

**Safety Data Sheet**

according to the REACH Regulation (EC) 1907/2006 amended by Regulation (EU) 2020/878

SDS Reference Number: CM32933

Issue date: 2021/11/3 Revision date: 2025/1/5 Supersedes version of: 2021/11/3 Version: 1.2

**SECTION 1: Identification of the substance/mixture and of the company/undertaking****1.1. Product identifier**

Product form : Mixture  
Product name : Standard solution - 5 Components in toluene  
Product code : CM32933  
BIG No : 10046

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

Main use category : Professional use  
Use of the substance/mixture : Reference material  
Function or use category : Laboratory chemicals

**1.3. Details of the supplier of the safety data sheet****Spectracer UK Ltd.**

20 Seymour Mews,  
London,  
W1H 6BQ,  
United Kingdom.

Tel: +44 (0) 207 193 9114

Fax: +44 (0) 203 432 4686

Email: [contact@spectracer.com](mailto:contact@spectracer.com)Web: [www.spectracer.com](http://www.spectracer.com)**1.4. Emergency telephone number**

Country/Area	Organisation/Company	Address	Emergency number	Comment
Ireland	National Poisons Information Centre Beaumont Hospital	Beaumont Hospital Beaumont Road 9 Dublin	: +353 1 8379964	
Malta	Medicines & Poisons Info Office	Mater Dei Hospital Msida MSD 2090 Msida	112 +356 2545 6508	
United Kingdom	National Poisons Information Service (NHS Direct)	<a href="http://www.npis.org">http://www.npis.org</a>	111 (England & Wales only) or 112 (EU) or 08454 24 24 24 (Scotland)	

**SECTION 2: Hazards identification****2.1. Classification of the substance or mixture****Classification according to Regulation (EC) No. 1272/2008 [CLP]**

Flammable liquids, Category 2 H225  
Skin corrosion/irritation, Category 2 H315  
Reproductive toxicity, Category 2 H361d  
Specific target organ toxicity – Single exposure, Category 3, H336  
Narcosis  
Specific target organ toxicity – Repeated exposure, Category 2 H373  
Aspiration hazard, Category 1 H304  
Full text of H- and EUH-statements: see section 16

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### Adverse physicochemical, human health and environmental effects

Highly flammable liquid and vapour. Suspected of damaging fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure. May cause drowsiness or dizziness. Causes skin irritation. May be fatal if swallowed and enters airways.

## 2.2. Label elements

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

Hazard pictograms (CLP)



Signal word (CLP)

Contains

Hazard statements (CLP)

Precautionary statements (CLP)

- : Danger
- : toluene
- : H225 - Highly flammable liquid and vapour.  
H304 - May be fatal if swallowed and enters airways.  
H315 - Causes skin irritation.  
H336 - May cause drowsiness or dizziness.  
H361d - Suspected of damaging the unborn child.  
H373 - May cause damage to organs through prolonged or repeated exposure.
- : P201 - Obtain special instructions before use.  
P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.  
P261 - Avoid breathing dust/fume/gas/mist/vapours/spray.  
P264 - Wash hands, forearms and face thoroughly after handling.  
P280 - Wear protective gloves/protective clothing/eye protection/face protection.  
P301+P310+P331 - IF SWALLOWED: Immediately call a POISON CENTER or doctor. Do NOT induce vomiting.  
P308+P313 - IF exposed or concerned: Get medical advice/attention.  
P312 - Call a POISON CENTRE or doctor if you feel unwell.  
P314 - Get medical advice/attention if you feel unwell.

## 2.3. Other hazards

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

Component	
Substance(s) not meeting the PBT criteria of REACH regulation, in accordance with Annex XIII	toluene (108-88-3), 2-furaldehyde (98-01-1)
Substance(s) not meeting the vPvB criteria of REACH regulation, in accordance with Annex XIII	toluene (108-88-3), 2-furaldehyde (98-01-1)

The mixture does not contain substance(s) included in the list established in accordance with Article 59(1) of REACH for having endocrine disrupting properties, or substance(s) are 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 at a concentration equal to or greater than 0,1 %

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### SECTION 3: Composition/information on ingredients

#### 3.2. Mixtures

Name	Product identifier	%	Classification according to Regulation (EC) No. 1272/2008 [CLP]
toluene substance with national workplace exposure limit(s) (AT, BE, BG, CY, CZ, DE, DK, EE, ES, FI, FR, GB, GI, GR, HR, HU, IE, IT, LT, LU, LV, MT, NL, PL, PT, RO, SE, SI, SK, AL, IS, NO, MK, RS, CH, TR); substance with a Community workplace exposure limit	CAS-No.: 108-88-3 EC-No.: 203-625-9 EC Index-No.: 601-021-00-3	≥ 99	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 2, H361d STOT SE 3, H336 STOT RE 2, H373 Asp. Tox. 1, H304
2-furyl methyl ketone	CAS-No.: 1192-62-7 EC-No.: 214-757-1	0,1 – 0,25	Acute Tox. 3 (Oral), H301 Acute Tox. 1 (Dermal), H310 Acute Tox. 1 (Inhalation), H330 Eye Irrit. 2, H319
furfuryl alcohol substance with national workplace exposure limit(s) (AT, BE, CZ, DK, EE, ES, FI, FR, GR, HR, HU, IE, LT, LV, PL, PT, RO, SE, SK, IS, NO, CH)	CAS-No.: 98-00-0 EC-No.: 202-626-1 EC Index-No.: 603-018-00-2	0,1 – 0,25	Acute Tox. 4 (Oral), H302 Acute Tox. 4 (Dermal), H312 Acute Tox. 3 (Inhalation), H331 Eye Irrit. 2, H319 Carc. 2, H351 STOT SE 3, H335 STOT RE 2, H373
2-furaldehyde substance with national workplace exposure limit(s) (AT, BE, BG, CZ, DK, EE, ES, FI, FR, GB, GR, HR, HU, IE, LT, LV, PL, PT, RO, SE, SK, IS, NO, CH)	CAS-No.: 98-01-1 EC-No.: 202-627-7 EC Index-No.: 605-010-00-4 REACH-no: 01-2119486861-27-XXXX	0,1 – 0,25	Flam. Liq. 3, H226 Acute Tox. 3 (Oral), H301 Acute Tox. 4 (Dermal), H312 Acute Tox. 3 (Inhalation), H331 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Carc. 2, H351 STOT SE 3, H335 STOT RE 2, H373 Aquatic Chronic 3, H412

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

### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

First-aid measures general	: Call a physician immediately.
First-aid measures after inhalation	: Remove person to fresh air and keep comfortable for breathing.
First-aid measures after skin contact	: Rinse skin with water/shower. Take off immediately all contaminated clothing. If skin irritation occurs: Get medical advice/attention.
First-aid measures after eye contact	: Rinse eyes with water as a precaution.
First-aid measures after ingestion	: Do not induce vomiting. Call a physician immediately.
First-aid measures for first aider	: First aid workers will be equipped with suitable personal protective equipment.

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

Symptoms/effects	: May cause drowsiness or dizziness.
Symptoms/effects after inhalation	: None under normal conditions.
Symptoms/effects after skin contact	: Irritation.
Symptoms/effects after eye contact	: None under normal conditions.
Symptoms/effects after ingestion	: Risk of lung oedema.

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

Treat symptomatically.

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### SECTION 5: Firefighting measures

#### 5.1. Extinguishing media

Suitable extinguishing media : Water spray. Dry powder. Foam. Carbon dioxide.  
Unsuitable extinguishing media : Do not use a heavy water stream.

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

Fire hazard : Highly flammable liquid and vapour.  
Explosion hazard : No direct explosion hazard.  
Hazardous decomposition products in case of fire : Toxic fumes may be released.

#### 5.3. Advice for firefighters

Firefighting instructions : Fight fire from safe distance and protected location. Do not enter fire area without proper protective equipment, including respiratory protection.  
Protection during firefighting : Do not attempt to take action without suitable protective equipment. Self-contained breathing apparatus. Complete protective clothing.

### SECTION 6: Accidental release measures

#### 6.1. Personal precautions, protective equipment and emergency procedures

General measures : Stop leak if safe to do so. Notify authorities if product enters sewers or public waters.  
Absorb spillage to prevent material damage.

##### For non-emergency personnel

Protective equipment : Wear recommended personal protective equipment.  
Emergency procedures : Ventilate spillage area. No open flames, no sparks, and no smoking. Do not breathe dust/fume/gas/mist/vapours/spray. Avoid contact with skin and eyes.

##### For emergency responders

Protective equipment : Do not attempt to take action without suitable protective equipment. For further information refer to section 8: "Exposure controls/personal protection".  
Emergency procedures : Evacuate unnecessary personnel. Stop leak if safe to do so.

#### 6.2. Environmental precautions

Avoid release to the environment.

#### 6.3. Methods and material for containment and cleaning up

For containment : Absorb spilled material with sand or earth. Contain any spills with dikes or absorbents to prevent migration and entry into sewers or streams. Stop leak without risks if possible.  
Methods for cleaning up : Take up liquid spill into absorbent material. Notify authorities if product enters sewers or public waters.  
Other information : Dispose of materials or solid residues at an authorized site.

#### 6.4. Reference to other sections

For further information refer to section 13.

### SECTION 7: Handling and storage

#### 7.1. Precautions for safe handling

Additional hazards when processed : Not expected to present a significant hazard under anticipated conditions of normal use.

