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

1.1. Product identifier

Product form	:	Substance
Trade name	:	Ortho-Xylene
Chemical name	:	o-xylene
EC Index-No.	:	601-022-00-9
EC-No.	:	202-422-2
CAS-No.	:	95-47-6
REACH registration No.	:	01-2119485822-30
Product code	:	P080
Formula	:	C8H10
Product group	:	Trade product

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

1.2.1. Relevant identified uses

Use of the substance/mixture	:	Utilized as reactant for Phthalic anidride's and plasticizer's production. Flexible PVC, dyes, insecticides and pharmaceuticals

Title	Use descriptors
Use at industrial sites. Use as an intermediate (ES Ref.: ES3)	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC28, ERC6a
Manufacture of substances (ES Ref.: ES1)	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, PROC28, ERC1
Formulation or re-packing - Formulation (ES Ref.: ES2)	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC28, ERC2

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 Nertherland 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

Country	Organisation/Company	Address	Emergency number	Comment
Ireland	National Poisons Information Centre Beaumont Hospital	PO Box 1297 Beaumont Road 9 Dublin	+353 1 809 2566 (Healthcare professionals-24/7) +353 1 809 2166 (public, 8am - 10pm, 7/7)	
Malta	Medicines & Poisons Info Office	Mater Dei Hospital Msida MSD 2090 Msida	112 +356 2545 6508	

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

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

Flammable liquids, Category 3	H226
Acute toxicity (dermal), Category 4	H312
Acute toxicity (inhal.), Category 4	H332
Skin corrosion/irritation, Category 2	H315
Serious eye damage/eye irritation, Category 2	H319
Carcinogenicity, Category 1B	H350
Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation	H335
Aspiration hazard, Category 1	H304
Hazardous to the aquatic environment – Chronic Hazard, Category 3	H412

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

Adverse physicochemical, human health and environmental effects

Flammable liquid and vapour. May be fatal if swallowed and enters airways. Harmful in contact with skin or if inhaled. Causes skin irritation. May cause respiratory irritation. Harmful to aquatic life with long lasting effects.

2.2. Label elements

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

Hazard pictograms (CLP) :

GHS02 GHS07 GHS08

Signal word (CLP) : Danger

Hazard statements (CLP) : H226 - Flammable liquid and vapour.
H304 - May be fatal if swallowed and enters airways.
H312+H332 - Harmful in contact with skin or if inhaled.
H315 - Causes skin irritation.
H319 - Causes serious eye irritation.
H335 - May cause respiratory irritation.
H350 - May cause cancer.
H412 - Harmful to aquatic life with long lasting effects.

Precautionary statements (CLP) : P201 - Obtain special instructions before use.
P202 - Do not handle until all safety precautions have been read and understood.
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P303+P361+P353 - IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water .
P304+P340 - IF INHALED: Remove person to fresh air and keep comfortable for breathing.
P305+P351+P338 - IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3. Other hazards

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 and/or vPvB substances ≥ 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

Name : o-xylene
CAS-No. : 95-47-6
EC-No. : 202-422-2
EC Index-No : 601-022-00-9
Concentration : ≥98%

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
m-xylene	CAS-No.: 108-38-3 EC-No.: 203-576-3 EC Index-No.: 601-022-00-9	< 0.9	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation), H332 (ATE=1.5 mg/l/4h) Acute Tox. 4 (Dermal), H312 (ATE=1100 mg/kg bodyweight) Skin Irrit. 2, H315
cumene	CAS-No.: 98-82-8 EC-No.: 202-704-5 EC Index-No.: 601-024-00-X	≤ 0.5	Flam. Liq. 3, H226 Carc. 1B, H350 STOT SE 3, H335 Asp. Tox. 1, H304 Aquatic Chronic 2, H411

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
p-xylene	CAS-No.: 106-42-3 EC-No.: 215-535-7 EC Index-No.: 601-022-00-9	< 0.1	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation), H332 (ATE=1.5 mg/l/4h) Acute Tox. 4 (Dermal), H312 (ATE=1000 mg/kg bodyweight) Skin Irrit. 2, H315
Styrene	CAS-No.: 100-42-5 EC-No.: 202-851-5 EC Index-No.: 601-026-00-0	≤ 0.05	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation), H332 (ATE=1.5 mg/l/4h) Skin Irrit. 2, H315 Eye Irrit. 2, H319 Repr. 2, H361d STOT SE 3, H335 STOT RE 1, H372 Asp. Tox. 1, H304 Aquatic Chronic 3, H412
Benzene	CAS-No.: 71-43-2 EC-No.: 200-753-7 EC Index-No.: 601-020-00-8 REACH-no: 01-2119447106-44	< 0.01	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Muta. 1B, H340 Carc. 1A, H350 STOT RE 1, H372 Asp. Tox. 1, H304 Aquatic Chronic 3, H412
ethylbenzene	CAS-No.: 100-41-4 EC-No.: 202-849-4 EC Index-No.: 601-023-00-4 REACH-no: 01-2119489370-35	< 0.01	Flam. Liq. 2, H225 Acute Tox. 4 (Inhalation), H332 STOT RE 2, H373 Asp. Tox. 1, H304

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

3.2. Mixtures

Not applicable

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures after inhalation : Remove casualty to fresh air and keep warm and at rest. In case of irregular breathing or respiratory arrest provide artificial respiration. In case of breathing difficulties administer oxygen. Immediately get medical attention.

First-aid measures after skin contact : For even minor contact, immediately remove contaminated clothing. Wash skin thoroughly with mild soap and water. Rinse immediately with plenty of water (for at least 15 minutes). Immediately get medical attention. Discard contaminated clothing.

First-aid measures after eye contact : In case of contact, immediately rinse eyes with plenty of water for at least 15 minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately get medical attention.

First-aid measures after ingestion : Do not induce vomiting. If swallowed, rinse mouth with water (only if the person is conscious). Give water to drink if victim completely conscious/alert. Never give anything by mouth to an unconscious person. Do not ingest. If swallowed then seek immediate medical assistance.

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

Symptoms/effects : May cause cancer.

Symptoms/effects after inhalation : Harmful if inhaled. May cause respiratory irritation.

Symptoms/effects after skin contact : Harmful in contact with skin. Causes skin irritation.

Symptoms/effects after eye contact : Causes serious eye irritation.

Symptoms/effects after ingestion : May be fatal if swallowed and enters airways

Chronic symptoms : Symptoms include headache, dizziness, fatigue, muscular weakness, drowsiness and in extreme cases, loss of consciousness.

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 : Carbon dioxide (CO_2), dry chemical powder, foam. Water fog.

Unsuitable extinguishing media : Do not use a solid water stream as it may scatter and spread fire.

5.2. Special hazards arising from the substance or mixture

Fire hazard : Flammable liquid and vapour. On combustion forms: Carbon monoxide. Carbon dioxide. Formaldehyde.

Explosion hazard : Vapours can form explosive mixtures with air. Vapour heavier than air may travel considerable distance to a source of ignition and flash back.

Hazardous decomposition products in case of fire : Thermal decomposition may produce : Carbon oxides (CO, CO_2). Formaldehyde.

5.3. Advice for firefighters

Firefighting instructions : Do not approach fire except upwind and only with proper skin and respiratory protection (supplied air only). Cool closed containers exposed to fire with water spray.

Protective equipment for firefighters : Extra personal protection: complete protective clothing including self-contained breathing apparatus. In case of fire: Wear self-contained breathing apparatus. Refer to chapter 8.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Evacuate unnecessary personnel. Ventilate spillage area. Avoid any direct contact with the product. Avoid breathing mist, spray, vapours, fume.

6.1.1. For non-emergency personnel

Protective equipment : Wear recommended personal protective equipment. For further information refer to section 8: "Exposure controls/personal protection".

Emergency procedures : Keep away from heat/sparks/open flames/hot surfaces. No smoking.

6.1.2. For emergency responders

Protective equipment	:	Wear recommended personal protective equipment. For further information refer to section 8: "Exposure controls/personal protection".
Emergency procedures	:	Eliminate leaks immediately. Eliminate all ignition sources if safe to do so. Ventilate affected area. Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.

6.2. Environmental precautions

Use water spray jet to minimise or disperse vapours. Do not flush down sewers. Do not allow run-off from fire fighting to enter drains or water courses. Collect contaminated extinguishing water separately and must not enter the sewage system. If the product enters drains or sewers the local water company should be contacted immediately; in the case of contamination of streams, rivers or lakes, the National Rivers Authority.

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	:	Prevent spread over a wide area (e.g. by containment or oil barriers). Collect spillage. Store away from other materials.
Other information	:	Bioremediation of contaminated water bodies using granulated activated charcoal has been demonstrated to be the best method of removal from contaminated water bodies . Recovery and remediation of polluted soil and water can be accomplished through the Fenton reaction.

6.4. Reference to other sections

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

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Precautions for safe handling	:	Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Use grounded electrical/mechanical equipment. Provide earthing of containers, equipment, pumps and ventilation facilities. Ground/bond container and receiving equipment. Avoid producing mist or vapours by heating of opened receptacle/container. Avoid contact with skin and eyes. Avoid breathing mist, spray, vapours, fume. Take all necessary technical measures to avoid or minimize the release of the product on the workplace. Limit quantities of product at the minimum necessary for handling and limit the number of exposed workers.
Hygiene measures	:	Wash hands and other exposed areas with mild soap and water before eating, drinking or smoking and when leaving work. Always wash hands after handling the product. Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Use good personal hygiene practices. Separate working clothes from town clothes. Launder separately.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures	:	Use explosion-proof equipment. Ensure adequate ventilation. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ground/bond container and receiving equipment.

Storage conditions : Keep away from heat/sparks/open flames/hot surfaces. No smoking. Keep in original containers closed. Keep stored the least quantity possible. Store in dry, cool, well-ventilated area. Store locked up. Keep container closed when not in use.

Incompatible materials : Oxidizing agents. Strong acid. Halogenated compounds.

7.3. Specific end use(s)

No additional information available

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

8.1.1 National occupational exposure and biological limit values

Ortho-Xylene (95-47-6)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	o-Xylene
IOEL TWA	221 mg/m³
IOEL TWA	50 ppm
IOEL STEL	442 mg/m³
IOEL STEL	100 ppm
Remark	Skin
Regulatory reference	COMMISSION DIRECTIVE 2000/39/EC
Austria - Occupational Exposure Limits	
Local name	Xylol (alle Isomeren): o-Xylol
MAK (OEL TWA)	221 mg/m³
MAK (OEL TWA)	50 ppm
MAK (OEL STEL)	442 mg/m³ (4x 15(Miw) min)
MAK (OEL STEL)	100 ppm (4x 15(Miw) min)
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	o-Xylène # o-Xyleen
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm

Ortho-Xylene (95-47-6)	
Remark	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. # D: de vermelding “D” betekent dat de opname van het agens via de huid, de slijmvliezen of de ogen een belangrijk deel van de totale blootstelling vormt. Deze opname kan het gevolg zijn van zowel direct contact als zijn aanwezigheid in de lucht.
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	о-Ксилен
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	Кожа (възможна е значителна резорбция чрез кожата); • (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Croatia - Occupational Exposure Limits	
Local name	o-Ksilen
GVI (OEL TWA)	221 mg/m³
GVI (OEL TWA)	50 ppm
KGVI (OEL STEL)	442 mg/m³
KGVI (OEL STEL)	100 ppm
Remark	Direktiva: 2000/39/EZ
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Cyprus - Occupational Exposure Limits	
Local name	ο-ξυλένιο
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	δέρμα

Ortho-Xylene (95-47-6)	
Regulatory reference	Κανονισμοί του 2007 (Κ.Δ.Π. 295/2007)
Czech Republic - Occupational Exposure Limits	
Local name	Xylen isomery: o-Xylen
PEL (OEL TWA)	200 mg/m³
PEL (OEL TWA)	45.33 ppm
NPK-P (OEL C)	400 mg/m³
NPK-P (OEL C)	90.66 ppm
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, D - při expozici se významně uplatňuje pronikání faktoru kůží, I - dráždí sliznice (oči, dýchací cesty) resp. kůži.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Czech Republic - Biological limit values	
Local name	Xyleny
BLV	1400 mg/g creatinine Ukazatel: Methylhippurová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 820 µmol/mmol Creatinine Ukazatel: Methylhippurová 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	Xylen (Dimethylbenzen), alle isomere: o-Xylen
OEL TWA	109 mg/m³
OEL TWA	25 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	E (betyder, at stoffet har en EF-grænseværdi); H (betyder, at stoffet kan optages gennem huden)
Regulatory reference	BEK nr 291 af 19/03/2024
Estonia - Occupational Exposure Limits	
Local name	o-ksüleen
OEL TWA	200 mg/m³
OEL TWA	50 ppm
OEL STEL	450 mg/m³
OEL STEL	100 ppm
Remark	A (Naha kaudu kergesti imenduv aine)
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)

Ortho-Xylene (95-47-6)	
Finland - Occupational Exposure Limits	
Local name	o-Ksyleeni
HTP (OEL TWA)	220 mg/m³
HTP (OEL TWA)	50 ppm
HTP (OEL STEL)	440 mg/m³
HTP (OEL STEL)	100 ppm
Remark	Iho
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	o-Xylène
VME (OEL TWA)	221 mg/m³
VME (OEL TWA)	50 ppm
VLE (OEL C/STEL)	442 mg/m³
VLE (OEL C/STEL)	100 ppm
Remark	Valeurs règlementaires contraignantes. Risque de pénétration percutanée
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Xylol (alle Isomere)
AGW (OEL TWA)	220 mg/m³
AGW (OEL TWA)	50 ppm
Peak exposure limitation factor	2(II)
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich); H - hautresorptiv
Chemical category	Skin notation
Regulatory reference	TRGS900
Greece - Occupational Exposure Limits	
Local name	Ξυλόλια (όλα τα ισομερή)
OEL TWA	435 mg/m³
OEL TWA	100 ppm
OEL STEL	650 mg/m³

Ortho-Xylene (95-47-6)	
OEL STEL	150 ppm
Remark	Η ένδειξη «δέρμα» στις οριακές τιμές επαγγελματικής έκθεσης επισημαίνει το ενδεχόμενο σημαντικής διείσδυσης μέσω του δέρματος.
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	o-XILOL
AK (OEL TWA)	221 mg/m³
CK (OEL STEL)	442 mg/m³
Remark	b (Bőrön át is felszívódik), BEM (biológiai expozíciós mutató); EU1 (2000/39/EK irányelvben közölt érték); R (Azok az anyagok, amelyek egészségkárosító hatása RÖVID expozíció hatására jelentkezik)
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	Xylene, o-isomer
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	IOELV (Indicative Occupational Exposure Limit Values), Skin (Substances which have the capacity to penetrate intact skin when they come in contact with it and be absorbed into the body. A substantial contribution to the total body burden via dermal exposure is possible)
Regulatory reference	Chemical Agents Code of Practice 2024
Italy - Occupational Exposure Limits	
Local name	o-Xilene
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	Cute
Regulatory reference	Allegato XXXVIII del Decreto Legislativo 4 settembre 2024, n. 135
Latvia - Occupational Exposure Limits	
Local name	o-Ksilols, (1,2-dimetilbenzols)
OEL TWA	221 mg/m³

Ortho-Xylene (95-47-6)	
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	Āda
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).
Lithuania - Occupational Exposure Limits	
Local name	o-ksilenas
IPRV (OEL TWA)	221 mg/m³
IPRV (OEL TWA)	50 ppm
TPRV (OEL STEL)	442 mg/m³
TPRV (OEL STEL)	100 ppm
Remark	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	o-Xylène
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	Peau
Regulatory reference	Mémorial A Nº 226 de 2021 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
Malta - Occupational Exposure Limits	
Local name	o-Xylene
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	Skin # Ġilda
Regulatory reference	S.L. 424.24 - Chemical Agents at Work Regulations (L.N. 356 of 2021) # L.S. 424.24 - Regolamenti dwar Aġenti Kimiċi fuq il-Post tax-Xogħol (A.L. 356 tal-2021)

Ortho-Xylene (95-47-6)	
Netherlands - Occupational Exposure Limits	
TGG-8u (OEL TWA)	47.5 ppm
TGG-15min (OEL STEL)	100 ppm
Portugal - Indicative Occupational Exposure Limit (IOEL)	
Local name	o-Xileno
IOEL TWA	221 mg/m³
IOEL TWA	50 ppm
IOEL STEL	442 mg/m³
IOEL STEL	100 ppm
Remark	Cutânea.
Regulatory reference	Decreto-Lei n.º 1/2021 de 6 de janeiro
Portugal - Occupational Exposure Limits	
Local name	Xileno (o)
OEL TWA	100 ppm
OEL STEL	150 ppm
Remark	A4 (Agente não classificável como carcinogénico no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	Xilenos (graus técnico e comercial)
BEI	1.5 g/g creatinine Parâmetro: Ácidos (o, m, p)-metilhipúricos - Meio: urina - Momento da amostragem: Fim do turno
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	o-xilen
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	P - posibilitatea unei penetrări cutanate importante
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	o-Xylén
NPHV (OEL TWA)	221 mg/m³

Ortho-Xylene (95-47-6)	
NPHV (OEL TWA)	50 ppm
NPHV (OEL STEL)	442 mg/m³
NPHV (OEL STEL)	100 ppm
Remark	K – znamená, že faktor môže byť ľahko absorbovaný kožou
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	o-ksilen
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	K (Lastnost lažjega prehajanja snovi v organizem skozi kožo), BAT (Biološka mejna vrednost), EU
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4. 4. 2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu
Spain - Occupational Exposure Limits	
Local name	o-Xileno
VLA-ED (OEL TWA)	221 mg/m³
VLA-ED (OEL TWA)	50 ppm
VLA-EC (OEL STEL)	442 mg/m³
VLA-EC (OEL STEL)	100 ppm
Remark	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), VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Sweden - Occupational Exposure Limits	
Local name	o-Xylen
NGV (OEL TWA)	221 mg/m³
NGV (OEL TWA)	50 ppm
KGV (OEL STEL)	442 mg/m³

Ortho-Xylene (95-47-6)	
KGV (OEL STEL)	100 ppm
Remark	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 2018:1)
Iceland - Occupational Exposure Limits	
Local name	Xýlen, allir ísómerar (dímetýlbensen)
OEL TWA	109 mg/m³
OEL TWA	25 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Norway - Occupational Exposure Limits	
Local name	o-xylen
Grenseverdi (OEL TWA)	108 mg/m³
Grenseverdi (OEL TWA)	25 ppm
Remark	H: Kjemikalier som kan tas opp gjennom huden; E: EU har en veiledende grenseverdi og/eller anmerkning for stoffet.
Regulatory reference	FOR-2024-04-05-581
USA - ACGIH - Occupational Exposure Limits	
Local name	o-Xylene (1,2-Dimethylbenzene)
ACGIH OEL TWA	20 ppm
Remark (ACGIH)	TLV® Basis: URT & eye irr; hematologic eff; CNS impair. Notations: A4 (Not classifiable as a Human Carcinogen); BEI
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Xylenes (technical or commercial grade)
BEI	0.3 g/g creatinine Parameter: Methylhippuric acids - Medium: urine - Sampling time: End of shift
Remark	Commercial or technical grade xylenes consist of mixtures of isomers and significant amounts of ethyl benzene as indicated under "Properties." Because ethyl benzene is known to reduce the metabolism of xylenes to methylhippuric acids, the BEI applies to technical or commercial grades of xylenes only. The determinants refer to the total of all isomers of methylhippuric acids

Ortho-Xylene (95-47-6)	
Regulatory reference	ACGIH 2024

m-xylene (108-38-3)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	m-Xylene
IOEL TWA	221 mg/m³
IOEL TWA	50 ppm
IOEL STEL	442 mg/m³
IOEL STEL	100 ppm
Remark	Skin
Regulatory reference	COMMISSION DIRECTIVE 2000/39/EC
Austria - Occupational Exposure Limits	
Local name	Xylol (alle Isomeren): m-Xylol
MAK (OEL TWA)	221 mg/m³
MAK (OEL TWA)	50 ppm
MAK (OEL STEL)	442 mg/m³ (4x 15(Miw) min)
MAK (OEL STEL)	100 ppm (4x 15(Miw) min)
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	m-Xylène # m-Xyleen
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	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. # 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.
OEL chemical category	Skin, Skin notation
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	м-Ксилен
OEL TWA	221 mg/m³

m-xylene (108-38-3)	
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	Кожа (възможна е значителна резорбция чрез кожата); • (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Croatia - Occupational Exposure Limits	
Local name	m-Ksilen
GVI (OEL TWA)	221 mg/m³
GVI (OEL TWA)	50 ppm
KGVI (OEL STEL)	442 mg/m³
KGVI (OEL STEL)	100 ppm
Remark	Direktiva: 2000/39/EZ. Napomena: Koža (razvrstana kao tvar koja nadražuje kožu (H315))
OEL chemical category	Skin notation
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Cyprus - Occupational Exposure Limits	
Local name	μ-Ξυλένιο
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
OEL chemical category	Skin-potential for cutaneous absorption
Remark	δέρμα
Regulatory reference	Κανονισμοί του 2007 (Κ.Δ.Π. 295/2007)
Czech Republic - Occupational Exposure Limits	
Local name	Xylen isomery: m-Xylen
PEL (OEL TWA)	200 mg/m³
PEL (OEL TWA)	45.33 ppm
NPK-P (OEL C)	400 mg/m³
NPK-P (OEL C)	90.66 ppm

m-xylene (108-38-3)	
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, D - při expozici se významně uplatňuje pronikání faktoru kůží, I - dráždí sliznice (oči, dýchací cesty) resp. kůži.
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Czech Republic - Biological limit values	
Local name	Xyleny
BLV	1400 mg/g creatinine Ukazatel: Methylhippurová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 820 µmol/mmol Creatinine Ukazatel: Methylhippurová 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	Xylen (Dimethylbenzen), alle isomere: m-Xylen
OEL TWA	109 mg/m³
OEL TWA	25 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	E (betyder, at stoffet har en EF-grænseværdi); H (betyder, at stoffet kan optages gennem huden)
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	BEK nr 291 af 19/03/2024
Estonia - Occupational Exposure Limits	
Local name	m-ksüleen
OEL TWA	200 mg/m³
OEL TWA	50 ppm
OEL STEL	450 mg/m³
OEL STEL	100 ppm
Remark	A (Naha kaudu kergesti imenduv aine)
OEL chemical category	Skin notation
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	m-Ksyleeni
HTP (OEL TWA)	220 mg/m³
HTP (OEL TWA)	50 ppm

m-xylene (108-38-3)	
HTP (OEL STEL)	440 mg/m³
HTP (OEL STEL)	100 ppm
Remark	Iho
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	m-Xylène
VME (OEL TWA)	221 mg/m³
VME (OEL TWA)	50 ppm
VLE (OEL C/STEL)	442 mg/m³
VLE (OEL C/STEL)	100 ppm
Remark	Valeurs règlementaires contraignantes. Risque de pénétration percutanée
OEL chemical category	Risk of cutaneous absorption
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)
France - Biological limit values	
BLV	Parameter: Methylhippuric acid - Medium: urine - Sampling time: end of shift (per the Authority, the values for this substance must be decided and/or determined on a case by case basis. Guidance for the calculation of and interpretation of values is provided in the source)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Xylol (alle Isomere)
AGW (OEL TWA)	220 mg/m³
AGW (OEL TWA)	50 ppm
Peak exposure limitation factor	2(II)
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich); H - hautresorptiv
Chemical category	Skin notation
Regulatory reference	TRGS900
Germany - Biological limit values (TRGS 903)	
Biological limit value	2 g/l Methylhippur-(Tolur-)säure (Urin; Expositionsende bzw. Schichtende)

m-xylene (108-38-3)	
Greece - Occupational Exposure Limits	
Local name	Ξυλόλια (όλα τα ισομερή)
OEL TWA	435 mg/m³
OEL TWA	100 ppm
OEL STEL	650 mg/m³
OEL STEL	150 ppm
OEL chemical category	skin - potential for cutaneous absorption
Remark	Η ένδειξη «δέρμα» στις οριακές τιμές επαγγελματικής έκθεσης επισημαίνει το ενδεχόμενο σημαντικής διείσδυσης μέσω του δέρματος.
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	m-XILOL
AK (OEL TWA)	221 mg/m³
CK (OEL STEL)	442 mg/m³
Remark	b (Bőrön át is felszívódik), BEM (biológiai expozíciós mutató); EU1 (2000/39/EK irányelvben közölt érték); R (Azok az anyagok, amelyek egészségkárosító hatása RÖVID expozíció hatására jelentkezik)
OEL chemical category	Potential for cutaneous absorption
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	Xylene m-isomer
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	IOELV (Indicative Occupational Exposure Limit Values), Skin (Substances which have the capacity to penetrate intact skin when they come in contact with it and be absorbed into the body. A substantial contribution to the total body burden via dermal exposure is possible)
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Chemical Agents Code of Practice 2024
Italy - Occupational Exposure Limits	
Local name	m-Xilene
OEL TWA	221 mg/m³

m-xylene (108-38-3)	
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	Cute
OEL chemical category	skin - potential for cutaneous absorption
Regulatory reference	Allegato XXXVIII del Decreto Legislativo 4 settembre 2024, n. 135
Latvia - Occupational Exposure Limits	
Local name	m-Ksilols, (1,3-dimetilbenzols)
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	Āda
OEL chemical category	skin - potential for cutaneous exposure
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).
Latvia - Biological Exposure Indices	
Local name	m-Ksilols, (1,3-dimetilbenzols)
BEI	2000 mg/l Metilhipūr-(tolūr)skābi (visi izomēri) urīnā - Paraugus iegūst ekspozīcijas beigās vai maiņas beigās
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).
Lithuania - Occupational Exposure Limits	
Local name	m-ksilenas
IPRV (OEL TWA)	221 mg/m³
IPRV (OEL TWA)	50 ppm
TPRV (OEL STEL)	442 mg/m³
TPRV (OEL STEL)	100 ppm
Remark	O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
OEL chemical category	Skin notation
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Luxembourg - Occupational Exposure Limits	
Local name	m-Xylène
OEL TWA	221 mg/m³

m-xylene (108-38-3)	
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
OEL chemical category	Possibility of significant uptake through the skin
Remark	Peau
Regulatory reference	Mémorial A Nº 226 de 2021 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
Malta - Occupational Exposure Limits	
Local name	m-Xylene
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	Skin # Ġilda
OEL chemical category	Possibility of significant uptake through the skin
Regulatory reference	S.L. 424.24 - Chemical Agents at Work Regulations (L.N. 356 of 2021) # L.S. 424.24 - Regolamenti dwar Aġenti Kimiċi fuq il-Post tax-Xogħol (A.L. 356 tal-2021)
Netherlands - Occupational Exposure Limits	
TGG-8u (OEL TWA)	210 mg/m³
TGG-8u (OEL TWA)	47.5 ppm
TGG-15min (OEL STEL)	442 mg/m³
TGG-15min (OEL STEL)	100 ppm
MAC chemical category	Skin notation
Portugal - Occupational Exposure Limits	
Local name	Xileno (m)
OEL TWA	221 mg/m³ (indicative limit value)
OEL TWA	50 ppm (indicative limit value)
OEL STEL	442 mg/m³ (indicative limit value)
OEL STEL	100 ppm (indicative limit value)
OEL chemical category	A4 - Not Classifiable as a Human Carcinogen, skin - potential for cutaneous exposure indicative limit value
Remark	A4 (Agente não classificável como carcinogénico no Homem); IBE (Índice biológico de exposição)

m-xylene (108-38-3)	
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	Xilenos (graus técnico e comercial)
BEI	1.5 g/g creatinine Parâmetro: Ácidos (o, m, p)-metilhipúricos - Meio: urina - Momento da amostragem: Fim do turno
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	m-xilen
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
OEL chemical category	Skin notation
Remark	P - posibilitatea unei penetrări cutanate importante
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	m-Xylén
NPHV (OEL TWA)	221 mg/m³
NPHV (OEL TWA)	50 ppm
NPHV (OEL STEL)	442 mg/m³
NPHV (OEL STEL)	100 ppm
NPHV (OEL C)	442 mg/m³
Remark	K – znamená, že faktor môže byť ľahko absorbovaný kožou
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	m-ksilen
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	K (Lastnost lažjega prehajanja snovi v organizem skozi kožo), BAT (Biološka mejna vrednost), EU
OEL chemical category	Potential for cutaneous absorption

m-xylene (108-38-3)	
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4. 4. 2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu
Spain - Occupational Exposure Limits	
Local name	m-Xileno
VLA-ED (OEL TWA)	221 mg/m³ (indicative limit value)
VLA-ED (OEL TWA)	50 ppm (indicative limit value)
VLA-EC (OEL STEL)	442 mg/m³
VLA-EC (OEL STEL)	100 ppm
Remark	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), VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo).
OEL chemical category	skin - potential for cutaneous absorption
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Sweden - Occupational Exposure Limits	
Local name	m-Xylen
NGV (OEL TWA)	221 mg/m³ (Xylene)
NGV (OEL TWA)	50 ppm (Xylene)
KGV (OEL STEL)	442 mg/m³ (Xylene)
KGV (OEL STEL)	100 ppm (Xylene)
Remark	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)
OEL chemical category	Skin notation
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	220 mg/m³
WEL TWA (OEL TWA)	50 ppm
WEL STEL (OEL STEL)	441 mg/m³
WEL STEL (OEL STEL)	100 ppm
WEL chemical category	Potential for cutaneous absorption

m-xylene (108-38-3)	
Iceland - Occupational Exposure Limits	
Local name	Dímetýlbensen (xýlen)
OEL TWA	109 mg/m³
OEL TWA	25 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Norway - Occupational Exposure Limits	
Local name	m-xylen
Grenseverdi (OEL TWA)	108 mg/m³
Grenseverdi (OEL TWA)	25 ppm
Korttidsverdi (OEL STEL)	135 mg/m³ (value calculated)
Korttidsverdi (OEL STEL)	37.5 ppm (value calculated)
Remark	H: Kjemikalier som kan tas opp gjennom huden; E: EU har en veiledende grenseverdi og/eller anmerkning for stoffet.
OEL chemical category	Skin notation
Regulatory reference	FOR-2024-04-05-581
USA - ACGIH - Occupational Exposure Limits	
Local name	m-Xylene (1,3-Dimethylbenzene)
ACGIH OEL TWA	20 ppm
Remark (ACGIH)	TLV® Basis: URT & eye irr; hematologic eff; CNS impair. Notations: A4 (Not classifiable as a Human Carcinogen); BEI
ACGIH chemical category	Not Classifiable as a Human Carcinogen
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Xylenes (technical or commercial grade)
BEI	0.3 g/g creatinine Parameter: total of all isomers of Methylhippuric acids - Medium: urine - Sampling time: end of shift (technical or commercial grades)

m-xylene (108-38-3)	
Remark	Commercial or technical grade xylenes consist of mixtures of isomers and significant amounts of ethyl benzene as indicated under "Properties." Because ethyl benzene is known to reduce the metabolism of xylenes to methylhippuric acids, the BEI applies to technical or commercial grades of xylenes only. The determinants refer to the total of all isomers of methylhippuric acids
Regulatory reference	ACGIH 2024

p-xylene (106-42-3)	
EU - Indicative Occupational Exposure Limit (IOEL)	
IOEL TWA	221 mg/m³
IOEL TWA	50 ppm
IOEL STEL	442 mg/m³
IOEL STEL	100 ppm
Remark	Skin
Austria - Occupational Exposure Limits	
Local name	Xylol (alle Isomeren): p-Xylol
MAK (OEL TWA)	221 mg/m³
MAK (OEL TWA)	50 ppm
MAK (OEL STEL)	442 mg/m³ (4x 15(Miw) min)
MAK (OEL STEL)	100 ppm (4x 15(Miw) min)
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	D
OEL chemical category	Skin, Skin notation
Bulgaria - Occupational Exposure Limits	
Local name	p-Ксилен
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm

p-xylene (106-42-3)	
Remark	Кожа (възможна е значителна резорбция чрез кожата); • (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Croatia - Occupational Exposure Limits	
GVI (OEL TWA)	221 mg/m³
GVI (OEL TWA)	50 ppm
KGVI (OEL STEL)	442 mg/m³
KGVI (OEL STEL)	100 ppm
OEL chemical category	Skin notation
Cyprus - Occupational Exposure Limits	
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
OEL chemical category	Skin-potential for cutaneous absorption
Czech Republic - Occupational Exposure Limits	
Local name	Xylen isomery: p-Xylen
PEL (OEL TWA)	200 mg/m³
PEL (OEL TWA)	45.33 ppm
NPK-P (OEL C)	400 mg/m³
NPK-P (OEL C)	90.66 ppm
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, D - při expozici se významně uplatňuje pronikání faktoru kůží, I - dráždí sliznice (oči, dýchací cesty) resp. kůži.
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Czech Republic - Biological limit values	
Local name	Xyleny
BLV	1400 mg/g creatinine Ukazatel: Methylhippurová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 820 µmol/mmol Creatinine Ukazatel: Methylhippurová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)

p-xylene (106-42-3)	
Denmark - Occupational Exposure Limits	
Local name	Xylen (Dimethylbenzen), alle isomere: p-Xylen
OEL TWA	109 mg/m³
OEL TWA	25 ppm
OEL STEL	218 mg/m³
OEL STEL	50 ppm
Remark	E (betyder, at stoffet har en EF-grænseværdi); H (betyder, at stoffet kan optages gennem huden)
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	BEK nr 291 af 19/03/2024
Estonia - Occupational Exposure Limits	
Local name	p-ksüleen
OEL TWA	200 mg/m³
OEL TWA	50 ppm
OEL STEL	450 mg/m³
OEL STEL	100 ppm
Remark	A (Naha kaudu kergesti imenduv aine)
OEL chemical category	Skin notation
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	p-Ksyleeni
HTP (OEL TWA)	220 mg/m³
HTP (OEL TWA)	50 ppm
HTP (OEL STEL)	440 mg/m³
HTP (OEL STEL)	100 ppm
Remark	Iho
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	p-Xylène
VME (OEL TWA)	221 mg/m³
VME (OEL TWA)	50 ppm
VLE (OEL C/STEL)	442 mg/m³

p-xylene (106-42-3)	
VLE (OEL C/STEL)	100 ppm
Remark	Valeurs règlementaires contraignantes. Risque de pénétration percutanée
OEL chemical category	Risk of cutaneous absorption
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)
France - Biological limit values	
BLV	Parameter: Methylhippuric acid - Medium: urine - Sampling time: end of shift (per the Authority, the values for this substance must be decided and/or determined on a case by case basis. Guidance for the calculation of and interpretation of values is provided in the source)
Germany - Occupational Exposure Limits (TRGS 900)	
AGW (OEL TWA)	440 mg/m³
AGW (OEL TWA)	100 ppm
Chemical category	Skin notation
Germany - Biological limit values (TRGS 903)	
Biological limit value	1.5 mg/l Xylol (Blut; Expositionsende bzw. Schichtende) 2 g/l Methylhippur-(Tolur-)säure (Urin; Expositionsende bzw. Schichtende)
Greece - Occupational Exposure Limits	
Local name	Ξυλόλια (όλα τα ισομερή)
OEL TWA	435 mg/m³
OEL TWA	100 ppm
OEL STEL	650 mg/m³
OEL STEL	150 ppm
OEL chemical category	skin - potential for cutaneous absorption
Remark	Η ένδειξη «δέρμα» στις οριακές τιμές επαγγελματικής έκθεσης επισημαίνει το ενδεχόμενο σημαντικής διείσδυσης μέσω του δέρματος.
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	p-XILOL
AK (OEL TWA)	221 mg/m³
CK (OEL STEL)	442 mg/m³

p-xylene (106-42-3)	
Remark	b (Bőrön át is felszívódik), BEM (biológiai expozíciós mutató); EU1 (2000/39/EK irányelvben közölt érték); R (Azok az anyagok, amelyek egészségkárosító hatása RÖVID expozíció hatására jelentkezik)
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
OEL chemical category	Potential for cutaneous absorption
Italy - Occupational Exposure Limits	
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
OEL chemical category	skin - potential for cutaneous absorption
Latvia - Occupational Exposure Limits	
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL chemical category	skin - potential for cutaneous exposure
Lithuania - Occupational Exposure Limits	
Local name	p-ksilenas
IPRV (OEL TWA)	221 mg/m³
IPRV (OEL TWA)	50 ppm
TPRV (OEL STEL)	442 mg/m³
TPRV (OEL STEL)	100 ppm
Remark	O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
OEL chemical category	Skin notation
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Luxembourg - Occupational Exposure Limits	
OEL TWA	221 mg/m³
OEL TWA	50 ppm

p-xylene (106-42-3)	
OEL STEL	442 mg/m³
OEL STEL	100 ppm
OEL chemical category	Possibility of significant uptake through the skin
Malta - Occupational Exposure Limits	
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
OEL chemical category	Possibility of significant uptake through the skin
Netherlands - Occupational Exposure Limits	
TGG-8u (OEL TWA)	210 mg/m³
TGG-8u (OEL TWA)	50 ppm
TGG-15min (OEL STEL)	442 mg/m³
MAC chemical category	Skin notation
Portugal - Occupational Exposure Limits	
Local name	Xileno (p)
OEL TWA	221 mg/m³ (indicative limit value)
OEL TWA	50 ppm (indicative limit value)
OEL STEL	442 mg/m³ (indicative limit value)
OEL STEL	100 ppm (indicative limit value)
OEL chemical category	A4 - Not Classifiable as a Human Carcinogen, skin - potential for cutaneous exposure indicative limit value
Remark	A4 (Agente não classificável como carcinogénico no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	Xilenos (graus técnico e comercial)
BEI	1.5 g/g creatinine Parâmetro: Ácidos (o, m, p)-metilhipúricos - Meio: urina - Momento da amostragem: Fim do turno
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³

p-xylene (106-42-3)	
OEL STEL	100 ppm
OEL chemical category	Skin notation
Slovakia - Occupational Exposure Limits	
Local name	p-Xylén
NPHV (OEL TWA)	221 mg/m³
NPHV (OEL TWA)	50 ppm
NPHV (OEL STEL)	442 mg/m³
NPHV (OEL STEL)	100 ppm
NPHV (OEL C)	442 mg/m³
Remark	K – znamená, že faktor môže byť ľahko absorbovaný kožou
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
OEL TWA	221 mg/m³
OEL TWA	50 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
OEL chemical category	Potential for cutaneous absorption
Spain - Occupational Exposure Limits	
VLA-ED (OEL TWA)	221 mg/m³
VLA-ED (OEL TWA)	50 ppm
VLA-EC (OEL STEL)	442 mg/m³
VLA-EC (OEL STEL)	100 ppm
OEL chemical category	skin - potential for cutaneous absorption
Sweden - Occupational Exposure Limits	
Local name	p-Xylen
NGV (OEL TWA)	200 mg/m³
NGV (OEL TWA)	50 ppm
KGV (OEL STEL)	450 mg/m³
KGV (OEL STEL)	100 ppm
Remark	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)
OEL chemical category	Skin notation

p-xylene (106-42-3)	
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
WEL TWA (OEL TWA)	220 mg/m³
WEL TWA (OEL TWA)	50 ppm
WEL STEL (OEL STEL)	441 mg/m³
WEL STEL (OEL STEL)	100 ppm
WEL chemical category	Potential for cutaneous absorption
Iceland - Occupational Exposure Limits	
Local name	Xýlen, allir ísómerar (dímetýlbensen)
OEL TWA	109 mg/m³
OEL TWA	25 ppm
OEL STEL	442 mg/m³
OEL STEL	100 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Norway - Occupational Exposure Limits	
Local name	p-xylen
Grenseverdi (OEL TWA)	108 mg/m³
Grenseverdi (OEL TWA)	25 ppm
Korttidsverdi (OEL STEL)	135 mg/m³ (value calculated)
Korttidsverdi (OEL STEL)	37.5 ppm (value calculated)
Remark	H: Kjemikalier som kan tas opp gjennom huden; E: EU har en veiledende grenseverdi og/eller anmerkning for stoffet.
OEL chemical category	Skin notation
Regulatory reference	FOR-2024-04-05-581
USA - ACGIH - Occupational Exposure Limits	
Local name	p-Xylene (1,4-Dimethylbenzene)
ACGIH OEL TWA	434 mg/m³
ACGIH OEL TWA	100 ppm
ACGIH OEL STEL	651 mg/m³
Remark (ACGIH)	TLV® Basis: URT & eye irr; hematologic eff; ototoxycity; CNS impair. Notations: OTO (Ototoxicant); A4 (Not classifiable as a Human Carcinogen); BEI
ACGIH chemical category	Not Classifiable as a Human Carcinogen

p-xylene (106-42-3)	
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Xylenes (technical or commercial grade)
BEI	0.3 g/g creatinine Parameter: total of all isomers of Methylhippuric acids - Medium: urine - Sampling time: end of shift (technical or commercial grades)
Remark	Commercial or technical grade xylenes consist of mixtures of isomers and significant amounts of ethyl benzene as indicated under "Properties." Because ethyl benzene is known to reduce the metabolism of xylenes to methylhippuric acids, the BEI applies to technical or commercial grades of xylenes only. The determinants refer to the total of all isomers of methylhippuric acids
Regulatory reference	ACGIH 2024

Benzene (71-43-2)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Benzene
IOEL TWA	3.25 mg/m³ (BOEL)
Remark	Skin (Substantial contribution to the total body burden via dermal exposure possible)
Regulatory reference	DIRECTIVE (EU) 2019/130 (amending Directive 2004/37/EC)
EU - Binding Occupational Exposure Limit (BOEL)	
Local name	Benzene
BOEL TWA	0.66 mg/m³ (Limit value from 5 April 2026) 1.65 mg/m³ (Limit value until 5 April 2026)
BOEL TWA	0.2 ppm (Limit value from 5 April 2026) 0.5 ppm (Limit value until 5 April 2026)
Notes	Skin (Substantial contribution to the total body burden via dermal exposure possible)
Regulatory reference	DIRECTIVE (EU) 2022/431 (amending Directive 2004/37/EC)
EU - Biological Limit Value (BLV)	
Local name	Benzene
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

Benzene (71-43-2)	
TRK (OEL TWA)	3.2 mg/m³
TRK (OEL TWA)	1 ppm
TRK (OEL STEL)	12.8 mg/m³ (4x 15(Miw) min)
TRK (OEL STEL)	4 ppm (4x 15(Miw) min)
Remark	H. Krebserzeugend: III A1
Regulatory reference	BGBl. II Nr. 156/2021
Austria - Biological limit values	
Local name	Benzol
BLV	10 g/dl Parameter: Hämoglogin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Frauen 12 g/dl Parameter: Hämoglogin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Männer 1.6 mg/l Parameter: t,t-Muconsäure - Untersuchungsmaterial: Harn
Remark	Eignung: Blut: MCV: 79-97 fl; Erythrozyten: 3,2 Millionen/µl für Frauen, 3,8 Millionen/µl für Männer; Leukozyten: unterer Grenzwert: 4.000/µl (davon 2.000 Granulozyten) bzw. 3.700/µl bei nicht pathologischem Differentialblutbild, oberer Grenzwert: 13.000/µl; Thrombozyten: 150.000 bzw. 130.000/µl bei nicht pathologischem Differentialblutbild Eignung mit vorzeitiger Folgeuntersuchung: Bei Unterschreiten bzw. Überschreiten der Grenzwerte im Blut (ausgenommen Differentialblutbild) oder im Harn sowie bei atypischen Morphologien im Blut. Der Zeitabstand zwischen den Untersuchungen beträgt bei Eignung: ein Jahr; bei Arbeiten in Kokereien: drei Monate, für die Blutuntersuchung sechs Monate; bei Eignung mit vorzeitiger Folgeuntersuchung: drei Monate; bei Arbeiten in Kokereien: sechs Wochen
Regulatory reference	Verordnung über die Gesundheitsüberwachung am Arbeitsplatz 2017 (VGÜ 2017)
Belgium - Occupational Exposure Limits	
Local name	Benzène # Benzeen
OEL TWA	0.66 mg/m³ (à partir du 5 avril 2026) # (vanaf 5 april 2026) 1.65 mg/m³ (jusqu'au 5 avril 2026) # (tot 5 april 2026)
OEL TWA	0.2 ppm (à partir du 5 avril 2026) # (vanaf 5 april 2026) 0.5 ppm (jusqu'au 5 avril 2026) # (tot 5 april 2026)

