DESMODUR RFE

Version 8.6 Revision Date 09.11.2020 Print Date 10.11.2020

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

1.1 Product identifier

DESMODUR RFE

Material number: 04047842

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

Use:
Hardener for coating materials or adhesives for industrial and trade applications

Uses advised against:
Not suitable for use in homeworker (DIY) applications.

1.3 Details of the supplier of the safety data sheet

Covestro Deutschland AG
COV-CTO-HSEQ-PSRA-PSI
D-51365 LEVERKUSEN

Tel.: +49 214 6009 4068
e-mail: ProductSafetyEMLA@covestro.com

1.4 Emergency telephone number

In case of emergency: +49 214 30 99300 (Safety Desk)
National Chemical Emergency Centre - UK
Tel: +44 1865 407 333

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Flammable liquids, Category 2 (H225)
Specific target organ toxicity (single exposure), Category 3 (H336)

2.2 Label elements

Danger

Hazardous components which must be listed on the label
ethyl acetate

Hazard statements:
H225 Highly flammable liquid and vapour.
H336 May cause drowsiness or dizziness.

Precautionary statements:
P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.
P233 Keep container tightly closed.
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P303 + P361 + P353 IF ON SKIN (or hair): Take off immediately all contaminated clothing. Rinse skin with

water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P403 + P235 Store in a well-ventilated place. Keep cool.

Supplementary hazardous characteristics and labeling elements:
EUH066 Repeated exposure may cause skin dryness or cracking.
EUH204 Contains isocyanates. May produce an allergic reaction.

2.3 Other hazards

In case of hypersensitivity of the respiratory tract (e.g. asthmatics and those who suffer from chronic bronchitis) it is inadvisable to work with the product.
Symptoms affecting the respiratory tract can also occur several hours after overexposure.
Dust, vapors and aerosols are the primary risk to the respiratory tract.

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

SECTION 3: Composition/information on ingredients

Type of product: Mixture

3.2 Mixtures

Tris(p-isocyanatophenyl) thiophosphate

ca. 28 % in ethyl acetate

Hazardous components

ethyl acetate
Concentration [wt.-%]: ca. 72
Index-No.: 607-022-00-5
EC-No.: 205-500-4
REACH Registration Number: 01-2119475103-46-0017
CAS-No.: 141-78-6
Classification (1272/2008/CE): Flam. Liq. 2 H225 Eye Irrit. 2 H319 STOT SE 3 H336

Tris(p-isocyanatophenyl) thiophosphate
Concentration [wt.-%]: ca. 27
EC-No.: 223-981-9
REACH Registration Number: 01-2119948848-16-0000
CAS-No.: 4151-51-3
Classification (1272/2008/CE): Acute Tox. 4 Oral H302

chlorobenzene
Concentration [wt.-%]: < 1
Index-No.: 602-033-00-1
EC-No.: 203-628-5
REACH Registration Number: 01-2119432722-45
CAS-No.: 108-90-7
Classification (1272/2008/CE): Flam. Liq. 3 H226 Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Aquatic Chronic 2 H411

Candidate List of Substances of Very High Concern for Authorisation
This product contains no substances of very high concern in concentrations where an information obligation applies (REACH Regulation (EC) No. 1907/2006, Article 59).

SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: Soiled, soaked clothing and shoes must be immediately removed, decontaminated and disposed of.

If inhaled: Take the person into the fresh air and keep him warm, let him rest; if there is difficulty in breathing, medical advice is required.

In case of skin contact: In the event of contact with the skin, preferably wash with a cleanser based on polyethylene glycol or with plenty of warm water and soap. Consult a doctor in the event of a skin reaction.

In case of eye contact: Hold the eyes open and rinse with preferably lukewarm water for a sufficiently long period of time (at least 10 minutes). Contact an ophthalmologist.

If swallowed: DO NOT induce vomiting. Wash/clean mouth with water. Medical advice is required.

4.2 Most important symptoms and effects, both acute and delayed

Notes to physician: The product irritates the respiratory tract and may trigger sensitisation of the skin and respiratory tract. Treatment of acute irritation or bronchial constriction is primarily symptomatic. Extended medical treatment may be required depending on the degree of exposure and the severity of the symptoms.

4.3 Indication of any immediate medical attention and special treatment needed

Therapeutic measures: No information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media: Carbon dioxide (CO2), Foam, extinguishing powder, in cases of larger fires, water spray should be used.

