



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Safety Data Sheet according to Regulation (EC) No. 1907/2006 (REACH)

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

1.1. Product identifier

Trade name/designation:

RAVENOL Ketten-Spray

Article No.:

1360032

UFI:

H5YM-69HN-9K87-VV9Y

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

Use of the substance/mixture:

Technical Spray

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

Supplier (manufacturer/importer/only representative/downstream user/distributor):

Ravensberger Schmierstoffvertrieb GmbH

Produktsicherheit
Jöllenbecker Str. 2
33824 Werther
Germany

Telephone: +49 5203 9719 0

Telefax: +49 5203 9719 40

E-mail: kontakt@ravenol.de

Website: www.ravenol.de

E-mail (competent person): sdb@ravenol.de

* **1.4. Emergency telephone number**

24 hr. emergency phone number, 24h: +49 700 24 112 112 (Contract ID: RAV) / +1 872 5888271 (Contract ID: RAV)

SECTION 2: Hazards identification

* **2.1. Classification of the substance or mixture**

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

Hazard classes and hazard categories	Hazard statements	Classification procedure
Aerosols (<i>Aerosol 1</i>)	H222; H229: Extremely flammable aerosol. Pressurised container: May burst if heated.	On basis of test data.
Skin corrosion/irritation (<i>Skin Irrit. 2</i>)	H315: Causes skin irritation.	Calculation method.
STOT-single exposure (<i>STOT SE 3</i>)	H336: May cause drowsiness or dizziness.	Calculation method.
Hazardous to the aquatic environment (<i>Aquatic Chronic 2</i>)	H411: Toxic to aquatic life with long lasting effects.	Calculation method.

* **2.2. Label elements**

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

Hazard pictograms:



GHS02
Flame



GHS07
Exclamation mark



GHS09
Environment

Signal word: Danger



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Hazard components for labelling:

Hydrocarbons, C6-C7, n-alkanes, iso-alkanes, cyclics, <5% n-hexane; Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes

Hazard statements for physical hazards	
H222	Extremely flammable aerosol.
H229	Pressurised container: May burst if heated.

Hazard statements for health hazards	
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.

Hazard statements for environmental hazards	
H411	Toxic to aquatic life with long lasting effects.

Supplemental hazard information: none

Precautionary statements	
P102	Keep out of reach of children.

Precautionary statements Prevention	
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P211	Do not spray on an open flame or other ignition source.
P251	Do not pierce or burn, even after use.
P260	Do not breathe vapours and spray.
P271	Use only outdoors or in a well-ventilated area.
P280	Wear protective gloves and eye/face protection.

Precautionary statements Response	
P302 + P352	IF ON SKIN: Wash with plenty of soap and water.
P304 + P340	IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P312	Call a POISON CENTER/doctor/Emergency telephone number if you feel unwell.
P332 + P313	If skin irritation occurs: Get medical advice/attention.

Precautionary statements Storage	
P410 + P412	Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F.

Precautionary statements Disposal	
P501	Dispose of contents/container to an appropriate recycling or disposal facility.

* **2.3. Other hazards**

Other adverse effects:

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

SECTION 3: Composition/information on ingredients

3.2. Mixtures

Hazardous ingredients / Hazardous impurities / Stabilisers:

Product identifiers	Substance name Classification according to Regulation (EC) No 1272/2008 [CLP]	Concentration
CAS No.: 75-28-5 EC No.: 200-857-2 Index No.: 601-004-00-0 REACH No.: 01-2119485395-27	isobutane Flam. Gas 1A (H220), Press. Gas (Liq.) (H280) Danger	25 - < 50 Vol-%
EC No.: 921-024-6 REACH No.: 01-2119475514-35	Hydrocarbons, C6-C7, n-alkanes, iso-alkanes, cyclics, <5% n-hexane Aquatic Chronic 2 (H411), Asp. Tox. 1 (H304), Flam. Liq. 2 (H225), STOT SE 3 (H336), Skin Irrit. 2 (H315) Danger	10 - < 20 Vol-%
CAS No.: 64742-49-0 EC No.: 927-510-4 REACH No.: 01-2119475515-33	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes Aquatic Chronic 2 (H411), Asp. Tox. 1 (H304), Flam. Liq. 2 (H225), STOT SE 3 (H336), Skin Irrit. 2 (H315) Danger	10 - < 20 Vol-%



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Product identifiers	Substance name Classification according to Regulation (EC) No 1272/2008 [CLP]	Concentration
CAS No.: 74-98-6 EC No.: 200-827-9 Index No.: 601-003-00-5 REACH No.: 01-2119486944-21	propane Flam. Gas 1A (H220), Press. Gas (Liq.) (H280) Danger	5 - < 10 Vol-%
CAS No.: 106-97-8 EC No.: 203-448-7 Index No.: 601-004-00-0 REACH No.: 01-2119474691-32	butane Flam. Gas 1A (H220), Press. Gas (Liq.) (H280) Danger	1 - < 3 Vol-%
CAS No.: 110-54-3 EC No.: 203-777-6 Index No.: 601-037-00-0 REACH No.: 01-0000601037-00-0000	n-hexane Aquatic Chronic 2 (H411), Asp. Tox. 1 (H304), Flam. Liq. 2 (H225), Repr. 2 (H361f***), STOT RE 2 (H373**), STOT SE 3 (H336), Skin Irrit. 2 (H315) Danger Specific concentration limit (SCL) STOT RE 2; H373: C ≥ 5%	0.1 - < 1 Vol-%
CAS No.: 110-82-7 EC No.: 203-806-2 Index No.: 601-017-00-1	cyclohexane Aquatic Acute 1 (H400), Aquatic Chronic 1 (H410), Asp. Tox. 1 (H304), Flam. Liq. 2 (H225), STOT SE 3 (H336), Skin Irrit. 2 (H315) Danger	< 0.1 Vol-%

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

SECTION 4: First aid measures

* 4.1. Description of first aid measures

General information:

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible). Remove victim out of the danger area. Remove contaminated, saturated clothing. If unconscious but breathing normally, place in recovery position and seek medical advice. Do not leave affected person unattended.

Following inhalation:

Provide fresh air. Consult a doctor immediately in the case of inhaling spray mist and show him packing or label.

In case of skin contact:

Causes skin irritation. After contact with skin, wash immediately with plenty of water and soap. Take off contaminated clothing and wash it before reuse. If skin irritation occurs: Get medical advice/attention.

After eye contact:

After contact with the eyes, rinse with water with the eyelids open for a sufficient length of time, then consult an ophthalmologist immediately.

Following ingestion:

Rinse mouth thoroughly with water. Do NOT induce vomiting. Consult a doctor immediately.

Self-protection of the first aider:

Use personal protection equipment. No direct artificial respiration to be given by first aider.

