

1.1. Product identifier

Product form	: Substance
Trade name	: DCPD
Chemical name	: 3a,4,7,7a-tetrahydro-4,7-methanoindene
EC Index-No.	: 601-044-00-9
EC-No.	: 201-052-9
CAS-No.	: 77-73-6
REACH registration No.	: 01-2119463601-44
Product code	: P455
Formula	: C10H12
Synonyms	: DCPD; Bicyclopentadiene; 1,3-Cyclopentadiene dimers; 3a,4,7,7a-Tetrahydro-4,7-methaneindene

1.2.1. Relevant identified uses

Industrial/Professional use spec	: Polymer processing Industrial For professional use only
Use of the substance/mixture	: Polymer production

Full text of use descriptors: see section 16

1.2.2. Uses advised against

No additional information available

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Emergency number : +1 703-741-5970 - International

Country	Organisation/Company	Address	Emergency number	Comment
Ireland	National Poisons Information Centre Beaumont Hospital	PO Box 1297 Beaumont Road 9 Dublin	+353 1 809 2566 (Healthcare professionals-24/7) +353 1 809 2166 (public, 8am - 10pm, 7/7)	

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Country	Organisation/Company	Address	Emergency number	Comment
Malta	Medicines & Poisons Info Office	Mater Dei Hospital Msida MSD 2090 Msida	112 +356 2545 6508	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Flammable liquids, Category 2	H225
Acute toxicity (oral), Category 4	H302
Acute toxicity (inhal.), Category 2	H330
Skin corrosion/irritation, Category 2	H315
Serious eye damage/eye irritation, Category 2	H319
Reproductive toxicity, Category 2	H361
Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation	H335
Specific target organ toxicity – Repeated exposure, Category 2	H373
Aspiration hazard, Category 1	H304
Hazardous to the aquatic environment – Acute Hazard, Category 1	H400
Hazardous to the aquatic environment – Chronic Hazard, Category 2	H411

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

Adverse physicochemical, human health and environmental effects

Highly flammable liquid and vapour. Can form explosive peroxides by prolonged contact with air. Harmful if swallowed. Aspiration into lungs can cause a chemical pneumonia. May be fatal if swallowed and enters airways. Fatal if inhaled. Causes skin and eye irritation. May cause respiratory irritation. May cause damage to organs (if swallowed). Suspected of damaging fertility. Suspected of damaging the unborn child. Very toxic to aquatic life with long lasting effects.

2.2. Label elements

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

Hazard pictograms (CLP)



Signal word (CLP)

: Danger

Hazard statements (CLP)

: H225 - Highly flammable liquid and vapour.
H302 - Harmful if swallowed.
H304 - May be fatal if swallowed and enters airways.
H315 - Causes skin irritation.
H319 - Causes serious eye irritation.
H330 - Fatal if inhaled.
H335 - May cause respiratory irritation.
H361 - Suspected of damaging fertility or the unborn child.
H373 - May cause damage to organs (Not specified) through prolonged or repeated exposure (Oral).
H410 - Very toxic to aquatic life with long lasting effects.

Precautionary statements (CLP)

: P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P260 - Do not breathe mist, spray, vapours.
P264 - Wash hands, forearms and face thoroughly after handling.

P273 - Avoid release to the environment.

P280 - Wear eye protection, face protection, protective clothing, protective gloves.

2.3. Other hazards

other hazards which do not result in classification : Electrostatic charges may be generated during handling. Gas/vapour heavier than air. May accumulate in confined spaces, particularly at or below ground level. Burning liquid may float on water. May spread fire. Combustion produces toxic gases. Combustion produces irritating gases.

This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

Contains no PBT and/or vPvB substances $\geq 0.1\%$ assessed in accordance with REACH Annex XIII

Component	
Benzene (71-43-2)	<p>This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII</p> <p>This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII</p>

The substance is not included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or is not identified as having endocrine disrupting properties in accordance with the criteria set out in Commission Delegated Regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605

Component	
Benzene (71-43-2)	

SECTION 3: Composition/information on ingredients**3.1. Substances**

Substance type : Mono-constituent
 Name : Dicyclopentadiene
 CAS-No. : 77-73-6
 EC-No. : 201-052-9
 EC Index-No. : 601-044-00-9
 Concentration : $\geq 82\%$

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
1,3-Pentadiene	CAS-No.: 504-60-9	1.5 – 3.5	Flam. Liq. 2, H225
1,3-Pentadiene, (E)-	CAS-No.: 2004-70-8 EC-No.: 217-909-5	1 – 2	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Asp. Tox. 1, H304
cyclopentane	CAS-No.: 287-92-3 EC-No.: 206-016-6 EC Index-No.: 601-030-00-2 REACH-no: 01-2119463053-47	0.8 – 1.5	Flam. Liq. 2, H225 Aquatic Chronic 3, H412

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Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
1,3-Pentadiene, (Z)-	CAS-No.: 1574-41-0 EC-No.: 216-401-0	0 – 1.5	Flam. Liq. 2, H225 Asp. Tox. 1, H304
Cyclopentene	CAS-No.: 142-29-0 EC-No.: 205-532-9	0.9 – 1.4	Flam. Liq. 2, H225 Acute Tox. 4 (Oral), H302 (ATE=500 mg/kg bodyweight) Acute Tox. 4 (Dermal), H312 (ATE=1100 mg/kg bodyweight) Skin Irrit. 2, H315 Asp. Tox. 1, H304
Cyclopentadiene	CAS-No.: 542-92-7 EC-No.: 208-835-4	0.3 – 0.8	Flam. Liq. 3, H226 Acute Tox. 3 (Oral), H301 (ATE=100 mg/kg bodyweight) Acute Tox. 4 (Dermal), H312 (ATE=1100 mg/kg bodyweight) Acute Tox. 4 (Inhalation), H332 (ATE=4500 ppmv/4h) Skin Irrit. 2, H315 Eye Irrit. 2, H319 STOT SE 3, H335
2-Methyl-2-butene	CAS-No.: 513-35-9 EC-No.: 208-156-3	0 – 0.4	Flam. Liq. 2, H225 Acute Tox. 4 (Oral), H302 (ATE=500 mg/kg bodyweight) Skin Irrit. 2, H315 Muta. 2, H341 Carc. 2, H351 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Chronic 2, H411
Benzene	CAS-No.: 71-43-2 EC-No.: 200-753-7 EC Index-No.: 601-020-00-8 REACH-no: 01-2119447106-44	≤ 0.095	Flam. Liq. 2, H225 Carc. 1A, H350 Muta. 1B, H340 STOT RE 1, H372 Asp. Tox. 1, H304 Eye Irrit. 2, H319 Skin Irrit. 2, H315

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

Comments : Contains inhibitor

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Never give anything by mouth to an unconscious person. Call a physician immediately.

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First-aid measures after inhalation	: Remove person to fresh air and keep comfortable for breathing. Seek medical attention immediately. Do not apply mouth-to-mouth resuscitation. If breathing stops, give artificial respiration. Obtain medical attention if breathing difficulty persists.
First-aid measures after skin contact	: After contact with skin, take off immediately all contaminated clothing, and wash immediately with plenty of water and soap. Remove the victim away from contaminated area. Seek immediate medical advice.
First-aid measures after eye contact	: In case of eye contact, immediately rinse with clean water for 10-15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Get medical advice/attention.
First-aid measures after ingestion	: Do not induce vomiting. If swallowed, rinse mouth with water (only if the person is conscious). Keep victim warm and rested. Never give anything by mouth to an unconscious person. Seek immediate medical advice.

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

Symptoms/effects	: Suspected of damaging fertility or the unborn child. Causes damage to organs (Not specified) (oral).
Symptoms/effects after inhalation	: Fatal if inhaled. May cause respiratory irritation. Overexposure to vapours may result in cough.
Symptoms/effects after skin contact	: Causes skin irritation.
Symptoms/effects after eye contact	: Causes serious eye irritation.
Symptoms/effects after ingestion	: Harmful if swallowed. Ingestion may cause nausea, vomiting and diarrhea. Risk of lung oedema. Swallowing a small quantity of this material will result in serious health hazard. May be fatal if swallowed and enters airways.

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

Treat symptomatically.

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media	: dry chemical powder, alcohol-resistant foam, carbon dioxide (CO ₂).
Unsuitable extinguishing media	: Do not use water jet.

5.2. Special hazards arising from the substance or mixture

Fire hazard	: Highly flammable liquid and vapour. Remove ignition sources. Heavier than air, vapours may travel long distances along ground, ignite and flash back to source. May form explosive peroxides. Combustion produces irritating gases. On combustion forms: Carbon monoxide.
Explosion hazard	: Flammable vapours can accumulate in head space of closed systems. May form flammable/explosive vapour-air mixture.
Hazardous decomposition products in case of fire	: Toxic fumes may be released. Thermal decomposition can lead to the release of irritating gases and vapours.

5.3. Advice for firefighters

- Firefighting instructions : Do not attempt to take action without suitable protective equipment. Hose down area with water. In case of fire: Evacuate area. Fight fire remotely due to the risk of explosion. In case of fire: stop leak if safe to do so. Cool tanks/drums with water spray/remove them into safety. Exercise caution when fighting any chemical fire. Prevent fire fighting water from entering the environment.
- Protective equipment for firefighters : Full protective flameproof clothing. Fight fire from safe distance and protected location. Wear a self contained breathing apparatus.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

- General measures : Evacuate area. Remove ignition sources. Use special care to avoid static electric charges. No open flames. No smoking. Stop leak if safe to do so. Notify authorities if product enters sewers or public waters. Absorb spillage to prevent material damage.

6.1.1. For non-emergency personnel

- Protective equipment : Wear suitable protective clothing, gloves and eye/face protection. For further information refer to section 8: "Exposure controls/personal protection".
- Emergency procedures : Remove all sources of ignition. No open flames, no sparks, and no smoking. Stop leak if safe to do so. Evacuate unnecessary personnel. Do not breathe mist, spray, vapours. Only qualified personnel equipped with suitable protective equipment may intervene.

6.1.2. For emergency responders

- Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
- Emergency procedures : Remove all sources of ignition. Stop leaks if it can be done without personal risk. Evacuate unnecessary personnel. Ventilate area.

6.2. Environmental precautions

Use water spray to disperse the vapours. Absorb remaining liquid with sand or inert absorbent and remove to safe place. Do not allow uncontrolled discharge of product into the environment. Notify authorities if product enters sewers or public waters.

6.3. Methods and material for containment and cleaning up

- For containment : Soak up with inert absorbent material (for example sand, sawdust, a universal binder, silica gel). Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Stop leak without risks if possible.
- Methods for cleaning up : Take up liquid spill into absorbent material. Absorb remaining liquid with sand or inert absorbent and remove to safe place. Do not absorb in sawdust, paper, cloth or other combustible absorbents. Collect spillage. Store away from other materials. Notify authorities if product enters sewers or public waters.
- Other information : Dispose of materials or solid residues at an authorized site.

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6.4. Reference to other sections

For disposal of residues refer to section 13 : "Disposal considerations". For further information refer to section 8: "Exposure controls/personal protection".

