:** Pungent. Burning.

**Molecular Weight:** 46.07 g/mole

**Color:** Colorless. Clear

**pH (1% soln/water):** Not available.

**Boiling Point:** 78.5°C (173.3°F)

**Melting Point:** -114.1°C (-173.4°F)

**Critical Temperature:** 243°C (469.4°F)

**Specific Gravity:** 0.789 (Water = 1)

**Vapor Pressure:** 5.7 kPa (@ 20°C)

**Vapor Density:** 1.59 (Air = 1)

**Volatility:** Not available.

**Odor Threshold:** 100 ppm

**Water/Oil Dist. Coeff.:** The product is more soluble in water; log(oil/water) = -0.3

**Ionicity (in Water):** Not available.

**Dispersion Properties:** See solubility in water, methanol, diethyl ether, acetone.

**Solubility:**
Easily soluble in cold water, hot water. Soluble in methanol, diethyl ether, acetone.

## Section 10: Stability and Reactivity Data

**Stability:** The product is stable.

**Instability Temperature:** Not available.

**Conditions of Instability:** Incompatible materials, heat, sources of ignition.

**Incompatibility with various substances:** Reactive with oxidizing agents, acids, alkalis.

**Corrosivity:** Non-corrosive in presence of glass.

**Special Remarks on Reactivity:**
Ethanol rapidly absorbs moisture from the air. Can react vigorously with oxiders. The following oxidants have been demonstrated to undergo vigorous/explosive reaction with ethanol: barium perchlorate, bromine pentafluoride, calcium hypochlorite, chloryl perchlorate, chromium trioxide, chromyl chloride, dioxygen difluoride, disulfuryl difluoride, fluorine nitrate, hydrogen peroxide, iodine heptafluoride, nitric acid nitrosyl perchlorate, perchloric acid permanganic acid, peroxodisulfuric acid, potassium dioxide, potassium perchlorate, potassium permanganate, ruthenium(VIII) oxide, silver perchlorate, silver peroxide, uranium hexafluoride, uranyl perchlorate. Ethanol reacts violently/expodes with the following compounds: acetyl bromide (evolves hydrogen bromide) acetyl chloride, aluminum, sesquibromide ethylate, ammonium hydroxide & silver oxide, chlorate, chromic anhydride, cyanuric acid + water, dichloromethane + sulfuric acid + nitrate (or) nitrite, hydrogen peroxide + sulfuric acid, iodine + methanol + mercuric oxide, manganese perchlorate + 2,2-dimethoxy propane, perchlorates, permanganates + sulfuric acid, potassium superoxide, potassium tert-butoxide, silver & nitric acid, silver perchlorate, sodium hydrazide, sulfuric acid + sodium dichromate, tetrachlorisilane + water. Ethanol is also incompatible with platinium, and sodium. No really safe conditions exist under which ethyl alcohol and chlorine oxides can be handled. Reacts vigorously with acetyl chloride

**Special Remarks on Corrosivity:** Not available.

**Polymerization:** Will not occur.

## Section 11: Toxicological Information

**Routes of Entry:** Absorbed through skin. Dermal contact. Eye contact. Inhalation. Ingestion.

**Toxicity to Animals:**
WARNING: THE LC50 VALUES HEREUNDER ARE ESTIMATED ON THE BASIS OF A 4-HOUR EXPOSURE. Acute oral toxicity (LD50): 3450 mg/kg [Mouse]. Acute toxicity of the vapor (LC50): 39000 mg/m3 4 hours [Mouse].

**Chronic Effects on Humans:**
CARCINOGENIC EFFECTS: A4 (Not classifiable for human or animal.) by ACGIH. MUTAGENIC EFFECTS: Mutagenic for mammalian somatic cells. Mutagenic for bacteria and/or yeast. TERATOGENIC EFFECTS: Classified PROVEN for human. DEVELOPMENTAL TOXICITY: Classified Development toxin [PROVEN]. Classified Reproductive system/toxin/female, Reproductive system/toxin/male [POSSIBLE]. Causes damage to the following organs: blood, the reproductive system, liver, upper respiratory tract, skin, central nervous system (CNS).

**Other Toxic Effects on Humans:**
Hazardous in case of skin contact (irritant), of inhalation. Slightly hazardous in case of skin contact (permeator), of ingestion.

