



Safety Data Sheet

1 % 1,3-butadiene + 9 % n-pentane + 10 % isopentane + 40 % n-butane + 40 % isobutane, pressurized to 10 bar with helium

according to Regulation (EC) No. 453/2010

Date of issue: 08.08.2013

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Version: 1.3

SDS Ref.:

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Trade name : 1 % 1,3-butadiene + 9 % n-pentane + 10 % isopentane + 40 % n-butane + 40 % isobutane, pressurized to 10 bar with helium

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

Relevant identified uses : Industrial and professional. Perform risk assessment prior to use.
Test gas/Calibration gas.
Laboratory use.
Contact supplier for more information on uses.

Uses advised against : No additional information available

1.3. Details of the supplier of the safety data sheet

Company identification : Oy Woiikoski Ab
Virransalmentie 2023
52920 Voikoski Finland
+358 15 7700 700

E-Mail address (competent person) : info@woikoski.fi

1.4. Emergency telephone number

Country	Official advisory body	Address	Emergency number
FINLAND	Myrkytystietokeskus Giftnformationscentralen, Poison Information Centre	P.O.B 790 (Tukholmankatu 17) HUS SF - 00029 Helsinki	+358 9 471 977

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Flam. Gas 1 H220
Liquefied gas H280
Muta. 1B H340
Carc. 1A H350
Aquatic Chronic 3 H412

Classification according to Directive 67/548/EEC or 1999/45/EC

Carc.Cat.1; R45
Muta.Cat.2; R46
F+; R12

2.2. Label elements

Labelling according to Regulation (EC) No. 1272/2008 [CLP]

Hazard pictograms (CLP) :



GHS02

GHS04

GHS08

Signal word (CLP) : Danger

Hazardous ingredients : Butadiene 1,3

Hazard statements (CLP) : H220 - Extremely flammable gas
H280 - Contains gas under pressure; may explode if heated
H340 - May cause genetic defects
H350 - May cause cancer
H412 - Harmful to aquatic life with long lasting effects



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Precautionary statements (CLP) : P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking
P273 - Avoid release to the environment
P308+P313 - IF exposed or concerned: Get medical advice/attention
P377 - Leaking gas fire: Do not extinguish, unless leak can be stopped safely
P403 - Store in a well-ventilated place

2.3. Other hazards

: None.

SECTION 3: Composition/information on ingredients

3.1. Substances

Not applicable

3.2. Mixture

Name	Product identifier	%	Classification according to Directive 67/548/EEC	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Butane n-	(CAS No) 106-97-8 (EC no) 203-448-7 (EC index no) 601-004-00-0 (REACH-no) 01-2119474691-32	40	F+; R12	Flam. Gas 1, H220 Liquefied gas, H280
Isobutane	(CAS No) 75-28-5 (EC no) 200-857-2 (EC index no) 601-004-00-0 (REACH-no) 01-2119485395-27	40	F+; R12	Flam. Gas 1, H220 Liquefied gas, H280
Isopentane	(CAS No) 78-78-4 (EC no) 201-142-8 (EC index no) 601-085-00-2	10	Not classified	Flam. Liq. 1, H224 Asp. Tox. 1, H304 STOT SE 3, H336 Aquatic Chronic 2, H411
Pentane n-	(CAS No) 109-66-0 (EC no) 203-692-4 (EC index no) 601-006-00-1	9	F+; R12 Xn; R65 R66 R67 N; R51/53	Flam. Liq. 2, H225 Asp. Tox. 1, H304 STOT SE 3, H336 Aquatic Chronic 2, H411
Butadiene 1,3	(CAS No) 106-99-0 (EC no) 203-450-8 (EC index no) 601-013-00-X (REACH-no) 01-2119471988-16	1	Carc.Cat.1; R45 Muta.Cat.2; R46 F+; R12	Flam. Gas 1, H220 Carc. 1A, H350 Muta. 1B, H340 Liquefied gas, H280
Helium	(CAS No) 7440-59-7 (EC no) 231-168-5 (REACH-no) *1		Not classified	Compressed gas, H280

Full text of R-, H- and EUH-phrases: see section 16

Contains no other components or impurities which will influence the classification of the product.

*1: Listed in Annex IV / V REACH, exempted from registration.

*2: Registration deadline not expired.

*3: Registration not required: Substance manufactured or imported < 1t/y.

