

TETRAHYDROFURAN

Gen. Variant: SDS_IT

Version 2.6

Revision Date 10/25/2019

Print Date 01/20/2020

SDS No.: BE266

1. Identification of the substance/mixture and of the company/undertaking

1.1 Product identifier

Trade name : TETRAHYDROFURAN
Synonyms : Tetramethylene Oxide, THF
Substance name : Tetrahydrofuran
Substance No. : 203-726-8 (EINECS)
Chemical characterization : Oxygen substituted cyclic hydrocarbons

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

Identified uses : Manufacture of substances; Uses in Coatings; Polymer production; Use in Cleaning Agents; Manufacture of substances; Use in laboratories; Formulation & (re)packing of substance and mixtures; Functional Fluids

Prohibited uses : Pharmaceutical excipient

1.3 Details of the supplier of the safety data sheet

Company	Registration number	Telephone
Lyondell Chemie Nederland, B.V. Delftseplein 27E 3013 AA Rotterdam Netherlands	01-2119444314-46-0000	31 (0) 10 275 55 00
E-mail address	: product.safety@lyb.com	
Responsible/issuing person		

1.4 Emergency telephone number

Lyondell Chemie Nederland, B.V. +32 3 575 1235

Poison Center:
Bergamo Poison Control Center
IT: +39 800 883 300
24 hours all days

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2. Hazards identification

2.1 Classification of the substance or mixture

Classification (REGULATION (EC) No 1272/2008)

Flammable liquids	Category 2: H225
Acute toxicity; Oral	Category 4: H302
Serious eye damage/eye irritation	Category 2: H319
Carcinogenicity	Category 2: H351
Specific target organ toxicity - single exposure	Category 3: H335

2.2 Label elements

Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal word : Danger

Hazard Statements	:	H225 H302 H319 H351 H335 EUH019	Highly flammable liquid and vapour. Harmful if swallowed. Causes serious eye irritation. Suspected of causing cancer. May cause respiratory irritation. May form explosive peroxides.
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Precautionary Statements	:	Prevention: P210 P233 P280	Keep away from heat/sparks/open flames/hot surfaces. No smoking. Keep container tightly closed. Wear protective gloves/ protective clothing/ eye protection/ face protection.
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Response: P370 + P378	In case of fire: Use dry chemical, carbon dioxide, water spray, or alcohol-resistant foam.
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Disposal:
P501

Dispose of contents/ container to an
approved waste disposal plant.

2.3 Other hazards

This substance is not considered to be persistent, bioaccumulating and toxic (PBT).
This substance is not considered to be very persistent and very bioaccumulating (vPvB).

3. Composition/information on ingredients

3.1 Substances

Components

Chemical name	CAS-No. EINECS-No. / ELINCS No./EC-No.	<u>Weight %</u>	Component Type
tetrahydrofuran	109-99-9 203-726-8	>= 99.0 %	A

Key:
(A) Substance

4. First aid measures

4.1 Description of first-aid measures

General advice : Take proper precautions to ensure your own health and safety
before attempting rescue and providing first aid.
Move out of dangerous area.
Remove contaminated shoes and clothing.
Consult a physician.
Show this material safety data sheet to the doctor in
attendance.

If inhaled : Remove victim to fresh air and keep at rest in a position
comfortable for breathing.
Do not leave the victim unattended.
Keep patient warm and at rest.
Get immediate medical advice/ attention.
If breathing is difficult, give oxygen.
If breathing has stopped, apply artificial respiration.

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- In case of skin contact : In case of contact, immediately flush skin with soap and plenty of water.
Remove/Take off immediately all contaminated clothing.
Get medical attention immediately if irritation develops and persists.
- In case of eye contact : Rinse immediately with plenty of water for at least 15 minutes.
Remove contact lenses, if present and easy to do. Continue rinsing.
Seek immediate medical attention, preferably an ophthalmologist.
- If swallowed : Rinse mouth with water.
Do NOT induce vomiting.
Do not give milk or alcoholic beverages.
Never give anything by mouth to an unconscious person.
If a person vomits when lying on his back, place him in the recovery position.
Get immediate medical advice/ attention.

4.2 Most important symptoms and effects, both acute and delayed

- Symptoms : Eye damage
respiratory tract irritation
central nervous system effects
- Hazards : May be harmful if swallowed and enters airways.
Harmful if swallowed.
Causes serious eye damage.
May cause respiratory irritation.
May cause drowsiness or dizziness.

4.3 Indication of any immediate medical attention and special treatment needed

- Treatment : Treatment of overexposure should be directed at the control of symptoms and the clinical condition of the patient.
If ingested, this material presents a significant aspiration/chemical pneumonitis hazard.
Do not induce vomiting.

5. Fire-fighting measures

5.1 Extinguishing media

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Suitable extinguishing media : SMALL FIRE: Use dry chemicals, CO2, water spray or alcohol-resistant foam
LARGE FIRE: Use water spray, water fog or alcohol-resistant foam

Unsuitable extinguishing media : Do not use solid water stream.

5.2 Special hazards arising from the substance or mixture

Specific hazards during fire fighting : Fine sprays/mists may be combustible at temperatures below normal flash point.
When mixed with air and exposed to ignition source, vapors can burn in open or explode if confined.
Vapors may be heavier than air.
May travel long distances along the ground before igniting and flashing back to vapor source.
Fight fire from maximum distance or use unmanned hose holders or monitor nozzles.
Move containers from fire area if it can be done without risk.
Cool containers with flooding quantities of water until well after fire is out.
Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank.
Always stay away from tanks engulfed in fire.
For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

5.3 Advice for firefighters

Special protective equipment for fire-fighters : Wear positive pressure self-contained breathing apparatus (SCBA).
Structural firefighter's protective clothing will only provide limited protection.

6. Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Use personal protective equipment.
Ensure adequate ventilation.
Remove all sources of ignition.
Evacuate personnel to safe areas.
Beware of vapors accumulating to form explosive

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concentrations. Vapors can accumulate in low areas.

6.2 Environmental precautions

Environmental precautions : Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.

6.3 Methods and materials for containment and cleaning up

Methods for containment / : Eliminate all sources of ignition.
Methods for cleaning up : All equipment used when handling this product must be grounded.
Do not touch or walk through spilled material.
Stop leak if you can do it without risk.
Prevent entry into waterways, sewers, basements or confined areas.
A vapor suppressing foam may be used to reduce vapors.
Absorb or cover with dry earth, sand or other non-combustible material and transfer to containers.
Use clean non-sparking tools to collect absorbed material.

7. Handling and storage

7.1 Precautions for safe handling

Advice on safe handling : For industrial use only.
Keep container tightly closed when not in use.
Extinguish all ignition sources.
Wear recommended personal protective equipment.
Containers must be properly grounded before beginning transfer.
All electrical equipment should be grounded and conform to applicable electric codes and regulatory requirements.
Check atmosphere for explosiveness and oxygen deficiencies.
Observe precautions pertaining to confined space entry.
If below desired level, add extra inhibitor/mix well to be effective.
Carefully vent any internal pressure before removing closure.
Isolate, vent, drain, wash and purge systems or equipment before maintenance or repair.
Handle empty containers with care; vapor/residue may be flammable.
Avoid contact with skin and eyes.

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Smoking, eating and drinking should be prohibited in the application area.

Take precautionary measures against static discharges.

Fire-fighting class : Highly flammable liquid.