Unsuitable extinguishing media: High volume water jet

5.2 Special hazards arising from the substance or mixture

Burning releases carbon monoxide, carbon dioxide, oxides of nitrogen, isocyanate vapors and traces of hydrogen cyanide. In the event of fire and/or explosion do not breathe fumes.

Fire in vicinity poses risk of pressure build-up and rupture. Containers at risk from fire should be cooled with water and, if possible, removed from the danger area.

5.3 Advice for fire-fighters

For firefighting, self-contained breathing apparatus is required, plus a gas-tight chemical hazmat suit.

Do not allow contaminated extinguishing water to enter the soil, ground-water or surface waters.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Put on protective equipment (see section 8). Ensure adequate ventilation/exhaust extraction. Keep unauthorized persons away.

6.2 Environment related measures

Do not allow to escape into waterways, wastewater or soil.

6.3 Methods and material for containment and cleaning up

Remove mechanically; cover the remainder with wet, absorbent material (e.g. sawdust, chemical binder based on calcium silicate hydrate, sand). After approx. one hour transfer to waste container and do not seal (evolution of CO2!). Keep damp in a safe ventilated area for several days.

Spill area can be decontaminated with the following recommended decontamination solution:

Decontamination solution 1: 8-10% sodium carbonate and 2% of liquid soap in water

Decontamination solution 2: Liquid/yellow soap (potassium soap with ~15% anionic tenside): 20ml; Water:700ml; Polyethylenglycol (PEG 400): 350ml

Decontamination solution 3: 30 % commercial laundry detergent containing monoethanolamine, 70 % water

6.4 Reference to other sections

For further disposal measures see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Provide sufficient air exchange and/or exhaust in work rooms. Exhaust ventilation necessary if product is sprayed.

Solid products: Avoid formation and deposition of dust.

In all areas where isocyanate aerosols and/or vapor concentrations are produced in elevated concentrations, exhaust ventilation must be provided in such a way that the workplace exposure limits (WEL) is not exceeded. The air should be drawn away from the personnel handling the product The threshold limit values noted in section 8 must be monitored.

Products containing solvent: Explosion protection required.

The personal protective measures described in section 8 must be observed. The precautions required in the handling of isocyanates must be taken. Contact with skin and eyes and inhalation of vapors must be avoided under all circumstances.

Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at end of work and use skin-protecting ointment. Keep working clothes separately. Take off all contaminated clothing immediately.

7.2 Conditions for safe storage, including any incompatibilities

Keep container dry and tightly closed in a cool and well ventilated place. Further information on the storage conditions which must be observed to preserve quality can be found in our product information sheet.

Storage class (TRGS 510) : 3: Flammable liquids

7.3 Specific end use(s)

No information available.

SECTION 8: Exposure controls/personal protection

UK Workplace Exposure Limits (WEL), per EH40 document (Health & Safety Executive). If no UK value exists, EU exposure limits given where available.

8.1 Control parameters

Components with workplace control parameters

Substance	CAS-No.	Basis	Type	Value	Ceiling Limit Value	Remarks
ethyl acetate	141-78-6	EH40 WEL	STEL	400 ppm 1,468 mg/m3		
ethyl acetate	141-78-6	EH40 WEL	TWA	200 ppm 734 mg/m3		
ethyl acetate	141-78-6	EU ELV	TWA	200 ppm 734 mg/m3		Indicative
ethyl acetate	141-78-6	EU ELV	STEL	400 ppm 1,468 mg/m3		Indicative

The product may contain traces of phenylisocyanate.

Derived No Effect Level (DNEL)

ethyl acetate

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects	734 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Inhalation	Acute systemic effects	1468 mg/m3	
Workers	Inhalation	Long-term local effects	734 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Inhalation	Acute local effects	1468 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Workers	Dermal	Long-term systemic effects	63 mg/kg bw/day	
Workers	Dermal	Acute systemic effects		Not relevant
Workers	Dermal	Long-term local effects		No quantitative risk assessment possible.
Workers	Dermal	Acute local effects		Not relevant
Consumers	Inhalation	Long-term systemic effects	367 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Inhalation	Acute systemic effects	734 mg/m3	
Consumers	Inhalation	Long-term local effects	367 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Inhalation	Acute local effects	734 mg/m3	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Dermal	Long-term systemic effects	37 mg/kg bw/day	
Consumers	Dermal	Acute systemic effects		Not relevant
Consumers	Dermal	Long-term local effects		No quantitative risk assessment possible.
Consumers	Dermal	Acute local effects		Not relevant
Consumers	Oral	Long-term systemic effects	4.5 mg/kg bw/day	Most sensitive endpoint: Irritation (respiratory tract)
Consumers	Oral	Acute systemic effects		Not relevant

