Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Compressed air

SDS reference: 00000_GAS

Warning

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

1.1. Product identifier

Trade name : Compressed air

SDS no : 00000_GAS

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

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

Uses advised against : None.

1.3. Details of the supplier of the safety data sheet

Company identification : SIAD S.p.A.
Via San Bernardino, 92
I-24126 Bergamo Italia
+39 035 328111
www.siad.com
siad_reach_clp@siad.com

1.4. Emergency telephone number

Emergency telephone number : Linea verde S.E.T. - from Italy 800452661 - International +39 0362512868 - 24 hours a day, 365 days a year

SECTION 2: hazards identification

2.1. Classification of the substance or mixture

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

Physical hazards	Gases under pressure : Compressed gas	H280

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS04

Signal word (CLP) : Warning

Hazard statements (CLP) : H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP)

- Storage : P403 - Store in a well-ventilated place.

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Compressed air

SDS reference: 00000_GAS

2.3. Other hazards

: None.

SECTION 3: composition/information on ingredients

3.1. Substances : Not applicable

3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Nitrogen	(CAS-No.) 7727-37-9 (EC-No.) 231-783-9 (EC Index-No.) (REACH-no) *1	79	Press. Gas (Comp.), H280
Oxygen	(CAS-No.) 7782-44-7 (EC-No.) 231-956-9 (EC Index-No.) 008-001-00-8 (REACH-no) *1	21	Ox. Gas 1, H270 Press. Gas (Comp.), H280

Full text of H-statements: 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 : Adverse effects not expected from this product.
- Skin contact : Adverse effects not expected from this product.
- Eye contact : Adverse effects not expected from this product.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

: 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 : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Specific hazards	:	Supports combustion. Exposure to fire may cause containers to rupture/explode.
Hazardous combustion products	:	None.

5.3. Advice for firefighters

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. Move containers away from the fire area if this can be done without risk.
Special protective equipment for fire fighters	:	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.

SECTION 6: accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

: Try to stop release.
Evacuate area.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Ensure adequate air ventilation.
Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous.
Act in accordance with local emergency plan.
Oxygen detectors should be used when asphyxiating gases may be released.

6.2. Environmental precautions

: Try to stop release.

6.3. Methods and material for containment and cleaning up

: None.

6.4. Reference to other sections

: See also sections 8 and 13.

SECTION 7: handling and storage

7.1. Precautions for safe handling

Safe use of the product	:	The product must be handled in accordance with good industrial hygiene and safety procedures. 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 regularily) checked for leaks before use. Do not smoke while handling product. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Use only oxygen approved lubricants and oxygen approved sealings. Avoid suck back of water, acid and alkalis. Do not breathe gas.

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Compressed air

SDS reference: 00000_GAS

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. Suck back of water into the container must be prevented. Open valve slowly to avoid pressure shock.

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 them from falling over.
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.

7.3. Specific end use(s)

: None.

SECTION 8: exposure controls/personal protection

8.1. Control parameters

Nitrogen (7727-37-9)
OEL : Occupational Exposure Limits

Belgium	Remark (BE)	A: La mention A signifie que l'agent libère un gaz ou une vapeur qui n'ont en eux-mêmes aucun effet physiologique mais peuvent diminuer le taux d'oxygène dans l'air. Lorsque le taux d'oxygène descend en dessous de 17-18 % (vol/vol) le manque d'oxygène provoque des suffocations qu'aucun symptôme préalable n'annonce. # De vermelding A betekent dat dit agens gas of damp vrijgeeft dat of die op zich geen fysiologische werking heeft, maar het zuurstofgehalte in de lucht verlaagt. Wanneer het zuurstofgehalte daalt onder de 17-18 % (vol/vol), veroorzaakt het zuurstoftekort verstikking, die zich manifesteert zonder dat er een waarschuwing aan voorafgaat.
ACGIH	Remark (ACGIH)	Simple Asphyxiant

Spain	NotesNotes	b (Asfixiantes simples. Ciertos gases y vapores presentes en el aire actúan desplazando al oxígeno y disminuyendo su concentración en el aire, sin efecto toxicológico. Estas sustancias no tienen un valor límite ambiental asignado y el único factor limitador de la concentración viene dado por el oxígeno disponible en el aire, que debe ser al menos del 19,5 % de O2 equivalente a nivel del mar. Este valor proporciona una cantidad adecuada de oxígeno para la mayoría de los trabajos realizados, incluyendo un margen de seguridad).
Switzerland	Remark (CH)	s. 1.8.2
Finland	Huomautus (FI)	liite 4 (HAPPEA SYRJÄYTTÄMÄLLÄ TUKEHDUTTAVAT KAASUT)
Ireland	Notes (IE)	Asphx.

DNEL (Derived-No Effect Level) : None available.

PNEC (Predicted No-Effect Concentration) : None available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls

: Provide adequate general and local exhaust ventilation.
Systems under pressure should be regularly checked for leakages.
Consider the use of a 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.
Standard EN 166 - Personal eye-protection - specifications.

• Skin protection

- Hand protection : Wear working gloves when handling gas containers.
Standard EN 388 - Protective gloves against mechanical risk.

- Other : Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• Respiratory protection : Self contained breathing apparatus (SCBA) or positive pressure airline with mask are to be used in oxygen-deficient atmospheres.
Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

• Thermal hazards : None in addition to the above sections.

8.2.3. Environmental exposure controls

: None necessary.

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.

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Compressed air

SDS reference: 00000_GAS

Odour	:	Odourless.
Odour threshold	:	Odour threshold is subjective and inadequate to warn of overexposure.
pH	:	Not applicable for gases and gas mixtures.
Melting point / Freezing point	:	Not known.
Boiling point	:	Not known.
Flash point	:	Not applicable for gases and gas mixtures.
Evaporation rate	:	Not applicable for gases and gas mixtures.
Flammability (solid, gas)	:	Non flammable.
Explosive limits	:	Non flammable.
Vapour pressure [20°C]	:	Not applicable.
Vapour pressure [50°C]	:	Not applicable.
Vapour density	:	Not applicable.
Relative density, liquid (water=1)	:	Not applicable.
Relative density, gas (air=1)	:	1
Water solubility	:	Not known, but considered to have low solubility.
Partition coefficient n-octanol/water (Log Kow)	:	Not applicable for inorganic gases.
Auto-ignition temperature	:	Non flammable.
Decomposition temperature	:	Not applicable.
Viscosity	:	Not known.
Explosive properties	:	Not applicable.
Oxidising properties	:	Not applicable.

9.2. Other information

Molar mass	:	29 g/mol
Critical temperature [°C]	:	Not known.

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

: None.

10.4. Conditions to avoid

: Avoid moisture in installation systems.

10.5. Incompatible materials

: None.

For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

: None.

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	:	No known effects from this product.
Carcinogenicity	:	No known effects from this product.
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

Assessment	:	No ecological damage caused by this product.
EC50 48h - Daphnia magna [mg/l]	:	No data available.
EC50 72h - Algae [mg/l]	:	No data available.
LC50 96 h - fish [mg/l]	:	No data available.

12.2. Persistence and degradability

Assessment	:	No ecological damage caused by this product.

12.3. Bioaccumulative potential

Assessment	:	No ecological damage caused by this product.

12.4. Mobility in soil

Assessment	:	No ecological damage caused by this product.

12.5. Results of PBT and vPvB assessment

Assessment	:	Not classified as PBT or vPvB.

12.6. Other adverse effects

Other adverse effects	:	No known effects from this product.
Effect on the ozone layer	:	None.
Effect on global warming	:	No known effects from this product.

SECTION 13: disposal considerations

13.1. Waste treatment methods

May be vented to atmosphere.

Return unused product in original cylinder to supplier.

List of hazardous waste codes (from Commission Decision 2001/118/EC)	:	16 05 05 : Gases in pressure containers other than those mentioned in 16 05 04.

13.2. Additional information

: External treatment and disposal of waste should comply with applicable local and/or national regulations.

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Compressed air

SDS reference: 00000_GAS

SECTION 14: transport information

14.1. UN number

UN-No. : 1002

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : AIR, COMPRESSED

Transport by air (ICAO-TI / IATA-DGR) : Air, compressed

Transport by sea (IMDG) : AIR, COMPRESSED

14.3. Transport hazard class(es)

Labelling :

2.2 : Non-flammable, non-toxic gases.

Transport by road/rail (ADR/RID)

Class : 2

Classification code : 1A

Hazard identification number : 20

Tunnel Restriction : E - Passage forbidden through tunnels of category E

Transport by air (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s)) : 2.2

Transport by sea (IMDG)

Class / Div. (Sub. risk(s)) : 2.2

Emergency Schedule (EmS) - Fire : F-C

Emergency Schedule (EmS) - Spillage : S-V

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable

Transport by air (ICAO-TI / IATA-DGR) : Not applicable

Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.

Transport by air (ICAO-TI / IATA-DGR) : None.

Transport by sea (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID) : P200

Transport by air (ICAO-TI / IATA-DGR)

Passenger and Cargo Aircraft : 200.

Cargo Aircraft only : 200.

Transport by sea (IMDG) : P200

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.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

: Not applicable.

SECTION 15: regulatory information

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

EU-Regulations

Restrictions on use	:	None.
Seveso Directive : 2012/18/EU (Seveso III)	:	Not covered.

National regulations

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

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 2015/830.
Abbreviations and acronyms	:	ATE - Acute Toxicity Estimate CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008 REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006 EINECS - European Inventory of Existing Commercial Chemical Substances CAS# - Chemical Abstract Service number PPE - Personal Protection Equipment LC50 - Lethal Concentration to 50 % of a test population RMM - Risk Management Measures PBT - Persistent, Bioaccumulative and Toxic vPvB - Very Persistent and Very Bioaccumulative STOT- SE : Specific Target Organ Toxicity - Single Exposure CSA - Chemical Safety Assessment EN - European Standard UN - United Nations ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road IATA - International Air Transport Association IMDG code - International Maritime Dangerous Goods RID - Regulations concerning the International Carriage of Dangerous Goods by Rail
Training advice	:	None.

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Compressed air

SDS reference: 00000_GAS

Full text of H- and EUH-statements

Ox. Gas 1	Oxidising Gases, Category 1
Press. Gas (Comp.)	Gases under pressure : Compressed gas
H270	May cause or intensify fire; oxidizer
H280	Contains gas under pressure; may explode if heated

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.

End of document

SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended.

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

1.1 Product identifier

Product name: KAELTEMASCHINENOEL BSE 32

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

Identified uses: Lubricant
Uses advised against: No uses advised against identified.

1.3 Details of the supplier of the safety data sheet

Manufacturer / Supplier	Fuchs Schmierstoffe GmbH Friesenheimer Str. 19 68169 Mannheim
Telephone:	+49 621 3701-0 (ZENTRALE)
Fax:	+49 621 3701-570

Contact for request of safety data sheets

E-mail:	Automotive lubricants	automotive-FS@fuchs.com
	Industrial lubricants	industrie-FS@fuchs.com
Telephone:	+49 621 3701-0 (ZENTRALE)	
Fax:	+49 621 3701-570	

Informing department for safety data sheets

E-mail:	produktsicherheit-FS@fuchs.com
Telephone:	+49 621 3701-1333
Fax:	+49 621 3701-7303

1.4 Emergency telephone number: +49 621 3701-1333 / +49 621 3701-0 (Mo-Do 8-17, Fr 8-16)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

The product has not been classified as hazardous and does not need to be labelled according to regulation (EU) no 1272/2008 (CLP).

Classification according to Regulation (EC) No 1272/2008 as amended.

Hazard summary
Physical Hazards: No data available.

2.2 Label Elements Not applicable

2.3 Other hazards: By handling of mineral oil products and chemical products no particular hazard is known when normal precautions (item 7) and personal protective equipment (item 8) are kept. The product may not be released into the environment without control.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

General information: Mixture of synthetic base oils with additives. The components are not hazardous or are below required disclosure limits. No hazardous ingredients.

SECTION 4: First aid measures

General: Instantly remove any clothing soiled by the product.

4.1 Description of first aid measures

Inhalation: Supply fresh air; consult doctor in case of symptoms.

Eye contact: Promptly wash eyes with plenty of water while lifting the eye lids.

Skin Contact: Wash with soap and water.

Ingestion: Rinse mouth thoroughly.

4.2 Most important symptoms and effects, both acute and delayed: May cause skin and eye irritation.

4.3 Indication of any immediate medical attention and special treatment needed Get medical attention if symptoms occur.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: CO2, fire extinguishing powder or fog like water spraying. Extinguish larger fires with alcohol resistant foam or spray water with suitable surfactant added

Unsuitable extinguishing media: Water with a full water jet.

5.2 Special hazards arising from the substance or mixture:	During fire, gases hazardous to health may be formed.
5.3 Advice for firefighters	
Special fire fighting procedures:	Move container from fire area if it can be done without risk. Dispose of fire debris and contaminated fire fighting water inaccordance with official regulations. Collect contaminated fire fighting water separately. It must not enter drains.
Special protective equipment for fire-fighters:	Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:	In case of spills, beware of slippery floors and surfaces.
6.2 Environmental Precautions:	Prevent from spreading (e.g. by binding or oil barriers). Avoid release to the environment. Environmental manager must be informed of all major spillages. Prevent further leakage or spillage if safe to do so. Do not allow to enter drainage system, surface or ground water.
6.3 Methods and material for containment and cleaning up:	Absorb with liquid-binding material (sand, diatomite, acidbinders, universal binders, sawdust). Dispose of the material collected according to regulations. Stop the flow of material, if this is without risk.
6.4 Reference to other sections:	See Section 8 of the SDS for Personal Protective Equipment. See Section 7 for information on safe handling See Section 13 for information on disposal.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling:	Prevent formation of aerosols. Do not eat, drink or smoke when working with the product. Take usual precautions when handling mineral oil products or chemical products. Observe good industrial hygiene practices. Provide adequate ventilation.
7.2 Conditions for safe storage, including any incompatibilities:	Local regulations concerning handling and storage of waterpolluting products have to be followed. Do not heat up to temperatures close to the flash point.
7.3 Specific end use(s):	Not applicable
Storage Class:	10, Combustible liquids

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

8.2 Exposure controls

Appropriate engineering controls:

Provide adequate ventilation. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

General information:

Wash hands before breaks and after work. Use personal protective equipment as required. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment. The usual precautionary measures should be adhered to inhandling the chemicals or the mineral oil products.

Eye/face protection:

Safety glasses (EN 166) recommended during refilling.

Skin protection

Hand Protection:

Material: Nitrile butyl rubber (NBR).
Min. Breakthrough time: >= 480 min
Recommended thickness of the material: >= 0,38 mm

Avoid long-term and repeated skin contact. Suitable gloves can be recommended by the glove supplier. Use skin protection cream for preventive skin protection. Protective gloves, where permitted in acc. to safety directions. The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.

Other:

Do not carry cleaning cloths impregnated with the product in trouser pockets. Wear suitable protective clothing.

Respiratory Protection:

Ensure good ventilation/exhaustion at the workplace. Avoid breathing vapour/ aerosol.

Thermal hazards:

Not known.

Hygiene measures:

Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.

Environmental Controls:

No data available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	
Physical state:	liquid
Form:	liquid
Color:	Pale yellow
Odor:	Characteristic
Odor Threshold:	Not applicable for mixtures
pH:	Not applicable
Freezing point:	-57 °C
Boiling Point:	Value not relevant for classification
Flash Point:	250 °C
Evaporation Rate:	Not applicable for mixtures
Flammability (solid, gas):	Value not relevant for classification
Flammability Limit - Upper (%)–:	Value not relevant for classification
Flammability Limit - Lower (%)–:	Value not relevant for classification
Vapor pressure:	Not applicable for mixtures
Vapor density (air=1):	Not applicable for mixtures
Density:	1,00 g/cm3 (15 °C)
Solubility(ies)	
Solubility in Water:	Insoluble in water
Solubility (other):	No data available.
Partition coefficient (n-octanol/water):	Not applicable for mixtures
Autoignition Temperature:	Value not relevant for classification
Decomposition Temperature:	Value not relevant for classification
Kinematic viscosity:	32,1 mm2/s (40 °C)
Explosive properties:	Value not relevant for classification
Oxidizing properties:	Value not relevant for classification

9.2 Other information No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity:	Stable under normal use conditions.
10.2 Chemical Stability:	Stable under normal use conditions.
10.3 Possibility of hazardous reactions:	Stable under normal use conditions.
10.4 Conditions to avoid:	Stable under normal use conditions.
10.5 Incompatible Materials:	Strong oxidizing substances. Strong acids. Strong bases.
10.6 Hazardous Decomposition Products:	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Oral
Product:
Not classified for acute toxicity based on available data.

Dermal
Product:
Not classified for acute toxicity based on available data.

Inhalation
Product:
Not classified for acute toxicity based on available data.

Skin Corrosion/Irritation:
Product: Based on available data, the classification criteria are not met.

Serious Eye Damage/Eye Irritation:
Product: Based on available data, the classification criteria are not met.

Respiratory or Skin Sensitization:
Product: Skin sensitizer: Based on available data, the classification criteria are not met.
Respiratory sensitizer: Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity
Product: Based on available data, the classification criteria are not met.

Carcinogenicity
Product: Based on available data, the classification criteria are not met.

Reproductive toxicity
Product: Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure
Product: Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure
Product: Based on available data, the classification criteria are not met.

Aspiration Hazard
Product: Based on available data, the classification criteria are not met.

Other adverse effects: No data available.

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity

Product: Based on available data, the classification criteria are not met.

Chronic ToxicityProduct: Based on available data, the classification criteria are not met.

12.2 Persistence and Degradability

Biodegradation

Product: Not applicable for mixtures

12.3 Bioaccumulative potential

Product: Not applicable for mixtures

12.4 Mobility in soil:

Product: Not applicable for mixtures

12.5 Results of PBT and vPvB assessment: The product does not contain any substances fulfilling the PBT/vPvB criteria.

12.6 Other adverse effects: No data available.

Water Hazard Class (WGK): WGK 1: slightly water-endangering.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: Dispose in accordance with all applicable regulations.

Disposal methods: Do not empty into drains; dispose of this material and its container in a safe way. When storing used products, ensure that the waste categories and mixing instructions are observed.

European Waste Codes

13 02 08*: other engine, gear and lubricating oils

SECTION 14: Transport information

ADR/RID

14.1 UN Number:	–
14.2 UN Proper Shipping Name:	–
14.3 Transport Hazard Class(es)	
Class:	Non-dangerous goods
Label(s):	–
Hazard No. (ADR):	–
Tunnel restriction code:	–
14.4 Packing Group:	–
14.5 Environmental hazards:	–
14.6 Special precautions for user:	–

ADN

14.1 UN Number:	–
14.2 UN Proper Shipping Name:	–
14.3 Transport Hazard Class(es)	
Class:	Non-dangerous goods
Label(s):	–
14.3 Packing Group:	–
14.5 Environmental hazards:	–
14.6 Special precautions for user:	–

IMDG

14.1 UN Number:	–
14.2 UN Proper Shipping Name:	–
14.3 Transport Hazard Class(es)	
Class:	Non-dangerous goods
Label(s):	–
EmS No.:	–
14.3 Packing Group:	–
14.5 Environmental hazards:	–
14.6 Special precautions for user:	–

IATA

14.1 UN Number:	–
14.2 Proper Shipping Name:	–
14.3 Transport Hazard Class(es):	
Class:	Non-dangerous goods
Label(s):	–
14.4 Packing Group:	–
14.5 Environmental hazards:	–
14.6 Special precautions for user:	–

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: Not applicable.

SECTION 15: Regulatory information

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

National Regulations

Water Hazard Class (WGK):	WGK 1: slightly water-endangering.
15.2 Chemical safety assessment:	No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Revision Information:	Vertical lines in the margin indicate an amendment.

Wording of the H-statements in section 2 and 3

none

Training information:	Follow training instructions when handling this material.
Other information:	The classification complies with the current EU lists; however, it has been supplemented with expert literature information and information provided by/about our company. It was derived from the test data and/or the application of the conventional method. The classification complies with the current EU lists; however, it has been supplemented with expert literature information and information provided by/about our company. It was derived from the test data and/or the application of the conventional method.
Revision Date:	17.04.2020
Disclaimer:	The data contained in this safety data sheet are based on our current knowledge and experience and are given to the best of our knowledge and belief. It characterizes the product only with regard to safety requirements for handling, transport and disposal. The data do not describe the product's properties (tech. product specification). Neither should any agreed property nor the suitability of the product for any specific technical application be deduced from the data contained in this safety data sheet. Modifications on this document are not allowed. The data are not transferable to other products. In the case of mixing the product with other products or in the case of processing, the data in this safety data sheet are not necessarily valid for the new-made material. It is the responsibility of the recipient of the product to observe federal, state and local law. Please contact us to obtain up-to-date safety data sheets. This document was issued electronically and has no signature.

SAFETY DATA SHEET

According to Regulation (EC) No. 1907/2006 (REACH) Article 31, Annex II as amended.

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

1.1 Product identifier

Product name: KAELTEMASCHINENOEL BSE 60 K

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

Identified uses: Lubricant
Uses advised against: No uses advised against identified.

1.3 Details of the supplier of the safety data sheet

Manufacturer / Supplier	Fuchs Schmierstoffe GmbH Friesenheimer Str. 19 68169 Mannheim	
Telephone:	+49 621 3701-0 (ZENTRALE)	
Fax:	+49 621 3701-570	

Contact for request of safety data sheets

E-mail:	Automotive lubricants	automotive-FS@fuchs.com
	Industrial lubricants	industrie-FS@fuchs.com
Telephone:	+49 621 3701-0 (ZENTRALE)	
Fax:	+49 621 3701-570	

Informing department for safety data sheets

E-mail:	produktsicherheit-FS@fuchs.com
Telephone:	+49 621 3701-1333
Fax:	+49 621 3701-7303

1.4 Emergency telephone number: +49 621 3701-1333 / +49 621 3701-0 (Mo-Do 8-17, Fr 8-16)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

The product has been classified and labelled as hazardous according to regulation (EU) 1272/2008 (CLP).

Classification according to Regulation (EC) No 1272/2008 as amended.

Environmental Hazards

Chronic hazards to the aquatic environment	Category 3	H412: Harmful to aquatic life with long lasting effects.

Hazard summary

Physical Hazards: No data available.

2.2 Label Elements

Hazard Statement(s): H412: Harmful to aquatic life with long lasting effects.

Precautionary Statements

Prevention: P273: Avoid release to the environment.

Disposal: P501: Dispose of contents/container to an appropriate treatment and disposal facility in accordance with applicable laws and regulations, and product characteristics at time of disposal.

2.3 Other hazards: By handling of mineral oil products and chemical products no particular hazard is known when normal precautions (item 7) and personal protective equipment (item 8) are kept. The product may not be released into the environment without control.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

General information: Mixture of synthetic base oils with additives.

Chemical name	Identifier	Concentration *	REACH Registration No.	Notes
Triaryl phosphate, alkylated	EC: 700-990-0	1,00% - <2,50%	01-2119519251-50	

* All concentrations are percent by weight unless ingredient is a gas. Gas concentrations are in percent by volume.
PBT: persistent, bioaccumulative and toxic substance.
vPvB: very persistent and very bioaccumulative substance.

Classification

Chemical name	Identifier	Classification	
Triaryl phosphate, alkylated	EC: 700-990-0	CLP:	Aquatic Acute 1;H400, Aquatic Chronic 1;H410; M-Factor (aquatic acute): 1; M-Factor (aquatic chronic): 1

CLP: Regulation No. 1272/2008.

For the wording of the listed hazard statements refer to section 16.

SECTION 4: First aid measures

General: Instantly remove any clothing soiled by the product.

4.1 Description of first aid measures

Inhalation: Supply fresh air; consult doctor in case of symptoms.

Eye contact: Promptly wash eyes with plenty of water while lifting the eye lids.

Skin Contact: Wash with soap and water.

Ingestion: Rinse mouth thoroughly.

4.2 Most important symptoms and effects, both acute and delayed: May cause skin and eye irritation.

4.3 Indication of any immediate medical attention and special treatment needed Get medical attention if symptoms occur.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: CO2, fire extinguishing powder or fog like water spraying. Extinguish larger fires with alcohol resistant foam or spray water with suitable surfactant added

Unsuitable extinguishing media: Water with a full water jet.

5.2 Special hazards arising from the substance or mixture: During fire, gases hazardous to health may be formed.

5.3 Advice for firefighters

Special fire fighting procedures: Move container from fire area if it can be done without risk. Dispose of fire debris and contaminated fire fighting water inaccordance with official regulations. Collect contaminated fire fighting water separately. It must not enter drains.

Special protective equipment for fire-fighters: Self-contained breathing apparatus and full protective clothing must be worn in case of fire.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures: In case of spills, beware of slippery floors and surfaces.

6.2 Environmental Precautions: Prevent from spreading (e.g. by binding or oil barriers). Avoid release to the environment. Environmental manager must be informed of all major spillages. Prevent further leakage or spillage if safe to do so. Do not allow to enter drainage system, surface or ground water.

6.3 Methods and material for containment and cleaning up: Absorb with liquid-binding material (sand, diatomite, acidbinders, universal binders, sawdust). Dispose of the material collected according to regulations. Stop the flow of material, if this is without risk.

6.4 Reference to other sections: See Section 8 of the SDS for Personal Protective Equipment. See Section 7 for information on safe handling See Section 13 for information on disposal.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling: Prevent formation of aerosols. Do not eat, drink or smoke when working with the product. Take usual precautions when handling mineral oil products or chemical products. Observe good industrial hygiene practices. Provide adequate ventilation.

7.2 Conditions for safe storage, including any incompatibilities: Local regulations concerning handling and storage of waterpolluting products have to be followed. Do not heat up to temperatures close to the flash point.

7.3 Specific end use(s): Not applicable

Storage Class: 10, Combustible liquids

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

None of the components have assigned exposure limits.

8.2 Exposure controls

Appropriate engineering controls: Provide adequate ventilation. Ventilation rates should be matched to conditions. If applicable, use process enclosures, local exhaust ventilation, or other engineering controls to maintain airborne levels below recommended exposure limits. If exposure limits have not been established, maintain airborne levels to an acceptable level.

Individual protection measures, such as personal protective equipment

General information: Wash hands before breaks and after work. Use personal protective equipment as required. Personal protection equipment should be chosen according to the CEN standards and in discussion with the supplier of the personal protective equipment. The usual precautionary measures should be adhered to inhandling the chemicals or the mineral oil products.

Eye/face protection: Avoid contact with skin and eyes. Goggles/face shield are recommended. If risk of splashing, wear safety goggles or face shield.

Skin protection

Hand Protection:	Material: Nitrile butyl rubber (NBR). Min. Breakthrough time: >= 480 min Recommended thickness of the material: >= 0,38 mm Avoid long-term and repeated skin contact. Suitable gloves can be recommended by the glove supplier. Use skin protection cream for preventive skin protection. Protective gloves, where permitted in acc. to safety directions. The exact break through time has to be found out by the manufacturer of the protective gloves and has to be observed.
Other:	Do not carry cleaning cloths impregnated with the product in trouser pockets. Wear suitable protective clothing.
Respiratory Protection:	Ensure good ventilation/exhaustion at the workplace. Avoid breathing vapour/ aerosol.
Thermal hazards:	Not known.
Hygiene measures:	Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing to remove contaminants. Discard contaminated footwear that cannot be cleaned.
Environmental Controls:	No data available.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	
Physical state:	liquid
Form:	liquid
Color:	Pale yellow
Odor:	Characteristic
Odor Threshold:	Not applicable for mixtures
pH:	Not applicable
Freezing point:	-48 °C
Boiling Point:	Value not relevant for classification
Flash Point:	286 °C
Evaporation Rate:	Not applicable for mixtures
Flammability (solid, gas):	Value not relevant for classification
Flammability Limit - Upper (%)–:	Value not relevant for classification
Flammability Limit - Lower (%)–:	Value not relevant for classification
Vapor pressure:	Not applicable for mixtures
Vapor density (air=1):	Not applicable for mixtures
Density:	1,00 g/cm3 (15 °C)
Solubility(ies)	
Solubility in Water:	Insoluble in water
Solubility (other):	No data available.

Partition coefficient (n-octanol/water):	Not applicable for mixtures
Autoignition Temperature:	Value not relevant for classification
Decomposition Temperature:	Value not relevant for classification
Kinematic viscosity:	55 mm2/s (40 °C)
Explosive properties:	Value not relevant for classification
Oxidizing properties:	Value not relevant for classification
9.2 Other information	No data available.

SECTION 10: Stability and reactivity

10.1 Reactivity:	Stable under normal use conditions.
10.2 Chemical Stability:	Stable under normal use conditions.
10.3 Possibility of hazardous reactions:	Stable under normal use conditions.
10.4 Conditions to avoid:	Stable under normal use conditions.
10.5 Incompatible Materials:	Strong oxidizing substances. Strong acids. Strong bases.
10.6 Hazardous Decomposition Products:	Thermal decomposition or combustion may liberate carbon oxides and other toxic gases or vapors.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Oral

Product:

Not classified for acute toxicity based on available data.

Specified substance(s)

Triaryl phosphate, alkylated	LD 50 (Rat): > 5.001 mg/kg

Dermal

Product:

Not classified for acute toxicity based on available data.

