SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006, as amended by Commission Regulation (EU) 2020/878

Version 7.11
Revision Date 31.12.2025
Print Date 11.01.2026

GENERIC EU MSDS - NO COUNTRY SPECIFIC DATA - NO OEL DATA

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

1.1 Product identifiers

Product name : Toluene EMPLURA®

Product Number : 1.08323
Catalogue No. : 108323
Brand : Millipore
Index-No. : 601-021-00-3
REACH No. : 01-2119471310-51-XXXX
CAS-No. : 108-88-3

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

Identified uses : Chemical production, Solvent

1.3 Details of the supplier of the safety data sheet

Company : Merck Pty Ltd.
259 Davidson Road, Corner Peddie Road
WADEVILLE, GERMISTON
1428
SOUTH AFRICA

Telephone : +27 (0) 8600 63725
Fax : +27 (0) 860 522 329

1.4 Emergency telephone number

Emergency Phone # : 0-800-983-611 (CHEMTREC)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Flammable liquids, Category 2	H225: Highly flammable liquid and vapour.
Skin irritation, Category 2	H315: Causes skin irritation.
Reproductive toxicity, Category 2	H361d: Suspected of damaging the unborn child.
Specific target organ toxicity -	H336: May cause drowsiness or dizziness.

The life science business of Merck operates as MilliporeSigma in the US and Canada

single exposure, Category 3, Central nervous system	
Specific target organ toxicity - repeated exposure, Category 2, Central nervous system	H373: May cause damage to organs through prolonged or repeated exposure if inhaled.
Aspiration hazard, Category 1	H304: May be fatal if swallowed and enters airways.
Long-term (chronic) aquatic hazard, Category 3	H412: Harmful to aquatic life with long lasting effects.

2.2 Label elements

Labelling (REGULATION (EC) No 1272/2008)

Hazard pictograms :

Signal word : Danger

Hazard statements :

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 (Central nervous system) through prolonged or repeated exposure if inhaled.
H412	Harmful to aquatic life with long lasting effects.

Precautionary statements :

Prevention:

P202	Do not handle until all safety precautions have been read and understood.
P210	Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P273	Avoid release to the environment.

Response:

P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P303 + P361 + P353	IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with water.
P331	Do NOT induce vomiting.

The life science business of Merck operates as MilliporeSigma in the US and Canada

Reduced Labelling (<= 125 ml)

Hazard pictograms :

Signal word	Danger
Hazard Statements	
H304	May be fatal if swallowed and enters airways.
H412	Harmful to aquatic life with long lasting effects.
H361d	Suspected of damaging the unborn child.
Precautionary Statements	
P202	Do not handle until all safety precautions have been read and understood.
P301 + P310	IF SWALLOWED: Immediately call a POISON CENTER/ doctor.
P331	Do NOT induce vomiting.
Supplemental Hazard Statements	none

2.3 Other hazards

This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

SECTION 3: Composition/information on ingredients

3.1 Substances

Index-No. : 601-021-00-3

EC-No. : 203-625-9

Components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)	M-Factor, SCL, ATE
Toluene	108-88-3 203-625-9	>= 90 - <= 100	specific concentration limit STOT SE 3; H336 20 %

The life science business of Merck operates as MilliporeSigma in the US and Canada

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice	:	Show this safety data sheet to the doctor in attendance.
If inhaled	:	After inhalation: fresh air. Call in physician.
In case of skin contact	:	In case of skin contact: Take off immediately all contaminated clothing. Rinse skin with water/ shower. Consult a physician.
In case of eye contact	:	After eye contact: rinse out with plenty of water. Call in ophthalmologist. Remove contact lenses.
If swallowed	:	After swallowing: caution if victim vomits. Risk of aspiration! Keep airways free. Pulmonary failure possible after aspiration of vomit. Call a physician immediately.