7.2 Conditions for safe storage, including any incompatibilities

Requirements for storage areas and containers : Store closed drums with bung in up position.
Store only in tightly closed, properly vented containers away from heat, sparks, open flame and strong oxidizing agents.
Vapor space above stored liquid may be flammable/explosive unless blanketed with inert gas.
Can self-react/polymerize/liberate heat/raising temperature, pressure/possibly rupture container unless properly inhibited.
Storage in carbon steel is recommended.

7.3 Specific end use(s)

: (Refer to exposure scenario section for specific information).

8. Exposure controls/personal protection

8.1 Control parameters

Ingredients with workplace control parameters

Occupational Exposure Limits

Components	CAS-No.	Type	Limit Value	Basis Revision Date	Additional Information
tetrahydrofuran	109-99-9	STEL	100 ppm	US (ACGIH) 2012	
tetrahydrofuran	109-99-9	TWA	50 ppm	US (ACGIH) 2012	

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tetrahydrofuran	109-99-9	STEL	100 ppm 300 mg/m3	2000/39/EC (EU) December 17, 2009	
tetrahydrofuran	109-99-9	TWA	50 ppm 150 mg/m3	2000/39/EC (EU) December 17, 2009	
tetrahydrofuran	109-99-9	STEL	100 ppm 295 mg/m3	OEL (IT) October 2012	
tetrahydrofuran	109-99-9	TWA	50 ppm 147 mg/m3	OEL (IT) October 2012	
tetrahydrofuran	109-99-9		100 ppm 300 mg/m3	OEL (IT) May 25, 2014	
tetrahydrofuran	109-99-9	TWA	50 ppm 150 mg/m3	OEL (IT) May 25, 2014	

Consult local authorities for acceptable exposure limits.

Biological Exposure Indices

Components	CAS-No.	Control parameters	Biological specimen	Sampling time	Concentration	Basis
tetrahydrofuran	109-99-9	Tetrahydrofuran	urine	end of shift	2 mg/l	ACGIH_BEIS

DN(M)EL : End Use: Workers
Exposure routes: Inhalation
Potential health effects: Acute effects
Value: 300 mg/m3
Systemic effects, Based on IOEL

DN(M)EL : End Use: Workers
Exposure routes: Inhalation
Potential health effects: Acute effects
Value: 300 mg/m3
Local effects, Based on IOEL

DN(M)EL : End Use: Workers

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		Exposure routes: Skin contact
		Potential health effects: Long term
		Value: 25 mg/kg bw/day
		Systemic effects
DN(M)EL	:	End Use: Workers
		Exposure routes: Inhalation
		Potential health effects: Long term
		Value: 150 mg/m3
		Systemic effects, Based on IOEL
DN(M)EL	:	End Use: Workers
		Exposure routes: Inhalation
		Potential health effects: Long term
		Value: 150 mg/m3
		Local effects, Based on IOEL
DN(M)EL	:	End Use: Consumers
		Exposure routes: Inhalation
		Potential health effects: Acute effects
		Value: 150 mg/m3
		Systemic effects, Based on IOEL
DN(M)EL	:	End Use: Consumers
		Exposure routes: Inhalation
		Potential health effects: Acute effects
		Value: 150 mg/m3
		Local effects, Based on IOEL
DN(M)EL	:	End Use: Consumers
		Exposure routes: Skin contact
		Potential health effects: Long term
		Value: 15 mg/kg bw/day
		Systemic effects
DN(M)EL	:	End Use: Consumers
		Exposure routes: Inhalation
		Potential health effects: Long term
		Value: 62 mg/m3
		Systemic effects
DN(M)EL	:	End Use: Consumers
		Exposure routes: Ingestion
		Potential health effects: Long term
		Value: 15 mg/kg bw/day
		Systemic effects
DN(M)EL	:	End Use: Consumers
		Exposure routes: Inhalation
		Potential health effects: Long term
		Value: 75 mg/m3
		Local effects
PNEC	:	Water

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		Value: 4.32 mg/l Fresh water
PNEC	:	Water Value: 0.432 mg/l Sea water
PNEC	:	Water Value: 21.6 mg/l Intermittent Releases
PNEC	:	Sea sediment Value: 2.3 mg/kg
PNEC	:	Fresh water sediment Value: 23.3 mg/kg
PNEC	:	Soil Value: 2.1 mg/kg
PNEC	:	Sewage Treatment Plant Value: 4.6 mg/l

8.2 Exposure controls

Engineering measures

Electrical equipment should be grounded and conform to applicable electrical code.
Provide local exhaust or general room ventilation to minimize exposure to vapors.
Both local exhaust and good general room ventilation must be provided not only to control exposure but also to prevent formation of flammable mixtures.

Personal protective equipment

Respiratory protection	:	
Eye and face protection	:	Eye protection such as chemical splash goggles and/or face shield must be worn when possibility exists for eye contact due to splashing or spraying liquid, airborne particles, or vapor.
Skin and body protection	:	Depending on the conditions of use, protective gloves, apron, boots, head and face protection should be worn.
Hygiene measures	:	Selection of appropriate personal protective equipment should be based on an evaluation of the performance characteristics of the protective equipment relative to the task(s) to be

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performed, conditions present, duration of use, and the hazards and/or potential hazards that may be encountered during use.

Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Wash hands before eating, drinking, smoking, or using toilet facilities.

Use good personal hygiene practices.

Take off contaminated clothing and wash before reuse.

When using do not eat, drink or smoke.

Environmental exposure controls

General advice : See section 6.

9. Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance	: liquid at 20 °C (1,013 hPa)
Color	: clear colorless
Odor	: ether-like
Flash point	: -21 °C Method: (Abel-Pensky method)
Lower explosion limit	: ~ 2 vol%
Upper explosion limit	: ~ 11 vol%
Flammability (solid, gas)	: Highly flammable liquid.
Oxidizing properties	: No Data Available.
Autoignition temperature	: 215.1 °C at 1.013 hPa
Molecular weight	: 72 g/mol
Decomposition temperature	: not determined

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Melting point/range : -108.29 °C

Boiling point/boiling range : 65.15 °C

Vapor pressure : 170 hPa
at 20 °C

Density : 0.883 g/cm3
at 25 °C

Water solubility : Miscible in water.

Partition coefficient: n-
octanol/water : log Pow: 0.45
at 25 °C

Viscosity, kinematic : 0.516 mm2/s
at 25 °C

0.407 mm2/s
at 50 °C

Relative vapor density : no data available

Explosive properties : no data available

9.2 Other information

Other information : No additional information available.

10. Stability and reactivity

10.1 Reactivity

May react with oxygen to form unstable peroxides. Peroxides are thermally unstable and shock sensitive.

10.2 Chemical stability

This product is stable with an appropriate level of Butylated Hydroxy Toluene inhibitor (minimum 200 ppm), but reactive (unstable) without.

10.3 Possibility of hazardous reactions

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Hazardous reactions : May occur.

10.4 Conditions to avoid

Conditions to avoid : Heat, sparks, open flame, other ignition sources, and oxidizing conditions.

10.5 Incompatible materials

Materials to avoid : Reacts vigorously with strong oxidizers and acids.

10.6 Hazardous decomposition products

Hazardous decomposition products : No additional information available.

Thermal decomposition : Note: Thermal decomposition may produce carbon monoxide and other toxic vapors.

11. Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Acute oral toxicity :
Classified
Harmful if swallowed.

