

## Safety Data Sheet

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

#### 1.1 Product Identifier

**Material Name** : DIMETHYLETHER (99,99%)  
**Product Code** : 002D0808  
**CAS No.** : 115-10-6  
**Other Identifier** : DME  
Dimethylether  
**REACH Registration No.** : 01-2119472128-37-0002

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

**Product Use** : Aerosol Propellant. Please refer to Ch16 for the registered uses under REACH. Chemical intermediate. Foam blowing agent. Fuel. Use as a propellant in industrial aerosol products

**Uses Advised Against** : This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier.

#### 1.3 Details of the Supplier of the safety data sheet

**Manufacturer/Supplier** : **Shell Deutschland Oil GmbH**  
Suhrenkamp 71-77  
D-22335 Hamburg

**Telephone** : (+49) 40 6324-6255  
**Fax** : (+49) 40 6321-051  
**Email Contact for Safety Data Sheet** : If you have any enquiries about the content of this SDS please email fuelSDS@shell.com

#### 1.4 Emergency Telephone Number

: (+49) 30 3068 6790 (Giftnotruf Berlin)

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### SECTION 2. HAZARDS IDENTIFICATION

#### 2.1 Classification of the substance or mixture

Regulation (EC) No 1272/2008 (CLP)	
Hazard classes / Hazard categories	Hazard Statement

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Flammable gas., Category 1	H220
Gases under pressure	H280

67/548/EEC or 1999/45/EC	
Hazard Characteristics	R-phrased(s)
F+: Extremely flammable.;	R12

### 2.2 Label Elements

#### Labeling according to Regulation (EC) No 1272/2008

##### Hazard pictograms



**Signal Words** : Danger

**CLP Hazard Statements** : PHYSICAL HAZARDS:  
H220: Extremely flammable gas.  
H280: Contains gas under pressure; may explode if heated.

HEALTH HAZARDS:  
Not classified as a health hazard under CLP criteria.

ENVIRONMENTAL HAZARDS:  
Not classified as environmental hazard according to CLP criteria.

#### CLP Precautionary statements

**Prevention** : P210: Keep away from heat/sparks/open flames/hot surfaces. - No smoking.  
P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.  
P381: Eliminate all ignition sources if safe to do so.

**Storage** : P410+P403: Protect from sunlight. Store in a well-ventilated place.

### 2.3 Other Hazards

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**Health Hazards** : High gas concentrations will displace available oxygen from the air; unconsciousness and death may occur suddenly from lack of oxygen.  
Exposure to rapidly expanding gases may cause frost burns to eyes and/or skin.

**Safety Hazards** : Vapours are heavier than air. Vapours may travel across the ground and reach remote ignition sources causing a flashback fire danger. May form explosive peroxides. This material has the potential to be a static accumulator.

**Environmental Hazards** : Not classified as dangerous for the environment.

**Other Information** : This product is intended for use in closed systems only.

The substance does not meet the criteria for PBT or vPvB in accordance with Annex XIII.

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### SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

#### 3.1 Substance

**Material Name** : Not applicable.

**Synonyms** : DME  
Dimethylether

**CAS No.** : 115-10-6

#### 3.2 Mixtures

**Mixture Description** : Gaseous ether  
Product is not a mixture according to regulation 1907/2006/EC.

#### Hazardous Components

##### Classification of components according to Regulation (EC) No 1272/2008

Chemical Name	CAS No.	EC Number	REACH Registration No.	Conc.
Dimethylether	115-10-6	204-065-8	01-2119472128-37	>= 99,99%

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Chemical Name	Hazard Class & Category	Hazard Statement
Dimethylether	Flam. Gas, 1; Press. Gas, ;	H220; H280;

## Classification of components according to 67/548/EEC

Chemical Name	CAS No.	EC Number	REACH Registration No.	Symbol(s)	R-phrase(s)	Conc.
Dimethylether	115-10-6	204-065-8	01-2119472128-37	F+	R12	>= 99,99%

**Additional Information** : The substance does not meet the criteria for PBT or vPvB in accordance with Annex XIII.

Refer to Ch 16 for full text of R- and H- phrases.

## SECTION 4. FIRST-AID MEASURES

## 4.1 Description of First Aid Measures

- Inhalation** : Remove to fresh air. If breathing but unconscious, place in the recovery position. If breathing has stopped, apply artificial respiration. If heartbeat absent, give external cardiac compression. Monitor breathing and pulse. Seek urgent medical advice.
- Skin Contact** : Do not remove clothing that adheres to skin due to freezing. In the event of frostbite, slowly warm the exposed area by rinsing with warm water. Otherwise: Obtain medical treatment immediately. Contaminated clothing may be a fire hazard and therefore should be soaked with water before being removed. Loosen tight clothing. Keep warm and at rest.
- Eye Contact** : DO NOT DELAY. Obtain medical treatment immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush eye with copious quantities of water.
- Ingestion** : In the unlikely event of ingestion, obtain medical attention immediately.
- Self-protection of the first aider** : When administering first aid, ensure that you are wearing the appropriate personal protective equipment according to the incident, injury and surroundings.
- 4.2 Most important symptoms and effects, both acute and delayed** : High concentrations may cause central nervous system depression resulting in headaches, dizziness and nausea; continued exposure may result in unconsciousness and/or death.

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**4.3 Indication of any immediate medical attention and special treatment needed** : Treat symptomatically.  
Administer oxygen if necessary.