4.2 Most important symptoms and effects, both acute and delayed

The most important known symptoms and effects are described in the labelling (see section 2.2) and/or in section 11

4.3 Indication of any immediate medical attention and special treatment needed

No data available

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media	:	Foam Carbon dioxide (CO2) Dry powder
Unsuitable extinguishing media	:	For this substance/mixture no limitations of extinguishing agents are given.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire fighting	:	Combustible. Pay attention to flashback. Vapours are heavier than air and may spread along floors. Development of hazardous combustion gases or vapours possible in the event of fire. Forms explosive mixtures with air at ambient temperatures.
Hazardous combustion	:	Carbon oxides

The life science business of Merck operates as MilliporeSigma in the US and Canada

products

5.3 Advice for firefighters

Special protective equipment for fire-fighters	:	Stay in danger area only with self-contained breathing apparatus. Prevent skin contact by keeping a safe distance or by wearing suitable protective clothing.
Further information	:	Remove container from danger zone and cool with water. Prevent fire extinguishing water from contaminating surface water or the ground water system.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions	:	Advice for non-emergency personnel: Do not breathe vapours, aerosols. Avoid substance contact. Ensure adequate ventilation. Keep away from heat and sources of ignition. Evacuate the danger area, observe emergency procedures, consult an expert.

For personal protection see section 8.

6.2 Environmental precautions

Environmental precautions	:	Do not let product enter drains. Risk of explosion.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up	:	Cover drains. Collect, bind, and pump off spills. Observe possible material restrictions (see sections 7 and 10). Take up carefully with liquid-absorbent material (e.g. Chemizorb®). Dispose of properly. Clean up affected area.

6.4 Reference to other sections

For disposal considerations see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling	:	Work under hood. Do not inhale substance/mixture. Avoid generation of vapours/aerosols.
Advice on protection against fire and explosion	:	Keep away from open flames, hot surfaces and sources of ignition. Take precautionary measures against static discharge.
Hygiene measures	:	Immediately change contaminated clothing. Apply preventive skin protection. Wash hands and face after

The life science business of Merck operates as MilliporeSigma in the US and Canada

working with substance.

For precautions see section 2.2.

7.2 Conditions for safe storage, including any incompatibilities

Further information on storage conditions : Keep container tightly closed in a dry and well-ventilated place. Keep away from heat and sources of ignition.

Storage class (TRGS 510) : 3, Flammable liquids

Further information on storage stability : Recommended storage temperature see product label.

7.3 Specific end use(s)

Apart from the uses mentioned in section 1.2 no other specific uses are stipulated

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Occupational Exposure Limits

Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006

Substance name	End Use	Exposure routes	Potential health effects	Value
	Workers	Inhalation	Acute systemic effects	384 mg/m3
	Workers	Inhalation	Acute local effects	384 mg/m3
	Workers	Skin contact	Long-term systemic effects	384 mg/kg BW/d
	Workers	Inhalation	Long-term systemic effects	192 mg/m3
	Workers	Inhalation	Long-term local effects	192 mg/m3
	Consumers	Inhalation	Acute systemic effects	226 mg/m3
	Consumers	Inhalation	Acute local effects	226 mg/m3
	Consumers	Skin contact	Long-term systemic effects	226 mg/kg BW/d
	Consumers	Inhalation	Long-term systemic effects	56,5 mg/m3
	Consumers	Ingestion	Long-term systemic effects	8,13 mg/kg BW/d

Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006

Substance name	Environmental Compartment	Value
	Soil	2,89 mg/kg
	Marine water	0,68 mg/l
	Fresh water	0,68 mg/l
	Marine sediment	16,39 mg/kg

The life science business of Merck operates as MilliporeSigma in the US and Canada

	Fresh water sediment	16,39 mg/kg
	Sewage treatment plant	13,61 mg/l
	Aquatic intermittent release	0,68 mg/l

8.2 Exposure controls

Personal protective equipment

Eye/face protection : Use equipment for eye protection tested and approved under appropriate government standards such as NIOSH (US) or EN 166(EU).
Safety glasses

Hand protection

Material	:	Viton®
Break through time	:	480 min
Glove thickness	:	0,7 mm
Protective index	:	Full contact
Manufacturer	:	Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Material	:	Viton®
Break through time	:	480 min
Glove thickness	:	0,7 mm
Protective index	:	Splash contact
Manufacturer	:	Vitoject® (KCL 890 / Aldrich Z677698, Size M)

Remarks : This recommendation applies only to the product stated in the safety data sheet, supplied by us and for the designated use. When dissolving in or mixing with other substances and under conditions deviating from those stated in EN 16523-1 please contact the supplier of CE-approved gloves (e.g. KCL GmbH, D-36124 Eichenzell, Internet: www.kcl.de).

Skin and body protection : Flame retardant antistatic protective clothing.

Respiratory protection : required when vapours/aerosols are generated.
Our recommendations on filtering respiratory protection are based on the following standards: DIN EN 143, DIN 14387 and other accompanying standards relating to the used respiratory protection system.

Recommended Filter type: : Filter A (acc. to DIN 3181) for vapours of organic compounds

The entrepeneur has to ensure that maintenance, cleaning and testing of respiratory protective devices are carried out according to the instructions of the producer. These measures have to be properly documented.

Environmental exposure controls

Advice : Do not let product enter drains.
Risk of explosion.

The life science business of Merck operates as MilliporeSigma in the US and Canada

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Physical state	:	liquid (20 °C, 1.013 hPa)
Color	:	colourless
Odor	:	benzene-like
Odor Threshold	:	0,2 ppm
Melting point/ range	:	-95 - -93 °C
Boiling point/boiling range	:	110,6 °C (1.013 hPa)
Flammability	:	No data available
Upper explosion limit / Upper flammability limit	:	Upper explosion limit 7,1 %(V)
Lower explosion limit / Lower flammability limit	:	Lower explosion limit 1,2 %(V)
Flash point	:	4,4 °C(1.013 hPa) Method: closed cup, closed cup
Autoignition temperature	:	480 °C (1.013,25 hPa)
Decomposition temperature	:	No data available
pH	:	Not applicable
Viscosity		
Viscosity, dynamic	:	0,56 mPa.s (25 °C)
Viscosity, kinematic	:	No data available
Flow time	:	No data available
Solubility(ies)		
Water solubility	:	0,58 g/l (25 °C) pH: 7

The life science business of Merck operates as MilliporeSigma in the US and Canada

		partly soluble
Partition coefficient: n-octanol/water	:	log Pow: 2,73 (20 °C) pH: 7 Bioaccumulation is not expected.
Vapor pressure	:	30,88 hPa (21,1 °C)
Relative density	:	No data available
Density	:	0,87 g/cm3 (20 °C)
Relative vapour density	:	3,18

9.2 Other information

Explosives	:	Not classified as explosive.
Oxidizing properties	:	none
Burning rate	:	No data available
Evaporation rate	:	No data available
Conductivity	:	< 0,01 µS/cm
Surface tension	:	27,73 mN/m, 0,516 g/l, 25 °C
Molecular weight	:	92,14 g/mol

SECTION 10: Stability and reactivity

10.1 Reactivity

Vapours may form explosive mixture with air.

10.2 Chemical stability

The product is chemically stable under standard ambient conditions (room temperature) .

10.3 Possibility of hazardous reactions

Hazardous reactions	:	Risk of explosion with: fuming sulfuric acid

The life science business of Merck operates as MilliporeSigma in the US and Canada

Nitric acid
silver
perchlorates
nitrogen dioxide
nonmetallic halides
halogen-halogen compounds
uranium hexafluoride
organic nitro compounds
Violent reactions possible with:

Strong acids
Strong oxidizing agents
sulfur
with
Heat

10.4 Conditions to avoid

Conditions to avoid : Warming.

10.5 Incompatible materials

No data available

10.6 Hazardous decomposition products

In the event of fire: see section 5

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity
LD50 Oral - Rat - male - 5.580 mg/kg
(Directive 67/548/EEC, Annex V, B.1.)
LC50 Inhalation - Rat - male - 4 h - 25,7 mg/l - vapour

(OECD Test Guideline 403)
LD50 Dermal - Rabbit - male - > 5.000 mg/kg
Remarks: (ECHA)

Skin corrosion/irritation
Skin - Rabbit
Result: irritating - 4 h
(Regulation (EC) No. 440/2008, Annex, B.4)

Serious eye damage/eye irritation
Eyes - Rabbit
Result: No eye irritation
(OECD Test Guideline 405)

Respiratory or skin sensitization
Maximisation Test - Guinea pig
Result: negative
(Regulation (EC) No. 440/2008, Annex, B.6)

Germ cell mutagenicity
Test Type: In vitro mammalian cell gene mutation test
Test system: Mouse lymphoma test

The life science business of Merck operates as MilliporeSigma in the US and Canada

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: negative
Test Type: Ames test
Test system: S. typhimurium
Metabolic activation: with and without metabolic activation
Method: Regulation (EC) No. 440/2008, Annex, B.13/14 (Ames test)
Result: negative

Test Type: Chromosome aberration test
Species: Rat
Cell type: Bone marrow
Application Route: Intraperitoneal

Result: negative
Remarks: (ECHA)

Carcinogenicity
No data available

Reproductive toxicity
Suspected of damaging the unborn child.

Specific target organ toxicity - single exposure
Inhalation - May cause drowsiness or dizziness. - Central nervous system
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Specific target organ toxicity - repeated exposure
Inhalation - May cause damage to organs through prolonged or repeated exposure.
- Central nervous system
Remarks: Classified according to Regulation (EU) 1272/2008, Annex VI (Table 3.1/3.2)

Aspiration hazard
Aspiration may cause pulmonary oedema and pneumonitis.

11.2 Additional Information

Endocrine disrupting properties

Product:

Assessment	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

Repeated dose toxicity - Rat - male and female - Oral - 13 Weeks - No observed adverse effect level - 625 mg/kg - Lowest observed adverse effect level - 1.250 mg/kg

SECTION 12: Ecological information

12.1 Toxicity

Components:

Toluene:

The life science business of Merck operates as MilliporeSigma in the US and Canada

Toxicity to fish	:	LC50 (Oncorhynchus kisutch (coho salmon)): 5,5 mg/l End point: mortality Exposure time: 96 h Test Type: flow-through test Analytical monitoring: yes Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Ceriodaphnia dubia (water flea)): 3,78 mg/l End point: mortality Exposure time: 48 h Analytical monitoring: yes Method: US-EPA
Toxicity to microorganisms	:	EC50 (Bacteria): 84 mg/l Exposure time: 24 h Test Type: static test Remarks: (ECHA)
Toxicity to fish (Chronic toxicity)	:	NOEC: 1,39 mg/l End point: Growth inhibition Exposure time: 40 d Species: Oncorhynchus kisutch (coho salmon) Test Type: flow-through test Analytical monitoring: yes Remarks: (ECHA)
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC: 0,74 mg/l End point: reproduction rate Exposure time: 7 d Species: Ceriodaphnia dubia (water flea) Analytical monitoring: yes Method: US-EPA

12.2 Persistence and degradability

Components:

Toluene:

Biodegradability	:	Test Type: aerobic Result: Readily biodegradable. Biodegradation: 86 % Exposure time: 20 d Remarks: (IUCLID)

12.3 Bioaccumulative potential

Components:

Toluene:

Bioaccumulation	:	Species: Leuciscus idus (Golden orfe) Exposure time: 3 d Concentration: 0,05 mg/l Bioconcentration factor (BCF): 90

The life science business of Merck operates as MilliporeSigma in the US and Canada

Partition coefficient: n-octanol/water	:	log Pow: 2,73 (20 °C) pH: 7 Remarks: Bioaccumulation is not expected.

12.4 Mobility in soil

No data available

12.5 Results of PBT and vPvB assessment

Product:

Assessment	:	This substance/mixture contains no components considered to be either persistent, bioaccumulative and toxic (PBT), or very persistent and very bioaccumulative (vPvB) at levels of 0.1% or higher.

12.6 Endocrine disrupting properties

Product:

Assessment	:	The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher.

No data available

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product	:	Waste material must be disposed of in accordance with the national and local regulations. Leave chemicals in original containers. No mixing with other waste. Handle uncleaned containers like the product itself.

SECTION 14: Transport information

14.1 UN number or ID number

ADR	:	UN 1294
IMDG	:	UN 1294
IATA	:	UN 1294

14.2 UN proper shipping name

ADR	:	TOLUENE
IMDG	:	TOLUENE

The life science business of Merck operates as MilliporeSigma in the US and Canada

IATA	:	Toluene

14.3 Transport hazard class(es)

		Class	Subsidiary risks
ADR	:	3	
IMDG	:	3	
IATA	:	3	

14.4 Packing group

ADR

Packing group	:	II
Classification Code	:	F1
Hazard Identification Number	:	33
Labels	:	3
Tunnel restriction code	:	(D/E)

IMDG

Packing group	:	II
Labels	:	3
EmS Code	:	F-E, S-D

IATA (Cargo)

Packing instruction (cargo aircraft)	:	364
Packing instruction (LQ)	:	Y341
Packing group	:	II
Labels	:	Class 3 - Flammable liquids

IATA_P (Passenger)

Packing instruction (passenger aircraft)	:	353
Packing instruction (LQ)	:	Y341
Packing group	:	II
Labels	:	Class 3 - Flammable liquids

14.5 Environmental hazards

ADR

Environmentally hazardous	:	no

IMDG

Marine pollutant	:	no

14.6 Special precautions for user

The transport classification(s) provided herein are for informational purposes only, and solely based upon the properties of the unpackaged material as it is described within this Safety Data Sheet. Transportation classifications may vary by mode of transportation, package sizes, and variations in regional or country regulations.

14.7 Maritime transport in bulk according to IMO instruments

Not applicable for product as supplied.

The life science business of Merck operates as MilliporeSigma in the US and Canada

SECTION 15: Regulatory information

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

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII)	:	Conditions of restriction for the following entries should be considered: Number on list 3 Number on list 40 Number on list 75: If you intend to use this product as tattoo ink, please contact your vendor. Banned and/or restricted
REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59).	:	Not applicable
Regulation (EU) No 2024/590 on substances that deplete the ozone layer	:	Not applicable
Regulation (EU) 2019/1021 on persistent organic pollutants (recast)	:	Not applicable
REACH - List of substances subject to authorisation (Annex XIV)	:	Not applicable

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances.	P5c	FLAMMABLE LIQUIDS

15.2 Chemical safety assessment

A Chemical Safety Assessment has been carried out for this substance.

SECTION 16: Other information

H336 : May cause drowsiness or dizziness.

Full text of other abbreviations

STOT SE : Specific target organ toxicity - single exposure

ADN - European Agreement concerning the International Carriage of Dangerous Goods by Inland Waterways; ADR - Agreement concerning the International Carriage of Dangerous Goods by Road; AIIC - Australian Inventory of Industrial Chemicals; ASTM - American Society for the Testing of Materials; bw - Body weight; CLP - Classification Labelling Packaging Regulation; Regulation (EC) No 1272/2008; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DSL - Domestic Substances List (Canada); ECHA - European Chemicals Agency; EC-Number -

The life science business of Merck operates as MilliporeSigma in the US and Canada

European Community number; ECx - Concentration associated with x% response; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; GHS - Globally Harmonised System; GLP - Good Laboratory Practice; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organisation; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardisation; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; n.o.s. - Not Otherwise Specified; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NZIoC - New Zealand Inventory of Chemicals; OECD - Organisation for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RID - Regulations concerning the International Carriage of Dangerous Goods by Rail; SADT - Self-Accelerating Decomposition Temperature; SDS - Safety Data Sheet; SVHC - Substance of Very High Concern; TCSI - Taiwan Chemical Substance Inventory; TECI - Thailand Existing Chemicals Inventory; TRGS - Technical Rule for Hazardous Substances; TSCA - Toxic Substances Control Act (United States); UN - United Nations; vPvB - Very Persistent and Very Bioaccumulative