Tris(p-isocyanatophenyl) thiophosphate

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects		No hazard identified
Workers	Inhalation	Acute systemic effects		No hazard identified
Workers	Inhalation	Long-term local effects	0.047 mg/m3	Most sensitive endpoint: Repeated dose toxicity
Workers	Inhalation	Acute local effects		No hazard identified
Workers	Dermal	Long-term systemic effects		No hazard identified
Workers	Dermal	Acute systemic effects		No hazard identified
Workers	Dermal	Long-term local effects		No hazard identified
Workers	Dermal	Acute local effects		No hazard identified
Workers	Eye contact	Local effects		No hazard identified

chlorobenzene

Value type	Route of exposure	Health Effects	Value	Remarks
Workers	Inhalation	Long-term systemic effects	23 mg/m3	
Workers	Inhalation	Acute systemic effects	70 mg/m3	
Workers	Dermal	Long-term systemic effects	5 mg/kg bw/day	
Workers	Dermal	Acute systemic effects	15 mg/kg bw/day	

Predicted No Effect Concentration (PNEC)

ethyl acetate

Compartment	Value	Remarks
Fresh water	0.26 mg/l	
Fresh water sediment	1.25 mg/kg	dry weight
Marine water	0.026 mg/l	
Marine sediment	0.125 mg/kg	dry weight
Sewage treatment plant	650 mg/l	
Soil	0.24 mg/kg	dry weight
Oral	200 mg/kg	
Intermittent use/release	1.65 mg/l	

Tris(p-isocyanatophenyl) thiophosphate

Compartment	Value	Remarks
Fresh water	0.1 mg/l	
Fresh water sediment	2557 mg/kg	dry weight
Marine water	0.01 mg/l	
Marine sediment	155 mg/kg	dry weight
Sewage treatment plant	100 mg/l	

Air		No hazard identified
Soil	510 mg/kg	dry weight
Oral		Does not bioaccumulate.
Intermittent use/release	1 mg/l	

chlorobenzene

Compartment	Value	Remarks
Fresh water	0.032 mg/l	
Fresh water sediment	0.922 mg/kg	dry weight
Marine water	0.0032 mg/l	
Marine sediment	0.0922 mg/kg	dry weight
Sewage treatment plant	1.4 mg/l	
Soil	0.166 mg/kg	dry weight

8.2 Exposure controls

Respiratory protection
Respiratory protection required in insufficiently ventilated working areas and during spraying. An air-fed mask, or for short periods of work, a combination of charcoal filter and particulate filter A2-P2 (EN529) is recommended.

Symptoms affecting the respiratory tract can also occur several hours after overexposure.

Hand protection
Conditionally suitable materials for protective gloves; EN 374:
Butyl rubber - IIR (>= 0.5 mm); Break through time: >= 60 min
Recommendation: contaminated gloves should be disposed of.

Eye protection
Wear eye/face protection.

Skin and body protection
Wear suitable protective clothing.
In case of hypersensitivity of the skin it is inadvisable to work with the product.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance:	liquid	
Colour:	yellow to brownish	
Odour:	solvent-like	
Odour Threshold:	not established	
pH:	not applicable	
Boiling point/boiling range:	ca. 77 °C at 1,013 hPa	
Flash point:	ca. -4 °C	DIN 51755
Evaporation rate:	not established	
Flammability:	not established	
Burning number:	not established	
Upper/lower flammability or explosive limits:		
ethyl acetate	upper: 11.5 %(V) / lower: 2.2 %(V)	
chlorobenzene	upper: 11.0 %(V) / lower: 1.3 %(V)	
Vapour pressure:	ca. 97 hPa at 20 °C	
Vapour density:	not established	
Density:	ca. 1.0 g/cm³ at 20 °C	DIN 53217
Miscibility with water:	immiscible at 15 °C	
Water solubility of ingredients:		

ethyl acetate	ca. 85 g/l	at 20 °C	
Surface tension:	not established		
Partition coefficient (n−octanol/water):	not established		
Auto-ignition temperature:	not established		
Ignition temperature:	ca. 460 °C		
Decomposition temperature:	not established		
Heat of combustion:	not established		
Viscosity, dynamic:	ca. 3 mPa.s at 20 °C		DIN 53019
Flow time:	ca. 10 s		DIN 53211

9.2 Other information

The indicated values do not necessarily correspond to the product specification. Please refer to the technical information sheet for specification data.