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### SECTION 5. FIRE-FIGHTING MEASURES

Clear fire area of all non-emergency personnel.

- 5.1 Extinguishing Media** : Shut off supply. If not possible and no risk to surroundings, let the fire burn itself out. Use foam, water fog for major fires. Use dry chemical powder, carbon dioxide, sand or earth for minor fires.
- Unsuitable Extinguishing Media** : Do not use direct water jets on the burning product as they could cause a steam explosion and spread of the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.
- 5.2 Special hazards arising from the substance or mixture** : Hazardous combustion products may include: Carbon monoxide may be evolved if incomplete combustion occurs. Unidentified organic and inorganic compounds. Sustained fire attack on vessels may result in a Boiling Liquid Expanding Vapour Explosion (BLEVE). Contents are under pressure and can explode when exposed to heat or flames. The vapour is heavier than air, spreads along the ground and distant ignition is possible.
- 5.3 Advice for firefighters** : Wear full protective clothing and self-contained breathing apparatus.
- Additional Advice** : Keep adjacent containers cool by spraying with water. If possible remove containers from the danger zone. If the fire cannot be extinguished the only course of action is to evacuate immediately.

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### SECTION 6. ACCIDENTAL RELEASE MEASURES

Evacuate the area of all non-essential personnel. Ventilate contaminated area thoroughly. Avoid contact with spilled or released material. Immediately remove all contaminated clothing. Do not attempt to do so if clothing is adhering to skin. For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet.

- 6.1 Personal Precautions, Protective Equipment and Emergency Procedures** : 6.1.1 For non emergency personnel: Shut off leaks, if possible without personal risks. Remove all possible sources of ignition in the surrounding area and evacuate all personnel. Attempt to disperse the gas or to direct its flow to a safe location for

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- 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 meter.
- 6.1.2 For emergency responders: Test atmosphere for flammable gas concentrations to ensure safe working conditions before personnel are allowed to enter the area.
- 6.2 Environmental Precautions** : Use appropriate containment to avoid environmental contamination.
- 6.3 Methods and Material for Containment and Cleaning Up** : Allow to evaporate.  
Attempt to disperse the vapour or to direct its flow to a safe location, for example by using fog sprays. Otherwise treat as for small spillage.
- Additional Advice** : 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. Risk of explosion. Inform the emergency services if product enters surface water drains.
- 6.4 Reference to other sections** : For guidance on selection of personal protective equipment see Chapter 8 of this Material Safety Data Sheet. For guidance on disposal of spilled material see Chapter 13 of this Material Safety Data Sheet.

**SECTION 7. HANDLING AND STORAGE**

- General Precautions** : Avoid breathing vapours 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. Air-dry contaminated clothing in a well-ventilated area before laundering. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
- 7.1 Precautions for Safe Handling** : This product can create a low temperature exposure hazard when released as a liquid. Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks. Avoid prolonged or repeated contact with skin. Electrostatic charges may be generated during handling. Electrostatic discharge may cause fire. Earth all equipment. Use local exhaust ventilation if there is risk of inhalation of vapours, mists or aerosols.
- Product Transfer** : Do not use compressed air for filling, discharging or handling. Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire. Delivery lines may

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- become cold enough to present a cold burns hazard.
- 7.2 Conditions for safe storage, including any incompatibilities** : Store only in purpose-designed, appropriately labelled pressure vessels or cylinders. Must be stored in a well-ventilated area, away from sunlight, ignition sources and other sources of heat. Do not store near cylinders containing compressed oxygen or other strong oxidizers. Refer to section 15 for any additional specific legislation covering the packaging and storage of this product.
- Recommended Materials** : Stainless steel. Mild steel.
- Unsuitable Materials** : Some forms of cast iron. Examples of materials to avoid are: ABS, polymethyl methacrylate (PMMA), polyethylene (PE / HDPE), polypropylene (PP), PVC, natural rubber (NR), Nitrile (NBR) ethylene propylene rubber (EPDM), Butyl (IIR), Hypalon (CSM), polystyrene, polyvinyl chloride (PVC), polyisobutylene. For containers and container linings, aluminium should not be used if there is a risk of caustic contamination of the product.
- 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.
- 7.3 Specific end use(s)** : Please refer to Ch16 and/or the annexes for the registered uses under REACH.
- Additional Information** : This product is intended for use in closed systems only. Ensure that all local regulations regarding handling and storage facilities are followed.  
Storage class according to TRGS 510: 2A.  
Fire hazard classification: C.

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## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

If the American Conference of Governmental Industrial Hygienists (ACGIH) value is provided on this document, it is provided for information only.

Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.

### 8.1 Control Parameters

#### Occupational Exposure Limits

None established.

Material	Source	Type	ppm	mg/m3	Notation
Dimethylether	TRGS 900	AGW	1.000 ppm	1.900 mg/m3	

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	TRGS 900	STEL CL			Category II: substances with a resorptive effect.
	DFG MAK	MAK	1.000 ppm	1.900 mg/m3	Listed.
	DFG MAK	PEAK CAT			Category II: substances with a resorptive effect.

**Biological Exposure Index (BEI)**

No biological limit allocated.