Inhalation

Product:

Not classified for acute toxicity based on available data.

Specified substance(s)

Triaryl phosphate, alkylated	Based on available data, the classification criteria are not met.

Skin Corrosion/Irritation:

Product: Based on available data, the classification criteria are not met.

Serious Eye Damage/Eye Irritation:
Product: Based on available data, the classification criteria are not met.

Respiratory or Skin Sensitization:
Product: Skin sensitizer: Based on available data, the classification criteria are not met.
Respiratory sensitizer: Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity
Product: Based on available data, the classification criteria are not met.

Carcinogenicity
Product: Based on available data, the classification criteria are not met.

Reproductive toxicity
Product: Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure
Product: Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure
Product: Based on available data, the classification criteria are not met.

Aspiration Hazard
Product: Based on available data, the classification criteria are not met.

Other adverse effects: No data available.

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity
Product: Based on available data, the classification criteria are not met.

Fish
Specified substance(s)

Triaryl phosphate, alkylated	LC 50 (Fish, 96 h): 0,8 mg/l

Aquatic Invertebrates
Specified substance(s)

Triaryl phosphate, alkylated	EC 50 (Water Flea, 48 h): 0,202 mg/l

Chronic ToxicityProduct: Based on available data, the classification criteria are met.

Fish
Specified substance(s)

Triaryl phosphate, alkylated	NOEC (Fish, 90 d): 0,093 mg/l

Aquatic Invertebrates
Specified substance(s)

Triaryl phosphate, alkylated	NOEC (Water Flea, 21 d): 0,0399 mg/l

12.2 Persistence and Degradability

Biodegradation

Product:	Not applicable for mixtures
Specified substance(s)	
Triaryl phosphate, alkylated	61 % (28 d) Readily biodegradable

12.3 Bioaccumulative potential

Product: Not applicable for mixtures

12.4 Mobility in soil:

Product: Not applicable for mixtures

12.5 Results of PBT and vPvB assessment: The product does not contain any substances fulfilling the PBT/vPvB criteria.

12.6 Other adverse effects: No data available.

Water Hazard Class (WGK): WGK 1: slightly water-endangering.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: Dispose in accordance with all applicable regulations.

Disposal methods: Do not empty into drains; dispose of this material and its container in a safe way. When storing used products, ensure that the waste categories and mixing instructions are observed.

European Waste Codes

13 02 08*: other engine, gear and lubricating oils

SECTION 14: Transport information

ADR/RID

14.1 UN Number:	–
14.2 UN Proper Shipping Name:	–
14.3 Transport Hazard Class(es)	
Class:	Non-dangerous goods
Label(s):	–
Hazard No. (ADR):	–
Tunnel restriction code:	–
14.4 Packing Group:	–
14.5 Environmental hazards:	–
14.6 Special precautions for user:	–

ADN

14.1 UN Number:	–
14.2 UN Proper Shipping Name:	–
14.3 Transport Hazard Class(es)	
Class:	Non-dangerous goods
Label(s):	–
14.3 Packing Group:	–
14.5 Environmental hazards:	–
14.6 Special precautions for user:	–

IMDG

14.1 UN Number:	–
14.2 UN Proper Shipping Name:	–
14.3 Transport Hazard Class(es)	
Class:	Non-dangerous goods
Label(s):	–
EmS No.:	–
14.3 Packing Group:	–
14.5 Environmental hazards:	–
14.6 Special precautions for user:	–

IATA

14.1 UN Number:	–
14.2 Proper Shipping Name:	–
14.3 Transport Hazard Class(es):	
Class:	Non-dangerous goods
Label(s):	–
14.4 Packing Group:	–
14.5 Environmental hazards:	–
14.6 Special precautions for user:	–

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: Not applicable.

SECTION 15: Regulatory information

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

EU Regulations

Regulation (EC) No. 2037/2000 Substances that deplete the ozone layer: none

Regulation (EC) No. 850/2004 on persistent organic pollutants: none

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Revision Information: Vertical lines in the margin indicate an amendment.

Wording of the H-statements in section 2 and 3

H400	Very toxic to aquatic life.
H410	Very toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.

Other information: The classification complies with the current EU lists; however, it has been supplemented with expert literature information and information provided by/about our company. It was derived from the test data and/or the application of the conventional method.

Revision Date: 27.05.2020

Disclaimer: The data contained in this safety data sheet are based on our current knowledge and experience and are given to the best of our knowledge and belief. It characterizes the product only with regard to safety requirements for handling, transport and disposal. The data do not describe the product's properties (tech. product specification). Neither should any agreed property nor the suitability of the product for any specific technical application be deduced from the data contained in this safety data sheet. Modifications on this document are not allowed. The data are not transferable to other products. In the case of mixing the product with other products or in the case of processing, the data in this safety data sheet are not necessarily valid for the new-made material. It is the responsibility of the recipient of the product to observe federal, state and local law. Please contact us to obtain up-to-date safety data sheets. This document was issued electronically and has no signature.

Safety Data Sheet

according to Regulation (EC) No 1907/2006

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

1.1. Product identifier

GLYKOSOL N

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

Use of the substance/mixture

Various

1.3. Details of the supplier of the safety data sheet

Company name: pro Kühlsole GmbH
Street: Am Langen Graben 37
Place: D-52353 Düren
Telephone: +49 2421 59196-0 Telefax: +49 2421 59196-10
Responsible Department: Responsible for the safety data sheet: sds@gbk-ingelheim.de

1.4. Emergency telephone number:

Notrufnummer INTERNATIONAL: +49 (0) 6132 / 84463 (GBK GmbH, Ingelheim)

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Regulation (EC) No. 1272/2008

Hazard categories:
Acute toxicity: Acute Tox. 4
Specific target organ toxicity - repeated exposure: STOT RE 2
Hazard Statements:
Harmful if swallowed.
May cause damage to organs through prolonged or repeated exposure.

2.2. Label elements

Regulation (EC) No. 1272/2008

Hazard components for labelling

ethanediol, ethylene glycol

Signal word: Warning

Pictograms:

Hazard statements

H302	Harmful if swallowed.
H373	May cause damage to organs through prolonged or repeated exposure.

Precautionary statements

P260	Do not breathe dust/fume/gas/mist/vapours/spray.
P270	Do not eat, drink or smoke when using this product.
P301+P312	IF SWALLOWED: Call a POISON CENTER/doctor if you feel unwell.
P330	Rinse mouth.
P314	Get medical advice/attention if you feel unwell.
P501	Dispose of contents/container in accordance with local/regional/national/international/ regulations.

Additional advice on labelling

The product is labeled in accordance with Regulation (EC) no. 1272/2008 (GHS).

2.3. Other hazards

According to Regulation (EC) No 1907/2006 (REACH), this product is regarded to be neither PBT nor vPvB.
High risk of slipping due to leakage/spillage of product.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Chemical characterization

Mixture of the following substances with non-hazardous admixtures

Hazardous components

CAS No	Chemical name			Quantity
	EC No	Index No	REACH No	
	GHS Classification			
107-21-1	ethanediol, ethylene glycol			95 - <= 100 %
	203-473-3		01-2119456816-28	
	Acute Tox. 4, STOT RE 2; H302 H373			

Full text of H and EUH statements: see section 16.

SECTION 4: First aid measures

4.1. Description of first aid measures

General information

Remove contaminated soaked clothing immediately. In the event of persistent symptoms receive medical treatment.

After inhalation

Move to fresh air in case of accidental inhalation of vapours. In the event of symptoms refer for medical treatment.

After contact with skin

Wash off immediately with soap and plenty of water. Consult a doctor if skin irritation persists.

After contact with eyes

Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Seek medical treatment by eye specialist.

After ingestion

Never give anything by mouth to an unconscious person. Do not induce vomiting. Rinse out mouth and give plenty of water to drink. Seek medical treatment immediately. Symptoms of poisoning may not occur for many hours, therefore keep under medical supervision for at least 48 hours.

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

May cause damage to organs through prolonged or repeated exposure. (kidney, oral)
Harmful if swallowed.

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

Treat symptoms.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media

Alcohol-resistant foam, dry chemical, carbon dioxide (CO2), water-spray.

Unsuitable extinguishing media

Full water jet

5.2. Special hazards arising from the substance or mixture

Fire may produce: carbon monoxide and carbon dioxide Under certain fire conditions traces of other toxic substances cannot be excluded. Vapours may form explosive mixture with air.

5.3. Advice for firefighters

Cool containers at risk with water spray jet. Use breathing apparatus with independent air supply. Wear full protective suit. Suppress escaping gasses/vapours with directed water spray jet.

Additional information

Collect contaminated fire-fighting water, avoid any release into the sewerage. Fire residues and contaminated firefighting water must be disposed of in accordance with the local regulations.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

In case of vapour formation use respirator. Ensure adequate ventilation. Avoid contact with eyes, skin or mucous membrane. Use personal protective clothing.

6.2. Environmental precautions

Do not discharge into the drains/surface waters/ground water.

6.3. Methods and material for containment and cleaning up

Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder).
Shovel into suitable container for disposal.

6.4. Reference to other sections

Information for disposal see section 13.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Advice on safe handling

Use only in thoroughly ventilated areas. Avoid contact with eyes, skin or mucous membrane. Care for thoroughly room ventilation, if necessary suck off at workplace.

Advice on protection against fire and explosion

Keep away from sources of ignition - No smoking. Take measures against electrostatically charging. Vapours can form an explosive mixture with air.

Further information on handling

Avoid formation of aerosols. Do not inhale vapour/aerosol. In case of insufficient ventilation, especially in confined areas.

7.2. Conditions for safe storage, including any incompatibilities

Requirements for storage rooms and vessels

Store only in original container at cool and aired place.
Keep in a dry place.

Hints on joint storage

Keep away from food, drink and animal feeding stuffs.

Further information on storage conditions

Keep container tightly closed.

7.3. Specific end use(s)

No data available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

Exposure limits (EH40)

CAS No	Substance	ppm	mg/m³	fibres/ml	Category	Origin
107-21-1	Ethane-1,2-diol, vapour	20	52		TWA (8 h)	WEL
		40	104		STEL (15 min)	WEL

8.2. Exposure controls

Appropriate engineering controls

Ensure adequate ventilation, especially in confined areas.

Protective and hygiene measures

Wash hands before breaks and immediately after handling the product.
When using do not eat, drink or smoke.
Avoid contact with skin, eyes and clothing.
Take off immediately all contaminated clothing.

Eye/face protection

Tightly fitting goggles (EN 166).
Eye wash bottle with pure water (EN 15154).

Hand protection

Chemical-resistant gloves (EN 374)
Suitable materials also for extended, direct contact (recommended: protection index 6, corresponding to a permeation rate > 480 minutes according to EN 374): Nitrile rubber/nitrile latex - NBR (0,35 mm), Butyl rubber - Butyl (0,5 mm).
Follow the recommendations of the glove manufacturer for breakthrough properties especially for workplace conditions involving mechanical stress and contact duration.

Skin protection

Long sleeved clothing (DIN EN ISO 6530)

Respiratory protection

No personal respiratory protective equipment normally required.
Breathing apparatus in the event of aerosol or mist formation.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state:	Liquid
Colour:	Yellow, clear
Odour:	Odourless
pH-Value (at 20 °C):	8 - 10

Changes in the physical state

Melting point:	approx. - 30 °C

Initial boiling point and boiling range:	190 °C
Sublimation point:	No data available
Softening point:	No data available
Flash point:	116 °C
Sustaining combustion:	No data available

Flammability

Solid: No data available

Explosive properties

The product is not explosive. (Explosion group IIB)

Lower explosion limits:	3,2 vol. %
Upper explosion limits:	15,3 vol. %
Ignition temperature:	410 °C

Auto-ignition temperature

Solid:	No data available
Decomposition temperature:	No data available

Oxidizing properties

The product is not self-igniting

Vapour pressure: (at 20 °C)	0,1 hPa
Density (at 20 °C):	1,125 g/cm³
Water solubility: (at 20 °C)	Completely miscible

Solubility in other solvents

No data available

Partition coefficient:	No data available
Viscosity / dynamic:	No data available
Viscosity / kinematic:	No data available
Flow time:	No data available
Vapour density:	No data available
Solvent content:	95,00 %

9.2. Other information

No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

No data available

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

Reactions with strong oxidizing agents. In use formation of flammable/explosive vapour-air mixtures possible.

10.4. Conditions to avoid

No decomposition if used as directed.

10.5. Incompatible materials

Strong oxidizing agents, Bases.

10.6. Hazardous decomposition products

Carbon monoxide and carbon dioxide

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity

Harmful if swallowed.

ATEmix calculated

ATE (oral) 526,3 mg/kg

CAS No	Chemical name				
	Exposure route	Dose	Species	Source	Method
107-21-1	ethanediol, ethylene glycol				
	oral	LD50 5840 mg/kg	Rat		
	dermal	LD50 9530 mg/kg	Rabbit		

Irritation and corrosivity

Based on available data, the classification criteria are not met.

Sensitising effects

Based on available data, the classification criteria are not met.

Carcinogenic/mutagenic/toxic effects for reproduction

Based on available data, the classification criteria are not met.

STOT-single exposure

Based on available data, the classification criteria are not met.

STOT-repeated exposure

May cause damage to organs through prolonged or repeated exposure. (ethanediol, ethylene glycol)

Aspiration hazard

Based on available data, the classification criteria are not met.

SECTION 12: Ecological information

12.1. Toxicity

No data available

CAS No	Chemical name					
	Aquatic toxicity	Dose	[h] | [d]	Species	Source	Method
107-21-1	ethanediol, ethylene glycol					
	Acute fish toxicity	LC50 72860 mg/l	96 h	Pimephales promelas		
	Acute algae toxicity	ErC50 6500 - 13000 mg/l	96 h	Pseudokirchneriela subcapitata		
	Acute crustacea toxicity	EC50 > 1000 mg/l	48 h	Daphnia magna		

12.2. Persistence and degradability

Readily biodegradable.

12.3. Bioaccumulative potential

No data available

Partition coefficient n-octanol/water

CAS No	Chemical name	Log Pow
107-21-1	ethanediol, ethylene glycol	-1,36

12.4. Mobility in soil

No data available

12.5. Results of PBT and vPvB assessment

Not determined.

12.6. Other adverse effects

Not determined.

Further information

Do not release undiluted or in higher quantities into the groundwater, sewerage or waters.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Disposal recommendations

Should not be disposed of with household waste. Do not flush into surface water or sanitary sewer system. Where possible recycling is preferred to disposal. The waste code number must be agreed with the disposer / manufacturer / competent authority.

List of Wastes Code - residues/unused products

160508 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; gases in pressure containers and discarded chemicals; discarded organic chemicals consisting of or containing hazardous substances; hazardous waste

List of Wastes Code - used product

160508 WASTES NOT OTHERWISE SPECIFIED IN THE LIST; gases in pressure containers and discarded chemicals; discarded organic chemicals consisting of or containing hazardous substances; hazardous waste

List of Wastes Code - contaminated packaging

150102 WASTE PACKAGING; ABSORBENTS, WIPING CLOTHS, FILTER MATERIALS AND PROTECTIVE CLOTHING NOT OTHERWISE SPECIFIED; packaging (including separately collected municipal packaging waste); plastic packaging

Contaminated packaging

Empty containers should be taken for local recycling, recovery or waste disposal. Contaminated packaging should be emptied as far as possible and after appropriate cleansing may be taken for reuse. Packaging that cannot be cleaned should be disposed of like the product.

Cleaning agent: Water

SECTION 14: Transport information

Land transport (ADR/RID)

14.1. UN number: No dangerous good in sense of this transport regulation.

14.2. UN proper shipping name: No dangerous good in sense of this transport regulation.

14.3. Transport hazard class(es): No dangerous good in sense of this transport regulation.

14.4. Packing group: No dangerous good in sense of this transport regulation.

Inland waterways transport (ADN)

14.1. UN number:	No dangerous good in sense of this transport regulation.
14.2. UN proper shipping name:	No dangerous good in sense of this transport regulation.
14.3. Transport hazard class(es):	No dangerous good in sense of this transport regulation.
14.4. Packing group:	No dangerous good in sense of this transport regulation.

Marine transport (IMDG)

14.1. UN number:	No dangerous good in sense of this transport regulation.
14.2. UN proper shipping name:	No dangerous good in sense of this transport regulation.
14.3. Transport hazard class(es):	No dangerous good in sense of this transport regulation.
14.4. Packing group:	No dangerous good in sense of this transport regulation.

Air transport (ICAO-TI/IATA-DGR)

14.1. UN number:	No dangerous good in sense of this transport regulation.
14.2. UN proper shipping name:	No dangerous good in sense of this transport regulation.
14.3. Transport hazard class(es):	No dangerous good in sense of this transport regulation.
14.4. Packing group:	No dangerous good in sense of this transport regulation.

14.5. Environmental hazards

ENVIRONMENTALLY HAZARDOUS: no

14.6. Special precautions for user

No dangerous good in sense of this transport regulation.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

No dangerous good in sense of this transport regulation.

SECTION 15: Regulatory information

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

EU regulatory information

2004/42/EC (VOC):	95 % (1068,75 g/l)
Information according to 2012/18/EU (SEVESO III):	Not subject to 2012/18/EU (SEVESO III)

National regulatory information

Employment restrictions:	Observe restrictions to employment for juvenils according to the 'juvenile work protection guideline' (94/33/EC).
Water hazard class (D):	1 - slightly hazardous to water

15.2. Chemical safety assessment

Chemical safety assessments for substances in this mixture were not carried out.

SECTION 16: Other information

Changes

Update 2020

Abbreviations and acronyms

ADR: Accord européen relatif au transport international des marchandises Dangereuses par Route (Agreement concerning the international carriage of Dangerous goods by Road)
IMDG-Code: International Maritime Code for Dangerous Goods
ICAO: International Civil Aviation Organisation (IATA: The International Air Transport Association)
GHS: Globally Harmonized System of Classification, Labelling and Packaging of Chemicals

Classification for mixtures and used evaluation method according to Regulation (EC) No. 1272/2008 [CLP]

Classification	Classification procedure
Acute Tox. 4; H302	Calculation method
STOT RE 2; H373	Calculation method

Relevant H and EUH statements (number and full text)

H302 Harmful if swallowed.
H373 May cause damage to organs through prolonged or repeated exposure.

Further Information

Data of items 4 to 8, as well as 10 to 12, do partly not refer to the use and the regular employing of the product (in this sense consult information on use and on product), but to liberation of major amounts in case of accidents and irregularities.
The information describes exclusively the safety requirements for the product(s) and is based on the present level of our knowledge.
The delivery specifications are contained in the corresponding product sheet.
This data does not constitute a guarantee for the characteristics of the product(s) as defined by the legal warranty regulations.
(n.a. = not applicable; n.d. = not determined)

'The data for the hazardous ingredients were taken respectively from the last version of the sub-contractor's safety data sheet.)

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

1.1 Product identifier
Material Name
Hydrogen, compressed
Chemical Family
inorganic, gas

Substance name:	Hydrogen
CAS Number:	1333-74-0
EC Number:	215-605-7

Registration status
This product and its components are not subject to registration under REACH.
1.2 Relevant identified uses of the substance or mixture and uses advised against
Identified uses
semiconductor manufacture
Uses advised against
None known.
1.3 Details of the supplier of the safety data sheet

Entegris GmbH
Hugo-Junkers-Ring 5, Gebäude 107/W, 01109 Dresden, Germany

Telephone Number: +49 (0) 351 795 97 0
Fax Number: +49 (0) 351 795 97 499

Only Representative
Tetra Tech International, Inc.
Fuchsstrasse 1, 67688 Rodenbach, Germany
reach@tetratech.com

Entegris, Inc.
129 Concord Road
Building 2
Billerica, MA 01821
USA

Telephone Number: +1-952-556-4181
Telephone Number: +1-800-394-4083 (toll free within North America)

E-mail: Product.stewardship@entegris.com

1.4 Emergency telephone number
+1-703-527-3887 (24 hours) - CHEMTREC – International

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
Classification according to Regulation (EC) No 1272/2008 [CLP]
Flammable Gases - Category 1
Gases Under Pressure - Compressed gas
Acute Toxicity - Inhalation - Gas - Category 4

2.2 Label elements
Labeling according to Regulation (EC) No. 1272/2008 [CLP]
Hazard symbols

Signal word
Danger
Hazard statements
H220 Extremely flammable gas.
H280 Contains gas under pressure; may explode if heated.
H332 Harmful if inhaled.
Precautionary statements
Prevention
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P261 Avoid breathing gas.
P271 Use only outdoors or in a well-ventilated area.
Response
P377 Leaking gas fire: Do not extinguish, unless leak can be stopped safely.
P381 In case of leakage, eliminate all ignition sources.
P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312 Call a POISON CENTER or doctor/physician if you feel unwell.
Storage
P410+P403 Protect from sunlight. Store in a well-ventilated place.
Disposal
P501 Dispose of contents/container in accordance with local/regional/national/international regulations.
2.3 Other hazards
May displace oxygen and cause rapid suffocation.

SECTION 3: Composition / information on ingredients

3.1 SUBSTANCES

CAS EC No Registration No	Component Name Synonyms	1272/2008 (CLP)	Percent
1333-74-0 215-605-7 --	Hydrogen	Note(s): U Self-Classified: Flam. Gas 1 - H220 Press. Gas - H280 Acute Tox. (Gas) 4 - H332	100

Full text of H- and EUH-statements: see section 16.

SECTION 4: First aid measures

4.1 Description of first aid measures
Inhalation

If adverse effects occur, remove to uncontaminated area. Give artificial respiration if not breathing. If breathing is difficult, oxygen should be administered by qualified personnel. Get immediate medical attention.

Skin

Wash exposed skin with soap and water.

Eyes

Flush eyes with plenty of water for at least 15 minutes. Then get immediate medical attention.

Ingestion

Ingestion is not a route of exposure.

4.2 Most Important Symptoms/Effects

Acute

harmful if inhaled, suffocation

Delayed

No information on significant adverse effects.

4.3 Indication of Immediate Medical Attention and Special Treatment

No data available.

Note to Physicians

For inhalation, consider oxygen.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media

regular dry chemical, carbon dioxide. Large fires: water spray or fog

Unsuitable Extinguishing Media

None known.

5.2 Special hazards arising from the substance or mixture

Flammable gas. Severe explosion hazard. Vapor/air mixtures are explosive. Pressurized containers may rupture or explode if exposed to sufficient heat. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion. Burns with invisible flame.

5.3 Advice for firefighters

Flammable gas. Severe explosion hazard. Vapor/air mixtures are explosive. Pressurized containers may rupture or explode if exposed to sufficient heat. Electrostatic discharges may be generated by flow or agitation resulting in ignition or explosion. Burns with invisible flame.

Fire Fighting Measures

Move container from fire area if it can be done without risk. Cool containers with water spray until well after the fire is out. Stay away from the ends of tanks. For fires in cargo or storage area: Cool containers with water from unmanned hose holder or monitor nozzles until well after fire is out. If this is impossible then take the following precautions: Keep unnecessary people away, isolate hazard area and deny entry. Let the fire burn. Withdraw immediately in case of rising sound from venting safety device or any discoloration of tanks due to fire. For tank, rail car or tank truck: Stop leak if possible without personal risk. Let burn unless leak can be stopped immediately. Evacuation radius: 1600 meters (1 mile). Do not attempt to extinguish fire unless flow of material can be stopped first. Flood with fine water spray. Cool containers with water. Apply water from a protected location or from a safe distance. Avoid inhalation of material or combustion by-products. Stay upwind and keep out of low areas. Evacuate if fire gets out of control or containers are directly exposed to fire. Evacuation radius: 800 meters (1/2 mile). Consider downwind evacuation if material is leaking. Stop flow of gas.

Protective Equipment and Precautions for Firefighters

Wear full protective fire fighting gear including self contained breathing apparatus (SCBA) for protection against possible exposure.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Evacuate area. Ventilate the area. Do not enter confined spaces unless adequately ventilated. Test air for flammable gas concentration before entering an area where release occurred.

6.2 Environmental precautions

Avoid release to the environment.

6.3 Methods and Materials for Containment and Cleaning Up

Leaking gas fire: Let the fire burn. Stop leak if possible without personal risk. Re-ignition and/or explosion can occur if the fire is extinguished without stopping the leak first. Avoid heat, flames, sparks and other sources of ignition. Keep unnecessary people away, isolate hazard area and deny entry. Remove sources of ignition. Ventilate closed spaces before entering. All equipment used when handling the product must be grounded.

6.4 Reference to other sections

Safe handling: see section 7. Personal protection equipment (PPE): see section 8. Disposal: see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Protect cylinders from damage; use suitable carts to move cylinders. Ship and store cylinders with outlet plug and valve protective cap in place. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Avoid breathing gas. Use only outdoors or in a well-ventilated area. Connection of cylinders for use should be performed by trained personnel. It is recommended that the entire system is checked for leaks before use.

7.2 Conditions for safe storage, including any incompatibilities

Protect from sunlight. Store in a well-ventilated place.

Store and handle in accordance with all current regulations and standards. Grounding and bonding required. Keep separated from incompatible substances.

Incompatible Materials

oxygen, halogens, oxidizing materials, metals susceptible to hydrogen embrittlement

7.3 Specific end use(s)

semiconductor manufacture

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Component Exposure Limits

Hydrogen	**1333-74-0**
ACGIH:	(See Appendix F: Minimal Oxygen Content, explosion hazard)
	Simple asphyxiant (See Appendix F: Minimal Oxygen Content)
Belgium:	Asphyxiant
Ireland:	Simple asphyxiant
Italy:	Simple asphyxiant
Portugal:	Simple Asphyxiant
Spain:	simple asphyxiant

Component Biological Exposure Limits
None of this product's components are on the list.
Derived No Effect Levels (DNELs)
No DNELs available.
Predicted No Effect Concentrations (PNECs)
No PNECs available.
8.2 Exposure Controls
Engineering controls
Ventilation equipment should be explosion-resistant if explosive concentrations of material are present. Provide local exhaust ventilation system. Ensure compliance with applicable exposure limits.
Eye/face protection
For the gas: Safety glasses or goggles are recommended when there is a potential for eye contact (EN 166).
Skin Protection
For the gas: Protective clothing is not required, but recommended.
Respiratory Protection
Respirators depend on exposure level. SCBA with full face piece recommended during change outs and available in case of emergency (EN 137).
Glove Recommendations
Work gloves recommended when handling cylinders (EN 374).
Environmental exposure controls
Avoid release to the environment.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	colorless gas	**Physical State**	gas
Odor	odorless	**Color**	colorless
Odor Threshold	(odorless)	**pH**	Not available
Melting Point	-259 °C	**Boiling Point**	-252 °C
Boiling Point Range	Not available	**Freezing point**	Not available
Evaporation Rate	Not available	**Flammability (solid, gas)**	Flammable
Autoignition Temperature	500 °C	**Flash Point**	(Not applicable – material is a gas)
Lower Explosive Limit	4 %	**Decomposition temperature**	Not available
Upper Explosive Limit	75 %	**Vapor Pressure**	(Not applicable – material is a gas)
Vapor Density (air=1)	0.07	**Specific Gravity (water=1)**	(Not applicable – material is a gas)
Water Solubility	1.82 % (@ 20 °C)	**Partition coefficient: n-octanol/water**	Not available
Viscosity	0.008957 cp @ 26.8 °C	**Kinematic viscosity**	Not available

Solubility (Other)	Not available	**Density**	0.08342 kg/m3 at 21 °C pressure: 1 atm
Physical Form	compressed gas	**Taste**	tasteless
Molecular Formula	H2	**Molecular Weight**	2
Oxidising properties	Not an oxidizer	**Explosive properties**	Not available

9.2 Other information

No additional information is available.

Solvent Solubility

Slightly Soluble

alcohol, ether

SECTION 10: Stability and reactivity

10.1 Reactivity

Extremely flammable with air and other oxidizing materials.

10.2 Chemical stability

Stable at normal temperatures and pressure.

10.3 Possibility of hazardous reactions

Will not polymerize.

10.4 Conditions to avoid

Avoid heat, flames, sparks and other sources of ignition. Minimize contact with material. Containers may rupture or explode if exposed to heat.

10.5 Incompatible materials

oxygen, halogens, oxidizing materials, metals susceptible to hydrogen embrittlement

10.6 Hazardous decomposition products

Will not decompose.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute and Chronic Toxicity

Harmful if inhaled.

Component Analysis - LD50/LC50

The components of this material have been reviewed in various sources and the following selected endpoints are published:

Hydrogen (1333-74-0)

Inhalation LC50 Rat >15000 ppm 1 h

Product Toxicity Data

Acute Toxicity Estimate

Inhalation - Gas	7500 ppm

Irritation/Corrosivity Data

No data available.

Respiratory Sensitization

No data available.

Dermal Sensitization

No data available.

Germ Cell Mutagenicity

No data available.

Tumorigenic Data

No data available.

Component Carcinogenicity

None of this product's components are listed by IARC or DFG.

Toxicity for reproduction

No data available.

Specific Target Organ Toxicity - Single Exposure

No data available.

Specific Target Organ Toxicity - Repeated Exposure

No data available.

Aspiration hazard

Not applicable.