SECTION 7: Handling and storage

7.1. Precautions for safe handling

- | | |
|-----------------------------------|---|
| Additional hazards when processed | : Handling this product may result in electrostatic accumulation. Use proper grounding procedures. Handle empty containers with care because residual vapours are flammable. |
| Precautions for safe handling | : Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use only outdoors or in a well-ventilated area. Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Avoid ignition sources. Use only non-sparking tools. Use grounded electrical/mechanical equipment. Take precautionary measures against static discharge. Wear personal protective equipment. Do not breathe mist, spray, vapours. Avoid contact with skin and eyes. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers. Floors, walls and other surfaces in the hazard area must be cleaned regularly. Flammable vapours may accumulate in the container. |
| Hygiene measures | : Handle in accordance with good industrial hygiene and safety practice. Always wash hands after handling the product. Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Do not eat, drink or smoke in areas where product is used. Wash contaminated clothing before reuse. Separate working clothes from town clothes. Launder separately. |

7.2. Conditions for safe storage, including any incompatibilities

- | | |
|------------------------|--|
| Technical measures | : Keep container closed when not in use. Keep away from sources of ignition. Proper grounding procedures to avoid static electricity should be followed. Ground/bond container and receiving equipment. Use explosion-proof electrical, ventilating, lighting equipment. |
| Storage conditions | : Keep away from open flames, hot surfaces and sources of ignition. Store in dry, cool, well-ventilated area. Store at room temperature. Keep container tightly closed in a cool, well-ventilated place. Store locked up. Store in a well-ventilated place. Keep container tightly closed. Keep cool. Keep in fireproof place. Keep only in the original container in a cool well ventilated place. Keep only in the original container in a cool, well ventilated place away from : lcompatible materials |
| Incompatible materials | : Strong oxidizing agents. Reducing agents. Certain plastics, rubbers and coatings. Halogens. |
| Storage area | : Keep away from sources of ignition. |
| Packaging materials | : Stainless steel. Carbon steel. Cylinders. Drums. |

7.3. Specific end use(s)

For further information see section 1.

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SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

DCPD (77-73-6)	
Austria - Occupational Exposure Limits	
Local name	Dicyclopentadien (exo- und endo-) (3a,4,7,7a-Tetrahydro-4,7-methanoinden)
MAK (OEL TWA)	2.7 mg/m ³
MAK (OEL TWA)	0.5 ppm
MAK (OEL STEL)	5.4 mg/m ³ (8x 5(Mow) min)
MAK (OEL STEL)	1 ppm (8x 5(Mow) min)
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	Dicyclopentadiène # Dicyclopentadiéen
OEL TWA	27 mg/m ³
OEL TWA	5 ppm
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	Дициклопентадиен
OEL TWA	20 mg/m ³
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Croatia - Occupational Exposure Limits	
Local name	Diciklopentadien; 3a,4,7,7a-tetrahidro-4,7-metanoinden
GVI (OEL TWA)	27 mg/m ³
GVI (OEL TWA)	5 ppm
Remark	Koža (razvrstana kao tvar koja nadražuje kožu (H315))
OEL chemical category	Skin notation
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Czech Republic - Occupational Exposure Limits	
Local name	Dicyklopentadien
PEL (OEL TWA)	3 mg/m ³
PEL (OEL TWA)	0.55 ppm

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DCPD (77-73-6)	
NPK-P (OEL C)	6 mg/m ³
NPK-P (OEL C)	1.1 ppm
Remark	I - dráždí sliznice (oči, dýchací cesty) resp. kůži.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Dicyclopentadien
OEL TWA	2.7 mg/m ³
OEL TWA	0.5 ppm
OEL STEL	5.4 mg/m ³
OEL STEL	1 ppm
Regulatory reference	BEK nr 291 af 19/03/2024
Finland - Occupational Exposure Limits	
Local name	Disyklopentadieeni
HTP (OEL STEL)	5.5 mg/m ³
HTP (OEL STEL)	1 ppm
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveystieteiden ministeriö)
France - Occupational Exposure Limits	
Local name	Dicyclopentadiène
VME (OEL TWA)	30 mg/m ³
VME (OEL TWA)	5 ppm
Remark	Valeurs recommandées/admises
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 6443, 2022; Outil65)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	3a,4,7,7a-Tetrahydro-4,7-methanoinden
AGW (OEL TWA)	2.7 mg/m ³
AGW (OEL TWA)	0.5 ppm
Peak exposure limitation factor	1(I)
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission)
Regulatory reference	TRGS900
Greece - Occupational Exposure Limits	
Local name	Δικυκλοπενταδιένιο
OEL TWA	30 mg/m ³
OEL TWA	5 ppm

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DCPD (77-73-6)	
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Ireland - Occupational Exposure Limits	
Local name	Dicyclopentadiene
OEL TWA	30 mg/m³
OEL TWA	5 ppm
Remark	Advisory OELV (Advisory Occupational Exposure Limit Values)
Regulatory reference	Chemical Agents Code of Practice 2024
Lithuania - Occupational Exposure Limits	
Local name	Diciklopentadienas
IPRV (OEL TWA)	1 mg/m³
Remark	K (kancerogeninis poveikis); M (mutageninis poveikis); O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Poland - Occupational Exposure Limits	
Local name	3a,4,7,7a-Tetrahydro-4,7-metanoinden
NDS (OEL TWA)	10 mg/m³
Regulatory reference	Dz. U. 2024 poz. 1017 wraz z późn. zm.
Portugal - Occupational Exposure Limits	
Local name	Diciclopentadieno
OEL TWA	5 ppm
Regulatory reference	Norma Portuguesa NP 1796:2014
Slovenia - Occupational Exposure Limits	
Local name	3a,4,7,7a-tetrahidro-4,7-metanoinden
OEL TWA	2.7 mg/m³
OEL TWA	0.5 ppm
OEL STEL	2.7 mg/m³
OEL STEL	0.5 ppm
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4. 4. 2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu
Spain - Occupational Exposure Limits	
Local name	Diciclopentadieno
VLA-ED (OEL TWA)	5 ppm

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DCPD (77-73-6)	
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Iceland - Occupational Exposure Limits	
Local name	Dísýklópentadíen
OEL TWA	2.7 mg/m³
OEL TWA	0.5 ppm
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Norway - Occupational Exposure Limits	
Local name	Disyklopentadien (Dicyklopentadien)
Grenseverdi (OEL TWA)	30 mg/m³
Grenseverdi (OEL TWA)	5 ppm
Regulatory reference	FOR-2024-04-05-581
USA - ACGIH - Occupational Exposure Limits	
Local name	Dicyclopentadiene, including Cyclopentadiene
ACGIH OEL TWA	0.5 ppm
ACGIH OEL STEL	1 ppm
Remark (ACGIH)	TLV® Basis: URT, LRT, & eye irr; CNS eff
Regulatory reference	ACGIH 2024
Cyclopentadiene (542-92-7)	
Austria - Occupational Exposure Limits	
Local name	1,3-Cyclopentadien
MAK (OEL TWA)	200 mg/m³
MAK (OEL TWA)	75 ppm
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	1,3-Cyclopentadiène # 1,3-Cyclopentadiéen
OEL TWA	206 mg/m³
OEL TWA	75 ppm
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	Циклопентадиен
OEL TWA	200 mg/m³

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Cyclopentadiene (542-92-7)	
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Denmark - Occupational Exposure Limits	
Local name	Cyclopentadien
OEL TWA	200 mg/m³
OEL TWA	75 ppm
OEL STEL	400 mg/m³
OEL STEL	150 ppm
Regulatory reference	BEK nr 291 af 19/03/2024
Estonia - Occupational Exposure Limits	
Local name	1,3-tsüklopentadieen
OEL TWA	200 mg/m³
OEL TWA	75 ppm
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	Syklopentadieeni
HTP (OEL TWA)	210 mg/m³
HTP (OEL TWA)	75 ppm
HTP (OEL STEL)	330 mg/m³
HTP (OEL STEL)	120 ppm
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Cyclopentadiène
VME (OEL TWA)	200 mg/m³
VME (OEL TWA)	75 ppm
Remark	Valeurs recommandées/admises
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 6443, 2022; Outil65)
Greece - Occupational Exposure Limits	
Local name	Κυκλοπενταδιένιο, 1,3-
OEL TWA	200 mg/m³
OEL TWA	75 ppm
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους

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Cyclopentadiene (542-92-7)	
Hungary - Occupational Exposure Limits	
Local name	1,3-CIKLOPENTADIÉN
AK (OEL TWA)	200 mg/m ³
Remark	i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat); N (Irritáló anyagok, egyszerű fojtógázok, csekély egészségkárosító hatással bíró anyagok)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	Cyclopentadiene
OEL TWA	203 mg/m ³
OEL TWA	75 ppm
Remark	Advisory OELV (Advisory Occupational Exposure Limit Values)
Regulatory reference	Chemical Agents Code of Practice 2024
Lithuania - Occupational Exposure Limits	
Local name	Ciklopentadienas
IPRV (OEL TWA)	5 mg/m ³
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Portugal - Occupational Exposure Limits	
Local name	Ciclopentadieno
OEL TWA	75 ppm
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	Ciclopentadienă
OEL TWA	100 mg/m ³
OEL TWA	35.5 ppm
OEL STEL	200 mg/m ³
OEL STEL	75 ppm
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Spain - Occupational Exposure Limits	
Local name	Ciclopentadieno
VLA-ED (OEL TWA)	206 mg/m ³
VLA-ED (OEL TWA)	75 ppm

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Cyclopentadiene (542-92-7)	
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Iceland - Occupational Exposure Limits	
Local name	Sýklópentadíen
OEL TWA	200 mg/m ³
OEL TWA	75 ppm
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
USA - ACGIH - Occupational Exposure Limits	
Local name	Cyclopentadiene
ACGIH OEL TWA	203 mg/m ³
ACGIH OEL TWA	0.5 ppm
ACGIH OEL STEL	1 ppm
Remark (ACGIH)	TLV® Basis: URT, LRT, & eye irr; CNS eff
Regulatory reference	ACGIH 2024
Benzene (71-43-2)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Benzene
IOEL TWA	3.25 mg/m ³ (BOEL)
Remark	Skin (Substantial contribution to the total body burden via dermal exposure possible)
Regulatory reference	DIRECTIVE (EU) 2019/130 (amending Directive 2004/37/EC)
EU - Binding Occupational Exposure Limit (BOEL)	
Local name	Benzene
BOEL TWA	0.66 mg/m ³ (Limit value from 5 April 2026) 1.65 mg/m ³ (Limit value until 5 April 2026)
BOEL TWA	0.2 ppm (Limit value from 5 April 2026) 0.5 ppm (Limit value until 5 April 2026)
Notes	Skin (Substantial contribution to the total body burden via dermal exposure possible)
Regulatory reference	DIRECTIVE (EU) 2022/431 (amending Directive 2004/37/EC)
EU - Biological Limit Value (BLV)	
Local name	Benzene

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Benzene (71-43-2)	
BLV	28 µg/l Parameter: benzene - Medium: blood - Sampling time: immediately end of shift 46 µg/g creatinine Parameter: phenylmercapturic - Medium: urine - Sampling time: end of exposure/shift
Regulatory reference	SCOEL List of recommended health-based BLVs and BGVs
Austria - Occupational Exposure Limits	
Local name	Benzol
TRK (OEL TWA)	3.2 mg/m ³
TRK (OEL TWA)	1 ppm
TRK (OEL STEL)	12.8 mg/m ³ (4x 15(Miw) min)
TRK (OEL STEL)	4 ppm (4x 15(Miw) min)
Remark	H. Krebszeugend: III A1
Regulatory reference	BGBl. II Nr. 156/2021
Austria - Biological limit values	
Local name	Benzol
BLV	10 g/dl Parameter: Hämoglobin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Frauen 12 g/dl Parameter: Hämoglobin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Männer 1.6 mg/l Parameter: t,t-Muconsäure - Untersuchungsmaterial: Harn
Remark	Eignung: Blut: MCV: 79-97 fl; Erythrozyten: 3,2 Millionen/µl für Frauen, 3,8 Millionen/µl für Männer; Leukozyten: unterer Grenzwert: 4.000/µl (davon 2.000 Granulozyten) bzw. 3.700/µl bei nicht pathologischem Differentialblutbild, oberer Grenzwert: 13.000/µl; Thrombozyten: 150.000 bzw. 130.000/µl bei nicht pathologischem Differentialblutbild Eignung mit vorzeitiger Folgeuntersuchung: Bei Unterschreiten bzw. Überschreiten der Grenzwerte im Blut (ausgenommen Differentialblutbild) oder im Harn sowie bei atypischen Morphologien im Blut. Der Zeitabstand zwischen den Untersuchungen beträgt bei Eignung: ein Jahr; bei Arbeiten in Kokereien: drei Monate, für die Blutuntersuchung sechs Monate; bei Eignung mit vorzeitiger Folgeuntersuchung: drei Monate; bei Arbeiten in Kokereien: sechs Wochen
Regulatory reference	Verordnung über die Gesundheitsüberwachung am Arbeitsplatz 2017 (VGÜ 2017)
Belgium - Occupational Exposure Limits	
Local name	Benzène # Benzeen
OEL TWA	0.66 mg/m ³ (à partir du 5 avril 2026) # (vanaf 5 april 2026) 1.65 mg/m ³ (jusqu'au 5 avril 2026) # (tot 5 april 2026)