**Derived No Effect Levels (DNEL/DMEL) Table**

Component	Exposure Route	Exposure Type (long/short)	Application Area	Value
Dimethylether	Inhalation	long term, systemic effects	Worker	1894 mg/m3
	Inhalation	long term, systemic effects	Consumer	471 mg/m3

**Predicted No Effect Concentration (PNEC)**

Component	Exposure Route	Value	Remark
Dimethylether	Water.	0,155 mg/l	fresh
	Sediment	0,681 mg/kg	
	Soil	0,045 mg/kg	
	STP	160 mg/l	



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### 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. Validated exposure measurement methods should be applied by a competent person and samples analysed by an accredited laboratory. Examples of sources of recommended exposure measurement methods are given below or contact the 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/>  
Occupational Safety and Health Administration (OSHA), USA: Sampling and Analytical Methods <http://www.osha.gov/>

Institut für Arbeitsschutz Deutschen Gesetzlichen Unfallversicherung (IFA), Germany.  
<http://www.dguv.de/inhalt/index.jsp>

### 8.2 Exposure Controls General Information

: Read in conjunction with the Exposure Scenario for your specific use contained in the Annex.

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: Use sealed systems as far as possible. Adequate explosion-proof ventilation to control airborne concentrations below the exposure guidelines/limits. Local exhaust ventilation is recommended. Exhaust emission systems should be designed in accordance with local conditions; the air should always be moved away from the source of vapour generation and the person working at this point. Firewater monitors and deluge systems are recommended. Always observe good personal hygiene measures, such as washing hands after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants. Discard contaminated clothing and footwear that cannot be cleaned. Practice good housekeeping. Define procedures for safe handling and maintenance of controls. Educate and train workers in the hazards and control

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measures relevant to normal activities associated with this product. Ensure appropriate selection, testing and maintenance of equipment used to control exposure, e.g. personal protective equipment, local exhaust ventilation.

### Occupational Exposure Controls

- Personal Protective Equipment** : Personal protective equipment (PPE) should meet recommended national standards. Check with PPE suppliers. The provided information is made in consideration of the PPE directive (Council Directive 89/686/EEC) and the CEN European Committee for Standardisation (CEN) standards.
- Eye Protection** : Chemical splash goggles (gas-tight monogoggles) and face shield with chin guard.  
Approved to EU Standard EN166.
- Hand Protection** : Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturizer is recommended. Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material, dexterity. Always seek advice from glove suppliers. Contaminated gloves should be replaced. 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: Neoprene rubber. Nitrile rubber. If contact with liquefied product is possible or anticipated, gloves should be thermally insulated to prevent cold burns. For continuous contact we recommend gloves with breakthrough time of more than 240 minutes with preference for > 480 minutes where suitable gloves can be identified. For short-term/splash protection we recommend the same, but recognise that suitable gloves offering this level of protection may not be available and in this case a lower breakthrough time may be acceptable so long as appropriate maintenance and replacement regimes are followed. Glove thickness is not a good predictor of glove resistance to a chemical as it is dependent on the exact composition of the glove material. Glove thickness should be typically greater than 0.35 mm depending on the glove make and model.
- Body protection** : Chemical and cold resistant gloves/gauntlets, boots, and apron.
- Respiratory Protection** : If engineering controls do not maintain airborne concentrations

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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 unsuitable (e.g. airborne concentrations are high, risk of oxygen deficiency, confined space) use appropriate positive pressure breathing apparatus. Where air-filtering respirators are suitable, select an appropriate combination of mask and filter.

Select a filter suitable for organic gases and vapors [Type AX boiling point < 65°C (149°F)] meeting EN14387.

**Thermal Hazards** : When handling cold material that can cause frost burns, wear heat resistant gloves, safety hat and visor, cold resistant overalls (with cuffs over gloves and legs over boots) and heavy duty boots e.g. leather for cold resistance.

**Environmental Exposure Controls**

**Environmental exposure control measures** : Local guidelines on emission limits for volatile substances must be observed for the discharge of exhaust air containing vapour. Information on accidental release measures are to be found in section 6.

**SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES****9.1 Information on basic physical and chemical properties**

Appearance : Colourless. Liquid under pressure.  
 Odour : Ethereal.  
 Odour threshold : Data not available  
 pH : Not applicable  
 Initial Boiling Point and Boiling Range : ca. -25 °C / -13 °F 1.013 hPa  
 Melting / freezing point : Typical -141,5 °C / -222,7 °F  
 Flash point : ca. -80 °C / -112 °F  
 Upper / lower Flammability or Explosion limits : Typical 3,3 - 26,2 %(V)  
 Auto-ignition temperature : ca. 226 °C / 439 °F  
 Vapour pressure : Typical 513 kPa at 20 °C / 68 °F  
 Density : ca. 670 kg/m<sup>3</sup>  
 Water solubility : Typical 45,6 g/l at 25 °C / 77 °F  
 Solubility in other solvents : Data not available  
  
 n-octanol/water partition coefficient (log Pow) : Typical 0,07 at 25 °C / 77 °F

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Dynamic viscosity : Not applicable.  
Kinematic viscosity : Not applicable.  
Vapour density (air=1) : > 1  
Evaporation rate (nBuAc=1) : Data not available  
Flammability : Extremely flammable.  
Oxidizing Properties : Not applicable.

Explosive Properties : Not classified

### 9.2 Other Information

Electrical conductivity : This material is not expected to be a static accumulator.

Other Information : Not applicable.

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## SECTION 10. STABILITY AND REACTIVITY

**10.1 Reactivity** : No, product will not become self-reactive.

**10.2 Chemical stability** : Stable under normal use conditions.

**10.3 Possibility of Hazardous Reactions** :  
No hazardous reaction is expected when handled and stored according to provisions.