**Special Remarks on Toxicity to Animals:**
Lowest Published Dose/Conc: LDL[Human] - Route: Oral; Dose: 1400 mg/kg LDL[Human child] - Route: Oral; Dose: 2000 mg/kg LDL[Rabbit] - Route: Skin; Dose: 20000 mg/kg

**Special Remarks on Chronic Effects on Humans:**
May affect genetic material (mutagenic) Causes adverse reproductive effects and birth defects (teratogenic) , based on moderate to heavy consumption. May cause cancer based on animal data. Human: passes through the placenta, excreted in maternal milk.

**Special Remarks on other Toxic Effects on Humans:**
Acute potential health effects: Skin: causes skin irritation Eyes: causes eye irritation Ingestion: May cause gastrointestinal tract irritation with nausea, vomiting, diarrhea, and alterations in gastric secretions. May affect behavior/central nervous system (central nervous system depression - amnesia, headache, muscular incoordination, excitation, mild euphoria, slurred speech, drowsiness, staggaring gait, fatigue, changes in mood/personality, excessive talking, dizziness, ataxia, somnolence, coma/narcosis, hallucinations, distorted perceptions, general anesthetic), peripherial nervous system (spastic paralysis)vision (diplopia). Moderately toxic and narcotic in high concentrations. May also affect metabolism, blood, liver, respiration (dyspnea), and endocrine system. May affect respiratory tract, cardiovascular(cardiac arrhythmias, hypotension), and urinary systems. Inhalation: May cause irritation of the respiratory tract and affect behavior/central nervous system with symptoms similar to ingestion. Chronic Potential Health Effects: Skin: Prolonged or repeated skin contact may casue dermatitis, an allergic reaction. Ingestion: Prolonged or repeated ingestion will have similiar effects as acute ingestion. It may also affect the brain.

## Section 12: Ecological Information

**Ecotoxicity:** Ecotoxicity in water (LC50): 14000 mg/l 96 hours [Rainbow trout]. 11200 mg/l 24 hours [fingerling trout].

**BOD5 and COD:** Not available.

**Products of Biodegradation:**
Possibly hazardous short term degradation products are not likely. However, long term degradation products may arise.

**Toxicity of the Products of Biodegradation:** The product itself and its products of degradation are not toxic.

**Special Remarks on the Products of Biodegradation:** Not available.

## Section 13: Disposal Considerations

**Waste Disposal:**
Waste must be disposed of in accordance with federal, state and local environmental control regulations.

## Section 14: Transport Information

**DOT Classification:** CLASS 3: Flammable liquid.

**Identification:** : Ethanol UNNA: 1170 PG: II

**Special Provisions for Transport:** Not available.

## Section 15: Other Regulatory Information

**Federal and State Regulations:**
California prop. 65: This product contains the following ingredients for which the State of California has found to cause cancer, birth defects or other reproductive harm, which would require a warning under the statute: Ethyl alcohol 200 Proof (in alcoholic beverages) California prop. 65: This product contains the following ingredients for which the State of California has found to cause birth defects which would require a warning under the statute: Ethyl alcohol 200 Proof (in alcoholic beverages) Connecticut hazardous material survey.: Ethyl alcohol 200 Proof Illinois toxic substances disclosure to employee act: Ethyl alcohol 200 Proof Rhode Island RTK hazardous substances: Ethyl alcohol 200 Proof Pennsylvania RTK: Ethyl alcohol 200 Proof Florida: Ethyl alcohol 200 Proof Minnesota: Ethyl alcohol 200 Proof Massachusetts RTK: Ethyl alcohol 200 Proof Massachusetts spill list: Ethyl alcohol 200 Proof New Jersey: Ethyl alcohol 200 Proof Tennessee: Ethyl alcohol 200 Proof California - Directors List of Hazardous Substances (8 CCR 339): Ethyl alcohol 200 Proof TSCA 8(b) inventory: Ethyl alcohol 200 Proof

**Other Regulations:**
OSHA: Hazardous by definition of Hazard Communication Standard (29 CFR 1910.1200). EINECS: This product is on the European Inventory of Existing Commercial Chemical Substances.

**Other Classifications:**

**WHMIS (Canada):**
CLASS B-2: Flammable liquid with a flash point lower than 37.8°C (100°F). CLASS D-2A: Material causing other toxic effects (VERY TOXIC).