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Precautions for safe handling	: Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking. Ground/bond container and receiving equipment. Use only non-sparking tools. Take precautionary measures against static discharge. Flammable vapours may accumulate in the container. Use explosion-proof equipment. Wear personal protective equipment. Obtain special instructions before use. Do not handle until all safety precautions have been read and understood. Do not breathe dust/fume/gas/mist/vapours/spray. Use only outdoors or in a well-ventilated area. Avoid contact with skin and eyes.
Hygiene measures	: Wash contaminated clothing before reuse. Do not eat, drink or smoke when using this product. Always wash hands after handling the product.

### 7.2. Conditions for safe storage, including any incompatibilities

Technical measures	: Ground/bond container and receiving equipment.
Storage conditions	: Store in a well-ventilated place. Keep cool. Keep container tightly closed. Store locked up.
Packaging materials	: Store always product in container of same material as original container.

#### Germany

Storage class (LGK, TRGS 510)	: LGK 3 - Flammable liquids																									
Joint storage table	: <table border="1"><tr><td>LGK 1</td><td>LGK 2A</td><td>LGK 2B</td><td>LGK 3</td><td>LGK 4.1A</td></tr><tr><td>LGK 4.1B</td><td>LGK 4.2</td><td>LGK 4.3</td><td>LGK 5.1A</td><td>LGK 5.1B</td></tr><tr><td>LGK 5.1C</td><td>LGK 5.2</td><td>LGK 6.1A</td><td>LGK 6.1B</td><td>LGK 6.1C</td></tr><tr><td>LGK 6.1D</td><td>LGK 6.2</td><td>LGK 7</td><td>LGK 8A</td><td>LGK 8B</td></tr><tr><td>LGK 10</td><td>LGK 11</td><td>LGK 12</td><td>LGK 13</td><td>LGK 10-13</td></tr></table>	LGK 1	LGK 2A	LGK 2B	LGK 3	LGK 4.1A	LGK 4.1B	LGK 4.2	LGK 4.3	LGK 5.1A	LGK 5.1B	LGK 5.1C	LGK 5.2	LGK 6.1A	LGK 6.1B	LGK 6.1C	LGK 6.1D	LGK 6.2	LGK 7	LGK 8A	LGK 8B	LGK 10	LGK 11	LGK 12	LGK 13	LGK 10-13
LGK 1	LGK 2A	LGK 2B	LGK 3	LGK 4.1A																						
LGK 4.1B	LGK 4.2	LGK 4.3	LGK 5.1A	LGK 5.1B																						
LGK 5.1C	LGK 5.2	LGK 6.1A	LGK 6.1B	LGK 6.1C																						
LGK 6.1D	LGK 6.2	LGK 7	LGK 8A	LGK 8B																						
LGK 10	LGK 11	LGK 12	LGK 13	LGK 10-13																						
Joint storage not permitted for	: LGK 1, LGK 2A, LGK 4.1A, LGK 4.1B, LGK 4.2, LGK 4.3, LGK 5.1A, LGK 5.1C, LGK 5.2, LGK 6.1B, LGK 6.2, LGK 7																									
Joint storage with restrictions permitted for	: LGK 5.1B, LGK 6.1D, LGK 11, LGK 10-13																									
Joint storage permitted for	: LGK 2B, LGK 3, LGK 6.1A, LGK 6.1C, LGK 8A, LGK 8B, LGK 10, LGK 12, LGK 13																									

### 7.3. Specific end use(s)

No additional information available

## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

#### National occupational exposure and biological limit values

toluene (108-88-3)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	Toluene
IOEL TWA	192 mg/m <sup>3</sup>
	50 ppm
IOEL STEL	384 mg/m <sup>3</sup>
	100 ppm
Remark	Skin
Regulatory reference	COMMISSION DIRECTIVE 2006/15/EC
Albania - Occupational Exposure Limits	
Local name	Toluen
OEL TWA	192 mg/m <sup>3</sup>
	50 ppm
OEL STEL	384 mg/m <sup>3</sup>
	100 ppm

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toluene (108-88-3)	
Remark	Lëkurë (tregon mundësinë e një marrjeje të rëndësishme nëpërmjet lëkurës)
Regulatory reference	VENDIM Nr. 522, datë 6.8.2014 PËR MIRATIMIN E RREGULLORES "PËR MBROJTJEN E SIGURISË DHE SHËNDETIT TË PUNËMARRËSVE NGA RISQET E LIDHURA ME AGJENTËT KIMIKË NË PUNË"
<b>Austria - Occupational Exposure Limits</b>	
Local name	Toluol
MAK (OEL TWA)	190 mg/m <sup>3</sup> 50 ppm
MAK (OEL STEL)	380 mg/m <sup>3</sup> (4x 15(Miw) min) 100 ppm (4x 15(Miw) min)
Remark	H. Fortpflanzungsgefährdend: d
Regulatory reference	BGBI. II Nr. 156/2021
<b>Austria - Biological limit values</b>	
Local name	Toluol
BLV	10 g/dl Parameter: Hämoglobin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Frauen 12 g/dl Parameter: Hämoglobin - Untersuchungsmaterial: Blut - Mitarbeiter/innen: Männer 250 µg/l Parameter: Hämoglobin - Untersuchungsmaterial: Blut - Probenahmezeitpunkt: Bei wiederholt erhöhten o-Cresolwerten ist zusätzlich Toluol im Blut am Ende eines Arbeitstages zu bestimmen (der Zeitpunkt der Untersuchung ist anzugeben) 0,8 mg/l Parameter: o-Cresol - Untersuchungsmaterial: Harn
Remark	Eignung: Blut: 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 Eignung mit vorzeitiger Folgeuntersuchung: drei Monate.
Regulatory reference	Verordnung über die Gesundheitsüberwachung am Arbeitsplatz 2017 (VGÜ 2017)
<b>Belgium - Occupational Exposure Limits</b>	
Local name	Toluène # Toluene
OEL TWA	77 mg/m <sup>3</sup> 20 ppm
OEL STEL	384 mg/m <sup>3</sup> 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.
Regulatory reference	Koninklijk besluit/Arrêté royal 16/11/2023
<b>Bulgaria - Occupational Exposure Limits</b>	
Local name	Толуен
OEL TWA	192 mg/m <sup>3</sup>

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toluene (108-88-3)	
	50 ppm
OEL STEL	384 mg/m <sup>3</sup>
	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.)
Bulgaria - Biological limit values	
Local name	Толуен
BLV	1,6 mmol/mmol Creatinine Биомаркер за експозиция/биомаркер за ефект: хипурова киселина - Биологична среда: урина - Време на пробовземане: В края на експозицията или в края на работната смяна - Специфични ефекти: Няма
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Croatia - Occupational Exposure Limits	
Local name	Toluen
GVI (OEL TWA)	192 mg/m <sup>3</sup>
	50 ppm
KGVI (OEL STEL)	384 mg/m <sup>3</sup>
	100 ppm
Remark	Direktiva: 2006/15/EZ. Napomena: Koža (razvrstana kao tvar koja nadražuje kožu (H315))
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, граничним vrijednostima izloženosti i biološkim граничним vrijednostima (NN 148/2023)
Croatia - Biological limit values	
Local name	Toluen
BLV	10,85 µmol/l Karakteristični pokazatelj: toluen - Biološki uzorak: krv - Vrijeme uzorkovanja: na kraju radne smjene 1 mg/l Karakteristični pokazatelj: toluen - Biološki uzorak: krv - Vrijeme uzorkovanja: na kraju radne smjene 0,83 µmol/l Karakteristični pokazatelj: toluen - Biološki uzorak: krajnje izdahnuti zrak - Vrijeme uzorkovanja: za vrijeme izloženosti 20 ppm Karakteristični pokazatelj: toluen - Biološki uzorak: krajnje izdahnuti zrak - Vrijeme uzorkovanja: za vrijeme izloženosti 1,58 mol/mol Creatinine Karakteristični pokazatelj: hipurna kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene - Napomena: hrana bogata voćem i povrćem te konzervirana Na-benzoatom povisuje nalaz 2,5 g/g creatinine Karakteristični pokazatelj: hipurna kiselina - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene - Napomena: hrana bogata voćem i povrćem te konzervirana Na-benzoatom povisuje nalaz 1,05 mmol/mol Creatinine Karakteristični pokazatelj: o-krezol - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene 1 mg/g creatinine Karakteristični pokazatelj: o-krezol - Biološki uzorak: mokraća - Vrijeme uzorkovanja: na kraju radne smjene
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, граничним vrijednostima izloženosti i biološkim граничним vrijednostima (NN 91/2018)

