

SECTION 1: Identification of the substance/mixture and of the company/undertaking
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	: C ₁₀ H ₁₂
Synonyms	: DCPD; Bicyclopentadiene; 1,3-Cyclopentadiene dimers; 3a,4,7,7a-Tetrahydro-4,7-methaneindene

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

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

Title	Use descriptors
Use at industrial sites. Polymer processing (ES Ref.: ES4)	PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC21, PROC28, ERC4, ESVOC SPERC 4.21a.v1

Full text of use descriptors: see section 16

1.2.2. Uses advised against

No additional information available

1.3. Details of the supplier of the safety data sheet

Braskem Netherland BV
 Weena 238-240, 9th Floor, Tower C
 NL - 3012 NJ – Rotterdam
 T +31 10 798 5002
 productsafety@braskem.com

1.4. Emergency telephone number

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

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
Germ cell mutagenicity, Category 1B	H340
Carcinogenicity, Category 1A	H350

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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. Fatal if inhaled. Causes skin and eye irritation. May cause respiratory irritation. May cause genetic defects. May cause cancer. Suspected of damaging fertility or the unborn child. May cause damage to organs (central nervous system) through prolonged or repeated exposure (oral). May be fatal if swallowed and enters airways. 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.
H340 - May cause genetic defects.
H350 - May cause cancer.
H361 - Suspected of damaging fertility or the unborn child.
H373 - May cause damage to organs (central nervous system) 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.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P260 - Do not breathe mist, spray, vapours.
P264 - Wash every body parts after contact thoroughly after handling.
P273 - Avoid release to the environment.
P280 - Wear eye protection, face protection, protective clothing, protective gloves.

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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. Very toxic to aquatic life with long lasting effects.

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

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

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 : 3a,4,7,7a-tetrahydro-4,7-methanoindene
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
1,3-Pentadiene, (Z)-	CAS-No.: 1574-41-0 EC-No.: 216-401-0	$\leq 1,5$	Flam. Liq. 2, H225 Asp. Tox. 1, H304

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Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
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	≤ 0,4	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	≤ 0,1	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 after inhalation : Remove victim to fresh air. Seek medical attention immediately. Do not apply mouth-to-mouth resuscitation. If breathing stops, give artificial respiration.

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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. Get medical advice/attention. Remove contact lenses, if present and easy to do. Continue rinsing.
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.
Symptoms/effects after inhalation	: Fatal if inhaled. May cause respiratory irritation. Overexposure to vapours may result in cough. Depression of the central nervous system, headaches, dizziness, drowsiness, loss of coordination.
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. May be fatal if swallowed and enters airways. May cause damage to organs (central nervous system) through prolonged or repeated exposure (Oral).

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.

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.
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.
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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. Stop leak if safe to do so.

6.1.2. For emergency responders

- Protective equipment : Wear suitable protective clothing. 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.

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).
- Methods for cleaning up : Absorb remaining liquid with sand or inert absorbent and remove to safe place. Clean up any spills as soon as possible, using an absorbent material to collect it. Do not absorb in sawdust, paper, cloth or other combustible absorbents.

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.
- Precautions for safe handling : Use only outdoors or in a well-ventilated area. Avoid ignition sources. Use only non-sparking tools. Use grounded electrical/mechanical equipment. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. 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.

7.2. Conditions for safe storage, including any incompatibilities

- Technical measures : Keep container closed when not in use. Keep away from sources of ignition.
- Storage conditions : Keep away from open flames, hot surfaces and sources of ignition. Store in dry, cool, well-ventilated area. Store at room temperature. Hazardous polymerization will not occur. Contains inhibitor. To prevent further polymerization Dicyclopentadiene is inhibited with 4-tert-butylcatechol (TBC).
- Incompatible materials : Strong oxidizing agents. Reducing agents. Certain plastics, rubbers and coatings. Halogens.

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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.

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

DCPD (77-73-6)	
Belgium - Occupational Exposure Limits	
Local name	Dicyclopentadiène # Dicyclopentadien
OEL TWA	27 mg/m ³
OEL TWA	5 ppm
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
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. 47 от 2021 г., в сила от 04.06.2021 г.)
Croatia - Occupational Exposure Limits	
Local name	Diciklopentadien; 3a,4,7,7a-tetrahidro-4,7-metanoinden
GVI (OEL TWA) [1]	27 mg/m ³
GVI (OEL TWA) [2]	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 1/2021)
Czech Republic - Occupational Exposure Limits	
Local name	Dicyklopentadien
PEL (OEL TWA)	3 mg/m ³
PEL (OEL TWA) [ppm]	0,5 ppm
NPK-P (OEL C)	6 mg/m ³
NPK-P (OEL C) [ppm]	1 ppm
Remark	I - dráždí sliznice (oči, dýchací cesty), respektive kůže.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 195/2021 Sb.)

