## Section 1: Identification of the substance / mixture and of the company / business

### 1.1 Product identifier

**ALPIC_B HARDENER**

Index No: Not applicable.
No. EC: Not applicable.
CAS .: Not applicable.
No. REACH registration: The product is a mixture therefore does not require registration "REACH".

Product Description: Mixture
Origin: organic, aliphatique isocyanante prempolymer

### 1.2 Relevant identified uses of the substance or mixture and uses

Use of the substance / mixture : Hardener for coatings materials or adhesives (polyurea/polyurethane)

### 1.3 Details of the supplier of the safety data sheet.

Company: KEMICA COATINGS
ATstands: ZA DU BOIS Gueslin
28630 MIGNIERES
FRANCE
Telephone:+33 (0) 2 37 26 39 87 +33 (0) 2 37 26 33 56

ATstands email the responsible person FDS : info@kemica-coatings.com

### 1.4 Emergency telephone number

**advisory body / National Poison Center**

**France** **:** Poisons
Phone: +33 (0) 1 45 42 59 59

Provider
Phone number:+33 2 37 26 33 56 (8h30-12h00, 13h30-17h)

## Section 2: Hazards identification

### 2.1 Classification of the substance or mixture

Acute toxicity, Inhalative, Category 4 (H332)

Sensitization of the skin, Category 1 (H317)

Specific target organ toxicity (single exposure), Category 3 (H335 (Respiratory system))

### 2.2. Label éléments, Pictogram (es)

**Warning**

**Hazard statements:**
H317 May cause an allergic skin reaction.
H332 Harmful if inhaled.
H335 May cause respiratory irritation.

**Precautionary statements:**
P261 Avoid breathing dust/ fume/ gas/ mist/ vapours/ spray.
P280 Wear protective gloves.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
P403 + P233 Store in a well-ventilated place. Keep container tightly closed.

Supplementary hazardous characteristics and labeling elements:
"As from 24 August 2023 adequate training is required before industrial or professional use."

**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**

aliphatic polyisocyanate prepolymer

**Hazardous components**

hexamethylene-1,6-diisocyanate homopolymer
Concentration [wt.-%]: ca. 100
EC-No.: 500-060-2
REACH Registration Number: 01-2119488934-20-0000
CAS-No.: 28182-81-2
Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Sens. 1 H317 STOT SE 3 H335 (Respiratory system)
ATE (inhalation, dust/mist): 1.5 mg/l

Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Concentration [wt.-%]: ca. 38
EC-No.: 500-060-2
REACH Registration Number: 01-2119488177-26-0000
CAS-No.: 28182-81-2
Classification (1272/2008/CE): