

Safety Data Sheet

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

SDS Reference Number: USPVS114

Issue date: 01/02/2017 Revision date: 07/01/2025 Supersedes version of: 14/09/2023 Version: 1.3

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

1.1. Product identifier

Product form : Mixture
Product name : Perchloric Acid in Dioxane Tenth-Normal (0.1 N) solution
Product code : USPVS114

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.

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London,
W1H 6BQ,
United Kingdom.

Tel: +44 (0) 207 193 9114

Fax: +44 (0) 203 432 4686

Email: contact@spectracer.com

Web: 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)	http://www.npis.org	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
Oxidising Liquids, Category 2 H272
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, H335
Respiratory tract irritation

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. May intensify fire; oxidiser. May cause cancer. May cause respiratory irritation. Causes skin irritation. Causes serious eye irritation.

2.2. Label elements

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

Hazard pictograms (CLP)



GHS02

GHS03

GHS07

GHS08

Signal word (CLP)

: Danger

Contains

: 1,4-dioxane

Hazard statements (CLP)

: H225 - Highly flammable liquid and vapour.

H272 - May intensify fire; oxidiser.

H315 - Causes skin irritation.

H319 - Causes serious eye irritation.

H335 - May cause respiratory irritation.

H350 - May cause cancer.

Precautionary statements (CLP)

: P201 - Obtain special instructions before use.

P210 - Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P220 - Keep away from clothing and other combustible materials.

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.

P308+P313 - IF exposed or concerned: Get medical advice/attention.

P312 - Call a POISON CENTRE or doctor if you feel unwell.

P337+P313 - If eye irritation persists: Get medical advice/attention.

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	1,4-dioxane (123-91-1), perchloric acid (7601-90-3)
Substance(s) not meeting the vPvB criteria of REACH regulation, in accordance with Annex XIII	1,4-dioxane (123-91-1), perchloric acid (7601-90-3)

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 %

Component	
Substance(s) 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	1,4-dioxane (123-91-1)

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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]
1,4-dioxane substance listed on REACH Candidate List 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); substance with a Community workplace exposure limit	CAS-No.: 123-91-1 EC-No.: 204-661-8 EC Index-No.: 603-024-00-5	99	Flam. Liq. 2, H225 Eye Irrit. 2, H319 Carc. 1B, H350 STOT SE 3, H335 STOT RE Not classified
perchloric acid substance with national workplace exposure limit(s) (BG, CZ)	CAS-No.: 7601-90-3 EC-No.: 231-512-4 EC Index-No.: 017-006-00-4 REACH-no: 01-2120066865-44-XXXX	1	Ox. Liq. 1, H271 Met. Corr. 1, H290 Acute Tox. 4 (Oral), H302 Skin Corr. 1A, H314 Eye Dam. 1, H318 STOT RE 2, H373

Specific concentration limits:

Name	Product identifier	Specific concentration limits (%)
perchloric acid	CAS-No.: 7601-90-3 EC-No.: 231-512-4 EC Index-No.: 017-006-00-4 REACH-no: 01-2120066865-44-XXXX	(0 ≤ C < 50) Ox. Liq. 2; H272 (1 ≤ C < 10) Eye Irrit. 2; H319 (1 ≤ C < 10) Skin Irrit. 2; H315 (10 ≤ C < 50) Skin Corr. 1B; H314 (50 ≤ C < 100) Ox. Liq. 1; H271 (50 ≤ C < 100) Skin Corr. 1A; H314

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	: IF exposed or concerned: Get medical advice/attention.
First-aid measures after inhalation	: Remove person to fresh air and keep comfortable for breathing. Call a poison center or a doctor if you feel unwell.
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 cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. If eye irritation persists: Get medical advice/attention.
First-aid measures after ingestion	: Call a poison center or a doctor if you feel unwell.
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 after inhalation	: May cause respiratory irritation.
Symptoms/effects after skin contact	: Irritation.
Symptoms/effects after eye contact	: Eye irritation.
Symptoms/effects after ingestion	: None under normal conditions.