Benzene (71-43-2)	
Remark	C: la mention “C” signifie que l’agent en question relève du champ d’application du titre 2 relatif aux agents cancérigènes, mutagènes et reprotoiques du livre VI du code de bien-être au travail, D: la mention “D” signifie que la résorption de l’agent, via la peau, les muqueuses ou les yeux, constitue une partie importante de l’exposition totale. Cette résorption peut se faire tant par contact direct que par présence de l’agent dans l’air. # C: de vermelding “C” betekent dat het betrokken agens valt onder het toepassingsgebied van titel 2 betreffende kankerverwekkende, mutagene en reprotoxische agentia van boek VI van de codex over het welzijn op het werk, D: de vermelding “D” betekent dat de opname van het agens via de huid, de slijmvliezen of de ogen een belangrijk deel van de totale blootstelling vormt. Deze opname kan het gevolg zijn van zowel direct contact als zijn aanwezigheid in de lucht.
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	Бензен
OEL TWA	0.66 mg/m³ (Измерено като елементарен въглерод)
OEL TWA	0.2 ppm (Измерено като елементарен въглерод)
Remark	Кожа (Възможен е значителен принос за общото натрупване в тялото чрез кожна експозиция)
Regulatory reference	Наредба № 10 от 26.09.2003 г. за защита на работещите от рискове, свързани с експозиция на канцерогени и мутагени при работа (изм. и доп. ДВ. бр. 28 от 2 Април 2024г.)
Bulgaria - Biological limit values	
Local name	Бензен
BLV	2 mg/l Биомаркер за експозиция/биомаркер за ефект: Trans, trans-муконова киселина - Биологична среда: урина - Време на пробовземане: В края на експозицията или в края на работната смяна - Специфични ефекти: Кожа (възможна е значителна резорбция чрез кожата) 0.045 mg/g creatinine Биомаркер за експозиция/биомаркер за ефект: S-фенилмеркаптурова киселина - Биологична среда: урина - Време на пробовземане: В края на експозицията или в края на работната смяна - Специфични ефекти: Кожа (възможна е значителна резорбция чрез кожата)
Regulatory reference	Наредба № 10 от 26.09.2003 г. за защита на работещите от рискове, свързани с експозиция на канцерогени и мутагени при работа (изм. и доп. ДВ. бр. 28 от 2 Април 2024г.)
Croatia - Occupational Exposure Limits	
Local name	Benzen

Benzene (71-43-2)	
GVI (OEL TWA)	0.66 mg/m³ 1.65 mg/m³ do 5. travnja 2026.
GVI (OEL TWA)	0.2 ppm 0.5 ppm do 5. travnja 2026.
Remark	Direktiva: 2022/431/EU. Napomena: Koža (razvrstana kao tvar koja nadražuje kožu (H315)), Karc 1A, Muta 1B
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Croatia - Biological limit values	
Local name	Benzen
BLV	0.36 µmol/l Karakteristični pokazatelj: benzen - Biološki uzorak: krv - Vrijeme uzorkovanja: odmah na kraju radne smjene 28 µg/l Karakteristični pokazatelj: benzen - Biološki uzorak: krv - Vrijeme uzorkovanja: odmah na kraju radne smjene 21.7 µmol/mol creatinine Karakteristični pokazatelj: S-fenilmerkapturna kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene 46 µg/g creatinine Karakteristični pokazatelj: S-fenilmerkapturna kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 91/2018)
Cyprus - Occupational Exposure Limits	
Local name	Βενζόλιο
OEL TWA	0.66 mg/m³ 1.65 mg/m³ (Οριακή τιμή έως την 5η Απριλίου 2026)
OEL TWA	0.2 ppm 0.5 ppm (Οριακή τιμή έως την 5η Απριλίου 2026)
Remark	Δέρμα. Καρκινογόνοι και Μεταλλαξιογόνοι Παράγοντες
Regulatory reference	Κανονισμοί του 2023 (Κ.Δ.Π. 220/2023)
Czech Republic - Occupational Exposure Limits	
Local name	Benzen
PEL (OEL TWA)	3.25 mg/m³ 0.66 mg/m³ (od 5. 4. 2026)
PEL (OEL TWA)	1 ppm 0.2 ppm (od 5. 4. 2026)
NPK-P (OEL C)	10 mg/m³
NPK-P (OEL C)	3.08 ppm

Benzene (71-43-2)	
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, D - při expozici se významně uplatňuje pronikání faktoru kůží, I - dráždí sliznice (oči, dýchací cesty) resp. kůži, K - karcinogen kategorie 1A a 1B (s větou H350, H350i), M - mutagen v zárodečných buňkách kategorie 1A a 1B (s větou H340), P - u látky nelze vyloučit závažné pozdní účinky (s větou H372, H373).
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Czech Republic - Biological limit values	
Local name	Benzen
BLV	0.05 mg/g creatinine Ukazatel: S-Fenylmerkapturová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 0.024 µmol/mmol Creatinine Ukazatel: S-Fenylmerkapturová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 1.5 mg/g creatinine Ukazatel: t,t-Mukonová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 1.2 µmol/mmol Creatinine Ukazatel: t,t-Mukonová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Benzen
OEL TWA	0.66 mg/m³ Fra den 5. april 2026 1.6 mg/m³
OEL TWA	0.2 ppm Fra den 5. april 2026 0.5 ppm
OEL STEL	3.2 mg/m³
OEL STEL	1 ppm
Remark	E (betyder, at stoffet har en EF-grænseværdi); H (betyder, at stoffet kan optages gennem huden); K (betyder, at stoffet anses for at kunne være kræftfremkaldende)
Regulatory reference	BEK nr 291 af 19/03/2024
Estonia - Occupational Exposure Limits	
Local name	Benseen
OEL TWA	0.66 mg/m³ (kehtib alates 06.04.2026) 1.5 mg/m³ (kehtib kuni 05.04.2026)
OEL TWA	0.2 ppm (kehtib alates 06.04.2026) 0.5 ppm (kehtib kuni 05.04.2026)
OEL STEL	9 mg/m³ (kehtib kuni 05.04.2026)
OEL STEL	3 ppm (kehtib kuni 05.04.2026)
Remark	A (Naha kaudu kergesti imenduv aine), C (Kantserogeenne aine)

Benzene (71-43-2)	
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	Bentseeni
BOEL TWA	0.66 mg/m³ (Raja-arvoa sovelletaan 5 päivästä huhtikuuta 2026) 1.65 mg/m³
BOEL TWA	0.2 ppm (Raja-arvoa sovelletaan 5 päivästä huhtikuuta 2026) 0.5 ppm
Remark	Iho. Syöpäsairauden vaaraa aiheuttavat ja perimää vaurioittavat tekijät
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö). Valtioneuvoston asetus (113/2024)
France - Occupational Exposure Limits	
Local name	Benzène
VME (OEL TWA)	0.66 mg/m³ (À partir du 5 avril 2026) 1.65 mg/m³
VME (OEL TWA)	0.2 ppm (À partir du 5 avril 2026) 0.5 ppm
Remark	Valeurs règlementaires contraignantes. Cancérogène de catégorie 1A, Mutagène de catégorie 1B, Risque de pénétration percutanée
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849; Décret n° 2024-307)
Germany - Occupational Exposure Limits (TRGS 910)	
Local name	Benzol
Acceptable concentration (Volume conc.)	0.06 ppm
Acceptable concentration (Weight conc.)	0.2 mg/m³
Notes	b) Akzeptanzkonzentration assoziiert mit Risiko 4:10000
Tolerance concentration (Volume conc.)	0.6 ppm
Tolerance concentration (Weight conc.)	1.9 mg/m³
Tolerance concentration excess factor	8
Remark	H - Hautresorptiv
Equivalence value for acceptable concentration	0.8 µg/l (3) 3 µg/g creatinine (3)
Equivalence value for tolerance concentration	5 µg/l 25 µg/g creatinine 500 µg/g creatinine

Benzene (71-43-2)	
Parameter	Benzol S-Phenylmerkaptursäure Trans, trans-Muconsäure
This battery has passed the UN Manual of Tests and Criteria part III subsection 38.3 requirements.	U - Urin
Testing time	b - Expositionsende bzw. Schichtende
Regulatory reference	TRGS 910
Greece - Occupational Exposure Limits	
Local name	Βενζόλιο
OEL TWA	3.25 mg/m³
OEL TWA	1 ppm
Remark	Δέρμα (Είναι πιθανή η σημαντική αύξηση της συνολικής επιβάρυνσης του λόγω δερνατικής έκθεσης)
Regulatory reference	Π.Δ. 26/2020 - Σχετικά με την προστασία των εργαζομένων από τους κινδύνους που συνδέονται με την έκθεση σε καρκινογόνους ή μεταλλαξιγόνους παράγοντες κατά την εργασία
Hungary - Occupational Exposure Limits	
Local name	BENZOL
AK (OEL TWA)	1.65 mg/m³
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

Benzene (71-43-2)	
OEL TWA	0.66 mg/m³ LImit value from 5th April 2026 1.65 mg/m³ Limit value until 5th April 2026
OEL TWA	0.2 ppm LImit value from 5th April 2026 0.5 ppm Limit value until 5th April 2026
Remark	BOELV (Binding Occupational Exposure Limit Values), Skin (Substances which have the capacity to penetrate intact skin when they come in contact with it and be absorbed into the body. A substantial contribution to the total body burden via dermal exposure is possible), Carc.1A (Substances known to have carcinogenic potential for humans), Muta.1B (Substances which should be regarded as if they induce heritable mutations in the germ cells of humans)
Regulatory reference	Chemical Agents Code of Practice 2024
Ireland - Biological limit values	
Local name	Benzene
BMGV	25 µg/g creatinine Parameter: S-Phenylmercapturic acid - Medium: urine - Sampling time: End of shift - Notations: B (Background) 50 µg/g creatinine Parameter: t,t-Muconic acid - Medium: urine - Sampling time: End of shift - Notations: B (Background)
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
Italy - Occupational Exposure Limits	
Local name	Benzene
OEL TWA	3.25 mg/m³
OEL TWA	1 ppm
Remark	Cute
OEL chemical category	skin - potential for cutaneous absorption
Regulatory reference	Allegato XLIII del Decreto Legislativo 4 settembre 2024, n. 135 - Protezione da agenti cancerogeni, mutageni o da sostanze tossiche per la riproduzione
Latvia - Occupational Exposure Limits	
Local name	Benzols
OEL TWA	0.66 mg/m³ 1.65 mg/m³ AER līdz 2026.gada 5.aprīlim.
OEL TWA	0.2 ppm
Remark	Āda. Carc. 1A; Muta. 1B
Regulatory reference	Ministru kabineta 2008. gada 29. septembra noteikumi Nr. 803 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 190).

Benzene (71-43-2)	
Latvia - Biological Exposure Indices	
Local name	Benzols
BEI	5 µg/l Benzolam urīnā - Paraugus iegūst ekspozīcijas beigās vai maiņas beigās 25 µg/g creatinine S-fenilmerkaptūrskābi urīnā - Paraugus iegūst ekspozīcijas beigās vai maiņas beigās 500 µg/g creatinine trans, trans - Mukonskābi urīnā - Paraugus iegūst ekspozīcijas beigās vai maiņas beigās
Regulatory reference	Ministru kabineta 2008. gada 29. septembra noteikumi Nr. 803 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 190).
Lithuania - Occupational Exposure Limits	
Local name	Benzenas (benzolas)
IPRV (OEL TWA)	0.66 mg/m³ (įsigalioja 2026 m. balandžio 5 d.) 1.65 mg/m³
IPRV (OEL TWA)	0.2 ppm (įsigalioja 2026 m. balandžio 5 d.) 0.5 ppm
TPRV (OEL STEL)	19 mg/m³
TPRV (OEL STEL)	6 ppm
Remark	K (kancerogeninis poveikis); M (mutageninis poveikis); O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-82/A1-57, 2024-01-23)
Luxembourg - Occupational Exposure Limits	
Local name	Benzène
OEL TWA	3.25 mg/m³
OEL TWA	1 ppm
Remark	Peau
Regulatory reference	Mémorial A Nº 223 de 2021 concernant la protection des salariés contre les risques liés à l'exposition à des agents cancérigènes ou mutagènes au travail
Malta - Occupational Exposure Limits	
Local name	Benzene # Benżen
OEL TWA	1.65 mg/m³ (Limit value until 5 April 2026 # Valur limitu sal-5 ta' April 2026)
OEL TWA	0.5 ppm (Limit value until 5 April 2026 # Valur limitu sal-5 ta' April 2026)
Remark	Skin # Ġilda

Benzene (71-43-2)	
Regulatory reference	S.L. 424.22 - Exposure to Carcinogens, Mutagens or Reprotoxic Substances at Work Regulations (L.N. 102 of 2024) # L.S. 424.22 - Regolamenti dwar Espożizzjoni għall-Carcinogens, Mutagens jew Reprotoxic Substances fuq il-Post tax-Xogħol (A.L. 102 tal-2024)
Netherlands - Occupational Exposure Limits	
Local name	Benzeen
TGG-8u (OEL TWA)	0.7 mg/m³
TGG-8u (OEL TWA)	0.2 ppm
Remark	Kankerverwekkende stof. H (Huidopname) Stoffen die relatief gemakkelijk door de huid kunnen worden opgenomen, hetgeen een substantiële bijdrage kan betekenen aan de totale inwendige blootstelling, hebben in de lijst een H-aanduiding. Bij deze stoffen moeten naast maatregelen tegen inademing ook adequate maatregelen ter voorkoming van huidcontact worden genomen.
Regulatory reference	Arbeidsomstandighedenregeling 2024
Poland - Occupational Exposure Limits	
Local name	Benzen
NDS (OEL TWA)	0.66 mg/m³
Remark	Skóra (Oznakowanie substancji notacją „skóra” oznacza, że wchłanianie substancji przez skórę może być tak samo istotne jak przy narażeniu drogą oddechową).
Regulatory reference	Dz. U. 2024 poz. 1017 wraz z późn. zm.
Portugal - Occupational Exposure Limits	
Local name	Benzeno
OEL TWA	3.25 mg/m³ (indicative limit value)
OEL TWA	0.5 ppm
OEL STEL	2.5 ppm
Remark	P (Toxicidade percutânea); A1 (Agente carcinogénico confirmado no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	Benzeno
BEI	25 µg/g creatinine Parâmetro: Ácido s-fenilmercaptúrico - Meio: urina - Momento da amostragem: Fim do turno - Notaçao: Vb (Valor basal) 500 µg/g creatinine Parâmetro: Ácido t,t-mucónico - Meio: urina - Momento da amostragem: Fim do turno - Notaçao: Vb (Valor basal)
Regulatory reference	Norma Portuguesa NP 1796:2014

Benzene (71-43-2)	
Romania - Occupational Exposure Limits	
Local name	Benzen
OEL TWA	0.66 mg/m³ 1.65 mg/m³ Valoare-limită până la 5 aprilie 2026
OEL TWA	0.2 ppm 0.5 ppm Valoare-limită până la 5 aprilie 2026
Remark	P - posibilitatea unei penetrări cutanate importante; C1A - poate provoca apariția cancerului; M1B - poate provoca anomalii genetice
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Romania - Biological limit values	
Local name	Benzen
BLV	25 µg/g creatinine Indicatorul biologic: Acid s-fenil mercapturic - Material biologic: urină - Momentul recoltării: sfârșit de schimb 50 mg/l Indicatorul biologic: Fenoli totali - Material biologic: urină - Momentul recoltării: sfârșit de schimb 500 µg/g creatinine Indicatorul biologic: Acid t,t muconic - Material biologic: urină - Momentul recoltării: sfârșit de schimb
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	Benzén
NPHV (OEL TWA)	0.66 mg/m³ NPEL sa uplatňuje od 6. apríla 2026 1.65 mg/m³ NPEL sa uplatňuje do 5. apríla 2026
NPHV (OEL TWA)	0.2 ppm NPEL sa uplatňuje od 6. apríla 2026 0.5 ppm NPEL sa uplatňuje do 5. apríla 2026
Remark	Kategória karcinogénnych faktorov 1A – Dokázaný karcinogén pre ľudí; Kategória mutagénnych faktorov 1B – Mutagén cicavčích zárodočných buniek; K – prienik cez kožu: K celkovému zaťaženiu organizmu môže významne prispieť expozícia cez kožu.
Regulatory reference	Nariadenie vlády č. 356/2006 Z. z. (121/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	benzen
OEL TWA	3.25 mg/m³
OEL TWA	1 ppm
Remark	Rakotvorne snovi – kategorija 1A, Mutagene snovi za zarodne celice – kategorija 1B. EU, K (Lastnost lažjega prehajanja snovi v organizem skozi kožo), BAT (Biološka mejna vrednost), EKA (Zveza med koncentracijo rakotvornih snovi v zraku na delovnem mestu in količino snovi in/ali njenih metabolitov v organizmu)

Benzene (71-43-2)	
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4.4.2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti rakotvornim ali mutagenim snovem
Slovenia - Biological limit values	
Local name	benzen
BLV	5 µg/l Parameter: benzen - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene 0.025 mg/g creatinine Parameter: S-fenilmerkaptonska kislina - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene 500 µg/g creatinine Parameter: trans, trans-mukonska kislina - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4.4.2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti rakotvornim ali mutagenim snovem
Spain - Occupational Exposure Limits	
Local name	Benceno
VLA-ED (OEL TWA)	3.25 mg/m³
VLA-ED (OEL TWA)	1 ppm
Remark	C1A (Carcinógeno para el hombre), M1B (Sustancias de las que se considera que inducen mutaciones hereditarias en las células germinales humanas), vía dérmica (Indica que, en las exposiciones a esta sustancia, la aportación por la vía cutánea puede resultar significativa para el contenido corporal total si no se adoptan medidas para prevenir la absorción. En estas situaciones, es aconsejable la utilización del control biológico para poder cuantificar la cantidad global absorbida del contaminante), VLB® (Agente químico que tiene Valor Límite Biológico), v (Real Decreto 1124/2000, de 16 de junio (BOE nº 145 de 17 de junio de 2000), por el que se modifica el Real Decreto 665/1997, de 12 de mayo, sobre la protección de los trabajadores contra los riesgos relacionados con la exposición a agentes cancerígenos durante el trabajo), r (Esta sustancia tiene establecidas restricciones a la fabricación, la comercialización o el uso en los términos especificados en el “Reglamento (CE) nº 1907/2006 sobre Registro, Evaluación, Autorización y Restricción de sustancias y preparados químicos” (REACH) de 18 de diciembre de 2006 (DOUE L 369 de 30 de diciembre de 2006). Las restricciones de una sustancia pueden aplicarse a todos los usos o sólo a usos concretos. El anexo XVII del Reglamento REACH contiene la lista de todas las sustancias restringidas y especifica los usos que se han restringido), (Ω) Sujeto a la transposición de la Directiva (UE) 2022/431 del Parlamento Europeo y del Consejo de 9 de marzo de 2022.
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT

Benzene (71-43-2)	
Spain - Biological limit values	
Local name	Benceno
BLV	8 µg/g creatinine Parámetro: Ácido S-Fenilmercaptúrico - Medio: Orina - Momento de muestreo: Final de la jornada laboral (Entrada en vigor el 5 de abril de 2026) 2 mg/l Parámetro: Ácido t,t-Mucónico - Medio: Orina - Momento de muestreo: Final de la jornada laboral 0.045 mg/g creatinine Parámetro: Ácido S-Fenilmercaptúrico - Medio: Orina - Momento de muestreo: Final de la jornada laboral
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Sweden - Occupational Exposure Limits	
Local name	Bensen
NGV (OEL TWA)	0.66 mg/m³ (Gränsvärdet träder i kraft den 5 april 2026) 1.5 mg/m³
NGV (OEL TWA)	0.2 ppm (Gränsvärdet träder i kraft den 5 april 2026) 0.5 ppm
KGV (OEL STEL)	9 mg/m³
KGV (OEL STEL)	3 ppm
Remark	C (Ämnet är cancerframkallande. Risk för cancer finns även vid annan exponering än via inandning. För vissa cancerframkallande ämnen som inte har gränsvärden gäller förbud eller tillståndskrav enligt föreskrifterna om kemiska arbetsmiljörisker); H (Ämnet kan lätt upptas genom huden. Det föreskrivna gränsvärdet bedöms ge tillräckligt skydd endast under förutsättning att huden är skyddad mot exponering för ämnet ifråga)
Regulatory reference	Hygieniska gränsvärden (AFS 2022:5)
United Kingdom - Occupational Exposure Limits	
Local name	Benzene
WEL TWA (OEL TWA)	3.25 mg/m³
WEL TWA (OEL TWA)	1 ppm
Remark	Carc (Capable of causing cancer and/or heritable genetic damage), Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Iceland - Occupational Exposure Limits	
Local name	Bensen
OEL TWA	0.66 mg/m³
OEL TWA	0.2 ppm