**10.4 Conditions to Avoid** : Heat, open flames, sparks and flammable atmospheres.

**10.5 Incompatible Materials** : Strong oxidising agents.

**10.6 Hazardous Decomposition Products** : Hazardous decomposition products are not expected to form during normal storage.

### Other Information

**Hazardous Polymerisation** : No, hazardous, exothermic polymerization cannot occur.

**Sensitivity to Mechanical Impact** : No, product will not become self-reactive.

**Sensitivity to Static Discharge** : Yes, in certain circumstances product can ignite due to static electricity.

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## SECTION 11. TOXICOLOGICAL INFORMATION

### 11.1 Information on Toxicological effects

**Basis for Assessment** : Unless indicated otherwise, the data presented is

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	representative of the product as a whole, rather than for individual component(s).
<b>Likely Routes of Exposure</b>	: Inhalation is the primary route of exposure although exposure may occur through skin or eye contact.
<b>Acute Oral Toxicity</b>	: Not expected to be a hazard.
<b>Acute Dermal Toxicity</b>	: Not expected to be a hazard.
<b>Acute Inhalation Toxicity</b>	: Low toxicity by inhalation.
<b>Skin corrosion/irritation</b>	: Expected to be non-irritating to skin.
<b>Serious eye damage/irritation</b>	: Expected to be non-irritating to eyes.
<b>Respiratory Irritation</b>	: Not expected to be a respiratory irritant.
<b>Respiratory or skin sensitisation</b>	: Not expected to be a sensitiser.
<b>Aspiration Hazard</b>	: Not considered an aspiration hazard.
<b>Germ cell mutagenicity</b>	: No evidence of mutagenic activity.
<b>Carcinogenicity</b>	: Not expected to be carcinogenic.
Dimethylether	: GHS / CLP: No carcinogenicity classification
<b>Reproductive and Developmental Toxicity</b>	: Not expected to impair fertility. Not expected to be a developmental toxicant.
<b>Summary on evaluation of the CMR properties</b>	
<b>Carcinogenicity</b>	: This product does not meet the criteria for classification in categories 1A/1B.,
<b>Mutagenicity</b>	: This product does not meet the criteria for classification in categories 1A/1B.
<b>Reproductive Toxicity (fertility)</b>	: This product does not meet the criteria for classification in categories 1A/1B.
<b>Specific target organ toxicity - single exposure</b>	: May cause drowsiness and dizziness.
<b>Specific target organ toxicity - repeated exposure</b>	: Not expected to be a hazard.
<b>Additional Information</b>	: Rapid release of gases which are liquids under pressure may cause frost burns of exposed tissues (skin, eye) due to evaporative cooling. High gas concentrations will displace available oxygen from the air; unconsciousness and death may occur suddenly from lack of oxygen. Classifications by other authorities under varying regulatory frameworks may exist.

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### SECTION 12. ECOLOGICAL INFORMATION

- Basis for Assessment** : Incomplete ecotoxicological data are available for this product. The information given below is based partly on a knowledge of the components and the ecotoxicology of similar products. Unless indicated otherwise, the data presented is representative of the product as a whole, rather than for individual component(s).
- 12.1 Toxicity**
- Acute Toxicity** : In view of the high rate of loss from solution, the product is unlikely to pose a significant hazard to aquatic life.
- Fish** : Practically non toxic, LC/EC/IC 50 > 100 mg/l .
- Aquatic crustacea** : Practically non toxic, LC/EC/IC 50 > 100 mg/l .
- Algae/aquatic plants** : Practically non toxic, LC/EC/IC 50 > 100 mg/l .
- Microorganisms** : Expected to be practically non toxic: LC/EC/IC50 > 100 mg/l
- Chronic Toxicity**
- Fish** : Data not available
- Aquatic crustacea** : Data not available
- 12.2 Persistence and degradability** : Expected to be inherently biodegradable. Oxidises rapidly by photo-chemical reactions in air.
- 12.3 Bioaccumulative Potential** : Not expected to bioaccumulate significantly. Log Kow < 4
- 12.4 Mobility in Soil** : Contains volatile constituents. Because of their extreme volatility, air is the only environmental compartment that hydrocarbon gases will be found.
- 12.5 Result of PBT and vPvB assesment** : The substance does not fulfill all screening criteria for persistence, bioaccumulation and toxicity and hence is not considered to be PBT or vPvB.

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### SECTION 13. DISPOSAL CONSIDERATIONS

#### 13.1 Waste Treatment Methods

- Material Disposal** : 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

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methods in compliance with applicable regulations. Waste arising from a spillage or tank cleaning should be disposed of in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand. Do not dispose into the environment, in drains or in water courses. Given the nature and uses of this product, the need for disposal seldom arises. If necessary, dispose by controlled combustion in purpose-designed equipment. If this is not possible, contact the supplier.

**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. Do not pollute the soil, water or environment with the waste container. Return part-used or empty cylinders to the supplier. For tanks seek specialist advice from suppliers. Dispose in accordance with prevailing regulations, preferably to a recognised collector or contractor. The competence of the collector or contractor should be established beforehand.

**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 must be in compliance.  
EU Waste Disposal Code (EWC): 16 05 04 gases in pressure containers (including halons) containing dangerous substances.  
Classification of waste is always the responsibility of the end user.