Explosive properties:	not established
Dust explosion class:	not established
Oxidising properties:	not established

SECTION 10: Stability and reactivity

10.1 Reactivity

This information is not available.

10.2 Chemical stability

No decomposition below initial boiling point.

10.3 Possibility of hazardous reactions

Exothermic reaction with amines and alcohols; reacts with water forming CO2; in closed containers, risk of bursting owing to increase of pressure.

10.4 Conditions to avoid

This information is not available.

10.5 Incompatible materials

This information is not available.

10.6 Hazardous decomposition products

No hazardous decomposition products when stored and handled correctly.

SECTION 11: Toxicological information

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

Acute toxicity, oral
LD50 rat: > 2,000 mg/kg
Method: OECD Test Guideline 423
Toxicological studies at the product

Acute toxicity, dermal
ethyl acetate
LD50 rabbit, male: > 18,000 mg/kg

Tris(p-isocyanatophenyl) thiophosphate
Based on available data, the classification criteria are not met.

chlorobenzene
LD50 rabbit:
Assessment: The substance or mixture has no acute dermal toxicity

Acute toxicity, inhalation
ethyl acetate
LC50 rat: > 22.5 mg/l, 6 h
Test atmosphere: vapour
Assessment: The substance or mixture has no acute inhalation toxicity

Tris(p-isocyanatophenyl) thiophosphate
LC50 rat, male: 5.721 mg/l, 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

chlorobenzene
LC50 rat: 29.7 mg/l, 4 h
Test atmosphere: vapour
Assessment: Harmful if inhaled.

Primary skin irritation
Species: rabbit
Result: slight irritant
Classification: No skin irritation
Method: OECD Test Guideline 404
Toxicological studies at the product

Primary mucosae irritation
Species: rabbit
Result: slight irritant
Classification: No eye irritation
Method: OECD Test Guideline 405
Toxicological studies at the product

Sensitisation
ethyl acetate
Skin sensitisation according to Magnusson/Kligmann (maximizing test):
Species: Guinea pig
Result: negative
Classification: Does not cause skin sensitization.
Method: OECD Test Guideline 406

Tris(p-isocyanatophenyl) thiophosphate
Skin sensitisation according to Buehler (epicutaneous test):
Species: Guinea pig
Result: negative
Classification: Does not cause skin sensitization.
Method: OECD Test Guideline 406
Toxicological studies at the product containing solvent.

Respiratory sensitization

Classification: No classification according to EC Directives 2006/121/EC or 1999/45/EC as respiratory sensitizer.

chlorobenzene
Skin sensitisation:
Species: Guinea pig
Result: negative
Classification: Does not cause skin sensitization.

Subacute, subchronic and prolonged toxicity
ethyl acetate
LOAEL (Lowest observable adverse effect level): 350 ppm
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 350 - 750 - 1500 ppm
Exposure duration: 13 w

Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Nasal inner lining
Test substance: vapour
Method: OECD Test Guideline 413

NOAEL: 900 mg/kg
Application Route: Oral
Species: rat, male/female
Dose Levels: 0 - 300 - 900 - 3600 mg/kg
Exposure duration: 13 w
Frequency of treatment: daily

Tris(p-isocyanatophenyl) thiophosphate
NOAEL: 2,8 mg/m3
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 2,8 - 15,4 - 74 mg/m³
Exposure duration: 28 d
Frequency of treatment: (6 hours a day, 5 days a week)
Test substance: as aerosol
Method: OECD Test Guideline 412

chlorobenzene
NOAEL: 125 mg/kg
Application Route: Oral
Species: rat, male/female
Subsequent observation period: 90-day
Method: OECD Test Guideline 408

NOAEL: 120 mg/kg
Application Route: Oral
Species: rat, male/female
Dose Levels: 0 60 - 120 mg/kg/day
Frequency of treatment: 5 days/week
Method: OECD Test Guideline 451