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Denmark - Occupational Exposure Limits	
Local name	Dicyclopentadien
OEL TWA [1]	2,7 mg/m ³
OEL TWA [2]	0,5 ppm
OEL STEL	5,4 mg/m ³
OEL STEL	1 ppm
Regulatory reference	BEK nr 202 af 21/02/2023
Finland - Occupational Exposure Limits	
Local name	Disyklopentadieeni
HTP (OEL STEL)	5,5 mg/m ³
HTP (OEL STEL) [ppm]	1 ppm
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Dicyclopentadiène
VME (OEL TWA)	30 mg/m ³
VME (OEL TWA) [ppm]	5 ppm
Remark	Valeurs recommandées/admises
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	3a,4,7,7a-Tetrahydro-4,7-methanoinden
AGW (OEL TWA) [1]	2,7 mg/m ³
AGW (OEL TWA) [2]	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
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

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DCPD (77-73-6)	
OEL TWA [1]	30 mg/m ³
OEL TWA [2]	5 ppm
Regulatory reference	Chemical Agents Code of Practice 2021
Lithuania - Occupational Exposure Limits	
Local name	Diciklopentadienas
IPRV (OEL TWA)	1 mg/m ³
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 (dicyklopentadien)
NDS (OEL TWA)	10 mg/m ³
Regulatory reference	Dz. U. 2018 poz. 1286 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/m ³
OEL TWA	0,5 ppm
OEL STEL	2,7 mg/m ³
OEL STEL	0,5 ppm
Regulatory reference	Uradni list RS, št. 72/2021 z dne 11.5.2021
Spain - Occupational Exposure Limits	
Local name	Diciclopentadieno
VLA-ED (OEL TWA) [2]	5 ppm
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2023. INSHT
Norway - Occupational Exposure Limits	
Local name	Disyklopentadien
Greenseverdi (OEL TWA) [1]	30 mg/m ³
Greenseverdi (OEL TWA) [2]	5 ppm

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DCPD (77-73-6)	
Regulatory reference	FOR-2021-06-28-2248
USA - ACGIH - Occupational Exposure Limits	
Local name	Dicyclopentadiene
ACGIH OEL TWA [ppm]	5 ppm
ACGIH OEL STEL [ppm]	1 ppm (including Cyclopentadiene)
Remark (ACGIH)	URT, LRT, & eye irr
Regulatory reference	ACGIH 2023
Cyclopentadiene (542-92-7)	
Austria - Occupational Exposure Limits	
Local name	1,3-Cyclopentadien
MAK (OEL TWA)	200 mg/m ³
MAK (OEL TWA) [ppm]	75 ppm
Regulatory reference	BGBI. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	1,3-Cyclopentadiène # 1,3-Cyclopentadiéen
OEL TWA	206 mg/m ³
OEL TWA	75 ppm
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Bulgaria - Occupational Exposure Limits	
Local name	Циклопентадиен
OEL TWA	200 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. 47 от 2021 г., в сила от 04.06.2021 г.)
Denmark - Occupational Exposure Limits	
Local name	Cyclopentadien
OEL TWA [1]	200 mg/m ³
OEL TWA [2]	75 ppm
OEL STEL	400 mg/m ³
OEL STEL	150 ppm
Regulatory reference	BEK nr 202 af 21/02/2023
Estonia - Occupational Exposure Limits	
Local name	1,3-tsüklopentadiéen
OEL TWA	200 mg/m ³

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Cyclopentadiene (542-92-7)	
OEL TWA	75 ppm
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 21.12.2022, 3)
Finland - Occupational Exposure Limits	
Local name	Syklopentadieeni
HTP (OEL TWA) [1]	210 mg/m ³
HTP (OEL TWA) [2]	75 ppm
HTP (OEL STEL)	330 mg/m ³
HTP (OEL STEL) [ppm]	120 ppm
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Cyclopentadiène
VME (OEL TWA)	200 mg/m ³
VME (OEL TWA) [ppm]	75 ppm
Remark	Valeurs recommandées/admises
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)
Greece - Occupational Exposure Limits	
Local name	Κυκλοπενταδιένιο, 1,3-
OEL TWA	200 mg/m ³
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
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 [1]	203 mg/m ³
OEL TWA [2]	75 ppm
Regulatory reference	Chemical Agents Code of Practice 2021

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Cyclopentadiene (542-92-7)	
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)
Poland - Occupational Exposure Limits	
Local name	Cyklopenta-1,3-dien (cyklopentadien-1,3)
NDS (OEL TWA)	200 mg/m ³
Regulatory reference	Dz. U. 2018 poz. 1286 wraz z późn. zm.
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. 53/2021)
Spain - Occupational Exposure Limits	
Local name	Ciclopentadieno
VLA-ED (OEL TWA) [1]	206 mg/m ³
VLA-ED (OEL TWA) [2]	75 ppm
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2023. INSHT
Norway - Occupational Exposure Limits	
Local name	1,3-syklopentadien
Greenseverdi (OEL TWA) [1]	110 mg/m ³
Greenseverdi (OEL TWA) [2]	40 ppm
Regulatory reference	FOR-2021-06-28-2248
USA - ACGIH - Occupational Exposure Limits	
Local name	Cyclopentadiene
ACGIH OEL TWA	203 mg/m ³

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Cyclopentadiene (542-92-7)	
ACGIH OEL TWA [ppm]	0,5 ppm
ACGIH OEL STEL [ppm]	1 ppm
Remark (ACGIH)	TLV® Basis: URT, LRT, & eye irr; CNS eff
Regulatory reference	ACGIH 2023
Benzene (71-43-2)	
EU - Binding Occupational Exposure Limit (BOEL)	
Local name	Benzene
BOEL TWA	3,25 mg/m ³ (Limit value until 5 April 2024) 1,65 mg/m ³ (Limit value from 5 April 2024 until 5 April 2026) 0,66 mg/m ³ (Limit value from 5 April 2026)
BOEL TWA [ppm]	1 ppm (Limit value until 5 April 2024) 0,5 ppm (Limit value from 5 April 2024 until 5 April 2026) 0,2 ppm (Limit value from 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
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) [ppm]	1 ppm
TRK (OEL STEL)	12,8 mg/m ³ (4x 15(Miw) min)
TRK (OEL STEL) [ppm]	4 ppm (4x 15(Miw) min)
Remark	H. Krebszeugend: III A1
Regulatory reference	BGBI. II Nr. 156/2021
Austria - Biological limit values	
Local name	Benzol