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

The following symptoms may occur: Headache, Dizziness, Nausea, fatigue, skin irritation
May cause drowsiness or dizziness.

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

Treat symptomatically. Call a POISON CENTER. Symptoms may develop several hours following exposure; medical observation therefore necessary for at least 48 hours.

SECTION 5: Firefighting measures

* 5.1. Extinguishing media

Suitable extinguishing media:

Co-ordinate fire-fighting measures to the fire surroundings.

Carbon dioxide (CO₂)

Extinguishing powder

alcohol resistant foam

Use water spray jet to protect personnel and to cool endangered containers.



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Unsuitable extinguishing media:

Full water jet

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

Extremely flammable aerosol. Pressurized container: May burst if heated.

Hazardous combustion products:Nitrogen oxides (NO_x), Carbon monoxide, Carbon dioxide (CO₂), aldehydes, carbon black, Gases/vapours, toxic* **5.3. Advice for firefighters**

In case of fire: Wear self-contained breathing apparatus.

* **5.4. Additional information**

Move undamaged containers from immediate hazard area if it can be done safely. Do not inhale explosion and combustion gases. Use water spray jet to protect personnel and to cool endangered containers.

Collect contaminated fire extinguishing water separately. Do not allow entering drains or surface water.

SECTION 6: Accidental release measures* **6.1. Personal precautions, protective equipment and emergency procedures****6.1.1. For non-emergency personnel****Personal precautions:**

Use personal protection equipment. Do not breathe gas/fumes/vapour/spray. Avoid contact with skin, eyes and clothes. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Protective equipment:

Personal protection equipment: see section 8

Emergency procedures:

Remove all sources of ignition. Remove persons to safety. Provide adequate ventilation.

6.1.2. For emergency responders**Personal protection equipment:**

Use appropriate respiratory protection.

* **6.2. Environmental precautions**

Do not allow to enter into soil/subsoil. Do not allow to enter into surface water or drains. In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.

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

Absorb with liquid-binding material (sand, diatomaceous earth, acid- or universal binding agents).

For cleaning up:

Clean contaminated articles and floor according to the environmental legislation.

Other information:

Treat the recovered material as prescribed in the section on waste disposal.

6.4. Reference to other sections

Safe handling: see section 7

Personal protection equipment: see section 8

Disposal: see section 13

SECTION 7: Handling and storage* **7.1. Precautions for safe handling****Protective measures****Advices on safe handling:**

Pressurised container: May burst if heated. Do not pierce or burn, even after use. If handled uncovered, arrangements with local exhaust ventilation should be used if possible. Do not breathe gas/vapour/aerosol.

Wear personal protection equipment (refer to section 8). When using do not eat, drink, smoke, sniff. Wash hands before breaks and after work. Do not put any product-impregnated cleaning rags into your trouser pockets. Use appropriate container to avoid environmental contamination.

Fire prevent measures:

Do not spray on naked flames or any incandescent material. Protect from sunlight. Do not expose to temperatures exceeding 50 °C/122 °F. Keep away from sources of ignition - No smoking.



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Measures to prevent aerosol and dust generation:

Use only in well-ventilated areas.

Environmental precautions:

Shafts and sewers must be protected from entry of the product.

Advices on general occupational hygiene

Minimum standard for preventive measures while handling with working materials are specified in the TRGS 500.

7.2. Conditions for safe storage, including any incompatibilities**Technical measures and storage conditions:**

Keep container tightly closed in a cool, well-ventilated place. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

Requirements for storage rooms and vessels:

Observe legal regulations and regulations.

Hints on storage assembly:

Do not store together with:

Oxidizing agent

Pyrophoric or self-heating substances

Food and feedingstuffs

Storage class (TRGS 510, Germany): 2B - Aerosol dispensers and lighters**Further information on storage conditions:**Protect against: Frost, UV-radiation/sunlight
maximum storage temperature: 50 °C**7.3. Specific end use(s)****Recommendation:**

Observe technical data sheet.

SECTION 8: Exposure controls/personal protection**8.1. Control parameters****8.1.1. Occupational exposure limit values**

Limit value type (country of origin)	Substance name	① Long-term occupational exposure limit value ② Short-term occupational exposure limit value ③ Instantaneous value ④ Monitoring and observation processes ⑤ Remark
CH from 1 Jan 2022	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 800 ppm (1,900 mg/m ³) ② 3,200 ppm (7,600 mg/m ³) ⑤ Tox: ZNS
HTP (FI)	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 800 ppm (1,900 mg/m ³) ② 1,000 ppm (2,400 mg/m ³) ⑤ liite 4
MAK (AT)	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	② 1,600 ppm (3,800 mg/m ³) ⑤ (max. 3x60 min./SchichtMomentanwert)
BE from 3 Oct 2018	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	② 980 ppm (2,370 mg/m ³)
EE	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 800 ppm (1,900 mg/m ³)
TSH (SK) from 1 May 2019	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 1,000 ppm (2,400 mg/m ³) ⑤ karc 1A
SI	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 1,000 ppm (2,400 mg/m ³) ② 4,000 ppm (9,600 mg/m ³)
KR from 20 Mar 2018	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 800 ppm



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

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BC (CA) from 1 Mar 2022	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	② 1,000 ppm ⑤ EX
JP	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 500 ppm (1,200 mg/m ³)
IE from 21 Aug 2018	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	② 1,000 ppm
NIOSH (US)	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 800 ppm (1,900 mg/m ³)
ACGIH (US) from 1 Jan 2017	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 1,000 ppm
TRGS 900 (DE)	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 1,000 ppm (2,400 mg/m ³) ② 4,000 ppm (9,600 mg/m ³) ⑤ DFG
MAK (AT)	isobutane CAS No.: 75-28-5 EC No.: 200-857-2	① 800 ppm (1,900 mg/m ³)
TRGS 900 (DE) from 30 Nov 2017	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 700 mg/m ³ ② 1,400 mg/m ³ ⑤ (C6-C8 Aliphaten)
VLA (FR)	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 1,000 mg/m ³ ② 1,500 mg/m ³ ⑤ (hydrocarbures C9-C12)
NO	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 50 ppm (275 mg/m ³) ⑤ (White Spirit (aromatinnhold < 22 %))
CH from 1 Jan 2022	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 500 ppm (2,000 mg/m ³) ⑤ Tox: OAW ZNS Auge; Messmeth: OSHA
MAK (AT)	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 200 mL/m ³ ② 400 mL/m ³ ⑤ (für Kohlenwasserstoffgemische mit einem Gehalt an aromatischen Kohlenwasserstoffen von weniger als 1 %, an n-Hexan von weniger als 5 % und an Cyclo-/Isohexanen von weniger als 25 %)
MAK (AT)	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 170 mL/m ³ ② 340 mL/m ³ ⑤ (für Kohlenwasserstoffgemische mit einem Gehalt an aromatischen Kohlenwasserstoffen von weniger als 1 %, an n-Hexan von weniger als 5 % und an Cyclo-/Isohexanen von 25 % oder mehr)
WEL (GB)	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 1,800 mg/m ³ ⑤ (C5-C6 alkenes)
SI from 4 Dec 2018	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 700 mg/m ³