**SECTION 14. TRANSPORT INFORMATION****Land transport (ADR/RID):****ADR**

- 14.1 UN number : 1033  
 14.2 UN proper shipping name : DIMETHYL ETHER  
 14.3 Transport hazard class(es) : 2  
 14.4 Packing group : Not applicable.  
 Danger label (primary risk) : 2.1  
 14.5 Environmental hazards : No  
 14.6 Special precautions for : Special Precautions: Refer to Chapter 7, Handling & Storage,

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user for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

**RID**

14.1 UN number : 1033  
14.2 UN proper shipping name : DIMETHYL ETHER  
14.3 Transport hazard class(es) : 2  
14.4 Packing group : Not applicable.  
Danger label (primary risk) : 2.1  
14.5 Environmental hazards : No  
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

**Inland waterways transport (ADN):**

14.1 UN number : 1033  
14.2 UN proper shipping name : DIMETHYL ETHER  
14.3 Transport hazard class(es) : 2  
14.4 Packing group : Not applicable.  
Danger label (primary risk) : 2.1  
14.5 Environmental hazards : No  
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.  
CDNI Inland Water Waste Agreement : NST 8191 Dimethyl ether

**Sea transport (IMDG Code):**

14.1 UN number : UN 1033  
14.2 UN proper shipping name : DIMETHYL ETHER  
14.3 Transport hazard class(es) : 2.1  
14.4 Packing group : Not applicable.  
14.5 Environmental hazards : No  
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or



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needs to comply with in connection with transport.

### Air transport (IATA):

- 14.1 UN number : 1033  
14.2 UN proper shipping name : Dimethyl ether  
14.3 Transport hazard class(es) : 2.1  
14.4 Packing group : Not applicable.  
14.6 Special precautions for user : Special Precautions: Refer to Chapter 7, Handling & Storage, for special precautions which a user needs to be aware of or needs to comply with in connection with transport.

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

- Pollution Category : Not applicable.  
Ship Type : Not applicable.  
Product Name : Not applicable.  
Special Precaution : Not applicable.

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## SECTION 15. REGULATORY INFORMATION

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

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

#### Other regulatory Information

- Recommended Restrictions on Use (Advice Against)** : This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier.

#### National Legislation

- Water Pollution Class : WGK 1 - low hazard to waters (appendix 2, VwVwS, substances)., List Number 714  
Other Information : Technische Anleitung Luft: Product not listed by name. Observe section 5.2.5 in connection with section 5.4.9  
**15.2 Chemical Safety Assessment** : A Chemical Safety Assessment was performed for this substance.

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**SECTION 16. OTHER INFORMATION****R-phrases(s)**

R12 Extremely flammable.

**CLP Hazard Statements**

H220 Extremely flammable gas.

H280 Contains gas under pressure; may explode if heated.

**Identified Uses according to the Use Descriptor System****Uses - Worker**

Title : Manufacture of substance- Industrial

**Uses - Worker**

Title : Use as an intermediate- Industrial

**Uses - Worker**Title : Formulation & (re)packing of substances and mixtures-  
Industrial**Uses - Worker**

Title : Use as a propellant- Industrial

**Uses - Worker**

Title : Blowing agents- Industrial

**Uses - Worker**

Title : Use as a propellant- Professional

**Uses - Worker**

Title : Use in laboratories- Professional

**Uses - Worker**

Title : Use as a fuel- Professional

**Identified Uses according to the Use Descriptor System****Uses - Consumer**Title : Use as a propellant  
- Consumer**Identified Uses according to the Use Descriptor System****Uses - Article**Title : Service life of foam article.  
- Consumer

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**Additional Information** : This document contains important information to ensure the safe storage, handling and use of this product. The information in this document should be brought to the attention of the person in your organisation responsible for advising on safety matters.  
Due to the conversion of this product to CLP classification and labelling, there has been a significant change to the nature of the information presented in chapter 2.

### Other Information

**Further Information** : This product is intended for use in closed systems only.  
The substance does not meet the criteria for PBT or vPvB in accordance with Annex XIII.

### Abbreviations and Acronyms

: AGW = Maximum Workplace Concentration  
TRGS = Technical rules for hazardous substances  
DFG = Federal Institute of Hydrology  
MAK = Maximum workplace concentration  
  
ACGIH = American Conference of Governmental Industrial Hygienists  
ADR = European Agreement concerning the International Carriage of Dangerous Goods by Road  
AICS = Australian Inventory of Chemical Substances  
ASTM = American Society for Testing and Materials  
BEL = Biological exposure limits  
BTEX = Benzene, Toluene, Ethylbenzene, Xylenes  
CAS = Chemical Abstracts Service  
CEFIC = European Chemical Industry Council  
CLP = Classification Packaging and Labelling  
COC = Cleveland Open-Cup  
DIN = Deutsches Institut für Normung  
DMEL = Derived Minimal Effect Level  
DNEL = Derived No Effect Level  
DSL = Canada Domestic Substance List  
EC = European Commission  
EC50 = Effective Concentration fifty  
ECETOC = European Center on Ecotoxicology and Toxicology Of Chemicals  
ECHA = European Chemicals Agency  
EINECS = The European Inventory of Existing Commercial

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## Chemical Substances

EL50 = Effective Loading fifty

ENCS = Japanese Existing and New Chemical Substances Inventory

EWC = European Waste Code

GHS = Globally Harmonised System of Classification and Labelling of Chemicals

IARC = International Agency for Research on Cancer

IATA = International Air Transport Association

IC50 = Inhibitory Concentration fifty

IL50 = Inhibitory Level fifty

IMDG = International Maritime Dangerous Goods

INV = Chinese Chemicals Inventory

IP346 = Institute of Petroleum test method N° 346 for the determination of polycyclic aromatics DMSO-extractables

KECI = Korea Existing Chemicals Inventory

LC50 = Lethal Concentration fifty

LD50 = Lethal Dose fifty per cent.