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Benzene (71-43-2)	
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/ μ l für Frauen, 3,8 Millionen/ μ l für Männer; Leukozyten: unterer Grenzwert: 4.000/ μ l (davon 2.000 Granulozyten) bzw. 3.700/ μ l bei nicht pathologischem Differentialblutbild, oberer Grenzwert: 13.000/ μ l; Thrombozyten: 150.000 bzw. 130.000/ μ l 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	3,25 mg/m ³
OEL TWA	1 ppm
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 11/05/2021
Bulgaria - Occupational Exposure Limits	
Local name	Бензен
OEL TWA	3,25 mg/m ³
OEL TWA	1 ppm

Benzene (71-43-2)	
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.5 от 17 Януари 2020 г.)
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: Няма
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. 47 от 2021 г., в сила от 04.06.2021 г.)
Croatia - Occupational Exposure Limits	
Local name	Benzen
GVI (OEL TWA) [1]	3,25 mg/m ³
GVI (OEL TWA) [2]	1 ppm
Remark	Direktiva: 2017/2398. 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 1/2021)
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

Benzene (71-43-2)	
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	3,25 mg/m ³
OEL TWA	1 ppm
Remark	δέρμα. Καρκινογόνοι και Μεταλλαξιογόνοι Παράγοντες
Regulatory reference	Κανονισμοί του 2020 (Κ.Δ.Π. 282/2020)
Czech Republic - Occupational Exposure Limits	
Local name	Benzen
PEL (OEL TWA)	3 mg/m ³
PEL (OEL TWA) [ppm]	0,9 ppm
NPK-P (OEL C)	10 mg/m ³
NPK-P (OEL C) [ppm]	3,1 ppm
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, D - při expozici se významně uplatňuje pronikání faktoru kůže, I - dráždí sliznice (oči, dýchací cesty), respektive kůže, 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 195/2021 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 [1]	1,6 mg/m ³
OEL TWA [2]	0,5 ppm
OEL STEL	3,2 mg/m ³

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Benzene (71-43-2)	
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 202 af 21/02/2023
Estonia - Occupational Exposure Limits	
Local name	Benseen
OEL TWA	1,5 mg/m ³
OEL TWA	0,5 ppm
OEL STEL	9 mg/m ³
OEL STEL	3 ppm
Remark	A (Naha kaudu kergesti imenduv aine), C (Kantserogeenne aine)
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 21.12.2022, 3)
Finland - Occupational Exposure Limits	
Local name	Bentseeni
HTP (OEL TWA) [1]	3,25 mg/m ³ (Työssä tapahtuvan altistumisen sitovat raja-arvot)
HTP (OEL TWA) [2]	1 ppm (Työssä tapahtuvan altistumisen sitovat raja-arvot)
Remark	Iho
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Benzène
VME (OEL TWA)	3,25 mg/m ³
VME (OEL TWA) [ppm]	1 ppm
Remark	Valeurs réglementaires contraignantes; risque de pénétration percutanée; substance classée cancérigène de catégorie 1A et mutagène de catégorie 1B
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 984, 2016; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)
Germany - Occupational Exposure Limits (TRGS 910)	
Local name	Benzol
Acceptable concentration (Volume conc.)	0,06 ppm
Acceptable concentration (Weight conc.)	0,2 mg/m ³
Notes	b) Akzeptanzkonzentration assoziiert mit Risiko 4:10000
Tolerance concentration (Volume conc.)	0,6 ppm

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Benzene (71-43-2)	
Tolerance concentration (Weight conc.)	1,9 mg/m ³
Tolerance concentration excess factor	8
Remark	H - Hautresorptiv
Equivalence value for acceptable concentration	0,8 µg/l (3) 3 µg/g creatinine (3)
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
Gibraltar - Occupational Exposure Limits	
Local name	Benzene
OEL TWA	3,25 mg/m ³
OEL TWA	1 ppm
Remark	Skin
Regulatory reference	Factories (Control of Carcinogens and mutagens at Work) Regulations 2003 (LN. 2020/47)
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)	3,25 mg/m ³

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Benzene (71-43-2)	
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
Ireland - Occupational Exposure Limits	
Local name	Benzene
OEL TWA [1]	3,25 mg/m ³
OEL TWA [2]	1 ppm
Remark	BOELV (Binding Occupational Exposure Limit Values), Sk (Substances which have the capacity to penetrate intact skin when they come in contact with it, and be absorbed into the body), 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 2021
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

