1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Commercial name	Turbo Gas		
Our codes	12003005		
Chemical description	Propylene / N-Butane		
	CAS Number:	115-07-01	106-98-8
	CE Number:	204-062-1	203-448-7
	Index Number:	601-011-00-9	601-004-00-0
	Registration No:	01-2119447103-50-XXXX + 01-2119447103-50-XXXX	01-2119474691-32-XXX
Chemical formula	C3H6 + n-H4H10		

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

Industrial sector: Refrigeration and air-conditioning
Type of use: Welding, heating and brazing. Recharge cartridge of professional portable equipment.
Application: Industrial and professional. Perform risk assessment prior to use.

1.3 Details of the supplier of the safety data sheet

MARIEL SRL
Via Olubi, 5 – 28013 GATTICO (NO) – Italy
Telephone : +39 0322 838319
Fax : +39 0322 838813
E-mail : laboratorio@mariel.it

1.4 Emergency telephone number

Mariel Srl	**+39 0322 838319**	**Hours: 8.30-12.30 / 13.30-17.30**
CAV-CNIT Anti-Poison (toxicological) National Information Centre	+39 0382 24444	Hours: 24 h / 24 h

2. Hazards identification

2.1 Classification of the substance or mixture

Regulation (EC) 1272/2008 (CLP/GHS)

Physical Hazards:	Flammable gases, Category 1	H220
	Gases under pressure: Liquefied gas	H280

2.2 Label elements

Dangerous pictogram

GHS02 **GHS04**

Signal word (CLP)	Danger	
Hazard statements (H)	H270	May cause or intensify fire; oxidizer.
	H280	Contains gas under pressure; may explode if heated.
Precautionary statements (P)	P102	Keep out of reach of children.
	P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. 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+P403	Protect from sunlight. Store in a well-ventilated place.

2.3 Other hazards

Classified as dangerous goods under (CE) n. 1272/2008.
The substance/mixture does not fulfil the PBT and vPvB criteria listed in Annex XIII to REACH.

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3. Composition/information on ingredients

3.1 Substances

n.a.

3.2 Mixtures

Substance name	Contents	CAS No.	EC No.	Registration No.	Classification Reg. (CE) n. 1272/2008 (CLP/GHS)
Propylene	45-62%	115-01-01	204-062-1	01-2119447103-50-XXXX + 01-2119447103-50-XXXX	Flam. Gas 1 – H220 Press. Gas – H280
N-Butane	55-38%	106-97-8	203-448-7	01-2119474691-32-XXXX	Flam. Gas 1 – H220 Press. Gas – H280

4. First aid measures

General information: If the person is unconscious, place it in the recovery position and get immediately medical attention. Do not give anything to an unconscious person. If breathing is irregular, give oxygen. If breathing stopped, administer artificial respiration. If symptoms persist, call a physician.

4.1 Description of first aid measures

Inhalation	Remove patience from exposure to fresh air. Administer oxygen if necessary. Obtain immediate medical attention.
Skin contact	In case of contact with skin, warm immediately with plenty of water. Remove contaminated clothing. If irritation or blistering occurs, call a physician.
Eye contact	Remove contact lenses, if present. Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes. If symptoms persist, call a physician.
Ingestion	Unlikely route of exposure. As this product is a gas, refer to the section “Inhalation”. Do not induce vomiting without medical advice. Obtain immediate medical attention.

4.2 Most important symptoms and effects, both acute and delayed

Vapours are heavier than air and can cause rapid suffocation by reducing oxygen available for breathing.
Rapid evaporation of the liquid may cause frostbite.

4.3 Indication of any immediate medical attention and special treatment needed

None.

5. Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	Use water spray (fog), foam, dry chemical or CO2.
Unsuitable extinguishing media	Water jet.

5.2 Special hazards arising from the substance or mixture

Specific hazards	An incomplete combustion could generate a complex mixture of solid and liquid airborne particles and gases, including CO2 (carbon monoxide). Exposure to the source of heat and/or to the fire may cause containers to rupture/explode.

5.3 Advice for firefighters

Specific methods	Coordinate fire measure to the surrounding fire. If possible, stop flow of the product. From protected position, cool endangered containers with water spray jet.
Special protective equipment for fire fighters	Firefighters must use standard protective equipment including flame resistant clothing, helmet with face shield, gloves, protective boots and in enclosed spaces, SCBA. Firefighters must use standard protective equipment including. 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 firefighting 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.