SECTION 12: Ecological information

12.1 Toxicity

Component Analysis - Aquatic Toxicity

No LOLI ecotoxicity data are available for this product's components.

12.2 Persistence and degradability

No data available.

12.3 Bioaccumulative potential

No data available.

12.4 Mobility in soil

No data available.

12.5 Results of PBT and vPvB assessment

No components of this material are listed.

12.6 Other adverse effects

No data available.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Waste disposal according to directive 2008/98/EC, covering waste and dangerous waste.
Waste codes/waste designations according to LoW. EWC-code: 16 02 15*.
Since emptied containers retain material residue, follow safe handling/label warnings even after container is emptied.
Release to the environment or sewage system is prohibited.
Dispose of contents/container in accordance with local/regional/national/international regulations.

SECTION 14: Transport information

		ADR	RID	ICAO	IATA	ADN	IMDG
14.1	UN Number	UN1049	UN1049	UN1049	UN1049	UN1049	UN1049
14.2	UN Proper Shipping Name	HYDROGEN, COMPRESSED	HYDROGEN, COMPRESSED	HYDROGEN, COMPRESSED	HYDROGEN, COMPRESSED	HYDROGEN, COMPRESSED	HYDROGEN, COMPRESSED

14.3	Transport Hazard Class(es)	2	2 Risks: 2.1, 13	2.1	2.1	2	2.1
14.4	Packing Group	--	--	--	--	--	--
14.5	Environmental Hazards	--	--	--	--	--	--
14.6	Special Precautions For User	--	--	--	--	--	--
14.7	Transport in Bulk According to Annex II of MARPOL and the IBC Code	--	--	--	--	--	--
14.8	Further information	--	--	--	--	--	--

International Bulk Chemical Code

This material does not contain any chemicals required by the IBC Code to be identified as dangerous chemicals in bulk.

SECTION 15: Regulatory information

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

REACH Candidate List of Substances of Very High Concern (SVHC) for Authorization (Article 59(1)) - Reg. (EU) No. 1907/2006

No components of this material are listed.

EU - REACH (1907/2006) - Annex XVII Restrictions of Certain Dangerous Substances, Mixtures and Articles

No components of this material are listed.

EU - Substances Depleting the Ozone layer (1005/2009)

No components of this material are listed.

EU - Persistent Organic Pollutants (850/2004)

No components of this material are listed.

EU - Export and Import Restrictions (689/2008) - Chemicals and Articles Subject to Export Ban

No components of this material are listed.

EU - Seveso III Directive (2012/18/EU) - Qualifying Quantities of Dangerous Substances

Hydrogen	**1333-74-0**
Lower-Tier Requirements	5 tonne
Higher-Tier Requirements	50 tonne

EU - Plant Protection Products (1107/2009/EC)
No components of this material are listed.
EU - Biocides (528/2012/EU)
No components of this material are listed.
EU – Water Framework Directive (2000/60/EC)
No components of this material are listed.
EU - Limitation of Emissions of Volatile Organic Compounds Due to the Use of Organic Solvents in Certain Activities and Installations (1999/13/EC)
No components of this material are listed.
EU - Detergent Regulation (648/2004/EC)
No components of this material are listed.
Germany Regulations
Germany Water Classification - Product
non-hazardous to water (nwg)
Germany Water Classification - Component
Hydrogen (1333-74-0)
Reg. no 741 , non-hazardous to water
Denmark Regulations
No components of this material are listed.
Component Analysis - Inventory
Hydrogen (1333-74-0)

US	CA	EU	AU	PH	JP - ENCS	JP - ISHL	KR KECI - Annex 1	KR KECI - Annex 2	KR - REACH CCA	CN	NZ	MX	TW	VN (Draft)
Yes	DSL	EIN	Yes	Yes	No	No	Yes	No	No	Yes	Yes	Yes	Yes	Yes

15.2 Chemical Safety Assessment
No chemical safety assessment has been carried out for this substance.

SECTION 16: Other information

16.1 Indication of changes
Preparation Date
18/09/2018
16.2 Key / Legend
ACGIH - American Conference of Governmental Industrial Hygienists; ADR - European Road Transport; AU - Australia; BOD - Biochemical Oxygen Demand; C - Celsius; CA - Canada; CA/MA/MN/NJ/PA - California/Massachusetts/Minnesota/New Jersey/Pennsylvania*; CAS - Chemical Abstracts Service; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CFR - Code of Federal Regulations (US); CLP - Classification, Labelling, and Packaging; CN - China; CPR - Controlled Products Regulations; DFG - Deutsche Forschungsgemeinschaft; DOT - Department of Transportation; DSD - Dangerous Substance Directive; DSL - Domestic Substances List; EC – European Commission; EEC - European Economic Community; EIN - European Inventory of (Existing Commercial Chemical Substances); EINECS - European Inventory of Existing Commercial Chemical Substances; ENCS - Japan Existing and New Chemical Substance Inventory; EPA - Environmental Protection Agency; EU - European Union; F - Fahrenheit; F - Background (for Venezuela Biological Exposure Indices); IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; ICAO - International Civil Aviation Organization; IDL - Ingredient Disclosure List; IDLH - Immediately Dangerous to Life and Health; IMDG - International Maritime Dangerous Goods; ISHL - Japan Industrial Safety and Health Law; IUCLID -

International Uniform Chemical Information Database; JP - Japan; Kow - Octanol/water partition coefficient; KR KECI Annex 1 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL); KR KECI Annex 2 - Korea Existing Chemicals Inventory (KECI) / Korea Existing Chemicals List (KECL) , KR - Korea; LD50/LC50 - Lethal Dose/ Lethal Concentration; LEL - Lower Explosive Limit; LLV - Level Limit Value; LOLI - List Of LIsts™ - ChemADVISOR's Regulatory Database; MAK - Maximum Concentration Value in the Workplace; MEL - Maximum Exposure Limits; MX – Mexico; Ne- Non-specific; NFPA - National Fire Protection Agency; NIOSH - National Institute for Occupational Safety and Health; NJTSR - New Jersey Trade Secret Registry; Nq - Non-quantitative; NSL – Non-Domestic Substance List (Canada); NTP - National Toxicology Program; NZ - New Zealand; OSHA - Occupational Safety and Health Administration; PEL- Permissible Exposure Limit; PH - Philippines; RCRA - Resource Conservation and Recovery Act; REACH- Registration, Evaluation, Authorisation, and restriction of Chemicals; RID - European Rail Transport; SARA - Superfund Amendments and Reauthorization Act; Sc - Semi-quantitative; STEL - Short-term Exposure Limit; TCCA – Korea Toxic Chemicals Control Act; TDG - Transportation of Dangerous Goods; TLV - Threshold Limit Value; TSCA - Toxic Substances Control Act; TW – Taiwan; TWA - Time Weighted Average; UEL - Upper Explosive Limit; UN/NA - United Nations /North American; US - United States; VLE - Exposure Limit Value (Mexico); VN (Draft) - Vietnam (Draft); WHMIS - Workplace Hazardous Materials Information System (Canada)

16.3 Key literature references and sources for data

Available upon request.

16.4 Methods Used for Classification of Mixture According to Regulation (EC) No 1272/2008

Available upon request.

16.5 Relevant H- and EUH-phrases (Number and full text) and Notes

H220 Extremely flammable gas

H332 Harmful if inhaled

NOTE U: When put on the market gases have to be classified as 'Gases under pressure', in one of the groups compressed gas, liquefied gas, refrigerated liquefied gas or dissolved gas. The group depends on the physical state in which the gas is packaged and therefore has to be assigned case by case.

16.6 Training advice

Read the Safety Data Sheet before handling product.

16.7 Further Information

Disclaimer:

The information in this (Material) Safety Data Sheet ("(M)SDS") is believed to be current and accurate as of the time of shipment of the product by Entegris. Entegris makes no warranties, express or implied, with respect to such information, including, without limitation, the implied warranties of merchantability and fitness for a particular purpose. Entegris assumes no liability for any loss or injury which may result from the use of the information contained in this (M)SDS. The chemical, physical and toxicological properties of the Entegris product described in this (M)SDS have not been thoroughly investigated. Users are responsible for exercising due care in using the Entegris product, and for conducting their own investigation to determine whether the product is fit for their particular purpose and suitable for their method of use or application. It is the user's responsibility to ensure that its activities comply with all applicable laws and regulations. Entegris is a registered trademark of Entegris Inc. or an affiliated company.

NYSWITCHO™ 3X

SAFETY DATA SHEET

Date of printing	2021-05-27
Date of issue/ Date of revision	2021-05-27
Date of previous issue	2021-02-08
Version	5.01

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

1.1 Product identifier

Product name	NYSWITCHO™ 3X
UFI	8C60-10RS-H00T-KT4M
Product description	Insulating oil
Product type	Liquid.

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

Identified uses
Use in functional fluids - Industrial Use in functional fluids - Professional

Uses advised against	**Reason**
This product must not be used in applications other than those recommended in Section 1, without first seeking the advice of the supplier.	-

1.3 Details of the supplier of the safety data sheet

Supplier/Manufacturer	Head office: Nynas AB P.O. Box 10700 SE-121 29 Stockholm SWEDEN +46 8 602 12 00 (Office hours 8 am - 4.30 pm (CET)) www.nynas.com
e-mail address of person responsible for this SDS	ProductHSE@nynas.com

1.4 Emergency telephone number

Telephone number	+44 (0) 1235 239 670
Hours of operation	24 hour service

National advisory body/Poison Centre

Telephone number 020 - 99 60 00 (Kemiakuten, 24h service)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition	Mixture

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

Acute Tox. 4, H332
Skin Irrit. 2, H315
Asp. Tox. 1, H304
Aquatic Chronic 2, H411

The product is classified as hazardous according to Regulation (EC) 1272/2008 as amended.

See Section 16 for the full text of the H statements declared above.

SECTION 2: Hazards identification

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements

Hazard pictograms

Signal word	Danger
Hazard statements	H304 - May be fatal if swallowed and enters airways. H315 - Causes skin irritation. H332 - Harmful if inhaled. H411 - Toxic to aquatic life with long lasting effects.

Precautionary statements

Prevention	P280 - Wear protective gloves: 4 - 8 hours (breakthrough time): nitrile rubber. P273 - Avoid release to the environment. P261 - Avoid breathing vapour. P264 - Wash hands thoroughly after handling.
Response	P391 - Collect spillage. P304 + P312 - IF INHALED: Call a POISON CENTER or doctor if you feel unwell. P301 + P310, P331 - IF SWALLOWED: Immediately call a POISON CENTER or doctor. Do NOT induce vomiting. P362 + P364 - Take off contaminated clothing and wash it before reuse. P302 + P352 - IF ON SKIN: Wash with plenty of water.
Storage	Not applicable.
Disposal	P501 - Dispose of contents and container in accordance with all local, regional, national and international regulations.
Hazardous ingredients	Distillate (petroleum), hydrotreated middle
Supplemental label elements	Not applicable.
Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	Not applicable.

2.3 Other hazards

Product meets the criteria for PBT or vPvB according to Regulation (EC) No. 1907/2006, Annex XIII	This mixture does not contain any substances that are assessed to be a PBT or a vPvB.
Other hazards which do not result in classification	Prolonged or repeated contact may dry skin and cause irritation.

SECTION 3: Composition/information on ingredients

3.2 Mixtures Mixture

Product/ingredient name	Identifiers	%	Regulation (EC) No. 1272/2008 [CLP]	Type
Distillate (petroleum), hydrotreated middle	REACH #: 01-2119489867-12 EC: 265-148-2 CAS: 64742-46-7 Index: 649-221-00-X	>95	Acute Tox. 4, H332 Skin Irrit. 2, H315 Asp. Tox. 1, H304 Aquatic Chronic 2, H411	[1] [2]
Distillate (petroleum), hydrotreated light naphthenic	REACH #: 01-2119480375-34 EC: 265-156-6 CAS: 64742-53-6	1 - 3	Asp. Tox. 1, H304	[1] [2]

SECTION 3: Composition/information on ingredients

2,6-di-tert-butyl-p-cresol	Index: 649-466-00-2 REACH #: 01-2119555270-46 EC: 204-881-4 CAS: 128-37-0	<0.3	Aquatic Acute 1, H400 (M=1) Aquatic Chronic 1, H410 (M=1) **See Section 16 for the full text of the H statements declared above.**	[1]

Regulation (EC) No. 1272/2008 [CLP] Annex VI Nota N applies to the base oil(s) in this product. Nota N - The classification as a carcinogen need not apply if the full refining history is known and it can be shown that the substance from which it is produced is not a carcinogen.

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment, are PBTs, vPvBs or Substances of equivalent concern, or have been assigned a workplace exposure limit and hence require reporting in this section.

Type

[1] Substance classified with a health or environmental hazard
[2] Substance with a workplace exposure limit
[3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
[4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII
[5] Substance of equivalent concern
[6] Additional disclosure due to company policy

Occupational exposure limits, if available, are listed in Section 8.

SECTION 4: First aid measures

4.1 Description of first aid measures

Eye contact

Get medical attention. Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

Inhalation

If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing. If casualty is unconscious and: If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. If necessary, call a poison center or physician. Maintain an open airway.

Skin contact

Wash skin thoroughly with soap and water or use recognised skin cleanser. Continue to rinse for at least 10 minutes. Remove contaminated clothing and shoes. Handle with care and dispose of in a safe manner. Seek medical attention if skin irritation, swelling or redness develops and persists.

Accidental high pressure injection through the skin requires immediate medical attention. Do not wait for symptoms to develop.

Ingestion

Always assume that aspiration has occurred. Do not induce vomiting. Can enter lungs and cause damage. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Seek professional medical attention or send the casualty to a hospital. Do not wait for symptoms to develop.

Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.

Protection of first-aiders

No action shall be taken involving any personal risk or without suitable training. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus.

Before attempting to rescue casualties, isolate area from all potential sources of ignition including disconnecting electrical supply. Ensure adequate ventilation and check that a safe, breathable atmosphere is present before entry into confined spaces.

SECTION 4: First aid measures

4.2 Most important symptoms and effects, both acute and delayed

Over-exposure signs/symptoms

Eye contact	Adverse symptoms may include the following: pain or irritation watering redness
Inhalation	Inhalation of oil mist or vapours at elevated temperatures may cause respiratory irritation.
Skin contact	Adverse symptoms may include the following: irritation redness dryness cracking
Ingestion	Adverse symptoms may include the following: Nausea or vomiting. diarrhoea

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician	Due to low viscosity there is a risk of aspiration if the product enters the lungs. Treat symptomatically.
Specific treatments	Always assume that aspiration has occurred.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	Use dry chemical, CO_2, water spray (fog) or foam.
Unsuitable extinguishing media	Do not use direct water jets on the burning product; they could cause splattering and spread the fire. Simultaneous use of foam and water on the same surface is to be avoided as water destroys the foam.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture	In a fire or if heated, a pressure increase will occur and the container may burst. This substance will float and can be reignited on surface water. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.
Hazardous combustion products	Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates, gases, including carbon monoxide, H2S, SOx (sulfur oxides) or sulfuric acid and unidentified organic and inorganic compounds.

5.3 Advice for firefighters

Special precautions for fire-fighters	Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
Special protective equipment for fire-fighters	Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel	Avoid breathing vapour or mist. Keep non-involved personnel away from the area of spillage. Alert emergency personnel. Except in case of small spillages, the feasibility of any actions should always be assessed and advised, if possible, by a trained, competent person in charge of managing the emergency. Stop leak if safe to do so. Avoid direct contact with the product. Stay upwind/keep distance from source. In case of large spillages, alert occupants in downwind areas. Eliminate all ignition sources if safe to do so. Spillages of limited amounts of product, especially in the open air when vapours will be usually quickly dispersed, are dynamic situations, which will presumably limit the exposure to dangerous concentrations. Note : recommended measures are based on the most likely spillage scenarios for this material; however, local conditions (wind, air temperature, wave/current direction and speed) may significantly influence the choice of appropriate actions. For this reason, local experts should be consulted when necessary. Local regulations may also prescribe or limit actions to be taken.
For emergency responders	Small spillages: normal antistatic working clothes are usually adequate. Large spillages: full body suit of chemically resistant and thermal resistant material should be used. Work gloves providing adequate chemical resistance, specifically to aromatic hydrocarbons. Note : gloves made of PVA are not water-resistant, and are not suitable for emergency use. Safety helmet, antistatic non-skid safety shoes or boots. Goggles and /or face shield, if splashes or contact with eyes is possible or anticipated. Respiratory protection : A half or full-face respirator with filter(s) for organic vapours (and when applicable for H2S) a Self Contained Breathing Apparatus (SCBA) can be used according to the extent of spill and predictable amount of exposure. If the situation cannot be completely assessed, or if an oxygen deficiency is possible, only SCBA's should be used.
6.2 Environmental precautions	Water polluting material. Collect spillage. May be harmful to the environment if released in large quantities. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Prevent product from entering sewers, rivers or other bodies of water. If necessary dike the product with dry earth, sand or similar non-combustible materials. In case of soil contamination, remove contaminated soil and treat in accordance with local regulations. In case of small spillages in closed waters (i.e. ports), contain product with floating barriers or other equipment. Collect spilled product by absorbing with specific floating absorbents. If possible, large spillages in open waters should be contained with floating barriers or other mechanical means. If this is not possible, control the spreading of the spillage, and collect the product by skimming or other suitable mechanical means. The use of dispersants should be advised by an expert, and, if required, approved by local authorities.

6.3 Methods and material for containment and cleaning up

Small spill	Stop leak if without risk. Absorb spilled product with suitable non-combustible materials.
Large spill	Large spillages may be cautiously covered with foam, if available, to limit vapour cloud formation. Do not use water jet. When inside buildings or confined spaces, ensure adequate ventilation. Transfer collected product and other contaminated materials to suitable containers for recovery or safe disposal. Approach the release from upwind. Contaminated absorbent material may pose the same hazard as the spilt product.

SECTION 6: Accidental release measures

6.4 Reference to other sections	See Section 1 for emergency contact information. See Section 8 for information on appropriate personal protective equipment. See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

General information	Obtain special instructions before use. Keep away from heat/sparks/open flames/hot surfaces. No smoking. Use and store only outdoors or in a well-ventilated area. Hazard of slipping on spilt product. Avoid release to the environment.

7.1 Precautions for safe handling

Protective measures	Do not ingest. Do not breathe dust/fume/gas/mist/vapours/spray. Avoid contact with eyes, skin and clothing. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Prevent the risk of slipping. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Take precautionary measures against static discharge. Avoid splash filling of bulk volumes when handling hot liquid product. Empty containers retain product residue and can be hazardous. Avoid release to the environment. Use only bottom loading of tankers, in compliance with national or local legislation. Nota : See Section 8 for information on appropriate personal protective equipment. See section 13 for waste disposal information.
Advice on general occupational hygiene	Ensure that proper housekeeping measures are in place. Contaminated materials should not be allowed to accumulate in the workplaces and should never be kept inside the pockets. Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Wash hands thoroughly after handling. Change contaminated clothes at the end of working shift. See also Section 8 for additional information on hygiene measures.

7.2 Conditions for safe storage, including any incompatibilities	Storage area layout, tank design, equipment and operating procedures must comply with the relevant regional, national or local legislation. Storage installations should be designed with adequate bunds in case of leaks or spills. Cleaning, inspection and maintenance of internal structure of storage tanks must be done only by properly equipped and qualified personnel as defined by national, local or company regulations. Store separately from oxidising agents. Recommended materials for containers, or container linings use mild steel, stainless steel. Not suitable : Some synthetic materials may be unsuitable for containers or container linings depending on the material specification and intended use. Compatibility should be checked with the manufacturer. Keep only in the original container or in a suitable container for this kind of product. Keep container tightly closed and sealed until ready for use. Do not store in unlabelled containers. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Empty containers may contain harmful, flammable/combustible or explosive residue or vapours. Do not cut, grind, drill, weld, reuse or dispose of containers unless adequate precautions are taken against these hazards. Store locked up. Protect from sunlight.

Seveso Directive - Reporting thresholds

Danger criteria

Category	Notification and MAPP threshold	Safety report threshold
E2	200 tonne	500 tonne

SECTION 7: Handling and storage

7.3 Specific end use(s)

Recommendations	Not available.
Industrial sector specific solutions	Not available.

SECTION 8: Exposure controls/personal protection

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

8.1 Control parameters

Occupational exposure limits

Product/ingredient name	Exposure limit values
Distillate (petroleum), hydrotreated middle	**Work environment authority Regulation 2018:1 (Sweden, 2/2018).** TWA: 1 mg/m³ 8 hours. Form: mist and fume STEL: 3 mg/m³ 15 minutes. Form: mist and fume
Distillate (petroleum), hydrotreated light naphthenic	**Work environment authority Regulation 2018:1 (Sweden, 2/2018).** TWA: 1 mg/m³ 8 hours. Form: mist and fume STEL: 3 mg/m³ 15 minutes. Form: mist and fume
Oil mist	***[Air contaminant]*** **Work environment authority Regulation 2018:1 (Sweden, 2/2018).** TWA: 1 mg/m³ 8 hours. Form: mist and fume STEL: 3 mg/m³ 15 minutes. Form: mist and fume

Recommended monitoring procedures

If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to monitoring standards, such as the following: European Standard EN 689 (Workplace atmospheres - Guidance for the assessment of exposure by inhalation to chemical agents for comparison with limit values and measurement strategy) European Standard EN 14042 (Workplace atmospheres - Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents) European Standard EN 482 (Workplace atmospheres - General requirements for the performance of procedures for the measurement of chemical agents) Reference to national guidance documents for methods for the determination of hazardous substances will also be required.

DNELs/DMELs

Product/ingredient name	Type	Exposure	Value	Population	Effects
Distillate (petroleum), hydrotreated middle	DNEL	Short term Inhalation	5002,7 mg/m³	Workers	Systemic
	DNEL	Long term Dermal	2,91 mg/kg bw/day	Workers	Systemic
	DNEL	Long term Inhalation	16,4 mg/m³	Workers	Systemic
Distillate (petroleum), hydrotreated light naphthenic	DNEL	Long term Inhalation	5,58 mg/m³	Workers	Local
2,6-di-tert-butyl-p-cresol	DNEL	Long term Inhalation	5,8 mg/m³	Workers	Systemic
	DNEL	Long term Inhalation	1,74 mg/m³	General population [Consumers]	Systemic
	DMEL	Long term Dermal	8,3 mg/kg bw/day	Workers	Systemic
	DMEL	Long term Dermal	5 mg/kg bw/day	General population [Consumers]	Systemic

SECTION 8: Exposure controls/personal protection

PNECs

Product/ingredient name	Compartment Detail	Value	Method Detail
2,6-di-tert-butyl-p-cresol	Soil Sewage Treatment Plant Sediment Secondary Poisoning Marine water Fresh water	1,04 mg/kg wwt 100 mg/l 1,29 mg/kg wwt 16,7 mg/kg 0,4 µg/l 4 µg/l	Equilibrium Partitioning Assessment Factors Equilibrium Partitioning Assessment Factors Assessment Factors Assessment Factors

PNEC Summary: Hydrocarbon Block Method (Petrorisk)

8.2 Exposure controls

Appropriate engineering controls: Use only with adequate ventilation. Use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits. Mechanical ventilation and local exhaust will reduce exposure via the air. Use oil resistant material in construction of handling equipment. Store under recommended conditions and if heated, temperature control equipment should be used to avoid overheating.

Individual protection measures

Hygiene measures: Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Ensure that eyewash stations and safety showers are close to the workstation location. Wash contaminated clothing before reuse.

Eye/face protection: Recommended: Safety glasses with side shields.

Skin protection

Hand protection: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. 4 - 8 hours (breakthrough time): nitrile rubber

Body protection: Wear protective gloves/protective clothing/eye protection/face protection. Change contaminated clothes at the end of working shift.

Other skin protection: Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection: Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator. Use a properly fitted, particulate filter respirator complying with an approved standard if a risk assessment indicates this is necessary.

Environmental exposure controls: Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

SECTION 9: Physical and chemical properties

The conditions of measurement of all properties are at standard temperature and pressure unless otherwise indicated.

9.1 Information on basic physical and chemical properties

Appearance

Physical state: Liquid.

Colour: Light yellow

Odour: Odourless/Light petroleum.

Odour threshold: Not applicable.

pH: Not applicable.

Melting point/freezing point: <-70°C

Initial boiling point and boiling range: Not available.

Flammability (solid, gas): Not available.

SECTION 9: Physical and chemical properties

Upper/lower flammability or explosive limits	Not available.
Flash point	Closed cup: >94°C (>201,2°F) [Pensky-Martens]
Auto-ignition temperature	>200°C (>392°F)
Decomposition temperature	>280°C
Viscosity	Kinematic (40°C): 2,9 mm^2/s (2,9 cSt)
Solubility(ies)	Insoluble in water.
Solubility in water	Not available.
Partition coefficient: n-octanol/ water	Not applicable.

Vapour pressure (Calculated)

Ingredient name	Vapour Pressure at 20˚C			Vapour pressure at 50˚C		
	mm Hg	kPa	Method	mm Hg	kPa	Method
2,6-di-tert-butyl-p-cresol	0,00975	0,0013				

Evaporation rate	Not available.
Relative density	Not available.
Density	0,86 g/cm^3 [15°C]
Explosive properties	Not available.
Oxidising properties	Not available.

SECTION 10: Stability and reactivity

10.1 Reactivity	No specific test data related to reactivity available for this product or its ingredients.
10.2 Chemical stability	Stable under normal conditions.
10.3 Possibility of hazardous reactions	Under normal conditions of storage and use, hazardous reactions will not occur.
10.4 Conditions to avoid	Keep away from extreme heat and oxidizing agents. Take precautionary measures against static discharge.
10.5 Incompatible materials	Oxidising agent.
10.6 Hazardous decomposition products	Incomplete combustion is likely to give rise to a complex mixture of airborne solid and liquid particulates, gases, including carbon monoxide, H2S, SOx (sulfur oxides) or sulfuric acid and unidentified organic and inorganic compounds.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product/ingredient name	Result	Species	Dose	Exposure	Remarks
Distillate (petroleum), hydrotreated middle	LC50 Inhalation Dusts and mists	Rat - Male	4,6 mg/l	4 hours	API 1983(similar material)
	LD50 Dermal	Rabbit	>5000 mg/kg	-	API 1982 (similar material)
	LD50 Oral	Rat	>5000 mg/kg	-	API 1982 (similar material)
Distillate (petroleum), hydrotreated light naphthenic	LC50 Inhalation Dusts and mists	Rat	>5,53 mg/l	4 hours	EMBSI 1988 (similar material)
	LD50 Dermal	Rabbit	>5000 mg/kg	-	API 1982 (similar material)
	LD50 Oral	Rat	>5000 mg/kg	-	API 1982(similar

SECTION 11: Toxicological information

					material)
2,6-di-tert-butyl-p-cresol	LD50 Dermal	Rat	>5000 mg/kg	-	Supplier's information
	LD50 Oral	Rat	>5000 mg/kg	-	Supplier's information

Conclusion/Summary Harmful if inhaled.

Acute toxicity estimates

Product/ingredient name	Oral (mg/kg)	Dermal (mg/kg)	Inhalation (gases) (ppm)	Inhalation (vapours) (mg/l)	Inhalation (dusts and mists) (mg/l)
N/A	N/A	N/A	N/A	N/A	4,8
Distillate (petroleum), hydrotreated middle	N/A	N/A	N/A	N/A	4,6

Irritation/Corrosion

Product/ingredient name	Result	Species	Score	Observation	Remarks
Distillate (petroleum), hydrotreated middle	Eyes - Non-irritating to the eyes.	Rabbit	0	24 to 72 hours	API 1982(similar material)
	Skin - Irritant	Rabbit	-	24 to 72 hours	API 1982 (similar material)
Distillate (petroleum), hydrotreated light naphthenic	Skin - Non-irritant to skin.	Rabbit	0 to 1	24 to 72 hours	API 1982(similar material)
	Eyes - Non-irritating to the eyes.	Rabbit	0 to 0,11	24 to 72 hours	API 1982(similar material)
2,6-di-tert-butyl-p-cresol	Eyes - Redness of the conjunctivae	Rabbit	0,5	-	Supplier's information
	Eyes - Iris lesion	Rabbit	0	-	Supplier's information
	Eyes - Oedema of the conjunctivae	Rabbit	0,1	-	Supplier's information
	Eyes - Cornea opacity	Rabbit	0	-	Supplier's information

Skin Causes skin irritation.

Eyes Based on available data, the classification criteria are not met.

Respiratory Based on available data, the classification criteria are not met.

Sensitisation

Product/ingredient name	Route of exposure	Species	Result	Remarks
Distillate (petroleum), hydrotreated middle	skin	Guinea pig	Not sensitizing	API 1984(similar material)
Distillate (petroleum), hydrotreated light naphthenic	skin	Guinea pig	Not sensitizing	API 1982(similar material)
2,6-di-tert-butyl-p-cresol	skin	Human	Not sensitizing	Supplier's information

Skin Based on available data, the classification criteria are not met.

Respiratory Based on available data, the classification criteria are not met.