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. May intensify fire; oxidiser.
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 : No open flames, no sparks, and no smoking. Only qualified personnel equipped with suitable protective equipment may intervene. Avoid breathing dust/fume/gas/mist/vapours/spray.

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. Notify authorities if product enters sewers or public waters.

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 : Ensure good ventilation of the work station. 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. 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. Provide local exhaust or general room ventilation. Floors, walls and other surfaces in the hazard area must be cleaned regularly. Avoid breathing dust/fume/gas/mist/vapours/spray. Avoid contact with skin and eyes.
- Hygiene measures : Separate working clothes from town clothes. Launder separately. 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.
- Incompatible materials : combustible materials.
- Packaging materials : Store always product in container of same material as original container.

Germany

Storage class (LGK, TRGS 510)

Joint storage table

: LGK 5.1B - Oxidising substances

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

Joint storage with restrictions permitted for

: LGK 1, LGK 2A, LGK 2B, LGK 4.1A, LGK 4.2, LGK 4.3, LGK 5.2, LGK 6.2, LGK 7

: LGK 3, LGK 4.1B, LGK 5.1C, LGK 6.1A, LGK 6.1B, LGK 6.1C, LGK 6.1D, LGK 8A, LGK 10, LGK 11, LGK 10-13

Joint storage permitted for

: LGK 5.1A, LGK 5.1B, LGK 8B, 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

1,4-dioxane (123-91-1)	
EU - Indicative Occupational Exposure Limit (IOEL)	
Local name	1,4 Dioxane
IOEL TWA	73 mg/m ³
	20 ppm
Regulatory reference	COMMISSION DIRECTIVE 2009/161/EU
Albania - Occupational Exposure Limits	
Local name	Dioksan-1,4
OEL TWA	73 mg/m ³
	20 ppm

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1,4-dioxane (123-91-1)	
Regulatory reference	VENDIM Nr. 522, datë 6.8.2014 PËR MIRATIMIN E RREGULLORES "PËR MBROJTJEN E SIGURISË DHE SHËNETIT TË PUNËMARRËSVE NGA RISQET E LIDHURA ME AGJENTËT KIMIKË NË PUNË"
Austria - Occupational Exposure Limits	
Local name	1,4-Dioxan
MAK (OEL TWA)	73 mg/m ³ 20 ppm
OEL C	146 mg/m ³ 40 ppm
Remark	H. Krebszeugend: III B
Regulatory reference	BGBI. II Nr. 156/2021
Belgium - Occupational Exposure Limits	
Local name	1,4-Dioxane # 1,4-Dioxaan
OEL TWA	73 mg/m ³ 20 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	1,4-Диоксан
OEL TWA	73 mg/m ³ 20 ppm
Remark	• (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	1,4-Dioksan
GVI (OEL TWA)	73 mg/m ³ 20 ppm
Remark	Direktiva: 2009/161/EU
Regulatory reference	Pravilnik o zaštiti radnika od izloženosti opasnim kemikalijama na radu, граниčnim vrijednostima izloženosti i biološkim граниčnim vrijednostima (NN 148/2023)
Cyprus - Occupational Exposure Limits	
Local name	1,4-διοξάνιο
OEL TWA	73 mg/m ³ 20 ppm
Regulatory reference	Κανονισμοί του 2012 (Κ.Δ.Π. 70/2012)

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1,4-dioxane (123-91-1)	
Czech Republic - Occupational Exposure Limits	
Local name	1,4-Dioxan
PEL (OEL TWA)	70 mg/m ³
	19 ppm
NPK-P (OEL C)	140 mg/m ³
	38 ppm
Remark	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).
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)
Denmark - Occupational Exposure Limits	
Local name	1,4-Dioxan (Diethylendioxid)
OEL TWA	36 mg/m ³
	10 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	1,4-dioksaan
OEL TWA	73 mg/m ³
	20 ppm
Regulatory reference	Vabariigi Valitsuse 20. märtsi 2001. a määruse nr 105 (RT I, 02.04.2024, 13)
Finland - Occupational Exposure Limits	
Local name	1,4-Dioksaani
HTP (OEL TWA)	36 mg/m ³
	10 ppm
HTP (OEL STEL)	150 mg/m ³
	40 ppm
Remark	Iho
Regulatory reference	HTP-ARVOT 2020 (Sosiaali- ja terveysministeriö)
France - Occupational Exposure Limits	
Local name	1,4-Dioxane
VME (OEL TWA)	73 mg/m ³
	20 ppm
VLE (OEL C/STEL)	140 mg/m ³
	40 ppm
Remark	Valeurs réglementaires contraignantes. Cancérogène de catégorie 1B. La VLEP CT n'est pas réglementaire et provient d'une circulaire du ministère chargé du travail
Regulatory reference	Article R4412-149 du Code du travail et circulaire du Ministère du travail (réf.: INRS ED 6443, 2022; Outil65; Décret n° 2019-1487; Décret n° 2020-1546; Décret n° 2021-434; Décret n° 2021-1849)