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

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PL	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 500 mg/m ³ ② 1,500 mg/m ³
RO from 21 Aug 2018	Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	① 700 mg/m ³ ② 1,000 mg/m ³
CH from 1 Jan 2022	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³) ② 4,000 ppm (7,200 mg/m ³) ⑤ Tox: Formal; Messmeth: NIOSH
PL	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,800 mg/m ³
NO	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 500 ppm (900 mg/m ³)
HTP (FI)	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 800 ppm (1,500 mg/m ³) ② 1,100 ppm (2,000 mg/m ³) ⑤ liite 4
TRGS 900 (DE)	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³) ② 4,000 ppm (7,200 mg/m ³) ⑤ DFG
BG	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,800 mg/m ³
DK	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³) ② 2,000 ppm (3,600 mg/m ³)
BE	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm
MAK (AT)	propane CAS No.: 74-98-6 EC No.: 200-827-9	② 2,000 ppm (3,600 mg/m ³) ⑤ (max. 3x60 min./Schicht, Momentanwert)
RO	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 778 ppm (1,400 mg/m ³) ② 1,000 ppm (1,800 mg/m ³)
EE	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³)
Alberta (CA)	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm
MAK (AT)	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³)
SI	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³) ② 4,000 ppm (7,200 mg/m ³)
TW	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³)
IS	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³)



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Limit value type (country of origin)	Substance name	① Long-term occupational exposure limit value ② Short-term occupational exposure limit value ③ Instantaneous value ④ Monitoring and observation processes ⑤ Remark
MY from 1 Jan 2000	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 2,500 ppm
GR from 1 Oct 2016	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³)
LV from 7 Apr 2015	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³)
IDLH (US) from 1 Jan 1994	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 2,100 ppm [10% LEL]
OSHA (US)	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³)
NIOSH (US)	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³)
Québec (CA)	propane CAS No.: 74-98-6 EC No.: 200-827-9	① 1,000 ppm (1,800 mg/m ³)
MY from 1 Jan 2000	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,900 mg/m ³)
CH from 1 Jan 2022	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,900 mg/m ³) ② 3,200 ppm (7,600 mg/m ³) ⑤ Tox: ZNS
MAK (AT)	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,900 mg/m ³)
PL	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,900 mg/m ³ ② 3,000 mg/m ³
TRGS 900 (DE)	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,000 ppm (2,400 mg/m ³) ② 4,000 ppm (9,600 mg/m ³) ⑤ DFG
NO	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 250 ppm (600 mg/m ³)
IE from 5 Dec 2011	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,000 ppm
HTP (FI)	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,900 mg/m ³) ② 1,000 ppm (2,400 mg/m ³) ⑤ liite 4
DK	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 500 ppm (1,200 mg/m ³) ② 1,000 ppm (2,400 mg/m ³)
MAK (AT)	butane CAS No.: 106-97-8 EC No.: 203-448-7	② 1,600 ppm (3,800 mg/m ³) ⑤ (max. 3x60 min./Schicht, Momentanwert)
BG	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,900 mg/m ³
HR	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 600 ppm (1,450 mg/m ³) ② 750 ppm (1,810 mg/m ³) ⑤ Karc 1A, Muta 1B



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

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BE from 3 Oct 2018	butane CAS No.: 106-97-8 EC No.: 203-448-7	② 980 ppm (2,370 mg/m ³)
EE	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,500 mg/m ³)
Alberta (CA) from 1 Jun 2018	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,000 ppm
ES from 1 Jan 2015	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,000 ppm
LV	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 300 mg/m ³
BC (CA) from 1 Jun 2018	butane CAS No.: 106-97-8 EC No.: 203-448-7	② 1,000 ppm ⑤ EX
TSH (SK) from 1 May 2019	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,000 ppm (2,400 mg/m ³) ⑤ karc 1A
VLA (FR)	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,900 mg/m ³)
WEL (GB)	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 600 ppm (1,450 mg/m ³) ② 750 ppm (1,810 mg/m ³)
SI	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,000 ppm (2,400 mg/m ³) ② 4,000 ppm (9,600 mg/m ³)
TW	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,900 mg/m ³)
KR	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,900 mg/m ³)
IS	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 500 ppm (1,200 mg/m ³)
HU	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 2,350 mg/m ³ ② 9,400 mg/m ³ ⑤ N
GR from 1 Oct 2016	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,000 ppm (2,350 mg/m ³)
JP	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 500 ppm (1,200 mg/m ³)
RU	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 300 mg/m ³ ③ 900 mg/m ³
IDLH (US) from 1 Jan 2016	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,600 ppm [>10% LEL]
NIOSH (US)	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,900 mg/m ³)



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

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ACGIH (US) from 1 Jan 2017	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 1,000 ppm
Québec (CA)	butane CAS No.: 106-97-8 EC No.: 203-448-7	① 800 ppm (1,900 mg/m ³)
BE	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³)
CZ from 1 Mar 2020	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 19.53 ppm (70 mg/m ³) ② 55.8 ppm (200 mg/m ³) ⑤ (může pronikat pokožkou) I, D
PL from 1 Jan 2006	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 72 mg/m ³ ⑤ (może przenikać przez skórę do organizmu) skóra
NO	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ⑤ (forplantningsevne, verdsetting) RE
TRGS 900 (DE)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 50 ppm (180 mg/m ³) ② 400 ppm (1,440 mg/m ³) ⑤ DFG, EU, Y
IE from 17 Jan 2020	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ⑤ (may be absorbed through the skin) SK, IOELV
HTP (FI)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ⑤ (voivat imeytyä ihon läpi) iho
MY from 1 Jan 2000	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 50 ppm (176 mg/m ³) ⑤ (resapan melalui kulit hendaklah diambil kira)
LT from 15 Oct 2007	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ⑤ (pavoingas reprodukcijai) R
SE from 21 Aug 2018	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ② 50 ppm (180 mg/m ³)
NPEL (SK) from 23 Nov 2011	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ② 40 ppm (140 mg/m ³)
MAK (AT) from 11 Sept 2007	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	② 80 ppm (288 mg/m ³) ⑤ (max. 4x15 min./Schicht) f
CN from 1 Apr 2020	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 100 mg/m ³ ② 180 mg/m ³ ⑤ (#####)
DK from 13 Feb 2021	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ② 40 ppm (144 mg/m ³) ⑤ E
BG	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³)
HR	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ⑤ (mora se uzeti u obzir prodiranje kroz kožu) koža
ACGIH (US)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 50 ppm (176 mg/m ³) ⑤ (may be absorbed through the skin)