NOAEL: 234 mg/m³ air
Application Route: inhalation (vapour)
Species: rat, male/female
Frequency of treatment: 6 hours a day, 5 days a week

Carcinogenicity
ethyl acetate
No data available.

chlorobenzene
NOAEL (Toxicity): 120 mg/kg body weight/day
Species: rat, male/female
Application Route: Oral
Dose Levels: 0 - 60 - 120
Exposure duration: 103 week(s)
Frequency of treatment: 5 times/week
Method: OECD Test Guideline 451

Reproductive toxicity/Fertility
ethyl acetate
Available data show no indications for reproductive toxicity.

Tris(p-isocyanatophenyl) thiophosphate
Available data show no indications for reproductive toxicity.

chlorobenzene
NOAEL - Parents: 450 ppm
NOAEL – F1: 450 ppm
NOAEL – F2: 450 ppm
Test type: Two-generation study
Species: rat, male/female
Application Route: Inhalative

Frequency of treatment: 6 hours/day 7 days/week

Reproductive toxicity/Developmental Toxicity/Teratogenicity
ethyl acetate
NOAEL (teratogenicity): 20000 ppm
NOAEL (maternal): 16000 ppm
NOAEL (developmental toxicity): 20000 ppm
Species: rat, female
Application Route: Inhalative
Dose Levels: 0 - 10000 - 16000 - 20000 ppm
Method: OECD Test Guideline 414
Studies of a comparable product.

Tris(p-isocyanatophenyl) thiophosphate
Available data show no indications for reproductive toxicity.

chlorobenzene
NOAEL (teratogenicity): 590 ppm
NOAEL (maternal): 590 ppm
Species: rat, female
Application Route: Inhalative
Dose Levels: 75 - 210 - 590 ppm
Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 15 p.c.))
Method: OECD Test Guideline 414

Genotoxicity in vitro
Test type: Salmonella/microsome test (Ames test)
Result: No indication of mutagenic effects.
Method: OECD Test Guideline 471
Studies at the product.

Test type: Point mutation in mammalian cells (HPRT test)
Test system: Chinese hamster V79 cell line
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 476
Studies at the product.

Test type: Micronucleus test
Test system: Chinese hamster V79 cell line
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 487
Studies at the product.

Genotoxicity in vivo
ethyl acetate
Test type: In vivo micronucleus test
Species: Mouse, male
Application Route: intraperitoneal
Dose: 0 -100 - 200 - 400 - 800 mg/kg
Result: negative
Method: OECD Test Guideline 474

STOT evaluation – one-time exposure
ethyl acetate
May cause drowsiness or dizziness.

Tris(p-isocyanatophenyl) thiophosphate
Based on available data, the classification criteria are not met.

chlorobenzene
Based on available data, the classification criteria are not met.

STOT evaluation – repeated exposure
ethyl acetate
Based on available data, the classification criteria are not met.

Tris(p-isocyanatophenyl) thiophosphate
Based on available data, the classification criteria are not met.

chlorobenzene
Based on available data, the classification criteria are not met.

Aspiration toxicity

ethyl acetate
Based on available data, the classification criteria are not met.

Tris(p-isocyanatophenyl) thiophosphate
Based on available data, the classification criteria are not met.

chlorobenzene
No data available.

CMR Assessment
ethyl acetate
Carcinogenicity: Based on available data, the classification criteria are not met.
Mutagenicity: In vitro an in vivo tests did not show mutagenic effects. On the basis of this data, the substance is not classified as mutagenic.
Teratogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

Tris(p-isocyanatophenyl) thiophosphate
Carcinogenicity: Based on available data, the classification criteria are not met.
Mutagenicity: In vitro tests did not show mutagenic effects
Teratogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

chlorobenzene
Carcinogenicity: Based on available data, the classification criteria are not met.
Mutagenicity: Based on available data, the classification criteria are not met.
Teratogenicity: Based on available data, the classification criteria are not met.
Reproductive toxicity/Fertility: Based on available data, the classification criteria are not met.

Toxicology Assessment
ethyl acetate
Acute effects: Based on available data, the classification criteria are not met.
Sensitization: Based on available data, the classification criteria are not met.
Repeated dose toxicity: Repeated exposure may cause skin dryness or cracking.