: LD50: 1,650 mg/kg
Species: Rat

Acute inhalation toxicity : Based on acute toxicity values, not classified.

: LC50: > 14.7 mg/l
Exposure time: 6 HOUR
Species: Rat

Acute dermal toxicity : Based on acute toxicity values, not classified.

: LD50: > 2,000 mg/kg
Species: Rat

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Skin corrosion/irritation : Based on skin irritation values, not classified.

Serious eye damage/eye irritation : Classified
Causes serious eye irritation.

Respiratory or skin sensitization : Skin sensitization
Based on skin sensitization values, not classified.
: Respiratory sensitization
Not classified
No study available.

Chronic toxicity

Carcinogenicity : Classified
Suspected of causing cancer.
Contains a substance that has a positive carcinogenicity study.
High life-time exposures of tetrahydrofuran induced liver tumors in female mice by a non-genotoxic mode of action. At exposures that do not produce sustained liver injury, tumor development is of low concern. Increased kidney tumors in male rats occurred by a mode of action not relevant for human health.

Germ cell mutagenicity : Not classified
No adverse effect observed.

Reproductive toxicity

Effects on fertility / : Not classified
Effects on or via lactation No adverse effect observed.

Effects on Development : Not classified
No adverse effect observed.

Target Organ Systemic Toxicant - Single exposure

: Classified, May cause respiratory irritation., High

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concentrations may cause central nervous system depression.

: Exposure routes: Inhalation
Target Organs: Respiratory system

Target Organ Systemic Toxicant - Repeated exposure

: Based on repeated exposure toxicity values, not classified.

Aspiration hazard

: Not classified
May be harmful if swallowed and enters airways.

12. Ecological information

12.1 Ecotoxicology Assessment

Short-term (acute) aquatic hazard : Based on acute aquatic toxicity values, not classified.
Long-term (chronic) aquatic hazard : Not classified, based on conclusive test data.
Toxicity to fish : Low acute toxicity to fish

Toxicity to daphnia and other aquatic invertebrates : Low acute toxicity to aquatic invertebrates.

Toxicity to algae : Low toxicity to algae.

Toxicity to bacteria : Low toxicity to sewage microbes.

Toxicity to fish (Chronic toxicity) : Low chronic toxicity to fish.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : No Data Available.

12.2 Persistence and degradability

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Biodegradability : Inherently biodegradable.

: Biodegradation: 39 %
Testing period: 28 d

: Biodegradation: 61 %
Testing period: 52 d

Stability in water
tetrahydrofuran

: Not expected to hydrolyze readily.

12.3 Bioaccumulative potential

Bioaccumulation

: This material is not expected to bioaccumulate.

: Bioconcentration factor (BCF): 3.16
Method: (QSAR calculated value)

12.4 Mobility in soil

**Distribution among
environmental
compartments**

: Type: Stability in soil
Koc: 18
Low potential for soil adsorption expected
(based on QSAR calculation of Koc)

: Type: Stability in water
No significant hydrolysis is expected
Molecular structure includes no hydrolysable functional
groups.

12.5 Results of PBT and vPvB assessment

Result

: This substance is not considered to be persistent,
bioaccumulating and toxic (PBT)., This substance is not
considered to be very persistent and very bioaccumulating
(vPvB).

12.6 Other adverse effects

**Environmental fate and
pathways**

: No additional information available.

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12.7 Other information

Additional ecological information : No additional information available.

13. Disposal considerations

13.1 Waste treatment methods

Product : Contaminated product, soil or water may be hazardous waste due to potentially low flash point.
Comply with applicable local, state or international regulations concerning solid or hazardous waste disposal and/or container disposal.

14. Transport information

ADR

UN number : 2056
UN proper shipping name : TETRAHYDROFURAN
Transport hazard class(es) : 3
Packing group : II
Classification Code : F1
Hazard Identification Number : 33
Labels : 3
Tunnel restriction code : D/E
Environmentally hazardous : no

IMDG

UN number : 2056
Description of the goods : TETRAHYDROFURAN
Class : 3
Packing group : II
Labels : 3
EmS Number 1 : F-E
EmS Number 2 : S-D

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Marine pollutant : no

RID

UN number : 2056
Description of the goods : TETRAHYDROFURAN
Transport hazard class(es) : 3
Packing group : II
Classification Code : F1
Hazard Identification Number : 33
Labels : 3
Environmentally hazardous : no

BLG (MARPOL Annex II)

Description of the goods : TETRAHYDROFURAN
Pollution category : Z
Ship type : 3

IATA

UN number : 2056
Description of the goods : TETRAHYDROFURAN
Class : 3
Packing group : II
Labels : 3
Packing instruction (cargo aircraft) : 307
Environmentally hazardous : no

15. Regulatory information

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

Subject to restrictions of Annex XVII of Regulation (EC) No. 1907/2006: : Tetrahydrofuran / CAS# 109-99-9.
Restricted Use - See item 28

US (ACGIH) : Confirmed animal carcinogen with unknown relevance to humans.

: Skin

Italy (IT) : Skin

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REACH Annex XIV

None of the substances currently listed in Annex XIV of the REACH regulation 1907/2006/EC or in the SVHC Candidate List are known to be incorporated in this product in quantities ≥ 0.1 % w/w.

REACH Annex XVII

None of the substances currently listed in Annex XIV of the REACH regulation 1907/2006/EC or in the SVHC Candidate List are known to be incorporated in this product in quantities ≥ 0.1 % w/w.

REACH - Candidate List of Substances of Very High Concern for Authorisation

This product does not contain substances of very high concern (Regulation (EC) No. 1907/2006 (REACH), Article 57).

REACH status

If the product has been purchased from any company of the LyondellBasell group of companies registered in the European Union, we confirm that the chemical substance in this product has been registered under REACH, in accordance with the deadlines set forth in REACH. (Regulation (EU) No. 1907/2006)

Other international regulations

Global Inventory Status

The ingredients of this product are compliant with the following chemical inventory requirements or exemptions.

*Additional Explanatory Status Statements follow the table, as necessary.

Country/Region	Inventory	Status Description
Australia	AICS	Compliant
Canada	DSL	Compliant
China	IECSC	Compliant
Europe	REACH	See REACH Compliance Statement
Japan	ENCS	Compliant
Korea	KECI	Compliant
New Zealand	NZIoC	Compliant
Philippines	PICCS	Compliant
United States of America	TSCA	Compliant
Taiwan	TCSCA	Compliant

Contact product.safety@lyb.com for additional global inventory information.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



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15.2 Chemical safety assessment

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

16. OTHER INFORMATION

Material safety datasheet sections which have been updated:

Revised Section(s): 15 16

Full text of H-Statements referred to under sections 2 and 3.

H225	Highly flammable liquid and vapour.
H302	Harmful if swallowed.
H319	Causes serious eye irritation.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.

Abbreviations and Acronyms

ACGIH - American Conference of Governmental Industrial Hygienists
ACGIH_BEIs - American Conference of Governmental Industrial Hygienists_Biological Exposure Indices
ADR - European Agreement concerning the International Carriage of Dangerous Goods by Road
AICS - Australian Inventory of Chemical Substances
ASTM - American Society for Testing and Materials
BEL - Biological Exposure Limits
BTEX - Benzene, Toluene, Ethylbenzene, Xylenes
CAS - Chemical Abstracts Service
CEFIC - European Chemical Industry Council
CLP - Classification Packaging and Labelling
COC - Cleveland Open-Cup
CS - Consumer Scenario
DIN - Deutsches Institut für Normung
DN(M)EL - Derived No (Minimal) Effect Level
DSL - Canada Domestic Substance List
EC - European Commission
EC50 - Median Effective Concentration
ECETOC - European Center on Ecotoxicology and Toxicology of Chemicals
ECHA - European Chemicals Agency
EL50 - Effective Loading fifty
ELINCS - EHR-Lab Interoperability and Connectivity Specification
ENCS - Japanese Existing and New Chemical Substances Inventory

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



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ERC - Environmental Release Category
EUSES - European Union System for the Evaluation of Substances
EWC - European Waste Code
GHS - Globally Harmonized System of Classification and Labelling of Ch
IARC - International Agency for Research on Cancer
IATA - International Air Transport Association
IC50 - Inhibitory Concentration fifty IL50 = Inhibitory Level fifty
IMDG - International Maritime Dangerous Goods
IECSC - Chinese Chemicals Inventory
IOELV - Indicative Occupational Exposure Limit Values
IP346 - Institute of Petroleum test method N° 346 for the determination of polycyclic aromatics
DMSO-extractables
KECI - Korea Existing Chemicals Inventory
Koc - Organic Carbon/Water Partition Coefficient
LC50 - Lethal Concentration fifty
LD50 - Lethal Dose fifty per cent.
LL/EL/IL - Lethal Loading/Effective Loading/Inhibitory Loading
LL50 - Lethal Loading fifty
MAK Commission - Permanent Senate Commission for the Investigation of Health Hazards of
Chemical Compounds in the Work Area
MARPOL - International Convention for the Prevention of Pollution from Ships
No. - Number
NOEC/NOEL - No Observed Effect Concentration / No Observed Effect Level
NZIoC - New Zealand Inventory of Chemicals
OE_HP - Occupational Exposure - High Production Volume
OECD - Organization for Economic Co-operation and Development
OEL - Occupational Exposure Limit
PBT - Persistent, Bio accumulative and Toxic
PICCS - Philippine Inventory of Chemicals and Chemical Substances
PNEC - Predicted No Effect Concentration
PPE - Personal Protective Equipment
PROC - Process Category
QSAR - Quantitative Structure-Activity Relationship
REACH - Registration Evaluation and Authorization of Chemicals
RID - Regulations Relating to International Carriage of Dangerous Goods by Rail
SDS - Safety Data Sheet
SKIN_DES - Skin Designation
STEL - Short term exposure limit
STP - Standard Temperature and Pressure
TSCA - Taiwan inventory of chemicals
TGD - Technical Guidance Document
TRA - Targeted Risk Assessment
TSCA - US Toxic Substances Control Act
TWA - Time-Weighted Average
UN - United Nations
vPvB - very Persistent and very Bioaccumulative

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WGK - German Water Endangerment Class

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The presentation of numerical data, such as that used for physical and chemical properties and toxicological values, is expressed using a comma (,) to separate digits into groups of three and a period (.) as the decimal marker. For example, 1,234.56 mg/kg = 1 234,56 mg/kg.

Language Translations

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End of Material Safety Data Sheet

Section 1: Title of Exposure Scenario

Short title Manufacture of substances

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Use Descriptors

Sector of use:

SU8: Manufacture of bulk, large scale chemicals (including petroleum products)

SU9: Manufacture of fine chemicals

Process category:

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

PROC15: Use as laboratory reagent

Environmental release category:

ERC1: Manufacture of substances

Processes, tasks activities covered

Manufacture of THF or use as an intermediate or process chemical or extraction agent (e.g. to manufacture/synthesize pharmaceuticals). Includes recycling/ recovery, material transfers, storage, maintenance and loading (including marine vessel/barge, road/rail car and bulk container).

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Water solubility >10 g/l Miscible.

Biodegradability Inherently biodegradable.

log Pow: 18.2

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Amount used

Total (Production and Import)	140000
Annual site tonnage (tonnes/year)	80000
Regional use tonnage (tonnes/year)	80000

Frequency and duration of use

Continuous release

Environment factors not influenced by risk management

Flow rate 18,000 m3/d

Dilution Factor (River) 10

Dilution Factor (Coastal Areas) 100

Other given operational conditions affecting environmental exposure

Number of emission days per year 300

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

Flow rate of sewage 20,000 m3/d
treatment plant
effluent

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Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

**Contributing scenario
controlling worker
exposure for:**

Risk Management Measures

CS15: General exposures
(closed systems) CS54:
Continuous process CS57:
no sampling

No specific measures identified.
Handle substance within a closed system
Wear suitable gloves tested to EN374.

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CS15: General exposures
(closed systems) CS54:
Continuous process CS56:
with sample collection

Ensure material transfers are under containment or extract
ventilation.
Handle substance within a closed system.
Wear suitable gloves tested to EN374.

CS15: General exposures
(closed systems) CS55:
Batch process

Ensure material transfers are under containment or extract
ventilation.
Handle substance within a closed system.
Wear suitable gloves tested to EN374.

CS2: Process sampling

Ensure material transfers are under containment or extract
ventilation.
Wear suitable gloves tested to EN374.

CS59: internal CS14: Bulk
transfers

Provide extraction ventilation at points where emissions
occur.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS5: Equipment
maintenance

Limit the substance content in the product to 1 %.
Clear transfer lines prior to de-coupling.
Drain down system prior to equipment opening or
maintenance.
Wear suitable gloves tested to EN374.

CS14: Bulk transfers CS58:
transport CS81: Dedicated
facility

Ensure material transfers are under containment or extract
ventilation.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS36: Laboratory activities

Avoid splashing.
Ensure material transfers are under containment or extract
ventilation.
Wear suitable gloves tested to EN374.

Section 3: Exposure estimation and reference to its source

Health

When the recommended risk management measures (RMMs) and
operational conditions (OCs) are observed, exposures are not expected to
exceed the predicted DNELs and the resulting risk characterisation ratios
are expected to be less than 1.

Environment

As a result of the hazard assessment carried out in accordance to article
14.3, the registrant concludes that the substance does not meet the criteria

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for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health Confirm that RMMs and OCs are as described.

Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title Formulation & (re)packing of substance and mixtures

Use Descriptors

Sector of use:

SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

Process category:

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 tableting, compression, extrusion, pelletization

PROC15: Use as laboratory reagent

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

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Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, large and small scale packing, maintenance and associated laboratory activities

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

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Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

**Contributing scenario
controlling worker
exposure for:**

Risk Management Measures

CS15: General exposures
(closed systems) CS54:
Continuous process CS57:
no sampling

No specific measures identified.
Handle substance within a closed system.
Wear suitable gloves tested to EN374.

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CS15: General exposures
(closed systems) CS54:
Continuous process CS56:
with sample collection

Ensure material transfers are under containment or extract
ventilation.
Handle substance within a closed system
Wear suitable gloves tested to EN374.

CS15: General exposures
(closed systems) CS55:
Batch process

Ensure material transfers are under containment or extract
ventilation.
Handle substance within a closed system.
Wear suitable gloves tested to EN374.

CS2: Process sampling

Ensure material transfers are under containment or extract
ventilation.
Wear suitable gloves tested to EN374.

CS59: internal CS14: Bulk
transfers

Provide extraction ventilation at points where emissions
occur.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS23: Mixing in containers
CS55: Batch process

Provide extraction ventilation at points where emissions
occur.
Wear suitable gloves tested to EN374.