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Benzene (71-43-2)	
Remark	Cute
OEL chemical category	skin - potential for cutaneous absorption
Regulatory reference	Allegato XLIII del D.Lgs. 9 aprile 2008, n. 81 e s.m.i.
Latvia - Occupational Exposure Limits	
Local name	Benzols
OEL TWA	3,25 mg/m ³
OEL TWA	1 ppm
Remark	Āda. Carc. 1A; Muta. 1B
Regulatory reference	Ministru kabineta 2008. gada 29. septembra noteikumi Nr. 803 (Grozījumi Ministru kabineta 2020. gada 7. janvārī noteikumiem Nr. 10).
Latvia - Biological Exposure Indices	
Local name	Benzolam
BEI	46 µg/g creatinine Urīnā maiņas vai ekspozīcijas beigās nosaka fenilmerkaptūrskābi 28 µg/l Asinīs nekavējoties maiņas beigās benzolu
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2021. gada 18. februārī noteikumiem Nr. 110)
Lithuania - Occupational Exposure Limits	
Local name	Benzenas (benzolas)
IPRV (OEL TWA)	3,25 mg/m ³
IPRV (OEL TWA) [ppm]	1 ppm
TPRV (OEL STEL)	19 mg/m ³
TPRV (OEL STEL) [ppm]	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-695/A1-272, 2018-06-12)
Luxembourg - Occupational Exposure Limits	
Local name	Benzène
OEL TWA	3,25 mg/m ³
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 cancérogènes ou mutagènes au travail

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Benzene (71-43-2)	
Malta - Occupational Exposure Limits	
Local name	Benzene # Benžen
OEL TWA	3,25 mg/m ³
OEL TWA	1 ppm
Remark	Skin # Ġilda
Regulatory reference	S.L.424.22 - Exposure to carcinogens or mutagens at work (L.N.51 of 2021)
Netherlands - Occupational Exposure Limits	
Local name	Benzeen
TGG-8u (OEL TWA)	0,7 mg/m ³
TGG-8u (OEL TWA) [ppm]	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 2023
Poland - Occupational Exposure Limits	
Local name	Benzen
NDS (OEL TWA)	1,6 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. 2018 poz. 1286 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

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Benzene (71-43-2)	
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)
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	Benzen
OEL TWA	3,25 mg/m ³
OEL TWA	1 ppm
Remark	P - posibilitatea unei penetrări cutanate importante (Pentru benzen, la notația "Piele": este posibil ca la inhalarea reglementată să se adauge o absorbție cutanată); C1A - poate provoca apariția cancerului; M1B - poate provoca anomalii genetice
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 53/2021)
Romania - Biological limit values	
Local name	Benzen
BLV	25 µg/g creatinine Indicator biologic: Acid s-fenil mercapturic - Material biologic: urină - Momentul recoltării: sfârșit de schimb 50 mg/l Indicator biologic: Fenoli totali - Material biologic: urină - Momentul recoltării: sfârșit de schimb 500 µg/g creatinine Indicator biologic: Acid t,t muconic - Material biologic: urină - Momentul recoltării: sfârșit de schimb
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 584/2018)
Slovakia - Occupational Exposure Limits	
Local name	Benzén
NPHV (OEL TWA) [1]	3,25 mg/m ³ (TSH)
NPHV (OEL TWA) [2]	1 ppm (TSH)
Remark	Kategória karcinogénov 1A – Dokázaný karcinogén pre ľudí; Kategória mutagénov 1B – Mutagén cicavčích zárodočných buniek; K – prienik cez kožu: Niektoré látky môžu prenikať ľahko cez kožu a spôsobovať smrteľné otravy často bez varovných príznakov (napríklad anilín, nitrobenzén, nitroglykol, fenoly a podobne).
Regulatory reference	Nariadenie vlády č. 356/2006 Z. z. (235/2020 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	benzen
OEL TWA	3,25 mg/m ³
OEL TWA	1 ppm

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Benzene (71-43-2)	
Remark	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)
Regulatory reference	Uradni list RS, št. 79/2019 z dne 24.12.2019
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
Remark	BAT vrednosti za rakotvorne ali mutagene snovi
Regulatory reference	Uradni list RS, št. 79/2019 z dne 24.12.2019
Spain - Occupational Exposure Limits	
Local name	Benceno
VLA-ED (OEL TWA) [1]	3,25 mg/m ³
VLA-ED (OEL TWA) [2]	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).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2023. INSHT

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Benzene (71-43-2)	
Spain - Biological limit values	
Local name	Benceno
BLV	0,045 mg/g creatinine Parámetro: Ácido S-Fenilmercaptúrico - Medio: Orina - Momento de muestreo: Final de la jornada laboral 2 mg/l Parámetro: Ácido t,t-Mucónico - Medio: Orina - Momento de muestreo: Final de la jornada laboral
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2023. INSHT
Sweden - Occupational Exposure Limits	
Local name	Bensen
NGV (OEL TWA)	0,66 mg/m ³ (Gränsvärdet träder i kraft den 5 april 2026) 1,5 mg/m ³
NGV (OEL TWA) [ppm]	0,2 ppm (Gränsvärdet träder i kraft den 5 april 2026) 0,5 ppm
KTV (OEL STEL)	9 mg/m ³
KTV (OEL STEL) [ppm]	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)
Norway - Occupational Exposure Limits	
Local name	Benzen
Grenseverdi (OEL TWA) [1]	3 mg/m ³
Grenseverdi (OEL TWA) [2]	1 ppm
Korttidsverdi (OEL STEL)	1,98 mg/m ³ (value calculated)
Korttidsverdi (OEL STEL) [ppm]	0,6 ppm (value calculated)
Remark	G: EU har fastsatt en bindende grenseverdi og/eller anmerkning for stoffet; H: Kjemikalier som kan tas opp gjennom huden; K: Kjemikalier som skal betraktes som kreftfremkallende.
OEL chemical category	Skin notation, Carcinogen, Potential mutagen
Regulatory reference	FOR-2021-06-28-2248
USA - ACGIH - Occupational Exposure Limits	
Local name	Benzene
ACGIH OEL TWA [ppm]	0,5 ppm

