

**SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING****1.1. Product identifier**

- Trade name: **ETHYLENE FOR POLYMERIZATION**
- Chemical name: Ethylene
- Registration number REACH: 01-2119462827-27-0036
- UFI code: irrelevant for substances
- Index number: 601-010-00-3
- CAS number: 74-85-1
- EC number: 200-815-3

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

## 1.2.1. Identified uses

Monomer for the production of polymers, intermediate product for the production of chemical substances, technical gas for welding, cutting, etc., component for the preparation of mixtures - e.g. calibration gases.

Specific intended uses are listed in subsection 7.3. and Section 16.

Industrial and professional use.

## 1.2.2. Non-recommended uses

There are no non-recommended uses stated in the registration. The product may not be used in any way other than that specified in point 1.2.1 or subsection 7.3.

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

manufacturer: ORLEN Unipetrol RPA s.r.o., Záluží 1, 436 70 Litvínov, Czech Republic

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[info@orlenunipetrol.cz](mailto:info@orlenunipetrol.cz)

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Other contacts:

- Director of the Monomers and Chemicals Unit: ☎: +48 242 566 615; e-mail: [Dorota.Smolarek@orlen.pl](mailto:Dorota.Smolarek@orlen.pl)
- Key Account Manager: ☎: +48 691 991 378; e-mail: [Marta.Rosul@orlen.pl](mailto:Marta.Rosul@orlen.pl)
- Head of Customer Service Department: ☎: +420 476 162 006; [Lucie.Markova@orlenunipetrol.cz](mailto:Lucie.Markova@orlenunipetrol.cz)
- Person professionally qualified to compile a SDS: [reach.unirpa@orlenunipetrol.cz](mailto:reach.unirpa@orlenunipetrol.cz)

**1.4. Emergency telephone number**

- ORLEN Unipetrol RPA s.r.o. ☎: +420 476 163 111 (NON STOP)
- Toxicological Information Center (TIS) ☎: +420 224 919 293 (NON STOP)  
Na bojišti 1, 120 00 Prague 2, Czech Republic ☎: +420 224 915 402 (NON STOP)  
e-mail: [tis@vfn.cz](mailto:tis@vfn.cz)
- Transport Information & Accident System (TRINS) ☎: +420 476 163 111 (NON STOP)

*Note: Emergency telephone numbers for EU countries are listed in section 16.*

**SECTION 2: HAZARDS IDENTIFICATION****2.1. Classification of the substance or mixture**

The product is classified as hazardous pursuant to CLP Regulation (EC) No. 1272/2008 CLP:

(A) Refrigerated liquefied product with temperatures approx. -93 to -82°C

FLAMMABLE GAS, CATEGORY 1A

GASES UNDER PRESSURE (REFRIGERATED LIQUEFIED GAS)

**Flam. Gas 1A, H 220**

**Press. gas (Refrigerated liquefied gas), H 281**

# ETHYLENE

## SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006 (REACH), as amended

Valid Issue: 22/04/2024 – version 11

Revision: 22/04/2024 – 11<sup>th</sup> issue  
replaces: 30/11/2021 – 10<sup>th</sup> issue  
issued on: 07/13/2004

SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE, CATEGORY 3

**STOT SE 3, H 336**

(B) Compressed liquefied product with pressure 1.2-1.4 MPa (long-distance pipelines)

FLAMMABLE GAS, CATEGORY 1A

**Flam. Gas 1A, H 220**

GASES UNDER PRESSURE (COMPRESSED GAS)

**Press. gas (Compressed gas), H 280**


SPECIFIC TARGET ORGAN TOXICITY - SINGLE EXPOSURE, CATEGORY 3

**STOT SE 3, H 336**

*Note: The full text of the H-sentence and / or EUH-sentences is stated in Section 16.*


## 2.2. Label elements

(A) Refrigerated liquefied product with temperatures approx. -93 to -82°C

<i>Product identifiers</i>	<p align="center"><b>ETHYLENE FOR POLYMERIZATION</b> ETHEN / ETHYLENE index number: 601-010-00-3</p>	
<i>Warning hazard symbol</i>		
<i>Signal word</i>	<p align="center"><b>DANGER</b></p>	
<i>H-phrases (standard hazard phrases)</i>	H220 H281 H336	Extremely flammable gas. Contains refrigerated gas; may cause cryogenic burns or injury. May cause drowsiness or dizziness.
<i>P-statements (precautionary statements)</i>	P210 P243 P261 P377 P381 P304+P340 P410+403	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take action to prevent static discharges. Avoid breathing gas. Leaking gas fire – do not extinguish, unless leak can be stopped safely. In case of leakage, eliminate all ignition sources. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Protect from sunlight. Store in a well-ventilated place.
<i>Additional information</i>	None	
	<p align="center">ORLEN Unipetrol RPA s.r.o. Záluží 1, 436 70 Litvínov, Czech Republic ☎: +420 476 161 111, +420 476 163 111</p>	

(B) Compressed liquefied product with pressure 1.2-1.4 MPa (long-distance pipelines)

<i>Product identifiers</i>	<p align="center"><b>ETHYLENE FOR POLYMERIZATION</b> ETHEN / ETHYLENE index number: 601-010-00-3</p>
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Warning hazard symbol			
Signal word		<b>DANGER</b>	
H-phrases (standard hazard phrases)	H220 H280 H336	Extremely flammable gas. Contains gas under pressure; may explode if heated. May cause drowsiness or dizziness.	
P-statements (precautionary statements)	P210 P243 P261 P377 P381 P304+P340 P410+P403	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Take action to prevent static discharges. Avoid breathing gas. Leaking gas fire – do not extinguish, unless leak can be stopped safely. In case of leakage, eliminate all ignition sources. IF INHALED: Remove person to fresh air and keep comfortable for breathing. Protect from sunlight. Store in a well-ventilated place.	
Additional information		None	
<p>ORLEN Unipetrol RPA s.r.o. Záluží 1, 436 70 Litvínov, Czech Republic ☎: +420 476 161 111, +420 476 163 111</p>			

### 2.3. Other hazards

The product is easily flammable compressed or refrigerated liquefied gas. Liquefied product vaporizes quickly and may cause frostbites. Leaked gas spreads to long distances and creates explosive mixtures with air; after the product initiation it may cause fire or explosion even far from the leak source. Ethylene displaces oxygen in the air and may cause suffocation.

Produkt does not meet the criteria for PBT (P-persistent, B-bioaccumulative, T-toxic) or vPvB (vP-very persistent, vB-very bioaccumulative) substances. Product assessments for PBT / vPvB criteria see Subsection 12.5. ("Results of PBT and vPvB assessment").

The substance is not included in the candidate list pursuant to Article 59 (Paragraph 1) of the REACH Directive (SVHC substances).

## SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

### 3.1. Substances

Name of the substance:	ETHYLENE
Concentration [% hm.] :	min. 99.9
Index number (index):	601-010-00-3
CAS number:	74-85-1
EC number:	200-815-3

#### IMPURITIES

#### NAME:

#### IDENTIFIER :

The product does not contain any impurities, stabilizing additives or other components, which would have an impact on its classification.

Note: The substance is not or not contain a nanoform.

Note: Specific concentration limits (SCL), M-factor (M-) and Acute toxicity estimate (ATE) were not determined for this substance (harmonized classification).

### 3.2. Mixtures

Not applicable, the product is a substance.

**SECTION 4: FIRST AID MEASURES****4.1. Description of first aid measures****4.1.1. General instructions**

When providing first aid pay attention to self-protection.

Call emergency medical services (☎120 EU) and follow their instructions until their arrival. First aid must be always administered with the objective to preserve the basic bodily functions - should the victim become unconscious or should he/she stop breathing, start resuscitation immediately (chest compression and mouth-to-mouth resuscitation with the 30:2 ratio). When the victim is unconscious but is breathing NORMALLY, put him/her in the recovery position. The condition of the patient can change very quickly, so you need to watch him/her constantly and continuously monitor his/her consciousness status and breathing.

If the person is in unconscious or if he/she has spasms, do not put anything in his/her mouth, just put him/her into a stabilised position.

**4.1.2. When inhaled**

If possible with respect to your own safety, move the victim to fresh air and make sure they do not get cold. Ensure specialized medical help.

**4.1.3. Skin contact**

In case of frostbite do not pull off adherent clothing and wash the place with water (not warm). Do not rub the affected area, only cover it with sterile bandage or clean piece of cloth. Ensure specialized medical help.

**4.1.4. Contact with eyes**

Immediately start washing eyes while wide open under flowing tepid water, continue for at least 15 minutes. If the patient has contact lenses, remove them before washing eyes. Protect unharmed eye. Ensure specialized medical help; in case of eye contact with liquefied gas immediately, as there may be serious eye damage when freezing.

**4.1.5. When ingested**

Consumption is not a probable way of exposure. Contact with liquefied gas may cause frostbites of lips and mouth. In such case wash your mouth with luke water and ensure specialized medical help immediately.

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

Lack of oxygen may cause exhaustion, drowsiness, weariness, dizziness, nausea, vomiting, loss of coordination, problems with attention and reasoning, and general confusion. The victim may not even notice he is suffocating, and may fall unconscious and suffocate quickly without warning. In case of frostbite the affected areas appear pale, cold and insensitive, and may later change to red, swell, tingle, burn and hurt.

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

Immediate medical help is required in case of inhalation or eye contact with liquefied gas.