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Limit value type (country of origin)	Substance name	① Long-term occupational exposure limit value ② Short-term occupational exposure limit value ③ Instantaneous value ④ Monitoring and observation processes ⑤ Remark
RO	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ⑤ R2
EE	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³)
Alberta (CA) from 1 Dec 2021	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 50 ppm (176 mg/m ³) ⑤ (may be absorbed through the skin) 1
LV from 1 Feb 2011	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ⑤ letekme uz dzirdi
ES	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ⑤ VLB®, VL
BC (CA)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm ⑤ (may be absorbed through the skin) Skin
MAK (AT) from 11 Sept 2007	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ⑤ f
IOELV (EU)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³)
JP	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 40 ppm (140 mg/m ³) ⑤ (#####)
VRC (FR) from 1 Jun 2008	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³)
SI from 11 May 2021	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ② 160 ppm (576 mg/m ³) ⑤ Y, BAT, EU2
TW	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 50 ppm (176 mg/m ³) ⑤ (#####)
KR	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 50 ppm (180 mg/m ³)
WEL (GB)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³)
IS	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³)
CH from 1 Jan 2022	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 50 ppm (180 mg/m ³) ② 400 ppm (1,440 mg/m ³) ⑤ (kann über die Haut aufgenommen werden) H R2F SSC B; Tox: Auge NS; Messmeth: NIOSH
HU from 1 Jan 2001	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 72 mg/m ³ ⑤ (felvehető a bőrön keresztül) b, i, BEM, T
GR from 1 Oct 2016	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³)
NL from 1 Jan 2023	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³) ② 40 ppm (144 mg/m ³)



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Limit value type (country of origin)	Substance name	① Long-term occupational exposure limit value ② Short-term occupational exposure limit value ③ Instantaneous value ④ Monitoring and observation processes ⑤ Remark
TR	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 20 ppm (72 mg/m ³)
RU	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 300 mg/m ³ ③ 900 mg/m ³
IDLH (US) from 1 Jan 1994	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 1,100 ppm [10% LEL]
OSHA (US)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 500 ppm (1,800 mg/m ³)
NIOSH (US)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 50 ppm (180 mg/m ³)
Québec (CA) from 1 Apr 2022	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	① 50 ppm (176 mg/m ³) ⑤ (may be absorbed through the skin)
BE from 1 Dec 2011	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 100 ppm (350 mg/m ³)
CZ from 1 Mar 2020	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200.2 ppm (700 mg/m ³) ② 572 ppm (2,000 mg/m ³) ⑤ I
PL	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 300 mg/m ³ ② 1,000 mg/m ³ ⑤ (może przenikać przez skórę do organizmu) skóra
MY from 1 Jan 2000	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 300 ppm (1,030 mg/m ³)
TRGS 900 (DE)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³) ② 800 ppm (2,800 mg/m ³) ⑤ DFG, EU
NO	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 150 ppm (525 mg/m ³) ⑤ E
IE from 4 May 2010	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³) ⑤ IOELV
MAK (AT)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
HTP (FI)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 100 ppm (350 mg/m ³) ② 250 ppm (875 mg/m ³)
LT from 15 Oct 2007	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
SE from 1 Jun 2016	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
NPEL (SK)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
DK	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 50 ppm (172 mg/m ³) ② 100 ppm (344 mg/m ³) ⑤ E



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Limit value type (country of origin)	Substance name	① Long-term occupational exposure limit value ② Short-term occupational exposure limit value ③ Instantaneous value ④ Monitoring and observation processes ⑤ Remark
CN	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 250 mg/m ³
JP	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 150 ppm (520 mg/m ³)
MAK (AT)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	② 800 ppm (2,800 mg/m ³) ⑤ (max. 4x15 min./Schicht)
BG	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
HR	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³) ⑤ (mora se uzeti u obzir prodiranje kroz kožu) koža
RO	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
EE from 17 Jan 2020	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
Alberta (CA)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 100 ppm (344 mg/m ³)
ES	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³) ⑤ VLI, r
LV	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 23 ppm (80 mg/m ³)
BC (CA)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 100 ppm
IOELV (EU)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
VRC (FR) from 9 May 2012	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
WEL (GB)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 100 ppm (350 mg/m ³) ② 300 ppm (1,050 mg/m ³)
SI from 4 Dec 2018	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³) ② 800 ppm (2,800 mg/m ³) ⑤ BAT, EU2
TW	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 300 ppm (1,030 mg/m ³)
KR	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
IS	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 50 ppm (175 mg/m ³)
CH from 1 Jan 2022	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³) ② 800 ppm (2,800 mg/m ³) ⑤ B; Tox: ZNS; Messmeth: NIOSH



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Limit value type (country of origin)	Substance name	① Long-term occupational exposure limit value ② Short-term occupational exposure limit value ③ Instantaneous value ④ Monitoring and observation processes ⑤ Remark
HU from 6 Jan 2012	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 700 mg/m ³ ⑤ N
RU	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	③ 80 mg/m ³
GR from 1 Oct 2016	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
NL from 1 Jan 2023	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³) ② 400 ppm (1,400 mg/m ³)
TR	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 200 ppm (700 mg/m ³)
IDLH (US) from 1 Jan 1994	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 1,300 ppm [10% LEL]
OSHA (US)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 300 ppm (1,050 mg/m ³)
NIOSH (US)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 300 ppm (1,050 mg/m ³)
ACGIH (US) from 1 Mar 2014	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 100 ppm (344 mg/m ³)
Québec (CA)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	① 300 ppm (1,030 mg/m ³)

8.1.2. Biological limit values

Limit value type (country of origin)	Substance name	Limit value	① Parameter ② Test material ③ Time of sampling: ④ Remark
TRGS 903 (DE)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	5 mg/L	① 2,5-Hexandion + 4,5-Dihydroxy-2-hexanon, Nach Hydrolyse: ② Urin ③ Expositionsende bzw. Schichtende
BAT (CH)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	5 mg/L	① 2,5-Hexandion + 4,5-Dihydroxy-2-hexanon ② Urin ③ Expositionsende bzw. Schichtende
VLB (ES) from 1 Jan 2014	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	0.2 mg/L	① 2,5- Hexanodiona ② orina ③ en caso de exposición por largo tiempo, fin de exposición o fin de turno
BIO (HU) from 7 Feb 2020	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	2 mg/L	① 2,5-hexán-dion ② vizelet ③ expozíció vége illetve műszak vége