CS5: Equipment
maintenance

Limit the substance content in the product to 1 %.
Clear transfer lines prior to de-coupling.
Drain down system prior to equipment opening or
maintenance.
Wear suitable gloves tested to EN374.

CS28: Disposal of wastes
CS3: Material transfers CS8:
Drum/batch transfers

Ensure operation is undertaken outdoors.
Wear a respirator conforming to EN140 with Type A filter or
better.
Wear suitable gloves tested to EN374.

CS14: Bulk transfers CS58:
transport CS81: Dedicated
facility

Ensure material transfers are under containment or extract
ventilation.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS6: Drum and small
package filling

Ensure material transfers are under containment or extract
ventilation.
Wear suitable gloves tested to EN374.

CS100: Production or
preparation or articles by
tableting, compression,

Provide extraction ventilation at points where emissions
occur.
Wear suitable gloves tested to EN374.

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extrusion or pelletization

CS36: Laboratory activities

Avoid splashing.
Ensure material transfers are under containment or extract ventilation.
Wear suitable gloves tested to EN374.

Section 3: Exposure estimation and reference to its source

Health

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment

As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health

Confirm that RMMs and OCs are as described.

Environment

As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title

Use in polymer production

Use Descriptors

Sector of use:

SU 10: Formulation [mixing] of preparations and/ or re-packaging (excluding alloys)

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Process category:

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)

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)

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

Manufacture of polymers from monomers in continuous and batch processes, include sparging, discharging, and reactor maintenance and immediate polymer product formation (i.e. compounding, pelletisation, product off-gassing).

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

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Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

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Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

**Contributing scenario
controlling worker
exposure for:****Risk Management Measures**

CS15: General exposures
(closed systems) CS54:
Continuous process CS57:
no sampling

No specific measures identified.
Handle substance within a closed system
Wear suitable gloves tested to EN374.

CS65: Polymerization (bulk
and batch) CS54:
Continuous process CS56:
with sample collection

Ensure material transfers are under containment or extract
ventilation.
Wear suitable gloves tested to EN374.

CS65: Polymerization (bulk
and batch) CS55: Batch
process CS56: with sample
collection

Ensure samples are obtained under containment or extract
ventilation.
Wear suitable gloves tested to EN374.

CS55: Batch process CS56:
with sample collection

Ensure samples are obtained under containment or extract
ventilation.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS23: Mixing and blending
CS55: Batch process

Provide extraction ventilation at points where emissions
occur.
Wear suitable gloves tested to EN374.

CS5: Equipment
maintenance

Limit the substance content in the product to 1 %.
Clear transfer lines prior to de-coupling.
Drain down system prior to equipment opening or
maintenance.
Wear suitable gloves tested to EN374.

CS14: Bulk transfers CS58:
transport CS81: Dedicated
facility

Ensure material transfers are under containment or extract
ventilation.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS58: transport CS56: with
sample collection

Ensure material transfers are under containment or extract
ventilation.

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Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS6: Drum and small
package filling

Ensure material transfers are under containment or extract
ventilation.
Wear suitable gloves tested to EN374.

Section 3: Exposure estimation and reference to its source

Health

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment

As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health

Confirm that RMMs and OCs are as described.

Environment

As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title

Use in Cleaning Agents

Use Descriptors

Sector of use:

SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

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Process category:

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

PROC7: Industrial spraying

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

PROC10: Roller application or brushing

PROC13: Treatment of articles by dipping and pouring

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

Covers the use as a component of cleaning products at elevated temperature including transfer from storage, pouring/unloading from drums or containers. Exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping, automated and by hand), related equipment cleaning and maintenance.

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

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Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

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Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

Contributing scenario controlling worker exposure for:

Risk Management Measures

CS14: Bulk transfers

Ensure material transfers are under containment or extract ventilation.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS93: Automated process
with (semi) closed systems.
CS38: Use in contained
systems

Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS93: Automated process
with (semi) closed systems.
CS8: Drum/batch transfers
CS38: Use in contained
systems

Avoid carrying out operation for more than 1 hour.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS101: Application of
cleaning products in closed
systems

Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS28: Disposal of wastes
CS3: Material transfers CS8:
Drum/batch transfers

Ensure operation is undertaken outdoors.
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS45: Filling/ preparation of
equipment from drums or
containers. CS81: Dedicated
facility

Ensure material transfers are under containment or extract ventilation.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS37: Use in contained
batch processes CS129:
Treatment by heating

Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

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CS41: Degreasing small objects in cleaning station

Clear spills immediately.
Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

CS42: Cleaning with low-pressure washers

Avoid carrying out operation for more than 1 hour.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour).
Wear suitable gloves tested to EN374.

CS44: Cleaning with high pressure washers

Limit the substance content in the product to 25 %.
Avoid carrying out operation for more than 1 hour.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS34: Manual CS47:
Cleaning CS60: no spraying

Avoid carrying out operation for more than 1 hour.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour).
Wear suitable gloves tested to EN374.

Section 3: Exposure estimation and reference to its source

Health

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment

As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health

Confirm that RMMs and OCs are as described.

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Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title Use in Coatings

Use Descriptors

Sector of use:

SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process category:

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)

PROC7: Industrial spraying

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)

PROC10: Roller application or brushing

PROC13: Treatment of articles by dipping and pouring

PROC14: Production of preparations or articles by tableting, compression, extrusion, pelletization

PROC15: Use as laboratory reagent

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

Covers the use in coatings (paints, inks, adhesives, etc.) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities.

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Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

Contributing scenario controlling worker exposure for:

Risk Management Measures

CS15: General exposures (closed systems)

Wear suitable gloves tested to EN374.

CS15: General exposures (closed systems) CS56: with sample collection CS38: Use in contained systems

Ensure material transfers are under containment or extract ventilation.
Wear suitable gloves tested to EN374.

CS94: Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing

Handle substance within a closed system
Ensure material transfers are under containment or extract ventilation.
Wear suitable gloves tested to EN374.

CS29: Mixing operations (closed systems) CS15:

Ensure material transfers are under containment or extract ventilation.

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General exposures (closed systems)

Wear suitable gloves tested to EN374.

CS95: Film formation - air drying

Avoid manual contact with wet work pieces.
Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

CS96: Preparation of material for application
CS30: Mixing operations (open systems)

Avoid manual contact with wet work pieces.
Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

CS97: Spraying (automatic/robotic)

Carry out in a vented booth provided with laminar airflow.
Wear suitable gloves tested to EN374.

CS34: Manual CS10: Spraying

Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour).
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS3: Material transfers

Clear transfer lines prior to de-coupling.
Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

CS3: Material transfers
CS81: Dedicated facility

Clear transfer lines prior to de-coupling.
Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

CS28: Disposal of wastes
CS3: Material transfers CS8: Drum/batch transfers

Ensure operation is undertaken outdoors.
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS98: Roller, spreader, flow application

Minimize exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.
Wear suitable gloves tested to EN374.

CS4: Dipping, immersion and pouring

Avoid manual contact with wet work pieces.
Clear up spills immediately and dispose of waste safely.
Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

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CS36: Laboratory activities

Avoid manual contact with wet work pieces.
Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

CS3: Material transfers CS8:
Drum/batch transfers CS22:
Transfer from/pouring from
containers

Ensure transfer points are supplied with extract ventilation
Wear suitable gloves tested to EN374.

CS100: Production or
preparation or articles by
tableting, compression,
extrusion or pelletization

Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

Section 3: Exposure estimation and reference to its source

Health

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment

As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health

Confirm that RMMs and OCs are as described.

Environment

As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title

Use in Functional Fluids, Corrosion inhibitors

Use Descriptors

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Sector of use:

SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

Process category:

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)

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

Covers the industrial use of THF as a functional fluid, i.e., corrosion inhibitor in industrial equipment including maintenance and related material transfers, also industrial use as process solvent.

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

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Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

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Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

**Contributing scenario
controlling worker
exposure for:**

Risk Management Measures

CS45: Filling/ preparation of equipment from drums or containers. : manual filling of machines

Avoid carrying out operation for more than 1 hour.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Provide enhanced general ventilation by mechanical means
Wear suitable gloves tested to EN374.

CS28: Disposal of wastes
CS3: Material transfers CS8:
Drum/batch transfers

Ensure operation is undertaken outdoors.
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS1: General exposures

No specific measures identified.
Handle substance within a closed system
Wear suitable gloves tested to EN374.

CS23: Mixing and blending
CS2: Process sampling

Ensure material transfers are under containment or extract ventilation.
Wear suitable gloves tested to EN374.

CS14: Bulk transfers CS58:
transport CS81: Dedicated
facility

Provide extraction ventilation at points where emissions occur.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS33: Machine CS54:
Continuous process CS16:
General exposures (open
systems) : operation of
equipment containing
functional fluids

Provide enhanced general ventilation by mechanical means
Wear suitable gloves tested to EN374.

CS17: Operation and
lubrication of high energy
open equipment CS16:
General exposures (open
systems)

Provide enhanced general ventilation by mechanical means
Wear suitable gloves tested to EN374.

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CS6: Drum and small
package filling

Ensure samples are obtained under containment or extract
ventilation.
Clear transfer lines prior to de-coupling.
Wear suitable gloves tested to EN374.

CS17: Operation and
lubrication of high energy
open equipment CS16:
General exposures (open
systems) CS111: Elevated
temperature.

Provide extraction ventilation at points where emissions
occur.
Wear suitable gloves tested to EN374.

Section 3: Exposure estimation and reference to its source

Health

When the recommended risk management measures (RMMs) and
operational conditions (OCs) are observed, exposures are not expected to
exceed the predicted DNELs and the resulting risk characterisation ratios
are expected to be less than 1.

Environment

As a result of the hazard assessment carried out in accordance to article
14.3, the registrant concludes that the substance does not meet the criteria
for classification as dangerous for the environment; therefore risk
characterizations for environmental endpoints were not developed.

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

Health

Confirm that RMMs and OCs are as described.

Environment

As a result of the hazard assessment carried out in accordance to article
14.3, the registrant concludes that the substance does not meet the criteria
for classification as dangerous for the environment; therefore risk
characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title

Use in laboratories

Use Descriptors

Sector of use:

SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites

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Process category:

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

PROC10: Roller application or brushing

PROC15: Use as laboratory reagent

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

Use of the substance within laboratory settings, including material transfers and equipment cleaning

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

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No specific measures identified.

Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

**Contributing scenario
controlling worker
exposure for:**

Risk Management Measures

CS36: Laboratory activities

Apply within a vented cab supplied with filtered air under

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CS22: Transfer from/pouring
from containers

positive pressure and with a protection factor of >20.
Wear suitable gloves tested to EN374.

CS39: Equipment cleaning
and maintenance

Provide extraction ventilation at points where emissions
occur.
Wear suitable gloves tested to EN374.

CS36: Laboratory activities
CS9: Pouring from small
containers

Avoid splashing.
Provide extraction ventilation at points where emissions
occur.
Wear suitable gloves tested to EN374.

Section 3: Exposure estimation and reference to its source

Health

When the recommended risk management measures (RMMs) and
operational conditions (OCs) are observed, exposures are not expected to
exceed the predicted DNELs and the resulting risk characterisation ratios
are expected to be less than 1.

Environment

As a result of the hazard assessment carried out in accordance to article
14.3, the registrant concludes that the substance does not meet the criteria
for classification as dangerous for the environment; therefore risk
characterizations for environmental endpoints were not developed.

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

Health

Confirm that RMMs and OCs are as described.

Environment

As a result of the hazard assessment carried out in accordance to article
14.3, the registrant concludes that the substance does not meet the criteria
for classification as dangerous for the environment; therefore risk
characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title

Use in Cleaning Agents

Use Descriptors

Sector of use:

SU 22: Professional uses: Public domain (administration, education, entertainment, services,
craftsmen)

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Process category:

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

PROC10: Roller application or brushing

PROC11: Non industrial spraying

PROC13: Treatment of articles by dipping and pouring

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

Covers the use as a component of cleaning products including pouring/unloading from drums or containers; and exposures during mixing/diluting in the preparatory phase and cleaning activities (including spraying, brushing, dipping, wiping automated and by hand).

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

Remarks not required

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Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

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Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

**Contributing scenario
controlling worker
exposure for:**
Risk Management Measures

CS45: Filling/ preparation of equipment from drums or containers. CS81: Dedicated facility

Avoid carrying out operation for more than 1 hour.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Provide enhanced general ventilation by mechanical means.
Wear suitable gloves tested to EN374.

CS93: Automated process with (semi) closed systems. CS38: Use in contained systems

Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS93: Automated process with (semi) closed systems. CS8: Drum/batch transfers CS38: Use in contained systems

Limit the substance content in the product to 25 %.
Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS76: Semi Automated process. (e.g.: Semi automatic application of floor care and maintenance products)

Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Provide enhanced general ventilation by mechanical means.
Wear suitable gloves tested to EN374.

CS45: Filling/ preparation of equipment from drums or containers. OC9: Outdoor

Limit the substance content in the product to 25 %.
Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS28: Disposal of wastes CS3: Material transfers CS8: Drum/batch transfers

Limit the substance content in the product to 25 %.
Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or

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	better. Wear suitable gloves tested to EN374.
CS34: Manual CS48: Surfaces CS47: Cleaning CS4: Dipping, immersion and pouring	Avoid carrying out operation for more than 4 hours. or; Wear a respirator conforming to EN140 with Type A filter or better. Provide enhanced general ventilation by mechanical means Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.
CS42: Cleaning with low- pressure washers CS51: Rolling, Brushing CS60: no spraying	Limit the substance content in the product to 5 %. Provide enhanced general ventilation by mechanical means Wear suitable gloves tested to EN374.
CS44: Cleaning with high pressure washers CS10: Spraying OC8: Indoor	Limit the substance content in the product to 1 %. Provide enhanced general ventilation by mechanical means Wear suitable gloves tested to EN374.
CS44: Cleaning with high pressure washers CS10: Spraying OC9: Outdoor	Limit the substance content in the product to 1 %. Avoid carrying out operation for more than 4 hours. or; Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.
CS34: Manual CS48: Surfaces CS47: Cleaning CS10: Spraying	Ensure doors and windows are opened. Avoid carrying out operation for more than 1 hour. or; Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.
CS27: Ad hoc manual application via trigger sprays, dipping, etc. CS51: Rolling, Brushing	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 4 hours. or; Wear a respirator conforming to EN140 with Type A filter or better. Provide extraction ventilation at points where emissions occur. Wear suitable gloves tested to EN374.
CS27: Ad hoc manual application via trigger sprays, dipping, etc. CS51: Rolling,	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. or;

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Brushing
Wear a respirator conforming to EN140 with Type A filter or better.
Provide enhanced general ventilation by mechanical means.
Wear suitable gloves tested to EN374.