**SECTION 5: FIREFIGHTING MEASURES****5.1. Extinguishing media**

Appropriate extinguishing media: low expansion foam, spray or water fog.

Inappropriate extinguishing media: direct water stream.

Extinguishing small fire: dry-powder or carbon dioxide (CO<sub>2</sub>) extinguisher, dry sand or extinguishing foam.

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

Do not fight the fire until the source of its leak is removed. If this is not possible, let the fire burn out and only use water to cool the tanks near the fire. Otherwise there is a danger of a fast reaction or explosion. The gases may spread to significant distances and in contact with a source of ignition may cause back-up with subsequent explosion and / or fire. A cold mist forms from evaporation of the liquefied product. The mist accumulates near the ground and in enclosed areas, and may cause explosion and suffocation. Tanks containing the product can explode due to heat. Burning may cause the creation of toxic fumes containing carbon monoxide and carbon dioxide. Leaked refrigerated liquefied gas may create ice, which can create obstructions in sewage and freeze vents.

**5.3. Advice for firefighters**

Minimize the penetration of extinguishing medium contaminated by the substance into the sewage, surface or underground waters or into the soil. There is a danger of explosion and subsequent fire in case of a leak into the sewage.

Use water spray to keep the containers cool in order to prevent an explosion caused by the heat.

Do not use foam and water at the same time because water dissolves the foam.

Water contact with cooled liquefied gas can lead to significant foaming and quick creation of gases.

Protective equipment for fire fighters: full protective gear and self-contained close-circuit breathing apparatus.

**SECTION 6: ACCIDENTAL RELEASE MEASURES****6.1. Personal precautions, protective equipment and emergency procedures**

Enclose the place and prevent the access to the area in danger. Remain on the windward side. There is a danger of fire in case of accidental release of this substance, therefore remove all possible ignition sources, do not smoke and do not manipulate with open fire. If possible, ensure a sufficient ventilation of enclosed spaces. Prevent contact with the substance and its vapors. Use proper personal protective equipment (as indicated in Subsection 8.2) when removing the effects of the emergency event/accident. Evacuate people from the whole area in danger for large accidents. There is a danger of suffocation and in case of initiation also of explosion in areas below ground and in enclosed areas (including sewage). Leaked refrigerated liquefied gas may create ice, which can create obstructions in sewage and freeze vents.

**6.2. Environmental precautions**

Prevent further leaking and enclose the leaking place. In the case of leak of liquefied gas, prevent its escape into the sewage system or into surface and underground water by closing sewage entrances.

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

Leak of liquefied gas will cause quick evaporation with no efficient way of stopping it. Use a water shower to reduce the amount of gases in the air. Increase the intensity of air ventilation at the site of the leak, especially if it occurred in an enclosed area, and monitor the concentration of gases in the air.

For large leaks into water use floating barrage and collect the substance from surface using surface skimmers (separators) or cover the leaked substance with sorbent and remove saturated sorbent from the surface by scraping or draining. Consult a professional before using dispersing agents.

**6.4. Reference to other**

For recommended personal protective aids – see Subsection 8.2. (“Exposure controls”).

For recommended manner of removing waste – see Section 13 (“Disposal considerations”).

**SECTION 7: HANDLING AND STORAGE****7.1. Precautions for safe handling**

Adhere to all fire safety precautions (no smoking, no open fire, removal of all possible combustion sources) and stay in well-ventilated areas when manipulating with the substance and with empty tanks (may contain residue). Do not perform activities such as welding, cutting, grinding etc. near casings (even empty ones). Prevent bolts of static electricity. Only use in technological plants which are made of suitable construction materials, can withstand the appropriate pressure and are equipped with a protective mechanism which would prevent back-flow. Ensure that the whole gas system was inspected for possible leaks before use. Use recommended personal protective measures and follow all instructions to prevent possible contact of the substance with skin, eyes and possible inhalation. When entering enclosed or non-ventilated areas always use airway protective measures.

General sanitary precautions: Please keep the rules of personal hygiene. Take off contaminated pieces of clothing. Do not eat, drink or smoke during work! Wash your hands and exposed parts of body thoroughly with soap and water after work and before meal and possibly treat with suitable reparation lotion. Do not wear contaminated clothing, shoes or protective equipment in the catering area.

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

Storage must adhere to the fire safety requirements on buildings and electric equipment must adhere to valid regulations. Store in cool, well-ventilated places with efficient suction from all heat and combustion sources.

Protect from direct sunlight. Storage containers must be closed, properly labeled and grounded. Do not store near incompatible materials, such as oxidizers.

### 7.3. Specific end use(s)

Use of gaseous and liquid ethylene in accordance with the registration documentation.

The substance is intended for specific use as a monomer. Further as intermediate product for the production of chemical substances, technical gas for welding, cutting, etc., component for the preparation of mixtures - e.g. calibration gases.

All conditions for safe use are described directly in the relevant sections of the safety data sheet itself.

An overview of specific uses is given in section 16 of the body of the safety data sheet. Exposure scenarios are part of the annex to this Safety Data Sheet.

## SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

### 8.1. Control parameters

#### 8.1.1. Occupational exposure limit values

The following Permissible Exposure Limits (PELs) and Maximum Allowable Concentrations (NPK-P) of Chemicals in the Atmosphere of Workplaces within the Czech Republic are set by the Government Regulation No. 361/2007 Coll., determining conditions of occupational health protection, as amended:

Name	CAS number	PEL [ $\text{mg}\cdot\text{m}^{-3}$ ]	NPK-P [ $\text{mg}\cdot\text{m}^{-3}$ ]	Note
Ethylene	74-85-1	Limit values for the substance have not been determined.		
<i>Decomposition products:</i>	<i>NAME / CAS NUMBER:</i>	<i>PEL [<math>\text{mg}\cdot\text{m}^{-3}</math>]</i>	<i>NPK-P [<math>\text{mg}\cdot\text{m}^{-3}</math>]</i>	
	<i>Carbon monoxide / 630-08-0</i>	<i>23</i>	<i>117</i>	
	<i>Carbon dioxide / 124-38-9</i>	<i>9 000</i>	<i>45 000</i>	

Note 1: An explanation of the meaning of the PEL and NPK-P abbreviations is in section 16.

Note 2: Occupational exposure limit values for EU countries are listed in section 16.

#### 8.1.2. DNEL/DMEL values

The DNEL / DMEL was not established because no risk to human health was identified.

#### 8.1.3. PNEC values

PNECs were not established because no risk was identified for any of the environmental compartments.

#### 8.1.4. Recommended monitoring of the concentration in the workplace

Gas chromatography (GC) with a flame ionizing detector (FID) or a mass spectrometer (MS) in accordance with technical norms ČSN EN 689 and ČSN EN 482.

### 8.2. Exposure control

#### 8.2.1. Technical protective measures for limiting the exposure of people and the environment

Exposure control of unwanted exposure of humans and the environment must be ensured by strictly keeping the substance under control by using process and control technologies, which reduce emissions and subsequent exposure with the goal of preventing the substance from entering the air and water systems as well as the soil, and of preventing possible human exposure. The areas where the substance is stored and manipulated must be equipped with impermeable floors and retaining tanks in case of emergency leaks. It is necessary to ensure global as well as local ventilation and efficient suction.

#### 8.2.2. Individual protective measures

If an accident or extraordinary event causes increased exposure, employees must have access to personal protective measures (PPM) for the protection of airways, eyes, hands and skin, depending on the nature of the performed activities. Suitable protection for airways must also be available where it is not technically possible to ensure the adherence of exposition limits identified for the work environment or ensure that exposure via airways will not affect the health of people. During non-stop use of these measures during permanent work, it is necessary to include safety breaks if the nature of the PPM

requires them. All PPM need to be kept in usable condition and damaged or contaminated ones need to be immediately replaced.

### RECOMMENDED PERSONAL PROTECTIVE EQUIPMENT (PPE):

(the specific type of protective equipment must be chosen according to the type of activity being carried out and the quantity and concentration of the dangerous substance / mixture at the workplace)

- *Respiratory protection:* Use the insulation breathing apparatus use in case of insufficient ventilation and / or local exhaustion and product leakage;
- *Eye/face protection:* Protective chemical goggles compliant with EN 166 or protective face shield;
- *Hand protection:* Protective gloves against cold and possible frostbite; the follow materials protect from the chemical effects of the substance:

	<i>Glove material</i>	<i>Material thickness</i>	<i>Penetration time</i>
Regular work activities (staining risk)	nitrile	0.4 mm	60 minutes
Leak / accident liquidation	Viton	0.7 mm	480 minutes

- *Protection of other body parts:* Antistatic, inflammable protective clothes, antistatic shoes;
- *Thermal risk:* Not relevant for the given manner of the use.

### 8.2.3. Environmental exposure controls

Avoid product leakage to the environment with all available means. See section 6.2.

## SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

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

The information is taken from the registration dossier of substance (CSR) unless otherwise stated.