Tris(p-isocyanatophenyl) thiophosphate
Acute effects: Harmful if swallowed.
Sensitization: Based on available data, the classification criteria are not met.
Repeated dose toxicity: Based on available data, the classification criteria are not met.

chlorobenzene
Acute effects: Harmful if inhaled. Causes skin irritation.
Sensitization: Based on available data, the classification criteria are not met.

11.2 Information on other hazards

Other information
Special properties/effects: Over-exposure entails the risk of concentration-dependent irritating effects on eyes, nose throat, and respiratory tract. Delayed appearance of the complaints and development of hypersensitivity (difficult breathing, coughing, asthma) are possible. Hypersensitive persons may suffer from these effects even at low isocyanate concentrations, including concentrations below the occupational exposure limit. Prolonged contact with the skin may cause tanning and irritant effects.

Animal tests and other research indicate that skin contact with diisocyanates can play a role in causing isocyanate sensitization and respiratory reaction.

SECTION 12: Ecological information

Do not allow to escape into waterways, wastewater or soil.

12.1 Toxicity

Acute Fish toxicity
Species: Danio rerio (zebra fish)
Exposure duration: 96 h
Method: OECD Test Guideline 203
No toxic effects with saturated solution.
Ecotoxicological studies of the product

Chronic Fish toxicity
ethyl acetate
NOEC < 9.65 mg/l
Species: Pimephales promelas (fathead minnow)
Exposure duration: 32 d
Method: Early life stage test

chlorobenzene
NOEC 4.8 mg/l
Test type: Early life stage test
Species: Danio rerio (zebra fish)
Exposure duration: 28 d

Acute toxicity for daphnia
Species: Daphnia magna (Water flea)
Exposure duration: 48 h
Method: OECD Test Guideline 202
No toxic effects with saturated solution.
Ecotoxicological studies of the product

Chronic toxicity to daphnia
ethyl acetate
NOEC (Reproduction) 2.4 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 21 d
Method: no data available

chlorobenzene
NOEC 0.32 mg/l
Species: Daphnia (water flea)
Exposure duration: 16 d

Acute toxicity for algae
Species: scenedesmus subspicatus
Exposure duration: 72 h
Method: OECD Test Guideline 201
No toxic effects with saturated solution.
Ecotoxicological studies of the product

Acute bacterial toxicity
EC50 > 10,000 mg/l
Species: activated sludge
Method: OECD Test Guideline 209
Ecotoxicological studies of the product

Sediment Toxicity
ethyl acetate
Due to the low n-octanol-water partition coefficient, an adsorption on the sediment is not to be expected.

Ecotoxicology Assessment

ethyl acetate
Acute aquatic toxicity: The substance is graded as non-critical to water organisms.
Chronic aquatic toxicity: Due to easy biodegradability, the chronic aquatic toxicity can be regarded as uncritical.
Toxicity Data on Soil: Not expected to adsorb on soil.
Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

Tris(p-isocyanatophenyl) thiophosphate
Acute aquatic toxicity: Based on available data, the classification criteria are not met.
Chronic aquatic toxicity: Based on available data, the classification criteria are not met.
Impact on Sewage Treatment: Because of the low bacterial toxicity, there is no risk of an adverse effect on the performance of biological waste water treatment plants.

chlorobenzene
Acute aquatic toxicity: Based on available data, the classification criteria are not met.
Chronic aquatic toxicity: Toxic to aquatic life with long lasting effects.

12.2 Persistence and degradability

Biodegradability
ethyl acetate
Test type: aerobic
Inoculum: activated sludge
Biodegradation: ca. 69 %, 20 d, i.e. readily biodegradable

Inoculum: activated sludge
Biodegradation: 93 %, 6 d, i.e. readily biodegradable
Method: Simulation study

Tris(p-isocyanatophenyl) thiophosphate
Test type: aerobic
Inoculum: activated sludge
Biodegradation: 58.2 %, 28 d, i.e. not readily degradable
Method: OECD Test Guideline 301 F

chlorobenzene
Biodegradation: 15 %, 28 d, i.e. not readily degradable
Method: OECD Test Guideline 301 F

Stability in water
ethyl acetate
Test type: Hydrolysis
Half life: 16 Years (pH: 5)
Hydrolytic temperature: 25 °C

Test type: Hydrolysis
Half life: 2 Years (pH: 7)
Hydrolytic temperature: 25 °C

Test type: Hydrolysis
Half life: 7.5 d (pH: 9)
Hydrolytic temperature: 25 °C
Hydrolyses slowly on contact with water.

Tris(p-isocyanatophenyl) thiophosphate
Test type: Hydrolysis
Half life: < 24 h at 20 °C (pH: 7)
Method: OECD Test Guideline 111
The substance hydrolyzes rapidly in water.
Studies of a comparable product.

Photodegradation
ethyl acetate
Test type: Phototransformation in air
Temperature: 25 °C
sensitizer: OH-radicals
Half-life indirect photolysis: 75 h

After evaporation or exposure to the air, the product will be slowly degraded by photochemical processes.

chlorobenzene
Degradation (direct photolysis): 55 %
Degradation time (direct photolysis): 24 d

Volatility (Henry's Law constant)
Tris(p-isocyanatophenyl) thiophosphate
Calculated value = 0.621 Pa*m3/mol at 20 °C
The substance has to be scored as being slightly volatile from water.

Adsorbed organic bound halogens (AOX)
chlorobenzene

The product contains organic halogens.

12.3 Bioaccumulative potential

Bioaccumulation
ethyl acetate
Bioconcentration factor (BCF): 30
Species: Leuciscus idus (Golden orfe)
Exposure duration: 3 d
Does not significantly accumulate in organisms.

chlorobenzene
Bioconcentration factor (BCF): 3.9 - 40

Partition coefficient (n−octanol/water)
chlorobenzene

log Pow: 3

12.4 Mobility in soil

Distribution among environmental compartments
ethyl acetate
Adsorption/Soil
Due to the low n-octanol-water partition coefficient, an adsorption on the soil is not to be expected.
Highly mobile in soils

Tris(p-isocyanatophenyl) thiophosphate
Adsorption/Soil
Koc value: 256000
Method: calculated

Environmental distribution
ethyl acetate
Method: (calculated)
The product will be dispersed amongst the various environmental compartments (soil/ water/ air).

12.5 Results of PBT and vPvB assessment

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

12.6 Endocrine disrupting properties

No data available.

12.7 Other adverse effects

Isocyanate reacts with water at the interface forming CO2 and a solid insoluble product with high melting point (polyurea). This reaction is accelerated by surfactants (e.g. detergents) or by watersoluble solvents. Previous experience shows that polyurea is inert and non-degradable.

SECTION 13: Disposal considerations

Dispose in accordance with applicable international, national and local laws, ordinances and statutes. For disposal within the EC, the appropriate code according to the European Waste Catalogue (EWC) should be used.

13.1 Waste treatment methods

After final product withdrawal, all residues must be removed from containers (drip-free, powder-free or paste-free). Packaging empty of usable product can be handed to a professional waste management company; in the EU, this is done per packaging type at collection points run by the existing take-back systems for the chemicals industry. The product and hazardous substance labelling must be left intact on the packaging.

Alternatively, the product and hazardous substance labelling can be removed if the product residues adhering to the sides are rendered non-hazardous. This packaging can also be handed to the collection points run by the existing take-back systems for the chemicals industry for packaging type-specific recycling.
Containers must be recycled in compliance with national legislation and environmental regulations.

None disposal into waste water.

SECTION 14: Transport information

ADR/RID

14.1 UN number	:	1173
14.2 UN proper shipping name	:	ETHYL ACETATE, SOLUTION
14.3 Transport hazard class(es)	:	3
Hazard Identification Number	:	33
14.4 Packing group	:	II
14.5 Environmental hazards	:	no

Limited quantity regulations applicable in accordance with chapter 3.4 ADR/RID in compliance with threshold value

ADN

14.1 UN number	:	1173
14.2 UN proper shipping name	:	ETHYL ACETATE, SOLUTION
14.3 Transport hazard class(es)	:	3
Hazard Identification Number	:	33
14.4 Packing group	:	II
14.5 Environmental hazards	:	no

This classification data does not apply to transportation by tanker. If required, additional information can be requested from the manufacturer.