**DSCL (EEC):**
R11- Highly flammable. S7- Keep container tightly closed. S16- Keep away from sources of ignition - No smoking.

**HMIS (U.S.A.):**

**Health Hazard:** 2

**Fire Hazard:** 3

**Reactivity:** 0

**Personal Protection:** E

**National Fire Protection Association (U.S.A.):**

**Health:** 2

**Flammability:** 3

**Reactivity:** 0

**Specific hazard:**

**Protective Equipment:**
Gloves. Lab coat. Vapor respirator. Be sure to use an approved/certified respirator or equivalent. Wear appropriate respirator when ventilation is inadequate. Splash goggles.

## Section 16: Other Information

**References:**
-SAX, N.I. Dangerous Properties of Indutrial Materials. Toronto, Van Nostrand Reinold, 6e ed. 1984. -Material safety data sheet emitted by: la Commission de la Santé et de la Sécurité du Travail du Québec. -Hawley, G.G.. The Condensed Chemical Dictionary, 11e ed., New York N.Y., Van Nostrand Reinold, 1987. -The Sigma-Aldrich Library of Chemical Safety Data, Edition II. HSDB, RTECS, and LOLI databases.

**Other Special Considerations:** Not available.

**Created:** 10/09/2005 05:28 PM

**Last Updated:** 05/21/2013 12:00 PM

# *Material Safety Data Sheet*

## *Ethanol 95/E5*

***Version 1.04*** ***Revision Date 20.04.2007***

## *1. Identification of the substance/preparation and of the company/undertaking*

| | |
|---|---|
| ***Trade name*** | ***Ethanol 95/E5*** |
| ***Synonyms*** | ***Ethanol 95/E5*** |
| ***Product code*** | ***1806*** |
| ***Use*** | *Solvents, raw material for printing inks and printing ink additives* |
| ***Company*** | *Sasol Solvents*<br>*A division of Sasol Chemical Industries*<br>*Sturdee Avenue 2*<br>*ZA 2196 Rosebank* |
| ***Information (Product safety)*** | ***Telephone:*** *+27112800000* ***Fax:*** *+27112800198* |

| | | |
|---|---|---|
| ***Emergency telephone number*** | *Europe, Israel, Africa, Americas* | *+44 (0)208 762 8322* |
| | *Middle East, Arabic African countries* | *+961 3 487 287* |
| | *Asia Pacific* | *+65 633 44 177* |
| | *China* | *+86 10 5100 3039* |
| | *South Africa* | *+27 (0)17 610 4444* |

## *2. Composition/information on ingredients*

***ethanol; ethyl alcohol***

***Contents:*** *>= 95.00 - <= 100.00 %W/W*

***CAS-No.*** *64-17-5* ***Index-No.*** *603-002-00-5* ***EC-No.*** *200-578-6*
***Symbol(s)*** *F* ***R-phrase(s)*** *-R11*

***ethyl acetate***

***Contents:*** *>= 5.00 - < 7.00 %W/W*

***CAS-No.*** *141-78-6* ***Index-No.*** *607-022-00-5* ***EC-No.*** *205-500-4*
***Symbol(s)*** *F, Xi* ***R-phrase(s)*** *-R11 -R36 -R66 -R67*

*For the full text of the R phrases mentioned in this Section, see Section 16.*

## 3. Hazards identification

***Identification of the risks***
*R11* *Highly flammable.*

## 4. First aid measures

| | |
|---|---|
| ***Inhalation*** | *Move to fresh air in case of accidental inhalation of vapours. If breathing is irregular or stopped, administer artificial respiration. If symptoms persist, call a physician.* |
| ***Skin contact*** | *Wash off immediately with plenty of water for at least 15 minutes. If skin irritation persists, call a physician.* |
| ***Eye contact*** | *Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Remove contact lenses. If eye irritation persists, consult a specialist.* |
| ***Ingestion*** | *Do not induce vomiting without medical advice. Never give anything by mouth to an unconscious person. Call a physician immediately.* |

## 5. Fire-fighting measures

| | |
|---|---|
| ***Suitable extinguishing media*** | *Water spray, Dry powder, Alcohol-resistant foam* |
| ***Specific hazards during fire fighting*** | *Flash back possible over considerable distance. Do not allow run-off from fire fighting to enter drains or water courses.* |
| ***Special protective equipment for fire-fighters*** | *In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.* |
| ***Further information*** | *Cool containers / tanks with water spray.* |