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Benzene (71-43-2)	
ACGIH OEL STEL [ppm]	2,5 ppm
Remark (ACGIH)	TLV® Basis: Leukemia. 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 2023
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 2023
cyclopentane (287-92-3)	
Belgium - Occupational Exposure Limits	
Local name	Cyclopentane # Cyclopentaan
OEL TWA	1800 mg/m³
OEL TWA	600 ppm
Regulatory reference	Koninklijk besluit/Arrêté royal 11/05/2021
Denmark - Occupational Exposure Limits	
Local name	Cyclopentan
OEL TWA [1]	850 mg/m³
OEL TWA [2]	300 ppm
OEL STEL	1700 mg/m³
OEL STEL	600 ppm
Regulatory reference	BEK nr 202 af 21/02/2023
France - Occupational Exposure Limits	
Local name	Cyclopentane
VME (OEL TWA)	1720 mg/m³
VME (OEL TWA) [ppm]	600 ppm
Remark	Valeurs recommandées/admises
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 984, 2016)
Greece - Occupational Exposure Limits	
Local name	Κυκλοπεντάνιο
OEL TWA	1720 mg/m³

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cyclopentane (287-92-3)	
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 [1]	1720 mg/m ³
OEL TWA [2]	600 ppm
Regulatory reference	Chemical Agents Code of Practice 2021
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) [1]	1745 mg/m ³
VLA-ED (OEL TWA) [2]	600 ppm
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2023. INSHT
Sweden - Occupational Exposure Limits	
NGV (OEL TWA)	1800 mg/m ³
NGV (OEL TWA) [ppm]	600 ppm
KTV (OEL STEL)	2000 mg/m ³
KTV (OEL STEL) [ppm]	750 ppm
USA - ACGIH - Occupational Exposure Limits	
Local name	Cyclopentane
ACGIH OEL TWA	1720 mg/m ³
ACGIH OEL TWA [ppm]	1000 ppm (EX - Explosion hazard)
Remark (ACGIH)	TLV® Basis: CNS impair
Regulatory reference	ACGIH 2023
2-Methyl-2-butene (513-35-9)	
USA - ACGIH - Occupational Exposure Limits	
Local name	2-Methyl-2-butene
ACGIH OEL TWA [ppm]	10 ppm
Remark (ACGIH)	TLV® Basis: Clastogenic eff

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2-Methyl-2-butene (513-35-9)	
Regulatory reference	ACGIH 2023

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	160,23 mg/m ³
Long-term - systemic effects, dermal	0,95 mg/kg bodyweight/day
Long-term - local effects, dermal	No hazard identified
Long-term - systemic effects, inhalation	2,31 mg/m ³
Long-term - local effects, inhalation	2,31 mg/m ³
DNEL/DMEL (General population)	
Acute - systemic effects, dermal	No hazard identified
Acute - systemic effects, inhalation	No hazard identified
Acute - systemic effects, oral	25,6 mg/kg bodyweight
Acute - local effects, dermal	No hazard identified
Acute - local effects, inhalation	143,5 mg/m ³
Long-term - systemic effects, oral	0,03 mg/kg bodyweight/day
Long-term - systemic effects, inhalation	0,69 mg/m ³
Long-term - systemic effects, dermal	0,28 mg/kg bodyweight/day
Long-term - local effects, dermal	No hazard identified
Long-term - local effects, inhalation	0,69 mg/m ³
PNEC (Water)	
PNEC aqua (freshwater)	98 µg/L
PNEC aqua (marine water)	9,8 µg/L
PNEC aqua (intermittent, freshwater)	8,23 µg/L
PNEC aqua (intermittent, marine water)	0,823 µg/L
PNEC (Sediment)	
PNEC sediment (freshwater)	15,2 mg/kg dwt

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DCPD (77-73-6)	
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

8.2.2.1. Eye and face protection

Eye protection:

Protective goggles

8.2.2.2. Skin protection

Skin and body protection:

Avoid contact with skin. Avoid repeated or prolonged skin contact. 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

Hand protection					
Type	Material	Permeation	Thickness (mm)	Penetration	Standard
Disposable gloves, E.g. 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

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Respiratory protection			
Device	Filter type	Condition	Standard
Full face mask, with cartridge/filter	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

No additional information available

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Colour	: Slightly yellow.
Appearance	: Clear.
Odour	: Pungent.
Odour threshold	: Not available
Melting point	: Not available
Freezing point	: Not available
Boiling point	: 49 °C (120.2 °F; ASTM D86)
Flammability	: Not available
Lower explosion limit	: Not available
Upper explosion limit	: Not available
Flash point	: -15 °C (5 °F; Closed cup; ASTM D 56)
Auto-ignition temperature	: Not available
Decomposition temperature	: Not available
pH	: Not applicable
Viscosity, kinematic	: Not available
Solubility	: Not available
Partition coefficient n-octanol/water (Log Kow)	: Not available
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/cm³
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. Can form explosive peroxides by prolonged contact with air. Attacks some forms of plastics, rubber, and coatings.

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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.

10.4. Conditions to avoid

Avoid ignition sources. Strong oxidizing agents. Incompatible materials.