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1,4-dioxane (123-91-1)	
Germany - Occupational Exposure Limits (TRGS 900)	
Local name	1,4-Dioxan
AGW (OEL TWA)	73 mg/m ³ 20 ppm
Peak exposure limitation factor	2(l)
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; X - Krebs erzeugender 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; 29 - AGW nicht gesundheitsbasiert abgeleitet, die Ableitung einer Exposition-Risiko-Beziehung nach TRGS 910 ist initiiert
Regulatory reference	TRGS900
Germany - Biological limit values (TRGS 903)	
Local name	1,4-Dioxan
Biological limit value	200 mg/g creatinine Parameter: 2-Hydroxyethoxyessigsäure - Untersuchungsmaterial: U = Urin - Probenahmezeitpunkt: b) Expositionsende, bzw. Schichtende - Festlegung/Begründung: 11/2020 DFG
Regulatory reference	TRGS 903
Gibraltar - Occupational Exposure Limits	
Local name	1,4 Dioxane
OEL TWA	73 mg/m ³ 20 ppm
Regulatory reference	Factories (Control of Chemical Agents at Work) Regulations 2003 (LN. 2018/181)
Greece - Occupational Exposure Limits	
Local name	Διοξάνιο, 1,4-
OEL TWA	73 mg/m ³ 20 ppm
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	1,4-DIOXÁN
AK (OEL TWA)	73 mg/m ³ 20 ppm
Remark	b (Bőrön át is felszívódik), i (ingerlő anyag, amely izgatja a bőrt, nyálkahártyát, szemet vagy mindhármát); EU3 (2009/161/EK 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
Ireland - Occupational Exposure Limits	
Local name	1,4-Dioxane, tech. Grade
OEL TWA	73 mg/m ³

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1,4-dioxane (123-91-1)	
	20 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	1,4 Diossano
OEL TWA	73 mg/m ³ 20 ppm
Remark	Cute
Regulatory reference	Allegato XXXVIII del Decreto Legislativo 4 settembre 2024, n. 135
Latvia - Occupational Exposure Limits	
Local name	1,4-dioksāns
OEL TWA	20 mg/m ³ 5.5 ppm
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	1,4-dioksanas
IPRV (OEL TWA)	35 mg/m ³ 10 ppm
TPRV (OEL STEL)	90 mg/m ³ 25 ppm
Remark	K (kancerogeninis poveikis)
Regulatory reference	LIETUVOS HIGIENOS NORMA HN 23:2011 (Nr. V-695/A1-272, 2018-06-12)
Luxembourg - Occupational Exposure Limits	
Local name	1,4 Dioxane
OEL TWA	73 mg/m ³ 20 ppm
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
Malta - Occupational Exposure Limits	
Local name	1,4-Dioxane
OEL TWA	73 mg/m ³ 20 ppm
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	1,4-Dioxaan
TGG-8u (OEL TWA)	20 mg/m ³