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Limit value type (country of origin)	Substance name	Limit value	① Parameter ② Test material ③ Time of sampling: ④ Remark
OEL-B (JP)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	3 mg/g ##### ##	① 2,5-Hexanedione ② # ③ ##### ## ④ (after acid hydrolysis)
OEL-B (JP)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	0.3 mg/g ### ###	① 2,5-Hexanedione ② # ③ ##### ## ④ (without acid hydrolysis)
VLBO (RO)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	5 mg/g creatinină	① 2,5 hexandiona ② urina ③ finalul expunerii, resp. finalul schimbului
BMH (SK)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	5 mg/L	① 2,5-Hexándion a 4,5-dihydroxy-2-hexanón ② urín ③ koniec expozície, príp. koniec zmeny
ACGIH-BEI (US) from 1 Jan 2019	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	0.5 mg/L	① 2,5-Hexanedion ② urine ③ end of exposure or end of shift
BIO (HR)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	150 µg/L	① n-heksan ② krv ③ za vrijeme izloženosti
BIO (HR)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	40 ppm za vrijeme izloženosti	① n-heksan ③ za vrijeme izloženosti
BIO (HR)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	0.2 mg/g kreatinin	① 2-heksanol ② urin ③ kraj izloženosti, odnosno kraj smjene
BIO (HR)	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	5.3 mg/g kreatinin	① 2,5-heksandion ② urin ③ kraj izloženosti, odnosno kraj smjene
BAT (SI) from 4 Dec 2018	n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	5 mg/L	① 2,5-heksandion ② urin ③ ob koncu delovne izmene
TRGS 903 (DE) from 1 Nov 2012	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	150 mg/g Creatinin	① 1,2-Cyclohexandiol, Nach Hydrolyse: ② Urin ③ bei Langzeitexposition, Expositionsende bzw. Schichtende
BAT (CH) from 1 Jan 2011	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	150 mg/g Creatinin	① Gesamt-1,2-Cyclohexandiol ② Urin ③ bei Langzeitexposition, Expositionsende bzw. Schichtende
BIO (HR)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	450 µg/L	① cikloheksanol ② krv ③ za vrijeme izloženosti



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Limit value type (country of origin)	Substance name	Limit value	① Parameter ② Test material ③ Time of sampling: ④ Remark
BIO (HR)	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	3.2 mg/g kreatinin	① cikloheksanol ② urin ③ za vrijeme druge polovice radne smjene
BAT (SI) from 11 May 2021	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	150 mg/g kreatinina	① 1,2-cikloheksandiol (pohidrolizi) ② urin ③ po već zaporednih delavnikih, ob koncu delovne izmene
BIO (HR) from 12 Oct 2018	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	150 mg/g kreatinin	① 1,2-cikloheksandiol ② urin ③ pri dugotrajnom izlaganju, kraj izloženosti, odnosno kraj smjene
ACGIH-BEI (US) from 1 Jan 2022	cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	50 mg/g creatinine	① 1,2-Cyclohexanediol ② urine ③ end of shift at end of workweek

8.1.3. DNEL-/PNEC-values

Substance name	DNEL value	① DNEL type ② Exposure route
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane EC No.: 921-024-6	2,035 mg/m ³	① DNEL worker ② Long-term - inhalation, systemic effects
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane EC No.: 921-024-6	608 mg/m ³	① DNEL Consumer ② Long-term - inhalation, systemic effects
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane EC No.: 921-024-6	773 mg/kg bw/day	① DNEL worker ② Long-term - dermal, systemic effects
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane EC No.: 921-024-6	699 mg/kg bw/day	① DNEL Consumer ② Long-term - dermal, systemic effects
Hydrocarbons, C6-C7, n-alkanes, isoalkanes, cyclics, <5% n-hexane EC No.: 921-024-6	699 mg/kg bw/day	① DNEL Consumer ② Long-term - oral, systemic effects
Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	2,085 mg/m ³	① DNEL worker ② Long-term - inhalation, systemic effects
Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	447 mg/m ³	① DNEL Consumer ② Long-term - inhalation, systemic effects
Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	300 mg/kg bw/day	① DNEL worker ② Long-term - dermal, systemic effects
Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	149 mg/kg bw/day	① DNEL Consumer ② Long-term - dermal, systemic effects
Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4	149 mg/kg bw/day	① DNEL Consumer ② Long-term - oral, systemic effects
n-hexane CAS No.: 110-54-3 EC No.: 203-777-6	75 mg/m ³	① DNEL worker ② Long-term - inhalation, systemic effects



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Substance name	DNEL value	① DNEL type ② Exposure route
cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	700 mg/m ³	① DNEL worker ② Long-term - inhalation, systemic effects
cyclohexane CAS No.: 110-82-7 EC No.: 203-806-2	700 mg/m ³	① DNEL worker ② Long-term - inhalation, local effects

* **8.2. Exposure controls****8.2.1. Appropriate engineering controls**

See section 7. No additional measures necessary.

8.2.2. Personal protection equipment**Eye/face protection:**Suitable eye protection: Eye glasses with side protection
DIN-/EN-Norms EN 166**Skin protection:**

Hand protection

Suitable material: NBR (Nitrile rubber)

Thickness of the glove material: ≥ 0,45 mm

Breakthrough time: 480 min

Breakthrough times and swelling properties of the material must be taken into consideration.

The quality of the protective gloves resistant to chemicals must be chosen as a function of the specific working place concentration and quantity of hazardous substances.

For special purposes, it is recommended to check the resistance to chemicals of the protective gloves mentioned above together with the supplier of these gloves.

Tested protective gloves must be worn: EN ISO 374

Suitable protective clothing: Protective clothing

Respiratory protection:

Wear breathing apparatus if exposed to vapours/dusts/aerosols.

Suitable respiratory protection apparatus: Combination filtering device

Filtering device with filter or ventilator filtering device of type: A

Observe the wear time limits according GefStoffV in combination with the rules for using respiratory protection apparatus (BGR 190).

8.2.3. Environmental exposure controls

See section 7. No additional measures necessary.

SECTION 9: Physical and chemical properties* **9.1. Information on basic physical and chemical properties****Appearance****Physical state:** Aerosol**Colour:** beige**Odour:** characteristic**Safety relevant basis data**

Parameter	Value	at °C	① Method ② Remark
pH	<i>not applicable</i>		
Melting point	<i>not determined</i>		
Freezing point	<i>not determined</i>		
Initial boiling point and boiling range	-40 °C		
Decomposition temperature	<i>not determined</i>		
Flash point	-80 °C		
Evaporation rate	<i>not determined</i>		
Auto-ignition temperature	<i>No data available</i>		
Upper/lower flammability or explosive limits	1 - 11 Vol-%		



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Parameter	Value	at °C	① Method ② Remark
Vapour pressure	<i>not determined</i>		
Vapour density	<i>not determined</i>		
Density	0.74 g/cm ³	20 °C	
Relative density	<i>not determined</i>		
Bulk density	<i>not determined</i>		
Water solubility	practically insoluble		
Partition coefficient: n-octanol/water	<i>not determined</i>		
Dynamic viscosity	<i>not determined</i>		
Kinematic viscosity	<i>not determined</i>		

* **9.2. Other information**

The information relates to the active ingredient.