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Benzene (71-43-2)	
OEL TWA	0.2 ppm (à partir du 5 avril 2026) # (vanaf 5 april 2026) 0.5 ppm (jusqu'au 5 avril 2026) # (tot 5 april 2026)
Remark	C: la mention "C" signifie que l'agent en question relève du champ d'application du titre 2 relatif aux agents cancérogènes, mutagènes et reprotoïques du livre VI du code de bien-être au travail, D: la mention "D" signifie que la résorption de l'agent, via la peau, les muqueuses ou les yeux, constitue une partie importante de l'exposition totale. Cette résorption peut se faire tant par contact direct que par présence de l'agent dans l'air. # C: de vermelding "C" betekent dat het betrokken agens valt onder het toepassingsgebied van titel 2 betreffende kankerverwekkende, mutagene en reprotoxische agentia van boek VI van de codex over het welzijn op het werk, D: de vermelding "D" betekent dat de opname van het agens via de huid, de slijmvliezen of de ogen een belangrijk deel van de totale blootstelling vormt. Deze opname kan het gevolg zijn van zowel direct contact als zijn aanwezigheid in de lucht.
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	Бензен
OEL TWA	0.66 mg/m ³ (Измерено като елементарен въглерод)
OEL TWA	0.2 ppm (Измерено като елементарен въглерод)
Remark	Кожа (Възможен е значителен принос за общото натрупване в тялото чрез кожна експозиция)
Regulatory reference	Наредба № 10 от 26.09.2003 г. за защита на работещите от рискове, свързани с експозиция на канцерогени и мутагени при работа (изм. и доп. ДВ. бр. 28 от 2 Април 2024г.)
Bulgaria - Biological limit values	
Local name	Бензен
BLV	2 mg/l Биомаркер за експозиция/биомаркер за ефект: Trans, trans-муконова киселина - Биологична среда: урина - Време на пробовземане: В края на експозицията или в края на работната смяна - Специфични ефекти: Кожа (възможна е значителна резорбция чрез кожата) 0.045 mg/g creatinine Биомаркер за експозиция/биомаркер за ефект: S-фенилмеркаптурова киселина - Биологична среда: урина - Време на пробовземане: В края на експозицията или в края на работната смяна - Специфични ефекти: Кожа (възможна е значителна резорбция чрез кожата)
Regulatory reference	Наредба № 10 от 26.09.2003 г. за защита на работещите от рискове, свързани с експозиция на канцерогени и мутагени при работа (изм. и доп. ДВ. бр. 28 от 2 Април 2024г.)

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Benzene (71-43-2)	
Croatia - Occupational Exposure Limits	
Local name	Benzen
GVI (OEL TWA)	0.66 mg/m ³ 1.65 mg/m ³ do 5. travnja 2026.
GVI (OEL TWA)	0.2 ppm 0.5 ppm do 5. travnja 2026.
Remark	Direktiva: 2022/431/EU. Napomena: Koža (razvrstana kao tvar koja nadražuje kožu (H315)), Karc 1A, Muta 1B
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Croatia - Biological limit values	
Local name	Benzen
BLV	0.36 µmol/l Karakteristični pokazatelj: benzen - Biološki uzorak: krv - Vrijeme uzorkovanja: odmah na kraju radne smjene 28 µg/l Karakteristični pokazatelj: benzen - Biološki uzorak: krv - Vrijeme uzorkovanja: odmah na kraju radne smjene 21.7 µmol/mol creatinine Karakteristični pokazatelj: S-fenilmerkaptorna kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene 46 µg/g creatinine Karakteristični pokazatelj: S-fenilmerkaptorna kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 91/2018)
Cyprus - Occupational Exposure Limits	
Local name	Βενζόλιο
OEL TWA	0.66 mg/m ³ 1.65 mg/m ³ (Οριακή τιμή έως την 5η Απριλίου 2026)
OEL TWA	0.2 ppm 0.5 ppm (Οριακή τιμή έως την 5η Απριλίου 2026)
Remark	Δέρμα. Καρκινογόνοι και Μεταλλαξιογόνοι Παράγοντες
Regulatory reference	Κανονισμοί του 2023 (Κ.Δ.Π. 220/2023)
Czech Republic - Occupational Exposure Limits	
Local name	Benzen
PEL (OEL TWA)	3.25 mg/m ³ 0.66 mg/m ³ (od 5. 4. 2026)
PEL (OEL TWA)	1 ppm 0.2 ppm (od 5. 4. 2026)

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Benzene (71-43-2)	
NPK-P (OEL C)	10 mg/m ³
NPK-P (OEL C)	3.08 ppm
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, D - při expozici se významně uplatňuje pronikání faktoru kůží, I - dráždí sliznice (oči, dýchací cesty) resp. kůži, K - karcinogen kategorie 1A a 1B (s větou H350, H350i), M - mutagen v zárodečných buňkách kategorie 1A a 1B (s větou H340), P - u látky nelze vyloučit závažné pozdní účinky (s větou H372, H373).
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Czech Republic - Biological limit values	
Local name	Benzen
BLV	0.05 mg/g creatinine Ukazatel: S-Fenylmerkapturová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 0.024 µmol/mmol Creatinine Ukazatel: S-Fenylmerkapturová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 1.5 mg/g creatinine Ukazatel: t,t-Mukonová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 1.2 µmol/mmol Creatinine Ukazatel: t,t-Mukonová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Benzen
OEL TWA	0.66 mg/m ³ Fra den 5. april 2026 1.6 mg/m ³
OEL TWA	0.2 ppm Fra den 5. april 2026 0.5 ppm
OEL STEL	3.2 mg/m ³
OEL STEL	1 ppm
Remark	E (betyder, at stoffet har en EF-grænseværdi); H (betyder, at stoffet kan optages gennem huden); K (betyder, at stoffet anses for at kunne være kræftfremkaldende)
Regulatory reference	BEK nr 291 af 19/03/2024
Estonia - Occupational Exposure Limits	
Local name	Benseen
OEL TWA	0.66 mg/m ³ (kehtib alates 06.04.2026) 1.5 mg/m ³ (kehtib kuni 05.04.2026)
OEL TWA	0.2 ppm (kehtib alates 06.04.2026) 0.5 ppm (kehtib kuni 05.04.2026)
OEL STEL	9 mg/m ³ (kehtib kuni 05.04.2026)

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Benzene (71-43-2)	
OEL STEL	3 ppm (kehtib kuni 05.04.2026)
Remark	A (Naha kaudu kergesti imenduv aine), C (Kantserogeenne aine)
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	Bentseeni
BOEL TWA	0.66 mg/m³ (Raja-arvoa sovelletaan 5 päivästä huhtikuuta 2026) 1.65 mg/m³
BOEL TWA	0.2 ppm (Raja-arvoa sovelletaan 5 päivästä huhtikuuta 2026) 0.5 ppm
Remark	Iho. Syöpäsairauden vaaraa aiheuttavat ja perimää vaurioittavat tekijät
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö). Valtioneuvoston asetus (113/2024)
France - Occupational Exposure Limits	
Local name	Benzène
VME (OEL TWA)	0.66 mg/m³ (À partir du 5 avril 2026) 1.65 mg/m³
VME (OEL TWA)	0.2 ppm (À partir du 5 avril 2026) 0.5 ppm
Remark	Valeurs réglementaires contraignantes. Cancérogène de catégorie 1A, Mutagène de catégorie 1B, Risque de pénétration percutanée
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849; Décret n° 2024-307)
Germany - Occupational Exposure Limits (TRGS 910)	
Local name	Benzol
Acceptable concentration (Volume conc.)	0.06 ppm
Acceptable concentration (Weight conc.)	0.2 mg/m³
Notes	b) Akzeptanzkonzentration assoziiert mit Risiko 4:10000
Tolerance concentration (Volume conc.)	0.6 ppm
Tolerance concentration (Weight conc.)	1.9 mg/m³
Tolerance concentration excess factor	8
Remark	H - Hautresorptiv
Equivalence value for acceptable concentration	0.8 µg/l (3) 3 µg/g creatinine (3)

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Benzene (71-43-2)	
Equivalence value for tolerance concentration	5 µg/l 25 µg/g creatinine 500 µg/g creatinine
Parameter	Benzol S-Phenylmerkaptursäure Trans, trans-Muconsäure
This battery has passed the UN Manual of Tests and Criteria part III subsection 38.3 requirements.	U - Urin
Testing time	b - Expositionsende bzw. Schichtende
Regulatory reference	TRGS 910
Greece - Occupational Exposure Limits	
Local name	Βενζόλιο
OEL TWA	3.25 mg/m ³
OEL TWA	1 ppm
Remark	Δέρμα (Είναι πιθανή η σημαντική αύξηση της συνολικής επιβάρυνσης του λόγω δερματικής έκθεσης)
Regulatory reference	Π.Δ. 26/2020 - Σχετικά με την προστασία των εργαζομένων από τους κινδύνους που συνδέονται με την έκθεση σε καρκινογόνους ή μεταλλαξιγόνους παράγοντες κατά την εργασία
Hungary - Occupational Exposure Limits	
Local name	BENZOL
AK (OEL TWA)	1.65 mg/m ³
Remark	k(1A) (rákkeltő), b (Bőrön át is felszívódik), i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat), BEM (biológiai expozíciós mutató); EU6 (2019/130 EU irányelvben közölt érték); T (Azok az anyagok, amelyek egészségkárosító hatása TARTÓS expozíciót követően jelentkezik)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Hungary - Biological Exposure Indices	
Local name	Benzol
BEI	0.04 mg/g creatinine Biológiai expozíciós (hatás) mutató: S-fenilmerkaptursav - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén) 0.22 µmol/mmol Creatinine Biológiai expozíciós (hatás) mutató: S-fenilmerkaptursav - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről

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Benzene (71-43-2)	
Ireland - Occupational Exposure Limits	
Local name	Benzene
OEL TWA	0.66 mg/m ³ Limit value from 5th April 2026 1.65 mg/m ³ Limit value until 5th April 2026
OEL TWA	0.2 ppm Limit value from 5th April 2026 0.5 ppm Limit value until 5th April 2026
Remark	BOELV (Binding Occupational Exposure Limit Values), Skin (Substances which have the capacity to penetrate intact skin when they come in contact with it and be absorbed into the body. A substantial contribution to the total body burden via dermal exposure is possible), Carc.1A (Substances known to have carcinogenic potential for humans), Muta.1B (Substances which should be regarded as if they induce heritable mutations in the germ cells of humans)
Regulatory reference	Chemical Agents Code of Practice 2024
Ireland - Biological limit values	
Local name	Benzene
BMGV	25 µg/g creatinine Parameter: S-Phenylmercapturic acid - Medium: urine - Sampling time: End of shift - Notations: B (Background) 50 µg/g creatinine Parameter: t,t-Muconic acid - Medium: urine - Sampling time: End of shift - Notations: B (Background)
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
Italy - Occupational Exposure Limits	
Local name	Benzene
OEL TWA	3.25 mg/m ³
OEL TWA	1 ppm
Remark	Cute
OEL chemical category	skin - potential for cutaneous absorption
Regulatory reference	Allegato XLIII del Decreto Legislativo 4 settembre 2024, n. 135 - Protezione da agenti cancerogeni, mutageni o da sostanze tossiche per la riproduzione
Latvia - Occupational Exposure Limits	
Local name	Benzols
OEL TWA	0.66 mg/m ³ 1.65 mg/m ³ AER līdz 2026.gada 5.aprīlim.
OEL TWA	0.2 ppm
Remark	Āda. Carc. 1A; Muta. 1B