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1,4-dioxane (123-91-1)	
	5.46 ppm (1,4-Dioxaan; Netherlands; Time-weighted average exposure limit 8 h; Public occupational exposure limit value)
Regulatory reference	Arbeidsomstandighedenregeling 2024
Poland - Occupational Exposure Limits	
Local name	1,4-Dioksan
NDS (OEL TWA)	50 mg/m ³
Regulatory reference	Dz. U. 2024 poz. 1017 wraz z późn. zm.
Portugal - Occupational Exposure Limits	
Local name	1,4-Dioxano
OEL TWA	20 ppm
Remark	P (Toxicidade percutânea); A3 (Agente carcinogénico confirmado nos animais de laboratório con relevância desconhecida no Homem)
Regulatory reference	Norma Portuguesa NP 1796:2014
Romania - Occupational Exposure Limits	
Local name	1,4 Dioxan
OEL TWA	73 mg/m ³ 20 ppm
Remark	P - posibilitatea unei penetrări cutanate importante; C2 - susceptibil de a provoca apariția cancerului
Regulatory reference	Hotărârea Guvernului nr. 1.218/2006 (Hotărârea nr. 179/2024)
Serbia - Occupational Exposure Limits	
Local name	1.4-диоксан
OEL TWA	73 mg/m ³ 20 ppm
Remark	ЕУ*** – напомена да се ради о хемијским материјама за које су утврђене индикативне граничне вредности изложености према Директиви 2009/161/ЕУ (трећа листа)
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)
Slovakia - Occupational Exposure Limits	
Local name	1,4-Dioxán
NPHV (OEL TWA)	73 mg/m ³ 20 ppm
Regulatory reference	Nariadenie vlády č. 355/2006 Z. z. (122/2024 Z. z.)
Slovenia - Occupational Exposure Limits	
Local name	1,4-dioksan
OEL TWA	73 mg/m ³ 20 ppm
OEL STEL	146 mg/m ³ 40 ppm

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1,4-dioxane (123-91-1)	
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	1,4-dioksan
BLV	400 mg/g creatinine Parameter: 2-hidroksietoksiocetna 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	1,4-Dioxano
VLA-ED (OEL TWA)	73 mg/m ³ 20 ppm
Remark	VLI (Agente químico para el que la U.E. estableció en su día un valor límite indicativo), C1B (Supuesto carcinógeno para el hombre), 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	Dioxan
NGV (OEL TWA)	35 mg/m ³ 10 ppm
KGV (OEL STEL)	90 mg/m ³ 25 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); 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	1,4-Dioxane
WEL TWA (OEL TWA)	73 mg/m ³ 20 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	1,4-Díoxan (díetylendíoxíð)
OEL TWA	73 mg/m ³

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1,4-dioxane (123-91-1)	
	20 ppm
Remark	H (efnið getur auðveldlega borist inn í líkamann gegnum húð), K (efnið er krabbameinsvaldandi)
Regulatory reference	Reglugerð um mengunarmörk og aðgerðir til að draga úr mengun á vinnustöðum (Nr. 1296/2012)
Norway - Occupational Exposure Limits	
Local name	1,4-dioksan
Grenseverdi (OEL TWA)	18 mg/m ³
	5 ppm
Korttidsverdi (OEL STEL)	36 mg/m ³
	10 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
North Macedonia - Occupational Exposure Limits	
Local name	1,4-диоксан
OEL TWA	73 mg/m ³
	20 ppm
KTV	2
Short time value [mg/m ³]	146 mg/m ³
Short time value [ppm]	40 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 ³ или во ml/m ³ (ppm) а е дадена како многукратни дозволени пречекорувања на граничната вредност; (K) својство на полесно пренесување на супстанците во организмот преку кожата
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)
Switzerland - Occupational Exposure Limits	
Local name	Diethylendioxid (s. 1,4-Dioxan)
MAK (OEL TWA)	72 mg/m ³
	72 mg/m ³
	72 mg/m ³
KZGW (OEL STEL)	20 ppm
	20 ppm
	20 ppm
KZGW (OEL STEL)	144 mg/m ³
	144 mg/m ³
	144 mg/m ³