Mutagenicity

SECTION 11: Toxicological information

Product/ingredient name	Test	Experiment	Result	Remarks
2,6-di-tert-butyl-p-cresol	OECD 471 471 Bacterial Reverse Mutation Test	Experiment: In vitro Subject: Bacteria	Negative	-
	476 In vitro Mammalian Cell Gene Mutation Test	Experiment: In vitro Subject: Mammalian-Animal	Negative	-
	473 In vitro Mammalian Chromosomal Aberration Test	Experiment: In vitro Subject: Mammalian-Animal	Negative	-

Conclusion/Summary: Based on available data, the classification criteria are not met.

Carcinogenicity

Conclusion/Summary: The base oil(s) in this product is based on an severely hydrotreated distillate. The product should not be regarded as a carcinogen.

Reproductive toxicity

Conclusion/Summary: Based on available data, the classification criteria are not met.

Teratogenicity

Conclusion/Summary: Based on available data, the classification criteria are not met.

Aspiration hazard

Product/ingredient name	Result
Distillate (petroleum), hydrotreated middle	ASPIRATION HAZARD - Category 1
Distillate (petroleum), hydrotreated light naphthenic	ASPIRATION HAZARD - Category 1

Potential chronic health effects

Product/ingredient name	Result	Species	Dose	Exposure
Distillate (petroleum), hydrotreated middle	Sub-chronic NOAEL Dermal	Rat - Male	25 mg/kg	5 days per week
	Sub-chronic NOAEL Dermal	Rat - Female	125 mg/kg	5 days per week
	Sub-chronic NOAEL Inhalation Dusts and mists	Rat	>1,71 mg/l	4 hours; 2 days per week
Distillate (petroleum), hydrotreated light naphthenic	Sub-chronic LOAEL Oral	Rat	125 mg/kg	-
	Sub-chronic NOAEL Dermal	Rat	>2000 mg/kg	-
	Sub-acute NOEL Inhalation Dusts and mists	Rat	220 mg/m³	6 hours; 5 days per week
2,6-di-tert-butyl-p-cresol	Sub-acute NOAEL Oral	Rat	25 mg/kg	28 days; 7 days per week

Specific hazard

Aspiration hazard
Aspiration means the entry of a liquid substance directly into the trachea and lower respiratory tract.
Aspiration of hydrocarbon substances can result in in severe acute effects such as chemical pneumonitis, varying degree of pulmonary injury or death.
This property relates to the potential for low viscosity material to spread quickly into the deep lung and cause severe pulmonary tissue damage.
Classification of a hydrocarbon substance for aspiration hazard is made on the basis of reliable human evidence or on the basis of physical properties.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Result	Species	Exposure
Distillate (petroleum), hydrotreated middle	Acute EL50 1,714 mg/l Acute EL50 7,385 mg/l Acute LL50 1,13 mg/l Chronic NOEL 0,163 mg/l Chronic NOEL 0,069 mg/l Fresh water	Algae Daphnia Fish Aquatic invertebrates. Fish	72 hours 48 hours 96 hours 21 days 14 days
Distillate (petroleum), hydrotreated light naphthenic	Acute EL50 >10000 mg/l	Daphnia	48 hours
	Acute LL50 >100 mg/l Acute NOEL >100 mg/l Chronic NOEL 10 mg/l Fresh water	Fish Algae Daphnia	96 hours 72 hours 21 days
2,6-di-tert-butyl-p-cresol	Acute EC50 0,61 mg/l Acute IC50 >0,4 mg/l Acute LC50 >0,57 mg/l Chronic NOEC 0,316 mg/l	Daphnia - Magna Algae - Desmodesmus Subspicatus Fish - Danio-rerio Daphnia - Magna	48 hours 72 hours 96 hours 21 days

Conclusion/Summary Toxic to aquatic life with long lasting effects. Water polluting material.

12.2 Persistence and degradability

Product/ingredient name	Test	Result	Dose	Inoculum
2,6-di-tert-butyl-p-cresol	OECD 301C 301C Ready Biodegradability - Modified MITI Test (I)	4,5 % - 28 days	-	-

Product/ingredient name	Aquatic half-life	Photolysis	Biodegradability
Distillate (petroleum), hydrotreated middle	-	-	Inherent
Distillate (petroleum), hydrotreated light naphthenic	-	-	Inherent
2,6-di-tert-butyl-p-cresol	-	-	Not readily

Conclusion/Summary Inherently biodegradable.

12.3 Bioaccumulative potential

Product/ingredient name	$LogP_{ow}$	BCF	Potential
Distillate (petroleum), hydrotreated middle	>4	<500	low
Distillate (petroleum), hydrotreated light naphthenic	2 to 6	<500	low
2,6-di-tert-butyl-p-cresol	5,1	-	high

Conclusion/Summary The product has a potential to bioaccumulate.

12.4 Mobility in soil

Mobility High mobility in soil predicted, based on log Kow > 3.0.

12.5 Results of PBT and vPvB assessment

This mixture does not contain any substances that are assessed to be a PBT or a vPvB.

12.6 Other adverse effects Insoluble in water. Spills may form a film on water surfaces causing physical damage to organisms. Oxygen transfer could also be impaired.

SECTION 13: Disposal considerations

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

13.1 Waste treatment methods

Product

Methods of disposal: Where possible (e.g. in the absence of relevant contamination), recycling of used substance is feasible and recommended. This substance can be burned or incinerated, subject to national/local authorizations, relevant contamination limits, safety regulations and air quality legislation. Contaminated or waste substance (not directly recyclable): Disposal can be carried out directly, or by delivery to qualified waste handlers. National legislation may identify a specific organization, and/or prescribe composition limits and methods for recovery or disposal.

Hazardous waste: Yes.

European waste catalogue (EWC)

Waste code	Waste designation
13 03 07*	mineral-based non-chlorinated insulating and heat transmission oils

Packaging

Methods of disposal: The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

SECTION 14: Transport information

International transport regulations

	ADR/RID	ADN	IMO/IMDG Classification	ICAO/IATA Classification
14.1 UN number	UN3082	UN3082	UN3082	UN3082
14.2 UN proper shipping name	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Distillate (petroleum), hydrotreated middle , liquid)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Distillate (petroleum), hydrotreated middle , liquid)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Distillate (petroleum), hydrotreated middle , liquid)	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (Distillate (petroleum), hydrotreated middle , liquid)
14.3 Transport hazard class(es)	9 	9 	9 	9 
14.4 Packing group	III	III	III	III
14.5 Environmental hazards	Yes.	Yes.	Yes.	Yes.

Additional information

ADR/RID: This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8.
Hazard identification number 90
Special provisions 274;335;375;601
Tunnel code -

SECTION 14: Transport information

ADN	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. **Special provisions** 274;335;375;601
IMDG	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 4.1.1.1, 4.1.1.2 and 4.1.1.4 to 4.1.1.8. **Emergency schedules** F-A, S-F **Special provisions** 274;335;969 **Remarks** Marine pollutant
IATA	This product is not regulated as a dangerous good when transported in sizes of ≤5 L or ≤5 kg, provided the packagings meet the general provisions of 5.0.2.4.1, 5.0.2.6.1.1 and 5.0.2.8. **Quantity limitation** Passenger and Cargo Aircraft: 450 L. Packaging instructions: 964. Cargo Aircraft Only: 450 L. Packaging instructions: 964. Limited Quantities - Passenger Aircraft: 30 kg. Packaging instructions: 964Y. **Special provisions** A97;A158;A197
14.6 Special precautions for user	**Transport within user's premises:** always transport in closed containers that are upright and secure. Ensure that persons transporting the product know what to do in the event of an accident or spillage.
14.7 Transport in bulk according to IMO instruments	Not applicable.
MARPOL Annex 1	Oils

SECTION 15: Regulatory information

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

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorisation

None of the components are listed.

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles	Not applicable.

Other EU regulations

Industrial emissions (integrated pollution prevention and control) - Air	Not listed
Industrial emissions (integrated pollution prevention and control) - Water	Not listed

Ozone depleting substances (1005/2009/EU)

Not listed.

Prior Informed Consent (PIC) (649/2012/EU)

Not listed.

Persistent Organic Pollutants

Not listed.

Seveso Directive

SECTION 15: Regulatory information

This product is controlled under the Seveso Directive.

Danger criteria

Category
E2

International regulations

Chemical Weapon Convention List Schedules I, II & III Chemicals

Not listed.

Montreal Protocol

Not listed.

Stockholm Convention on Persistent Organic Pollutants

Not listed.

Rotterdam Convention on Prior Informed Consent (PIC)

Not listed.

UNECE Aarhus Protocol on POPs and Heavy Metals

Not listed.

National inventory

Australia	All components are listed or exempted.
Canada	All components are listed or exempted.
China	All components are listed or exempted.
Japan	**Japan inventory (CSCL)**: All components are listed or exempted. **Japan inventory (ISHL)**: All components are listed or exempted.
New Zealand	All components are listed or exempted.
Philippines	All components are listed or exempted.
Republic of Korea	All components are listed or exempted.
Taiwan	All components are listed or exempted.
United States	All components are active or exempted.
Thailand	All components are listed or exempted.
Turkey	All components are listed or exempted.
Viet Nam	All components are listed or exempted.

15.2 Chemical safety assessment	Complete.

SECTION 16: Other information

Revision comments	Not available.

Indicates information that has changed from previously issued version.

Abbreviations and acronyms	ATE = Acute Toxicity Estimate CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008] DMEL = Derived Minimal Effect Level DNEL = Derived No Effect Level EUH statement = CLP-specific Hazard statement N/A = Not available PBT = Persistent, Bioaccumulative and Toxic PNEC = Predicted No Effect Concentration RRN = REACH Registration Number SGG = Segregation Group vPvB = Very Persistent and Very Bioaccumulative

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

SECTION 16: Other information

Classification	Justification
Acute Tox. 4, H332	Calculation method
Skin Irrit. 2, H315	Calculation method
Asp. Tox. 1, H304	Calculation method
Aquatic Chronic 2, H411	Calculation method

Sweden

Full text of abbreviated H statements	H304	May be fatal if swallowed and enters airways.
	H315	Causes skin irritation.
	H332	Harmful if inhaled.
	H400	Very toxic to aquatic life.
	H410	Very toxic to aquatic life with long lasting effects.
	H411	Toxic to aquatic life with long lasting effects.
Full text of classifications [CLP/ GHS]	Acute Tox. 4	ACUTE TOXICITY - Category 4
	Aquatic Acute 1	SHORT-TERM (ACUTE) AQUATIC HAZARD - Category 1
	Aquatic Chronic 1	LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 1
	Aquatic Chronic 2	LONG-TERM (CHRONIC) AQUATIC HAZARD - Category 2
	Asp. Tox. 1	ASPIRATION HAZARD - Category 1
	Skin Irrit. 2	SKIN CORROSION/IRRITATION - Category 2
Date of printing	2021-05-27	
Date of issue/ Date of revision	2021-05-27	
Date of previous issue	2021-02-08	
Version	5.01	

Notice to reader

To the best of our knowledge, the information contained herein is accurate. However, neither the above-named supplier, nor any of its subsidiaries, assumes any liability whatsoever for the accuracy or completeness of the information contained herein.
Final determination of suitability of any material is the sole responsibility of the user. All materials may present unknown hazards and should be used with caution. Although certain hazards are described herein, we cannot guarantee that these are the only hazards that exist.
The information provided herein does not in any way constitute a product warranty, product specification, agreement on quality or similar.

Section 1 - Title

Short title of the exposure scenario	Use in functional fluids - Industrial
List of use descriptors	**Identified use name:** Use in functional fluids - Industrial **Process Category:** PROC01, PROC02, PROC08b, PROC09 **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC07
Environmental contributing scenarios	**Use of functional fluid at industrial site -** ERC07
Health Contributing scenarios	**General exposures (closed systems) -** PROC02 **Bulk transfers -** PROC01, PROC02 **Storage -** PROC01, PROC02 **Drum/batch transfers -** PROC08b **Filling of articles/equipment -** PROC09 **Remanufacture of reject articles -** PROC09
Processes and activities covered by the exposure scenario	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers.

Section 2 - Exposure controls

2.1 Control of environmental exposure

Amounts used	Annual site tonnage (tonnes/year) 10 Maximum daily site tonnage (kg/day) 500
Frequency and duration of use	Continuous release Emission days (days per year) 20
Other conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM) 0.0001 Release fraction to wastewater from process (initial release prior to RMM) 3.0E-5 Release fraction to soil from process (initial release prior to RMM) 0.001
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	Prevent discharge of undissolved substance to or recover from onsite wastewater. No wastewater treatment required. Floors should be impervious, resistant to liquids and easy to clean.
Risk management measures - Air	Treat air emissions. >= 70%.
Risk management measures - Water	Water - minimum efficiency of 70.0 %.
Risk management measures - Soil	Soil - minimum efficiency of >= 70%.
Organisational measures to prevent/limit release from site	Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%): 94.9. Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 94.9. Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/day): 90 000 Assumed on-site sewage treatment plant flow (m^3/d): 2000

2.2 Control of worker exposure

General measures applicable to all activities

Concentration of substance in mixture or article	Covers use up to 100%.

Section 2 - Exposure controls

Frequency and duration of use	Covers daily exposures up to 8 hours
Other conditions affecting workers exposure	Assumes a good basic standard of occupational hygiene is implemented Assumes use at not more than 20°C above ambient temperature. There are no routine anticipated exposures by ingestion related to any supported uses of the substance. The risk arising from aspiration hazard is solely related to the physico-chemical properties of the substance. The risk can therefore be controlled by implementing risk management measures tailored to this specific risk.

Risk management measures (RMM)

Bulk transfers - PROC 1, PROC 2
Handle substance within a closed system.

Drum/batch transfers Dedicated facility - PROC 8b
Use drum pumps.

Filling of articles/equipment Closed system - PROC 9
Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour). Transfer via enclosed lines.

General exposures (closed systems) - PROC 2
Sample via a closed loop or other system to avoid exposure.

Remanufacture of reject articles - PROC 9
Drain or remove substance from equipment prior to break-in or maintenance.

Storage - PROC 1, PROC 2
Store substance within a closed system.

Section 3 - Exposure estimation and reference to its source

3.1 Environment

Exposure assessment (environment):	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

3.2 Workers

Exposure assessment (human):	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Available hazard data do not enable the derivation of a DNEL for eye irritant effects. Risk management measures are based on qualitative risk characterisation.

Section 1 - Title

Short title of the exposure scenario	Use in functional fluids - Professional
List of use descriptors	**Identified use name:** Use in functional fluids - Professional **Process Category:** PROC01, PROC02, PROC08a, PROC20, PROC08b **Subsequent service life relevant for that use:** No. **Environmental Release Category:** ERC09a
Environmental contributing scenarios	**Widespread use of functional fluid (indoor) -** ERC09a
Health Contributing scenarios	**Drum/batch transfers -** PROC08a **Operation of equipment containing engine oils and similar -** PROC20 **Equipment cleaning and maintenance -** PROC08a **Storage -** PROC01, PROC02 **General exposures (closed systems) -** PROC01, PROC02
Processes and activities covered by the exposure scenario	Use as functional fluids e.g. cable oils, transfer oils, coolants, insulators, refrigerants, hydraulic fluids in industrial equipment including maintenance and related material transfers.

Section 2 - Exposure controls

2.1 Control of environmental exposure

Amounts used	Annual site tonnage (tonnes/year) 0.0005 Maximum daily site tonnage (kg/day) 0.0013
Frequency and duration of use	Continuous release Emission days (days per year) 365
Other conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM) 0.0005 Release fraction to wastewater from process (initial release prior to RMM) 0.0005 Release fraction to soil from process (initial release prior to RMM) 0.001
Technical on-site conditions and measures to reduce or limit discharges, air emissions and releases to soil	No wastewater treatment required.
Risk management measures - Water	Water - minimum efficiency of 63.06%.
Organisational measures to prevent/limit release from site	Do not apply industrial sludge to natural soils. Sewage sludge should be incinerated, contained or reclaimed.
Conditions and measures related to sewage treatment plant	Estimated substance removal from wastewater via domestic sewage treatment (%): 94.9. Total efficiency of removal from wastewater after onsite and offsite (domestic treatment plant) RMMs (%): 94.9. Maximum allowable site tonnage (M_{Safe}) based on release following total wastewater treatment removal (kg/day): 0.33. Assumed domestic sewage treatment plant flow (m^3/day): 2000.

2.2 Control of worker exposure

General measures applicable to all activities

Concentration of substance in mixture or article	Covers use up to 100%.
Frequency and duration of use	Covers daily exposures up to 8 hours

Section 2 - Exposure controls

Other conditions affecting workers exposure	Assumes a good basic standard of occupational hygiene is implemented Assumes use at not more than 20°C above ambient temperature. There are no routine anticipated exposures by ingestion related to any supported uses of the substance. The risk arising from aspiration hazard is solely related to the physico-chemical properties of the substance. The risk can therefore be controlled by implementing risk management measures tailored to this specific risk.

Risk management measures (RMM)

Drum/batch transfers Non-dedicated facility - PROC 8a
Use drum pumps.

General exposures (closed systems) - PROC 1, PROC 2
Sample via a closed loop or other system to avoid exposure.

Operation of equipment containing engine oils and similar Closed system - PROC 20
Handle substance within a closed system.

Operation of equipment containing engine oils and similar Closed system Elevated temperature - PROC 20
Provide a good standard of controlled ventilation (5 to 10 air changes per hour). Assumes process temperature up to 80.0 °C.

Equipment cleaning and maintenance - PROC 8a
Covers use up to 4.0 hours per day Drain down and flush system prior to equipment break-in or maintenance.

Storage - PROC 1, PROC 2
Store substance within a closed system.

Section 3 - Exposure estimation and reference to its source

3.1 Environment

Exposure assessment (environment):	The Hydrocarbon Block Method has been used to calculate environmental exposure with the Petrorisk model.

3.2 Workers

Exposure assessment (human):	The ECETOC TRA tool has been used to estimate workplace exposures unless otherwise indicated. Qualitative approach used to conclude safe use.
Exposure estimation and reference to its source	Predicted exposures are not expected to exceed the DN(M)EL when the risk management measures/operational conditions outlined in section 2 are implemented. Where other risk management measures/operational conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. Available hazard data do not enable the derivation of a DNEL for aspiration effects. Available hazard data do not enable the derivation of a DNEL for eye irritant effects. Risk management measures are based on qualitative risk characterisation.

MATERIAL SAFETY DATA SHEET

1. Identification of the substance or preparation and of the company/undertaking

1.1.	Identification of substance or preparation:	**UltraClean™ UCW3700**
	Trade name or designation of mixture:	Polystyrene sulphonic acid Polyvinyl benzyl trimethyl ammonium hydroxide
	EC Number:	Not applicable
	REACH Registration Number:	This mixture is exempted from Registration according to the provisions of Title II and VI and Article 2(9) of REACH
1.2.	Use of the substance/preparation:	Ion Exchange, Adsorbent, and/or Catalyst
1.3.	Company/undertaking Identification:	The Purolite Company 150 Monument Road Bala Cynwyd, PA 19004 USA Tel:+1 610 668 9090 Fax:+1 610 668 8139
	Name of Manufacturer:	Purolite S.R.L. Str.Aleea Uzinei nr.11, 505700 Victoria, Judetul Brasov, Romania Tel:+40 26 824 3004 Fax:+40 26 824 3002 Purolite (China) Company Limited, Qianlong Economic Development Zone, Qianyuan Town, Deqing County, Huzhou City, Zhejiang, China 313216 Tel: +86 572 842 2908 Fax:+86 572 842 5345 The Purolite Company 150 Monument Road Bala Cynwyd, PA 19004 USA Tel:+1 610 668 9090 Fax:+1 610 668 8139
	Responsible Person:	Ken Shaner
	Email:	msds@purolite.com
1.4.	Emergency Telephone:	USA Toll Free: + 1 866 387 7344, 24 hours 7 days a week USA Direct: + 1 760 602 8703, 24 hours 7 days a week

2. Hazards identification

Emergency overview
- Physical state: Solid (bead)
- Color: mixture of white, cream, amber, brown spherical beads
- Odor: Not applicable

- Contact with eyes: Warning! Causes eye irritation
- Contact with skin: Warning! Causes mild skin irritation

Low hazard for unusal industrial or commercial handling by trained personnel.

OSHA regulatory status
- This mixture is hazardous according to OSHA 29CFR 1910.1200.

Potential health effects
- Inhalation: Limited inhalation hazard at normal work temperatures
- Eye Contact: May cause temporary eye irritation
- Skin Contact: May be slightly irritating to skin
- Ingestion: Under normal conditions of intended use, this material does not pose a risk to health. However, ingestion may cause irritation and malaise
- Chronic Health Effects: No other specific acute or chronic health impact noted noted
- Target Organ(s): Eye / Skin
- Potential Physical / Chemical Effects: This mixture is not flammable

Environmental effects
- The environmental hazard of the mixture is considered limited

3. Composition/information on ingredients

3.1	Ingredient	Concentration	CAS Number	Hazard Statement	R Phrases	Hazard Pictogram	Symbol
	Polystyrene sulphonic acid	20-30%	69011-20-7	H319	R36	GH07	Xi
	Polyvinyl benzyl trimethyl ammonium hydroxide	15-30%	69011-18-3	-	R36	-	Xi
	Water	40-65%	7732-18-5	-	-	-	-

4. First aid measures

Inhalation
- No specific first aid measures noted

Eye Contact
- Any material that contacts the eye should be washed out immediately with water. If easy to do, remove any contact lenses. Get medical attention if any discomfort continues

Skin Contact
- Wash skin with soap and water

Ingestion
- Immediately rinse mouth and drink plenty of water (200-300 ml). Large quantities: Get medical attention if irritation persists

5. Fire-fighting measures

Flammability class
- NFPA Rating Fire = 1

Extinguishing media
- Extinguish with foam, carbon dioxide, dry powder or water fog

Unsuitable extinguishing media
- Not applicable

Special fire fighting procedures
- Self -contained breathing apparatus and full protective clothing must be worn in case of fire

Unusal fire and explosion hazards
- None known

Hazardous combustion products
- Monomers, residual organics, amines, carbon, sulphur and nitrogen oxides

Protective measures
- Selection of respiratory protection for fire fighting: follow the general fire precautions indicated in the workplace

6. Accidental release measures

Personal precautions
- Keep people away
- Spillage causes slippery surface

Environmental precautions
- Do not allow to enter public sewers and watercourses

Methods for cleaning up
- Sweep up as much as possible and transfer to plastic containers for recovery or disposal

7. Handling and storage

7.1 Handling
- Avoid contact with eyes and prolonged skin contact. See section 8 of the MSDS for personal protective equipment

7.2 Storage
- Store at temperatures above 0 °C
- Store at temperatures below 40 °C
- Keep in original container
- Keep container tightly closed to prevent the loss of water
- Store away from incompatible materials

8. Exposure controls/personal protection

8.1 Exposure limits

- No exposure limits noted for mixture

8.2 Exposure controls

- Provide adequate ventilation

8.2.1 Occupational exposure controls

- Respiratory Protection: If engineering controls do not maintain airborne concentrations below recommended exposure limits (where applicable) or to an acceptable level (in countries where exposure limits have not been established), an approved respirator must be worn. In the United States of America, if respirators are used, a program should be instituted to assure compliance with OSHA Standard 63 FR 1152, January 8, 1998. Respirator type: High-efficiency particulate respirator
- Eye Protection: Risk of contact: Wear approved safety goggles.
- Hand Protection: Risk of contact: Wear protective gloves. Suitable gloves can be recommended by the glove supplier
- Skin Protection: Risk of contact: Use skin protection. It is a good industrial hygiene practice to minimize skin contact

8.2.2 Hygiene Measures

- Always observe good personal hygiene measures, such as washing after handling the material and before eating, drinking, and/or smoking. Routinely wash work clothing and protective equipment to remove contaminants

8.2.3 Environmental exposure controls

- Environmental manager must be informed of all major spillages

9. Physical and chemical properties

9.1

- Appearance: mixture of white, cream, amber, brown spherical beads
- Odor: Odorless
- Odor Threshold: Not available
- Physical State: Solid (bead)
- pH: acidic/alkaline as aqueous slurry
- Melting Point: Not available
- Freezing Point: Not available
- Boiling Point: Not available
- Flash Point: Not available
- Evaporation Rate: Not available
- Flammability (solid, gas): Not available
- Flammability Limit - Upper/Flammability Limit - Lower (%): Not available
- Vapor Pressure: Not available
- Vapor Density (Air=1): Not available
- Specific Gravity: 1.05 - 1.28
- Solubility in Water: Insoluble
- Solubility (Other): Not available
- Partition Coefficient (n-Octanol/water): Not available
- Auto Ignition Temperature: Not available
- Decomposition Temperature: Not available

10. Stability and reactivity

10.1 Conditions to avoid
- Considered stable under normal conditions
- Avoid heat

10.2 Materials to avoid
- Incompatible with strong oxidising substances. Contact with strong oxidisers, especially nitric acid, may produce low molecular weight organics that may form explosive mixtures.

10.3 Hazardous decomposition products
- At Elevated Temperatures: monomers, residual organics, amines, carbon, sulphur and nitrogen oxides

10.4 Possibility of Hazardous Reactions: Not available

11. Toxicological information

Acute toxicity
- No evidence of acute toxicity

Carcinogenicity
- No evidence of carcinogenic effects

Teratogenicity
- No evidence of reproductive effects

Mutagenicity
- No evidence of mutagenic effects

12. Ecological information

12.1 Ecotoxicity
- No data available

12.2 Mobility
- The mixture is insoluble in water and will sediment in water systems

12.3 Persistence and degradability
- The mixture is not readily biodegradable

12.4 Bioaccumulative potential
- Potential to bioaccumulate is low

12.5 Other adverse effects
- No data available

13. Disposal considerations

General Information
- Dispose of waste and residues in accordance with local authority requirements

Disposal Methods
- No specific disposal method required

Container
- Since emptied containers retain product residue, follow label warnings even after container is emptied

14. Transport information

- DOT Not regulated
- TDG Not regulated
- IATA Not regulated
- IMDG Not regulated

15. Regulatory information

Canadian Controlled Products Regulations
- This mixture has been classified according to the hazard criteria of the Canadian Controlled Products Regulations, Section 33, and the MSDS contains all required information

WHMIS Classification
- This is not a WHMIS controlled mixture

Mexican Dangerous Statement
- This mixture is not dangerous according to Mexican regulations

Applicable International laws and regulations
- This mixture meets the OECD polymer definition and is therefore exempt from REACH registration

Inventory Status
- This mixture or all components are listed or exempt from listing on the following inventory: TSCA, DSL

US Regulations
- CERCLA Hazardous Substance List (40 CFR 302.4): Not regulated

SARA Title III
- Section 302 Extremely Hazardous Substances (40 CFR 355, Appendix A): Not regulated
- Section 311/312 (40 CFR 370):
Acute (Immediate) Chronic (Delayed) Fire Reactive Pressure Generating
- Section 313 Toxic Release Inventory (40 CFR 372): Not regulated

Clean Air Act (CAA) Section 112(r) Accidental Release Prevention (40 CFR 68.130)
- Not regulated

Clean Water Act Section 311 Hazardous Substances (40 CFR 117.3)
- Not regulated

Drug Enforcement Act
- Not regulated.

TSCA
- TSCA Section 4(a) Final Test Rules & Testing Consent Orders: Not regulated
- TSCA Section 5(a)(2) Final Significant New Use Rules (SNURs) (40CFR 721, Subpt. E): Not regulated
- TSCA Section 5(e) PMN-Substance Consent Orders: Not regulated
- TSCA Section 12(b) Export Notification (40 CFR 707, Subpt. D): Not regulated

State Regulations
- California Safe Drinking Water and Toxic Enforcement Act of 1986 (Proposition 65): Not regulated
- Massachusetts Right-To-Know List: Not regulated
- Michigan Critical Materials List (Michigan Natural Resources and Environmental Protection Act (Act. 451 of 1994)): Not regulated
- Minnesota Hazardous Substances List: Not regulated
- New Jersey Right-To-Know List: Not regulated
- Pennsylvania Right-To-Know List: Not regulated
- Rhode Island Right-To-Know List: Not regulated

16. Other information

HAZARD RATINGS

	Health Hazard	Fire Hazard	Instability	Special Hazard
NFPA	1	1	0	0

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
NFPA Label colored diamond code: Blue - Health; Red - Flammability; Yellow - Instability; White - Special Hazards

	Health Hazard	Flammability	Physical Hazard	Personal Protection
HMIS	1	1	0	--

Hazard rating: 0 - Minimal; 1 - Slight; 2 - Moderate; 3 - Serious; 4 - Severe
HMIS Label colored bar code: Blue - Health; Red - Flammability; Orange - Physical Hazards; White - Special

-Relevant Hazard Statements: (H319) Causes serious eye irritation
-Relevant R phrases: (R36) Irritating to eyes

Note:
The information provided in this material safety data sheet is based on current knowledge about the product and current legal requirements and standards. It relates specifically to health, safety and environmental requirements and standards, may not identify all hazards associated with the product or its uses or misuses, does not signify any warranty with regard to the properties of the product, and only applies when the product is used for the purposes indicated in section 1. This product is not sold as suitable for other purposes and such other usage may cause risks not mentioned in this safety data sheet.

Safety Data Sheet
Nitrogen, compressed.

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

1.1. Product identifier
Product name
Nitrogen, compressed.

EC No (from EINECS): 231-783-9
CAS No: 7727-37-9
Index-Nr. -
Chemical formula N2
REACH Registration number:
Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.