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
- Skin contact : For liquid spillage - flush with water for at least 15 minutes.
- Eye contact : Immediately flush eyes thoroughly with water for at least 15 minutes.
- Ingestion : Ingestion is not considered a potential route of exposure.



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

: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Refer to section 11.

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

: None.

SECTION 5: Firefighting measures

5.1. Extinguishing media

- Suitable extinguishing media : Water spray or fog.
- Unsuitable extinguishing media : Carbon dioxide.
Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

- Specific hazards : Exposure to fire may cause containers to rupture/explode.
- Hazardous combustion products : Incomplete combustion may form carbon monoxide.

5.3. Advice for fire-fighters

- Specific methods : Use fire control measures appropriate for the surrounding fire. Exposure to fire and heat radiation may cause gas receptacles to rupture. Cool endangered receptacles with water spray jet from a protected position. Prevent water used in emergency cases from entering sewers and drainage systems.
If possible, stop flow of product.
Use water spray or fog to knock down fire fumes if possible.
Do not extinguish a leaking gas flame unless absolutely necessary. Spontaneous/explosive re-ignition may occur. Extinguish any other fire.
- Special protective equipment for fire fighters : In confined space use self-contained breathing apparatus.
Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.
Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- : Try to stop release.
Evacuate area.
Monitor concentration of released product.
Consider the risk of potentially explosive atmospheres.
Eliminate ignition sources.
Ensure adequate air ventilation.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.

6.2. Environmental precautions

- : Try to stop release.

6.3. Methods and material for containment and cleaning up

- : Ventilate area.

6.4. Reference to other sections

- : See also sections 8 and 13.



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SECTION 7: Handling and storage

7.1. Precautions for safe handling

- Safe use of the product
- : The substance must be handled in accordance with good industrial hygiene and safety procedures.
 - Protect eyes, face and skin from liquid splashes.
 - Only experienced and properly instructed persons should handle gases under pressure.
 - Consider pressure relief device(s) in gas installations.
 - Ensure the complete gas system was (or is regularly) checked for leaks before use.
 - Do not smoke while handling product.
 - Avoid exposure, obtain special instructions before use.
 - Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.
 - Assess the risk of potentially explosive atmospheres and the need for explosion-proof equipment.
 - Purge air from system before introducing gas.
 - Take precautionary measures against static discharge.
 - Keep away from ignition sources (including static discharges).
 - Consider the use of only non-sparking tools.
- Safe handling of the gas receptacle
- : Refer to supplier's container handling instructions.
 - Do not allow backfeed into the container.
 - Protect cylinders from physical damage; do not drag, roll, slide or drop.
 - When moving cylinders, even for short distances, use a cart (trolley, hand truck, etc.) designed to transport cylinders.
 - Leave valve protection caps in place until the container has been secured against either a wall or bench or placed in a container stand and is ready for use.
 - If user experiences any difficulty operating cylinder valve discontinue use and contact supplier.
 - Never attempt to repair or modify container valves or safety relief devices.
 - Damaged valves should be reported immediately to the supplier.
 - Keep container valve outlets clean and free from contaminants particularly oil and water.
 - Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment.
 - Close container valve after each use and when empty, even if still connected to equipment.
 - Never attempt to transfer gases from one cylinder/container to another.
 - Never use direct flame or electrical heating devices to raise the pressure of a container.
 - Do not remove or deface labels provided by the supplier for the identification of the cylinder contents.
 - Containers should be stored in the vertical position and properly secured to prevent toppling.

7.2. Conditions for safe storage, including any incompatibilities

- : Observe all regulations and local requirements regarding storage of containers.
- Containers should not be stored in conditions likely to encourage corrosion.
- Container valve guards or caps should be in place.
- Containers should be stored in the vertical position and properly secured to prevent toppling.
- Stored containers should be periodically checked for general condition and leakage.
- Keep container below 50°C in a well ventilated place.
- Store containers in location free from fire risk and away from sources of heat and ignition.
- Keep away from combustible materials.
- Segregate from oxidant gases and other oxidants in store.
- All electrical equipment in the storage areas should be compatible with the risk of a potentially explosive atmosphere.