IATA

14.1 UN number	:	1173
14.2 UN proper shipping name	:	ETHYL ACETATE, SOLUTION
14.3 Transport hazard class(es)	:	3
14.4 Packing group	:	II
14.5 Environmental hazards	:	no

IMDG

14.1 UN number	:	1173
14.2 UN proper shipping name	:	ETHYL ACETATE, SOLUTION
14.3 Transport hazard class(es)	:	3
14.4 Packing group	:	II
14.5 Marine pollutant	:	no
EmS Code	:	F-E - S-D
Segregation Group IMDG	:	not applicable

14.6 Special precautions for user

See section 6 - 8.

Additional information	:	Highly flammable. Keep dry. Avoid heat above +40 °C. Keep away from foodstuffs, acids and alkalis.

14.7 Transport in bulk according to Annex II of MARPOL73/78 and the IBC Code

Not applicable.

SECTION 15: Regulatory information

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

Directive 2012/18/EU on the control of major-accident hazards involving dangerous substances.
P5c Flammable liquids

Quantity1:	5,000 t	Quantity2:	50,000 t

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, preparations and articles (Annex XVII)
Conditions of restriction for the following entries should be considered: 3, 40

This product contains substances subject to EU Regulation 1907/2006 (REACH), Annex XVII.

ethyl acetate
CAS-No.: 141-78-6, EC-No.: 205-500-4
Subject to REACH Annex XVII, No. 40

Water contaminating class (Germany)
1 slightly water endangering
Classification according to AwSV, Annex 1 (5.2)

Any existing national regulations on the handling of isocyanates must be observed.
Products containing solvent:
Any existing national regulations on the handling of solvents must be observed.

Other regulations
Take note of Directive 94/33/EC on the protection of young people at work or stricter national regulations, where applicable.

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for:
ethyl acetate
Tris(p-isocyanatophenyl) thiophosphate
chlorobenzene

SECTION 16: Other information

Full text of the hazard statements of the CLP classification (1272/2008/CE) referred to under sections 2, 3 and 10.

H225	Highly flammable liquid and vapour.
H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H315	Causes skin irritation.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H336	May cause drowsiness or dizziness.
H411	Toxic to aquatic life with long lasting effects.

No annex is provided for this mixture, because the necessary information about operational conditions and Risk Management Measures (RMM) of the identified uses can be found in section 8 of this SDS.

Abbreviations and acronyms

ADN	Accord européen relatif au transport international des marchandises Dangereuses par voie de Navigation intérieure
ADR	Accord européen relatif au transport international des marchandises Dangereuses par Route
ANSI	American National Standards Institute
ASTM	American Society of Testing and Materials (US)
ATE	Acute Toxic Estimate
AwSv	Verordnung über Anlagen zum Umgang mit wassergefährdenden Stoffen
BCF	Bioconcentration Factor
CAS	Chemical Abstract Service
CLP	Regulation on Classification, Labelling and Packaging of Substances and Mixtures
CMR	Cancerogenic Mutagenic Reprotoxic
DIN	Deutsches Institut für Normung
DNEL	Derived No-Effect Level
EC…	Effect Concentration ... %
EWC	European Waste Catalogue
IATA	International Air Transport Association
IBC	Intermediate Bulk Container
ICAO	International Civil Aviation Organization
IMDG	International Maritime Dangerous Goods
IMO	International Maritime Organization
ISO	International Organization for Standardization
IUPAC	International Union of Pure and Applied Chemistry
LOAEL	Lowest Observable Adverse Effect Level
LC…	Lethal Concentration, ...%
LD…	Lethal Dose, ...%
MARPOL	International Convention for the Prevention of Pollution From Ships
NOAEL	No Observed Adverse Effect Level
NOEL/NOEC	No Observed Effect Level/Concentration
OECD	Organisation for Economic Co-operation and Development
PBT	persistent, bioaccumulative, toxic
PNEC	Predicted No-Effect Concentration
REACH	Registration, Evaluation, Authorisation and Restriction of Chemicals
RID	Règlement concernant le transport International ferroviaire de marchandises Dangereuses
STOT	Specific Target Organ Toxicity
TRGS	Technische Regeln für Gefahrstoffe
vPvB	very Persistent, very Bioaccumulative
WGK	Wassergefährdungsklasse

Further information

Classification of the mixture:	Classification procedure:
Flam. Liq. 2 H225	Based on product data or assessment
STOT SE 3 H336	Calculation method

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information given is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and is not to be considered a warranty or quality specification. The information relates only to the specific material designated and may not be valid for such material used in combination with any other materials or in any process, unless specified in the text.