Benzene (71-43-2)	
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð), K (efnið er krabbameinsvaldandi)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 1309/2023)
Norway - Occupational Exposure Limits	
Local name	Benzen
Grenseverdi (OEL TWA)	0.33 mg/m³ Fra april 2028 0.66 mg/m³ Fram til april 2028
Grenseverdi (OEL TWA)	0.1 ppm Fra april 2028 0.2 ppm Fram til april 2028
Korttidsverdi (OEL STEL)	1.98 mg/m³ (value calculated)
Korttidsverdi (OEL STEL)	0.6 ppm (value calculated)
Remark	H: Kjemikalier som kan tas opp gjennom huden; K: Kjemikalier som skal betraktes som kreftfremkallende; M: Kjemikalier som skal betraktes som mutagene; G: EU har fastsatt en bindende grenseverdi og/eller anmerkning for stoffet.
OEL chemical category	Skin notation, Carcinogen, Potential mutagen
Regulatory reference	FOR-2024-04-05-581
USA - ACGIH - Occupational Exposure Limits	
Local name	Benzene
ACGIH OEL TWA	0.02 ppm
Remark (ACGIH)	TLV® Basis: Myelodysplastic syndrome; acute myeloid leukemia; leukemia; hematologic eff; chromosomal dam. Notations: Skin; A1 (Confirmed Human Carcinogen); BEI
ACGIH chemical category	Confirmed Human Carcinogen, Skin - potential significant contribution to overall exposure by the cutaneous route
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Benzene
BEI	25 µg/g creatinine Parameter: S-Phenylmercapturic acid - Medium: urine - Sampling time: End of shift - Notations: B 500 µg/g creatinine Parameter: t,t-Muconic acid - Medium: urine - Sampling time: End of shift - Notations: B
Regulatory reference	ACGIH 2024

cumene (98-82-8)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	2-Phenylpropane (Cumene)

cumene (98-82-8)	
IOEL TWA	50 mg/m³
IOEL TWA	10 ppm
IOEL STEL	250 mg/m³
IOEL STEL	50 ppm
Remark	Skin. During exposure monitoring, account should be taken of relevant biological monitoring values as suggested by the Scientific Committee on Occupational Exposure Limits for Chemicals Agents (SCOEL)
Regulatory reference	COMMISSION DIRECTIVE (EU) 2019/1831
Austria - Occupational Exposure Limits	
Local name	Isopropylbenzol
MAK (OEL TWA)	100 mg/m³ 50 mg/m³
MAK (OEL TWA)	20 ppm 10 ppm
MAK (OEL STEL)	250 mg/m³ (4x 15(Miw) min) 250 mg/m³ (4x 15(Miw) min)
MAK (OEL STEL)	50 ppm (4x 15(Miw) min) 50 ppm (4x 15(Miw) min)
Remark	H H
Regulatory reference	BGBl. II Nr. 238/2018 BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	Cumène (2-phénylpropane) # Cumeen (2-fenylpropaan)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm

cumene (98-82-8)	
Remark	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. Lors du suivi de l’exposition, il convient de tenir compte des valeurs de suivi biologique appropriées, comme le suggère le Comité scientifique en matière de limites d’exposition professionnelle à des agents chimiques (SCOEL). # 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.) Tijdens de monitoring van de blootstelling moet rekening worden gehouden met de relevante, door het Wetenschappelijk Comité inzake grenswaarden voor beroepsmatige blootstelling aan chemische agentia (SCOEL) voorgestelde, biologische monitoringwaarden.
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	2-Фенилпропан (Кумен)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	Кожа (възможна е значителна резорбция чрез кожата); • (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност); При мониторинга на експозицията следва да се вземат под внимание съответните методи за биологичен мониторинг на Научния комитет за граничните стойности на професионална експозиция (SCOEL - НКГСПЕ) съгласно приложение № 2.
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Bulgaria - Biological limit values	
Local name	2-Фенилпропан (Кумен)
BLV	7 mg/g creatinine Parameter: 2-Phenol-2 propanol - Medium: urine - Sampling time: up to two hours after the end of work shift (possible significant absorption through the skin)
Remark	• Химични агенти, за които са определени биологични гранични стойности за Европейската общност. Биологичните гранични стойности на тези химични агенти, определени с наредбата, са съобразени със съответните стойности, приети за Европейската общност, като могат да бъдат равни или по-ниски от тях.

cumene (98-82-8)	
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Croatia - Occupational Exposure Limits	
Local name	2-Fenilpropan (kumen)
GVI (OEL TWA)	50 mg/m³
GVI (OEL TWA)	10 ppm
KGVI (OEL STEL)	250 mg/m³
KGVI (OEL STEL)	50 ppm
Remark	Direktiva: 2019/1831. Napomena: Koža (razvrstana kao tvar koja nadražuje kožu (H315))
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Cyprus - Occupational Exposure Limits	
Local name	Κουμένιο
OEL TWA	100 mg/m³
OEL TWA	20 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	δέρμα
Regulatory reference	Κανονισμοί του 2007 (Κ.Δ.Π. 295/2007)
Czech Republic - Occupational Exposure Limits	
Local name	Kumen (2-Fenylpropan; Isopropylbenzen)
PEL (OEL TWA)	50 mg/m³
PEL (OEL TWA)	10 ppm
NPK-P (OEL C)	250 mg/m³
NPK-P (OEL C)	50 ppm
Remark	D - při expozici se významně uplatňuje pronikání faktoru kůží.
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Isopropylbenzen (Cumen)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³

cumene (98-82-8)	
OEL STEL	20 ppm
Remark	E (betyder, at stoffet har en EF-grænseværdi); H (betyder, at stoffet kan optages gennem huden)
Regulatory reference	BEK nr 291 af 19/03/2024
Estonia - Occupational Exposure Limits	
Local name	2-fenüülpropaan (kumeen)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	A (Naha kaudu kergesti imenduv aine)
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	Kumeeni
HTP (OEL TWA)	50 mg/m³
HTP (OEL TWA)	10 ppm
HTP (OEL STEL)	250 mg/m³
HTP (OEL STEL)	50 ppm
Remark	Iho
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Cumène (Isopropylbenzène; 2-phénylpropane)
VME (OEL TWA)	50 mg/m³
VME (OEL TWA)	10 ppm
VLE (OEL C/STEL)	250 mg/m³
VLE (OEL C/STEL)	50 ppm
Remark	Valeurs règlementaires contraignantes. Risque de pénétration percutanée, Classification Cancérogène de catégorie 1B dans la 18ième ATP. Si un suivi biologique est mis en place, le suivi de l'exposition s'effectue à partir des valeurs de suivi biologique disponibles et appropriées pour cet agent chimique.
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)

cumene (98-82-8)	
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Cumol
AGW (OEL TWA)	50 mg/m³
AGW (OEL TWA)	10 ppm
Peak exposure limitation factor	4(II)
Remark	AGS - Ausschuss für Gefahrstoffe; DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich); H - hautresorptiv; X - Krebserzeugender Stoff der Kat. 1A oder 1B oder krebserzeugende Tätigkeit oder Verfahren nach § 2 Absatz 3 Nr. 4 der Gefahrstoffverordnung – es ist zusätzlich § 10 GefStoffV zu beachten; Y - Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden
Regulatory reference	TRGS900
Germany - Biological limit values (TRGS 903)	
Local name	Cumol (Iso-Propylbenzol)
Biological limit value	10 mg/g creatinine Parameter: 2-Phenyl-2-propanol (after hydrolysis) - Medium: urine - Sampling time: end of shift
Regulatory reference	TRGS 903
Greece - Occupational Exposure Limits	
Local name	Φαινυλοπροπάνιο (κουμένιο)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	Η ένδειξη «δέρμα» στις οριακές τιμές επαγγελματικής έκθεσης επισημαίνει το ενδεχόμενο σημαντικής διείσδυσης μέσω του δέρματος.
Regulatory reference	Π.Δ. 72/2021 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Hungary - Occupational Exposure Limits	
Local name	KUMOL
AK (OEL TWA)	50 mg/m³
CK (OEL STEL)	250 mg/m³

cumene (98-82-8)	
Remark	b (Bőrön át is felszívódik), i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat); EU8 (2019/1831 EU irányelvben közölt érték); R (Azok az anyagok, amelyek egészségkárosító hatása RÖVID expozíció hatására jelentkezik)
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	Isopropyl benzene (Cumene)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	IOELV (Indicative Occupational Exposure Limit Values), Skin (Substances which have the capacity to penetrate intact skin when they come in contact with it and be absorbed into the body. A substantial contribution to the total body burden via dermal exposure is possible), Carc.1B (Substances presumed to have carcinogenic potential for humans)
Regulatory reference	Chemical Agents Code of Practice 2024
Italy - Occupational Exposure Limits	
Local name	Cumene (2-fenilpropano)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	Cute
Regulatory reference	Allegato XXXVIII del Decreto Legislativo 4 settembre 2024, n. 135
Latvia - Occupational Exposure Limits	
Local name	Kumols (2-fenilpropāns, izopropilbenzols, propilbenzols)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	Āda
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).

cumene (98-82-8)	
Latvia - Biological Exposure Indices	
Local name	Kumols (2-fenilpropāns, izopropilbenzols, propilbenzols)
BEI	7 µg/g creatinine Parameter: Cumene - Medium: urine - Sampling time: no later than two hours after the end of the shift
Regulatory reference	Ministru kabineta 2008. gada 29. septembra noteikumi Nr. 803 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 190).
Lithuania - Occupational Exposure Limits	
Local name	Izopropilbenzenas, 2-fenilpropanas (kumenas)
IPRV (OEL TWA)	50 mg/m³
IPRV (OEL TWA)	10 ppm
TPRV (OEL STEL)	170 mg/m³
TPRV (OEL STEL)	35 ppm
Remark	O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą); Atliekant poveikio stebėseną, be orientacinių profesinio poveikio ribinių verčių reikia atsižvelgti į biologinės stebėsenos vertes
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-14/A1-11, 2021-01-06)
Luxembourg - Occupational Exposure Limits	
Local name	2-Phénylpropane (cumène)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	Peau
Regulatory reference	Mémorial A Nº 226 de 2021 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
Malta - Occupational Exposure Limits	
Local name	2-Phenyl-propane (Cumene)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm

cumene (98-82-8)	
Remark	Skin. During exposure monitoring, account should be taken of relevant biological monitoring values as suggested by the Scientific Committee on Occupational Exposure Limits for Chemical Agents (SCOEL). # Ġilda
Regulatory reference	S.L. 424.24 - Chemical Agents at Work Regulations (L.N. 356 of 2021) # L.S. 424.24 - Regolamenti dwar Aġenti Kimiċi fuq il-Post tax-Xogħol (A.L. 356 tal-2021)
Netherlands - Occupational Exposure Limits	
Local name	2-Fenylpropaan (cumeen)
TGG-8u (OEL TWA)	50 mg/m³
TGG-8u (OEL TWA)	10 ppm
TGG-15min (OEL STEL)	250 mg/m³
TGG-15min (OEL STEL)	50 ppm
Remark	Bij het beoordelen van de blootstelling wordt rekening gehouden met de relevante, door het Wetenschappelijk Comité inzake grenswaarden voor beroepsmatige blootstelling aan chemische agentia (SCOEL) voorgestelde, biologische-monitoringwaarden. H (Huidopname) Stoffen die relatief gemakkelijk door de huid kunnen worden opgenomen, hetgeen een substantiële bijdrage kan betekenen aan de totale inwendige blootstelling, hebben in de lijst een H-aanduiding. Bij deze stoffen moeten naast maatregelen tegen inademing ook adequate maatregelen ter voorkoming van huidcontact worden genomen.
Regulatory reference	Arbeidsomstandighedenregeling 2024
Portugal - Indicative Occupational Exposure Limit (IOEL)	
Local name	2 -Fenilpropano (Cumeno)
IOEL TWA	10 mg/m³ Fração inalável
IOEL TWA	50 ppm Fração inalável
IOEL STEL	250 mg/m³ Fração inalável
IOEL STEL	50 ppm Fração inalável
Remark	Cutânea.
Regulatory reference	Decreto-Lei n.º 1/2021 de 6 de janeiro
Portugal - Occupational Exposure Limits	
Local name	Cumeno
OEL TWA	50 ppm
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	Cumen/Izopropilbenzen (2-Fenilpropan)
OEL TWA	50 mg/m³

cumene (98-82-8)	
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
OEL chemical category	Skin notation
Remark	P - posibilitatea unei penetrări cutanate importante
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	2-Fenylpropán (izopropylbenzén, kumén)
NPHV (OEL TWA)	50 mg/m³
NPHV (OEL TWA)	10 ppm
NPHV (OEL STEL)	250 mg/m³
NPHV (OEL STEL)	50 ppm
Remark	K – znamená, že faktor môže byť ľahko absorbovaný kožou
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovakia - Biological limit values	
Local name	2-Fenylpropán (kumén)
BLV	10.6 mg/l Parameter: 2-Phenylpropane - Medium: urine - Sampling time: end of exposure or work shift
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	Kumen (2-fenilpropan)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	K (Lastnost lažjega prehajanja snovi v organizem skozi kožo), Y (Snovi, pri katerih ni nevarnosti za zarodek ob upoštevanju mejnih vrednosti in bat vrednosti), BAT (Biološka mejna vrednost), EU
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4. 4. 2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu
Slovenia - Biological limit values	
Local name	kumen
BLV	10 mg/g creatinine Parameter: 2-fenil-2-propanol (po hidrolizi) - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene

cumene (98-82-8)	
Regulatory reference	Uradni list RS, št. 29/24 z dne 4. 4. 2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu
Spain - Occupational Exposure Limits	
Local name	Cumeno
VLA-ED (OEL TWA)	50 mg/m³
VLA-ED (OEL TWA)	10 ppm
VLA-EC (OEL STEL)	250 mg/m³
VLA-EC (OEL STEL)	50 ppm
Remark	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), VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo), VLB® (Agente químico que tiene Valor Límite Biológico).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Spain - Biological limit values	
Local name	Cumeno
BLV	7 mg/g creatinine Parameter: 2-Phenyl-2-propanol - Medium: urine - Sampling time: end of shift (with hydrolysis)
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Sweden - Occupational Exposure Limits	
Local name	Isopropylbensen (Kumen)
NGV (OEL TWA)	50 mg/m³
NGV (OEL TWA)	10 ppm
KGV (OEL STEL)	250 mg/m³
KGV (OEL STEL)	50 ppm
Remark	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 2020:6)
United Kingdom - Occupational Exposure Limits	
Local name	Cumene
WEL TWA (OEL TWA)	125 mg/m³

cumene (98-82-8)	
WEL TWA (OEL TWA)	25 ppm
WEL STEL (OEL STEL)	250 mg/m³
WEL STEL (OEL STEL)	50 ppm
Remark	Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity)
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Iceland - Occupational Exposure Limits	
Local name	Kúmen (ísóprópýlbensen)
OEL TWA	50 mg/m³
OEL TWA	10 ppm
OEL STEL	250 mg/m³
OEL STEL	50 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 631/2021)
Norway - Occupational Exposure Limits	
Local name	1-metyletylbenzen (Kumen; 2-fenylpropan)
Grenseverdi (OEL TWA)	50 mg/m³
Grenseverdi (OEL TWA)	10 ppm
Korttidsverdi (OEL STEL)	250 mg/m³
Korttidsverdi (OEL STEL)	50 ppm
Remark	H: Kjemikalier som kan tas opp gjennom huden; K: Kjemikalier som skal betraktes som kreftfremkallende; E: EU har en veiledende grenseverdi og/eller anmerkning for stoffet.
Regulatory reference	FOR-2024-04-05-581
USA - ACGIH - Occupational Exposure Limits	
Local name	Cumene
ACGIH OEL TWA	5 ppm
Remark (ACGIH)	TLV® Basis: URT adenoma; neurological eff. Notations: A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans)
ACGIH chemical category	Confirmed Animal Carcinogen with Unknown Relevance to Humans
Regulatory reference	ACGIH 2024

styrene (100-42-5)	
Austria - Occupational Exposure Limits	
MAK (OEL TWA)	85 mg/m³
MAK (OEL TWA)	20 ppm
MAK (OEL STEL)	340 mg/m³ max. 4x15 min./Schicht
MAK (OEL STEL)	80 ppm max. 4x15 min./Schicht
Belgium - Occupational Exposure Limits	
Local name	Styrène (monomère) # Styreen (monomeer)
OEL TWA	108 mg/m³
OEL TWA	25 ppm
OEL STEL	216 mg/m³
OEL STEL	50 ppm
Remark	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. # D: de vermelding “D” betekent dat de opname van het agens via de huid, de slijmvliezen of de ogen een belangrijk deel van de totale blootstelling vormt. Deze opname kan het gevolg zijn van zowel direct contact als zijn aanwezigheid in de lucht.
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
Bulgaria - Occupational Exposure Limits	
Local name	Стирен
OEL TWA	85 mg/m³
OEL STEL	215 mg/m³
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Bulgaria - Biological limit values	
Local name	Стирен
BLV	600 mg/g creatinine Биомаркер за експозиция/биомаркер за ефект: бадемена и фенилглиоксалова киселина - сумарно - Биологична среда: урина - Време на пробовземане: При отдалечена експозиция - след няколко работни смени. 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. 28 от 2024 г., в сила от 05.04.2024 г.)
Croatia - Occupational Exposure Limits	
Local name	Stiren

styrene (100-42-5)	
GVI (OEL TWA)	430 mg/m³
GVI (OEL TWA)	100 ppm
KGVI (OEL STEL)	1080 mg/m³
KGVI (OEL STEL)	250 ppm
Remark	Koža (razvrstana kao tvar koja nadražuje kožu (H315))
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Croatia - Biological limit values	
Local name	Stiren
BLV	0.19 µmol/l Karakteristični pokazatelj: stiren - Biološki uzorak: krv - Vrijeme uzorkovanja: oko 16 sati nakon završetka radne smjene 20 µg/l Karakteristični pokazatelj: stiren - Biološki uzorak: krv - Vrijeme uzorkovanja: oko 16 sati nakon završetka radne smjene 600 mg/g creatinine Karakteristični pokazatelj: bademova + fenilglioksalna kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene (kod kronične izloženosti u sredini radnog tjedna) 0.74 mol/mol Creatinine Karakteristični pokazatelj: bademova kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene 1 g/g creatinine Karakteristični pokazatelj: bademova kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene 0.18 mol/mol Creatinine Karakteristični pokazatelj: fenilglioksilna kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene 240 mg/g creatinine Karakteristični pokazatelj: fenilglioksilna kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 91/2018)
Czech Republic - Occupational Exposure Limits	
Local name	Styren (Ethenylbenzen; Fenylethylen; Vinylbenzen)
PEL (OEL TWA)	100 mg/m³
PEL (OEL TWA)	23 ppm
NPK-P (OEL C)	400 mg/m³
NPK-P (OEL C)	92 ppm
Remark	B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, I - dráždí sliznice (oči, dýchací cesty) resp. kůži, P - u látky nelze vyloučit závažné pozdní účinky (s větou H372, H373).
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)

styrene (100-42-5)	
Czech Republic - Biological limit values	
Local name	Styren (Ethenylbenzen; Fenylethylen; Vinylbenzen)
BLV	400 mg/g creatinine Ukazatel: Mandlová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 300 µmol/mmol Creatinine Ukazatel: Mandlová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 600 mg/g creatinine Ukazatel: Mandlová + fenylglyoxylová 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	Styren (Ethenylbenzen; Phenylethen; Vinylbenzen)
OEL C	105 mg/m³
OEL C	25 ppm
Remark	H (betyder, at stoffet kan optages gennem huden); K (betyder, at stoffet anses for at kunne være kræftfremkaldende)
Regulatory reference	BEK nr 291 af 19/03/2024
Finland - Occupational Exposure Limits	
Local name	Styreeni
HTP (OEL TWA)	86 mg/m³
HTP (OEL TWA)	20 ppm
HTP (OEL STEL)	430 mg/m³
HTP (OEL STEL)	100 ppm
Remark	Melu
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
Finland - Biological limit values	
Local name	Styreeni
BLV	1.2 mmol/l Parametri: Virtsan MAPGA (Virtsan manteli- ja fenyyliglyoksyylihappo) - Näytteenottoajankohta: Työpäivän jälkeinen aamu
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Styrène
VME (OEL TWA)	100 mg/m³
VME (OEL TWA)	23.3 ppm
VLE (OEL C/STEL)	200 mg/m³
VLE (OEL C/STEL)	46.6 ppm

styrene (100-42-5)	
Remark	Valeurs règlementaires contraignantes. Toxique pour la reproduction de catégorie 2, Risque de pénétration percutanée. Ces valeurs sont assortie de la mention "bruit" indiquant la possibilité d'une atteinte auditive en cas de co-exposition au bruit.
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Styrol
AGW (OEL TWA)	86 mg/m³
AGW (OEL TWA)	20 ppm
AGW (OEL C)	172 mg/m³
Peak exposure limitation factor	2(II)
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); Y - Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden
Regulatory reference	TRGS900
Germany - Biological limit values (TRGS 903)	
Local name	Styrol
Biological limit value	600 mg/g creatinine Parameter: Mandelsäure plus Phenylglyoxylsäure - Untersuchungsmaterial: U = Urin - Probenahmezeitpunkt: b) Expositionsende, bzw. Schichtende - Festlegung/Begründung: 05/2024 DFG
Regulatory reference	TRGS 903
Greece - Occupational Exposure Limits	
Local name	Στυρόλιο
OEL TWA	425 mg/m³
OEL TWA	100 ppm
OEL STEL	1050 mg/m³
OEL STEL	250 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	SZTIROL
AK (OEL TWA)	86 mg/m³
CK (OEL STEL)	172 mg/m³

styrene (100-42-5)	
Remark	i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat), BEM (biológiai expozíciós mutató); R+T (Azok az anyagok, amelyek RÖVID és TARTÓS expozíciója is egészségkárosodást okoz)
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	Sztirol
BEI	600 mg/g creatinine Biológiai expozíciós (hatás) mutató: mandulasav - Biológiai minta: vizeletben - Mintavétel ideje: mhv., m.v. (munkahét végén, műszak végén) 450 µmol/mmol Creatinine Biológiai expozíciós (hatás) mutató: mandulasav - Biológiai minta: vizeletben - Mintavétel ideje: mhv., m.v. (munkahét végén, 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	Styrene [Phenylethylene, Vinyl benzene]
OEL TWA	85 mg/m³
OEL TWA	20 ppm
OEL STEL	170 mg/m³
OEL STEL	40 ppm
Remark	Advisory OELV (Advisory Occupational Exposure Limit Values)
Regulatory reference	Chemical Agents Code of Practice 2024
Ireland - Biological limit values	
Local name	Styrene
BMGV	400 mg/g creatinine Parameter: mandelic acid plus phenylglyoxylic acid - Medium: urine - Sampling time: End of shift - Notations: Ns (Non-specific) 0.2 mg/l Parameter: styrene - Medium: venous blood - Sampling time: End of shift - Notations: Sq (Semi-quantitative)
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
Latvia - Occupational Exposure Limits	
Local name	Stirols (vinilbenzols)
OEL TWA	10 mg/m³
OEL STEL	30 mg/m³
Remark	Ietekme uz dzirdi

styrene (100-42-5)	
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).
Lithuania - Occupational Exposure Limits	
Local name	Stirenas (stirolas)
IPRV (OEL TWA)	90 mg/m³
IPRV (OEL TWA)	20 ppm
TPRV (OEL STEL)	200 mg/m³
TPRV (OEL STEL)	50 ppm
Remark	O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą); Projektuojant naujus objektus ar keičiant senus, reikia stengtis užtikrinti, kad stireno poveikis per darbo dieną būtų priimtinas laikantis IPRD 10 ppm koncentracijos.
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Netherlands - Occupational Exposure Limits	
TGG-8u (OEL TWA)	107 mg/m³
Poland - Occupational Exposure Limits	
Local name	Styren
NDS (OEL TWA)	50 mg/m³
NDSCh (OEL STEL)	100 mg/m³
Regulatory reference	Dz. U. 2024 poz. 1017 wraz z późn. zm.
Portugal - Occupational Exposure Limits	
Local name	Estireno, monómero
OEL TWA	20 ppm
OEL STEL	40 ppm
Remark	A4 (Agente não classificável como carcinogénico no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	Estireno
BEI	400 mg/g creatinine Parâmetro: Soma do ácido mandélico e ácido fenilflioxílico - Meio: urina - Momento da amostragem: Fim do turno - Notaçao: Ne (Não específico) 0.2 mg/l Parâmetro: Estireno - Meio: sangue - Momento da amostragem: Fim do turno - Notaçao: Sq (Semi quantitativo)
Regulatory reference	Norma Portuguesa NP 1796:2014