7.3. Specific end use(s)

- : None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Butadiene 1,3 (106-99-0)		
Finland	HTP-value (8h) (mg/m ³)	2,2 mg/m ³
Finland	HTP-value (8h) (ppm)	1 ppm



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Butane n- (106-97-8)		
Finland	HTP-value (8h) (mg/m ³)	1900 mg/m ³
Finland	HTP-value (8h) (ppm)	800 ppm
Finland	HTP-value (15 min)	2400 mg/m ³
Finland	HTP-value (15 min) (ppm)	1000 ppm

Isobutane (75-28-5)		
Finland	HTP-value (8h) (mg/m ³)	1900 mg/m ³
Finland	HTP-value (8h) (ppm)	800 ppm
Finland	HTP-value (15 min)	2400 mg/m ³
Finland	HTP-value (15 min) (ppm)	1000 ppm

Butadiene 1,3 (106-99-0)		
DNEL: Derived no effect level (Workers)		
Long-term - systemic effects, inhalation		2,21 mg/m ³ 1 ppm
Long-term - local effects, dermal		324 mg/kg bw/day

8.2. Exposure controls

8.2.1. Appropriate engineering controls

- : Product to be handled in a closed system and under strictly controlled conditions.
- Provide adequate general and local exhaust ventilation.
- Preferably use only permanent leak-tight installations (e.g. welded pipes).
- Systems under pressure should be regularly checked for leakages.
- Ensure exposure is below occupational exposure limits (where available).
- Alarm detectors should be used when toxic gases may be released.
- Keep concentrations well below lower explosion limits.
- Consider work permit system e.g. for maintenance activities.

8.2.2. Individual protection measures, e.g. personal protective equipment

- : A risk assessment should be conducted and documented in each work area to assess the risks related to the use of the product and to select the PPE that matches the relevant risk. The following recommendations should be considered:
 - PPE compliant to the recommended EN/ISO standards should be selected.
- Eye/face protection
 - : Wear safety glasses with side shields.
 - Wear goggles and a face shield when transfilling or breaking transfer connections.
 - Standard EN 166 - Personal eye-protection.
- Skin protection
 - Hand protection
 - : Wear working gloves when handling gas containers.
 - Standard EN 388 - Protective gloves against mechanical risk.
 - Other
 - : Consider the use of flame resistant anti-static safety clothing.
 - Standard EN ISO 14116 - Limited flame spread materials.
 - Standard EN ISO 1149-5 - Protective clothing: Electrostatic properties.
 - Wear safety shoes while handling containers.
 - Standard EN ISO 20345 - Personal protective equipment - Safety footwear.
- Respiratory protection
 - : Keep self contained breathing apparatus readily available for emergency use.
 - Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.
 - Self contained breathing apparatus is recommended, where unknown exposure may be expected, e.g. during maintenance activities on installation systems.
- Thermal hazards
 - : Wear cold insulating gloves when transfilling or breaking transfer connections.
 - Standard EN 511 - Cold insulating gloves.

8.2.3. Environmental exposure controls

- : Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.



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SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Appearance

- Physical state at 20°C / 101.3kPa : Gas
- Colour : Mixture contains one or more component(s) which have the following colour(s):
Colourless.

Odour : There may be no odour warning properties, odour is subjective and inadequate to warn of overexposure.

Mixture contains one or more component(s) which have the following odour(s):
Poor warning properties at low concentrations., Mildly aromatic., Stenchant often added.,
Sweetish., No odour warning properties.

Odour threshold : Odour threshold is subjective and inadequate to warn for overexposure.

pH value : Not applicable for gas-mixtures.

Molar mass : Not applicable for gas-mixtures.

Melting point : Not applicable for gas-mixtures.

Boiling point : Not applicable for gas-mixtures.

Critical temperature : No data available

Flash point : Not applicable for gas-mixtures.

Evaporation rate (ether=1) : Not applicable for gas-mixtures.

Flammability range [vol% in air] : Not applicable for gas-mixtures.

Vapour pressure [20°C] : Not applicable.

Relative density, gas (air=1) : Heavier than air.

Relative density, liquid (water=1) : No data available

Solubility in water [mg/l] : Solubility in water of component(s) of the mixture :
• Butadiene 1,3: 1025 mg/l • Butane n-: 88 mg/l • Isobutane: 54 mg/l • Helium: 1,5 mg/l

Partition coefficient n-octanol/water [log Kow] : Not applicable for gas-mixtures.

Auto-ignition temperature [°C] : No data available

Viscosity at 20°C : Not applicable.

Explosive Properties : Not applicable.