LL/EL/IL = Lethal Loading/Effective Loading/Inhibitory loading

LL50 = Lethal Loading fifty

MARPOL = International Convention for the Prevention of Pollution From Ships

NOEC/NOEL = No Observed Effect Concentration / No Observed Effect Level

OE\_HP V = Occupational Exposure - High Production Volume

PBT = Persistent, Bioaccumulative and Toxic

PICCS = Philippine Inventory of Chemicals and Chemical Substances

PNEC = Predicted No Effect Concentration

REACH = Registration Evaluation And Authorisation Of Chemicals

RID = Regulations Relating to International Carriage of Dangerous Goods by Rail

SKIN\_DES = Skin Designation

STEL = Short term exposure limit

TRA = Targeted Risk Assessment

TSCA = US Toxic Substances Control Act

TWA = Time-Weighted Average

vPvB = very Persistent and very Bioaccumulative

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

**SDS Version Number** : 2.2

## Safety Data Sheet

- SDS Effective Date** : 01.04.2014
- SDS Revisions** : A vertical bar (|) in the left margin indicates an amendment from the previous version.
- SDS Regulation** : Regulation 1907/2006/EC as amended by Regulation (EU) 453/2010
- 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.

## Safety Data Sheet

## Exposure Scenario - Worker

SECTION 1	EXPOSURE SCENARIO TITLE
<b>Title</b>	Manufacture of substance - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3, SU8, SU9 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8b, PROC 9, PROC 15 <b>Environmental Release Categories:</b> ERC 1
<b>Scope of process</b>	Manufacture of the substance or use as a process chemical or extraction agent. Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container), sampling and associated laboratory activities.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
<b>Product Characteristics</b>	
Physical form of product	Gas/liquefied gas
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures applicable to all activities.	No other specific measures identified.

Section 2.2	Control of Environmental Exposure
Substance is a unique structure.	
Not biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	1,0E+00
Regional use tonnage (tonnes/year):	3,0E+04
Fraction of Regional tonnage used locally:	1,0E+00

## Safety Data Sheet

Annual site tonnage (tonnes/year):	3,0E+04
Maximum daily site tonnage (kg/day):	9,4E+04
<b>Frequency and Duration of Use</b>	
Emission Days (days/year):	320
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	5,0E-03
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	99,5
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
During manufacturing no waste of the substance is generated.	
<b>Conditions and measures related to external recovery of waste</b>	
During manufacturing no waste of the substance is generated.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>
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**Safety Data Sheet**

Used ECETOC TRA model.

**SECTION 4****GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO****Section 4.1 - Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Section 4.2 -Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.



## Safety Data Sheet

## Exposure Scenario - Worker

SECTION 1	EXPOSURE SCENARIO TITLE
<b>Title</b>	Use as an intermediate - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3, SU8, SU9 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8b, PROC 9, PROC 15 <b>Environmental Release Categories:</b> ERC 6A
<b>Scope of process</b>	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
<b>Product Characteristics</b>	
Physical form of product	Gas/liquefied gas
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures applicable to all activities.	No other specific measures identified.

Section 2.2	Control of Environmental Exposure
Substance is a unique structure.	
Not biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	1,0E+00
Regional use tonnage (tonnes/year):	3,0E+04
Fraction of Regional tonnage used locally:	1,0E+00

## Safety Data Sheet

Annual site tonnage (tonnes/year):	3,0E+04
Maximum daily site tonnage (kg/day):	9,4E+04
<b>Frequency and Duration of Use</b>	
Emission Days (days/year):	320
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	5,0E-03
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	99,5
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

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<b>Section 3.2 - Environment</b>
Used ECETOC TRA model.

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
<p>Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.</p> <p>Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.</p>	

<b>Section 4.2 -Environment</b>
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

## Safety Data Sheet

## Exposure Scenario - Worker

SECTION 1	EXPOSURE SCENARIO TITLE
<b>Title</b>	Formulation & (re)packing of substances and mixtures - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3, SU 10 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8b, PROC 9, PROC 15 <b>Environmental Release Categories:</b> ERC 2
<b>Scope of process</b>	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
<b>Product Characteristics</b>	
Physical form of product	Gas/liquefied gas
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently)..
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures applicable to all activities.	No other specific measures identified.

Section 2.2	Control of Environmental Exposure
Substance is a unique structure.	
Not biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	1
Regional use tonnage (tonnes/year):	6,0E+03

## Safety Data Sheet

Fraction of Regional tonnage used locally:	1
Annual site tonnage (tonnes/year):	6,0E+03
Maximum daily site tonnage (kg/day):	2,0E+04
<b>Frequency and Duration of Use</b>	
Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	2,0E-03
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
If discharging to domestic sewage treatment plant, no secondary wastewater treatment required.	
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

**Safety Data Sheet****Section 3.2 - Environment**

Used ECETOC TRA model.