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toluene (108-88-3)	
<b>Cyprus - Occupational Exposure Limits</b>	
Local name	Τολουόλιο
OEL TWA	192 mg/m <sup>3</sup>
	50 ppm
OEL STEL	384 mg/m <sup>3</sup>
	100 ppm
Remark	δέγμα
Regulatory reference	Κανονισμοί του 2007 (Κ.Δ.Π. 295/2007)
<b>Czech Republic - Occupational Exposure Limits</b>	
Local name	Toluen (Methylbenzen)
PEL (OEL TWA)	192 mg/m <sup>3</sup>
	50 ppm
NPK-P (OEL C)	384 mg/m <sup>3</sup>
	100 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, P - u látky nelze vyloučit závažné pozdní účinky (s větou H372, H373).
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
<b>Czech Republic - Biological limit values</b>	
Local name	Toluen (Methylbenzen)
BLV	1,5 mg/g creatinine Ukazatel: o-Kresol (po hydrolyze) - Biologicky vzorek: moči - Doba odběru: konec směny 1,6 μmol/mmol Creatinine Ukazatel: o-Kresol (po hydrolyze) - Biologicky vzorek: moči - Doba odběru: konec směny 1600 mg/g creatinine Ukazatel: Hippurová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 1000 μmol/mmol Creatinine Ukazatel: Hippurová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny
Remark	Je-li hodnota při nálezů kyseliny hippurové vyšší než 1600 mg/g, avšak nepřesahuje 2500 mg/g kreatininu, použije se ke zpřesnění expozice toluenu biologický expoziční test podle ukazatele o-Kresol. Je-li hodnota při nálezů kyseliny hippurové vyšší než 2500 mg/g, považuje se za hodnotu prokazující, že jde o pracovní expozici toluenu, jehož hodnota PEL je překračována a biologický expoziční test podle ukazatele o-Kresol se již neprovádí.
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
<b>Denmark - Occupational Exposure Limits</b>	
Local name	Toluen (Methylbenzen; Phenylmethan)
OEL TWA	94 mg/m <sup>3</sup>
	25 ppm
OEL STEL	384 mg/m <sup>3</sup>
	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

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<b>toluene (108-88-3)</b>	
<b>Estonia - Occupational Exposure Limits</b>	
Local name	Tolueen (metüülbenseen)
OEL TWA	192 mg/m <sup>3</sup>
	50 ppm
OEL STEL	384 mg/m <sup>3</sup>
	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)
<b>Finland - Occupational Exposure Limits</b>	
Local name	Tolueeni
HTP (OEL TWA)	81 mg/m <sup>3</sup>
	25 ppm
HTP (OEL STEL)	380 mg/m <sup>3</sup>
	100 ppm
Remark	lho, melu
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
<b>Finland - Biological limit values</b>	
Local name	Tolueeni
BLV	500 nmol/l Parametri: Veren tolueeni - Näytteenottoajankohta: Työpäivän jälkeinen aamu
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
<b>France - Occupational Exposure Limits</b>	
Local name	Toluène
VME (OEL TWA)	76,8 mg/m <sup>3</sup>
	20 ppm
VLE (OEL C/STEL)	384 mg/m <sup>3</sup>
	100 ppm
Remark	Valeurs réglementaires 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; Décret n° 2024-307)
<b>Germany - Occupational Exposure Limits (TRGS 900)</b>	
Local name	Toluol
AGW (OEL TWA)	190 mg/m <sup>3</sup>
	50 ppm
Peak exposure limitation factor	2(II)

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toluene (108-88-3)	
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; 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	Toluol
Biological limit value	600 µg/l Parameter: Toluol - Untersuchungsmaterial: B = Vollblut - Probenahmezeitpunkt: g) unmittelbar nach Exposition - Festlegung/Begründung: 05/2024 DFG 75 µg/l Parameter: Toluol - Untersuchungsmaterial: U = Urin - Probenahmezeitpunkt: b) Expositionsende, bzw. Schichtende - Festlegung/Begründung: 05/2024 DFG 1,5 mg/l Parameter: o-Kresol (nach Hydrolyse) - Untersuchungsmaterial: U = Urin - Probenahmezeitpunkt: c) am Schichtende, bei Langzeitexposition nach mehreren vorangegangenen Schichten - Festlegung/Begründung: 05/2024 DFG
Regulatory reference	TRGS 903
Gibraltar - Occupational Exposure Limits	
Local name	Toluene
OEL TWA	192 mg/m <sup>3</sup> 50 ppm
OEL STEL	384 mg/m <sup>3</sup> 100 ppm
Remark	Skin
Regulatory reference	Factories (Control of Chemical Agents at Work) Regulations 2003 (LN. 2018/181)
Greece - Occupational Exposure Limits	
Local name	Τολουόλιο
OEL TWA	192 mg/m <sup>3</sup> 50 ppm
OEL STEL	384 mg/m <sup>3</sup> 100 ppm
Remark	Η ένδειξη «δέρμα» στις οριακές τιμές επαγγελματικής έκθεσης επισημαίνει το ενδεχόμενο σημαντικής διείσδυσης μέσω του δέρματος.
Regulatory reference	Π.Δ. 162/2007 - Προστασία της υγείας των εργαζομένων που εκτίθενται σε ορισμένους χημικούς παράγοντες κατά τη διάρκεια της εργασίας τους
Hungary - Occupational Exposure Limits	
Local name	TOLUOL
AK (OEL TWA)	192 mg/m <sup>3</sup>
CK (OEL STEL)	384 mg/m <sup>3</sup>
Remark	b (Bőrön át is felszívódik), i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármát); BEM (biológiai expozíciós mutató); EU2 (2006/15/EK irányelvben közölt érték); 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

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toluene (108-88-3)	
<b>Hungary - Biological Exposure Indices</b>	
Local name	Toluol
BEI	1 mg/g creatinine Biológiai expozíciós (hatás) mutató: o-krezol - Biológiai minta: vizeletben - Mintavétel ideje: m.v. (műszak végén) 1 µmol/mmol Creatinine Biológiai expozíciós (hatás) mutató: o-krezol - 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
<b>Ireland - Occupational Exposure Limits</b>	
Local name	Toluene
OEL TWA	192 mg/m <sup>3</sup> 50 ppm
OEL STEL	384 mg/m <sup>3</sup> 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
<b>Ireland - Biological limit values</b>	
Local name	Toluene
BMGV	0,02 mg/l Parameter: toluene - Medium: blood - Sampling time: Prior to last shift of workweek 0,03 mg/l Parameter: toluene - Medium: urine - Sampling time: End of shift 0,3 mg/g creatinine Parameter: o-cresol - Medium: urine - Sampling time: End of shift - Notations: B (Background)
Regulatory reference	Biological Monitoring Guidelines (HSA, 2011)
<b>Italy - Occupational Exposure Limits</b>	
Local name	Toluene
OEL TWA	192 mg/m <sup>3</sup> 50 ppm
Remark	Cute
Regulatory reference	Allegato XXXVIII del Decreto Legislativo 4 settembre 2024, n. 135
<b>Latvia - Occupational Exposure Limits</b>	
Local name	Toluols (metilbenzols)
OEL TWA	50 mg/m <sup>3</sup> 14 ppm
OEL STEL	150 mg/m <sup>3</sup> 40 ppm
Remark	Āda; letekme uz dzirdi
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).

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toluene (108-88-3)	
<b>Lithuania - Occupational Exposure Limits</b>	
Local name	Toluenas
IPRV (OEL TWA)	192 mg/m <sup>3</sup>
	50 ppm
TPRV (OEL STEL)	384 mg/m <sup>3</sup>
	100 ppm
Remark	R (reprodukcijai toksiškas poveikis); O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
<b>Luxembourg - Occupational Exposure Limits</b>	
Local name	Toluène
OEL TWA	192 mg/m <sup>3</sup>
	50 ppm
OEL STEL	384 mg/m <sup>3</sup>
	100 ppm
Remark	Peau
Regulatory reference	Mémorial A N° 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
<b>Malta - Occupational Exposure Limits</b>	
Local name	Toluene
OEL TWA	192 mg/m <sup>3</sup>
	50 ppm
OEL STEL	384 mg/m <sup>3</sup>
	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)
<b>Netherlands - Occupational Exposure Limits</b>	
Local name	Toluene
TGG-8u (OEL TWA)	150 mg/m <sup>3</sup>
	39 ppm
TGG-15min (OEL STEL)	384 mg/m <sup>3</sup>
	100 ppm
Regulatory reference	Arbeidsomstandighedenregeling 2024
<b>Poland - Occupational Exposure Limits</b>	
Local name	Toluen
NDS (OEL TWA)	100 mg/m <sup>3</sup>
NDSCh (OEL STEL)	200 mg/m <sup>3</sup>
Remark	Skóra (Oznakowanie substancji notacją „skóra” oznacza, że wchłanianie substancji przez skórę może być tak samo istotne jak przy narażeniu drogą oddechową).

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toluene (108-88-3)	
Regulatory reference	Dz. U. 2024 poz. 1017 wraz z późn. zm.
<b>Portugal - Occupational Exposure Limits</b>	
Local name	Tolueno
OEL TWA	20 ppm
Remark	A4 (Agente não classificável como carcinogénico no Homem); IBE (Índice biológico de exposição)
Regulatory reference	Norma Portuguesa NP 1796:2014
<b>Portugal - Biological Exposure Indices</b>	
Local name	Tolueno
BEI	0,02 mg/l Parâmetro: Tolueno - Meio: sangue - Momento da amostragem: Antes do último turno da semana de trabalho 0,03 mg/l Parâmetro: Tolueno - Meio: urina - Momento da amostragem: Fim do turno 0,3 mg/g creatinine Parâmetro: o-Cresol - Meio: urina - Momento da amostragem: Fim do turno - Notação: Vb (Valor basal), Com hidrólise
Regulatory reference	Norma Portuguesa NP 1796:2014
<b>Romania - Occupational Exposure Limits</b>	
Local name	Toluen
OEL TWA	192 mg/m <sup>3</sup> 50 ppm
OEL STEL	384 mg/m <sup>3</sup> 100 ppm
Remark	P - posibilitatea unei penetrări cutanate importante; R2 - susceptibil de a dăuna fertilității
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
<b>Romania - Biological limit values</b>	
Local name	Toluen
BLV	2 g/l Indicatorul biologic: Acid hipuric - Material biologic: urină - Momentul recoltării: sfârșit de schimb 3 mg/l Indicatorul biologic: o-cresol - Material biologic: urină - Momentul recoltării: sfârșit de schimb
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
<b>Serbia - Occupational Exposure Limits</b>	
Local name	толуен
OEL TWA	192 mg/m <sup>3</sup> 50 ppm
OEL STEL	384 mg/m <sup>3</sup> 100 ppm
Remark	EU** – напомена да се ради о хемијским материјама за које су утврђене индикативне граничне вредности изложености према Директиви 2006/15/ЕЗ (друга листа); К – напомена да хемијска материја може штетно деловати на кожу
Regulatory reference	ПРАВИЛНИК о превентивним мерама за безбедан и здрав рад при излагању хемијским материјама („Службени гласник РС”, бр. 106/09, 117/17 и 107/21)
<b>Slovakia - Occupational Exposure Limits</b>	
Local name	Toluén