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.
Uses advised against
Consumer use.

1.3. Details of the supplier of the safety data sheet
Company identification
Linde (Thailand) Public Company Limited
15th Floor, Bangna Tower A, 2/3 Moo 14, Bangna-Trad
KM.6.5 Road, Bangkaew, Bangplee, Samutprakarn 10540
Phone (66) 2338-6100 Fax (66) 2312-0126
E-Mail Address: csc.lg.th@linde.com

1.4. Emergency telephone number
Emergency phone numbers (24h): 1384

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

Classification acc. to Regulation (EC) No 1272/2008/EC (CLP/GHS)
Press. Gas (Compressed gas) - Contains gas under pressure; may explode if heated.

Classification acc. to Directive 67/548/EEC & 1999/45/EC
Not classified as hazardous to health.
Asphyxiant in high concentrations.
Risk advice to man and the environment
In high concentrations may cause asphyxiation.
Compressed gas.

2.2. Label elements

- Labelling Pictograms

- Signal word

Warning

- Hazard Statements

H280	Contains gas under pressure; may explode if heated.
EIGA-As	Asphyxiant in high concentrations.

- Precautionary Statements

Precautionary Statement Prevention
None.

Precautionary Statement Response
None.

Precautionary Statement Storage

P403	Store in a well-ventilated place.

Precautionary Statement Disposal
None.

2.3. Other hazards
None.

SECTION 3: Composition/information on ingredients

Substance / Mixture: Substance.

3.1. Substances
Nitrogen, compressed.
CAS No: 7727-37-9
Index-Nr.: -
EC No (from EINECS): 231-783-9
REACH Registration number:
Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.
Contains no other components or impurities which will influence the classification of the product.

3.2. Mixtures
Not applicable.

SECTION 4: First aid measures

4.1. Description of first aid measures

First Aid General Information:
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
First Aid Inhalation:
Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.
First Aid Skin / Eye:
Adverse effects not expected from this product.
First Aid Ingestion:
Ingestion is not considered a potential route of exposure.

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.

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

None.

SECTION 5: Fire fighting measures

5.1. Extinguishing media

Suitable extinguishing media
All known extinguishants can be used.

5.2. Special hazards arising from the substance or mixture

Specific hazards
Exposure to fire may cause containers to rupture/explode.
Hazardous combustion products
None.

5.3. Advice for fire-fighters

Specific methods
If possible, stop flow of product. Move container away or cool with water from a protected position.
Special protective equipment for fire-fighters
Normal firefighters' equipment consists of an appropriate SCBA (opencircuit positive pressure compressed air type) in combination with fire kit. Equipment and clothing to the following standards will provide a suitable level of protection for firefighters.
Guideline:
EN 469:2005: Protective clothing for firefighters. Performance requirements for protective clothing for firefighting., EN 15090 Footwear for firefighters., EN 443 Helmets for fire fighting in buildings and other structures., EN 659 Protective gloves for firefighters., EN 137 Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — Requirements, testing, marking.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Evacuate area. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. Ensure adequate air ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. EN 137 Respiratory protective devices — Self-contained open-circuit compressed air breathing apparatus with full face mask — Requirements, testing, marking.

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.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Suck back of water into the container must be prevented. Do not allow backfeed into the container. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt. Refer to supplier's handling instructions. Only experienced and properly instructed persons should handle gases under pressure. Protect containers from physical damage; do not drag, roll, slide or drop. 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 container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. 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. Ensure the complete gas system has been (or is regularly) checked for leaks before use. If user experiences any difficulty operating container valve discontinue use and contact supplier. Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Damaged valves should be reported

immediately to the supplier. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. Never attempt to transfer gases from one container to another. Do not smoke while handling product. The substance must be handled in accordance with good industrial hygiene and safety procedures.

7.2. Conditions for safe storage, including any incompatibilities

Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. Containers should not be stored in conditions likely to encourage corrosion. Cylinders should be stored in the vertical position and properly secured to prevent falling over. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from ignition sources (including static discharges). Keep away from combustible materials. Secure cylinders to prevent them from falling. Observe "Technische Regeln Druckgase (TRG) 280 Ziffer 5"

7.3. Specific end use(s)

None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

No occupational exposure limit.

8.2. Exposure controls

Appropriate engineering controls

Product to be handled in a closed system. Oxygen detectors should be used when asphyxiating gases may be released. The substance must be handled in accordance with good industrial hygiene and safety procedures. Consider work permit system e.g. for maintenance activities. Systems under pressure should be regularly checked for leakages. Provide adequate general or local ventilation.

Personal protective equipment

Eye and face protection

Wear eye protection to EN 166 when using gases.

Skin protection

Hand protection

Advice: Wear working gloves and safety shoes while handling containers.

Other protection

Wear working gloves and safety shoes while handling containers. EN ISO 20345 Personal protective equipment - Safety footwear.

Respiratory protection

Not required

Thermal hazards

Not required

Environmental Exposure Controls

Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Refer to local regulations for restriction of emissions to the atmosphere. See section 13 for specific methods for waste gas treatment.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

General information

Appearance/Colour: Colourless gas.
Odour: None.
Melting point: -210 °C
Boiling point: -196 °C
Flash point: Not applicable for gases and gas mixtures.
Flammability range: Non flammable.
Vapour Pressure 20 °C: Not applicable.
Relative density, gas (Air=1): 0.97
Solubility in water: 20 mg/l
Autoignition temperature: Not applicable.
Explosive properties:
Explosive acc. EU legislation: Not explosive.
Explosive acc. transp. reg.: Not explosive.
Oxidising properties: Not applicable.
Molecular weight: 28 g/mol
Critical temperature: -147 °C
Relative density, liquid (Water=1): 0.8

Maximum filling pressure (bar): 300 bar

9.2. Other information

None.

SECTION 10: Stability and reactivity

10.1. Reactivity

Unreactive under normal conditions.

10.2. Chemical stability

Stable under normal conditions.

10.3. Possibility of hazardous reactions

None.

10.4. Conditions to avoid
None.

10.5. Incompatible materials
No reaction with any common materials in dry or wet conditions.

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
General
No known toxicological effects from this product.

SECTION 12: Ecological information

12.1. Toxicity
No ecological damage caused by this product.

12.2. Persistence and degradability
The substance is naturally occurring.

12.3. Bioaccumulative potential
Not applicable.

12.4. Mobility in soil
The substance is a gas, not applicable.

12.5. Results of PBT and vPvB assessment
Not classified as PBT or vPvB.

12.6. Other adverse effects
Not applicable.

SECTION 13: Disposal considerations

13.1. Waste treatment methods
Do not discharge into any place where its accumulation could be dangerous. Contact supplier if guidance is required. Vent to atmosphere in a well ventilated place. Consult supplier for specific recommendations. 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.
Gases in pressure containers excluding those, which are mentioned under 16 05 04
EWC Nr. 16 05 05

SECTION 14: Transport information

ADR/RID

14.1. UN number
1066

14.2. UN proper shipping name
Nitrogen, compressed

14.3. Transport hazard class(es)
Class: 2
Classification Code: 1A
Labels: 2.2
Hazard number: 20
Tunnel restriction code: (E)

14.4. Packing group (Packing Instruction)
P200

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

IMDG

14.1. UN number
1066

14.2. UN proper shipping name
Nitrogen, compressed

14.3. Transport hazard class(es)
Class: 2.2
Labels: 2.2
EmS: F-C, S-V

14.4. Packing group (Packing Instruction)
P200

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

14.7. Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code
Not applicable.

IATA

14.1. UN number
1066

14.2. UN proper shipping name
Nitrogen, compressed

14.3. Transport hazard class(es)
Class: 2.2
Labels: 2.2

14.4. Packing group (Packing Instruction)
P200

14.5. Environmental hazards
None.

14.6. Special precautions for user
None.

Other transport information
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 that they are firmly secured. Ensure that the container valve is closed and not leaking. Ensure that the valve outlet cap nut or plug (where provided) is correctly fitted. Ensure that the valve protection device (where provided) is correctly fitted. Ensure adequate ventilation. Ensure compliance with applicable regulations.

SECTION 15: Regulatory information

15.1. Safety, health and environmental regulations/legislation specific for the substance or mixture
Seveso Directive 96/82/EC: Not covered.

Other regulations
Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work
Directive 94/9/EC on equipment and protective systems intended for use in potentially explosive atmospheres (ATEX)
Directive 89/686/EEC on personal protective equipment
Council Directive 67/548/EEC on the approximation of laws, regulations and administrative provisions relating to the classification, packaging and labelling of dangerous substances
Directive 1999/45/EC concerning the approximation of the laws, regulations and administrative provisions of the Member States relating to the classification, packaging and labelling of dangerous preparations
Directive 97/23/EC on the approximation of the laws of the Member
States concerning pressure equipment.
Further national regulations
Not classified according to TA-Luft.
Water pollution class
Not polluting to waters according to VwVwS from 27.07.2005.
TA-Luft
Not classified according to TA-Luft.

15.2. Chemical safety assessment
A CSA does not need to be carried out for this product.

SECTION 16: Other information

Ensure all national/local regulations are observed. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out.
Advice
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. Details given in this document are believed to be correct at the time of going to press.
Further information

References
Various sources of data have been used in the compilation of this SDS,they include but are not exclusive to:
European Chemical Agency: Information on Registered Substances
http://apps.echa.europa.eu/registered/registered-sub.aspx#search
European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.
European Industrial Gases Association (EIGA) Doc. 169/11 Classification and Labelling guide.
ISO 10156:2010 Gases and gas mixtures -- Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
Matheson Gas Data Book, 7th Edition.
National Institute for Standards and Technology (NIST) Standard Reference Database Number 69
The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (http://ecb.jrc.ec.europa.eu/esis/).
The European Chemical Industry Council (CEFIC) ERICards.

United States of America's National Library of Medicine's toxicology data network TOXNET (http://toxnet.nlm.nih.gov/index.html)
International Programme on Chemical Safety (http://www.inchem.org/)
Substance specific information from suppliers.

Linde safety advice
No. 3 Oxygen deficiency
No. 7 Safe handling of gas cylinders and cylinder bundles
No. 11 Transport of gas receptacles in vehicles

End of Document

Safety Data Sheet

according to Regulation (EC) No. 1907/2006 (REACH) with its amendment Regulation (EU) 2015/830

Oxygen, Oxygen compressed, Oxygen Lazer P, Medical Oxygen, Oxygen Food grade; Oxygen Scubaline; Aviators Oxygen, Breathing Oxygen

Date of issue: 31/01/2013 Supersedes: 21/02/2018 Revision date: 12/09/2019 Version: 5.0

SDS reference: YPX097A

Danger

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

1.1. Product identifier

Trade name : Oxygen, Oxygen compressed, Oxygen Lazer P, Medical Oxygen, Oxygen Food grade; Oxygen Scubaline; Aviators Oxygen, Breathing Oxygen

SDS no : YPX097A

Chemical description : Oxygen

CAS-No. : 7782-44-7

EC-No. : 231-956-9

EC Index-No. : 008-001-00-8

Registration-No. : Listed in Annex IV / V REACH, exempted from registration.

Chemical formula : O2

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.

Medical applications.

Breathing gas (not for medical use).

Food applications.

Water treatment.

Shield gas for welding processes.

Welding, cutting, heating and brazing.

Laser gas.

Use for manufacture of electronic/photovoltaic components.

Contact supplier for more information on uses.

Uses advised against : Consumer use.

1.3. Details of the supplier of the safety data sheet

Company identification : Nippon Gases Norge AS
Ringnesveien 50
N-0915 Oslo - NORWAY
T +47 97 77 42 77
www.nippongases.no
kundeservice@nippongases.com

1.4. Emergency telephone number

Country	Official advisory body	Address	Emergency number	Comment
Norway	Giftinformasjonen (Norwegian Poisons Information Center) Helsedirektoratet	P.O. Box 7000 St. Olavs Plass 0130 Oslo	+47 22 591300	24 hours a day

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Physical hazards	Oxidising Gases, Category 1	H270
	Gases under pressure : Compressed gas	H280

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS03 GHS04

Signal word (CLP) : Danger

Hazard statements (CLP) : H270 - May cause or intensify fire; oxidiser.
H280 - Contains gas under pressure; may explode if heated.

Precautionary statements (CLP)

- Prevention : P244 - Keep valves and fittings free from oil and grease.
P220 - Keep away from clothing and other combustible materials.
- Response : P370+P376 - In case of fire: stop leak if safe to do so.
- Storage : P403 - Store in a well-ventilated place.

2.3. Other hazards

: None.

SECTION 3: Composition/information on ingredients

3.1. Substances

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
Oxygen	(CAS-No.) 7782-44-7 (EC-No.) 231-956-9 (EC Index-No.) 008-001-00-8 (Registration-No.) *1	100	Ox. Gas 1, H270 Press. Gas (Comp.), H280

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

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

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

3.2. Mixtures : Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

- Inhalation : Remove victim to uncontaminated area.
- Skin contact : Adverse effects not expected from this product.
- Eye contact : Adverse effects not expected from this product.
- Ingestion : Ingestion is not considered a potential route of exposure.

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

: Continuous inhalation of concentrations higher than 75% may cause nausea, dizziness, respiratory difficulty and convulsion.

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 : Do not use water jet to extinguish.

5.2. Special hazards arising from the substance or mixture

Specific hazards : Supports combustion.

Exposure to fire may cause containers to rupture/explode.

Hazardous combustion products : None.

5.3. Advice for firefighters

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.

Move containers away from the fire area if this can be done without risk.

Special protective equipment for fire fighters : Standard protective clothing and equipment (Self Contained Breathing Apparatus) for fire fighters.

Standard EN 137 - Self-contained open-circuit compressed air breathing apparatus with full face mask.

Standard EN 469 - Protective clothing for firefighters. Standard - EN 659: Protective gloves for firefighters.

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.

Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.

Eliminate ignition sources.

Ensure adequate air ventilation.

Act in accordance with local emergency plan.

Stay upwind.

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.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Safe use of the product : The product must be handled in accordance with good industrial hygiene and safety procedures.

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 regularily) checked for leaks before use.

Do not smoke while handling product.

Keep equipment free from oil and grease. For more guidance, refer to the EIGA Doc. 33 - Cleaning of Equipment for Oxygen Service downloadable at http://www.eiga.eu.

Use no oil or grease.

Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Contact your gas supplier if in doubt.

Use only oxygen approved lubricants and oxygen approved sealings.

Use only with equipment cleaned for oxygen service and rated for cylinder pressure.

Avoid suck back of water, acid and alkalis.

Do not breathe gas.

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.

Suck back of water into the container must be prevented.

Open valve slowly to avoid pressure shock.

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 them from falling over.
Stored containers should be periodically checked for general condition and leakage.
Keep container below 50°C in a well ventilated place.
Segregate from flammable gases and other flammable materials in store.
Store containers in location free from fire risk and away from sources of heat and ignition.
Keep away from combustible materials.

7.3. Specific end use(s)

: None.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

OEL (Occupational Exposure Limits) : None available.

DNEL (Derived-No Effect Level) : None available.

PNEC (Predicted No-Effect Concentration) : None available.

8.2. Exposure controls

8.2.1. Appropriate engineering controls

: Provide adequate general and local exhaust ventilation.
Systems under pressure should be regularly checked for leakages.
Avoid oxygen rich (>23,5%) atmospheres.
Gas detectors should be used when oxidising gases may be released.
Consider the use of a 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.
Standard EN 166 - Personal eye-protection - specifications.

• 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 safety clothing.
Standard EN ISO 14116 - Limited flame spread materials.
Wear safety shoes while handling containers.
Standard EN ISO 20345 - Personal protective equipment - Safety footwear.

• Respiratory protection : None necessary.

• Thermal hazards : None in addition to the above sections.

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.

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 : Colourless.

Odour	: No odour warning properties.
Odour threshold	: Odour threshold is subjective and inadequate to warn of overexposure.
pH	: Not applicable for gases and gas mixtures.
Melting point / Freezing point	: -219 °C
Boiling point	: -183 °C
Flash point	: Not applicable for gases and gas mixtures.
Evaporation rate	: Not applicable for gases and gas mixtures.
Flammability (solid, gas)	: Non flammable.
Explosive limits	: Non flammable.
Vapour pressure [20°C]	: Not applicable.
Vapour pressure [50°C]	: Not applicable.
Vapour density	: Not applicable.
Relative density, liquid (water=1)	: 1.1
Relative density, gas (air=1)	: 1.1
Water solubility	: 39 mg/l
Partition coefficient n-octanol/water (Log Kow)	: Not applicable for inorganic products.
Auto-ignition temperature	: Non flammable.
Decomposition temperature	: Not applicable.
Viscosity	: No reliable data available.
Explosive properties	: Not applicable.
Oxidising properties	: Oxidiser.

9.2. Other information

Molar mass	: 32 g/mol
Critical temperature [°C]	: -118 °C
- Coefficient of oxygen equivalency (Ci)	: 1

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

: Violently oxidises organic material.

10.4. Conditions to avoid

: Avoid moisture in installation systems.

10.5. Incompatible materials

: May react violently with combustible materials.
May react violently with reducing agents.
Keep equipment free from oil and grease. For more guidance, refer to the EIGA Doc. 33 - Cleaning of Equipment for Oxygen Service downloadable at http://www.eiga.eu.
Consider the potential toxicity hazard due to the presence of chlorinated or fluorinated polymers in high pressure (> 30 bar) oxygen lines in case of combustion.
For additional information on compatibility refer to ISO 11114.

10.6. Hazardous decomposition products

: None.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : No known 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 : No known effects from this product.

Carcinogenicity : No known effects from this product.

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

Assessment : No ecological damage caused by this product.

EC50 48h - Daphnia magna [mg/l] : No data available.

EC50 72h - Algae [mg/l] : No data available.

LC50 96 h - Fish [mg/l] : No data available.

12.2. Persistence and degradability

Assessment : No ecological damage caused by this product.

12.3. Bioaccumulative potential

Assessment : No data available.

12.4. Mobility in soil

Assessment : Because of its high volatility, the product is unlikely to cause ground or water pollution.
Partition into soil is unlikely.

12.5. Results of PBT and vPvB assessment

Assessment : No data available.

12.6. Other adverse effects

Other adverse effects	:	No known effects from this product.
Effect on the ozone layer	:	None.
Effect on global warming	:	None.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Contact supplier if guidance is required.

May be vented to atmosphere in a well ventilated place.

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.

Return unused product in original cylinder to supplier.

List of hazardous waste codes (from Commission Decision 2000/532/EC as amended) : 16 05 04 *: Gases in pressure containers (including halons) containing hazardous substances.

13.2. Additional information

: External treatment and disposal of waste should comply with applicable local and/or national regulations.

SECTION 14: Transport information

14.1. UN number

UN-No. : 1072

14.2. UN proper shipping name

Transport by road/rail (ADR/RID) : OXYGEN, COMPRESSED

Transport by air (ICAO-TI / IATA-DGR) : Oxygen, compressed

Transport by sea (IMDG) : OXYGEN, COMPRESSED

14.3. Transport hazard class(es)

Labelling :

2.2 : Non-flammable, non-toxic gases.

5.1 : Oxidizing substances.

Transport by road/rail (ADR/RID)

Class	:	2
Classification code	:	1O
Hazard identification number	:	25
Tunnel Restriction	:	E - Passage forbidden through tunnels of category E

Transport by air (ICAO-TI / IATA-DGR)

Class / Div. (Sub. risk(s))	:	2.2 (5.1)

Transport by sea (IMDG)

Class / Div. (Sub. risk(s))	:	2.2 (5.1)
Emergency Schedule (EmS) - Fire	:	F-C
Emergency Schedule (EmS) - Spillage	:	S-W

14.4. Packing group

Transport by road/rail (ADR/RID) : Not applicable

Transport by air (ICAO-TI / IATA-DGR) : Not applicable

Transport by sea (IMDG) : Not applicable

14.5. Environmental hazards

Transport by road/rail (ADR/RID) : None.

Transport by air (ICAO-TI / IATA-DGR) : None.

Transport by sea (IMDG) : None.

14.6. Special precautions for user

Packing Instruction(s)

Transport by road/rail (ADR/RID) : P200

Transport by air (ICAO-TI / IATA-DGR)

Passenger and Cargo Aircraft : 200.

Cargo Aircraft only : 200.

Transport by sea (IMDG) : P200

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.

14.7. Transport in bulk according to Annex II of Marpol and the IBC Code

: Not applicable.

SECTION 15: Regulatory information

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

EU-Regulations

Restrictions on use : None.

Seveso Directive : 2012/18/EU (Seveso III) : Listed.

National regulations

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

15.2. Chemical safety assessment

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

SECTION 16: Other information

Section	Changed item	Change	Comments
1.3	Company identification	Modified	New company name
2.2	Precautionary statements (CLP)	Modified	P220

Abbreviations and acronyms	:	ATE - Acute Toxicity Estimate CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008 REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals Regulation (EC) No 1907/2006 EINECS - European Inventory of Existing Commercial Chemical Substances CAS# - Chemical Abstract Service number LC50 - Lethal Concentration to 50 % of a test population RMM - Risk Management Measures PBT - Persistent, Bioaccumulative and Toxic vPvB - Very Persistent and Very Bioaccumulative STOT- SE : Specific Target Organ Toxicity - Single Exposure CSA - Chemical Safety Assessment EN - European Standard UN - United Nations ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road IATA - International Air Transport Association IMDG code - International Maritime Dangerous Goods RID - Regulations concerning the International Carriage of Dangerous Goods by Rail WGK - Water Hazard Class STOT - RE : Specific Target Organ Toxicity - Repeated Exposure
Training advice	:	Ensure operators understand the hazard of oxygen enrichment.
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.

End of document

PANOLIN AG
CH-8322 MADETSWIL / SWITZERLAND
Telefon ++41 1 956 65 65
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PANOLIN

SAFETY DATA SHEET

PANOLIN HLP SYNTH

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

Chemical characterization	Saturated, synthetic esters with additives No mineraloil.
Supplier	PANOLIN AG Bläsimühle CH-8322 Madetswil Switzerland
Emergency telephone number	++41 (0) 1 / 956 65 65 (Mo. - Fr. 08.00 - 17.00)

2. COMPOSITION/INFORMATION ON INGREDIENTS

Hazardous components	The product contains no substances which at their given concentration, are considered to be hazardous to health. CAS-No: preparation EINECS: preparation.

3. HAZARDS IDENTIFICATION

None.

4. FIRST AID MEASURES

General advice	Wash contaminated clothing before re-use.
Inhalation	Move to fresh air in case of accidental inhalation of vapours.
Skin contact	Wash with water and soap as a precaution.
Eye contact	Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.
Ingestion	Do not induce vomiting. Drink water as a precaution. Obtain medical attention.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media Foam. Dry chemical. Carbon dioxide (CO_2).

Extinguishing media which must not be used for safety reasons
High volume water jet.

Specific hazards During a fire, smoke may contain the original material in addition to unidentified toxic and/or irritating compounds.

Special protective equipment for firefighters
In case of fire, wear a self contained breathing apparatus.

Specific methods Do not use a solid water stream as it may scatter and spread fire.

---

6. ACCIDENTAL RELEASE MEASURES

Personal precautions Sweep up to prevent slipping hazard.

Environmental precautions Do not flush into surface water or sanitary sewer system. Advise water authority if spillage has entered water course or drainage system.

Methods for cleaning up Dam up. Soak up with oil absorbent material. Shovel into suitable container for disposal.

---

7. HANDLING AND STORAGE

Handling Spilling onto the container's outside will make container slippery. The product is flammable but not readily ignited.

Storage Keep containers dry and tightly closed to avoid moisture absorption and contamination. Keep out of reach of children. CEA F4 I Fu Y3

---

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Engineering measures to reduce exposure
General industrial hygiene practice.

Personal protection equipment

Respiratory protection No personal respiratory protective equipment normally required.

Hand protection Rubber or plastic gloves.

Eye protection Safety glasses with side-shields.

Skin and body protection Remove and wash contaminated clothing before re-use.

---

9. PHYSICAL AND CHEMICAL PROPERTIES

Form Liquid.

Colour Yellow-orange.

Odour Mild.

Physical and chemical properties

Flash point (COC):	> 210 °C.
Relative density	0.92 g/ml.
Viscosity:	according to datasheet.
Pour point:	< - 35 °C.
Water solubility:	insoluble.

10. STABILITY AND REACTIVITY

Stability No decomposition if stored and applied as directed.

Conditions to avoid Fire or intense heat may cause violent rupture of packages.

Materials to avoid Strong oxidizing agents.

Hazardous decomposition products

None under normal use. Thermal decomposition can lead to release of irritating gases and vapours.

11. TOXICOLOGICAL INFORMATION

Acute toxicity LD50/oral/rat = > 2'000 mg/kg.

Local effects Negligible. Experience shows no unusual dermatitis hazard from routine handling.

Long term toxicity Negligible.

Sensitization Negligible.

Specific effects No data is available on the product itself.

Human experience No data is available on the product itself.

Further information The product contains no substances which at their given concentration, are considered to be hazardous to health. Health injuries are not known or expected under normal use. No persistent or cumulative effects were observed.

12. ECOLOGICAL INFORMATION

Ecotoxicity Ecological injuries are not known or expected under normal use.

Persistence / degradability According to the results of tests of biodegradability this product is considered as being readily biodegradable. Readily biodegradable, according to appropriate OECD test.

13. DISPOSAL CONSIDERATIONS

Waste from residues / unused products

Can be incinerated, when in compliance with local regulations. Where possible recycling is preferred to disposal or incineration. In accordance with local and national regulations.
European Waste catalogue code (EWC-code): 13 01 12 biodegradable hydraulic oils

Contaminated packaging

Store containers and offer for recycling of material according to local regulations.

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14. TRANSPORT INFORMATION

Further Information

Not classified as dangerous in the meaning of transport regulations.

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15. REGULATORY INFORMATION

Regulatory Information

The product does not need to be labelled in accordance with (national equivalent of EC-Directive 88/379).
BAG T No: 611'500
Water Pollution Class WGK (self-assesment).

HLP SYNTH	German Water Pollution Class (WGK)	
	VCI conception	German VwVwS
15, 22, 32	0	nwg*)
46, 68, 100	0	1

*) nwg: not water contaminating.

Symbol(s)

None.

R-phrase(s)

None.

S-phrase(s)

None.

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16. OTHER INFORMATION

Recommended use

According to datasheet.

Further information

Modifications in the following chapters since the last version:

Date	Chapter
10.06.2002	13; EWC Code

Disclaimer

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

Revision Date 10.06.2002
Number 2

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

1.1 Product identifier

Product name: C2HF5 17,948 %;C3H2F4 19,3482 %;C2H2F4 21,9674 %;CH2F2 40,7365 %

Trade name: Opteon™ XP40 (R449A)

Other Name: R449A, HFC-134a 25,7 wt%; HFC-1234yf 25,3 wt%; HFC-125 24,7 wt%; HFC-32 24,3 wt%

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

Identified uses: Industrial and professional. Perform risk assessment prior to use. Refrigerant.

Uses advised against Consumer use.

1.3 Details of the supplier of the safety data sheet

Supplier

Linde Gas GmbH
Carl-von-Linde-Platz 1
A-4651 Stadl-Paura

Telephone: +43 50 4273

E-mail: office@at.linde-gas.com

1.4 Emergency telephone number: Emergency number Linde: + 43 50 4273 (during business hours), Poisoning Information Center: +43 1 406 43 43

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended.

Physical Hazards

Gases under pressure	Liquefied gas	H280: Contains gas under pressure; may explode if heated.

2.2 Label Elements

Signal Words: Warning

Hazard Statement(s): H280: Contains gas under pressure; may explode if heated.

Precautionary Statements

Prevention: None.

Response: None.

Storage: P403: Store in a well-ventilated place.

Disposal: None.

Supplemental label information

EIGA-0783: Contains fluorinated greenhouse gases
EIGA-As: Asphyxiant in high concentrations.

2.3 Other hazards: Contact with evaporating liquid may cause frostbite or freezing of skin.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Chemical name	Chemical formula	Concentration	CAS-No.	EC No.	REACH Registration No.	Notes
Norflurane	C2H2F4	21,9674%	811-97-2	212-377-0	01-2119459374-33	#
2,3,3,3-Tetrafluoropropene	C3H2F4	19,3482%	754-12-1	468-710-7	01-0000019665-61	
Pentafluoroethane	C2HF5	17,9480%	354-33-6	206-557-8	01-2119485636-25	
Difluoromethane	CH2F2	40,7365%	75-10-5	200-839-4	01-2119471312-47	

The concentrations of the components in the SDS header, product name on page one and in section 3.2 are in mol due to regulatory requirements.
All concentrations are nominal.
This substance has workplace exposure limit(s).
PBT: persistent, bioaccumulative and toxic substance.
vPvB: very persistent and very bioaccumulative substance.

Classification

Chemical name	Classification		Notes
Norflurane	CLP:	Press. Gas Liquef. Gas;H280	
2,3,3,3-Tetrafluoropropene	CLP:	Flam. Gas 1;H220, Press. Gas Liquef. Gas;H280	
Pentafluoroethane	CLP:	Press. Gas Liquef. Gas;H280	
Difluoromethane	CLP:	Press. Gas Liquef. Gas;H280, Flam. Gas 1;H220	

CLP: Regulation No. 1272/2008.