Oxidising Properties : None.

Coefficient of oxygen equivalency (Ci) : No data available

9.2. Other information

Other data : Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.

SECTION 10: Stability and reactivity

10.1. Reactivity

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

10.2. Chemical stability

: Stable under normal conditions.

10.3. Possibility of hazardous reactions

: Can form explosive mixture with air.
May react violently with oxidants.

10.4. Conditions to avoid

: Keep away from heat/sparks/open flames/hot surfaces. – No smoking.

10.5. Incompatible materials

: For additional information on compatibility refer to ISO 11114.



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10.6. Hazardous decomposition products

: Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity	: No toxicological effects from this product.
Skin corrosion/irritation	: No known effects from this product.
Serious eye damage/irritation	: No known effects from this product.
Respiratory or skin sensitisation	: No known effects from this product.
Germ cell mutagenicity	: May have mutagenic effect.
Carcinogenicity	: May have carcinogenic effect.
Toxic for reproduction : Fertility	: No known effects from this product.
Toxic for reproduction : unborn child	: No known effects from this product.
STOT-single exposure	: No known effects from this product.
STOT-repeated exposure	: No known effects from this product.
Aspiration hazard	: Not applicable for gases and gas-mixtures.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : Harmful to aquatic life with long lasting effects.

Butadiene 1,3 (106-99-0)

EC50 48h - Daphnia magna [mg/l]	24 mg/l
EC50 72h Algae [mg/l]	11 mg/l
LC50-96 h - fish [mg/l]	43 mg/l

Butane n- (106-97-8)

EC50 48h - Daphnia magna [mg/l]	14,2 mg/l
EC50 72h Algae [mg/l]	7,7 mg/l
LC50-96 h - fish [mg/l]	24,1 mg/l

Isobutane (75-28-5)

EC50 48h - Daphnia magna [mg/l]	16,3 mg/l
EC50 72h Algae [mg/l]	8,6 mg/l
LC50-96 h - fish [mg/l]	28 mg/l

12.2. Persistence and degradability

1 % 1,3-butadiene + 9 % n-pentane + 10 % isopentane + 40 % n-butane + 40 % isobutane, pressurized to 10 bar with helium

Persistence and degradability : No data available.

Butadiene 1,3 (106-99-0)

Persistence and degradability : Not readily biodegradable.

Butane n- (106-97-8)

Persistence and degradability : The substance is biodegradable. Unlikely to persist.

Isobutane (75-28-5)

Persistence and degradability : The substance is biodegradable. Unlikely to persist.

Helium (7440-59-7)

Persistence and degradability : No ecological damage caused by this product.

12.3. Bioaccumulative potential

1 % 1,3-butadiene + 9 % n-pentane + 10 % isopentane + 40 % n-butane + 40 % isobutane, pressurized to 10 bar with helium

Log Pow	Not applicable for gas-mixtures.
Log Kow	Not applicable for gas-mixtures.
Bioaccumulative potential	No data available.



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Butadiene 1,3 (106-99-0)	
Log Pow	1,99
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.
Butane n- (106-97-8)	
Log Pow	2,89
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.
Isobutane (75-28-5)	
Log Pow	2,76
Bioaccumulative potential	Not expected to bioaccumulate due to the low log Kow (log Kow < 4). Refer to section 9.
Helium (7440-59-7)	
Log Pow	Not applicable for inorganic gases.
Bioaccumulative potential	No ecological damage caused by this product.

12.4. Mobility in soil

1 % 1,3-butadiene + 9 % n-pentane + 10 % isopentane + 40 % n-butane + 40 % isobutane, pressurized to 10 bar with helium	
Mobility in soil	No data available.
Butadiene 1,3 (106-99-0)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.
Butane n- (106-97-8)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.
Isobutane (75-28-5)	
Ecology - soil	Because of its high volatility, the product is unlikely to cause ground or water pollution.
Helium (7440-59-7)	
Ecology - soil	No ecological damage caused by this product.

12.5. Results of PBT and vPvB assessment

No data available.