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Benzene (71-43-2)	
Regulatory reference	Ministru kabineta 2008. gada 29. septembra noteikumi Nr. 803 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 190).
Latvia - Biological Exposure Indices	
Local name	Benzols
BEI	5 µg/l Benzolam urīnā - Paraugus iegūst ekspozīcijas beigās vai maiņas beigās 25 µg/g creatinine S-fenilmerkaptūrskābi urīnā - Paraugus iegūst ekspozīcijas beigās vai maiņas beigās 500 µg/g creatinine trans, trans - Mukonskābi urīnā - Paraugus iegūst ekspozīcijas beigās vai maiņas beigās
Regulatory reference	Ministru kabineta 2008. gada 29. septembra noteikumi Nr. 803 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 190).
Lithuania - Occupational Exposure Limits	
Local name	Benzenas (benzolas)
IPRV (OEL TWA)	0.66 mg/m³ (įsigalioja 2026 m. balandžio 5 d.) 1.65 mg/m³
IPRV (OEL TWA)	0.2 ppm (įsigalioja 2026 m. balandžio 5 d.) 0.5 ppm
TPRV (OEL STEL)	19 mg/m³
TPRV (OEL STEL)	6 ppm
Remark	K (kancerogeninis poveikis); M (mutageninis poveikis); O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-82/A1-57, 2024-01-23)
Luxembourg - Occupational Exposure Limits	
Local name	Benzène
OEL TWA	3.25 mg/m³
OEL TWA	1 ppm
Remark	Peau
Regulatory reference	Mémorial A N° 223 de 2021 concernant la protection des salariés contre les risques liés à l'exposition à des agents cancérigènes ou mutagènes au travail
Malta - Occupational Exposure Limits	
Local name	Benzene # Benžen
OEL TWA	1.65 mg/m³ (Limit value until 5 April 2026 # Valur limitu sal-5 ta' April 2026)

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Benzene (71-43-2)	
OEL TWA	0.5 ppm (Limit value until 5 April 2026 # Valur limitu sal-5 ta' April 2026)
Remark	Skin # Ġilda
Regulatory reference	S.L. 424.22 - Exposure to Carcinogens, Mutagens or Reprotoxic Substances at Work Regulations (L.N. 102 of 2024) # L.S. 424.22 - Regolamenti dwar Espożizzjoni għall-Carcinogens, Mutagens jew Reprotoxic Substances fuq il-Post tax-Xogħol (A.L. 102 tal-2024)
Netherlands - Occupational Exposure Limits	
Local name	Benzeen
TGG-8u (OEL TWA)	0.7 mg/m ³
TGG-8u (OEL TWA)	0.2 ppm
Remark	Kankerverwekkende stof. H (Huidopname) Stoffen die relatief gemakkelijk door de huid kunnen worden opgenomen, hetgeen een substantiële bijdrage kan betekenen aan de totale inwendige blootstelling, hebben in de lijst een H-aanduiding. Bij deze stoffen moeten naast maatregelen tegen inademing ook adequate maatregelen ter voorkoming van huidcontact worden genomen.
Regulatory reference	Arbeidsomstandighedenregeling 2024
Poland - Occupational Exposure Limits	
Local name	Benzen
NDS (OEL TWA)	0.66 mg/m ³
Remark	Skóra (Oznakowanie substancji notacją „skóra” oznacza, że wchłanianie substancji przez skórę może być tak samo istotne jak przy narażeniu drogą oddechową).
Regulatory reference	Dz. U. 2024 poz. 1017 wraz z późn. zm.
Portugal - Occupational Exposure Limits	
Local name	Benzeno
OEL TWA	3.25 mg/m ³ (indicative limit value)
OEL TWA	0.5 ppm
OEL STEL	2.5 ppm
Remark	P (Toxicidade percutânea); A1 (Agente carcinogénico confirmado no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	Benzeno
BEI	25 µg/g creatinine Parâmetro: Ácido s-fenilmercaptúrico - Meio: urina - Momento da amostragem: Fim do turno - Notação: Vb (Valor basal) 500 µg/g creatinine Parâmetro: Ácido t,t-mucónico - Meio: urina - Momento da amostragem: Fim do turno - Notação: Vb (Valor basal)

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Benzene (71-43-2)	
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	Benzen
OEL TWA	0.66 mg/m ³ 1.65 mg/m ³ Valoare-limită până la 5 aprilie 2026
OEL TWA	0.2 ppm 0.5 ppm Valoare-limită până la 5 aprilie 2026
Remark	P - posibilitatea unei penetrări cutanate importante; C1A - poate provoca apariția cancerului; M1B - poate provoca anomalii genetice
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Romania - Biological limit values	
Local name	Benzen
BLV	25 µg/g creatinine Indicatorul biologic: Acid s-fenil mercapturic - Material biologic: urină - Momentul recoltării: sfârșit de schimb 50 mg/l Indicatorul biologic: Fenoli totali - Material biologic: urină - Momentul recoltării: sfârșit de schimb 500 µg/g creatinine Indicatorul biologic: Acid t,t muconic - Material biologic: urină - Momentul recoltării: sfârșit de schimb
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	Benzén
NPHV (OEL TWA)	0.66 mg/m ³ NPEL sa uplatňuje od 6. apríla 2026 1.65 mg/m ³ NPEL sa uplatňuje do 5. apríla 2026
NPHV (OEL TWA)	0.2 ppm NPEL sa uplatňuje od 6. apríla 2026 0.5 ppm NPEL sa uplatňuje do 5. apríla 2026
Remark	Kategória karcinogénnych faktorov 1A – Dokázaný karcinogén pre ľudí; Kategória mutagénnych faktorov 1B – Mutagén cicavčích zárodočných buniek; K – prienik cez kožu: K celkovému zaťaženiu organizmu môže významne prispieť expozícia cez kožu.
Regulatory reference	Nariadenie vlády č. 356/2006 Z. z. (121/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	benzen
OEL TWA	3.25 mg/m ³
OEL TWA	1 ppm
Remark	Rakotvorne snovi – kategorija 1A, Mutagene snovi za zarodne celice – kategorija 1B. EU, K (Lastnost lažjega prehajanja snovi v organizem skozi kožo), BAT (Biološka mejna vrednost), EKA (Zveza med koncentracijo rakotvornih snovi v zraku na delovnem mestu in količino snovi in/ali njenih metabolitov v organizmu)

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Benzene (71-43-2)	
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4.4.2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti rakotvornim ali mutagenim snovem
Slovenia - Biological limit values	
Local name	benzen
BLV	5 µg/l Parameter: benzen - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene 0.025 mg/g creatinine Parameter: S-fenilmerkaptionska kislina - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene 500 µg/g creatinine Parameter: trans, trans-mukonska kislina - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4.4.2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti rakotvornim ali mutagenim snovem
Spain - Occupational Exposure Limits	
Local name	Benceno
VLA-ED (OEL TWA)	3.25 mg/m ³
VLA-ED (OEL TWA)	1 ppm
Remark	C1A (Carcinógeno para el hombre), M1B (Sustancias de las que se considera que inducen mutaciones hereditarias en las células germinales humanas), vía dérmica (Indica que, en las exposiciones a esta sustancia, la aportación por la vía cutánea puede resultar significativa para el contenido corporal total si no se adoptan medidas para prevenir la absorción. En estas situaciones, es aconsejable la utilización del control biológico para poder cuantificar la cantidad global absorbida del contaminante), VLB® (Agente químico que tiene Valor Límite Biológico), v (Real Decreto 1124/2000, de 16 de junio (BOE nº 145 de 17 de junio de 2000), por el que se modifica el Real Decreto 665/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo), r (Esta sustancia tiene establecidas restricciones a la fabricación, la comercialización o el uso en los términos especificados en el "Reglamento (CE) nº 1907/2006 sobre Registro, Evaluación, Autorización y Restricción de sustancias y preparados químicos" (REACH) de 18 de diciembre de 2006 (DOUE L 369 de 30 de diciembre de 2006). Las restricciones de una sustancia pueden aplicarse a todos los usos o sólo a usos concretos. El anexo XVII del Reglamento REACH contiene la lista de todas las sustancias restringidas y especifica los usos que se han restringido), (Ω) Sujeto a la transposición de la Directiva (UE) 2022/431 del Parlamento Europeo y del Consejo de 9 de marzo de 2022.
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT

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Benzene (71-43-2)	
Spain - Biological limit values	
Local name	Benceno
BLV	8 µg/g creatinine Parámetro: Ácido S-Fenilmercaptúrico - Medio: Orina - Momento de muestreo: Final de la jornada laboral (Entrada en vigor el 5 de abril de 2026) 2 mg/l Parámetro: Ácido t,t-Mucónico - Medio: Orina - Momento de muestreo: Final de la jornada laboral 0.045 mg/g creatinine Parámetro: Ácido S-Fenilmercaptúrico - Medio: Orina - Momento de muestreo: Final de la jornada laboral
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Sweden - Occupational Exposure Limits	
Local name	Bensen
NGV (OEL TWA)	0.66 mg/m³ (Gränsvärdet träder i kraft den 5 april 2026) 1.5 mg/m³
NGV (OEL TWA)	0.2 ppm (Gränsvärdet träder i kraft den 5 april 2026) 0.5 ppm
KGV (OEL STEL)	9 mg/m³
KGV (OEL STEL)	3 ppm
Remark	C (Ämnet är cancerframkallande. Risk för cancer finns även vid annan exponering än via inandning. För vissa cancerframkallande ämnen som inte har gränsvärden gäller förbud eller tillståndskrav enligt föreskrifterna om kemiska arbetsmiljörisker); H (Ämnet kan lätt upptas genom huden. Det föreskrivna gränsvärdet bedöms ge tillräckligt skydd endast under förutsättning att huden är skyddad mot exponering för ämnet ifråga)
Regulatory reference	Hygieniska gränsvärden (AFS 2022:5)
Iceland - Occupational Exposure Limits	
Local name	Bensen
OEL TWA	0.66 mg/m³
OEL TWA	0.2 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð), K (efnið er krabbameinsvaldandi)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 1309/2023)
Norway - Occupational Exposure Limits	
Local name	Benzen
Grenseverdi (OEL TWA)	0.33 mg/m³ Fra april 2028 0.66 mg/m³ Fram til april 2028