The full text for all H-statements is displayed in section 16.

SECTION 4: First aid measures

General: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

Eye contact: Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

Skin Contact: Contact with evaporating liquid may cause frostbite or freezing of skin.

Ingestion: Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed: Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling. Irregular cardiac activity.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

Treatment: Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

SECTION 5: Firefighting measures

General Fire Hazards: Heat may cause the containers to explode.

5.1 Extinguishing media

Suitable extinguishing media: Material will not burn. In case of fire in the surroundings: use appropriate extinguishing agent.

Unsuitable extinguishing media: None.

5.2 Special hazards arising from the substance or mixture: Fire or excessive heat may produce hazardous decomposition products.

Hazardous Combustion Products:	If involved in a fire the following toxic and/or corrosive fumes may be produced by thermal decomposition: Carbon oxides Hydrogen fluoride ; Carbonyl difluoride

5.3 Advice for firefighters

Special fire fighting procedures:	In case of fire: Stop leak if safe to do so. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.
Special protective equipment for fire-fighters:	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:	Evacuate area. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.
6.2 Environmental Precautions:	Prevent further leakage or spillage if safe to do so.
6.3 Methods and material for containment and cleaning up:	Provide adequate ventilation.
6.4 Reference to other sections:	Refer to sections 8 and 13.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling:

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with. Never use direct flame or electrical heating devices to raise the pressure of a container. 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. Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place.

7.2 Conditions for safe storage, including any incompatibilities:

Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

7.3 Specific end use(s):

None.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

Chemical name	Type	Exposure Limit Values	Source
Norflurane	MAK STEL	4.000 ppm 16.800 mg/m3	Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001 (09 2007)
	MAK	1.000 ppm 4.200 mg/m3	Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001 (09 2007)

DNEL-Values

Critical component	Type	Value	Remarks
Norflurane	Worker - inhalative, long-term - systemic	13936 mg/m3	-
2,3,3,3-Tetrafluoropropene	Worker - inhalative, long-term - systemic	950 mg/m3	-
Pentafluoroethane	Workers - Inhalation, Systemic, long-term	16444 mg/m3	Repeated dose toxicity
Difluoromethane	Workers - Inhalation, Systemic, long-term	7035 mg/m3	Repeated dose toxicity

PNEC-Values

Critical component	Type	Value	Remarks
Norflurane	Aquatic (intermit. releases)	1 mg/l	-
	Sediment (freshwater)	0,75 mg/kg	-
	Sewage treatment plant	73 mg/l	-
	Aquatic (freshwater)	0,1 mg/l	-
	Aquatic (marine water)	0,01 mg/l	-
2,3,3,3-Tetrafluoropropene	Aquatic (freshwater)	0,1 mg/l	-
	Aquatic (intermit. releases)	1 mg/l	-
	Sediment (freshwater)	1,77 mg/kg	-
	Soil	1,54 mg/kg	-
	Aquatic (marine water)	0,01 mg/l	-
	Sediment (marine water)	0,178 mg/kg	-
Pentafluoroethane	Aquatic (intermit. releases)	1 mg/l	-
	Aquatic (freshwater)	0,1 mg/l	-
	Sediment (freshwater)	0,6 mg/kg	-
Difluoromethane	Aquatic (freshwater)	0,142 mg/l	-
	Sediment (freshwater)	0,534 mg/kg	-

8.2 Exposure controls

Appropriate engineering controls: Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Oxygen detectors should be used when asphyxiating gases may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Preferably use permanent leak tight connections (eg. welded pipes). Do not eat, drink or smoke when using the product.

Individual protection measures, such as personal protective equipment

General information:	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. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.
Eye/face protection:	Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.
Skin protection	
Hand Protection:	Wear working gloves while handling containers Guideline: EN 388 Protective gloves against mechanical risks.
Body protection:	No special precautions.
Other:	Wear safety shoes while handling containers Guideline: ISO 20345 Personal protective equipment - Safety footwear.
Respiratory Protection:	Not required.
Thermal hazards:	No precautionary measures are necessary.
Hygiene measures:	Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.
Environmental exposure controls:	For waste disposal, see section 13 of the SDS.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance

Physical state:	Gas
Form:	Liquefied gas
Color:	C2H2F4: Colorless C3H2F4: Colorless C2HF5: Colorless CH2F2: Colorless
Odor:	C2H2F4: faint ethereal C3H2F4: Ethereal odor C2HF5: faint ethereal CH2F2: Odorless
Odor Threshold:	Odor threshold is subjective and is inadequate to warn of over exposure.

pH:	not applicable.
Melting Point:	No data available.
Boiling Point:	No data available.
Sublimation Point:	not applicable.
Critical Temp. (°C):	No data available.
Flash Point:	Not applicable to gases and gas mixtures.
Evaporation Rate:	Not applicable to gases and gas mixtures.
Flammability (solid, gas):	Non-Flammable Gas
Flammability Limit - Upper (%):	not applicable.
Flammability Limit - Lower (%):	not applicable.
Vapor pressure:	No reliable data available.
Vapor density (air=1):	3,07 (calculated) (15 °C)
Relative density:	No data available.
Solubility(ies)	
Solubility in Water:	No data available.
Partition coefficient (n-octanol/water):	Not known.
Autoignition Temperature:	not applicable.
Decomposition Temperature:	Not known.
Viscosity	
Kinematic viscosity:	No data available.
Dynamic viscosity:	No data available.
Explosive properties:	Not applicable.
Oxidizing properties:	not applicable.

9.2 Other information: 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-section below.

10.2 Chemical Stability: Stable under normal conditions.

10.3 Possibility of hazardous reactions: None.

10.4 Conditions to avoid: Open flames and high energy ignition sources. The product is not flammable in air under ambient conditions of temperature and pressure. When pressurised with air or oxygen, the mixture may become flammable. Certain mixtures of HCFCs or HFCs with chlorine may become flammable or reactive under certain conditions.

10.5 Incompatible Materials: No reaction with any common materials in dry or wet conditions. Strong alkalis. Strong oxidizers Alkali earth metals. Chemically-active metals (such as calcium, powdered aluminum, zinc, and magnesium)

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

SECTION 11: Toxicological information

General information: None.

11.1 Information on toxicological effects

Acute toxicity - Oral
Product: Based on available data, the classification criteria are not met.

Acute toxicity - Dermal
Product: Based on available data, the classification criteria are not met.

Acute toxicity - Inhalation
Product: Based on available data, the classification criteria are not met.

Component Information
2,3,3,3-Tetrafluoropropene: LC 50 (Rat): > 405000 ppm

Repeated dose toxicity
Component Information
Norflurane: NOAEL (Rat(Male), Inhalation, 14 d): 100.000 ppm(m) Inhalation Experimental result, Supporting study

Pentafluoroethane: NOAEL (Rat(Female, Male), Inhalation, 13 Weeks): >= 50.000 ppm(m) Inhalation Experimental result, Key study

Difluoromethane: NOAEL (Rat(Female, Male), Inhalation, 28 d): 49.500 ppm(m) Inhalation Experimental result, Supporting study

Skin Corrosion/Irritation
Product: Based on available data, the classification criteria are not met.

Serious Eye Damage/Eye Irritation
Product: Based on available data, the classification criteria are not met.

Respiratory or Skin Sensitization
Product: Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity

Product	Based on available data, the classification criteria are not met.

In vitro

Component Information

2,3,3,3-Tetrafluoropropene	Ames test in vitro: (OECD Guideline 471 (Bacterial Reverse Mutation Test)): Mutagenic

In vivo

Component Information

2,3,3,3-Tetrafluoropropene	Chromosome aberration (OECD Guideline 474 (Mammalian Erythrocyte Micronucleus Test)): Negative.

Carcinogenicity

Product	Based on available data, the classification criteria are not met.

Reproductive toxicity

Product	Based on available data, the classification criteria are not met.

Reproductive toxicity (Fertility)

Component Information

2,3,3,3-Tetrafluoropropene	Rat NOAEL - No Observable Adverse Effect Level: 50.000 ppm

Developmental toxicity (Teratogenicity)

Component Information

2,3,3,3-Tetrafluoropropene	Rat Inhalation (OECD Guideline 414 (Prenatal Developmental Toxicity Study))

Specific Target Organ Toxicity - Single Exposure

Product	Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure

Product	Based on available data, the classification criteria are not met.

Aspiration Hazard

Product	Not applicable to gases and gas mixtures..

Other Relevant Toxicity Information

Difluoromethane	Cardiac sensitisation threshold limit >350000 ppm Beagle (dog)LOAEC Cardiac sensitisation threshold limit 350000 ppm Beagle (dog)NOAEC Light hydrocarbons like this one have been associated with cardiac sensitization in abuse situations. Hypoxia or the injection of adrenaline-like substances enhances these effects.
Norflurane	Cardiac sensitisation threshold limit 40000 ppm Beagle (dog)NOAEC Cardiac sensitisation threshold limit 80000 ppm Beagle (dog)LOAEC Light hydrocarbons like this one have been associated with cardiac sensitization in abuse situations. Hypoxia or the injection of adrenaline-like substances enhances these effects. May produce irregular heart beat and nervous symptoms.
2,3,3,3-Tetrafluoropropene	Cardiac sensitisation threshold limit >120000 ppm Beagle (dog)LOAEC Cardiac sensitisation threshold limit 120000 ppm Beagle (dog)NOAEC Light hydrocarbons like this one have been associated with cardiac sensitization in abuse situations. Hypoxia or the injection of adrenaline-like substances enhances these effects.

Pentafluoroethane	Cardiac sensitisation threshold limit 100000 ppm Beagle (dog)NOAEC Cardiac sensitisation threshold limit 75000 ppm Beagle (dog)LOAEC

Light hydrocarbons like this one have been associated with cardiac sensitization in abuse situations. Hypoxia or the injection of adrenaline-like substances enhances these effects. May produce irregular heart beat and nervous symptoms.

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity

Product	No ecological damage caused by this product.

Acute toxicity - Fish

Component Information

Norflurane	LC 50 (Oncorhynchus mykiss, 96 h): 450 mg/l (semi-static) Remarks: Experimental result, Key study
2,3,3,3-Tetrafluoropropene	LC 50 (Carp (Cyprinus carpio), 96 h): > 197 mg/l
Pentafluoroethane	LC 50 (Oncorhynchus mykiss, 96 h): 450 mg/l (semi-static) Remarks: Read-across from supporting substance (structural analogue or surrogate), Weight of Evidence study
Difluoromethane	LC 50 (Pimephales promelas, 96 h): 1.405 mg/l Remarks: QSAR QSAR, Supporting study

Acute toxicity - Aquatic Invertebrates

Component Information

Norflurane	EC 50 (Daphnia magna, 24 h): 960 mg/l (Static) Remarks: Experimental result, Key study
2,3,3,3-Tetrafluoropropene	EC 50 (Water flea (Daphnia magna), 48 h): > 100 mg/l
Pentafluoroethane	EC 50 (Daphnia magna, 48 h): > 200 mg/l (Static) Remarks: Read-across from supporting substance (structural analogue or surrogate), Weight of Evidence study
Difluoromethane	EC 50 (Daphnia magna, 48 h): 1.573 mg/l Remarks: QSAR QSAR, Supporting study

Chronic Toxicity - Aquatic Invertebrates

Component Information	
Pentafluoroethane	EC 50 (16 d): 12 mg/l

Toxicity to Aquatic Plants

Component Information	
2,3,3,3-Tetrafluoropropene	NOEC (Algae (Pseudokirchneriella subcapitata), 72 h): > 75 mg/l (OECD Guideline 201 (Freshwater Alga and Cyanobacteria, Growth Inhibition Test))
Pentafluoroethane	EC 50 (Green Algae, 72 h): 142 mg/l
Difluoromethane	EC 50 (Alga, 96 h): 142 mg/l

12.2 Persistence and Degradability

Product	Not applicable to gases and gas mixtures..

Biodegradation

Component Information	
2,3,3,3-Tetrafluoropropene	< 5 % (28 d, OECD 301F/ ISO 9408/ EEC 92/69/V, C.4-D)
Difluoromethane	5 % (28 d) Detected in water. Experimental result, Key study

12.3 Bioaccumulative potential

Product	The subject product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

12.4 Mobility in soil

Product	Because of its high volatility, the product is unlikely to cause ground or water pollution.

Component Information	
Norflurane	Henry's Law Constant: 8.580 MPa (25 °C)

12.5 Results of PBT and vPvB assessment

Product	Not classified as PBT or vPvB.

12.6 Other adverse effects:

Global Warming Potential

Global warming potential: 1.397,1
Contains fluorinated greenhouse gases When discharged in large quantities may contribute to the greenhouse effect. For GWP value of mixture and quantities, refer to container label.

Component Information

Norflurane

EU. F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation 517/2014/EU on FGGs
- Global warming potential: 1430 Annex 1: Fluorinated greenhouse gases referred to in Point 1 of Article 2; Section 1:Hydrofluorocarbons (HFCs) and its mixtures

2,3,3,3-Tetrafluoropropene

EU. F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation 517/2014/EU on FGGs
- Global warming potential: 4 Annex 2: Other fluorinated greenhouse gases subject to reporting in accordance with Article 19; Section 1: Unsaturated hydro(chloro)fluorocarbons

Pentafluoroethane

EU. F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation 517/2014/EU on FGGs
- Global warming potential: 3500 Annex 1: Fluorinated greenhouse gases referred to in Point 1 of Article 2; Section 1:Hydrofluorocarbons (HFCs) and its mixtures

Difluoromethane

EU. F-Gases Subject to Emission Limits/Reporting (Annexes I, II), Regulation 517/2014/EU on FGGs
- Global warming potential: 675 Annex 1: Fluorinated greenhouse gases referred to in Point 1 of Article 2; Section 1:Hydrofluorocarbons (HFCs) and its mixtures

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: Avoid discharges to atmosphere. Do not discharge into any place where its accumulation could be dangerous. Refer to manufacturer or supplier for information on recovery or recycling.

Disposal methods: 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. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

European Waste Codes

Container: 14 06 01*: chlorofluorocarbons, HCFC, HFC

SECTION 14: Transport information

ADR

14.1 UN Number:	UN 1078
14.2 UN Proper Shipping Name:	REFRIGERANT GAS, N.O.S.(Difluoromethane, 1,1,1,2-Tetrafluoroethane)
14.3 Transport Hazard Class(es)	
Class:	2
Label(s):	2.2
Hazard No. (ADR):	20
Tunnel restriction code:	(C/E)
14.4 Packing Group:	-
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	-

RID

14.1 UN Number:	UN 1078
14.2 UN Proper Shipping Name	REFRIGERANT GAS, N.O.S.(Difluoromethane, 1,1,1,2-Tetrafluoroethane)
14.3 Transport Hazard Class(es)	
Class:	2
Label(s):	2.2
14.4 Packing Group:	-
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	-

IMDG

14.1 UN Number:	UN 1078
14.2 UN Proper Shipping Name:	REFRIGERANT GAS, N.O.S.(Difluoromethane, 1,1,1,2-Tetrafluoroethane)
14.3 Transport Hazard Class(es)	
Class:	2.2
Label(s):	2.2
EmS No.:	F-C, S-V
14.3 Packing Group:	-
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	-

IATA

14.1 UN Number:	UN 1078
14.2 Proper Shipping Name:	Refrigerant gas, n.o.s.(Difluoromethane, 1,1,1,2-Tetrafluoroethane)
14.3 Transport Hazard Class(es):	
Class:	2.2
Label(s):	2.2
14.4 Packing Group:	-
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	-
Other information	
Passenger and cargo aircraft:	Allowed.
Cargo aircraft only:	Allowed.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: not applicable

Additional identification: 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 that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

SECTION 15: Regulatory information

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

National Regulations

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work Directive 89/686/EEC on personal protective equipment Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.
This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Revision Information: Not relevant.

Key literature references and sources for data:	Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to: Agency for Toxic Substances and Diseases Registry (ATSDR) (http://www.atsdr.cdc.gov/). European Chemical Agency: Guidance on the Compilation of Safety Data Sheets. European Chemical Agency: Information on Registered Substances http://apps.echa.europa.eu/registered/registered-sub.aspx#search European Industrial Gases Association (EIGA) Doc. 169 Classification and Labelling guide. International Programme on Chemical Safety (http://www.inchem.org/) ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets. Matheson Gas Data Book, 7th Edition. National Institute for Standards and Technology (NIST) Standard Reference Database Number 69. The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (http://ecb.jrc.ec.europa.eu/esis/). The European Chemical Industry Council (CEFIC) ERICards. United States of America's National Library of Medicine's toxicology data network TOXNET (http://toxnet.nlm.nih.gov/index.html) Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH). Substance specific information from suppliers. Details given in this document are believed to be correct at the time of publication.

Wording of the H-statements in section 2 and 3

H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.

H220	Extremely flammable gas.
H280	Contains gas under pressure; may explode if heated.

Training information:	Users of breathing apparatus must be trained. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Ensure operators understand the hazards.

Classification according to Regulation (EC) No 1272/2008 as amended.

Press. Gas Liq. Gas, H280

Other information:	Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. 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.
Last revised date:	13.09.2018
Disclaimer:	This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SAFETY DATA SHEET

REFRIGERANT R454B

Compilation date: 20/03/2017

Revision No: 1

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

1.1. Product identifier

Product name: REFRIGERANT R454B

Product code: R454B

Synonyms: OPTEON XL55

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

1.3. Details of the supplier of the safety data sheet

Company name: National Refrigerants Ltd

4 Watling Close

Sketchley Meadows Business Park

Hinckley

Leicestershire

LE10 3EZ

United Kingdom

Tel: 01455 630790

Fax: 01455 630791

Email: sds@nationalref.com

1.4. Emergency telephone number

Emergency tel: Carechem24 +44 (0)1865 407333

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification under CLP: Flam. Gas 1: H220; Press. Gas: H280

Most important adverse effects: Extremely flammable gas. Contains gas under pressure; may explode if heated.

2.2. Label elements

Label elements:

Hazard statements: H220: Extremely flammable gas.

H280: Contains gas under pressure; may explode if heated.

Hazard pictograms: GHS02: Flame

GHS04: Gas cylinder

Signal words: Danger

Precautionary statements: P210: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources.

[cont...]

No smoking.

P377: Leaking gas fire: Do not extinguish, unless leak can be stopped safely.

P381: Eliminate all ignition sources if safe to do so.

P410+403: Protect from sunlight. Store in a well-ventilated place.

2.3. Other hazards

Other hazards: In use, may form flammable / explosive vapour-air mixture.

PBT: This product is not identified as a PBT/vPvB substance.

Section 3: Composition/information on ingredients

3.2. Mixtures

Hazardous ingredients:

DIFLUOROMETHANE

EINECS	CAS	PBT / WEL	CLP Classification	Percent
200-839-4	75-10-5	Substance with a Community workplace exposure limit.	Flam. Gas 1: H220; Press. Gas: H280	68.900%

2,3,3,3-TETRAFLUOROPROP-1-EN - REACH registered number(s): 01-0000019665-61

-	754-12-1	Substance with a Community workplace exposure limit.	Flam. Gas 1: H220; Press. Gas: H280	31.100%

Section 4: First aid measures

4.1. Description of first aid measures

Skin contact: Remove all contaminated clothes and footwear immediately unless stuck to skin. Drench the affected skin with running water for 10 minutes or longer if substance is still on skin. Do not use hot water. If frostbite has occurred call a physician.

Eye contact: Bathe the eye with running water for 15 minutes. Consult a doctor.

Ingestion: Not applicable.

Inhalation: Remove casualty from exposure ensuring one's own safety whilst doing so. If unconscious, check for breathing and apply artificial respiration if necessary. Consult a doctor.

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

Skin contact: There may be redness or whiteness of the skin in the area of exposure. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be pain and redness. Corneal burns may occur. May cause permanent damage.

Ingestion: Not applicable.

Inhalation: No symptoms.

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

Immediate / special treatment: Not applicable.

[cont...]

Section 5: Fire-fighting measures

5.1. Extinguishing media

Extinguishing media: Alcohol resistant foam. Water spray. Carbon dioxide. Dry chemical powder. Suitable extinguishing media for the surrounding fire should be used. Use water spray to cool containers.

5.2. Special hazards arising from the substance or mixture

Exposure hazards: Flammable. In combustion emits toxic fumes. Forms explosive air-vapour mixture.

5.3. Advice for fire-fighters

Advice for fire-fighters: Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Refer to section 8 of SDS for personal protection details. Eliminate all sources of ignition. If outside keep bystanders upwind and away from danger point.

6.2. Environmental precautions

Environmental precautions: Stop release if safe to do so. Prevent from entering sewers, basements and work pits, or any place where the accumulation can be dangerous.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Do not use equipment in clean-up procedure which may produce sparks. Material evaporates. Ventilate the area, especialy low or enclosed places where heavy vapours might collect.

6.4. Reference to other sections

Reference to other sections: Refer to section 8 of SDS.

Section 7: Handling and storage

7.1. Precautions for safe handling

Handling requirements: Smoking is forbidden. Use non-sparking tools. Ensure there is sufficient ventilation of the area. Avoid the formation or spread of mists in the air.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a cool, well ventilated area. Keep container tightly closed. Keep away from sources of ignition. Prevent the build up of electrostatic charge in the immediate area. Ensure lighting and electrical equipment are not a source of ignition.

Suitable packaging: Must only be kept in original packaging.

[cont...]

7.3. Specific end use(s)

Specific end use(s): No data available.

Section 8: Exposure controls/personal protection

8.1. Control parameters

Hazardous ingredients:

DIFLUOROMETHANE

Workplace exposure limits: **Respirable dust**

State	8 hour TWA	15 min. STEL	8 hour TWA	15 min. STEL
UK	1000 ppm	-	-	-

2,3,3,3-TETRAFLUOROPROP-1-EN

EU	500 ppm	-	-	-

DNEL/PNEC Values

Hazardous ingredients:

DIFLUOROMETHANE

Type	Exposure	Value	Population	Effect
DNEL	Inhalation (developmental tox)	16444 mg/m3	Workers	Systemic
DNEL	Inhalation (developmental tox)	1753 mg/m3	Consumers	Systemic

2,3,3,3-TETRAFLUOROPROP-1-EN

Type	Exposure	Value	Population	Effect
DNEL	Inhalation	273 mg/m3	Workers	-
PNEC	Fresh water	> 0.1 mg/l	-	-
PNEC	Marine water	> 0.01 mg/l	-	-
PNEC	Fresh water sediments	> 1.77 mg/kg	-	-
PNEC	Soil (agricultural)	> 1.54 mg/kg	-	-

8.2. Exposure controls

Engineering measures: Ensure there is sufficient ventilation of the area. Ensure lighting and electrical equipment are not a source of ignition.

Respiratory protection: Respiratory protection not required.

Hand protection: Protective gloves.

Eye protection: Safety glasses with side-shields. Safety goggles. Face-shield. Ensure eye bath is to hand.

Skin protection: Protective clothing.

Section 9: Physical and chemical properties

[cont...]

9.1. Information on basic physical and chemical properties

State: Liquified gas
Colour: Colourless
Odour: Characteristic odour

9.2. Other information

Other information: No data available.

Section 10: Stability and reactivity

10.1. Reactivity

Reactivity: Stable under recommended transport or storage conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions. Stable at room temperature.

10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions. Decomposition may occur on exposure to conditions or materials listed below.

10.4. Conditions to avoid

Conditions to avoid: Heat. Hot surfaces. Sources of ignition. Flames.

10.5. Incompatible materials

Materials to avoid: Strong oxidising agents. Strong acids.

10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes.

Section 11: Toxicological information

11.1. Information on toxicological effects

Hazardous ingredients:

DIFLUOROMETHANE

GASES	RAT	LD50	520000	ppmV

2,3,3,3-TETRAFLUOROPROP-1-EN

GASES	RAT	4H LC50	> 400000	ppmV

Toxicity values: No data available.

Symptoms / routes of exposure

Skin contact: There may be redness or whiteness of the skin in the area of exposure. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be pain and redness. Corneal burns may occur. May cause permanent damage.

[cont...]

Ingestion: Not applicable.

Inhalation: No symptoms.

Section 12: Ecological information

12.1. Toxicity

Hazardous ingredients:

DIFLUOROMETHANE

ALGAE	96H ErC50	142	mg/l
Daphnia magna	48H EC50	652	mg/l
FISH	96H LC50	1.057	mg/l

2,3,3,3-TETRAFLUOROPROP-1-EN

ALGAE	96H LC50	> 100	mg/l
Daphnia magna	48H EC50	> 83	mg/l
FISH	96H ErC50	>197	mg/l

12.2. Persistence and degradability

Persistence and degradability: Biodegradable.

12.3. Bioaccumulative potential

Bioaccumulative potential: No bioaccumulation potential.

12.4. Mobility in soil

Mobility: Readily absorbed into soil.

12.5. Results of PBT and vPvB assessment

PBT identification: This product is not identified as a PBT/vPvB substance.

12.6. Other adverse effects

Other adverse effects: Negligible ecotoxicity.

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal operations: Product evaporates.

Recovery operations: Consult manufacturer or supplier for information regarding recovery and recycling of the product. If recovery is not possible, incinerate at a licenced instalation.

Disposal of packaging: Return to supplier.

NB: The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

Section 14: Transport information

[cont...]

14.1. UN number

UN number: UN3161

14.2. UN proper shipping name

Shipping name: LIQUEFIED GAS, FLAMMABLE, N.O.S.
(DIFLUOROMETHANE; 2,3,3,3-TETRAFLUOROPROP-1-EN)

14.3. Transport hazard class(es)

Transport class: 2

14.4. Packing group

14.5. Environmental hazards

Environmentally hazardous: No **Marine pollutant:** No

14.6. Special precautions for user

Special precautions: No special precautions.

Tunnel code: B/D

Transport category: 2

Section 15: Regulatory information

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

Specific regulations: Not applicable.

15.2. Chemical Safety Assessment

Chemical safety assessment: A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

Section 16: Other information

Other information

Other information: This safety data sheet is prepared in accordance with Commission Regulation (EU) No 2015/830.

* indicates text in the SDS which has changed since the last revision.

Phrases used in s.2 and s.3: H220: Extremely flammable gas.

H280: Contains gas under pressure; may explode if heated.

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SAFETY DATA SHEET

REFRIGERANT R513A

Compilation date: 09/02/2017

Revision No: 1

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

1.1. Product identifier

Product name: REFRIGERANT R513A

Product code: R513A

Synonyms: OPTEON XP10

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

1.3. Details of the supplier of the safety data sheet

Company name: National Refrigerants Ltd
4 Watling Close
Sketchley Meadows Business Park
Hinckley
Leicestershire
LE10 3EZ
United Kingdom

Tel: 01455 630790

Fax: 01455 630791

Email: sds@nationalref.com

1.4. Emergency telephone number

Emergency tel: Carechem24 +44 (0)1865 407333

Section 2: Hazards identification

2.1. Classification of the substance or mixture

Classification under CLP: Press. Gas: H280

Most important adverse effects: Contains gas under pressure; may explode if heated.

2.2. Label elements

Label elements:

Hazard statements: H280: Contains gas under pressure; may explode if heated.

Hazard pictograms: GHS04: Gas cylinder

Signal words: Warning

Precautionary statements: P403: Store in a well-ventilated place.

P410: Protect from sunlight.

[cont...]

2.3. Other hazards

PBT: This product is not identified as a PBT/vPvB substance.

Section 3: Composition/information on ingredients

3.2. Mixtures

Hazardous ingredients:

2,3,3,3-TETRAFLUOROPROP-1-EN - REACH registered number(s): 01-0000019665-61

EINECS	CAS	PBT / WEL	CLP Classification	Percent
-	754-12-1	Substance with a Community workplace exposure limit.	Flam. Gas 1: H220; Press. Gas: H280	50-70%

REFRIGERANT R134A - REACH registered number(s): 01-2119459374-33

212-377-0	811-97-2	Substance with a Community workplace exposure limit.	Press. Gas: H280	30-50%

Section 4: First aid measures

4.1. Description of first aid measures

Skin contact: Remove all contaminated clothes and footwear immediately unless stuck to skin. Drench the affected skin with running water for 10 minutes or longer if substance is still on skin. Do not use hot water. If frostbite has occurred call a physician.

Eye contact: Bathe the eye with running water for 15 minutes. Transfer to hospital for specialist examination.

Ingestion: Not applicable.

Inhalation: Move to fresh air in case of accidental inhalation of vapours. Consult a doctor.

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

Skin contact: There may be redness or whiteness of the skin in the area of exposure. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be severe pain. May cause permanent damage.

Ingestion: Not applicable.

Inhalation: Inhalation may produce the following symptoms: Shortness of breath, dizziness, weakness, nausea, headache, narcosis, irregular cardiac activity. Gas reduces oxygen available for breathing. The victum will not realize that he/she is suffocating.

Delayed / immediate effects: May cause cardiac arrhythmia.

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

Immediate / special treatment: Do Not give adrinaline or similar drugs.

Section 5: Fire-fighting measures

[cont...]

5.1. Extinguishing media

Extinguishing media: Suitable extinguishing media for the surrounding fire should be used. Alcohol resistant foam. Carbon dioxide. Water spray. Dry chemical powder. Use water spray to cool containers.