Other information

Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

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6. Accidental release measure

6.1 Personal precautions, protective equipment and emergency procedures

Try to stop release.
Evacuate the area.
Monitor concentration of released product.
Wear self-contained breathing apparatus when entering area unless atmosphere is proved to be safe.
Eliminate ignition sources if safe to do so.
Ensure adequate air ventilation.
Act in accordance with local emergency plan.

6.2 Environmental precautions

Try to stop leak if safe to do so.
Remove containers from area of fire if safe to do so.
Do not release the product into the environment.
Avoid any spills and leaks.

6.3 Methods and material for containment and cleaning up

Ventilate/aerate the area/local.

6.4 Reference to other sections

See section 8 and 13.

7. Handling and storage

7.1 Precautions for safe handling

Technical measures	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. Service technician must check regularly your entire gas system to ensure that it is leak-free. Do not smoke, eat or drink when handling product. Keep equipment free from oil and grease. Use properly specified equipment which is suitable for this product, its supply pressure and temperature. Use only oxygen approved lubricants and oxygen approved sealing. Use only with equipment cleaned for oxygen service and rated for cylinder pressure. Do not breathe gas. Contact your supplier if in doubt.
Safe handling	Refer to supplier's handling instructions. Do not allow back-feed into the container. Protect containers from physical damage; do not drag, roll, slide or drop. When moving containers, even for short distances, use appropriate equipment (trolley, hand truck, fork 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 the supplier. Damaged valves should be reported immediately to the supplier. Never attempt to repair or modify container valves or safety relief devices. Keep container valve outlets clean and free from contaminates 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 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 container contents. Suck back of water into the container must be prevented. Open valve slowly to avoid pressure shock.
Industrial hygiene	Ensure adequate ventilation of the working area.

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7.2 Conditions for safe storage, including any incompatibility

Requirements for storage areas and containers

Observe all regulations and local requirements regarding storage of containers.
Containers should not be stored in conditions likely to encourage corrosion.
Containers valve or caps should be in place.
Keep containers tightly closed in a dry, cool and well-ventilated place (below 50 °C), away from any ignition or heat sources.
Keep away from combustible materials.
Store in original container.

7.3 Specific end use(s)

None.

8. Exposure controls/personal protection

8.1 Control parameters

Threshold limit values (substance)	:	Propylene ACGIH 2011: TLV-TWA 500 ppm
DNEL Derived No-Effect Level	:	None available.
DMEL Derived Minimum Effect Level	:	Non available.
PNEC Predicted No-Effect Concentration	:	Not derived because the substance is not dangerous for the environment.

8.2 Exposure controls

8.2.1 Appropriate engineering controls

Provide adequate general and local exhaust ventilation. In case of insufficient ventilation, wear self-contained breathing apparatus.
Minimize exposure to vapours.

8.2.2 Individual protection measures, such as personal protective equipment

A risk assessment should be conducted and documented in each work area to assess the risks related to 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.

a) Eye/face protection — Safety glasses with side-shields (according to directive EN 166).

b) Skin protection

i) Hand protection — Thermal-protective gloves resistant to chemical products (EN 374). The penetration time of the gloves must be greater than the period of expected use. Gloves should be replaced immediately if they show signs of wear or deterioration.

ii) Other — Wear long-sleeved clothes. Remove or clean contaminated clothing.
Apron or protective clothing are not necessary.

c) Respiratory protection — Mask filter for gases and vapours (EN141). To obtain an adequate protection, filter class you should choose according to the type and concentration of contaminants. The breathing apparatus with filters do not operate satisfactorily when the air contains high concentrations of vapours. In case of insufficient ventilation, wear self-contained breathing apparatus (EN529).

8.2.3. Environmental exposure controls

Handling in accordance with good industrial hygiene and safety practice. Prevent spillage or leakage of the product in watercourse or sewers (explosion danger). Avoid air emissions. Refer to local regulations for restriction of emissions in atmosphere.
No additional risk control measures may be needed (SDU7).
See section 7 and 13.