CS101: Application of cleaning products in closed systems OC9: Outdoor
Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Wear suitable gloves tested to EN374.

CS74: Cleaning of medical devices
Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

Section 3: Exposure estimation and reference to its source

Health
When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health
Confirm that RMMs and OCs are as described.

Environment
As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title Use in Coatings

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Use Descriptors

Sector of use:

SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process category:

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

PROC10: Roller application or brushing

PROC11: Non industrial spraying

PROC13: Treatment of articles by dipping and pouring

PROC15: Use as laboratory reagent

PROC19: Hand-mixing with intimate contact and only PPE available

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

Covers the use in coatings (paints, inks, adhesives, etc.) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation), and equipment cleaning, maintenance and associated laboratory activities.

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

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Frequency and duration of use

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

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Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

**Contributing scenario
controlling worker
exposure for:**

Risk Management Measures

CS15: General exposures
(closed systems)

No specific measures identified.
Wear suitable gloves tested to EN374.

CS45: Filling/ preparation of
equipment from drums or
containers.

Handle substance within a closed system
Ensure material transfers are under containment or extract
ventilation.
Wear suitable gloves tested to EN374.

CS15: General exposures
(closed systems) CS38: Use
in contained systems

Ensure material transfers are under containment or extract
ventilation.
Wear suitable gloves tested to EN374.

CS96: Preparation of
material for application OC9:
Outdoor

Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or
better.
Clear up spills immediately and dispose of waste safely.
Use drum pumps or carefully pour from container.
Wear suitable gloves tested to EN374.

CS95: Film formation - air
drying OC9: Outdoor

Limit the substance content in the product to 25 %.
Provide a good standard of general or controlled ventilation

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	(5 to 10 air changes per hour). Wear suitable gloves tested to EN374.
CS95: Film formation - air drying OC8: Indoor	Avoid carrying out operation for more than 4 hours. or; Wear a respirator conforming to EN140 with Type A filter or better. Provide extraction ventilation at points where emissions occur. Wear suitable gloves tested to EN374.
CS96: Preparation of material for application OC8: Indoor	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. or; Wear a respirator conforming to EN140 with Type A filter or better. Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour). Wear suitable gloves tested to EN374.
CS96: Preparation of material for application OC9: Outdoor	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. or; Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.
CS3: Material transfers CS8: Drum/batch transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. or; Wear a respirator conforming to EN140 with Type A filter or better. Provide enhanced general ventilation by mechanical means. Wear suitable gloves tested to EN374.
CS28: Disposal of wastes CS3: Material transfers CS8: Drum/batch transfers	Limit the substance content in the product to 25 %. Avoid carrying out operation for more than 1 hour. or; Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.
CS3: Material transfers CS8: Drum/batch transfers CS81: Dedicated facility	Ensure transfer points are supplied with extract ventilation Wear suitable gloves tested to EN374.

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CS98: Roller, spreader, flow application OC8: Indoor

Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour).
Wear suitable gloves tested to EN374.
Limit the substance content in the product to 20 %.

CS98: Roller, spreader, flow application OC9: Outdoor

Ensure operation is undertaken outdoors.
Wear suitable gloves tested to EN374.
Limit the substance content in the product to 20 %.

CS34: Manual CS10: Spraying OC8: Indoor

Wear a respirator conforming to EN140 with Type A filter or better.
Carry out in a vented booth or extracted enclosure.
Wear suitable gloves tested to EN374.

CS34: Manual CS10: Spraying OC9: Outdoor

Avoid carrying out operation for more than 4 hours.
Wear a full face respirator conforming to EN140 with Type A filter or better.
Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training.

CS4: Dipping, immersion and pouring OC8: Indoor

Limit the substance content in the product to 25 %.
Avoid manual contact with wet work pieces.
Clear up spills immediately and dispose of waste safely.
Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

CS4: Dipping, immersion and pouring OC9: Outdoor

Wear a respirator conforming to EN140 with Type A filter or better.
Avoid manual contact with wet work pieces.
Clear up spills immediately and dispose of waste safely.
Wear suitable gloves tested to EN374.

CS36: Laboratory activities

Provide extraction ventilation at points where emissions occur.
Wear suitable gloves tested to EN374.

CS72: Hand application - finger-paints, pastels, adhesives OC8: Indoor

Provide a good standard of general or controlled ventilation (5 to 10 air changes per hour).
Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Limit the substance content in the product to 20 %.

CS72: Hand application - finger-paints, pastels, adhesives OC9: Outdoor

Wear chemically resistant gloves (tested to EN374) in combination with specific activity training.
Limit the substance content in the product to 20 %.

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Section 3: Exposure estimation and reference to its source

Health When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health Confirm that RMMs and OCs are as described.

Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title Use in Functional Fluids, Corrosion inhibitors

Use Descriptors

Sector of use:

SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process category:

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

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

PROC20: Heat and pressure transfer fluids in dispersive, professional use but closed systems

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Environmental release category:

: Not Applicable.

Processes, tasks activities covered

Covers the professional use of THF as a functional fluid, i.e., corrosion inhibitor in professional equipment including maintenance and related material transfers.

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

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Section 2.2: Control of worker exposure

Product characteristics

Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

**Contributing scenario
controlling worker
exposure for:**

Risk Management Measures

CS45: Filling/ preparation of equipment from drums or containers. : manual filling of machines

Limit the substance content in the product to 25 %.
Avoid carrying out operation for more than 4 hours.
or;
Wear a respirator conforming to EN140 with Type A filter or better.

SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006



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	Provide enhanced general ventilation by mechanical means Wear suitable gloves tested to EN374.
CS28: Disposal of wastes CS3: Material transfers CS8: Drum/batch transfers	Ensure operation is undertaken outdoors. Wear a respirator conforming to EN140 with Type A filter or better. Wear suitable gloves tested to EN374.
CS6: Drum and small package filling	Avoid carrying out operation for more than 4 hours. or; Wear a respirator conforming to EN140 with Type A filter or better. Ensure transfer points are supplied with extract ventilation Wear suitable gloves tested to EN374.
CS15: General exposures (closed systems)	No specific measures identified. Wear suitable gloves tested to EN374.
CS23: Mixing in containers CS2: Process sampling	Ensure material transfers are under containment or extract ventilation. Wear suitable gloves tested to EN374.
CS33: Machine CS54: Continuous process CS16: General exposures (open systems): operation of equipment containing functional fluids	Provide enhanced general ventilation by mechanical means Wear suitable gloves tested to EN374.
CS17: Operation and lubrication of high energy open equipment CS16: General exposures (open systems)	Limit the substance content in the product to 25 %. Provide enhanced general ventilation by mechanical means. Wear suitable gloves tested to EN374.
CS17: Operation and lubrication of high energy open equipment CS16: General exposures (open systems) CS111: Elevated temperature.	Limit the substance content in the product to 25 %. Provide extraction ventilation at points where emissions occur. Wear suitable gloves tested to EN374.
CS17: Operation and lubrication of high energy open equipment	Limit the substance content in the product to 25 %. Provide enhanced general ventilation by mechanical means. Wear suitable gloves tested to EN374.

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Section 3: Exposure estimation and reference to its source

Health When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health Confirm that RMMs and OCs are as described.

Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title Use in laboratories

Use Descriptors

Sector of use:

SU 22: Professional uses: Public domain (administration, education, entertainment, services, craftsmen)

Process category:

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

PROC10: Roller application or brushing

PROC15: Use as laboratory reagent

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

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Use of small quantities within laboratory settings, including material transfers and equipment cleaning.