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toluene (108-88-3)	
NPHV (OEL TWA)	192 mg/m <sup>3</sup>
	50 ppm
NPHV (OEL STEL)	384 mg/m <sup>3</sup>
	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.)
Slovakia - Biological limit values	
Local name	Toluén
BLV	600 µg/l Zisťovaný faktor: Toluén - Vyšetrovaný materiál: krv - Čas odberu vzorky: b) koniec expozície alebo pracovnej zmeny 1,5 mg/l Zisťovaný faktor: O-krezol - Vyšetrovaný materiál: moč - Čas odberu vzorky: c) pri dlhodobej expozícii; po viacerých pracovných zmenách, b) koniec expozície alebo pracovnej zmeny 2401 mg/l Zisťovaný faktor: Kyselina hipurová - Vyšetrovaný materiál: moč - Čas odberu vzorky: b) koniec expozície alebo pracovnej zmeny 1600 mg/g creatinine Zisťovaný faktor: Kyselina hipurová - Vyšetrovaný materiál: moč - Čas odberu vzorky: 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	toluen
OEL TWA	192 mg/m <sup>3</sup>
	50 ppm
OEL STEL	384 mg/m <sup>3</sup>
	100 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	toluen
BLV	600 µg/l Parameter: toluen - Biološki vzorec: kri - Čas vzorčenja: takoj po izpostavljenosti ob koncu delovne izmene 1,5 mg/l Parameter: o-krezol (po hidrolizi) - Biološki vzorec: urin - Čas vzorčenja: ob koncu delovne izmene, pri dolgotrajni izpostavljenosti: ob koncu delovne izmene po več zaporednih delavnikih 75 µg/l Parameter: toluen - Biološki vzorec: urin - Čas vzorčenja: takoj po izpostavljenosti 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	Tolueno
VLA-ED (OEL TWA)	192 mg/m <sup>3</sup>
	50 ppm
VLA-EC (OEL STEL)	384 mg/m <sup>3</sup>

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toluene (108-88-3)	
	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), r (Esta sustancia tiene establecidas restricciones a la fabricación, la comercialización o el uso en los términos especificados en el "Reglamento (CE) nº 1907/2006 sobre Registro, Evaluación, Autorización y Restricción de sustancias y preparados químicos" (REACH) de 18 de diciembre de 2006 (DOUE L 369 de 30 de diciembre de 2006). Las restricciones de una sustancia pueden aplicarse a todos los usos o sólo a usos concretos. El anexo XVII del Reglamento REACH contiene la lista de todas las sustancias restringidas y especifica los usos que se han restringido).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Spain - Biological limit values	
Local name	Tolueno
BLV	0,6 mg/l Parámetro: o-Cresol - Medio: Orina - Momento de muestreo: Final de la jornada laboral - Notas: F (Fondo. El indicador está generalmente presente en cantidades detectables en personas no expuestas laboralmente. Estos niveles de fondo están considerados en el valor VLB) 0,05 mg/l Parámetro: Tolueno - Medio: Sangre - Momento de muestreo: Principio de la última jornada de la semana laboral 0,08 mg/l Parámetro: Tolueno - 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	Toluen
NGV (OEL TWA)	192 mg/m <sup>3</sup> 50 ppm
KGV (OEL STEL)	384 mg/m <sup>3</sup> 100 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)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
United Kingdom - Occupational Exposure Limits	
Local name	Toluene
WEL TWA (OEL TWA)	191 mg/m <sup>3</sup> 50 ppm
WEL STEL (OEL STEL)	384 mg/m <sup>3</sup> 100 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

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toluene (108-88-3)	
<b>Iceland - Occupational Exposure Limits</b>	
Local name	Tólúen (fenýlmetan, metýlbensen)
OEL TWA	94 mg/m <sup>3</sup>
	25 ppm
OEL STEL	188 mg/m <sup>3</sup>
	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. 390/2009)
<b>Norway - Occupational Exposure Limits</b>	
Local name	Toluen
Grenseverdi (OEL TWA)	94 mg/m <sup>3</sup>
	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
<b>North Macedonia - Occupational Exposure Limits</b>	
Local name	Толуен
OEL TWA	192 mg/m <sup>3</sup>
	50 ppm
KTV	2
Short time value [mg/m <sup>3</sup> ]	384 mg/m <sup>3</sup>
Short time value [ppm]	100 ppm
Remark	(KTV) краткотрајна вредност (КТВ) значи концентрација на опасни хемиски супстанции во воздухот на работното место внатре во зона на дишење, на која работникот без опасност по здравјето може да е изложен на покусо време. Изложеноста на краткотрајни вредности може да трае највеќе 15 минути и не смее да се повтори повеќе од четирипати во работната смена, при што меѓу две изложености на оваа концентрација мора да измине најмалку 60 минути. Краткотрајната вредност е изразена во mg/m <sup>3</sup> или во ml/m <sup>3</sup> (ppm) а е дадена како многукратни дозволени пречекорувања на граничната вредност; (K) својство на полесно пренесување на супстанците во организмот преку кожата; (BAT) биолошка гранична вредност – праг на биолошка гранична вредност, што значи предупредување на опасна хемиска супстанца и нејзини метаболити во ткивата, телесните течности или издишувањето на воздухот, без оглед на тоа, дали опасната хемиска супстанца е внесена во организмот со вдишување, голтање или преку кожата; (EU) European Union – гранична вредност, определена на ниво на Европската унија
Regulatory reference	Правилник за минималните барања за безбедност и здравје при работа на вработени од ризици поврзани со изложување на хемиски супстанции („Службен весник на Република Македонија“ бр.46/10)
<b>Switzerland - Occupational Exposure Limits</b>	
Local name	Toluène / Toluol
MAK (OEL TWA)	190 mg/m <sup>3</sup>
	50 ppm

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toluene (108-88-3)	
KZGW (OEL STEL)	760 mg/m <sup>3</sup> 200 ppm
Notation	R, R2, SS <sub>c</sub> , O <sup>B</sup> , B / H, R2, SS <sub>c</sub> , O <sup>L</sup> , B
Remark	INRS, HSE, NIOSH, DFG
Regulatory reference	www.suva.ch, 01.01.2024
Switzerland - BAT	
Local name	Toluène / Toluol
BAT	<p>2 g/g creatinine (1.26 mmol/mmol cr.; Paramètre biologique: Acide hippurique; Substrat d'examen: Urine; Moment du prélèvement: Fin de l'exposition, de la période de travail. Exposition de longue durée: après plusieurs périodes de travail; Remarques: Paramètre non spécifique. Influence de l'environnement.) / (1.26 mmol/mmol cr.; Biologischer Parameter: Hippursäure; Untersuchungsmaterial: Urin; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende. Bei Langzeitexposition: nach mehreren vorangegangenen Schichten; Bemerkungen: Nicht spezifischer Parameter. Umwelteinflüsse.)</p> <p>0,5 mg/l (4.62 µmol/l; Paramètre biologique: o-Crésol; Substrat d'examen: Urine; Moment du prélèvement: Fin de l'exposition, de la période de travail. Exposition de longue durée: après plusieurs périodes de travail; Remarques: Interprétation quantitative difficile.) / (4.62 µmol/l; Biologischer Parameter: o-Kresol; Untersuchungsmaterial: Urin; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende. Bei Langzeitexposition: nach mehreren vorangegangenen Schichten; Bemerkungen: Quantitative Interpretation schwierig.)</p> <p>600 µg/l (6.48 µmol/l; Paramètre biologique: Toluène; Substrat d'examen: Sang complet; Moment du prélèvement: Fin de l'exposition, de la période de travail.) / (6.48 µmol/l; Biologischer Parameter: Toluol; Untersuchungsmaterial: Vollblut; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende.)</p> <p>75 µg/l (Paramètre biologique: Toluène; Substrat d'examen: Urine; Moment du prélèvement: Fin de l'exposition, de la période de travail.) / (Biologischer Parameter: Toluol; Untersuchungsmaterial: Urin; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende.)</p>
Regulatory reference	Ordonnance 832.30 (OPA), article 50 al. 3, www.suva.ch/valeurs-limites / Verordnung 832.30 (VUV), Art. 50 Abs. 3, www.suva.ch/grenzwerte
USA - ACGIH - Occupational Exposure Limits	
Local name	Toluene
ACGIH OEL TWA	20 ppm
Remark (ACGIH)	TLV® Basis: CNS, visual & hearing impair; female repro system eff; pregnancy loss. Notations: OTO; A4 (Not classifiable as a Human Carcinogen); BEI
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Toluene
BEI	<p>0,3 mg/g creatinine Parameter: o-Cresol (with hydrolysis) - Medium: urine - Sampling time: End of shift - Notations: B</p> <p>0,03 mg/l Parameter: Toluene - Medium: urine - Sampling time: End of shift</p> <p>0,02 mg/l Parameter: Toluene - Medium: blood - Sampling time: Prior to last shift of workweek</p>
Regulatory reference	ACGIH 2024
furfuryl alcohol (98-00-0)	
Austria - Occupational Exposure Limits	
Local name	Furfurylalkohol