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Benzene (71-43-2)	
Grenseverdi (OEL TWA)	0.1 ppm Fra april 2028 0.2 ppm Fram til april 2028
Korttidsverdi (OEL STEL)	1.98 mg/m ³ (value calculated)
Korttidsverdi (OEL STEL)	0.6 ppm (value calculated)
Remark	H: Kjemikalier som kan tas opp gjennom huden; K: Kjemikalier som skal betraktes som kreftfremkallende; M: Kjemikalier som skal betraktes som mutagene; G: EU har fastsatt en bindende grenseverdi og/eller anmerkning for stoffet.
OEL chemical category	Skin notation, Carcinogen, Potential mutagen
Regulatory reference	FOR-2024-04-05-581
USA - ACGIH - Occupational Exposure Limits	
Local name	Benzene
ACGIH OEL TWA	0.02 ppm
Remark (ACGIH)	TLV® Basis: Myelodysplastic syndrome; acute myeloid leukemia; leukemia; hematologic eff; chromosomal dam. Notations: Skin; A1 (Confirmed Human Carcinogen); BEI
ACGIH chemical category	Confirmed Human Carcinogen, Skin - potential significant contribution to overall exposure by the cutaneous route
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Benzene
BEI	25 µg/g creatinine Parameter: S-Phenylmercapturic acid - Medium: urine - Sampling time: End of shift - Notations: B 500 µg/g creatinine Parameter: t,t-Muconic acid - Medium: urine - Sampling time: End of shift - Notations: B
Regulatory reference	ACGIH 2024
cyclopentane (287-92-3)	
Belgium - Occupational Exposure Limits	
Local name	Cyclopentane # Cyclopentaan
OEL TWA	1800 mg/m ³
OEL TWA	600 ppm
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Denmark - Occupational Exposure Limits	
Local name	Cyclopentan
OEL TWA	850 mg/m ³
OEL TWA	300 ppm

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cyclopentane (287-92-3)	
OEL STEL	1700 mg/m ³
OEL STEL	600 ppm
Regulatory reference	BEK nr 291 af 19/03/2024
France - Occupational Exposure Limits	
Local name	Cyclopentane
VME (OEL TWA)	1720 mg/m ³
VME (OEL TWA)	600 ppm
Remark	Valeurs recommandées/admises
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 6443, 2022; Outil65)
Greece - Occupational Exposure Limits	
Local name	Κυκλοπεντάνιο
OEL TWA	1720 mg/m ³
OEL TWA	600 ppm
Regulatory reference	Π.Δ. 90/1999 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Ireland - Occupational Exposure Limits	
Local name	Cyclopentane
OEL TWA	1720 mg/m ³
OEL TWA	600 ppm
Remark	Advisory OELV (Advisory Occupational Exposure Limit Values)
Regulatory reference	Chemical Agents Code of Practice 2024
Portugal - Occupational Exposure Limits	
Local name	Ciclopentano
OEL TWA	600 ppm
Regulatory reference	Norma Portuguesa NP 1796:2014
Spain - Occupational Exposure Limits	
Local name	Ciclopentano
VLA-ED (OEL TWA)	1745 mg/m ³
VLA-ED (OEL TWA)	600 ppm
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	1800 mg/m ³
NGV (OEL TWA)	600 ppm

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cyclopentane (287-92-3)	
KGV (OEL STEL)	2000 mg/m ³
KGV (OEL STEL)	750 ppm
Iceland - Occupational Exposure Limits	
Local name	Sýklópentan
OEL TWA	850 mg/m ³
OEL TWA	300 ppm
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
USA - ACGIH - Occupational Exposure Limits	
Local name	Cyclopentane
ACGIH OEL TWA	1720 mg/m ³
ACGIH OEL TWA	1000 ppm (EX - Explosion hazard)
Remark (ACGIH)	TLV® Basis: CNS impair
Regulatory reference	ACGIH 2024
2-Methyl-2-butene (513-35-9)	
USA - ACGIH - Occupational Exposure Limits	
Local name	2-Methyl-2-butene
ACGIH OEL TWA	10 ppm
Remark (ACGIH)	TLV® Basis: Clastogenic eff
Regulatory reference	ACGIH 2024

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

DCPD (77-73-6)	
DNEL/DMEL (Workers)	
Acute - systemic effects, dermal	No hazard identified
Acute - systemic effects, inhalation	No hazard identified
Acute - local effects, dermal	No hazard identified
Acute - local effects, inhalation	160.2 mg/m ³
Long-term - systemic effects, dermal	0.3 mg/kg bodyweight/day
Long-term - local effects, dermal	No hazard identified
Long-term - systemic effects, inhalation	1.058 mg/m ³
Long-term - local effects, inhalation	2.31 mg/m ³

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DCPD (77-73-6)	
DNEL/DMEL (General population)	
Long-term - systemic effects, oral	0.15 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	0.26 mg/m ³
Long-term - local effects, inhalation	0.652 mg/m ³
PNEC (Water)	
PNEC aqua (freshwater)	98 µg/L
PNEC aqua (marine water)	9.8 µg/L
PNEC (Sediment)	
PNEC sediment (freshwater)	15.2 mg/kg dwt
PNEC sediment (marine water)	1.52 mg/kg dwt
PNEC (Soil)	
PNEC soil	2.98 mg/kg dwt
PNEC (STP)	
PNEC sewage treatment plant	2.2 mg/l

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:

Ensure adequate ventilation. Mechanical ventilation is recommended. Use explosion-proof equipment.

8.2.2. Personal protection equipment

Personal protective equipment:

Avoid all unnecessary exposure.

8.2.2.1. Eye and face protection

Eye protection:

Protective goggles. Use eye protection according to ISO 16321-1

8.2.2.2. Skin protection

Skin and body protection:

Avoid contact with skin. Avoid repeated or prolonged skin contact. Wear suitable protective clothing. Remove contaminated clothing and shoes

Hand protection:

Impermeable protective gloves. Do not reuse gloves. For short time exposure risk (e.g. single splash), other material may be usable. It is recommended that the glove supplier be consulted to ensure the protective gloves are resistant to chemicals in this product. Do not use : Butyl-rubber protective gloves

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Hand protection					
Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Disposable gloves, KCL Type: 890 or equivalent	Viton	< 80 minutes.	0.7	Not known	EN 374

Other skin protection

Materials for protective clothing:

Wear suitable protective clothing

8.2.2.3. Respiratory protection

Respiratory protection:

An approved organic vapour respirator/supplied air or self-contained breathing apparatus must be used when vapour concentration exceeds applicable exposure limits. Observe the wear time limits

Respiratory protection			
Device	Filter type	Condition	Standard
Full face mask, with cartridge/filter	Type A	Concentrations exceed max allowed workplace atmospheric concentrations.	EN 14387

8.2.2.4. Thermal hazards

No additional information available

8.2.3. Environmental exposure controls

Environmental exposure controls:

Avoid release to the environment.

Other information:

Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Colour	: Slightly yellow.
Appearance	: Clear.
Molecular mass	: 132.2 g/mol
Odour	: Pungent.
Odour threshold	: Not available
Melting point	: Not applicable
Freezing point	: Not available
Boiling point	: 49 °C (120.2 °F; ASTM D86)
Flammability	: Highly flammable liquid and vapour.
Lower explosion limit	: Not available
Upper explosion limit	: Not available
Flash point	: -15 °C (Closed cup, ASTM D56)
Auto-ignition temperature	: Not available
Decomposition temperature	: Not available

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pH	: Not applicable
Viscosity, kinematic	: 1.75 – 1.77 mm ² /s @ 40°C
Solubility	: Not available
Partition coefficient n-octanol/water (Log Kow)	: 2.78
Vapour pressure	: 7 – 15 kPa (37.8 °C; 100.04 °F)
Vapour pressure at 50°C	: Not available
Density	: Not available
Relative density	: 0.9584 – 0.9598 g/cm ³
Relative vapour density at 20°C	: Not available
Particle characteristics	: Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

No additional information available

9.2.2. Other safety characteristics

No additional information available

SECTION 10: Stability and reactivity

10.1. Reactivity

Highly flammable liquid and vapour. Hazardous polymerization may occur if exposure to fire conditions. Can form explosive peroxides by prolonged contact with air. Attacks some forms of plastics, rubber, and coatings.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

Contains inhibitor. Hazardous polymerization will not occur. Can form explosive peroxides by prolonged contact with air. Hazardous polymerization may occur if exposed to high temperature.

10.4. Conditions to avoid

Avoid ignition sources. Open flame. Direct sunlight. Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition. Extremely high or low temperatures.

10.5. Incompatible materials

Strong oxidizing agents. Strong reducing agents. Certain plastics, rubbers and coatings. Halogens.

10.6. Hazardous decomposition products

Carbon oxides (CO, CO₂). Hydrocarbon substances with low molecular weight and their oxidation products. Explosive decomposition on exposure to air: peroxidation resulting in increased fire or explosion risk.

SECTION 11: Toxicological information

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

Acute toxicity (oral)	: Harmful if swallowed.
Acute toxicity (dermal)	: Not classified (Based on available data, the classification criteria are not met)
Acute toxicity (inhalation)	: Fatal if inhaled.

DCPD (77-73-6)	
LD50 dermal rat	> 2000 mg/kg
LC50 Inhalation - Rat	1910 mg/m ³ (Exposure time: 6 h Source: ECHA_API)

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Cyclopentadiene (542-92-7)	
LC50 Inhalation - Rat	39 mg/l
ATE CLP (oral)	100 mg/kg bodyweight
ATE CLP (dermal)	1100 mg/kg bodyweight
ATE CLP (gases)	4500 ppmv/4h
ATE CLP (vapours)	11 mg/l/4h
ATE CLP (dust,mist)	1.5 mg/l/4h

Benzene (71-43-2)	
LD50 oral rat	> 2000 mg/kg
LD50 dermal rabbit	> 8200 mg/kg (Source: JAPAN_GHS)
LC50 Inhalation - Rat	43.767 mg/l air Animal: rat, Animal sex: female, Guideline: OECD Guideline 403 (Acute Inhalation Toxicity), 95% CL: 41690 - 45939
ATE CLP (vapours)	44.66 mg/l/4h
ATE CLP (dust,mist)	44.66 mg/l/4h

Cyclopentene (142-29-0)	
LD50 oral rat	2140 µl/kg (Source: NLM_CIP)
LD50 dermal rabbit	1231 mg/kg (Source: ECHA_API)
LC50 Inhalation - Rat	> 22.9 mg/l/4h
ATE CLP (oral)	500 mg/kg bodyweight
ATE CLP (dermal)	1100 mg/kg bodyweight

cyclopentane (287-92-3)	
LC50 Inhalation - Rat	> 25.3 mg/l/4h

2-Methyl-2-butene (513-35-9)	
LD50 oral rat	700 mg/kg
LD50 dermal rat	> 2000 mg/kg (Source: OECD_SIDS)
LC50 Inhalation - Rat [ppm]	> 61000 ppm/4h
ATE CLP (oral)	500 mg/kg bodyweight

Skin corrosion/irritation : Causes skin irritation.
pH: Not applicable

Benzene (71-43-2)	
pH	Not applicable

Serious eye damage/irritation : Causes serious eye irritation.
pH: Not applicable

Benzene (71-43-2)	
pH	Not applicable

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Respiratory or skin sensitisation	: Not classified (Based on available data, the classification criteria are not met)
Germ cell mutagenicity	: Not classified (Based on available data, the classification criteria are not met)
Carcinogenicity	: Not classified (Based on available data, the classification criteria are not met)

Benzene (71-43-2)	
IARC group	1 - Carcinogenic to humans

Reproductive toxicity : Suspected of damaging fertility or the unborn child.

STOT-single exposure : May cause respiratory irritation.

Cyclopentadiene (542-92-7)	
STOT-single exposure	May cause respiratory irritation.

2-Methyl-2-butene (513-35-9)	
STOT-single exposure	May cause drowsiness or dizziness.

STOT-repeated exposure : May cause damage to organs (Not specified) through prolonged or repeated exposure (Oral).

Benzene (71-43-2)	
NOAEL (oral, rat, 90 days)	100 mg/kg bodyweight Animal: rat, Animal sex: male, Guideline: OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity Study in Rodents)
STOT-repeated exposure	Causes damage to organs through prolonged or repeated exposure.

Aspiration hazard : May be fatal if swallowed and enters airways.