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9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

a)	**Appearance**	Gas
b)	**Odour**	Olefin
c)	**Odour Threshold**	n.a.
d)	**pH**	n.a.
e)	**Melting point [°C]**	- 185 °C at 1 bar (Propylene) / - 138 °C at 1 bar (N-Butane)
f)	**Initial boiling point**	- 47,70 °C at 1 bar (Propylene) / - 05 °C at 1 bar (N-Butane)
g)	**Flash point**	- 108 °C at 1 bar (Propylene) / - 60 °C at 1 bar (N-Butane)
h)	**Evaporation rate** [ether=1]	n.a.
i)	**Flammability** (solid, gas)	n.a.
j)	**Upper/Lower flammability**	LEL 2%; UEL 11% (Propylene)
k)	**Vapour pressure**	Not applicable (see column 2 of Annex XI of REACH Regulation)
l)	**Vapour density**	1,8 Kg/m³
m)	**Relative density** (air = 1)	1,4 at 15 °C
n)	**Solubility** (in the water– mg/l)	200 mg/l at 25 °C
o)	**Partition coefficient: n-Octanol/water**	1,77 at 20 °C
p)	**Auto-ignition temperature**	455 °C
q)	**Decomposition temperature**	n.a.
r)	**Viscosity**	Not applicable (see column 2 of Annex XI of REACH Regulation)
s)	**Explosive properties**	Not applicable (see column 2 of Annex XI of REACH Regulation)
t)	**Oxidising properties**	Not applicable (see column 2 of Annex XI of REACH Regulation)

9.2 Other information

VOC content ≥ 90% (EU, CH, USA)

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 handling and storage conditions

10.3 Possibility of hazardous reactions

Strong oxidizing agents (e.g. peroxides and chromates).

10.4 Conditions to avoid

Store separate from oxidizing agents.
Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. Do not smoke. Avoid electrostatic charges.
Protect from sunlight and do not expose to temperatures exceeding 50° C.

10.5 Incompatible materials

Strong oxidizing agents.

10.6 Hazardous decomposition products

None.

11. Toxicological information

Tests show an elimination of 82% to 93% of propylene inhaled. The propylene absorbed is metabolized as propylene oxide.

11.1 Information on toxicological effects

a) Acute toxicity

Oral

In accordance with point 2 of Annex XI of EC Regulation No. 1907/2006 (REACH), such testing may be omitted, as the substance is present in a gas phase at room temperature and atmospheric pressure. Extremely volatile and flammable at room temperature, it tends to form explosive mixtures with air. A high risk of fire or explosion would be associated with any significant concentrations test.

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Inhalation

Method	Result	Comments	Font
Rat – Inhalation 14 days	NOAEC 10'000 ppm (M/F)	2 (Reliability with restrictions) – Propylene	NTP (1985)

Skin

In accordance with point 2 of Annex XI of EC Regulation No. 1907/2006 (REACH), such testing may be omitted, as the substance is present in a gas phase at room temperature and atmospheric pressure. Extremely volatile and flammable at room temperature, it tends to form explosive mixtures with air. A high risk of fire or explosion would be associated with any significant concentrations test.

b) Skin corrosion/Skin irritation

In accordance with point 2 of Annex XI of EC Regulation No. 1907/2006 (REACH), such testing may be omitted, as the substance is present in a gas phase at room temperature and atmospheric pressure. Extremely volatile and flammable at room temperature, it tends to form explosive mixtures with air. A high risk of fire or explosion would be associated with any significant concentrations test. Literature data regarding dose response studies in humans have shown similar substances (propane and butane) are not irritant and corrosive for skin and mucous membranes. Contact with the liquefied gas can produce frostbite.

c) Serious eye damage/irritation

In accordance with point 2 of Annex XI of EC Regulation No. 1907/2006 (REACH), such testing may be omitted, as the substance is present in a gas phase at room temperature and atmospheric pressure. Extremely volatile and flammable at room temperature, it tends to form explosive mixtures with air. Contact with the liquefied gas can produce frostbite.

d) Respiratory or skin sensitisation

Respiratory sensitisation: There are no studies that indicate this type of effect.
Skin sensitisation: n accordance with point 2 of Annex XI of EC Regulation No. 1907/2006 (REACH), such testing may be omitted.

e) Germ cell mutagenicity

Literature data have shown no consistent evidence of genotoxicity and therefore the substance is not classified as mutagen according to the legislation on dangerous substances.

Method	Result	Comments	Font
S. Typhimurium E. Coli AMES test – OECD 471	Negative (with or without metabolic activity)	1 (Reliability without restrictions)	INVERESK Research (2003)
Mammalian cell mutation assay OECD 476	Ambiguous (negative without activation, ambiguous with activation)	1 (Reliability without restrictions)	Mc Gregor et al, 1991

f) Carcinogenicity

Literature data have shown no consistent evidence of carcinogenicity and therefore the substance is not classified as carcinogenic according to the legislation on dangerous substances.