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furfuryl alcohol (98-00-0)	
MAK (OEL TWA)	20 mg/m <sup>3</sup>
	5 ppm
Remark	H. Krebszeugend: III B
Regulatory reference	BGBI. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	Alcool furfurylique # Furfurylalcohol
OEL TWA	41 mg/m <sup>3</sup>
	10 ppm
OEL STEL	61 mg/m <sup>3</sup>
	15 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
Croatia - Occupational Exposure Limits	
Local name	Furfuril-alkohol
GVI (OEL TWA)	40 mg/m <sup>3</sup>
	10 ppm
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, graničnim vrijednostima izloženosti i biološkim graničnim vrijednostima (NN 148/2023)
Czech Republic - Occupational Exposure Limits	
Local name	2-Furylmethanol (2-Furanmethanol; Furfurylalcohol; 2-Hydroxymethylfurfural)
PEL (OEL TWA)	20 mg/m <sup>3</sup>
	4,9 ppm
NPK-P (OEL C)	40 mg/m <sup>3</sup>
	9,8 ppm
Remark	D - při expozici se významně uplatňuje pronikání faktoru kůží, 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.)
Denmark - Occupational Exposure Limits	
Local name	Furfurylalcohol (2-Furylmethanol; 2-Hydroxymethylfuran)
OEL TWA	20 mg/m <sup>3</sup>
	5 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
Estonia - Occupational Exposure Limits	
Local name	Furfurüülalkohol (2-furüülkarbinool)

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furfuryl alcohol (98-00-0)	
OEL TWA	20 mg/m <sup>3</sup>
	5 ppm
OEL STEL	40 mg/m <sup>3</sup>
	10 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	Furfuryylialkoholi
HTP (OEL TWA)	8,1 mg/m <sup>3</sup>
	2 ppm
HTP (OEL STEL)	41 mg/m <sup>3</sup>
	10 ppm
Remark	lho
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveystieteiden ministeriö)
France - Occupational Exposure Limits	
Local name	Alcool furfurylique
VME (OEL TWA)	40 mg/m <sup>3</sup>
	10 ppm
Remark	Valeurs recommandées/admises. Risque de pénétration percutanée, Cancérogène de catégorie 2
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 6443, 2022; Outil65)
Greece - Occupational Exposure Limits	
Local name	Φουρφουρλική αλκοόλη
OEL TWA	40 mg/m <sup>3</sup>
	10 ppm
OEL STEL	60 mg/m <sup>3</sup>
	15 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	FURFURIL-ALKOHOL
AK (OEL TWA)	20 mg/m <sup>3</sup>
CK (OEL STEL)	40 mg/m <sup>3</sup>
Remark	i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármát), sz (Túlérzékenységet okozó (szenzibilizáló) tulajdonságú anyag. Az anyagra érzékeny egyéneken „túlérzékenységen” alapuló bőr-, légzőrendszeri, esetleg más szervet/szervrendszert károsító megbetegedést okozhat), b (Bőrön át is felszívódik); N (Irritáló anyagok, egyszerű fojtógázok, csekély egészségkárosító hatással bíró anyagok)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről

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furfuryl alcohol (98-00-0)	
<b>Ireland - Occupational Exposure Limits</b>	
Local name	Furfuryl alcohol
OEL TWA	40 mg/m <sup>3</sup>
	10 ppm
OEL STEL	60 mg/m <sup>3</sup>
	15 ppm
Remark	Advisory OELV (Advisory 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
<b>Latvia - Occupational Exposure Limits</b>	
Local name	Furfurilspirts (2-hidroksimetilfurāns)
OEL TWA	0,5 mg/m <sup>3</sup>
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).
<b>Lithuania - Occupational Exposure Limits</b>	
Local name	Furfurilo alkoholis
IPRV (OEL TWA)	20 mg/m <sup>3</sup>
	5 ppm
TPRV (OEL STEL)	40 mg/m <sup>3</sup>
	10 ppm
Remark	K (kancerogeninis poveikis); Ū (ūmus poveikis); O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
<b>Poland - Occupational Exposure Limits</b>	
Local name	2-Furylometanol
NDS (OEL TWA)	30 mg/m <sup>3</sup>
NDSCh (OEL STEL)	60 mg/m <sup>3</sup>
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.
<b>Portugal - Occupational Exposure Limits</b>	
Local name	Álcool furfúrico
OEL TWA	10 ppm
OEL STEL	15 ppm
Remark	P (Toxicidade percutânea)
Regulatory reference	Norma Portuguesa NP 1796:2014
<b>Romania - Occupational Exposure Limits</b>	
Local name	Alcool furfuralic
OEL TWA	50 mg/m <sup>3</sup>

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furfuryl alcohol (98-00-0)	
	12,5 ppm
OEL STEL	100 mg/m <sup>3</sup>
	25 ppm
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	Furfurylalkohol (furan-2-ylmetanol)
NPHV (OEL TWA)	41 mg/m <sup>3</sup>
	10 ppm
Remark	K – znamená, že faktor môže byť ľahko absorbovaný kožou
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Spain - Occupational Exposure Limits	
Local name	Alcohol furfúrico
VLA-ED (OEL TWA)	20 mg/m <sup>3</sup>
	5 ppm
VLA-EC (OEL STEL)	61 mg/m <sup>3</sup>
	15 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).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Sweden - Occupational Exposure Limits	
Local name	Furfurylalkohol
NGV (OEL TWA)	20 mg/m <sup>3</sup>
	5 ppm
KGV (OEL STEL)	40 mg/m <sup>3</sup>
	10 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); V (Vägledande korttidsgränsvärde ska användas som ett rekommenderat högsta värde som inte bör överskridas)
Regulatory reference	Hygieniska gränsvärden (AFS 2018:1)
Iceland - Occupational Exposure Limits	
Local name	Fúrfúrýlalkóhól (2-hýdroxýmetylfúran, 2-fúrýlmetanól)
OEL TWA	20 mg/m <sup>3</sup>
	5 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	Furfurylalkohol

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furfuryl alcohol (98-00-0)	
Grenseverdi (OEL TWA)	20 mg/m <sup>3</sup>
	5 ppm
Remark	H: Kjemikalier som kan tas opp gjennom huden.
Regulatory reference	FOR-2024-04-05-581
Switzerland - Occupational Exposure Limits	
Local name	Alcool furfurylique / Furfurylalkohol
MAK (OEL TWA)	40 mg/m <sup>3</sup>
	10 ppm
KZGW (OEL STEL)	40 mg/m <sup>3</sup>
	10 ppm
Notation	R / H
Remark	INRS, NIOSH
Regulatory reference	www.suva.ch, 01.01.2024
USA - ACGIH - Occupational Exposure Limits	
Local name	Furfuryl alcohol
ACGIH OEL TWA	0,2 ppm
Remark (ACGIH)	TLV® Basis: URT & eye irr. Notations: Skin; A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans)
Regulatory reference	ACGIH 2024
2-furaldehyde (98-01-1)	
Austria - Occupational Exposure Limits	
Local name	2-Furylmethanal (Furfural, Furfurol)
MAK (OEL TWA)	20 mg/m <sup>3</sup>
	5 ppm
Remark	H. Krebserzeugend: III B
Regulatory reference	BGBl. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	Aldéhyde furfurylique # 2-Furaldehyde
OEL TWA	8 mg/m <sup>3</sup>
	2 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	Фурфурол
OEL TWA	10 mg/m <sup>3</sup>

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2-furaldehyde (98-01-1)	
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.)
<b>Croatia - Occupational Exposure Limits</b>	
Local name	2-Furaldehyd (furfural)
GVI (OEL TWA)	8 mg/m <sup>3</sup> 2 ppm
KGVI (OEL STEL)	20 mg/m <sup>3</sup> 5 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)
<b>Czech Republic - Occupational Exposure Limits</b>	
Local name	Furfural (2-Furankarboxaldehyd; Furylmethanal)
PEL (OEL TWA)	10 mg/m <sup>3</sup> 2,5 ppm
NPK-P (OEL C)	20 mg/m <sup>3</sup> 5 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.)
<b>Czech Republic - Biological limit values</b>	
Local name	Furfural
BLV	200 mg/g creatinine Ukazatel: Pyroslizová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny 200 µmol/mmol Creatinine Ukazatel: Pyroslizová kyselina - Biologicky vzorek: moči - Doba odběru: konec směny
Regulatory reference	Vyhláška č. 107/2013 Sb. (kterou se mění vyhláška č. 432/2003 Sb.)
<b>Denmark - Occupational Exposure Limits</b>	
Local name	Furfural
OEL TWA	7,9 mg/m <sup>3</sup> 2 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
<b>Estonia - Occupational Exposure Limits</b>	
Local name	Furfuraal (2-oksometüülfuraan, 2-furüülaldehyüd)
OEL TWA	8 mg/m <sup>3</sup> 2 ppm
OEL STEL	20 mg/m <sup>3</sup> 5 ppm