CHARACTERISTIC	UNIT	VALUE	SOURCE	NOTE
Physical state		Gas		at 20°C; 101,3 kPa
Colour		Colorless		
Odour		Sweet	HSDB	CSR does not specify
Odour threshold	[ppm]	260	UAKRON	
Melting point/freezing point	[°C]	-169.15		
Boiling point or Initial boiling point / boiling range	[°C]	-103.77		at 101,3 kPa
Flammability (solid, gas, liquid)		Extremely flammable		
Upper flammability / explosive limits	[% obj]	36		
Lower flammability / explosive limits	[% obj]	2.7		
Flash point	[°C]	Irrelevant	CSR - DW	
Auto-ignition temperature	[°C]	450		at 101,3 kPa
Decomposition temperature	[°C]	Does not decompose at normal usage temperatures		CSR does not specify
pH value		Irrelevant		CSR does not specify
Kinematic viscosity	[mm <sup>2</sup> /s]	-	CSR - DW	
Solubility in water	[mg.l <sup>-1</sup> ]	131		at 25°C
Partition coefficient: n-octanol/water	[log Kow]	1.13		at 20°C
Vapour pressure	[hPa]	2 124		at -90°C

CHARACTERISTIC	UNIT	VALUE	SOURCE	NOTE
Density	[g.cm <sup>-3</sup> ]	0.5678		at -104°C
Relative density		0.978		at 20°C
Particle characteristics		Irrelevant		Not applicable - this is a gas.

### 9.2. Other information

#### 9.2.1. Information with regard to physical hazard classes

CHARACTERISTIC	UNIT	VALUE	SOURCE	NOTE
Explosive properties		Substance is not explosive		CSR - DW
Oxidising properties		None		CSR - DW

#### 9.2.2. Other safety characteristics

CHARACTERISTIC	UNIT	VALUE	SOURCE	NOTE
Henry's constant (volatility)	Pa m <sup>3</sup> /mol	0.162	CSR	at 25°C
Dynamic viscosity	[μP]	10.4	CSR	at 25°C

## SECTION 10: STABILITY AND REACTIVITY

### 10.1. Reactivity

No risk assuming adherence to the conditions for manipulation and storage listed in Section 7 The product can polymerize at temperatures exceeding 600°C, and in the presence of catalyzer substances the polymerization temperature can drop lower (e.g. copper allows polymerization at 400°C).

### 10.2. Chemical stability

The product is chemically stable assuming storage and manipulation under the conditions listed in Section 7.

### 10.3. Possibility of hazardous reactions

Polymerization can occur at higher temperatures. Dangerous reactions occur after contact with oxidizers.

### 10.4. Conditions to avoid

Ignition sources (including static energy), high temperature, sunshine.

### 10.5. Incompatible materials

Oxidizers.

### 10.6. Hazardous decomposition products

Carbon monoxide and carbon dioxide might be produced during heat decomposition at high temperatures.

## SECTION 11: TOXIKOLOGICAL INFORMATION

### 11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008

#### 11.1.1. Toxicological effects of the substance

HAZARD CLASS	DATA FROM REGISTRATION DOCUMENTATION		EVALUATION
	DESCRIPTION	RESULT	
Acute toxicity	1/ Oral and Dermal: 2/ Inhalation:	1/ Not feasible - the substance is a gas at room temperature (Dw/nf) 2/ LC50 > 57 000ppm(rat, male) LC50: > 65 400 mg/m <sup>3</sup> air No adverse effect observed	Does not meet the classification criteria



HAZARD CLASS	DATA FROM REGISTRATION DOCUMENTATION		EVALUATION
	DESCRIPTION	RESULT	
Skin corrosion/irritation		Not feasible - the substance is a gas at room temperature (Dw/nf)	Does not meet the classification criteria
Serious eye damage/irritation		Not feasible - the substance is a gas at room temperature (Dw/nf)	Does not meet the classification criteria
Sensitisation		Not feasible (Dw/nf)	Does not meet the classification criteria
Germ cell mutagenicity	1/ in vitro: 2/ in vivo:	1/ Study scientifically not necessary 2/ No adverse effect observed (negative)	Does not meet the classification criteria
Carcinogenicity	1/ Oral and Dermal: 2/ Inhalation: OECD 453 (rat)	1/ No study available / No effects 2/ No adverse effect observed (NOAEC = 3 445 mg/m <sup>3</sup> (chronic))	Does not meet the classification criteria
Reproductive toxicity	1/ OECD 421 fertility tests (all routes of exposure) 2/ developmental toxicity tests (inhalation)	1/ No effects 2/ No effects (NOAEC= 5 737 mg/m <sup>3</sup> )	Does not meet the classification criteria
STOT-single exposure	1/ Oral and Dermal: 2/ Inhalation:	1/ Not feasible (Dw/nf) 2/ To 57 000 ppm no toxic effects	Does not meet the classification criteria
STOT-repeated exposure	1/ Oral and Dermal: 2/ Inhalation: OECD 413 (10 000 ppm, 13 weeks, rat):	1/ Not feasible (Dw/nf) 2/ No effects (NOAEC=10 000 ppm / 11 473 mg/m <sup>3</sup> , systematic effects; LOAEC=10 ppm /11.47mg/m <sup>3</sup> ; local effects;)	Does not meet the classification criteria
Aspiration hazard		If swallowed and when entering into the respiratory system, does not cause lung damage or cause death	Does not meet the classification criteria

### 11.1.2. Information on likely routes of exposure

Inhalation is the most significant type of exposure.

### 11.1.3. Delayed and immediate effects as well as chronic effects from short and long-term exposure

The product displaces oxygen. Lack of oxygen may cause exhaustion, drowsiness, weariness, dizziness, nausea, vomiting, loss of coordination, problems with attention and reasoning, and general confusion. The victim may not even notice he is suffocating, and may fall unconscious and suffocate quickly without warning. Frostbites may develop from contact with cooled liquefied gas. Frostbitten areas appear pale, cold and insensitive, and may later change to red, swell, tingle, burn and hurt.

The product itself could also cause sleepiness and dizziness, however these narcotic effects only occur at very high concentrations of circa 80% volume (equivalent dose 800,000 ppm or 917,857 mg/m<sup>3</sup>), which highly exceed the values of work exposure. This shows that ethylene is not dangerous for human health.

### 11.1.4. Interactive effects

There are no interactions for identified use.

### 11.1.5. Toxicokinetics

The product is metabolized and detoxicated very quickly after inhalation.

## 11.2. Information on other hazards

The substance is not included in the candidate list pursuant to Article 59 (Paragraph 1) of the REACH Directive (due to the characteristics that can compromise endocrine activities or due to any other reason).

## SECTION 12: ECOLOGICAL INFORMATION

### 12.1. Toxicity

Ethylene forms a gas under normal pressures and temperatures, and during toxicity testing it is technically difficult to keep its designated concentration in water, as was shown in tests performed on seaweed and algae. Thus, the results of such tests might not be relevant. For this reason the tests were replaced by the (Q)SAR mathematical model method.

Substance is a gas and is extremely unlikely to reside in the aquatic or terrestrial compartment. Deriving a PNEC for a gas is unreasonable and technically of little use for risk assessment as the substance will not be present in the aquatic or terrestrial environment.

Water environment	Fish	LC <sub>50</sub> (96 h) = 115 mg/l	QSAR
		CnV(21 d) = 12.39 mg/l	QSAR
	Invertebrates	LL <sub>50</sub> (48 h) = 215 mg/l	QSAR
		ChV/NOEC = 6.31 mg/l	QSAR
	Algae	EC <sub>50</sub> (96 h) = 30 mg/l	QSAR
EC10/LC10 or NOEC = 7.07 mg/l		QSAR	
Terrestrial environment	Soil organisms	LL50 (28d, earthworms) = 29,84 mg/kg sediment dw	QSAR
	Terrestrial plants	Short-term EC50 or LC50: 48.65mg/kg soil dw Long-term EC10/LC10 or NOEC: 9.32ng/kg soil dw	
Microbiological activity (STP)	Activated sludge	The aquatic toxicity of this substance was estimated using the Target Lipid Model based on methodologies described by Mcgrath et al. (2004).The estimated 72-hr EL50 value for activated sludge is 1760.893 mg/L.	

*Note: An explanation of the meaning of the abbreviations is in section 16.*

### 12.2. Persistence and degradability

**Biological degradability:** due to the fact that ethylene forms a gas under normal temperature and pressure, standard biodegradability tests are technically difficult to perform and the results might not be relevant. The (Q)SAR method has led to the conclusion that ethylene is well bio-degradable in water or soil.

**Abiotic degradability:**

- hydrolysis as a function of pH: the product is unaffected by hydrolysis (due to the lack of hydrolyzable functional groups)
- photolysis: the product is unaffected by photolysis
- atmospheric oxidation: easy decomposition is assumed via indirect photolysis in the air

### 12.3. Bioaccumulative potential

With regards to the fact that the value of the distribution coefficient n-octanol/water (log Kow) is lower than 3, no bioaccumulation of the product is expected.

The Bioconcentration Factor (BFC) for this substance has been estimated using the EPISUITE program and based on the regression method. The estimated BCF based on the regression method (upper trophic) for this substance is 2.586 L/kg.

### 12.4. Mobility in soil

With regards to low value of the distribution coefficient n-octane/water (low Kow < 3) no sorption of the product into sediment or soil is expected.

The estimated Log Koc of this substance is 0.980.

### 12.5. Results of PBT and vPvB assessment

The product does not fulfill the criteria of persistence, bioaccumulation and toxicity, or the criteria of high persistence and high bioaccumulation in accordance with Annex XIII of EC Regulation No 1907/2006 REACH, and so is not identified as a PBT substance (Persistent, Bioaccumulative, Toxic) or a vPvB (very Persistent, very Bioaccumulative) substance.

**B:** Ethylene has a log Kow of 1.13 and therefore it is not B/vB according to REACH regulations.

**T:** The information indicates that ethylene is of low toxicity to environmental receptors. Informace naznačují, že ethylen má nízkou toxicitu pro environmentální receptory.