styrene (100-42-5)	
Romania - Occupational Exposure Limits	
Local name	Stiren
OEL TWA	50 mg/m³
OEL TWA	12 ppm
OEL STEL	150 mg/m³
OEL STEL	35 ppm
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Romania - Biological limit values	
Local name	Stiren
BLV	800 mg/g creatinine Indicatorul biologic: Acid mandelic - Material biologic: urină - Momentul recoltării: sfârșit de schimb 300 mg/g creatinine Indicatorul biologic: Acid mandelic - Material biologic: urină - Momentul recoltării: începutul schimbului următor 100 mg/g creatinine Indicatorul biologic: Acid fenilglioxalic - Material biologic: urină - Momentul recoltării: sfârșit de schimb 0.55 mg/l Indicatorul biologic: Stiren - Material biologic: sânge - Momentul recoltării: sfârșit de schimb 0.02 mg/l Indicatorul biologic: Stiren - Material biologic: sânge - Momentul recoltării: începutul schimbului următor
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	Styrén
NPHV (OEL TWA)	90 mg/m³
NPHV (OEL TWA)	20 ppm
NPHV (OEL STEL)	200 mg/m³
NPHV (OEL STEL)	50 ppm
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovakia - Biological limit values	
Local name	Styrén
BLV	600 mg/g creatinine Zisťovaný faktor: Kyselina mandľová a kyselina fenylglyoxylová - Vyšetrovaný materiál: moč - Čas odberu vzorky: c) pri dlhodobej expozícii; po viacerých pracovných zmenách, b) koniec expozície alebo pracovnej zmeny
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	stiren
OEL TWA	86 mg/m³

styrene (100-42-5)	
OEL TWA	20 ppm
OEL STEL	172 mg/m³
OEL STEL	40 ppm
Remark	Y (Snovi, pri katerih ni nevarnosti za zarodek ob upoštevanju mejnih vrednosti in bat vrednosti), BAT (Biološka mejna vrednost)
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4. 4. 2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu
Slovenia - Biological limit values	
Local name	stiren
BLV	600 mg/g creatinine Parameter: mandljeva kislina in fenilglioksilna kislina - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene,pri dolgotrajni izpostavljenosti: ob koncu delovne izmene po več zaporednih delavnikih
Regulatory reference	Uradni list RS, št. 29/24 z dne 4. 4. 2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu
Spain - Occupational Exposure Limits	
Local name	Estireno
VLA-ED (OEL TWA)	86 mg/m³
VLA-ED (OEL TWA)	20 ppm
VLA-EC (OEL STEL)	172 mg/m³
VLA-EC (OEL STEL)	40 ppm

styrene (100-42-5)	
Remark	VLB® (Agente químico que tiene Valor Límite Biológico), ae (Alterador endocrino. Hay una serie de sustancias utilizadas en la industria, la agricultura y los bienes de consumo de las que se sospecha que interfieren con los sistemas endocrinos de los seres humanos y de los animales y que son causantes de perjuicios para la salud como el cáncer, alteraciones del comportamiento y anomalías en la reproducción. Tales sustancias se denominan “alteradores endocrinos”. [Aplicación de la estrategia comunitaria en materia de alteradores endocrinos-sustancias de las que se sospecha interfieren en los sistemas hormonales de seres humanos y animales-COM (1999) 706. Comisión de las Comunidades Europeas, COM (2001) 262 final, Bruselas 14.06.2001]. En el caso del ser humano, algunas vías posibles de exposición a alteradores endocrinos son la exposición directa en el lugar de trabajo o a través de productos de consumo como alimentos, ciertos plásticos, pinturas, detergentes y cosméticos, o indirecta a través del medio ambiente (aire, agua y suelo). [Estrategia comunitaria en materia de alteradores endocrinos (sustancias de las que se sospecha interfieren en los sistemas hormonales de seres humanos y animales). Comisión de las Comunidades Europeas, COM (1999) 706 final, Bruselas 17.12.1999]. Los valores límite asignados a estos agentes no se han establecido para prevenir los posibles efectos de alteración endocrina, lo cual justifica una vigilancia adecuada de la salud).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Spain - Biological limit values	
Local name	Estireno
BLV	400 mg/g creatinine Parámetro: Ácido mandélico más ácido fenilglioxílico - Medio: Orina - Momento de muestreo: Final de la jornada laboral - Notas: I (Significa que el indicador biológico es inespecífico puesto que puede encontrarse después de la exposición a otros agentes químicos) 0.2 mg/l Parámetro: Estireno - Medio: Sangre venosa - Momento de muestreo: Final de la jornada laboral - Notas: S (Significa que el indicador biológico es un indicador de exposición al agente químico en cuestión, pero la interpretación cuantitativa de su medida es ambigua (semicuantitativa). Estos indicadores biológicos deben utilizarse como una prueba de selección (screening) cuando no se pueda realizar una prueba cuantitativa o usarse como prueba de confirmación, si la prueba cuantitativa no es específica y el origen del determinante es dudoso)
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Sweden - Occupational Exposure Limits	
Local name	Styren
NGV (OEL TWA)	43 mg/m³

styrene (100-42-5)	
NGV (OEL TWA)	10 ppm
KGV (OEL STEL)	86 mg/m³
KGV (OEL STEL)	20 ppm
Remark	B (Ämnet kan orsaka hörselskada. Exponering för ämnet nära det befintliga yrkeshygieniska gränsvärdet och vid samtidig exponering för buller nära insatsvärdet 80 dB kan orsaka hörselskada); 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); V (Vägledande korttidsgränsvärde ska användas som ett rekommenderat högsta värde som inte bör överskridas)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	Styrene
WEL TWA (OEL TWA)	430 mg/m³
WEL TWA (OEL TWA)	100 ppm
WEL STEL (OEL STEL)	1080 mg/m³
WEL STEL (OEL STEL)	250 ppm
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Iceland - Occupational Exposure Limits	
Local name	Stýren (etenýlbensen, fenýleten, vínýlbensen)
OEL STEL	105 mg/m³
OEL STEL	25 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Norway - Occupational Exposure Limits	
Local name	Styren (Vinylbenzen)
Grenseverdi (OEL TWA)	105 mg/m³
Grenseverdi (OEL TWA)	25 ppm
Remark	M: Kjemikalier som skal betraktes som mutagene.
Regulatory reference	FOR-2024-04-05-581
USA - ACGIH - Occupational Exposure Limits	
Local name	Styrene
ACGIH OEL TWA	10 ppm
ACGIH OEL STEL	20 ppm

styrene (100-42-5)	
Remark (ACGIH)	TLV® Basis: CNS & hearing impair; URT irr; peripheral neuropathy; visual disorders. Notations: OTO; A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans); BEI
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Styrene
BEI	150 mg/g creatinine Parameter: Mandelic acid plus phenylglyoxylic acid - Medium: urine - Sampling time: End of shift - Notations: Ns 20 µg/l Parameter: Styrene - Medium: urine - Sampling time: End of shift
Regulatory reference	ACGIH 2024

ethylbenzene (100-41-4)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Ethylbenzene
IOEL TWA	442 mg/m³
IOEL TWA	100 ppm
IOEL STEL	884 mg/m³
IOEL STEL	200 ppm
Remark	Skin
Regulatory reference	COMMISSION DIRECTIVE 2000/39/EC
Austria - Occupational Exposure Limits	
Local name	Ethylbenzol
MAK (OEL TWA)	440 mg/m³
MAK (OEL TWA)	100 ppm
MAK (OEL STEL)	880 mg/m³ (8x 5(Mow) min)
MAK (OEL STEL)	200 ppm (8x 5(Mow) min)
Remark	H
OEL chemical category	Skin notation
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	551 mg/m³
OEL STEL	125 ppm
Remark	D
OEL chemical category	Skin, Skin notation

ethylbenzene (100-41-4)	
Bulgaria - Occupational Exposure Limits	
Local name	Етилбензен
OEL TWA	435 mg/m³
OEL STEL	545 mg/m³
Remark	Кожа (възможна е значителна резорбция чрез кожата); • (Химични агенти, за които са определени гранични стойности във въздуха на работната среда за Европейската общност)
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Bulgaria - Biological limit values	
Local name	Етилбензен
BLV	2000 mg/g creatinine Parameter: Mandelic acid and Phenylglyoxylic acid - total - Medium: urine - Sampling time: at the end of exposure or end of work shift (possible significant absorption through the skin)
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Croatia - Occupational Exposure Limits	
Local name	Etilbenzen
GVI (OEL TWA)	442 mg/m³
GVI (OEL TWA)	100 ppm
KGVI (OEL STEL)	884 mg/m³
KGVI (OEL STEL)	200 ppm
Remark	Direktiva: 2000/39/EZ. Napomena: Koža (razvrstana kao tvar koja nadražuje kožu (H315))
OEL chemical category	Skin notation
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Croatia - Biological limit values	
Local name	Etilbenzen
BLV	1.5 mg/l Parameter: Ethylbenzene - Medium: blood - Sampling time: during exposure 1.5 g/g creatinine Parameter: Mandelic acid - Medium: urine - Sampling time: at the end of the work shift and at the end of the working week (calculated on the average Creatinine value of 1.2 g/L urine)

ethylbenzene (100-41-4)	
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	Αιθυλοβενζένιο
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
OEL chemical category	Skin-potential for cutaneous absorption
Remark	δέρμα
Regulatory reference	Κανονισμοί του 2007 (Κ.Δ.Π. 295/2007)
Czech Republic - Occupational Exposure Limits	
Local name	Ethylbenzen
PEL (OEL TWA)	200 mg/m³
PEL (OEL TWA)	45.33 ppm
NPK-P (OEL C)	500 mg/m³
NPK-P (OEL C)	113.32 ppm
Remark	D - při expozici se významně uplatňuje pronikání faktoru kůží, B - u látky je zaveden biologický expoziční test (BET) v moči nebo krvi, P - u látky nelze vyloučit závažné pozdní účinky (s větou H372, H373).
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Czech Republic - Biological limit values	
Local name	Ethylbenzen
BLV	1100 µmol/mmol Creatinine Parameter: Mandelic acid - Medium: urine - Sampling time: end of shift 1500 mg/g creatinine Parameter: Mandelic acid - Medium: urine - Sampling time: end of shift
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
Denmark - Occupational Exposure Limits	
Local name	Ethylbenzen
OEL TWA	217 mg/m³
OEL TWA	50 ppm
OEL STEL	434 mg/m³
OEL STEL	100 ppm

ethylbenzene (100-41-4)	
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)
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	BEK nr 291 af 19/03/2024
Estonia - Occupational Exposure Limits	
Local name	Etüülbenseen
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
Remark	A (Naha kaudu kergesti imenduv aine), S (Sensibiliseeriv aine)
OEL chemical category	Skin notation, Sensitizer
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	Etyylibentseeni
HTP (OEL TWA)	220 mg/m³
HTP (OEL TWA)	50 ppm
HTP (OEL STEL)	880 mg/m³
HTP (OEL STEL)	200 ppm
Remark	Iho
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
Finland - Biological limit values	
Local name	Etyylibentseeni
BLV	Parameter: Mandelic acid - Medium: urine - Sampling time: after the shift after a working week or exposure period
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	Ethylbenzène
VME (OEL TWA)	88.4 mg/m³
VME (OEL TWA)	20 ppm
VLE (OEL C/STEL)	442 mg/m³
VLE (OEL C/STEL)	100 ppm

ethylbenzene (100-41-4)	
Remark	Valeurs règlementaires contraignantes. Risque de pénétration percutanée
OEL chemical category	Risk of cutaneous absorption
Regulatory reference	Article R4412-149 du Code du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)
France - Biological limit values	
BLV	Parameter: Mandelic acid - Medium: urine - Sampling time: end of shift at end of workweek (per the Authority, the values for this substance must be decided and/or determined on a case by case basis. Guidance for the calculation of and interpretation of values is provided in the source)
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	Ethylbenzol
AGW (OEL TWA)	88 mg/m³ (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
AGW (OEL TWA)	20 ppm (the risk of damage to the embryo or fetus can be excluded when AGW and BGW values are observed)
Peak exposure limitation factor	2(II)
Remark	DFG - Senatskommission zur Prüfung gesundheitsschädlicher Arbeitsstoffe der DFG (MAK-Kommission); H - hautresorptiv; Y - Ein Risiko der Fruchtschädigung braucht bei Einhaltung des Arbeitsplatzgrenzwertes und des biologischen Grenzwertes (BGW) nicht befürchtet zu werden; EU - Europäische Union (Von der EU wurde ein Luftgrenzwert festgelegt: Abweichungen bei Wert und Spitzenbegrenzung sind möglich)
Chemical category	Skin notation
Regulatory reference	TRGS900
Germany - Biological limit values (TRGS 903)	
Local name	Ethylbenzol
Biological limit value	250 mg/g creatinine Parameter: Mandelic acid plus Phenylglyoxylic acid - Medium: urine - Sampling time: end of shift
Regulatory reference	TRGS 903
Greece - Occupational Exposure Limits	
Local name	Αιθυλοβενζόλιο
OEL TWA	435 mg/m³
OEL TWA	100 ppm
OEL STEL	545 mg/m³

ethylbenzene (100-41-4)	
OEL STEL	125 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	ETILBENZOL
AK (OEL TWA)	442 mg/m³
CK (OEL STEL)	884 mg/m³
Remark	b (Bőrön át is felszívódik), i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármat), BEM (biológiai expozíciós mutató); EU1 (2000/39/EK irányelvben közölt érték); T (Azok az anyagok, amelyek egészségkárosító hatása TARTÓS expozíciót követően jelentkezik)
OEL chemical category	Potential for cutaneous absorption
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	Etilbenzol
BEI	1500 mg/g creatinine Biológiai expozíciós (hatás) mutató: mandulasav - Biológiai minta: vizeletben - Mintavétel ideje: mhv., m.v. (munkahét végén, műszak végén) 1110 µmol/mmol Creatinine Biológiai expozíciós (hatás) mutató: mandulasav - Biológiai minta: vizeletben - Mintavétel ideje: mhv., m.v. (munkahét végén, 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	Ethylbenzene
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
Remark	IOELV (Indicative Occupational Exposure Limit Values), Skin (Substances which have the capacity to penetrate intact skin when they come in contact with it and be absorbed into the body. A substantial contribution to the total body burden via dermal exposure is possible)
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Chemical Agents Code of Practice 2024

ethylbenzene (100-41-4)	
Ireland - Biological limit values	
Local name	Ethyl benzene
BMGV	0.7 g/g creatinine Parameter: mandelic acid and phenylglyoxylic acid - Medium: urine - Sampling time: End of shift at end of workweek - Notations: Ns (Non-specific), Sq (Semi-quantitative) Parameter: ethylbenzene - Medium: end-exhaled air - Sampling time: Not critical - Notations: Sq (Semi-quantitative)
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
Italy - Occupational Exposure Limits	
Local name	Etilbenzene
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
Remark	Cute
OEL chemical category	skin - potential for cutaneous absorption
Regulatory reference	Allegato XXXVIII del Decreto Legislativo 4 settembre 2024, n. 135
Latvia - Occupational Exposure Limits	
Local name	Etilbenzols
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
Remark	Āda; Ietekme uz dzirdi
OEL chemical category	skin - potential for cutaneous exposure
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).
Lithuania - Occupational Exposure Limits	
Local name	Etilbenzenas
IPRV (OEL TWA)	442 mg/m³
IPRV (OEL TWA)	100 ppm
TPRV (OEL STEL)	884 mg/m³
TPRV (OEL STEL)	200 ppm
Remark	O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
OEL chemical category	Skin notation

ethylbenzene (100-41-4)	
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Luxembourg - Occupational Exposure Limits	
Local name	Ethylbenzène
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
OEL chemical category	Possibility of significant uptake through the skin
Remark	Peau
Regulatory reference	Mémorial A Nº 226 de 2021 concernant la protection de la sécurité et de la santé des salariés contre les risques liés à des agents chimiques sur le lieu de travail
Malta - Occupational Exposure Limits	
Local name	Ethylbenzene
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
Remark	Skin # Ġilda
OEL chemical category	Possibility of significant uptake through the skin
Regulatory reference	S.L. 424.24 - Chemical Agents at Work Regulations (L.N. 356 of 2021) # L.S. 424.24 - Regolamenti dwar Aġenti Kimiċi fuq il-Post tax-Xogħol (A.L. 356 tal-2021)
Netherlands - Occupational Exposure Limits	
Local name	Ethylbenzeen
TGG-8u (OEL TWA)	215 mg/m³
TGG-8u (OEL TWA)	48.6 ppm
TGG-15min (OEL STEL)	430 mg/m³
TGG-15min (OEL STEL)	97.3 ppm
Remark	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.

ethylbenzene (100-41-4)	
MAC chemical category	Skin notation
Regulatory reference	Arbeidsomstandighedenregeling 2024
Poland - Occupational Exposure Limits	
Local name	Etylobenzen
NDS (OEL TWA)	200 mg/m³
NDSCh (OEL STEL)	400 mg/m³
Remark	Skóra (Oznakowanie substancji notacją „skóra” oznacza, że wchłanianie substancji przez skórę może być tak samo istotne jak przy narażeniu drogą oddechową).
Regulatory reference	Dz. U. 2024 poz. 1017 wraz z późn. zm.
Portugal - Indicative Occupational Exposure Limit (IOEL)	
Local name	Etilbenzeno
IOEL TWA	442 mg/m³
IOEL TWA	100 ppm
IOEL STEL	884 mg/m³
IOEL STEL	200 ppm
Remark	Cutânea.
Regulatory reference	Decreto-Lei n.º 1/2021 de 6 de janeiro
Portugal - Occupational Exposure Limits	
Local name	Etilbenzeno
OEL TWA	442 mg/m³ (indicative limit value)
OEL TWA	20 ppm
OEL STEL	884 mg/m³ (indicative limit value)
OEL STEL	200 ppm (indicative limit value)
OEL chemical category	A3 - Confirmed Animal Carcinogen with Unknown Relevance to Humans, skin - potential for cutaneous exposure indicative limit value
Remark	A3 (Agente carcinogénico confirmado nos animais de laboratorio con relevância desconhecida no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
Portugal - Biological Exposure Indices	
Local name	Etilbenzeno
BEI	0.7 g/g creatinine Parâmetro: Soma do ácido mandélico e do ácido fenilflioxílico - Meio: urina - Momento da amostragem: Fim do turno - Notaçao: Ne (Não específico)
Regulatory reference	Norma Portuguesa NP 1796:2014

ethylbenzene (100-41-4)	
Romania - Occupational Exposure Limits	
Local name	Etilbenzen
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
OEL chemical category	Skin notation
Remark	P - posibilitatea unei penetrări cutanate importante
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Romania - Biological limit values	
Local name	Etilbenzen
BLV	1.5 g/g creatinine Parameter: Mandelic acid - Medium: urine - Sampling time: end of work week
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	Etylbenzén
NPHV (OEL TWA)	442 mg/m³
NPHV (OEL TWA)	100 ppm
NPHV (OEL STEL)	884 mg/m³
NPHV (OEL STEL)	200 ppm
NPHV (OEL C)	884 mg/m³ (also biological monitoring considered)
Remark	K – znamená, že faktor môže byť ľahko absorbovaný kožou
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovakia - Biological limit values	
Local name	Etylbenzén
BLV	12 mg/l Parameter: 2 and 4-Ethylphenol - Medium: urine - Sampling time: end of exposure or work shift (also after all work shifts for long-term exposure) 1600 mg/l Parameter: Mandelic acid and acid phenylglyoxyl - Medium: urine - Sampling time: end of exposure or work shift (also after all work shifts for long-term exposure)
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	etilbenzen

ethylbenzene (100-41-4)	
OEL TWA	442 mg/m³
OEL TWA	100 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
Remark	K (Lastnost lažjega prehajanja snovi v organizem skozi kožo), Y (Snovi, pri katerih ni nevarnosti za zarodek ob upoštevanju mejnih vrednosti in bat vrednosti), BAT (Biološka mejna vrednost), EU
OEL chemical category	Potential for cutaneous absorption
Regulatory reference	Uradni list RS, št. 29/2024 z dne 4. 4. 2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu
Slovenia - Biological limit values	
Local name	etilbenzen
BLV	250 mg/g creatinine Parameter: mandljeva kislina in fenilglioksilna kislina - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene
Regulatory reference	Uradni list RS, št. 29/24 z dne 4. 4. 2024 - Pravilnik o varovanju delavcev pred tveganji zaradi izpostavljenosti kemičnim snovem pri delu
Spain - Occupational Exposure Limits	
Local name	Etilbenceno
VLA-ED (OEL TWA)	441 mg/m³ (indicative limit value)
VLA-ED (OEL TWA)	100 ppm (indicative limit value)
VLA-EC (OEL STEL)	884 mg/m³
VLA-EC (OEL STEL)	200 ppm
Remark	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), VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo).
OEL chemical category	skin - potential for cutaneous absorption
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Spain - Biological limit values	
BLV	700 mg/g creatinine Parameter: Mandelic acid plus Phenylglyoxylic acid - Medium: urine - Sampling time: end of workweek
Sweden - Occupational Exposure Limits	
Local name	Etylbensen

ethylbenzene (100-41-4)	
NGV (OEL TWA)	220 mg/m³
NGV (OEL TWA)	50 ppm
KGV (OEL STEL)	884 mg/m³
KGV (OEL STEL)	200 ppm
Remark	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)
OEL chemical category	Skin notation
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	Ethylbenzene
WEL TWA (OEL TWA)	441 mg/m³
WEL TWA (OEL TWA)	100 ppm
WEL STEL (OEL STEL)	552 mg/m³
WEL STEL (OEL STEL)	125 ppm
Remark	Sk (Can be absorbed through the skin. The assigned substances are those for which there are concerns that dermal absorption will lead to systemic toxicity)
WEL chemical category	Potential for cutaneous absorption
Regulatory reference	EH40/2005 (Fourth edition, 2020). HSE
Iceland - Occupational Exposure Limits	
Local name	Etýlbensen
OEL TWA	200 mg/m³
OEL TWA	50 ppm
OEL STEL	884 mg/m³
OEL STEL	200 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 390/2009)
Norway - Occupational Exposure Limits	
Local name	Etylbenzen
Grenseverdi (OEL TWA)	20 mg/m³
Grenseverdi (OEL TWA)	5 ppm
Korttidsverdi (OEL STEL)	30 mg/m³ (value calculated)
Korttidsverdi (OEL STEL)	10 ppm (value calculated)

ethylbenzene (100-41-4)	
Remark	H: Kjemikalier som kan tas opp gjennom huden; K: Kjemikalier som skal betraktes som kreftfremkallende; E: EU har en veiledende grenseverdi og/eller anmerkning for stoffet.
OEL chemical category	Skin notation, Carcinogen
Regulatory reference	FOR-2024-04-05-581
USA - ACGIH - Occupational Exposure Limits	
Local name	Ethyl benzene
ACGIH OEL TWA	20 ppm
Remark (ACGIH)	TLV® Basis: URT & eye irr; ototoxicity; kidney eff; CNS impair. Notations: OTO (Ototoxicant); A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans); BEI
ACGIH chemical category	Confirmed Animal Carcinogen with Unknown Relevance to Humans
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Ethyl benzene
BEI	150 mg/g creatinine Parameter: Sum of mandelic acid and phenylglyoxylic acid - Medium: urine - Sampling time: End of shift - Notations: Ns
Regulatory reference	ACGIH 2024

8.1.2. Recommended monitoring procedures

No additional information available

8.1.3. Air contaminants formed

No additional information available

8.1.4. DNEL and PNEC

Ortho-Xylene (95-47-6)	
DNEL/DMEL (Workers)	
Acute - systemic effects, dermal	Low hazard (no threshold derived)
Acute - systemic effects, inhalation	442 mg/m³
Acute - local effects, dermal	Low hazard (no threshold derived)
Acute - local effects, inhalation	442 mg/m³
Long-term - systemic effects, dermal	212 mg/kg bodyweight/day
Long-term - local effects, dermal	No hazard identified
Long-term - systemic effects, inhalation	221 mg/m³
Long-term - local effects, inhalation	221 mg/m³
DNEL/DMEL (General population)	
Long-term - systemic effects,oral	2.5 mg/kg bodyweight/day

Ortho-Xylene (95-47-6)	
Long-term - systemic effects, inhalation	65.3 mg/m³
Long-term - local effects, inhalation	65.3 mg/m³
PNEC (Water)	
PNEC aqua (freshwater)	0.044 mg/l
PNEC aqua (marine water)	0.0044 mg/l
PNEC (Sediment)	
PNEC sediment (freshwater)	2.52 mg/kg dwt
PNEC sediment (marine water)	0.252 mg/kg dwt
PNEC (Soil)	
PNEC soil	0.852 mg/kg dwt
PNEC (Oral)	
PNEC oral (secondary poisoning)	Not applicable
PNEC (STP)	
PNEC sewage treatment plant	1.6 mg/l

8.1.5. Control banding

No additional information available

8.2. Exposure controls

8.2.1. Appropriate engineering controls

Appropriate engineering controls:

Provide local exhaust or general room ventilation to minimize vapour concentrations. Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure.