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

Section 2.2: Control of worker exposure

Product characteristics

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Physical Form (at time of use) liquid

Vapor pressure 170 hPa

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

Amount used

Remarks Not applicable.

Frequency and duration of use

Remarks Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management

Not applicable.

Other operational conditions affecting workers exposure

Assumes use at not more than 20°C above ambient temperature. Assumes a good basic standard of occupational hygiene is implemented.

**Contributing scenario
controlling worker
exposure for:**

Risk Management Measures

CS36: Laboratory activities
CS22: Transfer from/pouring
from containers

Avoid carrying out operation for more than 1 hour.
or;
Wear a respirator conforming to EN140 with Type A filter or better.
Apply within a vented cab supplied with filtered air under positive pressure and with a protection factor of >20.
Wear suitable gloves tested to EN374.

CS39: Equipment cleaning
and maintenance

Carry out in a vented booth or extracted enclosure.
Wear suitable gloves tested to EN374.

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CS36: Laboratory activities
CS9: Pouring from small
containers

Avoid splashing.
Provide extraction ventilation at points where emissions
occur.
Wear suitable gloves tested to EN374.

Section 3: Exposure estimation and reference to its source

Health When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health Confirm that RMMs and OCs are as described.

Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title Consumer Uses of THF in Cleaning Products

Use Descriptors

Sector of use:

SU 21: Consumer uses: Private households (= general public = consumers)

Product category:

PC35: Washing and cleaning products (including solvent based products)

Environmental release category:

: Not Applicable.

Processes, tasks activities covered

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Covers general exposures to consumers arising from the use of household products sold as washing and cleaning products.

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

Section 2.2: Control of consumer exposure

Product characteristics

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Physical Form (at time of use) liquid

Vapor pressure 170 hPa

Concentration of the Substance in Mixture/Article Covers typically used concentrations only, unless otherwise stated.

Amount used

Remarks Covers typically used amounts only, unless otherwise stated.

Frequency and duration of use

Remarks Covers typical frequency and duration of use only, unless otherwise stated.

Human factors not influenced by risk management

Not applicable.

Contributing scenario controlling consumer exposure for:

Laundry and dish washing products

Operational conditions and risk management measures

Remarks: Unless otherwise stated, covers concentrations up to 0.01%
For each use event, covers use amounts up to 50 g
Covers use up to 2 time/day.
Covers Skin Contact area up to 2028 cm²
Covers use under typical household ventilation.
For each use event, assumes swallowed amount of 0 g.

Covers exposure up to (hours/event): 0.5

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Remarks:

Avoid using at a product concentration greater than 100%.

Cleaners, liquids (all purpose cleaners, sanitary products, floor cleaners, glass cleaners, carpet cleaners, metal cleaners)

Operational conditions and risk management measures

Remarks:

Unless otherwise stated, covers concentrations up to 0.012%
For each use event, covers use amounts up to 60 g
Covers use up to 1 time/day.
Covers Skin Contact area up to 858 cm²
Covers use under typical household ventilation.
For each use event, assumes swallowed amount of 0 g.

Covers exposure up to (hours/event):

0.33

Remarks:

Avoid using at a product concentration greater than 100%.

Cleaners, trigger sprays (all purpose cleaners, sanitary products, glass cleaners)

Operational conditions and risk management measures

Remarks:

For each use event, covers use amounts up to 30 g
Covers use up to 1 time/day.
Covers Skin Contact area up to 480 cm²
Covers use under typical household ventilation.
For each use event, assumes swallowed amount of 0 g.

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Covers exposure up to
(hours/event): 0.16

Remarks: Avoid using at a product
concentration greater than
15%.

Section 3: Exposure estimation and reference to its source

Health When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health Confirm that RMMs and OCs are as described.

Environment As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

Section 1: Title of Exposure Scenario

Short title Consumer Uses of products containing THF (PVC glues, universal glues, paint removers, lacquers, coatings)

Use Descriptors

Sector of use:

SU 21: Consumer uses: Private households (= general public = consumers)

Product category:

PC1: Adhesives, sealants

PC9a: Coatings and paints, thinners, paint removers

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Environmental release category:

: Not Applicable.

Processes, tasks activities covered

Covers general exposures to consumers arising from the use of household products sold as PVC primer, PVC cement, paint stripper, adhesives, lacquers.

Section 2: Operational conditions and risk management measures

Section 2.1: Control of environmental exposure

Product characteristics

Physical Form (at time of use) liquid

Biodegradability Inherently biodegradable.

Environment factors not influenced by risk management

Remarks not required

Other given operational conditions affecting environmental exposure

Remarks not required

Technical conditions and measures / Organizational measures

No specific measures identified.

Conditions and measures related to municipal sewage treatment plant

No specific measures identified.

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Section 2.2: Control of consumer exposure

Product characteristics

Physical Form (at time of use) liquid
Vapor pressure 170 hPa

Concentration of the Substance in Mixture/Article Covers typically used concentrations only, unless otherwise stated.

Amount used

Remarks Covers typically used amounts only, unless otherwise stated.

Frequency and duration of use

Remarks Covers typical frequency and duration of use only, unless otherwise stated.

Human factors not influenced by risk management

Not applicable.

Contributing scenario controlling consumer exposure for:

Glues DIY-use (PVC primer, PVC cement)

Operational conditions and risk management measures

Remarks: For each use event, covers use amounts up to 9 g
Covers use up to 1 time/day.
Covers use under typical household ventilation.
For each use event, assumes swallowed amount of 0 g.
Covers Skin Contact area up to 428 cm²

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Covers exposure up to
(hours/event): 4

Remarks: Avoid using at a product
concentration greater than
80%.

Glues DIY-use (universal glues)

Operational conditions and risk management measures

Remarks: For each use event, covers
use amounts up to 300 g
Covers use up to 1 time/day.
Covers Skin Contact area up
to 2 cm²
Covers use under typical
household ventilation.
For each use event, assumes
swallowed amount of 0 g.

Covers exposure up to
(hours/event): 4

Remarks: Avoid using at a product
concentration greater than
30%.

Lacquers, coatings

Operational conditions and risk management measures

Remarks: For each use event, covers
use amounts up to 1000 g
Covers use up to 1 time/day.
For each use event, assumes
swallowed amount of 0 g.
Covers Skin Contact area up
to 960 cm²

Covers exposure up to
(hours/event): 2

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Remarks:

Avoid using at a product concentration greater than 20%.

Removers (paint remover)

Operational conditions and risk management measures

Remarks:

For each use event, covers use amounts up to 1000 g
Covers use up to 1 time/day.
Covers Skin Contact area up to 430 cm²
For each use event, assumes swallowed amount of 0 g.

Covers exposure up to (hours/event):

1

Remarks:

Avoid using at a product concentration greater than 20%.

Section 3: Exposure estimation and reference to its source

Health

When the recommended risk management measures (RMMs) and operational conditions (OCs) are observed, exposures are not expected to exceed the predicted DNELs and the resulting risk characterisation ratios are expected to be less than 1.

Environment

As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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

Health

Confirm that RMMs and OCs are as described.

Environment

As a result of the hazard assessment carried out in accordance to article 14.3, the registrant concludes that the substance does not meet the criteria for classification as dangerous for the environment; therefore risk characterizations for environmental endpoints were not developed.

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