**P:** Ethylene is not expected to persist in the environment because it is predicted to degrade rapidly, has a low potential for adsorption to organic matter and has a low potential for bioaccumulation. Therefore, for PBT assessment ethylene is considered to be not P/vP and not B/vB.

#### 12.6. Endocrine disrupting properties

The substance is not included in the candidate list pursuant to Article 59 (Paragraph 1) of the REACH Directive due to the characteristics that can compromise endocrine activities.

#### 12.7. Other adverse effects

Pursuant to Appendix 1 of the Water Act No. 254/2001 Coll., the product is not considered a hazardous and harmful substance.

### SECTION 13: DISPOSAL CONSIDERATIONS

#### 13.1. Waste treatment methods

In the event that it is necessary to dispose of the rest of the product (eg unused or leaked product), the applicable European Union legislation as well as applicable national and local regulations must be observed. Dispose of waste at a waste disposal facility.

Recommended waste classification according to Decree No. 8/2021 Coll., On the Waste Catalog and assessment of waste properties.

##### 13.1.1. Catalogue number

Gases, which are not delivered in pressurized bottles, cannot be put in waste and assigned a number in accordance with the catalogue.

##### 13.1.2. Recommended waste removal method

Burn the unusable remainder of the product with a suitable burner equipped with protection against flame blow-back.

##### 13.1.3. Recommended methods of contaminated containers disposal

Not relevant. The product is not packed, it is transported via piping and tank cars.

##### 13.1.4. Measures for limiting exposure when handling waste

Never release the rest of the product to be disposed into an environment where an explosive mixture with air could form. Do not flush leaked cooled liquefied product during an emergency event or accident into sewage. Proceed in accordance with instructions provided in Section 6 („Accidental release measures“) and in Subsection 8.2 („Limiting exposure“) and adhere to all valid legal regulations for the protection of people, air and water.

*WARNING: The stated information is of a recommendation character. It is related to the delivered, still unused material. Pursuant to the Waste Act all responsibilities for managing the waste, including its assignment based on its type and category, are responsibilities of the waste originator.*

### SECTION 14: TRANSPORT INFORMATION

Pressurized ethylene is transported by pipes and thus is not adjusted by regulations for land, water or air transportation of dangerous items.

Refrigerated liquefied ethylene is transported by tank cars. The listed information applies to road transport (ADR) and rail (RID) transport of dangerous goods:

<b>14.1. UN number or ID number</b>	1038
<b>14.2. UN proper shipping name</b>	ETHYLENE, DEEP COOLED, LIQUID
<b>14.3. Transport hazard class(es)</b>	2
<b>14.4. Packing group</b>	not listed
<b>14.5. Environmental hazards</b>	the product is not harmful to the environment
<b>14.6. Special precautions for user</b>	none

**14.7. Maritime transport in bulk according to IMO instruments:** the product is not designated for bulk transport pursuant to the International Maritime Organization (IMO) documents

**14.8. Other information**

Hazard identification number: 223  
Classification code: 3F  
Labels: 2.1 + (13)\*



Note: \*Safety sign for displacement „move with care“ (only valid for RID)

**SECTION 15: REGULATORY INFORMATION****15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture**

## 15.1.1. European Union

Regulation of the European Parliament and Council (EC) No. 1907/2006 (REACH), as amended

REGISTRATION (TITLE II OF THE REACH REGULATION)

*the product was fully registered as a substance*

AUTORISATION (TITLE VII OF THE REACH REGULATION)

*the product is not listed in the list of substances in Annex XIV of EC Regulation No 1907/2006 REACH, and so no licensing obligation applies*

RESTRICTION (TITLE VIII OF THE REACH REGULATION)

*the product shall not be used in aerosol dispensers for amusement and decorative purposes intended for sale to the public(annex XVII, point 40)*

Regulation of the European Parliament and Council (EC) No. 1272/2008 (CLP), as amended

*the product has been classified in compliance with the stated regulation, packaging and labeling obligations of dangerous chemicals only apply to the product if it is marketed in packaging subject to its labelling according to CLP regulation*

Regulation of the European Parliament and Council (EC) No. 649/2012 on the export and import of dangerous chemicals, as amended

*the product is not subject to special import or export restrictions*

Commission decision 2014/955/EU of 18 December 2014, amending Decision 2000/532/EC on the list of waste pursuant to Directive 2008/98/EC of the European Parliament and of the Council

EP and Council Regulation (EC) No. 2019/1148 (explosives precursors), as amended

Annex I - EXPLOSIVES PRECURSORS SUBJECT TO RESTRICTIONS - *Substance not contained.*

Annex II - EXPLOSIVE PRECURSORS SUBJECT TO NOTIFICATION - *Substance not contained.*

The Seveso III Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances – product listed

## 15.1.2. Czech Republic

Act No. 350/2011 Coll. on Chemical Substances and Chemical Mixtures, as amended

*the product is not subject to the obligation of notification to the PCN (Poison centres notification)*

Act No. 258/2000 Coll. on the Protection of Public Health, as amended

Act No. 254/2001 Coll., on Water, as amended

Act No. 201/2012 Coll., on Air Protection, as amended

Act No. 541/2020 Coll., on Waste, as amended

Regulation No. 8/2021 Coll., on the Waste Catalogue and on Assessing Waste Characteristics, as amended

Governmental decree no. 361/2007 Coll., laying down occupational health and safety conditions

*product has no exposure limit; the product is not subject to the obligation to establish a controlled zone*

Act no. 224/2015 Coll., on prevention of serious accidents caused by selected dangerous chemical substances or mixtures

**15.2. Chemical safety assessment**

Chemical safety assessment was performed when the substance was registered. The substance fulfils the criteria for classification as dangerous in accordance with EC Regulation No 1272/2008 CLP for physicochemical properties but does not meet the criteria for classification as a dangerous for human health and the environment, is not carcinogenic, mutagenic or toxic for reproduction (CMR), and is not identified as a PBT or vPvB substance.

Information on the safe handling of the substance is incorporated into the body of the safety data sheet (section 1-16) or listed in Article 9.0.4. attachments – Exposure scenarios.

An exposure assessment and a subsequent risk characterization step were performed. Exposure scenarios according to Article 31 of the European Parliament and Council Regulation (EC) No. 1907/2006 (REACH) are attached to the safety data sheet.

**SECTION 16: OTHER INFORMATION****Changes adopted as a part of the revision process**

- 10/26/2005: Revision (2): Editing information in the sections 2, 3.1, 4.5, 15.1, 15.2, 16  
10/16/2006: Revision (3): Editing information in the sections 1, 2, 8, 12.5, 13 and 16  
03/01/2007: Revision (4): Editing information in the sections 1 and 16  
06/01/2007: Revision (5): Complete revision of the document in relation to the Regulation (EC) No 1907/2006 of the European Parliament and of the Council  
12/01/2009: Revision (6): Editing information in the sections 1, 2.1, 8.1, 15, 16 and the „Declaration“  
12/01/2010: Revision (7): Editing information in the sections 1 (registration number), 2 (classification and labeling according to CLP), and 16  
08/01/2011: Revision (8): Complete revision of the document in relation to the updating of Annex II of Regulation (EC) No 1907/2006 REACH in accordance with Annex I of Commission Regulation (EU) No 453/2010  
01/01/2012 / 8(1): Section 15.1.2 – updating legislation  
01/06/2012 / 8(2): Section 1.1 - identifiers, Section 1.3 – update contact and Section 16 – abbreviations  
05/31/2015 / 8(3): Section 1 (contact information), Section 2, Section 15.1 (update of legal regulations) and 16 (text deletion)  
11/01/2016 / 8(4): Section 1 (contact information), Section 14 and 15 (editing in accordance with Regulation (EC) no. 830/2015), Section 15 (legislation update)  
02/01/2018 / 8(5): Unification of SDS format after the ČeR merger into UNIPETROL RPA, including the editing of data in sections 1, 8, 9, 11, 12, 13 15 and 16  
12/08/2020: Revision (9): Change of a classification of substance – updating according a valid legal regulation  
30/11/2021: Revision (10): – Overall modification of the document in relation to the update of Appendix II of Directive (EC) No. 1907/2006 REACH, by Directive of the Council (EC) No. 2020/878;  
Data modification in Sections 13 and 15 - update of the legal regulations;  
Data modification in Section 1 – change of the company name;  
22/ 04/2024: Revize (11): Overall modification of the document in connection with the update of the Safety Report (CSR) and replacement of the annex – Exposure scenarios;

**Acronyms and abbreviations used in the text**

ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
CAS	Registration number assigned to the substance by the Chemical Abstracts Service of the American Chemical Society
CLP	EU Directive No. 1272/2008 on Classification, Labeling and Packaging of chemical substances and mixtures, which is implemented into the European legislature by the means of GHS (United Nations' Globally harmonized System) for classifying and labeling chemical substances
CMR	Carcinogenic, mutagenic or toxic for reproduction