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)

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	44,66 mg/l/4h
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

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Cyclopentene (142-29-0)	
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
Respiratory or skin sensitisation	: Not classified (Based on available data, the classification criteria are not met)
Germ cell mutagenicity	: May cause genetic defects.
Carcinogenicity	: May cause cancer.
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 (central nervous system) 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 (haematopoietic system) through prolonged or repeated exposure.
Aspiration hazard	: May be fatal if swallowed and enters airways.

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Benzene (71-43-2)	
Viscosity, kinematic	0,689 mm²/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 - general : Very 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.

Benzene (71-43-2)	
LC50 - Fish [1]	10,7 – 14,7 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through] Source: EPA)
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]	29 mg/l (Species: Pseudokirchneriella subcapitata)
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 readily biodegradable.

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Benzene (71-43-2)	
Persistence and degradability	Readily biodegradable in water.

12.3. Bioaccumulative potential

DCPD (77-73-6)	
BCF - Fish [1]	58,9 – 384 Cyprinus carpio (Common carp)
BCF - Fish [2]	53 Lepomis macrochirus (Bluegill)
Bioaccumulative potential	The product presents low bioaccumulative potential in aquatic organisms.

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.

2-Methyl-2-butene (513-35-9)	
BCF - Fish [1]	(low potential to bioaccumulate)

12.4. Mobility in soil

DCPD (77-73-6)	
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 PBT criteria of REACH regulation, annex XIII	
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

No additional information available

12.7. Other adverse effects

Additional information : Avoid release to the environment.

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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.
- Additional information : Dispose of contaminated material at an authorized site. Do not re-use empty containers.

SECTION 14: Transport information

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

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. (DICYCLOPENTADIE NE)	HYDROCARBONS, LIQUID, N.O.S. (DICYCLOPENTADIE NE)	Hydrocarbons, liquid, n.o.s. (DICYCLOPENTADIE NE)	HYDROCARBONS, LIQUID, N.O.S. (DICYCLOPENTADIE NE)	HYDROCARBONS, LIQUID, N.O.S. (DICYCLOPENTADIE NE)
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

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

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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 - : S2, S20

Operation (ADR)

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

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Rail transport

Classification code (RID)	: F1
Special provisions (RID)	: 640D
Limited quantities (RID)	: 1L
Excepted quantities (RID)	: E2
Packing instructions (RID)	: P001, IBC02, R001
Mixed packing provisions (RID)	: MP19
Portable tank and bulk container instructions (RID)	: T7
Portable tank and bulk container special provisions (RID)	: TP1, TP8, TP28
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

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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)
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 dimethylacetamine; 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 of 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

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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
The requirements from the Danish Working Environment Authorities regarding work with carcinogens must be followed during use and disposal

15.2. Chemical safety assessment

No additional information available

SECTION 16: Other information

Indication of changes			
Section	Changed item	Change	Comments
1.3	Details of the supplier of the safety data sheet	Modified	
1.4	Emergency telephone number	Modified	
3.1	Substances	Modified	
8	Exposure controls / Personal protection equipment	Modified	
9	Physical and chemical properties	Modified	
11	Toxicological information	Modified	
12.	Ecological information	Modified	
14	Transport information	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).

Sources of Key data : MSDS. CSR - Chemical Safety Report.

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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.
H341	Suspected of causing genetic defects.
H350	May cause cancer.
H351	Suspected of causing cancer.
H361	Suspected of damaging fertility or the unborn child.

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Full text of H- and EUH-statements:	
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.
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 4.21a.v1	Polymer processing: Industrial (SU 10)
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
PROC21	Low energy manipulation and handling of substances bound in/on materials or articles
PROC28	Manual maintenance (cleaning and repair) of machinery
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
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

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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	Use at industrial sites. Polymer processing

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1. Exposure scenario ES4

Use at industrial sites. Polymer processing

ES Ref.: ES4
ES Type: Worker

Use descriptors

PROC1, PROC2, PROC3, PROC4, PROC5, PROC6, PROC8a, PROC8b, PROC9, PROC13, PROC14, PROC21, PROC28
ERC4
ESVOC SPERC 4.21a.v1

2. Operational conditions and risk management measures

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

Product characteristics

Physical form of product

Liquid

Concentration of substance in product

100 %

Vapour pressure

Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions

Frequency and duration of use

Duration of activity

≤ 8 h/day

Human factors not influenced by risk management

Skin contact

Palm of one hand. 240 cm²

Other given operational conditions affecting workers exposure

Operating temperature

≤ 32 °C

Indoor use

Risk Management Measures

Technical conditions and measures at process level (source) to prevent release

Use in closed process, no likelihood of exposure

Technical conditions and measures to control dispersion from source towards the worker

Occupational Health and Safety Management System: Advanced

Local exhaust ventilation

No specific measures identified

General ventilation

Basic. Up to 3 ACH

Conditions and measures related to personal protection, hygiene and health evaluation

Dermal Protection:

Not required

Respiratory protection:

Not required

Eye protection:

Yes

2.2. Contributing scenario controlling environmental exposure (ERC4, ESVOC SPERC 4.21a.v1)

Polymer processing

ERC4

Use of non-reactive processing aid at industrial site (no inclusion into or onto article)

ESVOC SPERC 4.21a.v1

Polymer production: Industrial (SU10)

Product characteristics

Physical form of product

Liquid

Concentration of substance in product

100 %

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Product characteristics		
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure	
Operational conditions		
Amounts used	Maximum daily use at site	≤ 50 t/d
	Annual site tonnage	≤ 1000 t/yr
Frequency and duration of use	Emission days	300
Other given operational conditions affecting environmental exposure	Equipment cleaning and maintenance	No release to wastewater form process as such
	Indoor or outdoor use	Indoor use
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)
	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	Required Removal Efficiency (wastewater):	91.56 %
	Discharge rate of Municipal STP	≥ 2000 m³/d
	Application of the STP sludge on agricultural soil:	Yes.