8.2.2. Personal protection equipment

Personal protective equipment:

Avoid all unnecessary exposure.

8.2.2.1. Eye and face protection

Eye protection:

Chemical goggles or face shield with safety glasses. Use eye protection according to ISO 16321-1

8.2.2.2. Skin protection

Skin and body protection:

Use protective coverall . Boots made of PVA

Hand protection:

Impermeable protective gloves. Do not reuse gloves. It is recommended that the glove supplier be consulted to ensure the protective gloves are resistant to chemicals in this product

Hand protection					
Type	**Material**	**Permeation**	**Thickness (mm)**	**Penetration**	**Standard**
Disposable gloves, E.g. KCL Type: 890 or equivalent	Viton	<480 minutes.	0.7	Not known	ISO 374-1

8.2.2.3. Respiratory protection

Respiratory protection:
Approved organic vapour respirator. An approved organic vapour respirator/supplied air or self-contained breathing apparatus must be used when vapour concentration exceeds applicable exposure limits. Consult a national health and safety authority for further guidance

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

Other information:
Do not eat, drink or smoke during use.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	:	Liquid
Colour	:	Colourless.
Appearance	:	Clear.
Molecular mass	:	106.16 g/mol
Odour	:	Aromatic.
Odour threshold	:	Not available
Melting point	:	-25 °C
Freezing point	:	Not available
Boiling point	:	144.4 °C
Flammability	:	Flammable liquid and vapour
Lower explosion limit	:	Not available
Upper explosion limit	:	Not available
Flash point	:	32 °C (Closed cup)
Auto-ignition temperature	:	463 °C
Decomposition temperature	:	Not available
pH	:	Not available
Viscosity, kinematic	:	0.66 mm²/s (25 °C)
Viscosity, dynamic	:	0.81 mPa·s (20 °C)
Solubility	:	Not available

Partition coefficient n-octanol/water (Log Kow)	:	Not available
Partition coefficient n-octanol/water (Log Pow)	:	3.12 (at 20 °C (at pH 7)
Vapour pressure	:	0.7 kPa (20 °C)
Vapour pressure at 50°C	:	Not available
Density	:	0.87 – 0.88 g/m³ (20/4°C)
Relative density	:	0.88
Relative vapour density at 20°C	:	3.7
Particle characteristics	:	Not applicable

9.2. Other information

9.2.1. Information with regard to physical hazard classes

Explosion limits : 0.9 – 6.7 vol %

9.2.2. Other safety characteristics

Relative evaporation rate (ether=1) : 0.7

SECTION 10: Stability and reactivity

10.1. Reactivity

Flammable liquid and vapour.

10.2. Chemical stability

Stable at ambient temperature and under normal conditions of use.

10.3. Possibility of hazardous reactions

Hazardous reactions may occur on contact with certain chemicals. (Refer to the list of incompatible materials section 10: "Stability-Reactivity").

10.4. Conditions to avoid

Keep away from heat/sparks/open flames/hot surfaces. No smoking. Avoid static electricity discharges.

10.5. Incompatible materials

Oxidizing agents. Strong acids. Halogenated compounds.

10.6. Hazardous decomposition products

Thermal decomposition may produce : Carbon oxides (CO, CO2). Formaldehyde.

SECTION 11: Toxicological information

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

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

Ortho-Xylene (95-47-6)	
LD50 oral rat	3608 mg/kg (Source: JAPAN_GHS)
LD50 dermal rabbit	12126 mg/kg
LC50 Inhalation - Rat	27124 mg/m³

m-xylene (108-38-3)	
LD50 oral rat	5 g/kg (Source: NLM_CIP)

m-xylene (108-38-3)	
LD50 dermal rabbit	12.18 g/kg (Source: CHEMVIEW)
LC50 Inhalation - Rat	27124 mg/m³ (Exposure time: 4 h Source: ECHA_API)
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

p-xylene (106-42-3)	
LD50 oral rat	4029 mg/kg (Source: JAPAN_GHS)
LD50 dermal rabbit	1000 – 2000 mg/kg
LC50 Inhalation - Rat	10 – 20 mg/l/4h
LC50 Inhalation - Rat [ppm]	4740 ppm/4h
ATE CLP (oral)	4029 mg/kg bodyweight
ATE CLP (dermal)	1000 mg/kg bodyweight
ATE CLP (gases)	4740 ppmv/4h
ATE CLP (vapours)	10 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
LC50 Inhalation - Rat (Vapours)	> 20 mg/l/4h
ATE CLP (vapours)	44.66 mg/l/4h
ATE CLP (dust,mist)	44.66 mg/l/4h

cumene (98-82-8)	
LD50 oral rat	1400 mg/kg
LD50 dermal rabbit	12300 µl/kg
LC50 Inhalation - Rat [ppm]	> 3577 ppm (Exposure time: 6 h)

styrene (100-42-5)	
LD50 oral rat	5000 mg/kg
LD50 oral	> 6000 mg/kg bodyweight Animal: hamster, Syrian, Animal sex: male
LD50 dermal rat	> 2000 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 402 (Acute Dermal Toxicity)
LC50 Inhalation - Rat	11.8 mg/l/4h
LC50 Inhalation - Rat (Dust/Mist)	11.8 mg/l/4h

styrene (100-42-5)	
ATE CLP (oral)	5000 mg/kg bodyweight
ATE CLP (gases)	4500 ppmv/4h
ATE CLP (vapours)	11.8 mg/l/4h
ATE CLP (dust,mist)	1.5 mg/l/4h

ethylbenzene (100-41-4)	
LD50 oral rat	3500 mg/kg (Source: JAPAN_GHS)
LD50 oral	3500 mg/kg bodyweight
LD50 dermal rabbit	15400 mg/kg (Source: JAPAN_GHS)
LD50 dermal	15350 mg/kg bodyweight
LC50 Inhalation - Rat	17.4 mg/l/4h
LC50 Inhalation - Rat [ppm]	4000 ppm Source: ECHA, Harmonized classification of EU CLP
LC50 Inhalation - Rat (Dust/Mist)	17200 mg/l
ATE CLP (oral)	3500 mg/kg bodyweight
ATE CLP (dermal)	15400 mg/kg bodyweight
ATE CLP (gases)	1432 ppmv/4h
ATE CLP (vapours)	17.4 mg/l/4h
ATE CLP (dust,mist)	1.5 mg/l/4h

Skin corrosion/irritation : Causes skin irritation.

Benzene (71-43-2)	
pH	Not applicable

Serious eye damage/irritation : Causes serious eye irritation.

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 : Not classified (Based on available data, the classification criteria are not met)

Carcinogenicity : May cause cancer.

m-xylene (108-38-3)	
IARC group	3 - Not classifiable

p-xylene (106-42-3)	
IARC group	3 - Not classifiable

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

cumene (98-82-8)	
IARC group	2B - Possibly carcinogenic to humans

styrene (100-42-5)	
IARC group	2A - Probably carcinogenic to humans

ethylbenzene (100-41-4)	
IARC group	2B - Possibly carcinogenic to humans

Reproductive toxicity : Not classified (Based on available data, the classification criteria are not met)

STOT-single exposure : May cause respiratory irritation.

cumene (98-82-8)	
STOT-single exposure	May cause respiratory irritation.

styrene (100-42-5)	
STOT-single exposure	May cause respiratory irritation.

STOT-repeated exposure : Not classified (Based on available data, the classification criteria are not met)

Ortho-Xylene (95-47-6)	
NOAEL (oral, rat, 90 days)	250 mg/kg bodyweight/day

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.

styrene (100-42-5)	
STOT-repeated exposure	Causes damage to organs (hearing organs) through prolonged or repeated exposure.

ethylbenzene (100-41-4)	
NOAEL (oral, rat, 90 days)	75 mg/kg bodyweight Animal: rat, Guideline: OECD Guideline 408 (Repeated Dose 90-Day Oral Toxicity in Rodents)
STOT-repeated exposure	May cause damage to organs (hearing organs) through prolonged or repeated exposure.

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

Ortho-Xylene (95-47-6)	
Viscosity, kinematic	0.66 mm²/s (25 °C)

Benzene (71-43-2)	
Viscosity, kinematic	0.686 mm²/s

ethylbenzene (100-41-4)	
Viscosity, kinematic	0.738 mm²/s

11.2. Information on other hazards

11.2.1. Endocrine disrupting properties

Adverse health effects caused by endocrine disrupting properties : No additional information available

11.2.2. Other information

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

SECTION 12: Ecological information

12.1. Toxicity

Hazardous to the aquatic environment, short–term (acute) : Not classified (Based on available data, the classification criteria are not met)

Hazardous to the aquatic environment, long–term (chronic) : Harmful to aquatic life with long lasting effects.

Ortho-Xylene (95-47-6)	
LC50 - Fish [1]	11.6 – 22.4 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through] Source: EPA)
LC50 - Fish [2]	11.6 – 22.4 mg/l (Exposure time: 96 h - Species: Lepomis macrochirus [flow-through] Source: EPA)
EC50 - Crustacea [1]	3.2 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 - Crustacea [2]	2.61 – 5.59 mg/l (Exposure time: 48 h - Species: Daphnia magna [Flow through])
NOEC (acute)	1.17 mg/l (aquatic invertebrates - 7 d)
NOEC (chronic)	> 1.3 mg/l (56 d)

m-xylene (108-38-3)	
LC50 - Fish [1]	14.3 – 18 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through] Source: EPA)
LC50 - Fish [2]	8.4 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [semi-static] Source: EPA)
EC50 - Crustacea [1]	2.81 – 5 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])
EC50 72h - Algae [1]	4.9 mg/l (Species: Pseudokirchneriella subcapitata [static])
LOEC (chronic)	3.16 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
NOEC chronic fish	0.714 mg/l Test organisms (species): Danio rerio (previous name: Brachydanio rerio) Duration: '35 d'

p-xylene (106-42-3)	
LC50 - Fish [1]	7.2 – 9.9 mg/l (Exposure time: 96 h - Species: Pimephales promelas [static] Source: EPA)
LC50 - Fish [2]	2.6 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss Source: EPA)
EC50 - Crustacea [1]	3.55 – 6.31 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])

p-xylene (106-42-3)	
EC50 72h - Algae [1]	3.2 mg/l (Species: Pseudokirchneriella subcapitata [static])

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)
ErC50 algae	100 mg/l
NOEC chronic fish	0.8 mg/l Test organisms (species): Pimephales promelas Duration: '32 d'
NOEC chronic crustacea	3 mg/l

cumene (98-82-8)	
LC50 - Fish [1]	6.04 – 6.61 mg/l (Exposure time: 96 h - Species: Pimephales promelas [flow-through])
LC50 - Fish [2]	4.8 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [flow-through])
EC50 - Crustacea [2]	7.9 – 14.1 mg/l (Exposure time: 48 h - Species: Daphnia magna [Static])

styrene (100-42-5)	
LC50 - Fish [1]	10.1 mg/l (Exposure time: 96 h)
EC50 - Crustacea [1]	4.7 mg/l Test organisms (species): Daphnia magna
EC50 72h - Algae [1]	4.9 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
EC50 96h - Algae [1]	6.3 mg/l Test organisms (species): Pseudokirchneriella subcapitata (previous names: Raphidocelis subcapitata, Selenastrum capricornutum)
LOEC (chronic)	2.06 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
NOEC (chronic)	10.1 mg/l (Exposure time: 21d - Species: Daphnia magna)

ethylbenzene (100-41-4)	
LC50 - Fish [1]	11 – 18 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [static] Source: EPA)

ethylbenzene (100-41-4)	
LC50 - Fish [2]	4.2 mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss [semi-static] Source: EPA)
EC50 - Crustacea [1]	1.8 – 2.4 mg/l (Exposure time: 48 h - Species: Daphnia magna)
EC50 72h - Algae [1]	4.6 mg/l (Species: Pseudokirchneriella subcapitata)
EC50 72h - Algae [2]	2.6 – 11.3 mg/l (Species: Pseudokirchneriella subcapitata [static])
EC50 96h - Algae [1]	> 438 mg/l (Species: Pseudokirchneriella subcapitata)
EC50 96h - Algae [2]	1.7 – 7.6 mg/l (Species: Pseudokirchneriella subcapitata [static])
LOEC (chronic)	1.7 mg/l Test organisms (species): Ceriodaphnia dubia Duration: '7 d'
NOEC (chronic)	0.96 mg/l Test organisms (species): Ceriodaphnia dubia Duration: '7 d'

12.2. Persistence and degradability

Ortho-Xylene (95-47-6)	
Persistence and degradability	Readily biodegradable. not persistent.
BOD (% of ThOD)	50 % ThOD (23 d)
Benzene (71-43-2)	
Persistence and degradability	Readily biodegradable in water.

12.3. Bioaccumulative potential

Ortho-Xylene (95-47-6)	
BCF - Fish [1]	(21.4 dimensionless (xylene from crude oil)
Partition coefficient n-octanol/water (Log Pow)	3.12 (at 20 °C (at pH 7)
Bioaccumulative potential	not bioaccumulable.
m-xylene (108-38-3)	
Partition coefficient n-octanol/water (Log Pow)	3.2 (at 20 °C (at pH 7)
p-xylene (106-42-3)	
BCF - Fish [1]	(2,2 dimensionless)
Partition coefficient n-octanol/water (Log Pow)	3.2 (at 20 °C (at pH 7)
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
Partition coefficient n-octanol/water (Log Kow)	2.13

Benzene (71-43-2)	
Bioaccumulative potential	not bioaccumulable.

cumene (98-82-8)	
BCF - Fish [1]	35.5
Partition coefficient n-octanol/water (Log Pow)	3.55 (at 23 °C)

styrene (100-42-5)	
Partition coefficient n-octanol/water (Log Pow)	3.02

ethylbenzene (100-41-4)	
BCF - Fish [1]	(15 dimensionless)
Partition coefficient n-octanol/water (Log Pow)	3.6 (at 20 °C (at pH 7.84)

12.4. Mobility in soil

Benzene (71-43-2)	
Organic Carbon Normalized Adsorption Coefficient (Log Koc)	2.12742878

12.5. Results of PBT and vPvB assessment

Ortho-Xylene (95-47-6)	
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	
Results of PBT assessment	This substance does not meet the criteria for classification as PBT or vPvB.

Component	
Benzene (71-43-2)	This substance/mixture does not meet the PBT criteria of REACH regulation, annex XIII This substance/mixture does not meet the vPvB criteria of REACH regulation, annex XIII This substance does not meet the criteria for classification as PBT or vPvB.

12.6. Endocrine disrupting properties

Adverse effects on the environment caused by endocrine disrupting properties : No information available.

12.7. Other adverse effects

No additional information available

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Regional legislation (waste) : Dispose of contents/container to comply with applicable local, national and international regulations. Consult the appropriate authorities about waste disposal.

Waste treatment methods : Dispose of contents/container in accordance with licensed collector's sorting instructions.

Sewage disposal recommendations : The adequately treated and biorremediated effluents may be discarded into water bodies.

Product/Packaging disposal recommendations : Dispose of this material and its container at hazardous or special waste collection point.

Ecological waste information : Avoid release to the environment.

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 1307	UN 1307	UN 1307	UN 1307	UN 1307
14.2. UN proper shipping name				
XYLENES	XYLENES	Xylenes	XYLENES	XYLENES
14.3. Transport hazard class(es)				
3	3	3	3	3
				
14.4. Packing group				
III	III	III	III	III
14.5. Environmental hazards				
Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No	Dangerous for the environment: No	Dangerous for the environment: No	Dangerous for the environment: No
No supplementary information available				

14.6. Special precautions for user

Overland transport

Classification code (ADR) : F1

Limited quantities (ADR) : 5l

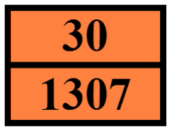
Excepted quantities (ADR) : E1

Packing instructions (ADR) : P001, IBC03, LP01, R001

Mixed packing provisions (ADR) : MP19

Portable tank and bulk container instructions (ADR) : T2

Portable tank and bulk container special provisions (ADR) : TP1

Tank code (ADR)	:	LGBF
Vehicle for tank carriage	:	FL
Transport category (ADR)	:	3
Special provisions for carriage - Packages (ADR)	:	V12
Special provisions for carriage - Operation (ADR)	:	S2
Hazard identification number (Kemler No.)	:	30
Orange plates	:	
Tunnel restriction code (ADR)	:	D/E
EAC code	:	3Y

Transport by sea

Special provisions (IMDG)	:	223
Limited quantities (IMDG)	:	5 L
Excepted quantities (IMDG)	:	E1
Packing instructions (IMDG)	:	P001, LP01
IBC packing instructions (IMDG)	:	IBC03
Tank instructions (IMDG)	:	T2
Tank special provisions (IMDG)	:	TP1
EmS-No. (Fire)	:	F-E
EmS-No. (Spillage)	:	S-D
Stowage category (IMDG)	:	A
Flash point (IMDG)	:	23°C to 30°C c.c.
Properties and observations (IMDG)	:	Colourless liquids. Flashpoint: 23°C to 30°C c.c. Explosive limits: 1.1% to 7%. Immiscible with water.

Air transport

PCA Excepted quantities (IATA)	:	E1
PCA Limited quantities (IATA)	:	Y344
PCA limited quantity max net quantity (IATA)	:	10L
PCA packing instructions (IATA)	:	355
PCA max net quantity (IATA)	:	60L
CAO packing instructions (IATA)	:	366
CAO max net quantity (IATA)	:	220L
Special provisions (IATA)	:	A3
ERG code (IATA)	:	3L

Inland waterway transport

Classification code (ADN)	:	F1
Limited quantities (ADN)	:	5 L
Excepted quantities (ADN)	:	E1
Carriage permitted (ADN)	:	T
Equipment required (ADN)	:	PP, EX, A
Ventilation (ADN)	:	VE01
Number of blue cones/lights (ADN)	:	0

Rail transport

Classification code (RID)	: F1
Limited quantities (RID)	: 5L
Excepted quantities (RID)	: E1
Packing instructions (RID)	: P001, IBC03, LP01, R001
Mixed packing provisions (RID)	: MP19
Portable tank and bulk container instructions (RID)	: T2
Portable tank and bulk container special provisions (RID)	: TP1
Tank codes for RID tanks (RID)	: LGBF
Transport category (RID)	: 3
Special provisions for carriage – Packages (RID)	: W12
Colis express (express parcels) (RID)	: CE4
Hazard identification number (RID)	: 30

14.7. Maritime transport in bulk according to IMO instruments

IBC code	: Applicable.
IBC product name	: Xylenes
Ship type	: Type 2
Pollution category	: Y

SECTION 15: Regulatory information

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

15.1.1. EU-Regulations

REACH Annex XVII (Restriction List)

Not listed on REACH Annex XVII

REACH Annex XIV (Authorisation List)

Not listed on REACH Annex XIV (Authorisation List)

REACH Candidate List (SVHC)

Not listed on the REACH Candidate List

PIC Regulation (Prior Informed Consent)

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

POP Regulation (Persistent Organic Pollutants)

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

Ozone Regulation (1005/2009)

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

Explosives Precursors Regulation (2019/1148)

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

Drug Precursors Regulation (273/2004)

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

15.1.2. National regulations

Listed on the United States TSCA (Toxic Substances Control Act) inventory - Status: Active
Listed on the Canadian DSL (Domestic Substances List)
Listed on the EEC inventory EINECS (European Inventory of Existing Commercial Chemical Substances)
Listed on the Canadian IDL (Ingredient Disclosure List)

Subject to reporting requirements of United States SARA Section 313
Listed on EPA Hazardous Air Pollutant (HAPS)
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 Poisonous and Deleterious Substances Control Law
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 66	Occupational rhinitis and asthma
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 2, Significantly 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. 206).