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2-furaldehyde (98-01-1)	
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	Furfuraali
HTP (OEL TWA)	8 mg/m <sup>3</sup> 2 ppm
HTP (OEL STEL)	20 mg/m <sup>3</sup> 5 ppm
Remark	lho
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveystieteiden ministeriö)
France - Occupational Exposure Limits	
Local name	Aldéhyde furfurylique (Furfural)
VLE (OEL C/STEL)	8 mg/m <sup>3</sup> 2 ppm
Remark	Valeurs recommandées/admises. Cancérogène de catégorie 2
Regulatory reference	Circulaire du Ministère du travail (réf.: INRS ED 6443, 2022; Outil65)
Greece - Occupational Exposure Limits	
Local name	Φουρφουράλη
OEL TWA	20 mg/m <sup>3</sup> 5 ppm
OEL STEL	40 mg/m <sup>3</sup> 10 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	FURFUROL
AK (OEL TWA)	8 mg/m <sup>3</sup>
CK (OEL STEL)	20 mg/m <sup>3</sup>
Remark	b (Bőrön át is felszívódik), i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhámat), sz (Túlérzékenységet okozó (szenzibilizáló) tulajdonságú anyag. Az anyagra érzékeny egyéneken „túlérzékenységen” alapuló bőr-, légzőrendszeri, esetleg más szervet/szervrendszert károsító megbetegedést okozhat); N (Irritáló anyagok, egyszerű fojtógázok, csekély egészségkárosító hatással bíró anyagok)
Regulatory reference	5/2020. (II. 6.) ITM rendelet - A kémiai kóroki tényezők hatásának kitett munkavállalók egészségének és biztonságának védelméről
Ireland - Occupational Exposure Limits	
Local name	2-Furaldehyde (Furfural)
OEL TWA	8 mg/m <sup>3</sup> 2 ppm

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<b>2-furaldehyde (98-01-1)</b>	
OEL STEL	20 mg/m <sup>3</sup> 5 ppm
Remark	Advisory OELV (Advisory 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
<b>Latvia - Occupational Exposure Limits</b>	
Local name	Furfuols (2-formilfurāns, 2-furānkarbaldehīds)
OEL TWA	10 mg/m <sup>3</sup>
Regulatory reference	Ministru kabineta 2007. gada 15. maija noteikumiem Nr. 325 (Grozījumi Ministru kabineta 2024. gada 26. martā noteikumiem Nr. 191).
<b>Lithuania - Occupational Exposure Limits</b>	
Local name	2-furaldehidas (furfuolas)
IPRV (OEL TWA)	8 mg/m <sup>3</sup> 2 ppm
TPRV (OEL STEL)	20 mg/m <sup>3</sup> 5 ppm
Remark	Ū (ūmus poveikis); K (kancerogeninis poveikis); O (medžiaga į organizmą gali prasiskverbti pro nepažeistą odą)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
<b>Poland - Occupational Exposure Limits</b>	
Local name	2-Furaldehyd
NDS (OEL TWA)	10 mg/m <sup>3</sup>
NDSch (OEL STEL)	25 mg/m <sup>3</sup>
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.
<b>Portugal - Occupational Exposure Limits</b>	
Local name	Furfural
OEL TWA	2 ppm
Remark	P (Toxicidade percutânea); 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
<b>Portugal - Biological Exposure Indices</b>	
Local name	Furfural
BEI	200 mg/l Parâmetro: Ácido furóico - Meio: urina - Momento da amostragem: Fim do turno - Notação: Ne (Não específico), Com hidrólise
Regulatory reference	Norma Portuguesa NP 1796:2014
<b>Romania - Occupational Exposure Limits</b>	
Local name	2-Furaldehidă
OEL TWA	10 mg/m <sup>3</sup>

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2-furaldehyde (98-01-1)	
	2,5 ppm
OEL STEL	15 mg/m <sup>3</sup>
	4 ppm
Remark	C2 - susceptibil de a provoca apariția cancerului
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Slovakia - Occupational Exposure Limits	
Local name	Furfural (furán-2-karbaldehyd)
NPHV (OEL TWA)	7,9 mg/m <sup>3</sup>
	2 ppm
Remark	K – znamená, že faktor môže byť ľahko absorbovaný kožou
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Spain - Occupational Exposure Limits	
Local name	2-Furaldehído (Furfural)
VLA-ED (OEL TWA)	8 mg/m <sup>3</sup>
	2 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).
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Spain - Biological limit values	
Local name	2-Furaldehído (Furfural)
BLV	200 mg/l Parámetro: Ácido furoico - 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), con hidrólisis
Regulatory reference	Límites de Exposición Profesional para Agentes Químicos en España 2024. INSHT
Sweden - Occupational Exposure Limits	
Local name	Furfural
NGV (OEL TWA)	8 mg/m <sup>3</sup>
	2 ppm
KGV (OEL STEL)	20 mg/m <sup>3</sup>
	5 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); 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	2-Furaldehyde (furfural)
WEL TWA (OEL TWA)	8 mg/m <sup>3</sup>
	2 ppm

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2-furaldehyde (98-01-1)	
WEL STEL (OEL STEL)	20 mg/m <sup>3</sup> 5 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	Fúrfúral
OEL TWA	7,9 mg/m <sup>3</sup> 2 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	2-furaldehyd (Furfural)
Grenseverdi (OEL TWA)	8 mg/m <sup>3</sup> 2 ppm
Remark	H: Kjemikalier som kan tas opp gjennom huden.
Regulatory reference	FOR-2024-04-05-581
Switzerland - Occupational Exposure Limits	
Local name	2-Furaldéhyde / 2-Furylmethanal [Furfural, Furfurol]
MAK (OEL TWA)	8 mg/m <sup>3</sup> 2 ppm
Notation	R / H
Remark	INRS, NIOSH
Regulatory reference	www.suva.ch, 01.01.2024
USA - ACGIH - Occupational Exposure Limits	
Local name	Furfural
ACGIH OEL TWA	0,2 ppm
Remark (ACGIH)	TLV® Basis: URT & eye irr. Notations: Skin; A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans); BEI
Regulatory reference	ACGIH 2024
USA - ACGIH - Biological Exposure Indices	
Local name	Furfural
BEI	200 mg/l Parameter: Furoic acid (with hydrolysis) - Medium: urine - Sampling time: End of shift - Notations: Ns
Regulatory reference	ACGIH 2024

## 8.2. Exposure controls

### Appropriate engineering controls

#### Appropriate engineering controls:

Ensure good ventilation of the work station.

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### Personal protection equipment

#### Personal protective equipment:

Avoid all unnecessary exposure. Personal protective equipment should be chosen according to the CEN standards and in discussion with the supplier of the protective equipment.

#### Personal protective equipment symbol(s):



### Eye and face protection

#### Eye protection:

Safety glasses

### Skin protection

#### Skin and body protection:

Wear suitable protective clothing

#### Hand protection:

Protective gloves

### Respiratory protection

#### Respiratory protection:

[In case of inadequate ventilation] wear respiratory protection.

### Environmental exposure controls

#### Environmental exposure controls:

Avoid release to the environment.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Colour	: Colourless.
Odour	: aromatic odour.
Odour threshold	: Not available
Melting point	: Not applicable
Freezing point	: Not available
Boiling point	: 110,6 °C
Flammability	: Highly flammable liquid and vapour.
Lower explosion limit	: Not available
Upper explosion limit	: Not available
Flash point	: 4,4 °C
Auto-ignition temperature	: 480 °C
Decomposition temperature	: Not available
pH	: Not available
Viscosity, kinematic	: 0,69 mm <sup>2</sup> /s (20°C)
Viscosity, dynamic	: 0,56 mPa·s (20°C)
Solubility	: Insoluble in water. Soluble in ethanol. Soluble in ether. Soluble in acetone. Soluble in chloroform. Soluble in carbondisulfide. Soluble in acetic acid. Soluble in ethylacetate. Soluble in petroleum spirit.
Partition coefficient n-octanol/water (Log Kow)	: Not available
Vapour pressure	: 30,89 hPa (21.1°C)
Vapour pressure at 50°C	: 109 hPa (50 °C)
Density	: Not available
Relative density	: 0,866
Relative vapour density at 20°C	: Not available
Particle characteristics	: Not applicable

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### 9.2. Other information

#### Information with regard to physical hazard classes

Explosion limits : 1,1 – 7 vol %  
Critical temperature : 321 °C

## SECTION 10: Stability and reactivity

### 10.1. Reactivity

Highly flammable liquid and vapour.

### 10.2. Chemical stability

Stable under normal conditions.

### 10.3. Possibility of hazardous reactions

No dangerous reactions known under normal conditions of use.

### 10.4. Conditions to avoid

Avoid contact with hot surfaces. Heat. No flames, no sparks. Eliminate all sources of ignition.

### 10.5. Incompatible materials

No additional information available

### 10.6. Hazardous decomposition products

Under normal conditions of storage and use, hazardous decomposition products should not be produced.