2.1.2. 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

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	100 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of one hand. 240 cm²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 40 °C
	Outdoor use	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed process, no likelihood of exposure	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	No specific measures identified
	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Not required
	Respiratory protection:	Not required

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Risk Management Measures		
	Eye protection:	Yes

2.1.3. Contributing scenario controlling worker exposure (PROC2)

Bulk transfers. Closed systems	
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	100 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of both hands. 480 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Closed continuous process with occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	≥ 90 % Yes. Specifically designed fixed capturing hood, on tool extraction or enclosing hoods.
	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Not required
	Respiratory protection:	Not required
	Eye protection:	Yes

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	100 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day

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Operational conditions		
Human factors not influenced by risk management	Skin contact	Both hands. 960 cm2
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	≥ 95 % Yes. Use high-performance fume cupboard
	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Wear suitable gloves tested to EN374
	Respiratory protection:	Not required
	Eye protection:	Yes

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

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	100 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of one hand. 240 cm2
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed process, no likelihood of exposure	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	No specific measures identified
	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Not required
	Respiratory protection:	Not required
	Eye protection:	Yes

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

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of both hands. 480 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Closed continuous process with occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	≥ 90 % Yes. Specifically designed fixed capturing hood, on tool extraction or enclosing hoods.
	General ventilation	Good general ventilation (3-5 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Not required
	Respiratory protection:	Not required
	Eye protection:	Yes

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)

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Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of both hands. 480 cm2
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	No specific measures identified
	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 90 % Chemical resistant dermal protection with basic employee training.
	Respiratory protection:	Not required
	Eye protection:	Yes

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

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	100 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of one hand. 240 cm2
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed batch process . With occasional controlled exposure	
	Role of standard operating procedures in managing exposure :	Ensure material transfers are under containment or extract ventilation [E66] [Effectiveness Inhal: 90%]

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Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	≥ 90 % Yes. Specifically designed fixed capturing hood, on tool extraction or enclosing hoods.
	General ventilation	Good general ventilation (3-5 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 90 % Chemical resistant dermal protection with basic employee training.
	Respiratory protection:	Not required
	Eye protection:	Yes

2.1.9. Contributing scenario controlling worker exposure (PROC4)

Additive premixing	
PROC4	Chemical production where opportunity for exposure arises

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of both hands. 480 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	≥ 90 % Yes. Specifically designed fixed capturing hood, on tool extraction or enclosing hoods.
	General ventilation	Good general ventilation (3-5 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Wear suitable gloves tested to EN374
	Respiratory protection:	Not required
	Eye protection:	Yes

2.1.10. Contributing scenario controlling worker exposure (PROC5)

Additive premixing	
PROC5	Mixing or blending in batch processes

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Additive premixing		
Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	≤ 5 %	
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure	

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of both hands. 480 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	≥ 90 % Yes. Specifically designed fixed capturing hood, on tool extraction or enclosing hoods.
	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 90 % Chemical resistant dermal protection with basic employee training.
	Respiratory protection:	Not required
	Eye protection:	Yes

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	≤ 5 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Both hands. 960 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
	Occupational Health and Safety Management System:	Advanced

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	≥ 90 % Yes. Specifically designed fixed capturing hood, on tool extraction or enclosing hoods. Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings
	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 90 % Chemical resistant dermal protection with basic employee training.
	Respiratory protection:	Not required
	Eye protection:	Yes

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	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management	Skin contact	Palm of both hands. 480 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	No specific measures identified
	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 95 % Chemical resistant dermal protection with specific employee training.
	Respiratory protection:	Not required
	Eye protection:	Yes

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	≤ 5 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of both hands. 480 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	No specific measures identified
	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 90 % Chemical resistant dermal protection with basic employee training.
	Respiratory protection:	Not required
	Eye protection:	Yes

2.1.14. Contributing scenario controlling worker exposure (PROC14, PROC21)

Injection moulding of articles	
PROC14	Tabletting, compression, extrusion, pelettisation, granulation
PROC21	Low energy manipulation and handling of substances bound in/on materials or articles
Product characteristics	
Physical form of product	Liquid

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Product characteristics		
Concentration of substance in product	≤ 5 %	
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure	

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of both hands. 480 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 40 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	≥ 90 % Yes. Specifically designed fixed capturing hood, on tool extraction or enclosing hoods.
	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 90 % Chemical resistant dermal protection with basic employee training.
	Respiratory protection:	Not required
	Eye protection:	Yes

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	≤ 5 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Both hands. 960 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
	Occupational Health and Safety Management System:	Advanced

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Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	≥ 90 % Yes. Specifically designed fixed capturing hood, on tool extraction or enclosing hoods. LEV has been added to equate to the SOP. Drain down and flush system prior to equipment break-in or maintenance
	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 90 % Chemical resistant dermal protection with basic employee training.
	Respiratory protection:	Not required
	Eye protection:	Yes