DCPD (77-73-6)	
Viscosity, kinematic	1.75 – 1.77 mm ² /s @ 40°C
Human evidence for classification	Yes
Hydrocarbon	Yes

Benzene (71-43-2)	
Viscosity, kinematic	0.689 mm ² /s

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Adverse health effects caused by endocrine disrupting properties : None known

11.2.2. Other information

Other information : Likely routes of exposure: ingestion, inhalation, skin and eye

SECTION 12: Ecological information

12.1. Toxicity

Ecology - water	: Very toxic to aquatic life. Toxic to aquatic life with long lasting effects.
Hazardous to the aquatic environment, short-term (acute)	: Very toxic to aquatic life.
Hazardous to the aquatic environment, long-term (chronic)	: Toxic to aquatic life with long lasting effects.

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Not rapidly degradable

Benzene (71-43-2)	
LC50 - Fish [1]	5.3 mg/l Test organisms (species): Oncorhynchus mykiss (previous name: Salmo gairdneri)
LC50 - Fish [2]	5.3 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through] Source: EPA)
EC50 - Crustacea [1]	8.76 – 15.6 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 - Crustacea [2]	10 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 72h - Algae [1]	32 mg/l Test organisms (species): Raphidocelis subcapitata (previous names: Pseudokirchneriella subcapitata, Selenastrum capricornutum)
EC50 72h - Algae [2]	100 mg/l Test organisms (species): Raphidocelis subcapitata (previous names: Pseudokirchneriella subcapitata, Selenastrum capricornutum)
NOEC chronic fish	0.8 mg/l Test organisms (species): Pimephales promelas Duration: '32 d'
2-Methyl-2-butene (513-35-9)	
LC50 - Fish [1]	4.99 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [semi-static] Source: ECHA)
EC50 - Crustacea [1]	3 mg/l (Exposure time: 48 h - Species: Daphnia magna)

12.2. Persistence and degradability

DCPD (77-73-6)	
Persistence and degradability	Not biodegradable.
Benzene (71-43-2)	
Persistence and degradability	Readily biodegradable in water.

12.3. Bioaccumulative potential

DCPD (77-73-6)	
BCF - Fish [1]	53
Partition coefficient n-octanol/water (Log Kow)	2.78
Bioaccumulative potential	The product presents low bioaccumulative potential in aquatic organisms. Not established.
Benzene (71-43-2)	
BCF - Fish [1]	3.5 – 4.4
Bioconcentration factor (BCF REACH)	> 2000
Partition coefficient n-octanol/water (Log Pow)	2.13 Source: CHemIDplus,IPCS
Bioaccumulative potential	not bioaccumulable.

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2-Methyl-2-butene (513-35-9)

BCF - Fish [1]

(low potential to bioaccumulate)

12.4. Mobility in soil

DCPD (77-73-6)

Organic Carbon Normalized Adsorption Coefficient (Log K_{oc})

3.2

Ecology - soil

Product is volatile. Mobility in soil.

12.5. Results of PBT and vPvB assessment

DCPD (77-73-6)

This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII

Component

Benzene (71-43-2)

This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII
This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII
This substance does not meet the criteria for classification as PBT or vPvB.

12.6. Endocrine disrupting properties

Adverse effects on the environment caused by endocrine disrupting properties : None known.

12.7. Other adverse effects

Additional information : Avoid release to the environment.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Dispose of at authorized waste collection point.
Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.
Sewage disposal recommendations : Disposal must be done according to official regulations.
Product/Packaging disposal recommendations : Dispose of in a safe manner in accordance with local/national regulations.
Additional information : Dispose of contaminated material at an authorized site. Do not re-use empty containers. Handle empty containers with care because residual vapours are flammable. Flammable vapours may accumulate in the container.
Ecological waste information : Avoid release to the environment. Hazardous waste due to toxicity.

SECTION 14: Transport information

In accordance with ADR / IMDG / IATA / ADN / RID

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ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
UN 3295	UN 3295	UN 3295	UN 3295	UN 3295
14.2. UN proper shipping name				
HYDROCARBONS, LIQUID, N.O.S. (Dicyclopentadiene)	HYDROCARBONS, LIQUID, N.O.S. (Dicyclopentadiene)	Hydrocarbons, liquid, n.o.s. (Dicyclopentadiene)	HYDROCARBONS, LIQUID, N.O.S. (Dicyclopentadiene)	HYDROCARBONS, LIQUID, N.O.S. (Dicyclopentadiene)
14.3. Transport hazard class(es)				
3	3	3	3	3
14.4. Packing group				
II	II	II	II	II
14.5. Environmental hazards				
Dangerous for the environment: Yes	Dangerous for the environment: Yes Marine pollutant: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes	Dangerous for the environment: Yes
Special precautions for user : Remarks : Special precautions: Refer to Section 7, Handling and Storage, for special precautions which a user needs to be aware of or is required to comply with regards to transport, Additional information : This product may be transport under nitrogen blanketing				

14.6. Special precautions for user

Special transport precautions : Special precautions for user : Remarks : Refer to Section 7, Handling and Storage, for special precautions which a user needs to be aware of or is required to comply with regards to transport, Additional information : This product may be transport under nitrogen blanketing

Overland transport

Classification code (ADR) : F1
Special provisions (ADR) : 640D
Limited quantities (ADR) : 1I
Excepted quantities (ADR) : E2
Packing instructions (ADR) : P001, IBC02, R001
Mixed packing provisions (ADR) : MP19
Portable tank and bulk container instructions (ADR) : T7
Portable tank and bulk container special provisions (ADR) : TP1, TP8, TP28
Tank code (ADR) : LGBF
Vehicle for tank carriage : FL
Transport category (ADR) : 2
Special provisions for carriage - Operation (ADR) : S2, S20

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Hazard identification number (Kemler No.) : 33

Orange plates :



Tunnel restriction code (ADR) : D/E

Transport by sea

Limited quantities (IMDG) : 1 L
Excepted quantities (IMDG) : E2
Packing instructions (IMDG) : P001
IBC packing instructions (IMDG) : IBC02
Tank instructions (IMDG) : T7
Tank special provisions (IMDG) : TP1, TP8, TP28
EmS-No. (Fire) : F-E
EmS-No. (Spillage) : S-D
Stowage category (IMDG) : B
Properties and observations (IMDG) : Immiscible with water.
MFAG-No : 130

Air transport

PCA Excepted quantities (IATA) : E2
PCA Limited quantities (IATA) : Y341
PCA limited quantity max net quantity (IATA) : 1L
PCA packing instructions (IATA) : 353
PCA max net quantity (IATA) : 5L
CAO packing instructions (IATA) : 364
CAO max net quantity (IATA) : 60L
Special provisions (IATA) : A3, A324
ERG code (IATA) : 3H

Inland waterway transport

Classification code (ADN) : F1
Special provisions (ADN) : 640D
Limited quantities (ADN) : 1 L
Excepted quantities (ADN) : E2
Carriage permitted (ADN) : T
Equipment required (ADN) : PP, EX, A
Ventilation (ADN) : VE01
Number of blue cones/lights (ADN) : 1

Rail transport

Classification code (RID) : F1
Special provisions (RID) : 640D
Limited quantities (RID) : 1L
Excepted quantities (RID) : E2
Mixed packing provisions (RID) : MP19

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Portable tank and bulk container : T7
instructions (RID)
Portable tank and bulk container special : TP1, TP8, TP28
provisions (RID)
Tank codes for RID tanks (RID) : LGBF
Transport category (RID) : 2
Colis express (express parcels) (RID) : CE7
Hazard identification number (RID) : 33

14.7. Maritime transport in bulk according to IMO instruments

IBC code : Transport in bulk according to Annex II of MARPOL73/78 and the IBC
Code :
IBC product name : Dicyclopentadiene, Resin Grade, 81-89%
Ship type : Type 2
Pollution category : Y

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

REACH Annex XVII (Restriction List)

Not listed on REACH Annex XVII

REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Not listed on the REACH Candidate List

PIC Regulation (Prior Informed Consent)

Not listed on the PIC list (Regulation EU 649/2012)

POP Regulation (Persistent Organic Pollutants)

Not listed on the POP list (Regulation EU 2019/1021)

Ozone Regulation (1005/2009)

Not listed on the Ozone Depletion list (Regulation EU 1005/2009)

Explosives Precursors Regulation (2019/1148)

Contains no substance(s) listed on the Explosives Precursors list (Regulation EU 2019/1148 on the marketing and use of explosives precursors)

Drug Precursors Regulation (273/2004)

Contains no substance(s) listed on the Drug Precursors list (Regulation EC 273/2004 on the manufacture and the placing on market of certain substances used in the illicit manufacture of narcotic drugs and psychotropic substances)

15.1.2. National regulations

Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active

Listed on the Canadian DSL (Domestic Substances List)

Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)

Listed on the Canadian IDL (Ingredient Disclosure List)

Subject to reporting requirements of United States SARA Section 313

Listed introduction on Australian Industrial Chemicals Introduction Scheme (AICIS Inventory)

Listed on PICCS (Philippines Inventory of Chemicals and Chemical Substances)

Listed on the Japanese ENCS (Existing New Chemical Substances) inventory

Listed on KECL/KECI (Korean Existing Chemicals Inventory)

Listed on IECSC (Inventory of Existing Chemical Substances Produced or Imported in China)

Japanese Pollutant Release and Transfer Register Law (PRTR Law)

Listed on NZIoC (New Zealand Inventory of Chemicals)

Listed on the Japanese ISHL (Industrial Safety and Health Law)

Listed on INSQ (Mexican National Inventory of Chemical Substances)

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Listed on the TCSI (Taiwan Chemical Substance Inventory)

Listed on the NCI (Vietnam - National Chemical Inventory)

Listed on Thailand Existing Chemicals Inventory (DIW)

France

Occupational diseases	
Code	Description
RG 4	Hematopathies caused by benzene and all products containing it
RG 4 BIS	Gastrointestinal disorders caused by benzene, toluene, xylenes and all products containing them
RG 84	Conditions caused by liquid organic solvents for professional use: saturated or unsaturated aliphatic or cyclic liquid hydrocarbons and mixtures thereof; liquid halogenated hydrocarbons; nitrated derivatives of aliphatic hydrocarbons; alcohols; glycols, glycol ethers; ketones; aldehydes; aliphatic and cyclic ethers, including tetrahydrofuran; esters; dimethylformamide and dimethylacetamide; acetonitrile and propionitrile; pyridine; dimethylsulfone and dimethylsulfoxide

Germany

Water hazard class (WGK)	: WGK 3, Highly hazardous to water (Classification is carried out on the basis of the Ordinance on facilities for handling substances that are hazardous to water (Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen (AwSV)) of 18 April 2017 (BGBl 2017, Teil I, Nr. 22, Seite 905).; ID No. 1514).
Chemicals Prohibition Ordinance (ChemVerbotsV)	: This product is subject to ChemVerbotsV Annex 2 Entry 1. The following requirements must be observed: authorization requirement (according to § 6 paragraph 1 sentence 1), basic requirements for carrying out the delivery (according to § 8 paragraph 1, 3 and 4), identification and documentation (according to § 9 paragraph 1 to 3) and exclusion of the shipping route (according to § 10).
Hazardous Incident Ordinance (12. BImSchV)	: Is not subject to the Hazardous Incident Ordinance (12. BImSchV)

Netherlands

SZW-lijst van kankerverwekkende stoffen	: The substance is not listed
SZW-lijst van mutagene stoffen	: The substance is not listed
SZW-lijst van reprotoxische stoffen – Borstvoeding	: The substance is not listed
SZW-lijst van reprotoxische stoffen – Vruchtbaarheid	: The substance is not listed
SZW-lijst van reprotoxische stoffen – Ontwikkeling	: The substance is not listed

Denmark

Classification remarks	: Emergency management guidelines for the storage of flammable liquids must be followed
Danish National Regulations	: Young people under 18 years are not allowed to use the product Pregnant/breastfeeding women working with the product must not be in direct contact with it

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15.2. Chemical safety assessment

A chemical safety assessment has been carried out.