**SECTION 4****GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO****Section 4.1 - Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented.  
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Section 4.2 -Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

## Safety Data Sheet

## Exposure Scenario - Worker

<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as a propellant - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3 <b>Process Categories:</b> PROC 7 <b>Environmental Release Categories:</b> ERC 8A, ERC 8D
<b>Scope of process</b>	Use as a propellant in professional aerosol products.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Gas/liquefied gas
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).,
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	No other specific measures identified.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is a unique structure.	
Not biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	0,0002
Annual site tonnage (tonnes/year):	3
Maximum daily site tonnage (kg/day):	8,2
<b>Frequency and Duration of Use</b>	
Emission Days (days/year):	365

## Safety Data Sheet

<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1,0E+00
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>	
Used ECETOC TRA model.	



**Safety Data Sheet**

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>Section 4.2 -Environment</b>	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.	
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.	
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.	

## Safety Data Sheet

## Exposure Scenario - Worker

<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Blowing agents - Industrial
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 3 <b>Process Categories:</b> PROC 5, PROC 12, PROC 14 <b>Environmental Release Categories:</b> ERC 4
<b>Scope of process</b>	Use as a blowing agent for rigid and flexible foams, including material transfers, mixing and injection, curing, cutting, storage and packing.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Gas/liquefied gas
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently)..
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	No other specific measures identified.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is a unique structure.	
Not biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	1,0E+00
Regional use tonnage (tonnes/year):	3,0E+02
Fraction of Regional tonnage used locally:	1,0E+00
Annual site tonnage (tonnes/year):	3,0E+02
Maximum daily site tonnage (kg/day):	9,4E+02
<b>Frequency and Duration of Use</b>	

## Safety Data Sheet

Emission Days (days/year):	300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	5,0E-01
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>
Used ECETOC TRA model.

**Safety Data Sheet**

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<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
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**Section 4.1 - Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Section 4.2 -Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

## Safety Data Sheet

## Exposure Scenario - Worker

<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as a propellant - Professional
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 22 <b>Process Categories:</b> PROC 11 <b>Environmental Release Categories:</b> ERC 8A, ERC 8D
<b>Scope of process</b>	Use as a propellant in professional aerosol products.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Gas/liquefied gas
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently).
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	No other specific measures identified.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is a unique structure.	
Not biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	1,0E-01
Regional use tonnage (tonnes/year):	1,5E+03
Fraction of Regional tonnage used locally:	2,0E-03
Annual site tonnage (tonnes/year):	3,0E+01
Maximum daily site tonnage (kg/day):	8,2E+01
<b>Frequency and Duration of Use</b>	
Emission Days (days/year):	365

## Safety Data Sheet

<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>	
Used ECETOC TRA model.	

**Safety Data Sheet**

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>Section 4.2 -Environment</b>	
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.	
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.	
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.	

## Safety Data Sheet

## Exposure Scenario - Worker

<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use in laboratories - Professional
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 22 <b>Process Categories:</b> PROC 15 <b>Environmental Release Categories:</b> ERC 8A
<b>Scope of process</b>	Use of small quantities within laboratory settings, including material transfers and equipment cleaning.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Worker Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Liquid, vapour pressure > 10 kPa at STP
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently)..
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
General measures applicable to all activities.	No other specific measures identified.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
Substance is a unique structure.	
Not biodegradable.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>
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**Safety Data Sheet**

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
<b>Section 4.1 - Health</b>	
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.	
<b>Section 4.2 -Environment</b>	

## Safety Data Sheet

## Exposure Scenario - Worker

SECTION 1	EXPOSURE SCENARIO TITLE
<b>Title</b>	Use as a fuel - Professional
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 22 <b>Process Categories:</b> PROC 1, PROC 2, PROC 3, PROC 8a, PROC 16, PROC 8b <b>Environmental Release Categories:</b> ERC 9A, ERC 9B
<b>Scope of process</b>	Covers consumer uses of automotive fuels only.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Worker Exposure
<b>Product Characteristics</b>	
Physical form of product	Gas/liquefied gas
Concentration of substance in product.	Covers use of substance/product up to 100% (unless stated differently)..
<b>Frequency and Duration of Use</b>	
Covers daily exposures up to 8 hours (unless stated differently).	
<b>Other Operational Conditions affecting Exposure</b>	
Assumes use at not more than 20°C above ambient temperature (unless stated differently). Assumes a good basic standard of occupational hygiene has been implemented.	

Contributing Scenarios	Risk Management Measures
General measures applicable to all activities.	No other specific measures identified.

Section 2.2	Control of Environmental Exposure
Substance is a unique structure.	
Not biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	1E-01
Regional use tonnage (tonnes/year):	5,0E+01
Fraction of Regional tonnage used locally:	2E-03
Annual site tonnage (tonnes/year):	1E-01
Maximum daily site tonnage (kg/day):	3E-01
<b>Frequency and Duration of Use</b>	

## Safety Data Sheet

Emission Days (days/year):	365
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1,0E+00
Release fraction to wastewater from process (initial release prior to RMM):	1E-01
Release fraction to soil from process (initial release prior to RMM):	0E+00
<b>Technical conditions and measures at process level (source) to prevent release</b>	
Common practices vary across sites thus conservative process release estimates used.	
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
No wastewater treatment required.	
Treat air emission to provide a typical removal efficiency of (%)	0
Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of >= (%)	0
If discharging to domestic sewage treatment plant, provide the required onsite wastewater removal efficiency of (%)	0
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>
Used ECETOC TRA model.