Method	Result	Comments	Font
Rat (M/F) 103 weeks 0 – 5'000 – 10'000 AMES test – OECD 471	Negative	2 (Reliability with restrictions)	NTP (1985)

g) Reproductive toxicity

Literature data have shown no consistent evidence of toxicity to fertility and therefore the substance is not classified as toxic for reproduction according to the legislation on dangerous substances

h) STOT-single exposure

Based on available data, no known effects from this product.

i) STOT-repeated exposure

Oral / Skin

In accordance with point 2 of Annex XI of EC Regulation No. 1907/2006 (REACH), such testing may be omitted, as the substance is present in a gas phase at room temperature and atmospheric pressure. Extremely volatile and flammable at room temperature, it tends to form explosive mixtures with air.

Inhalation

Method	Result	Font
Rat 14 weeks Equivalent to OECD 413	NOAEC: 10'000 ppm (17'200 mg/m³)	NTP (1985)
Rat 103 weeks Equivalent to OECD 453	LOAEC: 5'000 ppm (8'600 mg/m³)	NTP (1985)

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12. Ecological information

At present situation data on aquatic toxicity have shown no toxic phenomena from the environmental and ecological point of view and were not derived PNEC(S) for fresh waters, sea waters, sediments and soils. In accordance with column 2 of Annexes VII and VIII of the REACH Regulation, the acute toxicity tests (acute toxicity for the aquatic environment, chronic toxicity for the aquatic environment, toxicity on the ground) can't be performed if limiting factors indicate that the aquatic toxicity is unlikely. Regarding the influence on the waste waters, there are no specific actions to be performed because the substance occurs at room temperature and atmospheric pressure, in the gaseous state, which is extremely volatile and practically insoluble in water.

12.1 Toxicity

Endpoint	Result	Comments
Aquatic toxicity		
Invertebrates Daphnia STEL	LC50 (48 h): 28,2 mg/l	Key study Propylene QSAR, Nabholz et al., 2009
Invertebrates Daphnia LTEL	Chv (16 d): 3,1 mg/l	Key study Propylene QSAR, Nabholz et al., 2009
Algae STEL	EC50 (96 h): 12,1 mg/l	Key study Propylene QSAR, Nabholz et al., 2009
Fish STEL	LC50 (96 h): 51,7 mg/l	Key study Propylene QSAR, Nabholz et al., 2009
Fish LTEL	ChV (30 d): 5,3 mg/l	Key study Propylene QSAR, Nabholz et al., 2009

12.2 Persistence and degradability

Abiotic degradability
This substance may contribute to the formation of ozone in the atmosphere near the surface. However, the photochemical formation of ozone depends on a complex interaction of other air pollutants and environmental conditions.
Half-life (oxidation): 14.6 hours (rad. Hydroxyl); 23.7 hours (ozone).
Biotic degradation
Studies QSAR have been carried out with propylene, which has a biodegradability of 50% in 2.36 days, so the product is biodegradable.

12.3 Bioaccumulative potential

Propylene log Kow is 1.77 so the product is not bio-accumulative.

12.4 Mobility in soil

Not expected phenomena of adsorption/absorption in the soil.

12.5 Results of PBT and vPvB assessment

According to the criteria in Annex XIII of the REACH Regulation, the substance is not classified PBT or vPvB.

12.6 Other adverse effects

The substance has a content of volatile organic compounds (VOC) equal to 100%. Use the substance according to good working practices, without disperse it in the environment. High concentrations of ozone are associated with adverse effects on humans and during the growing season with different damage on crops, vegetation and forests.

13. Disposal consideration

13.1 Waste treatment methods

General information Avoid the formation of explosive mixtures with air: do not discharge into areas where its accumulation could be dangerous. The substance should be classified as dangerous waste: HP2 "Flammable".

Disposal methods For this product it is no possible assign a specific code number of the waste by the user (producer of the waste) that has the responsibility to choose the most appropriate code based on actual use of the product and any alterations and contaminations (Ref. Directive 2001/118/EC). The code number of the waste must be decided in accordance with the European Waste List (Decision on EU waste 200/532/CE index) in accordance with specific companies for the disposal

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factories/producers/National Authorities. Discharge, treatment, or disposal may be subject to national, state, or local laws. Dispose of waste material according to Local, State, Federal, and Provincial Environmental Regulations.
EURAL Code (CER) : 16 05 04 (gases in pressure containers- including halons – containing dangerous substances)

13.2 Additional information

The user is obliged to observe EU, state and/or local regulations on waste disposal.
External treatment and disposal waster should comply with applicable local and/or national regulations.
For further background information on waste disposal, see Directive 2008/98/CE.