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1,4-dioxane (123-91-1)	
	40 ppm 40 ppm 40 ppm
Notation	R, C2, SS _C , B / H, C2, SS _C , B
Remark	H C2 SS _C B - Leber, Auge ^{KT HU} - DFG, INRS, NIOSH
Regulatory reference	www.suva.ch, 01.01.2024
Switzerland - BAT	
Local name	1,4-Dioxane / 1,4-Dioxan
BAT	400 mg/g creatinine (378 µmol/mmol cr.; Paramètre biologique: Acide (2-hydroxyéthoxy) acétique; Substrat d'examen: Urine; Moment du prélèvement: Fin de l'exposition, de la période de travail.) / (378 µmol/mmol cr.; Biologischer Parameter: 2-Hydroxyethoxyessigsäure; Untersuchungsmaterial: Urin; Probennahmezeitpunkt: Expositionsende, bzw. Schichtende.)
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	1,4-Dioxane
ACGIH OEL TWA	20 ppm
Remark (ACGIH)	TLV® Basis: Liver dam. Notations: Skin; A3 (Confirmed Animal Carcinogen with Unknown Relevance to Humans)
Regulatory reference	ACGIH 2024
perchloric acid (7601-90-3)	
Bulgaria - Occupational Exposure Limits	
Local name	Перхлорна киселина
OEL TWA	2 mg/m ³
Regulatory reference	Наредба № 13 от 30.12.2003 г. за защита на работещите от рискове, свързани с експозиция на химични агенти при работа (изм. и доп. ДВ. бр. 28 от 2024 г., в сила от 05.04.2024 г.)
Czech Republic - Occupational Exposure Limits	
Local name	Kyselina chloristá
PEL (OEL TWA)	1 mg/m ³ 0.24 ppm
NPK-P (OEL C)	2 mg/m ³ 0.48 ppm
Regulatory reference	Nařízení vlády č. 361/2007 Sb. (Předpis 330/2023 Sb.)

8.2. Exposure controls

Appropriate engineering controls

Appropriate engineering controls:

Ensure good ventilation of the work station.

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.

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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	: Not available
Appearance	: Liquid.
Odour	: Mild odour. Ether-like odour.
Odour threshold	: Not available
Melting point	: Not applicable
Freezing point	: Not available
Boiling point	: 101 °C
Flammability	: Highly flammable liquid and vapour.
Lower explosion limit	: Not available
Upper explosion limit	: Not available
Flash point	: 12 °C
Auto-ignition temperature	: 180 °C
Decomposition temperature	: Not available
pH	: Not available
Viscosity, kinematic	: Not available
Solubility	: Miscible with water. Soluble in alcohols. Soluble in ether. Soluble in acetone. Soluble in dimethyl sulfoxide.
Partition coefficient n-octanol/water (Log Kow)	: Not available
Vapour pressure	: 41 hPa (20 °C)
Vapour pressure at 50 °C	: 159 hPa
Density	: Not available
Relative density	: 1
Relative vapour density at 20 °C	: Not available
Particle characteristics	: Not applicable

9.2. Other information

Information with regard to physical hazard classes

Explosion limits : 1.9 – 22.5 vol %

Other safety characteristics

VOC content : 99

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SECTION 10: Stability and reactivity

10.1. Reactivity

Highly flammable liquid and vapour. May intensify fire; oxidiser.

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

Combustible materials.

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

1,4-dioxane (123-91-1)	
LD50 oral rat	≈ 5150 mg/kg bodyweight
LD50 dermal rabbit	7600 mg/kg
LC50 Inhalation - Rat	51 mg/l/4h
LC50 Inhalation - Rat [ppm]	14250 ppm/4h

perchloric acid (7601-90-3)	
LD50 oral rat	200 – 2000 mg/kg bodyweight
Skin corrosion/irritation	: Causes skin irritation.

1,4-dioxane (123-91-1)	
pH	6 – 8 (50 %)

perchloric acid (7601-90-3)	
pH	< 2
Serious eye damage/irritation	: Causes serious eye irritation.

1,4-dioxane (123-91-1)	
pH	6 – 8 (50 %)

perchloric acid (7601-90-3)	
pH	< 2

Respiratory or skin sensitisation : Not classified
Germ cell mutagenicity : Not classified
Carcinogenicity : May cause cancer.