## 6. Accidental release measures

| | |
|---|---|
| ***Personal precautions*** | *Keep people away from and upwind of spill/leak. Remove all sources of ignition. Do not breathe vapours or spray mist.* |
| ***Environmental precautions*** | *Prevent product from entering drains. Prevent further leakage or spillage if safe to do so.* |
| ***Methods for cleaning up*** | *Soak up with inert absorbent material and dispose of as hazardous waste.* |
| ***Additional advice*** | *Never return spills in original containers for re-use.* |

## 7. Handling and storage

### Handling

| | |
|---|---|
| **Safe handling advice** | *Do not breathe vapours or spray mist. Wear personal protective equipment.* |
| **Advice on protection against fire and explosion** | *Keep away from open flames, hot surfaces and sources of ignition. Use explosion-proof equipment.* |

### Storage

| | |
|---|---|
| **Requirements for storage areas and containers** | *Keep containers tightly closed in a cool, well-ventilated place.* |

## 8. Exposure controls / personal protection

### Components with workplace control parameters

**NATIONAL OCCUPATIONAL EXPOSURE LIMITS**

*no data available*

**EUROPEAN OCCUPATIONAL EXPOSURE LIMITS**

*no data available*

### Engineering measures

*Provide sufficient air exchange and/or exhaust in work rooms.*

### Personal protective equipment

| | |
|---|---|
| **Respiratory protection** | *In case of insufficient ventilation wear suitable respiratory equipment.* |
| **Hand protection** | *Gloves suitable for permanent contact:*<br>*Material: butyl-rubber*<br>*Break through time: 4 h*<br>*Material thickness: 0.5 mm*<br>*unsuitable gloves*<br>*Material: Polyvinylchloride, leather, nitrile rubber/nitrile latex, natural rubber/natural latex* |
| **Eye protection** | *Safety glasses with side-shields* |
| **Skin and body protection** | *Safety shoes, protective suit* |
| **Hygiene measures** | *Wash hands before breaks and immediately after handling the product.* |
| **Protective measures** | *Wear suitable protective equipment.* |

# Material Safety Data Sheet

## Ethanol 95/E5

**Version 1.04** **Revision Date 20.04.2007**

## 9. Physical and chemical properties

| | |
|---|---|
| **Form** | liquid |
| **state of matter** | liquid; at 20 °C; 1,013 hPa |
| **Colour** | colourless |
| **Odour** | alcoholic |
| **pH** | neutral |
| **Melting point/range** | -83.6 °C |
| **Boiling point/range** | 77 °C |
| **Flash point** | 13 °C; closed cup |
| **Autoignition temperature** | 363 °C |
| **Lower explosion limit** | 3.3 %(V) |
| **Upper explosion limit** | 19 %(V) |
| **Density** | 0.794 g/cm3; 20 °C |
| **Water solubility** | completely miscible, completely soluble |
| **Solubility in other solvents** | Medium: Diethylether; completely soluble |
| **Viscosity, dynamic** | 1.41 mPa.s |
| **Relative vapour density** | 3.04 |

## 10. Stability and reactivity

| | |
|---|---|
| **Materials to avoid** | Oxidizing agents, Acids and bases |
| **Hazardous decomposition products** | Carbon oxides |

## 11. Toxicological information

| | |
|---|---|
| **Acute oral toxicity** | Ethanol:<br>LD50 rat: 7,060 mg/kg; literature value |
| **Acute inhalation toxicity** | Ethanol:<br>LC50 rat: 66,000 mg/l; literature value; 4 h |
| **Acute dermal toxicity** | Ethanol:<br>LDLo rabbit: 20,000 mg/kg; literature value |

## 12. Ecological information

**Ecotoxicity effects**

| | |
|---|---|
| **Toxicity to fish** | Ethanol: |

*LC50 Pimephales promelas: 15,300 mg/l; 96 h; literature value*

## 13. Disposal considerations

| | |
|---|---|
| **Product** | *Dispose of in accordance with local regulations.* |
| **Contaminated packaging** | *Store containers and offer for recycling of material when in accordance with the local regulations.* |