12.6. Other adverse effects

Effect on ozone layer : None.
Ozone depletion factor [R11=1] : No additional information available
Global warming potential [CO2=1] : No additional information available
Effect on the global warming : No known ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.
Avoid discharge to atmosphere.
Do not discharge into areas where there is a risk of forming an explosive mixture with air. Waste gas should be flared through a suitable burner with flash back arrestor.
Do not discharge into any place where its accumulation could be dangerous.
Ensure that the emission levels from local regulations or operating permits are not exceeded.
Refer to the EIGA code of practice Doc.30 "Disposal of Gases", downloadable at <http://www.eiga.org> for more guidance on suitable disposal methods.

List of hazardous wastes : 16 05 04: Gases in pressure containers (including halons) containing dangerous substances.

13.2. Additional information

: None.

SECTION 14: Transport information

In accordance with ADR / RID / ADNR / IMDG / ICAO / IATA

14.1. UN number

UN-No. : 3161

14.2. UN proper shipping name



1 % 1,3-butadiene + 9 % n-pentane + 10 %
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Proper Shipping Name : LIQUEFIED GAS, FLAMMABLE, N.O.S.
Transport document description : UN 3161 LIQUEFIED GAS, FLAMMABLE, N.O.S. (Isobutane, Butadiene 1,3), 2, (B/D)

14.3. Transport hazard class(es)

Class (UN) : 2

14.4. Packing group

Not applicable

14.5. Environmental hazards

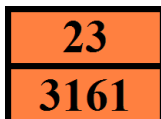
IMDG-Marine pollutant : No
Environmental hazards : None.
Other information : No supplementary information available.

14.6. Special precautions for user

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

14.6.1. Overland transport

Hazard identification number (Kemler No.) : 23
Classification code (UN) : 2F
Orange plates :



Special provision (ADR) : 274
Transport category (ADR) : 2
Tunnel restriction code : B/D
Limited quantities (ADR) : 0
Excepted quantities (ADR) : E0

14.6.2. Transport by sea

No additional information available

14.6.3. Air transport

No additional information available

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

No additional information available

SECTION 15: Regulatory information

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

EU-Regulations

No REACH Annex XVII restrictions
Contains no REACH candidate substance
Restrictions on use : Restricted to professional users (Annex XVII REACH).
Seveso directive 96/82/EC : Covered.

National regulations

National legislation : Ensure all national/local regulations are observed.



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Water hazard class (WGK) : -

15.2. Chemical safety assessment

A CSA does not need to be carried out for this product.

SECTION 16: Other information

Indication of changes : Revised safety data sheet in accordance with commission regulation (EU) No 453/2010.

Training advice : Ensure operators understand the flammability hazard. Receptacle under pressure.

Other information : This Safety Data Sheet has been established in accordance with the applicable European Union legislation. Classification in accordance with calculation methods of regulation (EC) 1272/2008 CLP / (EC) 1999/45 DPD.

Full text of R-, H- and EUH-phrases:

Aquatic Chronic 2	Hazardous to the aquatic environment - Chronic Hazard Category 2
Aquatic Chronic 3	Hazardous to the aquatic environment - Chronic Hazard Category 3
Asp. Tox. 1	Aspiration hazard Category 1
Carc. 1A	Carcinogenicity Category 1A
Compressed gas	Gases under pressure Compressed gas
Flam. Gas 1	Flammable gases Category 1
Flam. Liq. 1	Flammable liquids Category 1
Flam. Liq. 2	Flammable liquids Category 2
Liquefied gas	Gases under pressure Liquefied gas
Muta. 1B	Germ cell mutagenicity Category 1B
STOT SE 3	Specific target organ toxicity (single exposure) Category 3
H220	Extremely flammable gas
H224	Extremely flammable liquid and vapour
H225	Highly flammable liquid and vapour
H280	Contains gas under pressure; may explode if heated
H304	May be fatal if swallowed and enters airways
H336	May cause drowsiness or dizziness
H340	May cause genetic defects
H350	May cause cancer
H411	Toxic to aquatic life with long lasting effects
H412	Harmful to aquatic life with long lasting effects
R12	Extremely flammable
R45	May cause cancer
R46	May cause heritable genetic damage
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment
R65	Harmful: may cause lung damage if swallowed
R66	Repeated exposure may cause skin dryness or cracking
R67	Vapours may cause drowsiness and dizziness
F+	Extremely flammable
N	Dangerous for the environment
Xn	Harmful

DISCLAIMER OF LIABILITY : Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Details given in this document are believed to be correct at the time of going to press.
Whilst proper care has been taken in the preparation of this document, no liability for injury or damage resulting from its use can be accepted.