SECTION 10: Stability and reactivity* **10.1. Reactivity**

Extremely flammable aerosol.

10.2. Chemical stability

The product is stable under storage at normal ambient temperatures.

* **10.3. Possibility of hazardous reactions**

Extremely flammable aerosol. Pressurized container: May burst if heated. Do not expose to temperatures above 50 °C. Heating causes rise in pressure with risk of bursting.

* **10.4. Conditions to avoid**

Keep away from sources of heat (e.g. hot surfaces), sparks and open flames. Vapours can form explosive mixtures with air. Take precautionary measures against static discharge.

10.5. Incompatible materials

Oxidizing agent

Pyrophoric or self-heating substances

10.6. Hazardous decomposition products

Nitrogen oxides (NO_x), Carbon monoxide, Carbon dioxide (CO₂), carbon black, aldehydes

Gases/vapours, toxic

Further information

Do not mix with other chemicals.

SECTION 11: Toxicological information* **11.1. Information on hazard classes as defined in Regulation (EC) No 1272/2008**

isobutane CAS No.: 75-28-5 EC No.: 200-857-2
LC₅₀ Acute inhalation toxicity (vapour): 1,237 mg/L
Hydrocarbons, C6-C7, n-alkanes, iso-alkanes, cyclics, <5% n-hexane EC No.: 921-024-6
LD₅₀ oral: >5,000 mg/kg (Rat)
LD₅₀ dermal: >2,800 - 3,100 mg/kg (Rabbit)
LC₅₀ Acute inhalation toxicity (vapour): >25.2 mg/L 4 h (Rat)
Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes CAS No.: 64742-49-0 EC No.: 927-510-4
LD₅₀ oral: 5,500 mg/kg (Rat)
LD₅₀ dermal: 2,770 mg/kg (Rat)
LC₅₀ Acute inhalation toxicity (gas): 23.3 mg/L (Rat)
butane CAS No.: 106-97-8 EC No.: 203-448-7
LC₅₀ Acute inhalation toxicity (gas): 658 ppmV 4 h (Rat) GESTIS



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

n-hexane CAS No.: 110-54-3 EC No.: 203-777-6
LD₅₀ oral: >2,000 g/m ³ (Ratte)
LD₅₀ dermal: >2,000 g/m ³ (Rabbit)
LC₅₀ Acute inhalation toxicity (gas): 169 mg/L 4 h (Ratte)
LC₅₀ Acute inhalation toxicity (vapour): >31.86 mg/L (Rat)

Acute oral toxicity:

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

Acute dermal toxicity:

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

Acute inhalation toxicity:

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

Skin corrosion/irritation:

Causes skin irritation.

Serious eye damage/irritation:

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

Respiratory or skin sensitisation:

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

Germ cell mutagenicity:

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

Carcinogenicity:

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

Reproductive toxicity:

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

STOT-single exposure:

May cause drowsiness or dizziness.

STOT-repeated exposure:

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

Aspiration hazard:

Observe risk of aspiration if vomiting occurs.
 For viscosity data, see section 9.

Additional information:

Frequently or prolonged contact with skin may cause dermal irritation.

* **11.2. Information on other hazards**

Endocrine disrupting properties:

This product does not contain a substance that has endocrine disrupting properties with respect to humans as no components meets the criteria.

Other information:

No information available.

SECTION 12: Ecological information

* **12.1. Toxicity**

isobutane CAS No.: 75-28-5 EC No.: 200-857-2
LC₅₀: 91.42 mg/L 4 d (fish) United States Environmental Protection A
LC₅₀: 91.42 mg/L 4 d (fish)
EC₅₀: 69.43 mg/L 2 d (crustaceans, Daphnia pulex (water flea)) USEPA OPPT Risk Assessment Division (200
EC₅₀: 69.43 mg/L 2 d (crustaceans, Daphnia)
EC₅₀: 69.43 mg/L 2 d (crustaceans, Daphnia sp.)
ErC₅₀: 19.37 mg/L 4 d (Algae/water plant) USEPA OPPT Risk Assessment Division (200
ErC₅₀: 19.37 mg/L 4 d (Algae/water plant, Algae)



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

Hydrocarbons, C6-C7, n-alkanes, iso-alkanes, cyclics, <5% n-hexane	EC No.: 921-024-6
LC₅₀: 1 - 10 mg/L 4 d (fish, Pimephales promelas (fathead minnow))	
LC₅₀: >1 - 10 mg/L 4 d (fish, Pimephales promelas (fathead minnow))	
LC₅₀: 8.2 mg/L	
LC₅₀: >1 - 10 mg/L 4 d (fish, Pimephales promelas)	
EC₅₀: >1 - 10 mg/L 2 d (crustaceans, Daphnia magna (Big water flea))	
EC₅₀: 4.5 mg/L 2 d (crustaceans, Daphnia magna (Big water flea)) OECD- Prüfrichtlinie 202	
EC₅₀: >1 - 10 mg/L 2 d (crustaceans, Daphnia magna)	
NOEC: 2.045 mg/L 28 d (fish, Oncorhynchus mykiss (Rainbow trout)) CONCAWE Brussel, Belgium (2010)	
NOEC: 1 mg/L 21 d (crustaceans, Daphnia magna (Big water flea)) SIDS Initial Assessment Report For SIAM	
NOEC: 1 mg/L 21 d (crustaceans, Daphnia magna)	
ErC₅₀: >10 - 30 mg/L 3 d (Algae/water plant, Pseudokirchneriella subcapitata)	
ErC₅₀: 10 - 30 mg/L 3 d (Algae/water plant, Pseudokirchneriella subcapitata) Result of epidemiological study. (1995)	
ErC₅₀: 10 - 30 mg/L 3 d (Algae/water plant, Pseudokirchneriella subcapitata)	
Hydrocarbons, C7, n-alkanes, isoalkanes, cyclenes	CAS No.: 64742-49-0 EC No.: 927-510-4
LC₅₀: >1 - 10 mg/L 4 d (fish, Oncorhynchus mykiss (Rainbow trout))	
EC₅₀: >1 - 10 mg/L 2 d (crustaceans, Daphnia magna (Big water flea))	
NOEC: 1.534 mg/L 28 d (fish, Oncorhynchus mykiss (Rainbow trout)) CONCAWE Brussels Belgium (2010)	
NOEC: 1 mg/L 21 d (crustaceans, Daphnia magna (Big water flea))	
ErC₅₀: 12 mg/L 3 d (Algae/water plant, Pseudokirchneriella subcapitata) SIDS Initial Assessment Report For SIAM	
propane	CAS No.: 74-98-6 EC No.: 200-827-9
LC₅₀: 49.9 mg/L 4 d (fish, fish) United States Environmental Protection A	
LC₅₀: 49.9 mg/L 4 d (fish)	
LC₅₀: 24.11 - 147.54 mg/L 4 d (fish)	
LC₅₀: 14.22 - 69.43 mg/L 2 d (crustaceans)	
EC₅₀: 69.43 mg/L 2 d (crustaceans, Daphnia pulex (water flea))	
EC₅₀: 69.43 mg/L 2 d (crustaceans, Daphnia)	
EC₅₀: 69.43 mg/L 2 d (crustaceans, Daphnia sp.)	
EC₅₀: 7.71 - 19.37 mg/L 4 d (Algae/water plant)	
EC₅₀: 69.43 mg/L	
ErC₅₀: 19.37 mg/L 4 d (Algae/water plant, Algae/water plant) USEPA OPPT Risk Assessment Division (200)	
ErC₅₀: 19.37 mg/L 4 d (Algae/water plant, Algae)	
ErC₅₀: 19.37 mg/L	
butane	CAS No.: 106-97-8 EC No.: 203-448-7
LC₅₀: 49.9 mg/L 4 d (fish, fish) United States Environmental Protection A	
LC₅₀: 49.9 mg/L 4 d (fish)	
LC₅₀: 24.11 - 147.54 mg/L 4 d (fish)	
LC₅₀: 14.22 - 69.43 mg/L 2 d (crustaceans)	
EC₅₀: 69.43 mg/L 2 d (crustaceans, Daphnia pulex (water flea)) USEPA OPPT Risk Assessment Division (200)	
EC₅₀: 69.43 mg/L 2 d (crustaceans, Daphnia)	
EC₅₀: 7.71 - 19.37 mg/L 3 d (Algae/water plant)	
EC₅₀: 69.43 mg/L	
ErC₅₀: 19.37 mg/L 4 d (Algae/water plant, Algae/water plant) USEPA OPPT Risk Assessment Division (200)	
ErC₅₀: 19.37 mg/L 4 d (Algae/water plant)	
n-hexane	CAS No.: 110-54-3 EC No.: 203-777-6
LC₅₀: 2.5 mg/L 4 d (fish, Pimephales prometas)	
EC₅₀: 21.85 mg/L 2 d (crustaceans, Daphnia magna)	
ErC₅₀: 9.285 mg/L 3 d (Algae/water plant, Pseudokirchneriella subcapitata)	