## 14. Transport information

| | |
|---|---|
| **ADR** | *UN-No.: 1170; Class: 3; Packaging group: II; F1; Description of the goods: ETHANOL* |
| **RID** | *UN-No.: 1170; Class: 3; Packaging group: II; F1; Description of the goods: ETHANOL* |
| **ADNR** | *UN-No.: 1170; Class: 3; Packaging group: II; F1; Description of the goods: ETHANOL* |
| **IMDG** | *UN-No.: 1170; Class: 3; EmS: F-E, S-D; Packaging group: II; Description of the goods: ETHANOL* |
| **ICAO/IATA** | *UN-No. : 1170; Class: 3; Packaging group: II; Description of the goods: Ethanol* |

## 15. Regulatory information

**Labelling**

| | |
|---|---|
| **Regulatory base** | *1999/45/EC* |
| **Symbol(s)** | *F: Highly flammable* |
| **R-phrase(s)** | *R11: Highly flammable.* |
| **S-phrase(s)** | *S 9: Keep container in a well-ventilated place.*<br>*S16: Keep away from sources of ignition - No smoking.*<br>*S33: Take precautionary measures against static discharges.* |

*S60: This material and its container must be disposed of as hazardous waste.*

## 16. Other information

**Full text of R-phrases referred to under sections 2 and 3**

| | |
|---|---|
| R11 | Highly flammable. |
| R36 | Irritating to eyes. |
| R66 | Repeated exposure may cause skin dryness or cracking. |
| R67 | Vapours may cause drowsiness and dizziness. |

*All reasonable efforts were exercised to compile this MSDS in accordance with ISO 11014 and ANSIZ400.1.1993. The MSDS provides information regarding the health, safety and environmental hazards, at the date of issue, to facilitate the safe receipt, use and handling of the product in the workplace. Since Sasol and its subsidiaries cannot anticipate or control all conditions under which the product may be handled, used and received in the workplace, it remains the obligation of each user, receiver or handler to, prior to usage, review this MSDS in the context within which the product will be received, handled or used in the workplace. The user, handler or receiver must ensure that the necessary mitigating measures are in place as regards health and safety. This does not substitute the need or requirement for any relevant risk assessments to be conducted. It further remains the responsibility of the receiver, handler or user to communicate such information to all relevant parties that may beinvolved in the receipt, use or handling of the product.*

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*The MSDS was created by: Aneshia (AA) Sohan*
*The MSDS was approved by: Aggie Kotze*

# *Sasol Solvents*
# *Sales specification*

## *Ethanol 95 E5*

***Product code*** 2012
***Description*** Ethyl alcohol of 99.99 % (volume) purity, denatured with 5 % (volume) ethyl acetate.

***Specifications***

| ***Properties*** | ***Units*** | ***Limits*** | ***Test Methods*** |
|---|---|---|---|
| Appearance | | Clear and free from suspended matter | Visual; ASTM D4176 |
| Colour | Pt-Co | 2.5 max | ASTM D1209; ISO 6271 |
| Water | mass % | 0.3 max | ASTM D1364; ISO 760 |
| Acidity as $CH_3COOH$ | mass % | 0.01 max | ASTM D1613; ISO 2887 |
| Ethanol (dry basis) | vol % | 94.0 – 95.0 | GC |
| Ethyl acetate (dry basis) | vol % | 5.0 – 6.0 | GC |

| ***Further Properties*** | ***Units*** | ***Typical values*** | ***Test Methods*** |
|---|---|---|---|
| Distillation at 101.3 kPa: | | | ASTM D1078; ISO 918 |
| Initial boiling point | °C | 77 | |
| Dry point | °C | 80 | |
| Residue on evaporation | mg/100ml | 7.9 | ASTM D1353; ISO 759 |
| Density at 20 °C | g/ml | 0.795 | ASTM D4052; ISO 12185 |
| Water miscibility | | Complete | ASTM D1722; ISO 1388-6 |

(Revision 4: February 2010)

The Sales Specification values are continuously checked, documented and stored within the scope of quality assurance.
Further properties are of an informational nature only and are not checked regularly. If the Sales Specifications are complied with, it can generally be assumed that all further properties and typical data conform to the values given.

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Because of the nature of our manufacturing processes, our products do not contain any plant and animal products.
It is the responsibility of our customers to determine that their use of our product(s) is safe, lawful and technically suitable in their intended applications.


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