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 issued on: 07/13/2004

ČSN EN (ISO)	European standard incorporated into the Czech technical standards
CSR	Chemical Safety Report
DMEL	Derived minimal effect level - an exposure level that corresponds to a low and possibly theoretical risk, which should be considered as an acceptable risk (for thresholdless effects, i.e. there is no exposure level without effect)
DNEL	Derived no-effect level - level of exposure derived from toxicological data that does not produce any adverse effects on human health
DW	Data waiving
EC <sub>50</sub>	Effective concentration EC <sub>50</sub> is the concentration of substance that causes immobilization of 50% of individuals
ErC <sub>50</sub>	Effective concentration EC <sub>50</sub> is the concentration of substance that causes 50 % decrease of Algea growth
ECHA	European Chemicals Agency
ES	Official number of the chemical substance in the European Union: EINECS from the European Inventory of Existing Commercial Substances, or ELINCS from the European List of Notified Chemical Substances, or NLP from the No Longer Polymer list
HSDB	Hazardous Substances Data Bank
IATA	International Air Transport Association
IBC	Intermediate Bulk Container
IC <sub>50</sub>	Inhibition concentration IC <sub>50</sub> that causes inhibition of 50% of individuals
ICAO	International Civil Aviation Organization
ICE	"Intervention in Chemical Transport Emergencies" system providing both professional and practical assistance in dealing with emergency situations related to the transport and storage of hazardous chemicals
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organisation
ISO	International Organization for Standardization
LC <sub>50</sub> /LD <sub>50</sub>	Lethal concentration/level is the concentration/level of substance that causes mortality of 50 % individuals
LOEC/LOEL	Lowest Observed Effect Concentration/Level
log Kow	Logarithm of distribution coefficient n-octanol/water
nf	Not feasible
NOAEC/NOAEL	No Observed Adverse Effect Concentration/No Observed Adverse Effect Level
NOEC/NOEL	No Observed Effect Concentration/No Observed Effect Level
NPK-P	The highest permitted concentration of the chemical substance in the air (the concentration of the substance that a worker may be exposed to for a maximum of 15 minutes but which must never be exceeded)
OECD	Organization for Economic Co-operation and Development
OOP	Recommended personal protective aids
OSN	United Nations
(Q)SAR	Quantitative Structure-Activity Relationship
PBT, vPvB	Persistent, bioaccumulative and toxic; high persistent and high bioaccumulative
PCN	Poison Centres Notification – international system for the notification of dangerous mixtures
PEL	Permitted exposure limit of the chemical substance in the air (the exposure value that an employee may be exposed to during the entire working shift (8 hours), without endangering his health during lifetime occupational exposure)
PNEC	Predicted No Effect Concentration
REACH	EU Directive No. 1907/2006 on Registration, Evaluation and Authorization of Chemicals
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STOT	Specific Target Organ Toxicity
STP	Sewage treatment plant
su	Scientifically Unjustified



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TRINS	Transport Information and Accident System of the Czech Republic, providing professional and practical assistance in dealing with emergency situations related to transport and storage of hazardous chemical substances, included in ICE
UACRON	Chemical database (The University of Akron).
UFI code	Unique identifier of the composition of the product containing the dangerous mixture (s).
UN	The four-digit identification number of the substance or object identifying hazardous material in international transport
UVCB	Substances of Unknown or Variable composition, Complex reaction products or Biological materials

### Data sources used for preparing the material safety sheet

Annexes I, IV, VI and VII to Regulation (EC) No. 1272/2008 CLP, as amended;  
Principles for providing first aid upon being exposed to chemical substances;  
Substance registration documentation pursuant to Regulation (EC) No. 1907/2006 REACH;  
Decision of the European Chemicals Agency (ECHA) No. SUB-D-2114129354-54-01/F on registration pursuant to Directive (EC) No. 1907/2006 REACH;  
Research data sources (Hazardous Substances Data Bank HSDB, University of Akron Chemical UAKRON, Hygienické limity Gestis);

### Full text of H-/ EUH-sentences and abbreviations of hazard classes stated in Section 2 and/or 3

H 220 Extremely flammable gas.  
H 280 Contains gas under pressure; may explode if heated.  
H 281 Contains refrigerated gas; may cause cryogenic burns or injury.  
H 336 May cause drowsiness or dizziness.  
Flam. Gas. Flammable gas  
Press Gas Gases under pressure  
STOT SE Specific target organ toxicity — single exposure

### Identified uses (Exposure scenarios)

ES1 (M-1) Manufacture  
ES2 (F-1) Formulation & (re)packing of substances and mixtures  
ES3 (IW-1) Use as an intermediate  
ES4 (IW-2) Use as a fuel  
ES5 (IW-3) Functional Fluids  
ES6 (IW-4) Use in Laboratories  
ES7 (IW-5) Rubber production and processing  
ES8 (IW-6) Polymer Processing  
ES9 (IW-7) Polymer Production  
ES10 (PW-1) Use as a fuel  
ES11 (PW-2) Functional fluids  
ES12 (PW-3) Use in laboratories

### Training instructions

Persons handling the product must be advised of the risks involved in handling the product and the health and environmental protection requirements (see applicable provisions of the Labor Code).

### Access to information

Pursuant to Article 35 of Directive (EC) No. 1907/2006 REACH, every employer is obliged to allow access to the information stated on the given material safety sheet to all workers who use this product or are exposed to its impacts while working, and also to representatives of these workers.

### Occupational exposure limit values for EU countries (see point 8.1.1)

data for ethylene (number CAS 74-85-1)
























	8-hour limit [mg.m <sup>-3</sup> ]	Short-term limit [mg.m <sup>-3</sup> ]
European Union (Regulation No. 2000/39/EC)	not specified	not specified
Belgium	233 <sup>(1)</sup>	not specified
Italy	not specified	not specified
Germany	not specified	not specified
Slovakia	not specified	not specified
France	not specified	not specified
Spain	not specified	not specified
Sweden	330	1200
Great Britain	not specified	not specified
Latvia	100	not specified
Switzerland	11 500	not specified

8-hour limit: Measured or calculated in relation to the 8-hour reference period as a timely weighted average

Short-term limit: Exposure limit value, which shall not be exceeded and which corresponds to a 15-minute period

- (1) This agent releases gas or vapor which has no physiological effect but lowers the oxygen content in the air. When the oxygen content is below 17-18% (vol/vol) it causes suffocation without a warning preceding it.

### Emergency telephone number for EU countries (see subsection 1.4)

National Centers	TELEFONE	LANGUAGE	Institution / website / email
<b>Belgium</b>	 ☎+070245245	German	<a href="http://www.poissoncentre.be">http://www.poissoncentre.be</a> Centre Antipoisons, c/o Hôpital Militaire Reine Astrid Rue Bruyn 1, 1120 Bruxelles
<b>Czech Republic</b>	 ☎+420/224-919293; 915402	Czech	<a href="http://www.tis-cz.cz">http://www.tis-cz.cz</a> Toxikologické informační středisko (TIS) Na bojišti 1, 120 00 Praha 2 e-mail: tis@vfn.cz
<b>France – Orfila (INRS)</b>	 ☎+33/0145425959	French	"Centres Antipoison et de Toxicovigilance (CapTv) Hôpital Fernand Widal" 200 rue du Faubourg Saint Denis 75010 PARIS viviane.damboise@lrp.aphp.fr
<b>France - Angers</b>	 ☎+33/241482121	French	<a href="http://www.centres-antipoison.net/angers/index.html">http://www.centres-antipoison.net/angers/index.html</a>
<b>France - Bordeaux</b>	 ☎+33/556964080	French	<a href="http://www.centres-antipoison.net/bordeaux/index.html">http://www.centres-antipoison.net/bordeaux/index.html</a>
<b>France - Lille</b>	 ☎+33/0800595959	French	<a href="http://www.centres-antipoison.net/lille/index.html">http://www.centres-antipoison.net/lille/index.html</a>
<b>France - Lyon</b>	 ☎+33/472116911	French	<a href="http://www.centres-antipoison.net/lyon/index.html">http://www.centres-antipoison.net/lyon/index.html</a>
<b>France - Marseille</b>	 ☎+33/491752525	French	<a href="http://www.centres-antipoison.net/marseille/index.html">http://www.centres-antipoison.net/marseille/index.html</a>
<b>France - Nancy</b>	 ☎+33/383225050	French	<a href="http://www.centres-antipoison.net/nancy/index.html">http://www.centres-antipoison.net/nancy/index.html</a>
<b>France - Paris</b>	 ☎+33/140054848	French	<a href="http://www.centres-antipoison.net/paris/index.html">http://www.centres-antipoison.net/paris/index.html</a>
<b>France - Strasbourg</b>	 ☎+33/388373737	French	<a href="http://www.centres-antipoison.net/strasbourg/index.html">http://www.centres-antipoison.net/strasbourg/index.html</a>
<b>France - Toulouse</b>	 ☎+33/561777447	French	<a href="http://www.centres-antipoison.net/toulouse/index.html">http://www.centres-antipoison.net/toulouse/index.html</a>
<b>Ireland</b>	 ☎+353/18092166	English	<a href="http://www.poisons.ie/Public">http://www.poisons.ie/Public</a>
<b>Italy - Bergamo</b>	 ☎+39/800883300	Italian	Istituto Superiore di sanità – Preparati Pericolosi
<b>Italy - Firenze</b>	 ☎+39/0557947819	Italian	
<b>Italy - Milano</b>	 ☎+39/02-66101029	Italian	
<b>Italy - Pavia</b>	 ☎+39/0382-24444	Italian	
<b>Italy - Napoli</b>	 ☎+39/081-5453333	Italian	
<b>Italy - Foggia</b>	 ☎+39/800183459	Italian	
<b>Italy - Verona</b>	 ☎+39/800011858	Italian	
<b>Italy - Roma</b>	 ☎+39/06-49978000, ☎+39/06-3054343	Italian	
<b>Germany</b>	 ☎+49/112, ☎+49/116117	German	
<b>Germany - Berlin</b>	 ☎+49/3019240	German	<a href="https://giftnotruf.charite.de">https://giftnotruf.charite.de</a>
<b>Germany - Bonn</b>	 ☎+49/22819240	German	<a href="http://www.gizbonn.de/index.php?id=272">http://www.gizbonn.de/index.php?id=272</a>

