WGK remark : Most stringent classification due to insufficient data.

Chemicals Prohibition Ordinance (ChemVerbotsV) : This product is subject to ChemVerbotsV Annex 2 Entry 1. The following requirements must be observed: authorization requirement (according to § 6 paragraph 1 sentence 1), basic requirements for carrying out the delivery (according to § 8 paragraph 1, 3 and 4), identification and documentation (according to § 9 paragraph 1 to 3) and exclusion of the shipping route (according to § 10).

Hazardous Incident Ordinance (12. BImSchV) : Is not subject to the Hazardous Incident Ordinance (12. BImSchV)

Netherlands

SZW-lijst van kankerverwekkende stoffen : The substance is not listed

SZW-lijst van mutagene stoffen : The substance is not listed

SZW-lijst van reprotoxische stoffen – Borstvoeding : The substance is not listed

SZW-lijst van reprotoxische stoffen – Vruchtbaarheid : The substance is not listed

SZW-lijst van reprotoxische stoffen – Ontwikkeling : The substance is not listed

Denmark

Class for fire hazard : Class II-1

Store unit : 5 liter

Classification remarks : R10 <H226;H304;H312+H332;H315;H319;H335;H350;H412>; 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

CSA has been established. Exposure scenario is attached.

SECTION 16: Other information

Indication of changes

Section	Changed item	Change	Comments
1.2	Relevant identified uses of the substance or mixture and uses advised against	Modified	
2	Hazard identification	Modified	
4.1	Description of first aid measures	Modified	
4.2	Most important symptoms and effects, both acute and delayed	Modified	
7.1	Precautions for safe handling	Modified	
7.2	Hygiene measures	Modified	
8.1.4	DNEL/DMEL and PNEC values	Modified	
8.2.2	Personal protection equipment	Modified	

Abbreviations and acronyms:	
ACGIH	ACGIH (American Conference of Governement Industrial Hygienists)
ASTM	ASTM - American Society for Testing and Materials
CAS	CAS (Chemical Abstracts Service) number
CLP	CLP - Classification, Labelling and Packaging
EEC	EEC - European Economic Community
EC	EC - European Community
CSR	CSR - Chemical Safety Report

Abbreviations and acronyms:	
GHS	GHS - Globally Harmonised System
IARC	IARC (International Agency for Research on Cancer)
ADR	Overland transport (ADR)
PVC	PVC (Polyvinyl chloride).
REACH	REACH - Registration, Evaluation, Authorisation and Restriction of Chemicals
SDS	SDS - Safety Data Sheet

Other information : None.

Full text of H- and EUH-statements:	
Acute Tox. 4 (Dermal)	Acute toxicity (dermal), Category 4
Acute Tox. 4 (Inhalation)	Acute toxicity (inhal.), Category 4
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. 1B	Carcinogenicity, Category 1B
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.
H304	May be fatal if swallowed and enters airways.
H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H335	May cause respiratory irritation.
H340	May cause genetic defects.
H350	May cause cancer.
H361d	Suspected of damaging the unborn child.
H372	Causes damage to organs through prolonged or repeated exposure.
H373	May cause damage to organs through prolonged or repeated exposure.

Full text of H- and EUH-statements:	
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
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	
ERC1	Manufacture of the substance
ERC2	Formulation into mixture
ERC4	Use of non-reactive processing aid at industrial site (no inclusion into or onto article)
ERC6a	Use of intermediate
ERC8a	Widespread use of non-reactive processing aid (no inclusion into or onto article, indoor)
ERC8d	Widespread use of non-reactive processing aid (no inclusion into or onto article, outdoor)
ESVOC SPERC 2.2.v1	Formulation & packing of preparations and mixtures: Industrial (SU10)
ESVOC SPERC 8.3c.v1	Uses in Coatings: Consumer (SU21)
PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
PROC10	Roller application or brushing
PROC11	Non industrial spraying
PROC13	Treatment of articles by dipping and pouring
PROC14	Tabletting, compression, extrusion, pelettisation, granulation
PROC15	Use as laboratory reagent
PROC19	Manual activities involving hand contact
PROC2	Chemical production or refinery in closed continuous process with occasional controlled exposure or processes with equivalent containment conditions
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

Full text of use descriptors	
PROC7	Industrial spraying
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)

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.

Annex to the safety data sheet

Product exposure scenario(s)	
ES Type	**ES title**
Worker	Manufacture of substances
Worker	Formulation or re-packing
Worker	Use at industrial sites. Use as an intermediate

1. Exposure scenario ES1

Manufacture of substances

ES Ref.: ES1 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC15, PROC28 ERC1
Processes, tasks, activities covered	Manufacture (M)

2. Operational conditions and risk management measures

2.2 Contributing scenario controlling environmental exposure (ERC1)

Manufacturer	
ERC1	Manufacture of the substance

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Viscosity, kinematic	1 mm²/s

Operational conditions		
Amounts used	Maximum daily use at site	≤ 334 t/d
Amounts used	Annual site tonnage	≤ 100000 t/yr
Frequency and duration of use	Emission days	300 days/yr
Other given operational conditions affecting environmental exposure	Equipment cleaning and maintenance	No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water
Other given operational conditions affecting environmental exposure	Indoor or outdoor use	Indoor use
Other given operational conditions affecting environmental exposure	Release factor after on site RMM (water):	0.003 %
Other given operational conditions affecting environmental exposure	Release factor before on site RMM (water):	0.01 %
Other given operational conditions affecting environmental exposure	Release factor after on site RMM (Air):	0.5 %
Other given operational conditions affecting environmental exposure	Release factor before on site RMM (air):	5 %
Other given operational conditions affecting environmental exposure	Release factor after on site RMM (non agricultural soil):	0.01 %

Risk Management Measures		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Process efficiency:	Process optimized for efficient use of raw materials
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	On-site treatment of off-air:	Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS. Vapor recovery (adsorption) [Effectiveness Air: 90%]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Onsite wastewater treatment required	Acclimated biological treatment [Effectiveness Water: 70%]
Conditions and measures related to sewage treatment plant	Required Removal Efficiency (wastewater):	93.35 %
Conditions and measures related to sewage treatment plant	Discharge rate of Municipal STP	≥ 2000 m³/d
Conditions and measures related to sewage treatment plant	Application of the STP sludge on agricultural soil:	Yes.
Conditions and measures related to external treatment of waste for disposal	Particular considerations on the waste treatment operations:	No (low risk)

2.1.1 Contributing scenario controlling worker exposure (PROC1) (General exposures (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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor use	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Closed system (minimal contact during routine operations)	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.2 Contributing scenario controlling worker exposure (PROC1) (General exposures (closed systems);outdoor)

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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Closed system (minimal contact during routine operations)	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No

Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes.

2.1.3 Contributing scenario controlling worker exposure (PROC2) (General exposures (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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

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	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.4 Contributing scenario controlling worker exposure (PROC3) (General exposures (closed systems))

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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed batch process . With occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%). Handle substance within a predominantly closed system provided with extract ventilation

Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.5 Contributing scenario controlling worker exposure (PROC4) (General exposures (open systems))

PROC4	Chemical production where opportunity for exposure arises

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.6 Contributing scenario controlling worker exposure (PROC4) (General exposures (open systems))

PROC4	Chemical production where opportunity for exposure arises

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required

Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.7 Contributing scenario controlling worker exposure (PROC4) (General exposures (open systems);outdoor)

PROC4	Chemical production where opportunity for exposure arises

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.8 Contributing scenario controlling worker exposure (PROC9) (Process sampling)

Process sampling	
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.9 Contributing scenario controlling worker exposure (PROC9) (Process sampling)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions

Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.10 Contributing scenario controlling worker exposure (PROC9) (Process sampling;outdoor)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics

Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions

Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified

Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.11 Contributing scenario controlling worker exposure (PROC15) (Laboratory activities)

PROC15	Use as laboratory reagent

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes.

2.1.12 Contributing scenario controlling worker exposure (PROC8b) (Bulk transfers;Closed systems)

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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced

Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.13 Contributing scenario controlling worker exposure (PROC8b) (Bulk transfers;Open systems)

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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%)
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.14 Contributing scenario controlling worker exposure (PROC8b) (Bulk transfers;Open systems)

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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified

Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes.

2.1.15 Contributing scenario controlling worker exposure (PROC8a, PROC28) (Equipment cleaning and 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	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions

Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%). LEV has been added to equate to the SOP. Drain down and flush system prior to equipment break-in or maintenance
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	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	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions

Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor	

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 at process level (source) to prevent release	Store substance within a closed system	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	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	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

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 at process level (source) to prevent release	Store substance within a closed system	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation: 221 mg/m³ Dermal: 212 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure	RCR	dermal exposure	RCR	Sum RCR	Assessment method
PROC1	0.044 mg/m³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: TRA Workers 3.0

(General exposures (closed systems))						Dermal: TRA Workers 3.0
PROC1 (General exposures (closed systems),outdoor)	0.031 mg/m³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC2 (General exposures (closed systems))	22.11 mg/m³	0.1	0.274 mg/kg bw/day	< 0.01	< 0.11	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC3 (General exposures (closed systems))	4.424 mg/m³	0.02	0.138 mg/kg bw/day	< 0.01	< 0.03	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC4 (General exposures (open systems))	6.193 mg/m³	0.028	1.372 mg/kg bw/day	< 0.01	< 0.038	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC4 (General exposures (open systems))	3.716 mg/m³	0.017	0.823 mg/kg bw/day	< 0.01	< 0.027	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC4 (General exposures (open systems),outdoor)	3.716 mg/m³	0.017	0.823 mg/kg bw/day	< 0.01	< 0.027	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC9 (Process sampling)	22.11 mg/m³	0.1	1.372 mg/kg bw/day	< 0.01	< 0.11	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC9 (Process sampling)	13.27 mg/m³	0.06	0.823 mg/kg bw/day	< 0.01	< 0.07	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC9 (Process sampling,outdoor)	9.29 mg/m³	0.042	0.823 mg/kg bw/day	< 0.01	< 0.052	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC15 (Laboratory activities)	44.23 mg/m³	0.2	0.068 mg/kg bw/day	< 0.01	< 0.21	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8b (Bulk transfers,Closed systems)	77.41 mg/m³	0.35	2.742 mg/kg bw/day	0.013	0.363	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems)	3.871 mg/m³	0.018	2.742 mg/kg bw/day	0.013	0.031	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems)	4.645 mg/m³	0.021	1.645 mg/kg bw/day	< 0.01	< 0.031	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8a, PROC28 (Equipment cleaning and maintenance)	15.48 mg/m³	0.07	2.742 mg/kg bw/day	0.013	0.083	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC1 (Storage)	0.031 mg/m³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC2 (Storage)	22.11 mg/m³	0.1	0.274 mg/kg bw/day	< 0.01	< 0.11	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0

Acute - systemic effects						
DNEL	Inhalation: 442 mg/m³ Dermal:					
Contributing scenario	inhalation exposure	RCR	dermal exposure	RCR	Sum RCR	Assessment method
PROC1	0.177 mg/m³	< 0.01			< 0.01	Inhalation: TRA Workers 3.0

(General exposures (closed systems))						
PROC1 (General exposures (closed systems),outdoor)	0.124 mg/m³	< 0.01			< 0.01	Inhalation: TRA Workers 3.0
PROC2 (General exposures (closed systems))	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC3 (General exposures (closed systems))	17.69 mg/m³	0.04			0.04	Inhalation: TRA Workers 3.0
PROC4 (General exposures (open systems))	24.77 mg/m³	0.056			0.056	Inhalation: TRA Workers 3.0
PROC4 (General exposures (open systems))	24.77 mg/m³	0.056			0.056	Inhalation: TRA Workers 3.0
PROC4 (General exposures (open systems),outdoor)	24.77 mg/m³	0.056			0.056	Inhalation: TRA Workers 3.0
PROC9 (Process sampling)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC9 (Process sampling)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC9 (Process sampling,outdoor)	61.93 mg/m³	0.14			0.14	Inhalation: TRA Workers 3.0
PROC15 (Laboratory activities)	176.9 mg/m³	0.4			0.4	Inhalation: TRA Workers 3.0
PROC8b (Bulk transfers,Closed systems)	309.6 mg/m³	0.701			0.701	Inhalation: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems)	15.48 mg/m³	0.035			0.035	Inhalation: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems)	30.96 mg/m³	0.07			0.07	Inhalation: TRA Workers 3.0
PROC8a, PROC28 (Equipment cleaning and maintenance)	61.93 mg/m³	0.14			0.14	Inhalation: TRA Workers 3.0
PROC1 (Storage)	0.124 mg/m³	< 0.01			< 0.01	Inhalation: TRA Workers 3.0
PROC2 (Storage)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0

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Local - Inhalation					
DNEL	Acute: 442 mg/m³ Long-term: 221 mg/m³				
Contributing scenario	Acute	RCR	Long term	RCR	Assessment method
PROC1 (General exposures (closed systems))	0.177 mg/m³	< 0.01	0.044 mg/m³	< 0.01	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0

PROC1 (General exposures (closed systems),outdoor)	0.124 mg/m³	< 0.01	0.031 mg/m³/day	< 0.01	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC2 (General exposures (closed systems))	88.47 mg/m³	0.2	22.11 mg/m³	0.1	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC3 (General exposures (closed systems))	17.69 mg/m³	0.04	4.424 mg/m³	0.02	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC4 (General exposures (open systems))	24.77 mg/m³	0.056	6.193 mg/m³	0.028	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC4 (General exposures (open systems))	24.77 mg/m³	0.056	3.716 mg/m³	0.017	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC4 (General exposures (open systems),outdoor)	24.77 mg/m³	0.056	3.716 mg/m³	0.017	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC9 (Process sampling)	88.47 mg/m³	0.2	22.11 mg/m³	0.1	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC9 (Process sampling)	88.47 mg/m³	0.2	13.27 mg/m³	0.06	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC9 (Process sampling,outdoor)	61.93 mg/m³	0.14	9.29 mg/m³	0.042	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC15 (Laboratory activities)	176.9 mg/m³	0.4	44.23 mg/m³	0.2	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8b (Bulk transfers,Closed systems)	309.6 mg/m³	0.701	77.41 mg/m³	0.35	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems)	15.48 mg/m³	0.035	3.871 mg/m³	0.018	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems)	30.96 mg/m³	0.07	4.645 mg/m³	0.021	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8a, PROC28 (Equipment cleaning and maintenance)	61.93 mg/m³	0.14	15.48 mg/m³	0.07	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC1 (Storage)	0.124 mg/m³	< 0.01	0.031 mg/m³	< 0.01	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC2 (Storage)	88.47 mg/m³	0.2	22.11 mg/m³	0.1	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0

3.2. Environment

Information for contributing exposure scenario	
2.2	Man via environment - Inhalation (systemic effects): Concentration in air: 0.382 mg/m³; RCR < 0.01,Man via environment - Inhalation (local effects): Concentration in air: 0.382 mg/m³; RCR < 0.01,Man via environment - Oral: Exposure via food consumption: 2.7E-3 mg/kg bw/day; RCR < 0.01

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.00851	0.044	0.193	EUSES 2.1.2

Marine water	mg/l	0.00334	0.0044	0.76	EUSES 2.1.2
Freshwater sediment	mg/kg dwt	0.487	2.52	0.193	EUSES 2.1.2
Marine water sediment	mg/kg dwt	0.192	0.252	0.76	EUSES 2.1.2
Sewage treatment plant	mg/l	0.333	1.6	0.208	EUSES 2.1.2
Soil	mg/kg dwt	0.573	0.852	0.673	EUSES 2.1.2

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

4.1. Health

Guidance - Health	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Wear suitable gloves tested to EN374

4.2. Environment

Guidance - Environment	Common practices vary across sites thus conservative process release estimates used. Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. 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.

Additional good practice advice beyond the REACH CSA

Additional good practice advice	Wear suitable gloves (tested to EN374) and eye protection

1. Exposure scenario ES2

Formulation or re-packing

ES Ref.: ES2 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15, PROC28 ERC2
Processes, tasks, activities covered	Formulation or re-packing (F)

2. Operational conditions and risk management measures

2.2 Contributing scenario controlling environmental exposure (ERC2)

Formulation	
ERC2	Formulation into mixture

Product characteristics

Physical form of product	Liquid, including paste/slurry/suspension
Concentration of substance in product	≤ 100 %
Viscosity, kinematic	1 mm²/s

Operational conditions

Amounts used	Maximum daily use at site	≤ 5 t/d
Amounts used	Annual site tonnage	≤ 1500 t/yr
Frequency and duration of use	Emission days	300 days/yr
Other given operational conditions affecting environmental exposure	Equipment cleaning and maintenance	No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water
Other given operational conditions affecting environmental exposure	Indoor or outdoor use	Indoor use
Other given operational conditions affecting environmental exposure	Release factor before on site RMM (water):	0.2 %
Other given operational conditions affecting environmental exposure	Release factor after on site RMM (water):	0.2 %
Other given operational conditions affecting environmental exposure	Release factor before on site RMM (air):	2.5 %
Other given operational conditions affecting environmental exposure	Release factor after on site RMM (Air):	2.5 %
Other given operational conditions affecting environmental exposure	Release factor after on site RMM (non agricultural soil):	0.01

Risk Management Measures

Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Process efficiency:	Process optimized for efficient use of raw materials
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	On-site treatment of off-air:	Typical measures to maintain workplace concentrations or airborne VOCs and particulates below respective OELS
Conditions and measures related to sewage treatment plant	Required Removal Efficiency (wastewater):	93.35 %
Conditions and measures related to sewage treatment plant	Discharge rate of Municipal STP	≥ 2000 m³/d
Conditions and measures related to sewage treatment plant	Application of the STP sludge on agricultural soil:	Yes.
Conditions and measures related to external treatment of waste for disposal	Particular considerations on the waste treatment operations:	

2.1.1 Contributing scenario controlling worker exposure (PROC1) (General exposures (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	745.4 Pa	
Vapour pressure	at 20°C	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor use	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Closed system (minimal contact during routine operations)	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.2 Contributing scenario controlling worker exposure (PROC1) (General exposures (closed systems);outdoor)

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	745.4 Pa	
Vapour pressure	at 20°C	
Operational conditions		
Frequency and duration of use	Exposure duration	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Closed system (minimal contact during routine operations)	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes.

2.1.3 Contributing scenario controlling worker exposure (PROC2) (General exposures (closed systems);Use in contained systems;with sample collection)

General exposures (closed systems), Use in contained systems, with sample collection

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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

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	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.4 Contributing scenario controlling worker exposure (PROC3) (General exposures (closed systems))

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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed batch process . With occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required

Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.5 Contributing scenario controlling worker exposure (PROC4) (General exposures (open systems))

PROC4	Chemical production where opportunity for exposure arises

Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.6 Contributing scenario controlling worker exposure (PROC3) (Batch processes at elevated temperatures;Use in contained batch processes)

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	10000 Pa	
Vapour pressure	60°C	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 60 °C
Other given operational conditions affecting workers exposure	Indoor	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed batch process . With occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes

Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes.

2.1.7 Contributing scenario controlling worker exposure (PROC3) (Batch processes at elevated temperatures;Use in contained batch processes)

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	10000 Pa
Vapour pressure	60°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 60 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed batch process . With occasional controlled exposure	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.8 Contributing scenario controlling worker exposure (PROC9) (Process sampling)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced

Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.9 Contributing scenario controlling worker exposure (PROC15) (Laboratory activities)

Laboratory activities	
PROC15	Use as laboratory reagent

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes.

2.1.10 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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.11 Contributing scenario controlling worker exposure (PROC5) (Mixing operations (open systems))

PROC5	Mixing or blending in batch processes

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	indoor	
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.12 Contributing scenario controlling worker exposure (PROC8a) (Transfer from/pouring from containers;Non-dedicated facility)

PROC8a	Transfer of substance or mixture (charging and discharging) at non-dedicated facilities

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required

Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes.