Further information

Other information	:	The information is believed to be correct but is not exhaustive and will be used solely as a guideline, which is based on current knowledge of the chemical substance or mixture and is applicable to appropriate safety precautions for the product. It does not represent any guarantee of the properties of the product. Sigma-Aldrich Corporation and its Affiliates shall not be held liable for any damage resulting from handling or from contact with the above product. See www.sigma-aldrich.com and/or the reverse side of invoice or packing slip for additional terms and conditions of sale.
		Copyright 2025 Sigma-Aldrich Co. LLC. License granted to make unlimited paper copies for internal use only.

The branding on the header and/or footer of this document may temporarily not visually match the product purchased as we transition our branding. However, all of the information in the document regarding the product remains unchanged and matches the product ordered. For further information please contact mlsbranding@sial.com.

REG_EU / EN

The life science business of Merck operates as MilliporeSigma in the US and Canada

The life science business of Merck operates as MilliporeSigma in the US and Canada

Annex: Exposure scenario

Identified uses:

Use: Used as chemical intermediate

SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU 3, SU8, SU9: Industrial uses: Uses of substances as such or in preparations at industrial sites, Manufacture of bulk, large scale chemicals (including petroleum products), Manufacture of fine chemicals
PC19: Intermediate
PROC1: Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing)
ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates)

Use: Formulation of preparations

SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU 3, SU 10: Industrial uses: Uses of substances as such or in preparations at industrial sites, Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)
PROC1: Use in closed process, no likelihood of exposure **PROC2:** Use in closed, continuous process with occasional controlled exposure **PROC3:** Use in closed batch process (synthesis or formulation) **PROC4:** Use in batch and other process (synthesis) where opportunity for exposure arises **PROC5:** Mixing or blending in batch processes for formulation of preparations and articles (multistage and/ or significant contact) **PROC8a:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at non-dedicated facilities **PROC8b:** Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities **PROC9:** Transfer of substance or preparation into small containers (dedicated filling line, including weighing) **PROC14:** Production of preparations or articles by tabletting, compression, extrusion, pelletisation
ERC2: Formulation of preparations

Use: Used as laboratory reagent

SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)
SU 22, SU 3: Professional uses: Public domain (administration, education, entertainment, services, craftsmen), Industrial uses: Uses of substances as such or in preparations at industrial sites
PC21: Laboratory chemicals
PROC15: Use as laboratory reagent

The life science business of Merck operates as MilliporeSigma in the US and Canada

ERC8a: Wide dispersive indoor use of processing aids in open systems

Use: Surface treatment

SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
SU 3, SU9: Industrial uses: Uses of substances as such or in preparations at industrial sites, Manufacture of fine chemicals
PC35: Washing and cleaning products (including solvent based products) **PC24:** Lubricants, greases, release products
PROC7: Industrial spraying **PROC10:** Roller application or brushing **PROC13:** Treatment of articles by dipping and pouring
ERC4, ERC7: Industrial use of processing aids in processes and products, not becoming part of articles, Industrial use of substances in closed systems

1. Short title of Exposure Scenario: Used as chemical intermediate

Main User Groups	:	**SU 3**
Sectors of end-use	:	**SU 3, SU8, SU9**
Chemical product category	:	**PC19**
Process categories	:	**PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9**
Environmental Release Categories	:	**ERC6a:**

2. Exposure scenario

2.1 Contributing scenario controlling environmental exposure for: ERC6a

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC8a, PROC8b, PROC9, PC19

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Medium volatile liquid

Frequency and duration of use

Application duration	:	> 4 h
Frequency of use	:	220 days/year

The life science business of Merck operates as MilliporeSigma in the US and Canada

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor

Technical conditions and measures
Provide adequate ventilation., Good work practice required.

Organisational measures to prevent /limit releases, dispersion and exposure
Ensure operatives are trained to minimise exposures.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection and gloves., For personal protection see section 8.