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National Centers		TELEFONE	LANGUAGE	Institution / website / email
Germany - Erfurt		+49/361730730	German	<a href="https://www.ggiz-erfurt.de/home.html">https://www.ggiz-erfurt.de/home.html</a>
Germany - Freiburg		+49/076119240	German	<a href="https://www.uniklinik-freiburg.de/giftberatung.html">https://www.uniklinik-freiburg.de/giftberatung.html</a>
Germany - Göttingen		+49/55119240	German	<a href="https://www.giz-nord.de/cms/index.php">https://www.giz-nord.de/cms/index.php</a>
Germany – Homburg/Saar		+49/684119240	German	<a href="http://www.uniklinikum-saarland.de/de/einrichtungen/kliniken_institute/kinder_und_jugendmedizin/informations_und_behandlungszentrum_fuer_vergiftungen_des_saarlandes">http://www.uniklinikum-saarland.de/de/einrichtungen/kliniken_institute/kinder_und_jugendmedizin/informations_und_behandlungszentrum_fuer_vergiftungen_des_saarlandes</a>
Germany – Mainz		+49/613119240	German	<a href="http://www.giftinfo.uni-mainz.de/index.php?id=24807">http://www.giftinfo.uni-mainz.de/index.php?id=24807</a>
Germany - München		+49/8919240	German	<a href="http://www.toxinfo.med.tum.de">http://www.toxinfo.med.tum.de</a>
Netherlands		+31/302748888	Dutch	<a href="http://www.productnotification.nl/">http://www.productnotification.nl/</a>
Poland - Kraków		+48/124119999	Polish	<a href="http://www.oit.cm.uj.edu.pl">http://www.oit.cm.uj.edu.pl</a>
Poland – Gdansk		+48/586820404	Polish	<a href="http://www.pctox.pl/news.php">http://www.pctox.pl/news.php</a>
Poland – Poznań		+48/618476946	Polish	<a href="http://www.raszeja.poznan.pl/oddzialy/oddzialtoksykologiczny">http://www.raszeja.poznan.pl/oddzialy/oddzialtoksykologiczny</a>
Poland - Warszawa		+48/607218174	Polish	<a href="mailto:okzit@burdpi.pol.pl">okzit@burdpi.pol.pl</a>
Austria		+43/14064343	German	Austrian Poison Information Centre (Vergiftungsinformationszentrale-VIZ)
Slovakia		+421/254652307	Slovak	<a href="http://www.ntic.sk">http://www.ntic.sk</a>
Spain		+34/915620420	Spanish	Servicio de Información Toxicológica (SIT) Instituto Nacional de Toxicología y Ciencias Forenses (INTCF) C/José Echegaray nº4, 28232 Las Rozas de Madrid Madrid <a href="mailto:sit@mju.es">sit@mju.es</a> / <a href="mailto:intcf@justicia.es">intcf@justicia.es</a>

**Prohlášení:** The material safety sheet has been prepared in compliance with Directive (EC) No. 1907/2006 REACH. It includes data that are necessary for securing occupational health and safety and the protection of the environment. These data have been provided in good faith, correspond to the current state of knowledge and experience and are in accordance with our valid legal regulations. The data provided does not replace the quality specification and can not be considered as a guarantee of the suitability and usability of this product for a specific application. It is the responsibility of the product user to assess the accuracy of the information in a particular application where the product's properties can influence different factors. The consumer is responsible for compliance with the appropriate, regionally valid legal regulations.

### ANNEX OF MATERIAL SAFETY DATA SHEET

#### EXPOSURE SCENARIOS ACCORDING TO ARTICLE 31 OF REGULATION (EC) NO 1907/2006 (REACH) OF THE EUROPEAN PARLIAMENT AND OF THE COUNCIL

The Annex contains exposure scenarios contained in **Chapter 9** of the chemical safety report dated 14.12.2023 (**numbering from CSR is maintained here below**) for identified uses of the substance generated by Chesar v3.7.

Exposure scenario	Title	Page
ES1 (M-1)	<b>Manufacture</b>	22
ES2 (F-1)	<b>Formulation &amp; (re)packing of substances and mixtures</b>	22
ES3 (IW-1)	<b>Use as an intermediate</b>	23
ES4 (IW-2)	<b>Use as a fuel</b>	23
ES5 (IW-3)	<b>Functional Fluids</b>	24
ES6 (IW-4)	<b>Use in Laboratories</b>	24
ES7 (IW-5)	<b>Rubber production and processing</b>	25
ES8 (IW-6)	<b>Polymer Processing</b>	25
ES9 (IW-7)	<b>Polymer Production</b>	26
ES10 (PW-1)	<b>Use as a fuel</b>	27
ES11 (PW-2)	<b>Functional fluids</b>	27
ES12 (PW-3)	<b>Use in laboratories</b>	28

M Manufacture; F Formulation; IW Industrial use – worker; PW Widespread use by professional workers

### 9.0.3. Introduction to the assessment for the environment

#### 9.0.3.1. Tonnage

Assessed tonnage: 1.91E7 tonnes/year based on:

- 2.3E7 tonnes/year manufactured
- 3.87E6 tonnes/year used as intermediate under strictly controlled conditions

The following table provides the tonnage per use and the local tonnages used in the assessment for each environmental contributing activity. The local tonnage corresponds to a tonnage at the site for uses taking place at industrial sites and to a tonnage assumed for a town of 10 000 inhabitants for widespread uses.

**Table 9.1. Tonnage for assessment**

ES#	Exposure scenario (ES) name and related environmental contributing scenarios	Tonnage per use (t/year)	Daily local tonnage (t/day)	Annual local tonnage (t/year)
ES1 (M)	Manufacture	2.3E7		
	- Manufacture (ERC 1)		2E3	1
ES2 (F)	Formulation & (re)packing of substances and mixtures	2.25E6		
	- Formulation (ERC 2)		100	1
ES3 (IS)	Use as an intermediate	4.1E6		
	- Use at industrial site (ERC 6a)		238	7.16E4

ES#	Exposure scenario (ES) name and related environmental contributing scenarios	Tonnage per use (t/year)	Daily local tonnage (t/day)	Annual local tonnage (t/year)
ES4 (IS)	Use as a fuel	1.35E4		
	- Use as a fuel (ERC 7)		16	1.35E3
ES5 (IS)	Functional Fluids	1E3		
	- Functional Fluids (ERC 7)		16	100
ES6 (IS)	Use in Laboratories	1E3		
	- Use in Laboratories (ERC 4)		4	100
ES7 (IS)	Rubber production and processing	2.7E6		
	- Use at industrial site (ERC 4)		3	870
ES8 (IS)	Polymer Processing	7E5		
	- Polymer Processing (ERC 6c)		41.67	1.25E4
ES9 (IS)	Polymer Production	8.12E6		
	- Polymer Production (ERC 6a)		2	328
ES10 (PW)	Use as a fuel	1.5E3		
	- Use as a fuel (ERC 9b)		8.25E-4	-
ES11 (PW)	Functional fluids	1E3		
	- Use by professional worker (ERC 9b)		5.5E-4	-
ES12 (PW)	Use in laboratories	1E3		
	- Use by professional worker (ERC 8a)		5.5E-4	-

### 9.0.3.2. Scope and type of assessment for the environment

Exposure assessment and risk characterisation are not required for the environment as no hazard has been identified for the environment.

### 9.0.3.3. Fate and distribution parameters

#### Physicochemical properties used for exposure estimation

The following substance properties are used in the fate estimation done by EUSES.

**Table 9.2. Substance key phys-chem and fate properties**

Substance property	Value
Molecular weight	>= 28.05
Molecular weight used for the assessment	28.05
Melting point at 101 325 Pa	-169. °C
Vapour pressure	212.4 kPa at -90 °C
Partition coefficient (Log Kow)	1.13 at 20 °C
Water solubility	131 mg/L at 25 °C
Henry's law constant (in Pa m <sup>3</sup> /mol)	0.162 at 25 °C

Substance property	Value
Biodegradation in water: screening tests	readily biodegradable
Bioaccumulation: BCF (aquatic species)	2.586 L/kg ww
Adsorption/Desorption: Koc at 20 °C	0.98

**Caution:** The exposure estimates have been obtained with EUSES although the following parameter(s) is/are outside the boundaries of the EUSES model:

- Adsorption/Desorption: Koc at 20 °C
- Melting point at 101 325 Pa
- Molecular weight used for the assessment

#### **Fate (release percentage) in the modelled biological sewage treatment plant**

In a standard (modelled) biological STP, the emissions are distributed in the following way:

Release to water	12.64%
Release to air	0.033%
Release to sludge	9.26E-3%
Release degraded	87.31%

The above fractions are calculated by the SIMPLETREAT model integrated in EUSES.

#### **9.0.3.4. Comments on assessment approach for the environment**

The local Predicted Exposure Concentrations (PECs) reported for each contributing scenario correspond to the sum of the local concentrations (Clocal) and the regional concentrations (PEC regional).

#### **9.0.3.5. Scope and type of assessment for man via environment**

Exposure assessment and risk characterisation are not required for man via the environment as no hazard has been identified for long term systemic effects.