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1,4-dioxane (123-91-1)	
IARC group	2B - Possibly carcinogenic to humans
Reproductive toxicity	: Not classified
STOT-single exposure	: May cause respiratory irritation.
1,4-dioxane (123-91-1)	
STOT-single exposure	May cause respiratory irritation.
STOT-repeated exposure	: Not classified
1,4-dioxane (123-91-1)	
NOAEC (inhalation, rat, vapour, 90 days)	> 0.4 mg/L air
perchloric acid (7601-90-3)	
NOAEL (oral, rat, 90 days)	1 mg/kg bodyweight
STOT-repeated exposure	May cause damage to organs (thyroid gland) through prolonged or repeated exposure.
Aspiration hazard	: Not classified
1,4-dioxane (123-91-1)	
Viscosity, kinematic	1.162 mm ² /s
perchloric acid (7601-90-3)	
Viscosity, kinematic	0.43 mm ² /s

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

1,4-dioxane (123-91-1)	
EC50 - Crustacea [1]	> 1000 mg/l Daphnia magna (Water flea)
EC50 72h - Algae [1]	> 1000 mg/l Pseudokirchneriella subcapitata
NOEC (chronic)	1000 mg/l Daphnia magna (Water flea)
NOEC chronic fish	145 mg/l Pimephales promelas (Fathead minnow)
perchloric acid (7601-90-3)	
LC50 - Fish [1]	1470 mg/l Lepomis macrochirus (Bluegill)
EC50 - Crustacea [1]	> 100 mg/l Daphnia magna (Water flea)
EC50 72h - Algae [1]	> 435.7 mg/l Pseudokirchneriella subcapitata
NOEC chronic fish	10 mg/l Brachydanio rerio (zebra-fish)

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12.2. Persistence and degradability

Perchloric Acid in Dioxane Tenth-Normal (0.1 N) solution

Persistence and degradability	Rapidly degradable
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1,4-dioxane (123-91-1)

Persistence and degradability	Not readily biodegradable in water, Not degradable in the soil, Photooxidation in the air.
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Biochemical oxygen demand (BOD)	0 g O ₂ /g substance
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ThOD	1.8 g O ₂ /g substance
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BOD (% of ThOD)	0
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perchloric acid (7601-90-3)

Persistence and degradability	Rapidly degradable
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12.3. Bioaccumulative potential

1,4-dioxane (123-91-1)

Partition coefficient n-octanol/water (Log Pow)	-0.27
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Bioaccumulative potential	Low bioaccumulation potential (BCF < 500).
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perchloric acid (7601-90-3)

BCF - Fish [1]	≤ 1
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Partition coefficient n-octanol/water (Log Pow)	-4.63 (estimated value)
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Bioaccumulative potential	Not bioaccumulative.
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12.4. Mobility in soil

1,4-dioxane (123-91-1)

Surface tension	0.037 N/m (20 °C)
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perchloric acid (7601-90-3)

Surface tension	0.031 N/m 25 °C
-----------------	-----------------

12.5. Results of PBT and vPvB assessment

Component

Substance(s) not meeting the PBT criteria of REACH regulation, in accordance with Annex XIII	1,4-dioxane (123-91-1), perchloric acid (7601-90-3)
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Substance(s) not meeting the vPvB criteria of REACH regulation, in accordance with Annex XIII	1,4-dioxane (123-91-1), perchloric acid (7601-90-3)
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12.6. Endocrine disrupting properties

No additional information available

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.

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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

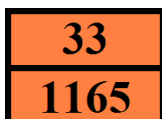
In accordance with ADR / IMDG / IATA / ADN / RID

ADR	IMDG	IATA	ADN	RID
14.1. UN number or ID number				
UN 1165	UN 1165	UN 1165	UN 1165	UN 1165
14.2. UN proper shipping name				
DIOXANE	DIOXANE	Dioxane	DIOXANE	DIOXANE
Transport document description				
UN 1165 DIOXANE, 3, II, (D/E)	UN 1165 DIOXANE, 3, II (12°C c.c.)	UN 1165 Dioxane, 3, II	UN 1165 DIOXANE, 3, II	UN 1165 DIOXANE, 3, II
14.3. Transport hazard class(es)				
3	3	3	3	3
				
14.4. Packing group				
II	II	II	II	II
14.5. Environmental hazards				
Dangerous for the environment: 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
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
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EAC code : •2YE

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) : 12°C c.c.