**Safety Data Sheet**

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<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
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**Section 4.1 - Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Section 4.2 -Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

## Safety Data Sheet

## Exposure Scenario - Consumer

<b>SECTION 1</b>	<b>EXPOSURE SCENARIO TITLE</b>
<b>Title</b>	Use as a propellant - Consumer
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 21 <b>Product Categories:</b> PC1, PC3, PC4, PC8, PC9a, PC39 <b>Environmental Release Categories:</b> ERC 8A, ERC 8D
<b>Scope of process</b>	Use as a propellant in household consumer aerosol products.

<b>SECTION 2</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
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<b>Section 2.1</b>	<b>Control of Consumer Exposure</b>
<b>Product Characteristics</b>	
Physical form of product	Gas/liquefied gas
Concentration of substance in product.	Unless otherwise stated: Covers concentration up to (%): 50 %
<b>Amounts Used</b>	
Unless otherwise stated: for each use event, covers amount up to (g):	10
<b>Frequency and Duration of Use</b>	
Unless otherwise stated: covers use up to (times/day of use):	4
Covers use up to (hours/event):	0,25
<b>Other Operational Conditions affecting Exposure</b>	
Unless otherwise stated: Covers use under typical household ventilation.	

<b>Product Categories</b>	<b>OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES</b>
General measures applicable to all Product Categories.	Covers use in room size of 2,5 m3
	No specific risk management measure identified beyond those operational conditions stated.

<b>Section 2.2</b>	<b>Control of Environmental Exposure</b>
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## Safety Data Sheet

Substance is a unique structure.	
Not biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	3,0E+03
Fraction of Regional tonnage used locally:	0,1
Annual site tonnage (tonnes/year):	3,0E+02
Maximum daily site tonnage (kg/day):	8,2E+02
<b>Frequency and Duration of Use</b>	
Emission Days (days/year):	365
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Estimated substance removal from wastewater via domestic sewage treatment (%)	0
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and Measures related to external treatment of waste for disposal</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to external recovery of waste</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The ECETOC TRA tool has been used to estimate consumer exposures unless otherwise indicated. The Consexpo model has been used to estimate consumer exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>
Used ECETOC TRA model.

**Safety Data Sheet**

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<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE EXPOSURE SCENARIO</b>
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**Section 4.1 - Health**

Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.

**Section 4.2 -Environment**

Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.

Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.

If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.

## Safety Data Sheet

## Exposure Scenario - Article

SECTION 1	EXPOSURE SCENARIO TITLE
<b>Title</b>	Service life of foam article. - Consumer
<b>Use Descriptor</b>	<b>Sector of Use:</b> SU 21 <b>Product Categories:</b> PC32 <b>Article Categories:</b> AC13 <b>Environmental Release Categories:</b> ERC 10A, ERC 11A
<b>Scope of process</b>	Article service life of foam boards in construction. Consumer and environmental exposure by low releases during service life.

SECTION 2	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
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Section 2.1	Control of Consumer Exposure
<b>Product Characteristics</b>	
Physical form of product	Gas trapped in foam matrix.
Concentration of substance in product.	Unless otherwise stated: 24Kg in 45 m2 of foam product.
<b>Amounts Used</b>	Unless otherwise stated: Concentration in foam product (%):
<b>Frequency and Duration of Use</b>	Unless otherwise stated: Covers exposure up to 24 hour/event.
<b>Other Operational Conditions affecting Exposure</b>	
Unless otherwise stated: Covers use in room size of 2,7 m3. Air Change Rate per hour:	

Article Categories	OPERATIONAL CONDITIONS AND RISK MANAGEMENT MEASURES
Plastic articles Service life of foam article.	No specific risk management measure identified beyond those operational conditions stated.

Section 2.2	Control of Environmental Exposure
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## Safety Data Sheet

Substance is a unique structure.	
Not biodegradable.	
<b>Amounts Used</b>	
Fraction of EU tonnage used in region:	0,1
Regional use tonnage (tonnes/year):	300
Fraction of Regional tonnage used locally:	0,002
Annual site tonnage (tonnes/year):	0,6
Maximum daily site tonnage (kg/day):	1,6
<b>Frequency and Duration of Use</b>	
Emission Days (days/year):	365
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor:	10
Local marine water dilution factor:	100
<b>Other Operational Conditions affecting Environmental Exposure</b>	
Release fraction to air from process (initial release prior to RMM):	1
Release fraction to wastewater from process (initial release prior to RMM):	0
Release fraction to soil from process (initial release prior to RMM):	0
<b>Conditions and Measures related to municipal sewage treatment plant</b>	
Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%)	0
Assumed domestic sewage treatment plant flow (m3/d)	2.000
<b>Conditions and measures related to disposal of articles at end of service life</b>	
External treatment and disposal of waste should comply with applicable local and/or regional regulations.	
<b>Conditions and measures related to recovery of articles at the end of service life</b>	
External recovery and recycling of waste should comply with applicable local and/or regional regulations.	

<b>SECTION 3</b>	<b>EXPOSURE ESTIMATION</b>
<b>Section 3.1 - Health</b>	
The Consexpo model has been used to estimate consumer exposures unless otherwise indicated.	

<b>Section 3.2 - Environment</b>	
Used ECETOC TRA model.	

<b>SECTION 4</b>	<b>GUIDANCE TO CHECK COMPLIANCE WITH THE</b>
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**Safety Data Sheet**

EXPOSURE SCENARIO
<b>Section 4.1 - Health</b>
Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
<b>Section 4.2 -Environment</b>
Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures.
Required removal efficiency for air can be achieved using on-site technologies, either alone or in combination.
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required.