SECTION 16: Other information

Indication of changes			
Section	Changed item	Change	Comments
1.2	Relevant identified uses of the substance or mixture and uses advised against	Modified	
1.4	Emergency telephone number	Modified	
2	Hazards identification	Modified	
3	Composition/information on ingredients	Modified	
4.1	Description of first aid measures	Modified	
4.2	Most important symptoms and effects, both acute and delayed	Modified	
5.2	Hazardous decomposition products in case of fire	Added	
5.3	Firefighting instructions	Modified	
6.1	Personal precautions, protective equipment and emergency procedures	Modified	
6.3	Methods and material for containment and cleaning up	Modified	
7.1	Precautions for safe handling	Modified	
7.2	Technical measures	Modified	
8.1	Control parameters	Modified	
8.2	Exposure controls	Modified	
8.2	Materials for protective clothing	Modified	
9	Partition coefficient n-octanol/water (Log Kow)	Added	
9	Viscosity, kinematic	Added	
10.3	Possibility of hazardous reactions	Modified	
10.4	Conditions to avoid	Modified	
11.1	Information on hazard classes as defined in Regulation (EC) No 1272/2008	Modified	
12.1	Ecology - water	Added	
12.2	Persistence and degradability	Modified	

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Indication of changes			
Section	Changed item	Change	Comments
12.3	BCF - Fish [2]	Removed	
12.3	BCF - Fish [1]	Modified	
12.3	Bioaccumulative potential	Modified	
12.4	Organic Carbon Normalized Adsorption Coefficient (Log Koc)	Added	
12.6	Adverse effects on the environment caused by endocrine disrupting properties	Added	
13.1	Product/Packaging disposal recommendations	Added	
13.1	Additional information	Modified	
13.1	Sewage disposal recommendations	Added	
13.1	Ecology - waste materials	Added	
14	Transport information	Modified	
15.2	Chemical safety assessment	Added	
16	Other information	Added	
16	Abbreviations and acronyms	Modified	
16	Sources of Key data	Modified	

Abbreviations and acronyms:	
ACGIH	ACGIH (American Conference of Government Industrial Hygienists)
CLP	CLP - Classification, Labelling and Packaging
CSR	CSR - Chemical Safety Report
EC	EC - European Community
GHS	GHS - Globally Harmonised System
EEC	EEC - European Economic Community
SDS	SDS - Safety Data Sheet
REACH	REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals
PVC	PVC (Polyvinyl chloride).
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor

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Abbreviations and acronyms:	
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
COD	Chemical oxygen demand (COD)
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Effective concentration for 50 percent of test population (median effective concentration)
EN	European Standard
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Lethal concentration for 50 percent of test population (median lethal concentration)
LD50	Lethal dose for 50 percent of test population (median lethal dose)
LOAEL	Lowest Observed Adverse Effect Level
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
OECD	Organisation for Economic Co-operation and Development
OEL	Occupational Exposure Limit
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
RID	Regulation concerning the International Carriage of Dangerous Goods by Railways
SDS	Safety Data Sheet
STP	Sewage treatment plant
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
VOC	Volatile Organic Compounds
CAS-No.	Chemical Abstract Service number
N.O.S.	Not Otherwise Specified
vPvB	Very Persistent and Very Bioaccumulative
ED	Endocrine disruptor

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Sources of Key data : MSDS. CSR - Chemical Safety Report. Regulation (EC) No 1272/2008 of the European Parliament and of the Council of 16 December 2008 on classification, labelling and packaging of substances and mixtures, amending and repealing Directives 67/548/EEC and 1999/45/EC, and amending Regulation (EC) No 1907/2006 (et sequens).

Other information : None.

Full text of H- and EUH-statements:	
Acute Tox. 2 (Inhalation)	Acute toxicity (inhal.), Category 2
Acute Tox. 3 (Oral)	Acute toxicity (oral), Category 3
Acute Tox. 4 (Dermal)	Acute toxicity (dermal), Category 4
Acute Tox. 4 (Inhalation)	Acute toxicity (inhal.), Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Acute 1	Hazardous to the aquatic environment – Acute Hazard, Category 1
Aquatic Chronic 2	Hazardous to the aquatic environment – Chronic Hazard, Category 2
Aquatic Chronic 3	Hazardous to the aquatic environment – Chronic Hazard, Category 3
Asp. Tox. 1	Aspiration hazard, Category 1
Carc. 1A	Carcinogenicity, Category 1A
Carc. 2	Carcinogenicity, Category 2
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 2	Flammable liquids, Category 2
Flam. Liq. 3	Flammable liquids, Category 3
H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H340	May cause genetic defects.

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Full text of H- and EUH-statements:	
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs (Not specified) through prolonged or repeated exposure (Oral).
H400	Very toxic to aquatic life.
H411	Toxic to aquatic life with long lasting effects.
H412	Harmful to aquatic life with long lasting effects.
Muta. 1B	Germ cell mutagenicity, Category 1B
Muta. 2	Germ cell mutagenicity, Category 2
Repr. 2	Reproductive toxicity, Category 2
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT RE 1	Specific target organ toxicity – Repeated exposure, Category 1
STOT RE 2	Specific target organ toxicity – Repeated exposure, Category 2
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation

Full text of use descriptors	
ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ESVOC SPERC 4.20.v1	Polymer production: Industrial (SU10)
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC13	Treatment of articles by dipping and pouring
PROC14	Tabletting, compression, extrusion, pelettisation, granulation
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
PROC4	Chemical production where opportunity for exposure arises
PROC5	Mixing or blending in batch processes
PROC6	Calendering operations
PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities

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Full text of use descriptors	
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
SU3	Industrial uses: Uses of substances as such or in preparations at industrial sites

This information is based on our current knowledge and is intended to describe the product for the purposes of health, safety and environmental requirements only. It should not therefore be construed as guaranteeing any specific property of the product. It warns that the handling of any chemical substance requires the previous knowledge of its hazards for the user. It is up to the user of the product company providing this SDS to and promote the training of its employees about possible risks come upon of the product. The information contained herein is not absolute, but only general information on the use of the chemical and indication of safety and security measures.

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Annex to the safety data sheet	
Product exposure scenario(s)	
ES Type	ES title
Worker	Polymer processing

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

1. Exposure scenario ES4

Polymer processing

ES Ref.: ES4

ES Type: Worker

Use descriptors	SU3 PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC13, PROC14 ERC4 ESVOC SPERC 4.20.v1
Processes, tasks, activities covered	Manufacture of polymers from monomers in continuous and batch processes. Including production, re-cycling and recovery, degassing, discharging, reactor maintenance and immediate polymer product formation (i.e. compounding, pelletisation, product off-gassing). Use at industrial sites (IS)

2. Operational conditions and risk management measures

2.2 Contributing scenario controlling environmental exposure (ERC4, ESVOC SPERC 4.20.v1)

ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ESVOC SPERC 4.20.v1	Polymer production: Industrial (SU10)
Assessment method	EUSES 2.1.2

Product characteristics

Physical form of product	liquid
Concentration of substance in product	100 %
Vapour pressure	186.6 Pa
Vapour pressure	at 20°C

Operational conditions

Amounts used	European tonnage	2000 t/yr
Amounts used	Daily amount per site	≤ 50 t/d
Amounts used	Annual amount per site	≤ 1000 t/yr
Frequency and duration of use	Emission days	300
Other given operational conditions affecting environmental exposure	Indoor use	
Other given operational conditions affecting environmental exposure	Equipment cleaning and maintenance	Not applicable as there is no release to wastewater
Other given operational conditions affecting environmental exposure	Release fraction to air from process (initial release prior to RMM):	25 %
Other given operational conditions affecting environmental exposure	Release fraction to wastewater from process (initial release prior to RMM):	0 %
Other given operational conditions affecting environmental exposure	Release fraction to soil from process (initial release prior to RMM):	0.001 %

Risk Management Measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Process efficiency:	Process optimized for highly efficient use of raw materials (very minimal environmental release)
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	On-site treatment of off-air:	Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS
Conditions and measures related to sewage treatment plant	Controlled application of sewage sludge to agricultural soil	Yes
Conditions and measures related to sewage treatment plant	Discharge rate of Municipal STP	≥ 2000 m³/d
Conditions and measures related to sewage treatment plant	Biological STP: Standard. Treatment effectiveness	91.57 %

2.1.1 Contributing scenario controlling worker exposure (PROC1) (Bulk transfers; Closed systems)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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Product characteristics

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

Physical form of product	liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	418.2 Pa
Vapour pressure	32°C

Operational conditions

Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(240 cm ²)
Other given operational conditions affecting workers exposure	Indoor use	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C
Other given operational conditions affecting workers exposure	Closed process without likelihood of exposure	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Closed system	
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Yes (effectiveness ≥ 80%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.2 Contributing scenario controlling worker exposure (PROC1) (Bulk transfers;Closed systems;outdoor)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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Product characteristics

Physical form of product	liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	418.2 Pa
Vapour pressure	32°C

Operational conditions

Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(240 cm ²)
Other given operational conditions affecting workers exposure	Outdoor use	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C
Other given operational conditions affecting workers exposure	Ventilation conditions	Basic. 3 ach (air changes per hour)
Other given operational conditions affecting workers exposure	Closed process without likelihood of exposure	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)

Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

Organisational measures to prevent/limit releases, dispersion and exposure	Closed system	
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Yes (effectiveness \geq 80%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.3 Contributing scenario controlling worker exposure (PROC2) (Bulk transfers;Closed systems;outdoor)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions	
Product characteristics		
Physical form of product	liquid	
Concentration of substance in product	≤ 1 %	
Vapour pressure	418.2 Pa	
Vapour pressure	32°C	
Operational conditions		
Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(480 cm2)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C
Other given operational conditions affecting workers exposure	Closed process without likelihood of exposure	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Closed system	
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Yes (effectiveness >= 80%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.4 Contributing scenario controlling worker exposure (PROC8b) (Bulk transfers;Dedicated facility)

PROC8b	Transfer of substance or mixture (charging and discharging) at dedicated facilities	
Product characteristics		
Physical form of product	liquid	
Concentration of substance in product	≤ 1 %	
Vapour pressure	418.2 Pa	
Vapour pressure	32°C	
Operational conditions		
Amounts used	Daily amount per site	50 t/d

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(960 cm ²)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, enclosing hood with very high effectiveness such as fume cupboard (assumed effectiveness ≥ 95%)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Yes (effectiveness ≥ 80%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.5 Contributing scenario controlling worker exposure (PROC1) (Bulk weighing;Closed systems)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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Product characteristics

Physical form of product	liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	418.2 Pa
Vapour pressure	32°C

Operational conditions

Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(240 cm ²)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Organisational measures to prevent/limit releases, dispersion and exposure	Use in closed process, no likelihood of exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Yes (effectiveness ≥ 80%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.6 Contributing scenario controlling worker exposure (PROC2) (Bulk weighing;Closed systems)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

Product characteristics		
Physical form of product	liquid	
Concentration of substance in product	≤ 1 %	
Vapour pressure	418.2 Pa	
Vapour pressure	32°C	
Operational conditions		
Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(480 cm2)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Good elimination. 3 - 5 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Organisational measures to prevent/limit releases, dispersion and exposure	Use in closed, continuous process with occasional controlled exposure.	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Yes (effectiveness >= 80%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.7 Contributing scenario controlling worker exposure (PROC9) (Small scale weighing)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)	
Product characteristics		
Physical form of product	liquid	
Concentration of substance in product	≤ 1 %	
Vapour pressure	418.2 Pa	
Vapour pressure	32°C	
Operational conditions		
Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(480 cm2)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Good elimination. 3 - 5 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