3. Exposure estimation and reference to its source

Environment

A chemical safety assessment was performed according REACH Article 14(3), Annex I, sections 3 (Environmental Hazard assessment) and 4 (PBT/vPvB Assessment). As no hazard was identified, an exposure assessment and risk characterisation is not necessary (REACH Annex I section 5.0).

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR*
PROC1	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	0,0038 mg/m³	0
PROC1	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	0,34 mg/kg BW/d	0,001
PROC2	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	40 mg/m³	0,208
PROC2	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	1,37 mg/kg BW/d	0,004
PROC3	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	0,34 mg/kg BW/d	0,001
PROC3	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	90 mg/m³	0,469
PROC4	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	6,86 mg/kg BW/d	0,018
PROC4	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	80 mg/m³	0,417
PROC8a	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	13,71 mg/kg BW/d	0,036

The life science business of Merck operates as MilliporeSigma in the US and Canada

PROC8a	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677
PROC8b	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	6,86 mg/kg BW/d	0,018
PROC8b	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677
PROC9	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677
PROC9	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	6,86 mg/kg BW/d	0,018

*Risk characterisation ratio

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

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

---

1. Short title of Exposure Scenario: Formulation of preparations

---

Main User Groups : **SU 3**
Sectors of end-use : **SU 3, SU 10**
Process categories : **PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14**
Environmental Release Categories : **ERC2:**

2. Exposure scenario

2.1 Contributing scenario controlling environmental exposure for: ERC2

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).

2.2 Contributing scenario controlling worker exposure for: PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14

Product characteristics
Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Medium volatile liquid

Frequency and duration of use
Application duration : > 4 h
Frequency of use : 220 days/year

The life science business of Merck operates as MilliporeSigma in the US and Canada

Other operational conditions affecting workers exposure
Outdoor / Indoor : Indoor

Technical conditions and measures
Provide adequate ventilation., Good work practice required.

Organisational measures to prevent /limit releases, dispersion and exposure
Ensure operatives are trained to minimise exposures.

Conditions and measures related to personal protection, hygiene and health evaluation
Use suitable eye protection and gloves., For personal protection see section 8.

3. Exposure estimation and reference to its source

Environment

A chemical safety assessment was performed according REACH Article 14(3), Annex I, sections 3 (Environmental Hazard assessment) and 4 (PBT/vPvB Assessment). As no hazard was identified, an exposure assessment and risk characterisation is not necessary (REACH Annex I section 5.0).

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR*
PROC1	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	0,34 mg/kg BW/d	0,001
PROC1	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	0,0038 mg/m³	0
PROC2	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	40 mg/m³	0,208
PROC2	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	1,37 mg/kg BW/d	0,004
PROC3	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	0,34 mg/kg BW/d	0,001
PROC3	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	90 mg/m³	0,469
PROC4	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	6,86 mg/kg BW/d	0,018
PROC4	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	80 mg/m³	0,417
PROC5	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	13,71 mg/kg BW/d	0,036

The life science business of Merck operates as MilliporeSigma in the US and Canada

PROC5	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677
PROC8a	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	13,71 mg/kg BW/d	0,036
PROC8a	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677
PROC8b	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	6,86 mg/kg BW/d	0,018
PROC8b	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677
PROC9	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677
PROC9	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	6,86 mg/kg BW/d	0,018
PROC14	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677
PROC14	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	3,43 mg/kg BW/d	0,009

*Risk characterisation ratio

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

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

---

1. Short title of Exposure Scenario: Used as laboratory reagent

---

Main User Groups : **SU 22**
Sectors of end-use : **SU 22, SU 3**
Chemical product category : **PC21**
Process categories : **PROC15**
Environmental Release Categories : **ERC8a:**

2. Exposure scenario

2.1 Contributing scenario controlling environmental exposure for: ERC8a

Product characteristics
Concentration of the Substance in : Covers the percentage of the substance in the product

The life science business of Merck operates as MilliporeSigma in the US and Canada

Mixture/Article up to 100 % (unless stated differently).