14. Transport information

14.1 UN Number 1965

Hazard labels
ADR/RID, IMDG, IATA/ICAO

2.1 Flammable gas.

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

14.2 UN proper shipping name	Hydrocarbon gas mixture, Liquefied, N.O.S.
14.3 Transport hazard class(es)	2
Classification code	5F
Kemler code	23
14.4 Packing group	
Tunnel restriction	B/D
14.5 Environmental hazards	No

IATA/ICAO (Transport by air)

14.2 UN proper shipping name	Hydrocarbon gas mixture, Liquefied, N.O.S.
14.3 Transport hazard class(es)	2.1, Flamm. Gas
14.4 Packing group	n.a.
14.5 Environmental hazards	No

IMDG (Transport by sea)

14.2 UN proper shipping name	Hydrocarbon gas mixture, Liquefied, N.O.S.
14.3 Transport hazard class(es)	2.1
Emergency Schedule (EmS) - Fire	F-C
Emergency Schedule (EmS) - Spillage	S-V
14.4 Packing group	n.a.
14.5 Environmental hazards	No

Special precautions for user

- Avoid transport on vehicles where the load space is not separated from the driver's.
- 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.
- 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 in Annex II of Marpol and the IBC Code

For the in bulk transports, follow the MARPOL 73/78 Annex II and IBC Code where applicable.

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15. Regulatory information

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

Authorization under REACH (Regulation EC 1907/2006 and subsequent amendments): the substance is not in the list of substances of very high concern (SVHC) candidate authorization. Regulation EC 1272/2008 and subsequent amendments (CLP/GHS).

Additional regulations/legislations

Regulation (EC) No 1906/2007 - Regulation REACH No. 1907/2006 - Regulation (EC) n. 1272/2008 - Directive 67/548/CEE – Directive 92/85/CE Directive 98/24/CE – Directive 96/82/CE – Directive 2003/105/CE - Directive 2004/42/CE.

16. Other information

This Material Safety Data Sheet has been made according regulation (EU) 2015/830 of 28 May 2015 amending Regulation (EC) No 1907/2006.

Text of H and P phrases in section 2

H270 May cause or intensify fire; oxidizer.
H280 Contains gas under pressure; may explode if heated.
P102 Keep out of reach of children.
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. 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+P403 Protect from sunlight. Store in a well-ventilated place.

History	Version 3 by Mariel Srl	Version 2 by Mariel Srl	Version 1 by Mariel Srl
	Revision date: 05/2018	Revision date: 10/2014	Revision date: 03/2011

b) Abbreviations and acronyms

ACGIH	American Conference of Governmental Industrial Hygienists
ADR	Accord Dangerous Route
AMES (Test)	Ames Bruce (Test for determining if the chemical is mutagens)
CAS	Chemical Abstracts Service
CE	European Community
CER	Catalogo Europeo Rifiuti (European Catalogue of Waste)
ChV	Chronic Values
CLP	Classification, Labelling and Packaging
DNEL	Derived No-Effect Level
DMEL	Derived Minimum Effect Level
EC	European Commission
EC50	Half maximal Effective Concentration
EURAL	European Waste Code
GHS	Globally Harmonised System
LC50	Half maximal Lethal Concentration
LEC	Lower Explosive Limit
LOAEC	Lowest Observed Adverse Effect Level
LTEL	Long Term Exposure Limit
IATA	International Air Transport Association
IBC Code	International Maritime Organization (Code)
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods
MARPOL	MARitime POLlution
n.a.	Not Applicable
n.d.	Not Available
NOAEC	No Observed Adverse Effect Level
NTP	Network Time Protocol
OECD	Organisation for Economic Co-operation and Development
PBT	Persistent Bio-accumulative Toxic (substa
PPE	Personal Protective Equipment
QSAR	Quantitative Structure–Activity Relationship

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RID	Rail International Dangerous Goods
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals (Regulation (EC) n. 1907/2006)
STEL	Short Term Exposure Limit
TLV	Threshold Limit Value
TWA	Time Weighted Average
UEL	Upper Explosive Limit
vPvB	very Persistent very Bioaccumulative

Notice of liability

This information should not constitute a guarantee for any specific product properties. This information are only a guidance for safe handling, use, processing, storage, transportation, disposal and release and are not to be considered a warranty or a quality specification.

The information contained in this safety data sheet are based on our current knowledge and EU and national laws; they describe the product only with regard to safety requirements. The conditions of the user are beyond our knowledge and control. The product should not be used for purpose other than those specified. It is always the responsibility of the user to take all the necessary measures to comply with the requirements of current legislation. The information contained in this form should not considered as a guarantee of its properties.

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