## SECTION 11: Toxicological information

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

Acute toxicity (oral) : Not classified  
Acute toxicity (dermal) : Not classified  
Acute toxicity (inhalation) : Not classified

toluene (108-88-3)	
LD50 oral rat	> 5000 mg/kg
LD50 dermal rabbit	> 5000 mg/kg
LC50 Inhalation - Rat (Vapours)	> 20 mg/l

2-furaldehyde (98-01-1)	
LD50 oral rat	100 mg/kg
LD50 dermal rat	> 2000 mg/kg
LC50 Inhalation - Rat	0,54 mg/l

Skin corrosion/irritation : Causes skin irritation.  
Serious eye damage/irritation : Not classified  
Respiratory or skin sensitisation : Not classified  
Germ cell mutagenicity : Not classified  
Carcinogenicity : Not classified

toluene (108-88-3)	
IARC group	3 - Not classifiable

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furfuryl alcohol (98-00-0)	
NOAEL (chronic, oral, animal/female, 2 years)	60 mg/kg bodyweight Animal: rat, Animal sex: female, Guideline: OECD Guideline 451 (Carcinogenicity Studies), Remarks on results: other:
2-furaldehyde (98-01-1)	
NOAEL (chronic, oral, animal/female, 2 years)	60 mg/kg bodyweight
Reproductive toxicity	: Suspected of damaging the unborn child.
STOT-single exposure	: May cause drowsiness or dizziness.
toluene (108-88-3)	
STOT-single exposure	May cause drowsiness or dizziness.
furfuryl alcohol (98-00-0)	
STOT-single exposure	May cause respiratory irritation.
2-furaldehyde (98-01-1)	
STOT-single exposure	May cause respiratory irritation.
STOT-repeated exposure	: May cause damage to organs through prolonged or repeated exposure.
toluene (108-88-3)	
STOT-repeated exposure	May cause damage to organs through prolonged or repeated exposure.
furfuryl alcohol (98-00-0)	
NOAEL (oral, rat, 90 days)	53 mg/kg bodyweight
STOT-repeated exposure	May cause damage to organs through prolonged or repeated exposure.
2-furaldehyde (98-01-1)	
NOAEL (oral, rat, 90 days)	100 mg/kg bodyweight
STOT-repeated exposure	May cause damage to organs through prolonged or repeated exposure.
Aspiration hazard	: May be fatal if swallowed and enters airways.
Standard solution - 5 Components in toluene	
Viscosity, kinematic	0,69 mm <sup>2</sup> /s (20°C)
toluene (108-88-3)	
Viscosity, kinematic	0,69 mm <sup>2</sup> /s (20°C)
11.2. Information on other hazards	
No additional information available	
SECTION 12: Ecological information	
12.1. Toxicity	
Ecology - general	: The product is not considered harmful to aquatic organisms nor to cause long-term adverse effects in the environment.
Hazardous to the aquatic environment, short-term (acute)	: Not classified
Hazardous to the aquatic environment, long-term (chronic)	: Not classified
toluene (108-88-3)	
LC50 - Fish [1]	5,5 mg/l Oncorhynchus kisutch (Coho salmon)
EC50 - Crustacea [1]	3,78 mg/l Daphnia magna (Water flea)

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<b>toluene (108-88-3)</b>	
EC50 72h - Algae [1]	134 mg/l
NOEC (chronic)	0,74 mg/l Daphnia magna (Water flea)
NOEC chronic fish	1,4 mg/l Oncorhynchus kisutch (Coho salmon)
NOEC chronic algae	10 mg/l
<b>2-furaldehyde (98-01-1)</b>	
LC50 - Fish [1]	10,5 mg/l Poecilia reticulata (Guppy)
EC50 - Crustacea [1]	13 mg/l
LOEC (chronic)	3,7 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
NOEC (chronic)	1,9 mg/l Test organisms (species): Daphnia magna Duration: '21 d'
NOEC chronic fish	0,33 mg/l Test organisms (species): Danio rerio (previous name: Brachydanio rerio) Duration: '12 d'

### 12.2. Persistence and degradability

<b>Standard solution - 5 Components in toluene</b>	
Persistence and degradability	Rapidly degradable
<b>toluene (108-88-3)</b>	
Persistence and degradability	Rapidly degradable
<b>2-furyl methyl ketone (1192-62-7)</b>	
Persistence and degradability	Rapidly degradable
<b>furfuryl alcohol (98-00-0)</b>	
Persistence and degradability	Rapidly degradable
<b>2-furaldehyde (98-01-1)</b>	
Persistence and degradability	Rapidly degradable

### 12.3. Bioaccumulative potential

<b>toluene (108-88-3)</b>	
Partition coefficient n-octanol/water (Log Pow)	2,73 (20°C)
<b>2-furaldehyde (98-01-1)</b>	
Partition coefficient n-octanol/water (Log Pow)	0,41

### 12.4. Mobility in soil

No additional information available

### 12.5. Results of PBT and vPvB assessment

<b>Component</b>	
Substance(s) not meeting the PBT criteria of REACH regulation, in accordance with Annex XIII	toluene (108-88-3), 2-furaldehyde (98-01-1)
Substance(s) not meeting the vPvB criteria of REACH regulation, in accordance with Annex XIII	toluene (108-88-3), 2-furaldehyde (98-01-1)

### 12.6. Endocrine disrupting properties

No additional information available

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### 12.7. Other adverse effects

No additional information available






## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods

Regional waste regulation	: Disposal must be done according to official regulations.
Waste treatment methods	: Dispose of contents/container in accordance with licensed collector's sorting instructions.
Sewage disposal recommendations	: Disposal must be done according to official regulations.
Product/Packaging disposal recommendations	: Disposal must be done according to official regulations.
Additional information	: Flammable vapours may accumulate in the container. Do not re-use empty containers.

## SECTION 14: Transport information

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

ADR	IMDG	IATA	ADN	RID
<b>14.1. UN number or ID number</b>				
UN 1294	UN 1294	UN 1294	UN 1294	UN 1294
<b>14.2. UN proper shipping name</b>				
TOLUENE	TOLUENE	Toluene	TOLUENE	TOLUENE
<b>Transport document description</b>				
UN 1294 TOLUENE, 3, II, (D/E)	UN 1294 TOLUENE, 3, II (7°C c.c.)	UN 1294 Toluene, 3, II	UN 1294 TOLUENE, 3, II	UN 1294 TOLUENE, 3, II
<b>14.3. Transport hazard class(es)</b>				
3	3	3	3	3
				
<b>14.4. Packing group</b>				
II	II	II	II	II
<b>14.5. Environmental hazards</b>				
Dangerous for the environment: No	Dangerous for the environment: No Marine pollutant: No EmS-No. (Fire): F-E EmS-No. (Spillage): S-D	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)	: 1I
Excepted quantities (ADR)	: E2
Packing instructions (ADR)	: P001, IBC02, R001
Mixed packing provisions (ADR)	: MP19
Portable tank and bulk container instructions (ADR)	: T4
Portable tank and bulk container special provisions (ADR)	: TP1

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Tank code (ADR) : LGBF  
Vehicle for tank carriage : FL  
Transport category (ADR) : 2  
Special provisions for carriage - Operation (ADR) : S2, S20  
Hazard identification number (Kemler No.) : 33  
Orange plates :



Tunnel restriction code (ADR) : D/E  
EAC code : 3YE

### Transport by sea

Limited quantities (IMDG) : 1 L  
Excepted quantities (IMDG) : E2  
Packing instructions (IMDG) : P001  
IBC packing instructions (IMDG) : IBC02  
Tank instructions (IMDG) : T4  
Tank special provisions (IMDG) : TP1  
Stowage category (IMDG) : B  
Flash point (IMDG) : 7°C c.c.  
Properties and observations (IMDG) : Colourless liquid with a benzene-like odour. Flashpoint: 7°C c.c. Explosive limits: 1.27% to 7%. Immiscible with water.

### Air transport

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

### Inland waterway transport

Classification code (ADN) : F1  
Limited quantities (ADN) : 1 L  
Excepted quantities (ADN) : E2  
Equipment required (ADN) : PP, EX, A  
Ventilation (ADN) : VE01  
Number of blue cones/lights (ADN) : 1

### Rail transport

Classification code (RID) : F1  
Limited quantities (RID) : 1L  
Excepted quantities (RID) : E2  
Packing instructions (RID) : P001, IBC02, R001  
Mixed packing provisions (RID) : MP19  
Portable tank and bulk container instructions (RID) : T4  
Portable tank and bulk container special provisions (RID) : TP1  
Tank codes for RID tanks (RID) : LGBF  
Transport category (RID) : 2  
Colis express (express parcels) (RID) : CE7  
Hazard identification number (RID) : 33

### 14.7. Maritime transport in bulk according to IMO instruments

Not applicable

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### SECTION 15: Regulatory information

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

##### EU-Regulations

##### REACH Annex XVII (Restriction List)

EU restriction list (REACH Annex XVII)		
Reference code	Applicable on	Entry title or description
3(a)	Standard solution - 5 Components in toluene ; toluene ; 2-furaldehyde	Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 2.1 to 2.4, 2.6 and 2.7, 2.8 types A and B, 2.9, 2.10, 2.12, 2.13 categories 1 and 2, 2.14 categories 1 and 2, 2.15 types A to F
3(b)	Standard solution - 5 Components in toluene ; toluene ; furfuryl alcohol ; 2-furaldehyde	Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard classes 3.1 to 3.6, 3.7 adverse effects on sexual function and fertility or on development, 3.8 effects other than narcotic effects, 3.9 and 3.10
3(c)	2-furaldehyde	Substances or mixtures fulfilling the criteria for any of the following hazard classes or categories set out in Annex I to Regulation (EC) No 1272/2008: Hazard class 4.1
48.	toluene	Toluene

##### REACH Annex XIV (Authorisation List)

Contains no substance(s) listed on REACH Annex XIV (Authorisation List)

##### REACH Candidate List (SVHC)

Contains no substance(s) listed on the REACH Candidate List

##### PIC Regulation (Prior Informed Consent)

Contains no substance(s) listed on the PIC list (Regulation EU 649/2012 concerning the export and import of hazardous chemicals)

##### POP Regulation (Persistent Organic Pollutants)

Contains no substance(s) listed on the POP list (Regulation EU 2019/1021 on persistent organic pollutants)

##### Ozone Regulation (2024/590)

Contains no substance(s) listed on the Ozone Depletion list (Regulation EU 2024/590 on substances that deplete the ozone layer)

##### Council Regulation (EC) for the control of dual-use items

Contains no substance subject to the COUNCIL REGULATION (EC) for the control of dual-use items

##### VOC Directive (2004/42)

Organic solvent : Yes

##### 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 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)

Name	CN designation	CAS-No.	CN code	Category, Subcategory	Threshold	Annex
Toluene		108-88-3	2902 30 00	Category 3		Annex I

##### National regulations

##### France

Occupational diseases	
Code	Description
RG 4 BIS	Gastrointestinal disorders caused by benzene, toluene, xylenes and all products containing them

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RG 74	Occupational disorders caused by furfural and furfuryl alcohol
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

VOC ordinance (ChemVOCFarbV)

:

Employment restrictions

: Observe restrictions according Act on the Protection of Working Mothers (MuSchG).  
Observe restrictions according Act on the Protection of Young People in Employment (JArbSchG).