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
Carriage permitted (ADN) : T
Equipment required (ADN) : PP, EX, A
Ventilation (ADN) : VE01
Number of blue cones/lights (ADN) : 1

Rail transport

Classification code (RID) : F1
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)	Perchloric Acid in Dioxane Tenth-Normal (0.1 N) solution ; 1,4-dioxane ; perchloric acid	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)	Perchloric Acid in Dioxane Tenth-Normal (0.1 N) solution ; 1,4-dioxane ; perchloric acid	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

REACH Annex XIV (Authorisation List)

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

REACH Candidate List (SVHC)

Contains substance(s) listed on the REACH Candidate List in concentrations $\geq 0.1\%$ or SCL: 1,4-dioxane (EC 204-661-8, CAS 123-91-1)

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

VOC content : 99

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)

National regulations

France

Occupational diseases	
Code	Description
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) : VOC content : 99

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- Water hazard class (WGK) : WGK 2, Significantly hazardous to water (Classification according to AwSV, Annex 1).
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

- ABM category : Z(2) - biodegradable substances with hazardous properties for humans and the environment (carcinogenicity/ mutagenicity/reprotoxicity/bioaccumulative potential or toxicity)
SZW-lijst van kankerverwekkende stoffen : 1,4-dioxane is 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 – Vruchtbaarheid : None of the components are listed
SZW-lijst van reprotoxische stoffen – Ontwikkeling : None of the components are listed

Denmark

- Class for fire hazard : Class I-1
Store unit : 1 liter
Classification remarks : F <Flam. Liq. 2; Ox. 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

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

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SECTION 16: Other information

Indication of changes		
Section	Changed item	Comments
4.1	First-aid measures for first aider	Added
4.2	Symptoms/effects after ingestion	Added
5.1	Unsuitable extinguishing media	Added
5.2	Explosion hazard	Added
5.3	Firefighting instructions	Added
6.1	Emergency procedures	Added
6.1	Protective equipment	Added
6.1	General measures	Added
6.3	For containment	Added
7.1	Additional hazards when processed	Added
7.2	Packaging materials	Added
13.1	Product/Packaging disposal recommendations	Added
13.1	Sewage disposal recommendations	Added
13.1	Regional waste regulation	Added
13.1	Additional information	Modified
15.1	REACH Annex XVII	Modified
16	Abbreviations and acronyms	Modified

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

Perchloric Acid in Dioxane Tenth-Normal (0.1 N) solution

Safety Data Sheet

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

Abbreviations and acronyms:	
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
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. 4 (Oral)	Acute toxicity (oral), Category 4
Carc. 1B	Carcinogenicity, Category 1B
Eye Dam. 1	Serious eye damage/eye irritation, Category 1
Eye Irrit. 2	Serious eye damage/eye irritation, Category 2
Flam. Liq. 2	Flammable liquids, Category 2
Met. Corr. 1	Corrosive to metals, Category 1
Ox. Liq. 1	Oxidising Liquids, Category 1

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Full text of H- and EUH-statements:	
Ox. Liq. 2	Oxidising Liquids, Category 2
Skin Corr. 1A	Skin corrosion/irritation, Category 1, Sub-Category 1A
Skin Corr. 1B	Skin corrosion/irritation, Category 1, Sub-Category 1B
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT RE 2	Specific target organ toxicity – Repeated exposure, Category 2
STOT RE Not classified	Specific target organ toxicity (repeated exposure) Not classified
STOT SE 3	Specific target organ toxicity – Single exposure, Category 3, Respiratory tract irritation
H225	Highly flammable liquid and vapour.
H271	May cause fire or explosion; strong oxidiser.
H272	May intensify fire; oxidiser.
H290	May be corrosive to metals.
H302	Harmful if swallowed.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H350	May cause cancer.
H373	May cause damage to organs through prolonged or repeated exposure.

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
Ox. Liq. 2	H272	Calculation method
Skin Irrit. 2	H315	Calculation method
Eye Irrit. 2	H319	Calculation method
Carc. 1B	H350	Calculation method
STOT SE 3	H335	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.