5.2. Special hazards arising from the substance or mixture

Exposure hazards: In combustion emits toxic fumes of hydrogen fluoride.

5.3. Advice for fire-fighters

Advice for fire-fighters: Wear self-contained breathing apparatus. Wear protective clothing to prevent contact with skin and eyes.

Section 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

Personal precautions: Refer to section 8 of SDS for personal protection details. Turn leaking containers leak-side up to prevent the escape of liquid.

6.2. Environmental precautions

Environmental precautions: The product evaporates readily. Prevent from entering sewers, basements and work pits, or any place where the accumulation can be dangerous. Stop release if safe to do so. Should not be released into the environment.

6.3. Methods and material for containment and cleaning up

Clean-up procedures: Material evaporates. Ventilate the area, especialy low or enclosed places where heavy vapours might collect.

6.4. Reference to other sections

Reference to other sections: Refer to section 8 of SDS.

Section 7: Handling and storage

7.1. Precautions for safe handling

Handling requirements: Ensure there is sufficient ventilation of the area. Ensure there is exhaust ventilation of the area.

7.2. Conditions for safe storage, including any incompatibilities

Storage conditions: Store in a cool, well ventilated area. Store at a temperature not exceeding 45°C. Keep container tightly closed.

Suitable packaging: Must only be kept in original packaging.

7.3. Specific end use(s)

Specific end use(s): No data available.

Section 8: Exposure controls/personal protection

[cont...]

8.1. Control parameters

Hazardous ingredients:

2,3,3,3-TETRAFLUOROPROP-1-EN

Workplace exposure limits: **Respirable dust**

State	8 hour TWA	15 min. STEL	8 hour TWA	15 min. STEL
EU	500 ppm	-	-	-

REFRIGERANT R134A

EU	4240 mg/m3	-	-	-

DNEL/PNEC Values

Hazardous ingredients:

2,3,3,3-TETRAFLUOROPROP-1-EN

Type	Exposure	Value	Population	Effect
DNEL	Inhalation	273 mg/m3	Workers	-
PNEC	Fresh water	> 0.1 mg/l	-	-
PNEC	Marine water	> 0.01 mg/l	-	-
PNEC	Fresh water sediments	> 1.77 mg/kg	-	-
PNEC	Soil (agricultural)	> 1.54 mg/kg	-	-

REFRIGERANT R134A

Type	Exposure	Value	Population	Effect
DNEL	Inhalation	2476 mg/m3	Workers	Systemic
DNEL	Inhalation	2476 mg/m3	Consumers	Systemic
PNEC	Fresh water	0.01 mg/l	-	-
PNEC	Marine water	0.75 mg/l	-	-
PNEC	Microorganisms in sewage treatment	73 mg/l	-	-

8.2. Exposure controls

Engineering measures: Use only in closed systems. Ensure there is sufficient ventilation of the area. Ensure there is exhaust ventilation of the area.

Respiratory protection: Respiratory protection not required. Self-contained breathing apparatus must be available in case of emergency.

Hand protection: The suitability for a specific workplace should be discussed with the producers of the protective gloves. Material: Leather gloves. Material: Low temperature resistant gloves.

Eye protection: Safety glasses with side-shields. Ensure eye bath is to hand.

Skin protection: Protective clothing.

Environmental: Gas escapes to be kept to the minimum by engineering processes and operating methods.

[cont...]

Section 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

State: Liquified gas
Colour: Colourless
Odour: Characteristic odour
Boiling point/range°C: -29.2
Flammability limits %: lower: Not applicable.
upper: Not applicable.
Flash point°C: Not applicable.
Vapour pressure: 7064 hPa at 25oC
Relative density: 1.17 at 25oC

9.2. Other information

Other information: No data available.

Section 10: Stability and reactivity

10.1. Reactivity

Reactivity: Stable under recommended transport or storage conditions.

10.2. Chemical stability

Chemical stability: Stable under normal conditions.

10.3. Possibility of hazardous reactions

Hazardous reactions: Hazardous reactions will not occur under normal transport or storage conditions.
Decomposition may occur on exposure to conditions or materials listed below.

10.4. Conditions to avoid

Conditions to avoid: Heat. Hot surfaces. Flames.

10.5. Incompatible materials

Materials to avoid: Finely powdered metals. Zinc. Aluminium. Magnesium. Strong oxidising agents. Strong acids.

10.6. Hazardous decomposition products

Haz. decomp. products: In combustion emits toxic fumes of hydrogen fluoride.

Section 11: Toxicological information

11.1. Information on toxicological effects

Hazardous ingredients:

2,3,3,3-TETRAFLUOROPROP-1-EN

GASES	RAT	4H LC50	> 400000	ppmV

[cont...]

REFRIGERANT R134A

GASES	RAT	4H LC50	567000	ppmV

Toxicity values: No data available.

Symptoms / routes of exposure

Skin contact: There may be redness or whiteness of the skin in the area of exposure. Frost-bite may occur causing the affected area to become white and numb.

Eye contact: There may be severe pain. May cause permanent damage.

Ingestion: Not applicable.

Inhalation: Inhalation may produce the following symptoms: Shortness of breath, dizziness, weakness, nausea, headache, narcosis, irregular cardiac activity. Gas reduces oxygen available for breathing. The victum will not realize that he/she is suffocating.

Delayed / immediate effects: May cause cardiac arrhythmia.

Section 12: Ecological information

12.1. Toxicity

Hazardous ingredients:

2,3,3,3-TETRAFLUOROPROP-1-EN

ALGAE	96H LC50	> 100	mg/l
Daphnia magna	48H EC50	> 83	mg/l
FISH	96H ErC50	>197	mg/l

REFRIGERANT R134A

ALGAE	72H ErC50	118	mg/l
Daphnia magna	48H EC50	980	mg/l
RAINBOW TROUT (Oncorhynchus mykiss)	96H LC50	450	mg/l

12.2. Persistence and degradability

Persistence and degradability: Biodegradable.

12.3. Bioaccumulative potential

Bioaccumulative potential: No data available.

12.4. Mobility in soil

Mobility: Volatile.

12.5. Results of PBT and vPvB assessment

PBT identification: This product is not identified as a PBT/vPvB substance.

12.6. Other adverse effects

Other adverse effects: Ozone Depletion Potential (ODP): 0 (R11 = 1) R513A: Global Warming Optential = 631 (CO2=1) Contains fluoronated greenhouse gases covered by the Kyoto Protocol.

[cont...]

Section 13: Disposal considerations

13.1. Waste treatment methods

Disposal operations: Product evaporates. Recover to a recovery cylinder and return to a refrigerant recovery facility.

Recovery operations: Consult manufacturer or supplier for information regarding recovery and recycling of the product. If recovery is not possible, incinerate at a licenced instalation.

Disposal of packaging: Return to supplier.

NB: The user's attention is drawn to the possible existence of regional or national regulations regarding disposal.

Section 14: Transport information

14.1. UN number

UN number: UN3163

14.2. UN proper shipping name

Shipping name: LIQUEFIED GAS, N.O.S.
(1,1,1,2-TETRAFLUOROETHANE; 2,3,3,3-TETRAFLUOROPROP-1-EN)

14.3. Transport hazard class(es)

Transport class: 2

14.4. Packing group

14.5. Environmental hazards

Environmentally hazardous: No **Marine pollutant:** No

14.6. Special precautions for user

Special precautions: No special precautions.

Tunnel code: C/E

Transport category: 3

Section 15: Regulatory information

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

Specific regulations: Not applicable.

15.2. Chemical Safety Assessment

Chemical safety assessment: A chemical safety assessment has not been carried out for the substance or the mixture by the supplier.

Section 16: Other information

Other information

Other information: This safety data sheet is prepared in accordance with Commission Regulation (EU) No

[cont...]

2015/830.

* indicates text in the SDS which has changed since the last revision.

Phrases used in s.2 and s.3: H220: Extremely flammable gas.

H280: Contains gas under pressure; may explode if heated.

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

1.1 Product identifier

Product name: Carbon dioxide

Trade name: Gasart 370 BIOGON® C, E290, Gasart 374 Kohlendioxid, Gasart 375 Kohlendioxid med., Gasart 471 Kältemittel R 744, Gasart 471 Kohlendioxid 4.5, Gasart 472 Kohlendioxid 4.8, Gasart 473 Kohlendioxid 2.0, Kohlendioxid 3.0, Kohlendioxid 5.3

Other Name: R744

Additional identification

Chemical name:	Carbon dioxide
Chemical formula:	CO_2
INDEX No.	-
CAS-No.	124-38-9
EC No.	204-696-9
REACH Registration No.	Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.

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

Identified uses: Industrial and professional. Perform risk assessment prior to use. Aerosol propellant. Balance gas for mixtures. Beverage applications. Biocidal uses. Blanketing gas. Blast cleaning. Calibration gas. Carrier gas. Chemical synthesis. Combustion, melting and cutting processes. Cooling applications. Fire suppressant gas. Food freezing. Food packaging gas. Freezing, Cooling and heat transfer. Inerting gas. Inflation systems. Laboratory use. Laser gas. Plant growth promoter. Pressure head gas, operational assist gas in pressure systems. Process gas. Purge gas. Refrigerant. Solvent for extraction. Special effects (entertainment). Test gas.
Consumer use. Propellant gas. Shielding gas in gas welding.

Uses advised against

1.3 Details of the supplier of the safety data sheet

Supplier

Linde Gas GmbH
Carl-von-Linde-Platz 1
A-4651 Stadl-Paura

Telephone: +43 50 4273

E-mail: office@at.linde-gas.com

1.4 Emergency telephone number: Emergency number Linde: + 43 50 4273 (during business hours), Poisoning Information Center: +43 1 406 43 43

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification according to Regulation (EC) No 1272/2008 as amended.

Physical Hazards

Gases under pressure	Liquefied gas	H280: Contains gas under pressure; may explode if heated.

2.2 Label Elements

Signal Words: Warning

Hazard Statement(s): H280: Contains gas under pressure; may explode if heated.

Precautionary Statements

Prevention: None.

Response: None.

Storage: P403: Store in a well-ventilated place.

Disposal: None.

Supplemental label information

EIGA-As: Asphyxiant in high concentrations.

2.3 Other hazards: Contact with evaporating liquid may cause frostbite or freezing of skin.

SECTION 3: Composition/information on ingredients

3.1 Substances

Chemical name	Carbon dioxide
INDEX No.:	-
CAS-No.:	124-38-9
EC No.:	204-696-9
REACH Registration No.:	Listed in Annex IV/V of Regulation (EC) No 1907/2006 (REACH), exempted from registration.
Purity:	100% The purity of the substance in this section is used for classification only, and does not represent the actual purity of the substance as supplied, for which other documentation should be consulted.
Trade name:	Gasart 370 BIOGON® C, E290, Gasart 374 Kohlendioxid, Gasart 375 Kohlendioxid med., Gasart 471 Kältemittel R 744, Gasart 471 Kohlendioxid 4.5, Gasart 472 Kohlendioxid 4.8, Gasart 473 Kohlendioxid 2.0, Kohlendioxid 3.0, Kohlendioxid 5.3

SECTION 4: First aid measures

General: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped.

4.1 Description of first aid measures

Inhalation: In high concentrations may cause asphyxiation. Symptoms may include loss of mobility/consciousness. Victim may not be aware of asphyxiation. Remove victim to uncontaminated area wearing self contained breathing apparatus. Keep victim warm and rested. Call a doctor. Apply artificial respiration if breathing stopped. Low concentrations of CO2 cause increased respiration and headache.

Eye contact: Rinse the eye with water immediately. Remove contact lenses, if present and easy to do. Continue rinsing. Flush thoroughly with water for at least 15 minutes. Get immediate medical assistance. If medical assistance is not immediately available, flush an additional 15 minutes.

Skin Contact: Contact with evaporating liquid may cause frostbite or freezing of skin.

Ingestion: Ingestion is not considered a potential route of exposure.

4.2 Most important symptoms and effects, both acute and delayed: Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

4.3 Indication of any immediate medical attention and special treatment needed

Hazards: Respiratory arrest. Contact with liquefied gas can cause damage (frostbite) due to rapid evaporative cooling.

Treatment:	Thaw frosted parts with lukewarm water. Do not rub affected area. Get immediate medical advice/attention.

SECTION 5: Firefighting measures

General Fire Hazards:	Heat may cause the containers to explode.
5.1 Extinguishing media	
Suitable extinguishing media:	Material will not burn. In case of fire in the surroundings: use appropriate extinguishing agent.
Unsuitable extinguishing media:	None.
5.2 Special hazards arising from the substance or mixture:	None.
Hazardous Combustion Products:	None.
5.3 Advice for firefighters	
Special fire fighting procedures:	In case of fire: Stop leak if safe to do so. Continue water spray from protected position until container stays cool. Use extinguishants to contain the fire. Isolate the source of the fire or let it burn out.
Special protective equipment for fire-fighters:	Firefighters must use standard protective equipment including flame retardant coat, helmet with face shield, gloves, rubber boots, and in enclosed spaces, SCBA. Guideline: EN 469 Protective clothing for firefighters. Performance requirements for protective clothing for firefighting. EN 15090 Footwear for firefighters. EN 659 Protective gloves for firefighters. EN 443 Helmets for fire fighting in buildings and other structures. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures:	Evacuate area. Provide adequate ventilation. Prevent from entering sewers, basements and workpits, or any place where its accumulation can be dangerous. Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe. EN 137 Respiratory protective devices - Self-contained open-circuit compressed air breathing apparatus with full face mask - Requirements, testing, marking.
6.2 Environmental Precautions:	Prevent further leakage or spillage if safe to do so.
6.3 Methods and material for containment and cleaning up:	Provide adequate ventilation.
6.4 Reference to other sections:	Refer to sections 8 and 13.

SECTION 7: Handling and storage:

7.1 Precautions for safe handling:

Only experienced and properly instructed persons should handle gases under pressure. Use only properly specified equipment which is suitable for this product, its supply pressure and temperature. Refer to supplier's handling instructions. The substance must be handled in accordance with good industrial hygiene and safety procedures. Protect containers from physical damage; do not drag, roll, slide or drop. Do not remove or deface labels provided by the supplier for the identification of the container contents. When moving containers, even for short distances, use appropriate equipment eg. trolley, hand truck, fork truck etc. Secure cylinders in an upright position at all times, close all valves when not in use. Provide adequate ventilation. Suck back of water into the container must be prevented. Do not allow backfeed into the container. Avoid suckback of water, acid and alkalis. Keep container below 50°C in a well ventilated place. Observe all regulations and local requirements regarding storage of containers. When using do not eat, drink or smoke. Store in accordance with. Never use direct flame or electrical heating devices to raise the pressure of a container. 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. Damaged valves should be reported immediately to the supplier Close container valve after each use and when empty, even if still connected to equipment. Never attempt to repair or modify container valves or safety relief devices. Replace valve outlet caps or plugs and container caps where supplied as soon as container is disconnected from equipment. Keep container valve outlets clean and free from contaminates particularly oil and water. If user experiences any difficulty operating container valve discontinue use and contact supplier. Never attempt to transfer gases from one container to another. Container valve guards or caps should be in place. Depressurisation of liquid CO2 below approximately 5 bar can create solid CO2 which may block protective devices, pipework and create dry-ice within containers. Containers, which contain or have contained flammable or explosive substances, must not be inerted with liquid carbon dioxide.

7.2 Conditions for safe storage, including any incompatibilities:

Containers should not be stored in conditions likely to encourage corrosion. Stored containers should be periodically checked for general conditions and leakage. Container valve guards or caps should be in place. Store containers in location free from fire risk and away from sources of heat and ignition. Keep away from combustible material.

7.3 Specific end use(s):

None.

SECTION 8: Exposure controls/personal protection

8.1 Control Parameters

Occupational Exposure Limits

Chemical name	Type	Exposure Limit Values	Source
Carbon dioxide	TWA	5.000 ppm 9.000 mg/m3	EU. Indicative Exposure Limit Values in Directives 91/322/EEC, 2000/39/EC, 2006/15/EC, 2009/161/EU (12 2009)
	MAK	5.000 ppm 9.000 mg/m3	Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001 (09 2007)
	MAK CEIL	10.000 ppm 18.000 mg/m3	Austria. MAK List, OEL Ordinance (GwV), BGBl. II, no. 184/2001 (09 2007)

8.2 Exposure controls

Appropriate engineering controls:	Consider a work permit system e.g. for maintenance activities. Ensure adequate air ventilation. Oxygen detectors should be used when asphyxiating gases may be released. Provide adequate ventilation, including appropriate local extraction, to ensure that the defined occupational exposure limit is not exceeded. Systems under pressure should be regularly checked for leakages. Preferably use permanent leak tight connections (eg. welded pipes). Do not eat, drink or smoke when using the product. CO2 detectors should be used when CO2 may be released.

Individual protection measures, such as personal protective equipment

General information:	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. Keep self contained breathing apparatus readily available for emergency use. Personal protective equipment for the body should be selected based on the task being performed and the risks involved.
Eye/face protection:	Safety eyewear, goggles or face-shield to EN166 should be used to avoid exposure to liquid splashes. Wear eye protection to EN 166 when using gases. Guideline: EN 166 Personal Eye Protection.
Skin protection	
Hand Protection:	Wear working gloves while handling containers Guideline: EN 388 Protective gloves against mechanical risks.
Body protection:	No special precautions.
Other:	Wear safety shoes while handling containers Guideline: ISO 20345 Personal protective equipment - Safety footwear.
Respiratory Protection:	Not required.

Thermal hazards:	No precautionary measures are necessary.
Hygiene measures:	Specific risk management measures are not required beyond good industrial hygiene and safety procedures. Do not eat, drink or smoke when using the product.
Environmental exposure controls:	For waste disposal, see section 13 of the SDS.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	
Physical state:	Gas
Form:	Liquefied gas
Color:	Colorless
Odor:	Odorless
Odor Threshold:	Odor threshold is subjective and is inadequate to warn of over exposure.
pH:	3,2 - 3,7 The pH of saturated CO2 solutions varies from 3.7 at 101 kPa (1 atm) to 3.2 at 2370 kPa (23.4 atm)
Melting Point:	-56,6 °C
Boiling Point:	-78,5 °C
Sublimation Point:	-78,5 °C
Critical Temp. (°C):	31,0 °C
Flash Point:	Not applicable to gases and gas mixtures.
Evaporation Rate:	Not applicable to gases and gas mixtures.
Flammability (solid, gas):	Nonflammable Gas
Flammability Limit - Upper (%):	not applicable.
Flammability Limit - Lower (%):	not applicable.
Vapor pressure:	45,1 bar (10 °C)
Vapor density (air=1):	1,522 (21 °C)
Relative density:	1,512 (-56,6 °C)
Solubility(ies)	
Solubility in Water:	2,900 mg/l (25 °C)
Partition coefficient (n-octanol/water):	0,83
Autoignition Temperature:	not applicable.
Decomposition Temperature:	Not known.
Viscosity	
Kinematic viscosity:	No data available.
Dynamic viscosity:	0,07 mPa.s (20 °C)
Explosive properties:	Not applicable.
Oxidizing properties:	not applicable.

9.2 Other information:	Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level.
Molecular weight:	44,01 g/mol (CO_2)

SECTION 10: Stability and reactivity

10.1 Reactivity:	No reactivity hazard other than the effects described in sub-section below.
10.2 Chemical Stability:	Stable under normal conditions.
10.3 Possibility of hazardous reactions:	None.
10.4 Conditions to avoid:	None.
10.5 Incompatible Materials:	No reaction with any common materials in dry or wet conditions.
10.6 Hazardous Decomposition Products:	Under normal conditions of storage and use, hazardous decomposition products should not be produced.

SECTION 11: Toxicological information

General information: In high concentrations may cause rapid circulatory deterioration even at normal levels of oxygen concentration. Symptoms are headache, nausea and vomiting, which may lead to unconsciousness and even death.

11.1 Information on toxicological effects

Acute toxicity - Oral
Product: Based on available data, the classification criteria are not met.

Acute toxicity - Dermal
Product: Based on available data, the classification criteria are not met.

Acute toxicity - Inhalation
Product: Based on available data, the classification criteria are not met.

Skin Corrosion/Irritation
Product: Based on available data, the classification criteria are not met.

Serious Eye Damage/Eye Irritation
Product: Based on available data, the classification criteria are not met.

Respiratory or Skin Sensitization
Product: Based on available data, the classification criteria are not met.

Germ Cell Mutagenicity
Product: Based on available data, the classification criteria are not met.

Carcinogenicity
Product: Based on available data, the classification criteria are not met.

Reproductive toxicity
Product: Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Single Exposure
Product: Based on available data, the classification criteria are not met.

Specific Target Organ Toxicity - Repeated Exposure
Product: Based on available data, the classification criteria are not met.

Aspiration Hazard
Product: Not applicable to gases and gas mixtures..

SECTION 12: Ecological information

12.1 Toxicity

Acute toxicity
Product: No ecological damage caused by this product.

12.2 Persistence and Degradability

Product: Not applicable to gases and gas mixtures..

12.3 Bioaccumulative potential

Product: The subject product is expected to biodegrade and is not expected to persist for long periods in an aquatic environment.

12.4 Mobility in soil

Product: Because of its high volatility, the product is unlikely to cause ground or water pollution.

12.5 Results of PBT and vPvB assessment

Product: Not classified as PBT or vPvB.

12.6 Other adverse effects:

Global Warming Potential

Global warming potential: 1
Contains greenhouse gas(es) not covered by 517/2014/EU. When discharged in large quantities may contribute to the greenhouse effect.

Carbon dioxide — UN / IPCC. Greenhouse Gas Global Warming Potentials (IPCC Fourth Assessment Report, Climate Change, Table TS.2
- Global warming potential: 1 100-yr

SECTION 13: Disposal considerations

13.1 Waste treatment methods

General information: Do not discharge into any place where its accumulation could be dangerous. Vent to atmosphere in a well ventilated place.

Disposal methods: 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. Dispose of container via supplier only. Discharge, treatment, or disposal may be subject to national, state, or local laws.

European Waste Codes
Container: 16 05 05: Gases in pressure containers other than those mentioned in 16 05 04.

SECTION 14: Transport information

ADR

14.1 UN Number:	UN 1013
14.2 UN Proper Shipping Name:	CARBON DIOXIDE
14.3 Transport Hazard Class(es)	
Class:	2
Label(s):	2.2
Hazard No. (ADR):	20
Tunnel restriction code:	(C/E)
14.4 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–

RID

14.1 UN Number:	UN 1013
14.2 UN Proper Shipping Name	CARBON DIOXIDE
14.3 Transport Hazard Class(es)	
Class:	2
Label(s):	2.2
14.4 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–

IMDG

14.1 UN Number:	UN 1013
14.2 UN Proper Shipping Name:	CARBON DIOXIDE
14.3 Transport Hazard Class(es)	
Class:	2.2
Label(s):	2.2
EmS No.:	F-C, S-V
14.3 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–

IATA

14.1 UN Number:	UN 1013
14.2 Proper Shipping Name:	Carbon dioxide
14.3 Transport Hazard Class(es):	
Class:	2.2
Label(s):	2.2
14.4 Packing Group:	–
14.5 Environmental hazards:	not applicable
14.6 Special precautions for user:	–
Other information	
Passenger and cargo aircraft:	Allowed.
Cargo aircraft only:	Allowed.

14.7 Transport in bulk according to Annex II of MARPOL and the IBC Code: not applicable

Additional identification: 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 that they are firmly secured. Ensure that the container valve is closed and not leaking. Container valve guards or caps should be in place. Ensure adequate air ventilation.

SECTION 15: Regulatory information

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

EU Regulations

National Regulations

Council Directive 89/391/EEC on the introduction of measures to encourage improvements in the safety and health of workers at work Directive 89/686/EEC on personal protective equipment Only products that comply with the food regulations (EC) No. 1333/2008 and (EU) No. 231/2012 and are labelled as such may be used as food additives.
This Safety Data Sheet has been produced to comply with Regulation (EU) 2015/830.

15.2 Chemical safety assessment: No Chemical Safety Assessment has been carried out.

SECTION 16: Other information

Revision Information: Not relevant.

Key literature references and sources for data: Various sources of data have been used in the compilation of this SDS, they include but are not exclusive to:
Agency for Toxic Substances and Diseases Registry (ATSDR) (http://www.atsdr.cdc.gov/).
European Chemical Agency: Guidance on the Compilation of Safety Data Sheets.
European Chemical Agency: Information on Registered Substances http://apps.echa.europa.eu/registered/registered-sub.aspx#search
European Industrial Gases Association (EIGA) Doc. 169 Classification and Labelling guide.
International Programme on Chemical Safety (http://www.inchem.org/)
ISO 10156:2010 Gases and gas mixtures - Determination of fire potential and oxidizing ability for the selection of cylinder valve outlets.
Matheson Gas Data Book, 7th Edition.
National Institute for Standards and Technology (NIST) Standard Reference Database Number 69.
The ESIS (European chemical Substances 5 Information System) platform of the former European Chemicals Bureau (ECB) ESIS (http://ecb.jrc.ec.europa.eu/esis/).
The European Chemical Industry Council (CEFIC) ERICards.
United States of America's National Library of Medicine's toxicology data network TOXNET (http://toxnet.nlm.nih.gov/index.html)
Threshold Limit Values (TLV) from the American Conference of Governmental Industrial Hygienists (ACGIH).
Substance specific information from suppliers.
Details given in this document are believed to be correct at the time of publication.

Wording of the H-statements in section 2 and 3

H280 Contains gas under pressure; may explode if heated.

Training information:	Users of breathing apparatus must be trained. The hazard of asphyxiation is often overlooked and must be stressed during operator training. Ensure operators understand the hazards.

Classification according to Regulation (EC) No 1272/2008 as amended.

Press. Gas Liq. Gas, H280

Other information:	Before using this product in any new process or experiment, a thorough material compatibility and safety study should be carried out. Ensure adequate air ventilation. Ensure all national/local regulations are observed. 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.
Last revised date:	11.12.2017
Disclaimer:	This information is provided without warranty. The information is believed to be correct. This information should be used to make an independent determination of the methods to safeguard workers and the environment.

SAFETY DATA SHEET

Creation Date 22-Jun-2008 **Revision Date** 17-Dec-2020 **Revision Number** 8

SECTION 1: IDENTIFICATION OF THE SUBSTANCE/MIXTURE AND OF THE COMPANY/UNDERTAKING

1.1. Product identifier

Product Description: Soda lime, granular, with indicator
Cat No. : **388350000; 388350010; 388350500; 388352500**
Synonyms A precipitate solid hydrate formed from Hydroxides of Calcium and Sodium
CAS-No 8006-28-8

Unique Formula Identifier (UFI) **1W0M-CU3T-2W0V-QHUC**

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

Recommended Use Absorbent. Laboratory chemicals.
Uses advised against No Information available

1.3. Details of the supplier of the safety data sheet

Company

UK entity/business name
Fisher Scientific UK
Bishop Meadow Road, Loughborough,
Leicestershire LE11 5RG, United Kingdom

EU entity/business name
Acros Organics BVBA
Janssen Pharmaceuticalaan 3a
2440 Geel, Belgium

E-mail address begel.sdsdesk@thermofisher.com

1.4. Emergency telephone number

For information **US** call: 001-800-ACROS-01 / **Europe** call: +32 14 57 52 11
Emergency Number **US:**001-201-796-7100 / **Europe:** +32 14 57 52 99
CHEMTREC Tel. No.**US:**001-800-424-9300 / **Europe:**001-703-527-3887

Poison Centre - Emergency information services

Ireland : National Poisons Information Centre (NPIC) -
01 809 2166 (8am-10pm, 7 days a week)
Malta : +356 2395 2000
Cyprus : +357 2240 5611

SECTION 2: HAZARDS IDENTIFICATION

2.1. Classification of the substance or mixture

CLP Classification - Regulation (EC) No 1272/2008

Physical hazards

Based on available data, the classification criteria are not met

Health hazards

Skin Corrosion/Irritation	Category 1 B (H314)
Serious Eye Damage/Eye Irritation	Category 1 (H318)

Environmental hazards
Based on available data, the classification criteria are not met

Full text of Hazard Statements: see section 16

2.2. Label elements

Signal Word **Danger**

Hazard Statements
H314 - Causes severe skin burns and eye damage

Precautionary Statements
P280 - Wear protective gloves/protective clothing/eye protection/face protection
P301 + P330 + P331 - IF SWALLOWED: Rinse mouth. Do NOT induce vomiting
P304 + P340 - IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing
P305 + P351 + P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing
P310 - Immediately call a POISON CENTER or doctor/physician
P303 + P361 + P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water or shower

2.3. Other hazards

SECTION 3: COMPOSITION/INFORMATION ON INGREDIENTS

3.2. Mixtures

Component	CAS-No	EC-No.	Weight %	CLP Classification - Regulation (EC) No 1272/2008
Soda lime	8006-28-8		-	Skin Corr. 1B (H314) Eye Dam. 1 (H318)
Calcium hydroxide	1305-62-0	215-137-3	75 - 85	Eye Dam. 1 (H318) Skin Irrit. 2 (H315) STOT SE 3 (H335)
Sodium hydroxide	1310-73-2	EEC No. 215-185-5	< 4	Met. Corr. 1 (H290) Skin Corr. 1A (H314) Eye Dam. 1 (H318)
Ethanaminium, N-[4-[bis[4-(diethylamino)phenyl]methylene]-2,5-cyclohexadien-1-ylidene]-N-ethyl-,	2390-59-2	EEC No. 219-231-5	<1	-

chloride				
Water	7732-18-5	231-791-2	10 - 20	-

Component	Specific concentration limits (SCL's)	M-Factor	Component notes
Sodium hydroxide	Skin Corr. 1A :: C>=5% Skin Corr. 1B :: 2%<=C<5% Eye Irrit. 2 :: 0.5%<=C<2% Skin Irrit. 2 :: 0.5%<=C<2%	-	-

Note
Soda lime CAS # 8006-28-8

Full text of Hazard Statements: see section 16

SECTION 4: FIRST AID MEASURES

4.1. Description of first aid measures

General Advice Show this safety data sheet to the doctor in attendance. Immediate medical attention is required.