Water hazard class (WGK)

: WGK 3, Highly hazardous to water (Classification according to AwSV, Annex 1).

Hazardous Incident Ordinance (12. BImSchV)

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

### Netherlands

ABM category

: A(2) - toxic for aquatic organisms, may have longterm hazardous effects in aquatic environment

SZW-lijst van kankerverwekkende stoffen

: None of the components are listed

SZW-lijst van mutagene stoffen

: None of the components are listed

SZW-lijst van reprotoxische stoffen – Borstvoeding

: None of the components are listed

SZW-lijst van reprotoxische stoffen –

: None of the components are listed

Vruchtbaarheid

SZW-lijst van reprotoxische stoffen – Ontwikkeling

: toluene is listed

### Denmark

Class for fire hazard

: Class I-1

Store unit

: 1 liter

Classification remarks

: F <Flam. Liq. 2>; Emergency management guidelines for the storage of flammable liquids must be followed

Danish National Regulations

: Young people below the age of 18 years are not allowed to use the product  
Pregnant/breastfeeding women working with the product must not be in direct contact with the product  
The requirements from the Danish Working Environment Authorities regarding work with carcinogens must be followed during use and disposal

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### Poland

#### Polish National Regulations

: Act of 25 February 2011 on chemical substances and their mixtures (J. o L. No. 63, item 322 as amended; consolidated text J. o L. 2019, item 1225).  
Act of 14 December 2012 on waste (J. o L. 2013, item 322 as amended; consolidated text J. o L. 2020, item 797).  
The announcement of Marshal of the Sejm of the Republic of Poland dated 19 October 2016 concerning the consolidated text announcement of the decree on the management of packaging and packaging waste (J. o L. 2016, item 1863 as amended).  
Decree of the Minister of Environment of 14 December 2014 on the catalogue of waste (J. o L. 2014, item 1923).  
Act of 19 August 2011 on the Carriage of Dangerous Goods (J. o L. 2011 No. 227, item 1367 as amended; consolidated text J. o L. 2020, item 154).  
Regulation of the Minister of Family, Labour and Social Policy of 12 June 2018 on the highest permissible concentration and intensity of noxious agents for health at work environment (J. o L. item 1286 as amended).  
The announcement of Minister of Health dated 9 September 2016 concerning the consolidated text announcement of the decree of the Minister of Health of 30 December 2004 on health and safety at work related to exposure to chemical agents at work (J. o L. of 16 September 2016, item 1488)  
Regulation of the Minister of Health of 2 February 2011 on tests and measurements of the noxious agents for health at work environment (J. o L. No. 33, item 166 as amended).  
Regulation of the Minister of Environment of 9 December 2003 on particularly hazardous substances to the environment (J. o L. No. 217, item 2141).  
ADR Agreement: Government Statement of 13 March 2023 on the entry into force of amendments to Annexes A and B to the Agreement concerning the International Carriage of Dangerous Goods by Road (ADR), signed in Geneva on 30 September 1957 (J. o. L. 2023, item 891)

### 15.2. Chemical safety assessment

No chemical safety assessment has been carried out

## SECTION 16: Other information

### Indication of changes

Section	Changed item	Comments
4.1	First-aid measures for first aider	<b>Added</b>
4.2	Symptoms/effects after inhalation	<b>Added</b>
4.2	Symptoms/effects after eye contact	<b>Added</b>
5.1	Unsuitable extinguishing media	<b>Added</b>
5.2	Explosion hazard	<b>Added</b>
5.3	Firefighting instructions	<b>Added</b>
6.1	Emergency procedures	<b>Added</b>
6.1	Protective equipment	<b>Added</b>
6.1	General measures	<b>Added</b>
6.3	For containment	<b>Added</b>
7.1	Additional hazards when processed	<b>Added</b>
7.2	Packaging materials	<b>Added</b>
9	Flammability	<b>Modified</b>
13.1	Product/Packaging disposal recommendations	<b>Added</b>
13.1	Sewage disposal recommendations	<b>Added</b>

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Indication of changes		
Section	Changed item	Comments
13.1	Regional waste regulation	<b>Added</b>
13.1	Additional information	<b>Modified</b>
15.1	REACH Annex XVII	<b>Modified</b>
16	Abbreviations and acronyms	<b>Modified</b>

Abbreviations and acronyms:	
ACGIH	American Conference of Government Industrial Hygienists
ADN	European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways
ADR	European Agreement concerning the International Carriage of Dangerous Goods by Road
ATE	Acute Toxicity Estimate
BCF	Bioconcentration factor
BLV	Biological limit value
BOD	Biochemical oxygen demand (BOD)
CAS-No.	Chemical Abstract Service number
CLP	Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008
COD	Chemical oxygen demand (COD)
CSA	Chemical safety assessment
DMEL	Derived Minimal Effect level
DNEL	Derived-No Effect Level
EC-No.	European Community number
EC50	Median effective concentration
ED	Endocrine disruptor
EN	European Standard
EWC	European waste catalogue
IARC	International Agency for Research on Cancer
IATA	International Air Transport Association
IMDG	International Maritime Dangerous Goods
LC50	Median lethal concentration
LD50	Median lethal dose
LOAEL	Lowest Observed Adverse Effect Level
Log Kow	Partition coefficient n-octanol/water (Log Kow)
Log Pow	Partition coefficient n-octanol/water (Log Pow)
MAK	maximum workplace concentration
NOAEC	No-Observed Adverse Effect Concentration
NOAEL	No-Observed Adverse Effect Level
NOEC	No-Observed Effect Concentration
N.O.S.	Not Otherwise Specified
OECD	Organisation for Economic Co-operation and Development

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### Abbreviations and acronyms:

OEL	Occupational Exposure Limit
OSHA	Occupational Safety Health Administration
PBT	Persistent Bioaccumulative Toxic
PNEC	Predicted No-Effect Concentration
PPE	Personal protection equipment
RID	Regulations concerning the International Carriage of Dangerous Goods by Rail
SDS	Safety Data Sheet
STP	Sewage treatment plant
TF	Technical function
ThOD	Theoretical oxygen demand (ThOD)
TLM	Median Tolerance Limit
TWA	Time Weighted Average
VOC	Volatile Organic Compounds
vPvB	Very Persistent and Very Bioaccumulative
UFI	Unique Formula Identifier

### Full text of H- and EUH-statements:

Acute Tox. 1 (Dermal)	Acute toxicity (dermal), Category 1
Acute Tox. 1 (Inhalation)	Acute toxicity (inhal.), Category 1
Acute Tox. 3 (Inhalation)	Acute toxicity (inhal.), Category 3
Acute Tox. 3 (Oral)	Acute toxicity (oral), Category 3
Acute Tox. 4 (Dermal)	Acute toxicity (dermal), Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Chronic 3	Hazardous to the aquatic environment – Chronic Hazard, Category 3
Asp. Tox. 1	Aspiration hazard, Category 1
Carc. 2	Carcinogenicity, Category 2
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 2	Flammable liquids, Category 2
Flam. Liq. 3	Flammable liquids, Category 3
Repr. 2	Reproductive toxicity, Category 2
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT RE 2	Specific target organ toxicity – Repeated exposure, Category 2
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Narcosis
H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H301	Toxic if swallowed.
H302	Harmful if swallowed.
H304	May be fatal if swallowed and enters airways.
H310	Fatal in contact with skin.

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### Full text of H- and EUH-statements:

H312	Harmful in contact with skin.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H330	Fatal if inhaled.
H331	Toxic if inhaled.
H335	May cause respiratory irritation.
H336	May cause drowsiness or dizziness.
H351	Suspected of causing cancer.
H361d	Suspected of damaging the unborn child.
H373	May cause damage to organs through prolonged or repeated exposure.
H412	Harmful to aquatic life with long lasting effects.

### Classification and procedure used to derive the classification for mixtures according to Regulation (EC) 1272/2008 [CLP]:

Flam. Liq. 2	H225	On basis of test data
Skin Irrit. 2	H315	Calculation method
Repr. 2	H361d	Calculation method
STOT SE 3	H336	Calculation method
STOT RE 2	H373	Calculation method
Asp. Tox. 1	H304	Calculation method

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.