2.2 Contributing scenario controlling worker exposure for: PROC15, PC21

Product characteristics

Concentration of the Substance in Mixture/Article : Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use) : Medium volatile liquid

Frequency and duration of use

Application duration : > 4 h
Frequency of use : 220 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor

Technical conditions and measures

Provide adequate ventilation., Good work practice required.

Organisational measures to prevent /limit releases, dispersion and exposure

Ensure operatives are trained to minimise exposures.

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

Use suitable eye protection and gloves., For personal protection see section 8.

3. Exposure estimation and reference to its source

Environment

A chemical safety assessment was performed according REACH Article 14(3), Annex I, sections 3 (Environmental Hazard assessment) and 4 (PBT/vPvB Assessment). As no hazard was identified, an exposure assessment and risk characterisation is not necessary (REACH Annex I section 5.0).

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value	Level of Exposure	RCR*
PROC15	ECETOC TRA	Without Local Exhaust Ventilation	Inhalation	40 mg/m³	0,208
PROC15	ECETOC TRA	Without Local Exhaust Ventilation	Dermal	0,34 mg/kg BW/d	0,001

*Risk characterisation ratio

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

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

The life science business of Merck operates as MilliporeSigma in the US and Canada

1. Short title of Exposure Scenario: Surface treatment

Main User Groups	:	**SU 3**
Sectors of end-use	:	**SU 3, SU9**
Chemical product category	:	**PC35, PC24**
Process categories	:	**PROC7, PROC10, PROC13**
Environmental Release Categories	:	**ERC4, ERC7:**

2. Exposure scenario

2.1 Contributing scenario controlling environmental exposure for: ERC4, ERC7

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).

2.2 Contributing scenario controlling worker exposure for: PROC7, PROC10, PROC13, PC35, PC24

Product characteristics

Concentration of the Substance in Mixture/Article	:	Covers the percentage of the substance in the product up to 100 % (unless stated differently).
Physical Form (at time of use)	:	Medium volatile liquid

Frequency and duration of use

Application duration	:	> 4 h
Frequency of use	:	220 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor	:	Indoor

Technical conditions and measures

Use only in area provided with appropriate exhaust ventilation., Good work practice required.

Organisational measures to prevent /limit releases, dispersion and exposure

Ensure operatives are trained to minimise exposures.

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

Use suitable eye protection and gloves., For personal protection see section 8.

3. Exposure estimation and reference to its source

Environment

A chemical safety assessment was performed according REACH Article 14(3), Annex I, sections 3 (Environmental Hazard assessment) and 4 (PBT/vPvB Assessment). As no hazard was identified, an exposure assessment and risk characterisation is not necessary (REACH Annex I section 5.0).

Workers

Contributin	Exposure	Specific	Value	Level of	RCR*

The life science business of Merck operates as MilliporeSigma in the US and Canada

g Scenario	Assessment Method	conditions		Exposure	
PROC7	ECETOC TRA	With Local Exhaust Ventilation	Dermal	42,86 mg/kg BW/d	0,112
PROC7	ECETOC TRA	With Local Exhaust Ventilation	Inhalation	10 mg/m³	0,052
PROC10	ECETOC TRA	With Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677
PROC10	ECETOC TRA	With Local Exhaust Ventilation	Dermal	27,43 mg/kg BW/d	0,071
PROC13	ECETOC TRA	With Local Exhaust Ventilation	Dermal	13,71 mg/kg BW/d	0,036
PROC13	ECETOC TRA	With Local Exhaust Ventilation	Inhalation	130 mg/m³	0,677

*Risk characterisation ratio

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

Please refer to the following documents: ECHA Guidance on information requirements and chemical safety assessment Part D: Exposure Scenario Building, Part E: Risk Characterisation and Part G: Extending the SDS; VCI/Cefic REACH Practical Guides on Exposure Assessment and Communications in the Supply Chain; CEFIC Guidance Specific Environmental Release Categories (SPERCs).

The life science business of Merck operates as MilliporeSigma in the US and Canada