### **9.0.4. Introduction to the assessment for workers**

#### **9.0.4.1. Scope and type of assessment for workers**

Exposure assessment and risk characterisation are not required for workers as no hazard has been identified for human health.

#### **9.0.4.2. Comments on assessment approach for workers**

##### **General information on risk management related to toxicological hazard:**

This general qualitative CSA approach aims to reduce/avoid contact or incidents with the substance. However, implementation of risk management measures (RMMs) and operational conditions (OCs) need to be proportional to the degree of concern for the health hazard presented by the substance. Exposures should be controlled to at least the levels that represent an acceptable level of risk, i.e. implementation of the chosen RMMs will ensure that the likelihood of an event occurring due to the hazard of the substance is negligible, and the risk is considered to be controlled to a level of no concern.

**For central nervous system depression (H336: May cause drowsiness or dizziness.)** a qualitative risk characterisation was conducted. A review of RMMs for handling and storage that would minimise risks indicates that if the user complies with the following generic statements, risks due to central nervous system depression can be considered to be adequately controlled:

*"INHALATION HAZARD - Avoid breathing dust/fume/ gas/mist/vapours/spray. Ensure area is well ventilated.*

*Minimise exposure by partial enclosure of the operation or equipment.”*

### **General information on risk management related to physicochemical hazard:**

#### **Qualitative Risk Assessment of Risks from Flammable GASES**

The accident scenarios relevant for REACH are minor accidents which might occur in the workplace and those related to consumer use. Major accidents caused by chemicals and the requirements to manage these risks are regulated under the Seveso II Directive and do not need to be considered.

Risks from the physicochemical hazards of substances can be controlled by implementing risk management measures tailored to each specific risk. For flammable substances the following measures need to be implemented to control the risks and to show that safe use can be accomplished. For all flammable substances classified as H220 safety data sheets should be made available in which the appropriate risk management measures are identified and communicated.

#### **Physicochemical Hazard Qualitative Risk Assessment**

A selection of the following organisational and technical measures should be taken to avoid ignition of flammable substances. These measures are suitable to prevent minor accidents which might occur at the workplace or during consumer use. Larger facilities manufacturing or using substances with flammable properties in significant quantities should follow the ATEX Directive (94/9/EC and 99/92/EC) to control risks arising from flammable substances and explosive atmospheres.

Based on the implementation of a selection of handling and storage risk management measures for the identified uses, we can conclude that there is no immediate concern as the risk is controlled to an acceptable level.

#### **Substance Handling and Transfer Preventative Measures**

- Avoid Splash Filling (Industrial) – N/A for Gases.
- Do NOT use compressed air for filling, discharging or handling operations (Industrial).
- Electrostatic charges may be generated during pumping. Electrostatic discharge may cause fire (Industrial).
- Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (< 1m.sec-1 until fill pipe submerged to twice its diameter, then < 7m.sec-1) (Industrial).
- Restrict line velocity during pumping in order to avoid generation of electrostatic discharge (<10m.sec-1) (Industrial).
- The vapour is heavier than air, spreads along the ground and distant ignition is possible (Industrial).
- If positive displacement pumps are used, these must be fitted with a non-integral pressure relief valve (Industrial).
- Use explosion-proof electrical/ventilating/ lighting and other equipment (Industrial).
- Use appropriate equipment for filling IBCs and other containers. IBCs and other containers must be constructed of appropriate material) (Industrial).
- Ensure electrical continuity by bonding and grounding (earthing) all equipment. (Industrial / Professional).
- Keep away from oxidising agents (Industrial/ Professional).
- Extinguish any naked flames. Do not smoke. Remove ignition sources. Avoid sparks (Industrial/ Professional).
- Handle and open container with care in a well-ventilated area (Industrial/ Professional).
- Avoid Overfilling (Industrial/ Professional).
- Do NOT empty into drains (Industrial/ Professional).

#### **Storage**

- Must be stored in a dike (bund) and well-ventilated area, away from sunlight, ignition sources and other sources of heat (Industrial).
- Storage Temperature: Ambient (Industrial).
- Keep away from flames, sources of ignition and hot surfaces. No smoking.
- Take precautionary measures against static discharges.
- Keep container in a well-ventilated place.
- Keep container tightly closed.

**Extremely Flammable Gas: H220 (Extremely flammable gas)**

For flammability a qualitative risk assessment was conducted and handling and storage risk management measures that are generally identified for flammability risks are outlined above. A review of these RMMs indicates that if the user complies with the following generic statement, risks due to flammability are considered to be controlled:

*“Risks are controlled by storage and use under conditions which avoid ignition sources.”*

**Exposure assessment and risk characterisation for workers (industrial and professional) and environment are not required (see scope under 9.0.3 and 9.0.4) for the following exposure scenarios (ES) including all contributing scenarios (Env CS and Worker CS):**

**9.1. Exposure scenario 1: Manufacture - Manufacture**

Environment contributing scenario(s):		
CS 1	Manufacture	ERC 1
Worker contributing scenario(s):		
CS 2	General Exposures (closed systems) [CS15]	PROC 1
CS 3	General Exposures (closed systems) [CS15]	PROC 2
CS 4	General Exposures (closed systems) [CS15]	PROC 3
CS 5	General Exposures (open systems) [CS16]	PROC 4
CS 6	Equipment cleaning and maintenance [CS39]	PROC 8a
CS 7	Process sampling [CS2]	PROC 8b
CS 8	Laboratory activities [CS36]	PROC 15
CS 9	Bulk transfers [CS14] (closed systems) [CS107]	PROC 8b
CS 10	Bulk transfers [CS14] (open systems) [CS108]	PROC 8b
CS 11	Storage [CS67]	PROC 1
CS 12	Storage [CS67]	PROC 2

**9.2. Exposure scenario 2: Formulation or re-packing - Formulation & (re)packing of substances and mixtures**

Environment contributing scenario(s):		
CS 1	Formulation	ERC 2
Worker contributing scenario(s):		
CS 2	General exposures (closed systems)[CS15]	PROC 1
CS 3	General exposures (closed systems) [CS15]	PROC 2
CS 4	General exposures (closed systems) [CS15]	PROC 3
CS 5	General exposures (open systems) [CS16]	PROC 4
CS 6	Batch processes at elevated temperatures [CS136] Use in contained batch processes [CS37]	PROC 3
CS 7	Process sampling [CS2]	PROC 3
CS 8	Laboratory activities [CS36]	PROC 15

CS 9	Bulk transfers [CS14] Dedicated facility [CS81]	PROC 8b
CS 10	Mixing operations (open systems) [CS30]	PROC 5
CS 11	Manual [CS34] Transfer from/pouring from containers [CS22] Non dedicated [CS82]	PROC 8a
CS 12	Drum/batch transfers [CS8] Dedicated facility [CS81]	PROC 8b
CS 13	Tabletting, compression, extrusion or pelletisation [CS100]	PROC 14
CS 14	Drum and small package filling [CS6]	PROC 9
CS 15	Equipment cleaning and maintenance [CS39]	PROC 8a
CS 16	Storage [CS67]	PROC 1
CS 17	Storage [CS67]	PROC 2

### 9.3. Exposure scenario 3: Use at industrial sites - Use as an intermediate

**Sector of use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products); SU 9: Manufacture of fine chemicals

Environment contributing scenario(s):		
CS 1	Use at industrial site	ERC 6a
Worker contributing scenario(s):		
CS 2	General Exposures (closed systems) [CS15]	PROC 1
CS 3	General Exposures (closed systems) [CS15]	PROC 2
CS 4	General Exposures (closed systems) [CS15]	PROC 3
CS 5	General exposures (open systems) [CS16]	PROC 4
CS 6	Equipment cleaning and maintenance [CS39]	PROC 8a
CS 7	Process sampling [CS2]	PROC 8b
CS 8	Laboratory activities [CS36]	PROC 15
CS 9	Bulk transfers [CS14] (closed system) [CS107]	PROC 8b
CS 10	Bulk transfers [CS14] (open system) [CS108]	PROC 8b
CS 11	Storage [CS67]	PROC 1
CS 12	Storage [CS67]	PROC 2

### 9.4. Exposure scenario 4: Use at industrial sites - Use as a fuel

**Product category used:** PC 13: Fuels

Environment contributing scenario(s):		
CS 1	Use as a fuel	ERC 7
Worker contributing scenario(s):		
CS 2	Bulk transfers [CS14].	PROC 4
CS 3	Drum batch transfer [CS8] Dedicated facility [CS81]	PROC 8b
CS 4	Bulk transfer [CS14] Dedicated facility [CS81]	PROC 8b
CS 5	General exposures (closed systems) [CS15]	PROC 1
CS 6	General exposures (closed systems) [CS15]. With occasional controlled exposure [CS137]	PROC 2

CS 7	General exposures (closed systems) [CS15]. Batch process [CS55].	PROC 3
CS 8	General exposures (open systems) [CS16].(closed systems) [CS107]	PROC 16
CS 9	General exposures (open systems) [CS16]. (closed systems) [CS107] Batch process [CS55].	PROC 3
CS 10	Equipment cleaning and maintenance [CS39]. Vessel and container cleaning [CS103]	PROC 8a
CS 11	Storage [CS67]	PROC 1
CS 12	Storage [CS67]. With occasional controlled exposure [CS137]	PROC 2