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

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of one hand. 240 cm2
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Outdoor use	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed process, no likelihood of exposure	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	No specific measures identified
	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Not required
	Respiratory protection:	Not required
	Eye protection:	Yes

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

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 5 %
Vapour pressure	Liquid, vapour pressure < 0.5 kPa at Standard Temperature and Pressure

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management	Skin contact	Palm of both hands. 480 cm ²
Other given operational conditions affecting workers exposure	Operating temperature	≤ 32 °C
	Indoor use	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Closed continuous process with occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
	Local exhaust ventilation	No specific measures identified
	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	Not required
	Respiratory protection:	Not required
	Eye protection:	Yes

3. Exposure estimation and reference to its source**3.1. Health**

Long-term - systemic effects	
DNEL	Inhalation: 2.31 mg/m ³ Dermal: 0.95 mg/kg bodyweight/day

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Long-term - systemic effects						
Contributing scenario	inhalation exposure	RCR	dermal exposure	RCR	Sum RCR	Assessment method
PROC1	0.055 mg/m ³	0.024	0.034 mg/kg bw/day	0.036	0.06	
PROC1	0.039 mg/m ³	0.017	0.034 mg/kg bw/day	0.036	0.053	
PROC2	0.11 mg/m ³	0.048	0.274 mg/kg bw/day	0.288	0.336	
PROC8b	0.275 mg/m ³	0.119	0.548 mg/kg bw/day	0.577	0.696	
PROC1	0.055 mg/m ³	0.024	0.034 mg/kg bw/day	0.036	0.06	
PROC2	0.077 mg/m ³	0.033	0.274 mg/kg bw/day	0.288	0.321	
PROC9	1.653 mg/m ³	0.715	0.137 mg/kg bw/day	0.144	0.859	
PROC3	1.157 mg/m ³	0.501	0.069 mg/kg bw/day	0.073	0.574	
PROC4	0.386 mg/m ³	0.167	0.274 mg/kg bw/day	0.289	0.456	
PROC5	0.551 mg/m ³	0.238	0.274 mg/kg bw/day	0.289	0.527	
PROC6	0.551 mg/m ³	0.238	0.549 mg/kg bw/day	0.577	0.815	
PROC13	0.992 mg/m ³	0.429	0.069 mg/kg bw/day	0.072	0.501	
PROC14	1.653 mg/m ³	0.715	0.069 mg/kg bw/day	0.072	0.787	
PROC14, PROC21	1.653 mg/m ³	0.715	0.069 mg/kg bw/day	0.072	0.787	
PROC8a, PROC28	1.102 mg/m ³	0.477	0.274 mg/kg bw/day	0.289	0.766	
PROC1	0.00771 mg/m ³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	
PROC2	1.102 mg/m ³	0.477	0.274 mg/kg bw/day	0.288	0.765	

Local - Inhalation					
DNEL			Acute: 160.23 mg/m ³ Long-term: 2.31 mg/m ³		
Contributing scenario	Acute	RCR	Long term	RCR	Assessment method
PROC1 X	0.22 mg/m ³	0.001	0.055 mg/m ³	0.024	
PROC1 X	0.154 mg/m ³	0.001	0.039 mg/m ³	0.017	

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Local - Inhalation					
PROC2 X	0.441 mg/m ³	0.003	0.11 mg/m ³	0.048	
PROC8b X	1.102 mg/m ³	0.007	0.275 mg/m ³	0.119	
PROC1 X	0.22 mg/m ³	0.001	0.055 mg/m ³	0.024	
PROC2 X	0.308 mg/m ³	0.002	0.077 mg/m ³	0.033	
PROC9 X	6.61 mg/m ³	0.041	1.653 mg/m ³	0.715	
PROC3 X	4.627 mg/m ³	0.029	1.157 mg/m ³	0.501	
PROC4 X	1.542 mg/m ³	< 0.01	0.386 mg/m ³	0.167	
PROC5 X	1.542 mg/m ³	0.014	0.551 mg/m ³	0.238	
PROC6 X	2.203 mg/m ³	0.014	0.551 mg/m ³	0.238	
PROC13 X	6.61 mg/m ³	0.041	0.992 mg/m ³	0.429	
PROC14 X	6.61 mg/m ³	0.041	1.653 mg/m ³	0.715	
PROC14, PROC21 X	6.61 mg/m ³	0.041	1.653 mg/m ³	0.715	
PROC8a, PROC28 X	4.407 mg/m ³	0.028	1.102 mg/m ³	0.477	
PROC1 X	0.0301 mg/m ³	< 0.01	0.00771 mg/m ³	< 0.01	
PROC2 X	4.407 mg/m ³	0.028	1.102 mg/m ³	0.477	

3.2. Environment

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.000278	98	< 0.01	EUSES model v2.1.1.
Freshwater - intermittent			8.23	< 0.01	
Marine water	mg/l	0.000028	9.8	< 0.01	EUSES model v2.1.1.
Freshwater sediment	mg/kg dwt	0.043	15.2	0.003	EUSES model v2.1.1.
Marine water sediment	mg/kg dwt	0.00354	1.52	0.002	EUSES model v2.1.1.
Sewage treatment plant	mg/l	0	2.2	< 0.01	EUSES model v2.1.1.
Soil	mg/kg dwt	1.824	2.98	0.612	EUSES model v2.1.1.

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

4.1. Health

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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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Additional good practice advice beyond the REACH CSA

No data available