Eye Contact Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. Immediate medical attention is required. Keep eye wide open while rinsing.

Skin Contact Wash off immediately with soap and plenty of water while removing all contaminated clothes and shoes. Call a physician immediately.

Ingestion Immediate medical attention is required. Do NOT induce vomiting. Drink plenty of water. Never give anything by mouth to an unconscious person.

Inhalation Remove to fresh air. If not breathing, give artificial respiration. Call a physician or poison control center immediately. Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

Self-Protection of the First Aider Ensure that medical personnel are aware of the material(s) involved, take precautions to protect themselves and prevent spread of contamination.

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

Causes burns by all exposure routes. Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated: Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation

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

Notes to Physician Treat symptomatically.

SECTION 5: FIREFIGHTING MEASURES

5.1. Extinguishing media

Suitable Extinguishing Media
Substance is nonflammable; use agent most appropriate to extinguish surrounding fire. CO_2, dry chemical, dry sand, alcohol-resistant foam.

Extinguishing media which must not be used for safety reasons
No information available.

5.2. Special hazards arising from the substance or mixture

The product causes burns of eyes, skin and mucous membranes.

Hazardous Combustion Products
Calcium oxides, Sodium oxides.

5.3. Advice for firefighters

As in any fire, wear self-contained breathing apparatus pressure-demand, MSHA/NIOSH (approved or equivalent) and full protective gear. Thermal decomposition can lead to release of irritating gases and vapors.

SECTION 6: ACCIDENTAL RELEASE MEASURES

6.1. Personal precautions, protective equipment and emergency procedures

Use personal protective equipment as required. Evacuate personnel to safe areas. Avoid contact with skin, eyes or clothing.

6.2. Environmental precautions

Should not be released into the environment. Do not allow material to contaminate ground water system.

6.3. Methods and material for containment and cleaning up

Sweep up and shovel into suitable containers for disposal. Avoid dust formation.

6.4. Reference to other sections

Refer to protective measures listed in Sections 8 and 13.

SECTION 7: HANDLING AND STORAGE

7.1. Precautions for safe handling

Wear personal protective equipment/face protection. Do not get in eyes, on skin, or on clothing. Do not breathe dust. Do not ingest. If swallowed then seek immediate medical assistance.

Hygiene Measures
Handle in accordance with good industrial hygiene and safety practice. Keep away from food, drink and animal feeding stuffs. Do not eat, drink or smoke when using this product. Remove and wash contaminated clothing and gloves, including the inside, before re-use. Wash hands before breaks and after work.

7.2. Conditions for safe storage, including any incompatibilities

Corrosives area. Keep containers tightly closed in a dry, cool and well-ventilated place.

Technical Rules for Hazardous Substances (TRGS) 510 Storage Class (LGK) (Germany) Class 8B

7.3. Specific end use(s)

Use in laboratories

SECTION 8: EXPOSURE CONTROLS/PERSONAL PROTECTION

8.1. Control parameters

Exposure limits
List source(s): **EU** - Commission Directive (EU) 2019/1831 of 24 October 2019 establishing a fifth list of indicative occupational exposure limit values pursuant to Council Directive 98/24/EC and amending Commission Directive 2000/39/EC **UK** - EH40/2005 Work Exposure Limits, Third edition. Published 2018. **IRE -** 2018 Code of Practice for the Chemical Agents Regulations, Schedule 1. Published by the Health and Safety Authority

Component	The United Kingdom	European Union	Ireland
Calcium hydroxide	STEL: 4 mg/m³ 15 min STEL: 15 mg/m³ 15 min TWA: 1 mg/m³ 8 hr TWA: 5 mg/m³ 8 hr	TWA: 1 mg/m³ (15min) STEL: 4 mg/m³ (8h)	TWA: 1 mg/m³ 8 hr. respirable dust STEL: 4 mg/m³ 15 min
Sodium hydroxide	2 mg/m³ STEL		STEL: 2 mg/m³ 15 min

Biological limit values
This product, as supplied, does not contain any hazardous materials with biological limits established by the region specific regulatory bodies

Monitoring methods
BS EN 14042:2003 Title Identifier: Workplace atmospheres. Guide for the application and use of procedures for the assessment of exposure to chemical and biological agents.
MDHS14/3 General methods for sampling and gravimetric analysis of respirable and inhalable dust

Derived No Effect Level (DNEL) No information available

Route of exposure	Acute effects (local)	Acute effects (systemic)	Chronic effects (local)	Chronic effects (systemic)
Oral				
Dermal				
Inhalation				

Predicted No Effect Concentration (PNEC) No information available.

8.2. Exposure controls

Engineering Measures
Ensure that eyewash stations and safety showers are close to the workstation location.
Wherever possible, engineering control measures such as the isolation or enclosure of the process, the introduction of process or equipment changes to minimise release or contact, and the use of properly designed ventilation systems, should be adopted to control hazardous materials at source

Personal protective equipment

Eye Protection Goggles (European standard - EN 166)

Hand Protection Protective gloves

Glove material	Breakthrough time	Glove thickness	EU standard	Glove comments
Neoprene	See manufacturers recommendations	-	EN 374	(minimum requirement)

Skin and body protection Long sleeved clothing

Inspect gloves before use.
Please observe the instructions regarding permeability and breakthrough time which are provided by the supplier of the gloves.

(Refer to manufacturer/supplier for information)
Ensure gloves are suitable for the task: Chemical compatability, Dexterity, Operational conditions, User susceptibility, e.g. sensitisation effects, also take into consideration the specific local conditions under which the product is used, such as the danger of cuts, abrasion.
Remove gloves with care avoiding skin contamination.

Respiratory Protection	When workers are facing concentrations above the exposure limit they must use appropriate certified respirators. To protect the wearer, respiratory protective equipment must be the correct fit and be used and maintained properly
Large scale/emergency use	Use a NIOSH/MSHA or European Standard EN 136 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced **Recommended Filter type:** Particulates filter conforming to EN 143
Small scale/Laboratory use	Use a NIOSH/MSHA or European Standard EN 149:2001 approved respirator if exposure limits are exceeded or if irritation or other symptoms are experienced. **Recommended half mask:-** Valve filtering: EN405; or; Half mask: EN140; plus filter, EN 141 When RPE is used a face piece Fit Test should be conducted
Environmental exposure controls	No information available.

SECTION 9: PHYSICAL AND CHEMICAL PROPERTIES

9.1. Information on basic physical and chemical properties

Physical State	Solid	
Appearance	White - Light grey	
Odor	Odorless	
Odor Threshold	No data available	
Melting Point/Range	No data available	
Softening Point	No data available	
Boiling Point/Range	No information available	
Flammability (liquid)	Not applicable	Solid
Flammability (solid,gas)	No information available	
Explosion Limits	No data available	
Flash Point	Not applicable	**Method -** No information available
Autoignition Temperature	No data available	
Decomposition Temperature	No data available	
pH	12 - 14	Alkaline
Viscosity	Not applicable	Solid
Water Solubility	Slightly soluble	
Solubility in other solvents	No information available	
Partition Coefficient (n-octanol/water)		
Vapor Pressure	No information available	
Density / Specific Gravity	0.9	
Bulk Density	No data available	
Vapor Density	Not applicable	Solid
Particle characteristics	No data available	

9.2. Other information

Evaporation Rate	Not applicable - Solid

SECTION 10: STABILITY AND REACTIVITY

10.1. Reactivity

None known, based on information available

10.2. Chemical stability

Stable under recommended storage conditions.

10.3. Possibility of hazardous reactions

Hazardous Polymerization Hazardous polymerization does not occur.
Hazardous Reactions None under normal processing.

10.4. Conditions to avoid

Exposure to air.

10.5. Incompatible materials

Halogenated solvents.

10.6. Hazardous decomposition products

Calcium oxides. Sodium oxides.

SECTION 11: TOXICOLOGICAL INFORMATION

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

Product Information

(a) acute toxicity;
Oral Based on available data, the classification criteria are not met
Dermal Based on available data, the classification criteria are not met
Inhalation Based on available data, the classification criteria are not met

Toxicology data for the components

Component	LD50 Oral	LD50 Dermal	LC50 Inhalation
Calcium hydroxide	LD50 = 7340 mg/kg (Rat)	-	-
Sodium hydroxide	140 - 340 mg/kg (Rat)	1350 mg/kg (Rabbit)	-
Water	-	-	-

(b) skin corrosion/irritation; Category 1 B

(c) serious eye damage/irritation; Category 1

(d) respiratory or skin sensitization;
Respiratory No data available
Skin No data available

(e) germ cell mutagenicity; No data available

(f) carcinogenicity; No data available

There are no known carcinogenic chemicals in this product

(g) reproductive toxicity; No data available

(h) STOT-single exposure; No data available

(i) STOT-repeated exposure; No data available

Target Organs No information available.

(j) aspiration hazard; Not applicable
Solid

Symptoms / effects,both acute and delayed Product is a corrosive material. Use of gastric lavage or emesis is contraindicated. Possible perforation of stomach or esophagus should be investigated. Ingestion causes severe swelling, severe damage to the delicate tissue and danger of perforation.

11.2. Information on other hazards

Endocrine Disrupting Properties Assess endocrine disrupting properties for human health. This product does not contain any known or suspected endocrine disruptors.

SECTION 12: ECOLOGICAL INFORMATION

12.1. Toxicity
Ecotoxicity effects .

Component	Freshwater Fish	Water Flea	Freshwater Algae
Calcium hydroxide	LC50 = 160 mg/L, 96h static (Gambusia affinis)		
Sodium hydroxide	LC50: = 45.4 mg/L, 96h static (Oncorhynchus mykiss)		

12.2. Persistence and degradability
Persistence May persist, based on information available.
Degradability Not relevant for inorganic substances.

12.3. Bioaccumulative potential Bioaccumulation is unlikely

12.4. Mobility in soil Is not likely mobile in the environment due its low water solubility. Highly mobile in soils

12.5. Results of PBT and vPvB assessment No data available for assessment.

12.6. Endocrine disrupting properties
Endocrine Disruptor Information This product does not contain any known or suspected endocrine disruptors

12.7. Other adverse effects
Persistent Organic Pollutant This product does not contain any known or suspected substance
Ozone Depletion Potential This product does not contain any known or suspected substance

SECTION 13: DISPOSAL CONSIDERATIONS

13.1. Waste treatment methods

Waste from Residues/Unused Products	Waste is classified as hazardous. Dispose of in accordance with the European Directives on waste and hazardous waste. Dispose of in accordance with local regulations.
Contaminated Packaging	Dispose of this container to hazardous or special waste collection point.
European Waste Catalogue (EWC)	According to the European Waste Catalog, Waste Codes are not product specific, but application specific.
Other Information	Waste codes should be assigned by the user based on the application for which the product was used. Do not empty into drains. Do not flush to sewer. Large amounts will affect pH and harm aquatic organisms.

SECTION 14: TRANSPORT INFORMATION

IMDG/IMO

Not regulated
Exempt under special provision 62

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

ADR

Not regulated
Exempt under special provision 62

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

IATA

Not regulated
Exempt under special provision A16

14.1. UN number
14.2. UN proper shipping name
14.3. Transport hazard class(es)
14.4. Packing group

14.5. Environmental hazards No hazards identified

14.6. Special precautions for user No special precautions required

14.7. Maritime transport in bulk according to IMO instruments Not applicable, packaged goods

SECTION 15: REGULATORY INFORMATION

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

International Inventories
X = listed, Europe (EINECS/ELINCS/NLP), U.S.A. (TSCA), Canada (DSL/NDSL), Philippines (PICCS), China (IECSC), Japan (ENCS), Australia (AICS), Korea (ECL).

Component	EINECS	ELINCS	NLP	TSCA	DSL	NDSL	PICCS	ENCS	IECSC	AICS	KECL

Soda lime	-	-		-	-	-	X	-	X	X	-
Calcium hydroxide	215-137-3	-		X	X	-	X	X	X	X	KE-04518
Sodium hydroxide	215-185-5	-		X	X	-	X	X	X	X	KE-31487
Ethanaminium, N-[4-[bis[4-(diethylamino)phenyl]methylene]-2,5-cyclohexadien-1-ylidene]-N-ethyl-, chloride	219-231-5	-		X	X	-	X	-	X	X	-
Water	231-791-2	-		X	X	-	X	X	X	X	KE-35400

Note
Soda lime CAS # 8006-28-8

Regulation (EC) No 649/2012 of the European Parliament and of the Council of 4 July 2012 concerning the export and import of dangerous chemicals
Not applicable

National Regulations

WGK Classification Water endangering class = 1 (self classification)

Component	Germany - Water Classification (VwVwS)	Germany - TA-Luft Class
Calcium hydroxide	WGK1	
Sodium hydroxide	WGK1	

UK - Take note of Control of Substances Hazardous to Health Regulations (COSHH) 2002 and 2005 Amendment

15.2. Chemical safety assessment

Chemical Safety Assessment/Reports (CSA/CSR) are not required for mixtures

SECTION 16: OTHER INFORMATION

Full text of H-Statements referred to under sections 2 and 3
H290 - May be corrosive to metals
H314 - Causes severe skin burns and eye damage
H315 - Causes skin irritation
H318 - Causes serious eye damage
H335 - May cause respiratory irritation

Legend

CAS - Chemical Abstracts Service

EINECS/ELINCS - European Inventory of Existing Commercial Chemical Substances/EU List of Notified Chemical Substances
PICCS - Philippines Inventory of Chemicals and Chemical Substances
IECSC - Chinese Inventory of Existing Chemical Substances
KECL - Korean Existing and Evaluated Chemical Substances

TSCA - United States Toxic Substances Control Act Section 8(b) Inventory
DSL/NDSL - Canadian Domestic Substances List/Non-Domestic Substances List
ENCS - Japanese Existing and New Chemical Substances
AICS - Australian Inventory of Chemical Substances
NZIoC - New Zealand Inventory of Chemicals

WEL - Workplace Exposure Limit
ACGIH - American Conference of Governmental Industrial Hygienists
DNEL - Derived No Effect Level
RPE - Respiratory Protective Equipment
LC50 - Lethal Concentration 50%
NOEC - No Observed Effect Concentration

TWA - Time Weighted Average
IARC - International Agency for Research on Cancer
Predicted No Effect Concentration (PNEC)
LD50 - Lethal Dose 50%
EC50 - Effective Concentration 50%
POW - Partition coefficient Octanol:Water

PBT - Persistent, Bioaccumulative, Toxic

vPvB - very Persistent, very Bioaccumulative

ADR - European Agreement Concerning the International Carriage of Dangerous Goods by Road

IMO/IMDG - International Maritime Organization/International Maritime Dangerous Goods Code

OECD - Organisation for Economic Co-operation and Development

BCF - Bioconcentration factor

ICAO/IATA - International Civil Aviation Organization/International Air Transport Association

MARPOL - International Convention for the Prevention of Pollution from Ships

ATE - Acute Toxicity Estimate

VOC (volatile organic compound)

Key literature references and sources for data

https://echa.europa.eu/information-on-chemicals

Suppliers safety data sheet, Chemadvisor - LOLI, Merck index, RTECS

Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:

Physical hazards	On basis of test data
Health Hazards	Calculation method
Environmental hazards	Calculation method

Training Advice

Chemical hazard awareness training, incorporating labelling, Safety Data Sheets (SDS), Personal Protective Equipment (PPE) and hygiene.

Use of personal protective equipment, covering appropriate selection, compatibility, breakthrough thresholds, care, maintenance, fit and standards.

First aid for chemical exposure, including the use of eye wash and safety showers.

Chemical incident response training.

Creation Date	22-Jun-2008
Revision Date	17-Dec-2020
Revision Summary	Update to CLP Format.

This safety data sheet complies with the requirements of Regulation (EC) No. 1907/2006 COMMISSION REGULATION (EU) 2020/878 amending Annex II to Regulation (EC) No 1907/2006

Disclaimer

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

End of Safety Data Sheet

Safety Data Sheet

According to OSHA Hazard Communication Standard, 29 CFR 1910.1200

Initial preparation date: 12.14.2017

Revision date: 05.21.2018

ENVIROTEMP™ FR3™ FLUID

SECTION 1: Identification

Product identifier

Product name: ENVIROTEMP™ FR3™ FLUID

Product code: 100088941; 100089128; 100089127; 100089129; 110013820; 110016511

Recommended use of the product and restriction on use

Relevant identified uses: Dielectric fluid

Uses advised against: Not determined or not applicable.

Reasons why uses advised against: Not determined or not applicable.

Manufacturer or supplier details

Manufacturer:

United States

Cargill, Incorporated
Cargill Industrial Specialties
13400 15th Avenue North
Plymouth, MN 55441
1-800-842-3631, 1-952-984-9122
CIS_CustomerService@Cargill.com

Emergency telephone number:

United States

ChemTel Inc

North America: 1-800-255-3924
International: 01-813-248-0585

SECTION 2: Hazard(s) identification

GHS classification: Not a hazardous substance or mixture

Label elements

Hazard pictograms: None

Signal word: None

Hazard statements: None

Precautionary statements: None

Hazards not otherwise classified: None

SECTION 3: Composition/information on ingredients

Identification	Name	Weight %
CAS number: 8001-22-7	Soybean Oil	>99

Additional Information:

*This material is not considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200)

SECTION 4: First aid measures

Description of first aid measures

General notes:

No special measures required

After inhalation:

If inhaled, remove to fresh air

Get medical advice if you feel unwell

After skin contact:

Wash with plenty of water / soap and rinse thoroughly

Get medical advice if skin irritation occurs or you feel unwell

After eye contact:

Rinse cautiously with water for several minutes

Remove contact lenses, if present and easy to do. Continue rinsing

If symptoms persist, consult a doctor

After swallowing:

Rinse mouth and do not induce vomiting

Get medical advice if you feel unwell or concerned

Most important symptoms and effects, both acute and delayed

Acute symptoms and effects:

Any additional important symptoms and effects are described in Section 11: Toxicological Information

Delayed symptoms and effects:

Not determined or not applicable.

Immediate medical attention and special treatment

Specific treatment:

Not determined or not applicable.

Notes for the doctor:

Not determined or not applicable.

SECTION 5: Firefighting measures

Extinguishing media

Suitable extinguishing media:

Use Water (fog only), dry chemical, chemical foam, carbon dioxide, or alcohol-resistant foam

Unsuitable extinguishing media:

Do not use water as an extinguisher

Specific hazards during fire-fighting:

Thermal decomposition can lead to release of irritating gases and vapors

Special protective equipment for firefighters:

Use typical firefighting equipment, self-contained breathing apparatus, special tightly sealed suit

Special precautions:

Rags, steel wool, or waste contaminated with this product may spontaneously catch fire if improperly discarded

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures:

Spilled material may cause a slipping hazard. Use appropriate safety equipment

Environmental precautions:

Should not be released into the environment
Prevent from reaching drains, sewers, or waterways

Methods and material for containment and cleaning up:

Large spills: Dike area to contain spill. Knock down and dilute vapors with water fog or spray. Collect with vacuum equipment or inert materials. Approach release upwind
Small spills: Absorb with non-combustible liquid-binding material (sand, diatomaceous earth (clay), acid binders, universal binders). Remove with shovel. Collect in suitable and properly labeled containers
Wash surfaces with aqueous cleaner and hot water. Used rags or other cleaning materials should be soaked with water and placed in a sealed container to prevent spontaneous combustion
Dispose of contents / container in accordance with local regulations

Reference to other sections:

Not determined or not applicable.

SECTION 7: Handling and storage

Precautions for safe handling:

Use appropriate personal protective equipment (see Section 8).
Avoid breathing mist or vapor. Use with adequate ventilation. Avoid repeated and prolonged skin contact.
Wash thoroughly after handling. Remove contaminated clothing and wash before reuse.
Surfaces of porous or fibrous materials saturated with this material can self-heat and auto ignite when exposed to air. Thin films of material on non-porous surfaces in contact with air will polymerize over time making it increasingly more difficult to clean.
Immediately after use, place rags, steel wool, or waste in a sealed water-filled metal container.

Conditions for safe storage, including any incompatibilities:

Protect material from extreme temperatures, humidity, and water prior to use. Store in labeled, tightly closed containers at 10-40° C (50-104° F) in dry, isolated and well-ventilated areas, away from sources of ignition and heat.

SECTION 8: Exposure controls/personal protection

Only those substances with limit values have been included below.

Occupational Exposure limit values:

Country (Legal Basis)	Substance	Identifier	Permissible concentration
United States (OSHA)	Vegetable oil mist	NA	OSHA PEL 15 mg/m3 (Total); 5 mg/m3 (Respirable fraction)
	Vegetable oil mists (except castor, cashew nut or similar irritant oils)	NA	California (OSHA) PEL 10 mg/m3 (Total); 5 mg/m3 (Respirable fraction)
NIOSH	Vegetable oil mist	NA	NIOSH REL 10-hr TWA 10 mg/m3 (Total); 5 mg/m3 (Respirable fraction)
ACGIH	Vegetable oil mists (except castor, cashew nut or similar irritant oils)	NA	ACGIH TLV TWA: 5 mg/m³ (respirable fraction), 10 mg/m³ (As 'Oil mist, mineral')

Biological limit values:

No biological exposure limits noted for the ingredient(s).

Information on monitoring procedures:

Monitoring procedures should be chosen according to the indications set by national authorities or recognized standards.

Appropriate engineering controls:

Provide exhaust ventilation or other engineering controls to keep the airborne concentrations of vapor and mists below the applicable workplace exposure limits (Occupational Exposure Limits-OELs) indicated above. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of use or handling.

Personal protection equipment

Eye and face protection:

Safety glasses, goggles, or face shield recommended to protect eyes from mists or splashing.

Skin and body protection:

Wear protective clothing as necessary to minimize prolonged skin contact. Selection of specific items will depend on task

Respiratory protection:

Respiratory protection should be worn when there is a potential to exceed the exposure limit requirements or guidelines. If there are no applicable exposure limit requirements or guidelines, wear respiratory protection when adverse effects, such as respiratory irritation or discomfort have been experienced, or where indicated by your risk assessment process. In misty atmospheres, use an approved particulate respirator.

General hygienic measures:

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin, eyes and clothing. Wash hands before breaks and at the end of work. Wash contaminated clothing before reusing.

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance	Light green liquid
Odor	Slight
Odor threshold	Not determined or not available.
pH	Not determined or not available.
Melting point/freezing point	Not determined or not available.
Initial boiling point/range	>360°C (>680°F)
Flash point (closed cup)	>265°C (Closed Cup)
Evaporation rate	Not determined or not available.
Flammability (solid, gas)	Not determined or not available.
Upper flammability/explosive limit	Not determined or not available.
Lower flammability/explosive limit	Not determined or not available.
Vapor pressure	< 1.3 Pa (<0.01 mmHg)
Vapor density	Not determined or not available.
Density	0.92 g/cm³ (7.677 lbs./gal)
Relative density	Not determined or not available.
Solubilities	Insoluble.
Partition coefficient (n-octanol/water)	Not determined or not available.
Auto/Self-ignition temperature	401-404°C (ASTM E659)
Decomposition temperature	Not determined or not available.
Dynamic viscosity	Not determined or not available.

Kinematic viscosity	33-35 mm²/s @ 40°C
Explosive properties	Not determined or not available.
Oxidizing properties	Not determined or not available.

Other information

SECTION 10: Stability and reactivity

Reactivity:
Does not react under normal conditions of use and storage.
Chemical stability:
Stable under normal conditions.
Possibility of hazardous reactions:
None under normal conditions of use and storage.
Conditions to avoid:
To avoid thermal decomposition, avoid temperatures > 250C
Incompatible materials:
Strong oxidizing agents.
Strong alkali.
Hazardous decomposition products:
Carbon monoxide, carbon dioxide.

SECTION 11: Toxicological information

Acute toxicity
Assessment: Based on available data, the classification criteria are not met.
Product data:

Route	Result
Oral	LD50 > 5000 mg/kg bw (calculated)
Dermal	LD50 > 2000 mg/kg bw (calculated)
Inhalation	Acute inhalation toxicity data not available. At room temperature, exposure to vapor is minimal due to low volatility; single exposure is not likely to be hazardous

Substance data: No data available.

Skin corrosion/irritation
Assessment: Based on available data, the classification criteria are not met.
Product data:
Not expected to cause irritation base on component or similar materials.
Substance data: No data available.

Serious eye damage/irritation
Assessment: Based on available data, the classification criteria are not met.
Product data:
Minimal irritation or no effect expected base on component or similar materials.
Substance data: No data available.

Respiratory or skin sensitization
Assessment: Based on available data, the classification criteria are not met.
Product data:
Not expected to be a skin sensitizer based on animal data for similar substances.

Substance data: No data available.

Carcinogenicity

Assessment: Based on available data, the classification criteria are not met.

Product data: No data available.

Substance data: No data available.

International Agency for Research on Cancer (IARC): None of the ingredients are listed.

National Toxicology Program (NTP): None of the ingredients are listed.

Germ cell mutagenicity

Assessment: Based on available data, the classification criteria are not met.

Product data:

Not expected to be a germ cell mutagen. In vitro and in vivo tests did not show mutagenic effects using similar materials.

Substance data: No data available.

Reproductive toxicity

Assessment: Based on available data, the classification criteria are not met.

Product data:

Not expected to be toxic to reproductive or developmental based on testing in rats for similar materials.

Substance data: No data available.

Specific target organ toxicity (single exposure)

Assessment: Based on available data, the classification criteria are not met.

Product data:

Not expected to cause organ damage from a single exposure.

Substance data: No data available.

Specific target organ toxicity (repeated exposure)

Assessment: Based on available data, the classification criteria are not met.

Product data:

Not expected to cause organ damage from prolonged or repeated exposure based on animal studies for similar materials.

Substance data: No data available.

Aspiration toxicity

Assessment: Based on available data, the classification criteria are not met.

Product data:

No data available.

Substance data: No data available.

Information on likely routes of exposure:

No data available.

Symptoms related to the physical, chemical and toxicological characteristics:

No data available.

Other information:

No data available.

SECTION 12: Ecological information

Acute (short-term) toxicity

Assessment: Based on available data, the classification criteria are not met.

Product data:

Fish	This product is not expected to be harmful to aquatic organisms.

Substance data: No data available.

Chronic (long-term) toxicity

Product data: No data available.

Substance data: No data available.

Persistence and degradability

Product data:

Readily biodegradable

Substance data: No data available.

Bioaccumulative potential

Product data:

Not expected to bioaccumulate based on testing of similar subtance in fish.

Substance data: No data available.

Mobility in soil

Product data:

Product has low mobility in soil.

Substance data: No data available.

Other adverse effects: No data available.

SECTION 13: Disposal considerations

Disposal methods:

It is the responsibility of the waste generator to properly characterize all waste materials according to applicable regulatory agencies Product and packaging must be disposed of in accordance with relevant national and local regulations. May be incinerated. Unopened product may be returned for reclamation

SECTION 14: Transport information

United States Transportation of dangerous goods (49 CFR DOT)

UN number	Not Regulated
UN proper shipping name	Not Regulated
UN transport hazard class(es)	None
Packing group	None
Environmental hazards	None
Special precautions for user	None

International Maritime Dangerous Goods (IMDG)

UN number	Not Regulated
UN proper shipping name	Not Regulated
UN transport hazard class(es)	None
Packing group	None
Environmental hazards	None
Special precautions for user	None

International Air Transport Association Dangerous Goods Regulations (IATA-DGR)

UN number	Not Regulated
UN proper shipping name	Not Regulated
UN transport hazard class(es)	None

Packing group	None
Environmental hazards	None
Special precautions for user	None

SECTION 15: Regulatory information

United States regulations

Inventory listing (TSCA): All ingredients are listed.
Significant New Use Rule (TSCA Section 5): Not applicable.
Export notification under TSCA Section 12(b): Not applicable.
SARA Section 302 extremely hazardous substances: Not listed.
SARA Section 313 toxic chemicals: Not listed.
CERCLA: Not listed.
RCRA: See Section 13.
Section 112(r) of the Clean Air Act (CAA): Not listed.
Massachusetts Right to Know: Not listed.
New Jersey Right to Know: Not listed.
New York Right to Know:

NA	Vegetable oil >5%	Listed

Pennsylvania Right to Know:

8001-22-7	Soybean Oil	Listed

California Proposition 65: Not listed.

SECTION 16: Other information

Abbreviations and Acronyms: None
Disclaimer:

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End of Safety Data Sheet