### 9.5. Exposure scenario 5: Use at industrial sites - Functional Fluids

**Product category used:** PC 16: Heat Transfer Fluids

Environment contributing scenario(s):		
CS 1	Functional Fluids	ERC 7
Worker contributing scenario(s):		
CS 2	Bulk transfers [CS14] (closed systems) [CS107]	PROC 1
CS 3	Bulk transfers [CS14] (closed systems) [CS107]. With occasional controlled exposure [CS137]	PROC 2
CS 4	Bulk transfers [CS14] (closed systems) [CS107]. Batch process [CS55].	PROC 3
CS 5	Bulk transfers [CS14] (closed systems) [CS107]	PROC 4
CS 6	Drum batch transfers [CS8] Dedicated facility [CS81]	PROC 8b
CS 7	Pelletizing [CS53]. (closed systems) [CS107]	PROC 9
CS 8	Filling/preparation of equipment from drums or containers [CS45] Non-dedicated facility [CS82]	PROC 8a
CS 9	General exposures (closed systems) [CS15]	PROC 2
CS 10	General exposures (open systems) [CS16]	PROC 4
CS 11	General exposures (open systems) [CS16] Elevated temperature [CS111]	PROC 4
CS 12	Remanufacture of reject articles [CS19]	PROC 9
CS 13	Equipment maintenance [CS5]	PROC 8a
CS 14	Storage [CS67]	PROC 1
CS 15	Storage [CS67] With occasional controlled exposure [CS137]	PROC 2

### 9.6. Exposure scenario 6: Use at industrial sites - Use in Laboratories

**Product category used:** PC 21: Laboratory Chemicals

Environment contributing scenario(s):		
CS 1	Use in Laboratories	ERC 4
Worker contributing scenario(s):		
CS 2	Laboratory activities [CS36]	PROC 15



CS 3	Cleaning [CS47]	PROC 10
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### 9.7. Exposure scenario 7: Use at industrial sites - Rubber production and processing

**Product category used:** PC 20: Products such as ph-regulators, flocculants, precipitants, neutralization agents

**Sector of use:** SU 8: Manufacture of bulk, large scale chemicals (including petroleum products)

Environment contributing scenario(s):		
CS 1	Use at industrial site	ERC 4
Worker contributing scenario(s):		
CS 2	Material transfers (CS3), (closed systems) [CS107]	PROC 1
CS 3	Material transfers [CS3] With occasional controlled exposure [CS137]	PROC 2
CS 4	Material transfers [CS3] Dedicated facility [CS81]	PROC 8b
CS 5	Rework of articles [CS86].	PROC 21
CS 6	Bulk weighing [CS91] Use in contained systems [CS38]	PROC 1
CS 7	Bulk weighing [CS91] With occasional controlled exposure [CS137]	PROC 2
CS 8	Small scale weighing [CS90]	PROC 9
CS 9	Additive premixing [CS92]	PROC 3
CS 10	Additive premixing [CS92]	PROC 4
CS 11	Additive premixing [CS92]	PROC 5
CS 12	Calendering (including banburys) [CS64] Operation is carried out at elevated temperature (>than 20 deg C above ambient temperature) [OC7]	PROC 6
CS 13	Pressing uncured rubber blanks [CS73]	PROC 14
CS 14	Vulcanisation [CS70] Operation is carried out at elevated temperature (> than 20 deg C above ambient temperature) [OC7]	PROC 6
CS 15	Cooling cured articles [CS71] Operation is carried out at elevated temperature (>than 20 deg C above ambient temperature) [OC7]	PROC 6
CS 16	Spraying [CS10]. Tyre build up [CS112]	PROC 7
CS 17	Laboratory activities [CS36]	PROC 15
CS 18	Production of articles by dipping and pouring [CS113]	PROC 13
CS 19	Equipment maintenance [CS5]	PROC 8a
CS 20	Storage [CS67]	PROC 1
CS 21	Storage [CS67] With occasional controlled exposure [CS137]	PROC 2

### 9.8. Exposure scenario 8: Use at industrial sites - Polymer Processing

**Product category used:** PC 32: Polymer Preparations and Compounds

Environment contributing scenario(s):		
CS 1	Polymer Processing	ERC 6d
Worker contributing scenario(s):		

CS 2	Bulk transfers [CS14]. (closed systems) [CS107]	PROC 1
CS 3	Bulk transfers [CS14]. (closed systems) [CS107]. With occasional controlled exposure [CS137]	PROC 2
CS 4	Bulk transfers [CS14]. Dedicated facility [CS81].	PROC 8b
CS 5	Bulk weighing [CS91]. (closed systems) [CS107].	PROC 1
CS 6	Bulk weighing [CS91]. With occasional controlled exposure [CS137]	PROC 2
CS 7	Small scale weighing [CS90]	PROC 9
CS 8	Additive premixing [CS92]. (closed systems) [CS107]	PROC 3
CS 9	Bulk transfers [CS14]. Drum/batch transfers [CS8].	PROC 8b
CS 10	Bulk transfers [CS14]. Small package filling [CS7].	PROC 9
CS 11	Calendering (including Banburys) [CS64]	PROC 6
CS 12	Production of articles by dipping and pouring [CS113].	PROC 13
CS 13	Extrusion and masterbatching [CS88]	PROC 14
CS 14	Injection moulding of articles [CS89]	PROC 14
CS 15	Equipment maintenance [CS5].	PROC 8a
CS 16	Storage [CS67]. With occasional controlled exposure [CS137]	PROC 2

### 9.9. Exposure scenario 9: Use at industrial sites - Polymer Production

**Product category used:** PC 32: Polymer Preparations and Compounds

Environment contributing scenario(s):		
CS 1	Polymer Production	ERC 6c
Worker contributing scenario(s):		
CS 2	General exposures (closed systems) [CS15].	PROC 1
CS 3	Polymerisation (bulk and batch) [CS65]	PROC 2
CS 4	Polymerisation (bulk and batch) [CS65]	PROC 3
CS 5	Bulk transfers [CS14].	PROC 8b
CS 6	Polymerisation (bulk and batch) [CS65]	PROC 3
CS 7	Finishing operations [CS102]	PROC 3
CS 8	Intermediate polymer storage [CS66]	PROC 4
CS 9	Additivation and stabilisation [CS69]	PROC 3
CS 10	Mixing in containers [CS23].	PROC 5
CS 11	Pelletizing [CS53].	PROC 6
CS 12	Pelletizing [CS53].	PROC 14
CS 13	Pelletisation and pellet screening [CS68]	PROC 8b
CS 14	Bulk transfers [CS14].	PROC 3
CS 15	Transport [CS58].	PROC 8b
CS 16	Equipment maintenance [CS5].	PROC 8a
CS 17	Storage [CS67]	PROC 2

### 9.10. Exposure scenario 10: Widespread use by professional workers - Use as a fuel

Product category used: PC 13: Fuels

Environment contributing scenario(s):		
CS 1	Use as a fuel	ERC 9b, ERC 9a
Worker contributing scenario(s):		
CS 2	Bulk transfer [CS14] Dedicated facility [CS81]	PROC 8b
CS 3	Drum batch transfer [CS8] Dedicated facility [CS81]	PROC 8b
CS 4	Refuelling [CS507]	PROC 8b
CS 5	Dipping, immersion and pouring [CS4].	PROC 8b
CS 6	General exposures (closed systems) [CS15]	PROC 1
CS 7	General exposures [CS15] With occasional controlled exposure [CS137]	PROC 2
CS 8	General exposures (open systems) [CS16]. (closed systems) [CS107] Batch process [CS55].	PROC 3
CS 9	General exposures (open systems) [CS16]. (closed systems) [CS107]	PROC 16
CS 10	Equipment cleaning and maintenance [CS39]	PROC 8a
CS 11	Vessel and container cleaning [CS103]	PROC 8a
CS 12	Storage [CS67]	PROC 1
CS 13	Storage [CS67] With occasional controlled exposure [CS137]	PROC 2

### 9.11. Exposure scenario 11: Widespread use by professional workers - Functional fluids

Product category used: PC 16: Heat Transfer Fluids

Environment contributing scenario(s):		
CS 1	Use by professional worker	ERC 9b, ERC 9a
Worker contributing scenario(s):		
CS 2	Drum batch transfers [CS8] Non-dedicated facility [CS82]	PROC 8a
CS 3	Transfer from/pouring from containers [CS22]	PROC 9
CS 4	Filling/preparation of equipment from drums or containers [CS45]	PROC 9
CS 5	General exposures (closed systems) [CS15]	PROC 1
CS 6	General exposures (closed systems) [CS15] With occasional controlled exposure [CS137]	PROC 2
CS 7	Use in contained batch processes [CS37].	PROC 3
CS 8	Operation of equipment containing engine oils and similar [CS26] (closed systems) [CS107]	PROC 20
CS 9	Operation of equipment containing engine oils and similar [CS26] (closed systems) [CS107] Elevated temperature [CS111]	PROC 20
CS 10	Remanufacture of reject articles [CS19]	PROC 9
CS 11	Equipment maintenance [CS5]	PROC 8a
CS 12	Storage [CS67]	PROC 1



# ETHYLENE

## SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006 (REACH), as amended

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CS 13 Storage [CS67] With occasional controlled exposure [CS137] PROC 2

### 9.12. Exposure scenario 12: Widespread use by professional workers - Use in laboratories

Product category used: PC 21: Laboratory Chemicals

Environment contributing scenario(s):		
CS 1	Use by professional worker	ERC 8a
Worker contributing scenario(s):		
CS 2	Laboratory activities [CS36]	PROC 15
CS 3	Cleaning [CS47]	PROC 10