Aquatic toxicity:

Toxic to aquatic life with long lasting effects.

Additional ecotoxicological information:

Do not allow uncontrolled discharge of product into the environment.



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

* **12.2. Persistence and degradability**

Hydrocarbons, C6-C7, n-alkanes, iso-alkanes, cyclics, <5% n-hexane	EC No.: 921-024-6
Biodegradation: Yes, rapidly	
propane	CAS No.: 74-98-6 EC No.: 200-827-9
Biodegradation: not applicable	
butane	CAS No.: 106-97-8 EC No.: 203-448-7
Biodegradation: not applicable	

Abiotic degradation:

The product has not been tested.

* **12.3. Bioaccumulative potential**

isobutane	CAS No.: 75-28-5 EC No.: 200-857-2
Log K_{OW}: 1.09	
Hydrocarbons, C6-C7, n-alkanes, iso-alkanes, cyclics, <5% n-hexane	EC No.: 921-024-6
Log K_{OW}: 5.2	
propane	CAS No.: 74-98-6 EC No.: 200-827-9
Log K_{OW}: 1.09	
Bioconcentration factor (BCF): 13.18	
butane	CAS No.: 106-97-8 EC No.: 203-448-7
Log K_{OW}: 1.09	
Bioconcentration factor (BCF): 33.88	
n-hexane	CAS No.: 110-54-3 EC No.: 203-777-6
Log K_{OW}: 3.9	

Accumulation / Evaluation:

The product has not been tested.

12.4. Mobility in soil

The product has not been tested.

* **12.5. Results of PBT and vPvB assessment**

isobutane	CAS No.: 75-28-5 EC No.: 200-857-2
Results of PBT and vPvB assessment: This substance does not meet the PBT/vPvB criteria of REACH, Annex XIII.	
Hydrocarbons, C6-C7, n-alkanes, iso-alkanes, cyclics, <5% n-hexane	EC No.: 921-024-6
Results of PBT and vPvB assessment: This substance does not meet the PBT/vPvB criteria of REACH, Annex XIII.	
Hydrocarbons, C7, n-alkanes, Isoalkanes, cyclenes	CAS No.: 64742-49-0 EC No.: 927-510-4
Results of PBT and vPvB assessment: This substance does not meet the PBT/vPvB criteria of REACH, Annex XIII.	
propane	CAS No.: 74-98-6 EC No.: 200-827-9
Results of PBT and vPvB assessment: This substance does not meet the PBT/vPvB criteria of REACH, Annex XIII.	
butane	CAS No.: 106-97-8 EC No.: 203-448-7
Results of PBT and vPvB assessment: This substance does not meet the PBT/vPvB criteria of REACH, Annex XIII.	
n-hexane	CAS No.: 110-54-3 EC No.: 203-777-6
Results of PBT and vPvB assessment: This substance does not meet the PBT/vPvB criteria of REACH, Annex XIII.	
cyclohexane	CAS No.: 110-82-7 EC No.: 203-806-2
Results of PBT and vPvB assessment: This substance does not meet the PBT/vPvB criteria of REACH, Annex XIII.	

The substances in the mixture do not meet the PBT/vPvB criteria according to REACH, annex XIII.

* **12.6. Endocrine disrupting properties**

This product does not contain a substance that has endocrine disrupting properties with respect to non-target organisms as no components meets the criteria.

* **12.7. Other adverse effects**

No information available.

SECTION 13: Disposal considerations

* **13.1. Waste treatment methods**

Do not allow to enter into surface water or drains. Dispose of waste according to applicable legislation.



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

13.1.1. Product/Packaging disposal

Waste codes/waste designations according to EWC/AVV Directive 2008/98/EC (Waste Framework Directive)

HP 3	Flammable
HP 4	Irritant — skin irritation and eye damage
HP 14	Ecotoxic

Waste code packaging

15 01 04	metallic packaging
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Waste treatment options

Appropriate disposal / Product:

Dispose of waste according to applicable legislation.

Appropriate disposal / Package:

Non-contaminated packages may be recycled. Handle contaminated packages in the same way as the substance itself.

13.2. Additional information

The allocation of waste identity numbers/waste descriptions must be carried out according to the EEC, specific to the industry and process.