2.1.13 Contributing scenario controlling worker exposure (PROC8b) (Drum/batch 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	745.4 Pa	
Vapour pressure	at 20°C	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.14 Contributing scenario controlling worker exposure (PROC14) (Production of preparations or articles by tabletting, compression, extrusion, pelettisation)

PROC14	Tabletting, compression, extrusion, pelettisation, granulation

Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%). Handle substance within a predominantly closed system provided with extract ventilation
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced

Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.15 Contributing scenario controlling worker exposure (PROC9) (Drum and small package filling)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.16 Contributing scenario controlling worker exposure (PROC9) (Drum and small package filling)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH

Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.17 Contributing scenario controlling worker exposure (PROC8a, PROC28) (Equipment cleaning and 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	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C

Operational conditions

Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	

Risk Management Measures

Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%). LEV has been added to equate to the SOP. Drain down and flush system prior to equipment break-in or maintenance
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	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.
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.18 Contributing scenario controlling worker exposure (PROC1, PROC2) (Storage)

PROC1	Chemical production or refinery in closed process without likelihood of exposure or processes with equivalent containment conditions
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	745.4 Pa
Vapour pressure	at 20°C

Operational conditions

Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C

Other given operational conditions affecting workers exposure	Indoor	
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 at process level (source) to prevent release	Store substance within a closed system	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.19 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	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor	
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 at process level (source) to prevent release	Store substance within a closed system	
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	No
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects	
DNEL	Inhalation: 221 mg/m³ Dermal: 212 mg/kg bodyweight/day

Contributing scenario	inhalation exposure	RCR	dermal exposure	RCR	Sum RCR	Assessment method
PROC1 (General exposures (closed systems))	0.044 mg/m³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC1 (General exposures (closed systems),outdoor)	0.031 mg/m³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC2 (General exposures (closed systems),Use in contained systems,with sample collection)	22.11 mg/m³	0.1	0.274 mg/kg bw/day	< 0.01	< 0.11	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC3 (General exposures (closed systems))	44.23 mg/m³	0.2	0.138 mg/kg bw/day	< 0.01	< 0.21	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC4 (General exposures (open systems))	88.47 mg/m³	0.4	1.372 mg/kg bw/day	< 0.01	< 0.41	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC3 (Batch processes at elevated temperatures,Use in contained batch processes)	66.35 mg/m³	0.3	0.138 mg/kg bw/day	< 0.01	< 0.31	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC3 (Batch processes at elevated temperatures,Use in contained batch processes)	13.27 mg/m³	0.06	0.083 mg/kg bw/day	< 0.01	< 0.07	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC9 (Process sampling)	39.81 mg/m³	0.18	0.823 mg/kg bw/day	< 0.01	< 0.19	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC15 (Laboratory activities)	44.23 mg/m³	0.2	0.068 mg/kg bw/day	< 0.01	< 0.21	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8b (Bulk transfers,Dedicated facility)	77.41 mg/m³	0.35	2.742 mg/kg bw/day	0.013	0.363	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC5 (Mixing operations (open systems))	66.35 mg/m³	0.3	2.742 mg/kg bw/day	0.013	0.313	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8a (Transfer from/pouring from containers,Non-dedicated facility)	39.81 mg/m³	0.18	1.645 mg/kg bw/day	< 0.01	< 0.19	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8b (Drum/batch transfers,Dedicated facility)	77.41 mg/m³	0.35	2.742 mg/kg bw/day	0.013	0.363	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC14 (Production of preparations or articles by tabletting, compression, extrusion, pelettisation)	13.27 mg/m³	0.06	0.412 mg/kg bw/day	< 0.01	< 0.07	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC9	66.35 mg/m³	0.3	1.372 mg/kg bw/day	< 0.01	< 0.31	Inhalation: TRA Workers 3.0

(Drum and small package filling)						Dermal: TRA Workers 3.0
PROC9 (Drum and small package filling)	13.27 mg/m³	0.06	0.823 mg/kg bw/day	< 0.01	< 0.07	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8a, PROC28 (Equipment cleaning and maintenance)	22.11 mg/m³	0.1	1.371 mg/kg bw/day	< 0.01	< 0.11	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC1, PROC2 (Storage)	0.031 mg/m³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC2 (Storage)	22.11 mg/m³	0.1	0.274 mg/kg bw/day	< 0.01	< 0.11	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0

Acute - systemic effects						
DNEL	Inhalation: 442 mg/m³ Dermal:					
Contributing scenario	inhalation exposure	RCR	dermal exposure	RCR	Sum RCR	Assessment method
PROC1 (General exposures (closed systems))	0.177 mg/m³	< 0.01			< 0.01	Inhalation: TRA Workers 3.0
PROC1 (General exposures (closed systems),outdoor)	0.124 mg/m³	< 0.01			< 0.01	Inhalation: TRA Workers 3.0
PROC2 (General exposures (closed systems),Use in contained systems,with sample collection)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC3 (General exposures (closed systems))	176.9 mg/m³	0.4			0.4	Inhalation: TRA Workers 3.0
PROC4 (General exposures (open systems))	353.9 mg/m³	0.801			0.801	Inhalation: TRA Workers 3.0
PROC3 (Batch processes at elevated temperatures,Use in contained batch processes)	265.4 mg/m³	0.601			0.601	Inhalation: TRA Workers 3.0
PROC3 (Batch processes at elevated temperatures,Use in contained batch processes)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC9 (Process sampling)	265.4 mg/m³	0.601			0.601	Inhalation: TRA Workers 3.0
PROC15 (Laboratory activities)	176.9 mg/m³	0.4			0.4	Inhalation: TRA Workers 3.0
PROC8b (Bulk transfers,Dedicated facility)	309.6 mg/m³	0.701			0.701	Inhalation: TRA Workers 3.0

PROC5 (Mixing operations (open systems))	265.4 mg/m³	0.601			0.601	Inhalation: TRA Workers 3.0
PROC8a (Transfer from/pouring from containers,Non-dedicated facility)	265.4 mg/m³	0.601			0.601	Inhalation: TRA Workers 3.0
PROC8b (Drum/batch transfers,Dedicated facility)	309.6 mg/m³	0.701			0.701	Inhalation: TRA Workers 3.0
PROC14 (Production of preparations or articles by tabletting, compression, extrusion, pelettisation)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC9 (Drum and small package filling)	265.4 mg/m³	0.601			0.601	Inhalation: TRA Workers 3.0
PROC9 (Drum and small package filling)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC8a, PROC28 (Equipment cleaning and maintenance)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC1, PROC2 (Storage)	0.124 mg/m³	< 0.01			< 0.01	Inhalation: TRA Workers 3.0
PROC2 (Storage)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0

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Local - Inhalation					
DNEL	Acute: 442 mg/m³ Long-term: 221 mg/m³				
Contributing scenario	Acute	RCR	Long term	RCR	Assessment method
PROC1 (General exposures (closed systems))	0.177 mg/m³	< 0.01	0.044 mg/m³	< 0.01	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC1 (General exposures (closed systems),outdoor)	0.124 mg/m³	< 0.01	0.031 mg/m³/day	< 0.01	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC2 (General exposures (closed systems),Use in contained systems,with sample collection)	88.47 mg/m³	0.2	22.11 mg/m³	0.1	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC3 (General exposures (closed systems))	176.9 mg/m³	0.4	44.23 mg/m³	0.2	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC4 (General exposures (open systems))	353.9 mg/m³	0.801	88.47 mg/m³	0.4	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC3 (Batch processes at elevated temperatures,Use in	265.4 mg/m³	0.601	66.35 mg/m³	0.3	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0

contained batch processes)					
PROC3 (Batch processes at elevated temperatures,Use in contained batch processes)	88.47 mg/m³	0.2	13.27 mg/m³	0.06	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC9 (Process sampling)	265.4 mg/m³	0.601	39.81 mg/m³	0.18	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC15 (Laboratory activities)	176.9 mg/m³	0.4	44.23 mg/m³	0.2	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8b (Bulk transfers,Dedicated facility)	309.6 mg/m³	0.701	77.41 mg/m³	0.35	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC5 (Mixing operations (open systems))	265.4 mg/m³	0.601	66.35 mg/m³	0.3	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8a (Transfer from/pouring from containers,Non-dedicated facility)	265.4 mg/m³	0.601	39.81 mg/m³	0.18	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8b (Drum/batch transfers,Dedicated facility)	309.6 mg/m³	0.701	77.41 mg/m³	0.35	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC14 (Production of preparations or articles by tabletting, compression, extrusion, pelettisation)	88.47 mg/m³	0.2	13.27 mg/m³	0.06	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC9 (Drum and small package filling)	265.4 mg/m³	0.601	66.35 mg/m³	0.3	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC9 (Drum and small package filling)	88.47 mg/m³	0.2	13.27 mg/m³	0.06	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8a, PROC28 (Equipment cleaning and maintenance)	88.47 mg/m³	0.2	22.11 mg/m³	0.1	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC1, PROC2 (Storage)	0.124 mg/m³	< 0.01	0.031 mg/m³	< 0.01	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC2 (Storage)	88.47 mg/m³	0.2	22.11 mg/m³	0.1	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0

3.2. Environment

Information for contributing exposure scenario	
2.2	Man via environment - Inhalation (systemic effects): Concentration in air: 0.029 mg/m³; RCR < 0.01,Man via environment - Inhalation (local effects): Concentration in air: 0.029 mg/m³; RCR < 0.01,Man via environment - Oral: Exposure via food consumption: 2.58E-3 mg/kg bw/day; RCR < 0.01

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.033	0.044	0.759	EUSES 2.1.2
Marine water	mg/l	0.00334	0.0044	0.759	EUSES 2.1.2

Freshwater sediment	mg/kg dwt	1.914	2.52	0.76	EUSES 2.1.2
Marine water sediment	mg/kg dwt	0.191	0.252	0.759	EUSES 2.1.2
Sewage treatment plant	mg/l	0.333	1.6	0.208	EUSES 2.1.2
Soil	mg/kg dwt	0.543	0.852	0.638	EUSES 2.1.2

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

4.1. Health

Guidance - Health	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Wear suitable gloves tested to EN374

4.2. Environment

Guidance - Environment	Common practices vary across sites thus conservative process release estimates used. Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. 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.

Additional good practice advice beyond the REACH CSA

Additional good practice advice	Wear suitable gloves (tested to EN374) and eye protection

1. Exposure scenario ES3

Use at industrial sites. Use as an intermediate

ES Ref.: ES3 ES Type: Worker	

Use descriptors	PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PROC28 ERC6a
Processes, tasks, activities covered	Use of substance as an intermediate (not related to Strictly Controlled Conditions). Includes recycling/ recovery, material transfers, storage, sampling, associated laboratory activities, maintenance and loading (including marine vessel/barge, road/rail car and bulk container) Use at industrial sites (IS)

2. Operational conditions and risk management measures

2.2 Contributing scenario controlling environmental exposure (ERC6a)

Use of intermediate	
ERC6a	Use of intermediate

Product characteristics	
Physical form of product	Liquid, including paste/slurry/suspension
Concentration of substance in product	≤ 100 %
Viscosity, kinematic	1 mm²/s

Operational conditions		
Amounts used	Maximum daily use at site	≤ 334 t/d
Amounts used	Annual site tonnage	≤ 100000 t/yr
Amounts used	Msperc	50 t/d
Frequency and duration of use	Emission days	300 days/yr
Other given operational conditions affecting environmental exposure	Equipment cleaning and maintenance	No release to wastewater from process as such, wastewater emissions limited to release generated from final equipment cleaning step using water
Other given operational conditions affecting environmental exposure	Indoor or outdoor use	Indoor use
Other given operational conditions affecting environmental exposure	Release factor before on site RMM (water):	0.01 %
Other given operational conditions affecting environmental exposure	Release factor after on site RMM (water):	0.003 %
Other given operational conditions affecting environmental exposure	Release factor before on site RMM (air):	0.6 %
Other given operational conditions affecting environmental exposure	Release factor after on site RMM (Air):	0.3 %
Other given operational conditions affecting environmental exposure	Release factor after on site RMM (non agricultural soil):	0.1 %
Risk Management Measures		
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	Process efficiency:	Process optimized for efficient use of raw materials
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	On-site treatment of off-air:	On-site treatment of off-air: Upgrade of the system in place or additional air treatment measures (Upgrade of the system in place or additional air treatment measures, such as wet scrubber and/or air filtration and/or thermal oxidation and/or vapour recovery systems, in order to achieve a reduction of the air emissions.) [Effectiveness Air: 50%]
Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil	On-site waste water treatment	Acclimated biological treatment [Effectiveness Water: 70%]
Conditions and measures related to sewage treatment plant	Required Removal Efficiency (wastewater):	93.35 %

Conditions and measures related to sewage treatment plant	Discharge rate of Municipal STP	≥ 2000 m³/d
Conditions and measures related to sewage treatment plant	Application of the STP sludge on agricultural soil:	Yes.
Conditions and measures related to external treatment of waste for disposal	Particular considerations on the waste treatment operations:	No (low risk)

2.1.1 Contributing scenario controlling worker exposure (PROC1) (General exposures (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	745.4 Pa
Vapour pressure	at 20°C
Viscosity, kinematic	1 mm²/s

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	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
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.2 Contributing scenario controlling worker exposure (PROC2) (General exposures (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	745.4 Pa
Vapour pressure	at 20°C
Viscosity, kinematic	1 mm²/s

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	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
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.3 Contributing scenario controlling worker exposure (PROC3) (General exposures (closed systems))

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	745.4 Pa
Vapour pressure	at 20°C
Viscosity, kinematic	1 mm²/s

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	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	
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.4 Contributing scenario controlling worker exposure (PROC4) (General exposures (open systems))

PROC4	Chemical production where opportunity for exposure arises

Product characteristics	
Physical form of product	Liquid
Concentration of substance in product	≤ 100 %
Vapour pressure	745.4 Pa
Vapour pressure	at 20°C
Viscosity, kinematic	1 mm²/s

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C

Other given operational conditions affecting workers exposure	Indoor use	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.5 Contributing scenario controlling worker exposure (PROC4) (General exposures (open systems);outdoor)

PROC4	Chemical production where opportunity for exposure arises

Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Viscosity, kinematic	1 mm²/s	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor use	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.6 Contributing scenario controlling worker exposure (PROC9) (Process sampling)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Viscosity, kinematic	1 mm²/s	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C

Other given operational conditions affecting workers exposure	Indoor use	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Yes, specifically designed fixed capturing hood, on tool extraction or enclosing hoods (assumed effectiveness >= 90-95%). Ensure samples are obtained under containment or extract ventilation. or. Sample via a closed loop or other system to avoid exposure
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.7 Contributing scenario controlling worker exposure (PROC9)

Process sampling	
PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Viscosity, kinematic	1 mm²/s	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor use	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.8 Contributing scenario controlling worker exposure (PROC1) (General exposures (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	745.4 Pa
Vapour pressure	at 20°C

Viscosity, kinematic	1 mm²/s	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	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
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.9 Contributing scenario controlling worker exposure (PROC9) (Process sampling;outdoor)

PROC9	Transfer of substance or preparation into small containers (dedicated filling line, including weighing)

Product characteristics		
Physical form of product	Liquid	
Concentration of substance in product	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Viscosity, kinematic	1 mm²/s	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor use	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Yes. APF ≥ 10
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.10 Contributing scenario controlling worker exposure (PROC8b) (Bulk transfers;Open systems;outdoor)

Bulk transfers. (open systems)	
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	745.4 Pa
Vapour pressure	at 20°C
Viscosity, kinematic	1 mm²/s

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor use	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.11 Contributing scenario controlling worker exposure (PROC8b) (Bulk transfers;Open systems)

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	745.4 Pa
Vapour pressure	at 20°C
Viscosity, kinematic	1 mm²/s

Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor use	

Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.12 Contributing scenario controlling worker exposure (PROC8b) (Bulk transfers;Closed systems)

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	745.4 Pa	
Vapour pressure	at 20°C	
Viscosity, kinematic	1 mm²/s	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Outdoor use	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	Not required
Technical conditions and measures to control dispersion from source towards the worker	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 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.13 Contributing scenario controlling worker exposure (PROC8a, PROC28) (Equipment cleaning and 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	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Viscosity, kinematic	1 mm²/s	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 4 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor use	
Risk Management Measures		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Enhanced general ventilation (5-10 air changes per hour)
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.14 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	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Viscosity, kinematic	1 mm²/s	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor use	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Use in closed process, no likelihood of exposure	Store substance within a closed system
Technical conditions and measures at process level (source) to prevent release		
Technical conditions and measures to control dispersion from source towards the worker	Occupational Health and Safety Management System:	Advanced
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH
Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

2.1.15 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	≤ 100 %	
Vapour pressure	745.4 Pa	
Vapour pressure	at 20°C	
Viscosity, kinematic	1 mm²/s	
Operational conditions		
Amounts used		
Frequency and duration of use	Duration of activity	≤ 8 h/day
Human factors not influenced by risk management		
Other given operational conditions affecting workers exposure	Operating temperature	≤ 20 °C
Other given operational conditions affecting workers exposure	Indoor use	
Risk Management Measures		
Technical conditions and measures at process level (source) to prevent release	Store substance within a closed system	
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
Technical conditions and measures to control dispersion from source towards the worker	Local exhaust ventilation	No specific measures identified
Technical conditions and measures to control dispersion from source towards the worker	General ventilation	Basic. Up to 3 ACH

Conditions and measures related to personal protection, hygiene and health evaluation	Dermal Protection:	≥ 80 % Yes
Conditions and measures related to personal protection, hygiene and health evaluation	Respiratory protection:	Not required
Conditions and measures related to personal protection, hygiene and health evaluation	Eye protection:	Yes

3. Exposure estimation and reference to its source

3.1. Health

Long-term - systemic effects						
DNEL	Inhalation: 221 mg/m³ Dermal: 212 mg/kg bodyweight/day					
Contributing scenario	inhalation exposure	RCR	dermal exposure	RCR	Sum RCR	Assessment method
PROC1 (General exposures (closed systems))	0.031 mg/m³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC2 (General exposures (closed systems))	22.11 mg/m³	0.1	0.274 mg/kg bw/day	< 0.01	< 0.11	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC3 (General exposures (closed systems))	44.23 mg/m³	0.2	0.138 mg/kg bw/day	< 0.01	< 0.21	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC4 (General exposures (open systems))	61.93 mg/m³	0.28	1.372 mg/kg bw/day	< 0.01	< 0.29	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC4 (General exposures (open systems),outdoor)	37.15 mg/m³	0.168	0.823 mg/kg bw/day	< 0.01	< 0.178	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC9 (Process sampling)	22.11 mg/m³	0.1	1.372 mg/kg bw/day	< 0.01	< 0.11	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC9	13.27 mg/m³	0.06	0.823 mg/kg bw/day	< 0.01	< 0.07	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC1 (General exposures (closed systems))	0.044 mg/m³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC9 (Process sampling,outdoor)	9.29 mg/m³	0.042	0.823 mg/kg bw/day	< 0.01	< 0.052	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems,outdoor)	46.44 mg/m³	0.21	1.645 mg/kg bw/day	< 0.01	< 0.22	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems)	77.41 mg/m³	0.35	2.742 mg/kg bw/day	0.013	0.363	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8b (Bulk transfers,Closed systems)	77.41 mg/m³	0.35	2.742 mg/kg bw/day	0.013	0.363	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC8a, PROC28 (Equipment cleaning and maintenance)	39.81 mg/m³	0.18	1.645 mg/kg bw/day	< 0.01	< 0.19	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC1 (Storage)	0.031 mg/m³	< 0.01	0.0068 mg/kg bw/day	< 0.01	< 0.02	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0
PROC2 (Storage)	22.11 mg/m³	0.1	0.274 mg/kg bw/day	< 0.01	< 0.11	Inhalation: TRA Workers 3.0 Dermal: TRA Workers 3.0

Acute - systemic effects						
DNEL	Inhalation: 442 mg/m³ Dermal:					
Contributing scenario	inhalation exposure	RCR	dermal exposure	RCR	Sum RCR	Assessment method
PROC1 (General exposures (closed systems))	0.124 mg/m³	< 0.01			< 0.01	Inhalation: TRA Workers 3.0
PROC2 (General exposures (closed systems))	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC3 (General exposures (closed systems))	176.9 mg/m³	0.4			0.4	Inhalation: TRA Workers 3.0
PROC4 (General exposures (open systems))	247.7 mg/m³	0.56			0.56	Inhalation: TRA Workers 3.0
PROC4 (General exposures (open systems),outdoor)	247.7 mg/m³	0.56			0.56	Inhalation: TRA Workers 3.0
PROC9 (Process sampling)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC9	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0
PROC1 (General exposures (closed systems))	0.177 mg/m³	< 0.01			< 0.01	Inhalation: TRA Workers 3.0
PROC9 (Process sampling,outdoor)	61.93 mg/m³	0.14			0.14	Inhalation: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems,outdoor)	309.6 mg/m³	0.701			0.701	Inhalation: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems)	309.6 mg/m³	0.701			0.701	Inhalation: TRA Workers 3.0
PROC8b (Bulk transfers,Closed systems)	309.6 mg/m³	0.701			0.701	Inhalation: TRA Workers 3.0
PROC8a, PROC28 (Equipment cleaning and maintenance)	265.4 mg/m³	0.601			0.601	Inhalation: TRA Workers 3.0
PROC1 (Storage)	0.124 mg/m³	< 0.01			< 0.01	Inhalation: TRA Workers 3.0
PROC2 (Storage)	88.47 mg/m³	0.2			0.2	Inhalation: TRA Workers 3.0

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Local - Inhalation					
DNEL	Acute: 442 mg/m³ Long-term: 221 mg/m³				
Contributing scenario	Acute	RCR	Long term	RCR	Assessment method
PROC1	0.124 mg/m³	< 0.01	0.031 mg/m³	< 0.01	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0

(General exposures (closed systems))					
PROC2 (General exposures (closed systems))	88.47 mg/m³	0.2	22.11 mg/m³	0.1	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC3 (General exposures (closed systems))	176.9 mg/m³	0.4	44.23 mg/m³	0.2	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC4 (General exposures (open systems))	247.7 mg/m³	0.56	61.93 mg/m³	0.28	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC4 (General exposures (open systems),outdoor)	247.7 mg/m³	0.56	37.15 mg/m³	0.168	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC9 (Process sampling)	88.47 mg/m³	0.2	22.11 mg/m³	0.1	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC9	88.47 mg/m³	0.2	13.27 mg/m³	0.06	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC1 (General exposures (closed systems))	0.177 mg/m³	< 0.01	0.044 mg/m³	< 0.01	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC9 (Process sampling,outdoor)	61.93 mg/m³	0.14	9.29 mg/m³	0.042	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems,outdoor)	309.6 mg/m³	0.701	46.44 mg/m³	0.21	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8b (Bulk transfers,Open systems)	309.6 mg/m³	0.701	77.41 mg/m³	0.35	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8b (Bulk transfers,Closed systems)	309.6 mg/m³	0.701	77.41 mg/m³	0.35	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC8a, PROC28 (Equipment cleaning and maintenance)	265.4 mg/m³	0.601	39.81 mg/m³	0.18	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC1 (Storage)	0.124 mg/m³	< 0.01	0.031 mg/m³	< 0.01	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0
PROC2 (Storage)	88.47 mg/m³	0.2	22.11 mg/m³	0.1	Acute: TRA Workers 3.0 Long term: TRA Workers 3.0

3.2. Environment

Information for contributing exposure scenario	
2.2	Man via environment - Inhalation (systemic effects): Concentration in air: 0.229 mg/m³; RCR < 0.01,Man via environment - Inhalation (local effects): Concentration in air: 0.229 mg/m³; RCR < 0.01,Man via environment - Oral: Exposure via food consumption: 2.25E-3 mg/kg bw/day; RCR < 0.01

Environmental exposure	Unit	Exposure estimation	PNEC	RCR	Assessment method
Freshwater	mg/l	0.00851	0.044	0.193	EUSES 2.1.2
Marine water	mg/l	0.00334	0.0044	0.76	EUSES 2.1.2
Freshwater sediment	mg/kg dwt	0.487	2.52	0.193	EUSES 2.1.2
Marine water sediment	mg/kg dwt	0.192	0.252	0.76	EUSES 2.1.2
Sewage treatment plant	mg/l	0.333	1.6	0.208	EUSES 2.1.2

Soil	mg/kg dwt	0.561	0.852	0.658	EUSES 2.1.2

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

4.1. Health

Guidance - Health	Estimated workplace exposures are not expected to exceed DNELs when the identified risk management measures are adopted. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects. Wear suitable gloves tested to EN374

4.2. Environment

Guidance - Environment	Common practices vary across sites thus conservative process release estimates used. Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures. 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.

Additional good practice advice beyond the REACH CSA

Additional good practice advice	Wear suitable gloves (tested to EN374) and eye protection