Organisational measures to prevent/limit releases, dispersion and exposure	Use in closed, continuous process with occasional controlled exposure.	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Chemical resistant dermal protection with basic employee training. . Efficiency of at least $\geq 90\%$
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.8 Contributing scenario controlling worker exposure (PROC3) (Additive premixing)

PROC3	Manufacture or formulation in the chemical industry in closed batch processes with occasional controlled exposure or processes with equivalent containment condition
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Product characteristics

Physical form of product	liquid
Concentration of substance in product	$\leq 100\%$
Vapour pressure	418.2 Pa
Vapour pressure	32°C

Operational conditions

Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(240 cm ²)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness $\geq 90-95\%$)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	under enhanced conditions (5 - 10 ach (air changes per hour))
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Organisational measures to prevent/limit releases, dispersion and exposure	Closed batch process with occasional controlled exposure	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Chemical resistant dermal protection with basic employee training. . Efficiency of at least $\geq 90\%$
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.9 Contributing scenario controlling worker exposure (PROC4) (Additive premixing)

PROC4	Chemical production where opportunity for exposure arises
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Product characteristics

Physical form of product	liquid
Concentration of substance in product	$\leq 1\%$
Vapour pressure	418.2 Pa
Vapour pressure	32°C

Operational conditions

Amounts used	Daily amount per site	50 t/d
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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(480 cm ²)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness ≥ 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Good elimination. 3 - 5 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Yes (effectiveness ≥ 80%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.10 Contributing scenario controlling worker exposure (PROC5) (Additive premixing)

PROC5	Mixing or blending in batch processes
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Product characteristics

Physical form of product	liquid
Concentration of substance in product	≤ 1 %
Vapour pressure	418.2 Pa
Vapour pressure	32°C

Operational conditions

Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(480 cm ²)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness ≥ 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 - 5 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Chemical resistant dermal protection with basic employee training. . Efficiency of at least ≥90%
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

2.1.11 Contributing scenario controlling worker exposure (PROC6) (Calendering (including Banburys);elevated temperature)

PROC6	Calendering operations	
Product characteristics		
Physical form of product	liquid	
Concentration of substance in product	≤ 1 %	
Vapour pressure	186.6 Pa	
Vapour pressure	60°C	
Operational conditions		
Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(960 cm2)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 60 °C
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%). Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Chemical resistant dermal protection with basic employee training. . Efficiency of at least >=90%
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.12 Contributing scenario controlling worker exposure (PROC13) (Production of articles by dipping and pouring)

PROC13	Treatment of articles by dipping and pouring	
Product characteristics		
Physical form of product	liquid	
Concentration of substance in product	≤ 1 %	
Vapour pressure	418.2 Pa	
Vapour pressure	32°C	
Operational conditions		
Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 4 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(480 cm2)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

		(assumed effectiveness >= 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Chemical resistant dermal protection with specific employee training. . (effectiveness >= 95%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.13 Contributing scenario controlling worker exposure (PROC14) (Extrusion and masterbatching)

PROC14	Tabletting, compression, extrusion, pelettisation, granulation	
Product characteristics		
Physical form of product	liquid	
Concentration of substance in product	≤ 1 %	
Vapour pressure	418.2 Pa	
Vapour pressure	32°C	
Operational conditions		
Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(480 cm2)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Chemical resistant dermal protection with basic employee training. . (efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.14 Contributing scenario controlling worker exposure (PROC14) (Injection moulding of articles)

PROC14	Tabletting, compression, extrusion, pelettisation, granulation	
Product characteristics		
Physical form of product	liquid	
Concentration of substance in product	≤ 1 %	
Vapour pressure	418.2 Pa	
Vapour pressure	32°C	
Operational conditions		
Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(480 cm ²)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness ≥ 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	under enhanced conditions (5 - 10 ach (air changes per hour))
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Chemical resistant dermal protection with basic employee training. . (efficacy 90%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.15 Contributing scenario controlling worker exposure (PROC8a, PROC28) (Equipment maintenance)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities
PROC28	Manual maintenance (cleaning and repair) of machinery

Product characteristics

Physical form of product	liquid
Concentration of substance in product	≤ 1 %
Vapour pressure	418.2 Pa
Vapour pressure	32°C

Operational conditions

Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(960 cm ²)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness ≥ 90-95%). LEV has been added to equate to the SOP. Drain down and flush system prior to equipment break-in or maintenance
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	under enhanced conditions (5 - 10 ach (air changes per hour))
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Chemical resistant dermal protection with specific

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

		employee training. . (effectiveness >= 95%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.16 Contributing scenario controlling worker exposure (PROC1) (Storage)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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Product characteristics

Physical form of product	liquid
Concentration of substance in product	≤ 1 %
Vapour pressure	418.2 Pa
Vapour pressure	32°C

Operational conditions

Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(240 cm ²)
Other given operational conditions affecting workers exposure	Outdoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Organisational measures to prevent/limit releases, dispersion and exposure	Closed process without likelihood of exposure. Store substance within a closed system	
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Yes (effectiveness >= 80%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

2.1.17 Contributing scenario controlling worker exposure (PROC2) (Storage)

PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
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Product characteristics

Physical form of product	liquid
Concentration of substance in product	≤ 1 %
Vapour pressure	418.2 Pa
Vapour pressure	32°C

Operational conditions

Amounts used	Daily amount per site	50 t/d
Amounts used	Annual amount per site	1000 t/yr
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management	Exposed skin surface assumed:	(480 cm ²)
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	processing temperatures	≤ 32 °C

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No
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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. 3 ach (air changes per hour)
Organisational measures to prevent/limit releases, dispersion and exposure	Closed batch process with occasional controlled exposure. Store substance within a closed system	
Organisational measures to prevent/limit releases, dispersion and exposure	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.	
Conditions and measures related to personal protection, hygiene and health evaluation	Use eye protection according to EN 166, designed to protect against dusts.	
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Yes (effectiveness >= 80%)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection	No

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation: 1.058 mg/m ³ Dermal: 0.3 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure	RCR	dermal exposure	RCR	Sum RCR	Assessment method
PROC1 (Bulk transfers,Closed systems)	0.055 mg/m ³	0.052	0.0068 mg/kg bw/day	0.023	0.075	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC1 (Bulk transfers,Closed systems,outdoor)	0.039 mg/m ³	0.036	0.0068 mg/kg bw/day	0.023	0.059	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2 (Bulk transfers,Closed systems,outdoor)	0.055 mg/m ³	0.052	0.00274 mg/kg bw/day	< 0.01	< 0.062	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8b (Bulk transfers,Dedicated facility)	0.138 mg/m ³	0.13	0.014 mg/kg bw/day	0.046	0.176	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC1 (Bulk weighing,Closed systems)	0.055 mg/m ³	0.052	0.0068 mg/kg bw/day	0.023	0.075	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2 (Bulk weighing,Closed systems)	0.039 mg/m ³	0.036	0.00274 mg/kg bw/day	< 0.01	< 0.046	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC9 (Small scale weighing)	0.193 mg/m ³	0.182	0.00686 mg/kg bw/day	0.023	0.205	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC3 (Additive premixing)	0.496 mg/m ³	0.469	0.0069 mg/kg bw/day	0.023	0.492	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC4 (Additive premixing)	0.193 mg/m ³	0.182	0.014 mg/kg bw/day	0.046	0.228	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC5 (Additive premixing)	0.275 mg/m ³	0.26	0.014 mg/kg bw/day	0.046	0.306	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC6 (Calendering (including Banburys),elevated temperature)	0.275 mg/m ³	0.26	0.027 mg/kg bw/day	0.091	0.351	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

PROC13 (Production of articles by dipping and pouring)	0.331 mg/m ³	0.312	0.00686 mg/kg bw/day	0.023	0.335	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC14 (Extrusion and masterbatching)	0.275 mg/m ³	0.26	0.00343 mg/kg bw/day	0.011	0.271	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC14 (Injection moulding of articles)	0.083 mg/m ³	0.078	0.00343 mg/kg bw/day	0.011	0.089	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC8a, PROC28 (Equipment maintenance)	0.551 mg/m ³	0.521	0.00686 mg/kg bw/day	0.023	0.544	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC1 (Storage)	0.00386 mg/m ³	< 0.01	0.00068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model
PROC2 (Storage)	0.551 mg/m ³	0.521	0.027 mg/kg bw/day	0.091	0.612	Inhalation: Used ECETOC TRA model Dermal: Used ECETOC TRA model

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Local - Inhalation					
DNEL	Acute: 160.2 mg/m ³ Long-term: 2.31 mg/m ³				
Contributing scenario	Acute	RCR	Long term	RCR	Assessment method
PROC1 (Bulk transfers,Closed systems)	0.22 mg/m ³	< 0.01	0.055 mg/m ³	0.024	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC1 (Bulk transfers,Closed systems,outdoor)	0.154 mg/m ³	< 0.01	0.039 mg/m ³	0.017	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC2 (Bulk transfers,Closed systems,outdoor)	0.22 mg/m ³	< 0.01	0.055 mg/m ³	0.024	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC8b (Bulk transfers,Dedicated facility)	0.551 mg/m ³	< 0.01	0.138 mg/m ³	0.06	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC1 (Bulk weighing,Closed systems)	0.22 mg/m ³	< 0.01	0.055 mg/m ³	0.024	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC2 (Bulk weighing,Closed systems)	0.154 mg/m ³	< 0.01	0.039 mg/m ³	0.017	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC9 (Small scale weighing)	0.771 mg/m ³	< 0.01	0.193 mg/m ³	0.083	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC3 (Additive premixing)	1.983 mg/m ³	0.012	0.496 mg/m ³	0.215	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC4 (Additive premixing)	0.771 mg/m ³	< 0.01	0.193 mg/m ³	0.083	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC5 (Additive premixing)	1.102 mg/m ³	< 0.01	0.275 mg/m ³	0.119	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC6 (Calendering (including Banburys),elevated temperature)	1.102 mg/m ³	< 0.01	0.275 mg/m ³	0.119	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model

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Annex to the safety data sheet: Exposure scenario

CAS-No.: 77-73-6 Product form: Substance Physical state: Liquid Substance type: Mono-constituent

PROC13 (Production of articles by dipping and pouring)	2.203 mg/m ³	0.014	0.331 mg/m ³	0.143	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC14 (Extrusion and masterbatching)	1.102 mg/m ³	< 0.01	0.275 mg/m ³	0.119	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC14 (Injection moulding of articles)	0.331 mg/m ³	< 0.01	0.083 mg/m ³	0.036	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC8a, PROC28 (Equipment maintenance)	2.203 mg/m ³	0.014	0.551 mg/m ³	0.238	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC1 (Storage)	0.015 mg/m ³	< 0.01	0.00386 mg/m ³	< 0.01	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model
PROC2 (Storage)	2.203 mg/m ³	0.014	0.551 mg/m ³	0.238	Acute: Used ECETOC TRA model Long term: Used ECETOC TRA model

3.2. Environment

Information for contributing exposure scenario	
2.2	Man via environment - Inhalation (systemic effects) 0.19 mg/m ³ Man via environment - Inhalation (local effect) 0.19 mg/m ³ Man via environment - Inhalation (Oral) Food 0.0422 mg/kg bw/day

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.000278	98	< 0.01	EUSES 2.1.2
Marine water	mg/l	0.0000228	9.8	< 0.01	EUSES 2.1.2
Freshwater sediment	mg/kg dwt	0.043	15.2	< 0.01	EUSES 2.1.2
Sewage treatment plant	mg/l	0	2.2	< 0.01	EUSES 2.1.2
Soil	mg/kg dwt	1.824	2.98	0.612	EUSES 2.1.2

4. Guidance to Downstream User to evaluate whether he works inside the boundaries set by the ES

4.1. Health

Guidance - Health	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels.
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4.2. Environment

Guidance - Environment	When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted PNECs and the resulting risk characterisation ratios are expected to be less than 1.
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