SECTION 14: Transport information

Land transport (ADR/RID)	Inland waterway craft (ADN)	Sea transport (IMDG)	Air transport (ICAO-TI / IATA-DGR)
14.1. UN number or ID number			
UN 1950	UN 1950	UN 1950	UN 1950
14.2. UN proper shipping name			
AEROSOLS	AEROSOLS	AEROSOLS	AEROSOLS
14.3. Transport hazard class(es)			
2.1	2.1	2.1	2.1
14.4. Packing group			
		-	
14.5. Environmental hazards			
		MARINE POLLUTANT	No data available
14.6. Special precautions for user			
Limited quantity (LQ): 1L Classification code: 5F Tunnel restriction code: (D)	Limited quantity (LQ): 1L Classification code: 5F	Limited quantity (LQ): 1L EmS-No.: F-D; S-U	No data available

14.7. Maritime transport in bulk according to IMO instruments

No transport as bulk according to IBC Code.

SECTION 15: Regulatory information

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

15.1.1. EU legislation

Restrictions on use:

Use restriction according to REACH annex XVII, no.: 3, 28, 40, 57

Other regulations (EU):

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances [Seveso-III-Directive], Hazard categories:



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

- P3a 'Flammable' aerosols Category 1 or 2, containing flammable gases Category 1 or 2 or flammable liquids
- E2 Hazardous to the Aquatic Environment in Category Chronic 2
Aerosol Directive (75/324/)

Directive 2004/42/EC on the limitation of emissions of volatile organic compounds:

Volatile organic compounds (VOC) content in percent by weight: 36.7 weight-%

15.1.2. National regulations

 **[DE] National regulations**

Restrictions of occupation

Observe restrictions to employment for juveniles according to the 'juvenile work protection guideline' (94/33/EC). Observe employment restrictions under the Maternity Protection Directive (92/85/EEC) for expectant or nursing mothers.

Störfallverordnung (12. BImSchV)

for substances contained in the product:

Hazard categories:

- P3a 'Flammable' aerosols Category 1 or 2, containing flammable gases Category 1 or 2 or flammable liquids
- E2 Hazardous to the Aquatic Environment in Category Chronic 2

Named dangerous substances:

- Liquefied flammable gases, Category 1 or 2 (including liquefied petroleum gas) and natural gas

Technische Anleitung zur Reinhaltung der Luft (TA-Luft)

Remark:

To follow: 5.2.5

Water hazard class

WGK:

2 - obviously hazardous to water

Source:

Self-classification (mixture; calculation rule).

Technische Regeln für Gefahrstoffe

- TRGS 500
- TRGS 510
- TRGS 900

Berufsgenossenschaftliche Vorschriften (DGUV-Vorschriften)

- Berufsgenossenschaftliche Informationen (DGUV-Informationen) 868
- Berufsgenossenschaftliche Regeln (DGUV-Regeln) 189, 190, 192, 195

15.2. Chemical Safety Assessment

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

SECTION 16: Other information

* **16.1. Indication of changes**

1.3.	Details of the supplier of the safety data sheet
1.4.	Emergency telephone number
2.1.	Classification of the substance or mixture
2.2.	Label elements
2.3.	Other hazards
4.1.	Description of first aid measures
4.2.	Most important symptoms and effects, both acute and delayed
5.1.	Extinguishing media
5.2.	Special hazards arising from the substance or mixture
5.3.	Advice for firefighters
5.4.	Additional information
6.1.	Personal precautions, protective equipment and emergency procedures
6.2.	Environmental precautions
7.1.	Precautions for safe handling
8.2.	Exposure controls
9.1.	Information on basic physical and chemical properties
9.2.	Other information
10.1.	Reactivity



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

10.3.	Possibility of hazardous reactions
10.4.	Conditions to avoid
11.1.	Information on hazard classes as defined in Regulation (EC) No 1272/2008
11.2.	Information on other hazards
12.1.	Toxicity
12.2.	Persistence and degradability
12.3.	Bioaccumulative potential
12.5.	Results of PBT and vPvB assessment
12.6.	Endocrine disrupting properties
12.7.	Other adverse effects
13.1.	Waste treatment methods
14.2.	UN proper shipping name
15.1.	Safety, health and environmental regulations/legislation specific for the substance or mixture
16.1.	Indication of changes
16.4.	Classification for mixtures and used evaluation method according to regulation (EC) No 1272/2008 [CLP]

16.2. Abbreviations and acronyms

See overview table at www.euphrac.eu

For abbreviations and acronyms, see: ECHA Guidance on information requirements and chemical safety assessment, chapter R.20 (Table of terms and abbreviations).

16.3. Key literature references and sources for data

EC 1907/2006 - REACH Regulation

1272/2008 EC - Regulation on classification, labeling and packaging of substances and mixtures, and amending Directives 67/548/EEC and 1999/45/EC and Regulation (EC) No 1907/2006

Regulation (EC) No 1907/2006 (REACH), Annex II

European Chemicals Agency (ECHA), C & L classification and labeling inventory

European Chemicals Agency (ECHA), ECHA CHEM Registered substances

OECD The Global Portal to Information on Chemical Substances (ChemPortal)

Institute for Occupational Safety and Health of the German Social Accident Insurance (IFA): GESTIS substance database and International limit values for chemical substances

Federal Environment Agency, Section IV 2.4: Documentation and Information Centre substances hazardous to water Rigoletto (catalog substances hazardous to water)

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

Hazard classes and hazard categories	Hazard statements	Classification procedure
Aerosols (<i>Aerosol 1</i>)	H222; H229: Extremely flammable aerosol. Pressurised container: May burst if heated.	On basis of test data.
Skin corrosion/irritation (<i>Skin Irrit. 2</i>)	H315: Causes skin irritation.	Calculation method.
STOT-single exposure (<i>STOT SE 3</i>)	H336: May cause drowsiness or dizziness.	Calculation method.
Hazardous to the aquatic environment (<i>Aquatic Chronic 2</i>)	H411: Toxic to aquatic life with long lasting effects.	Calculation method.

16.5. Relevant R-, H- and EUH-phrases (Number and full text)

Hazard statements	
H220	Extremely flammable gas.
H225	Highly flammable liquid and vapour.
H280	Contains gas under pressure; may explode if heated.
H304	May be fatal if swallowed and enters airways.
H315	Causes skin irritation.
H336	May cause drowsiness or dizziness.
H361f	Suspected of damaging fertility.
H373	May cause damage to organs through prolonged or repeated exposure.
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.



Revision date: 28 Sept 2023 Version: 6 Print date: 28 Sept 2023

16.6. Training advice

No data available

16.7. Additional information

The above information describes exclusively the safety requirements of the product and is based on our present-day knowledge. The information is intended to give you advice about the safe handling of the product named in this safety data sheet, for storage, processing, transport and disposal. The information cannot be transferred to other products. In the case of mixing the product with other products or in the case of processing, the information on this safety data sheet is not necessarily valid for the new made-up material.

* Data changed compared with the previous version.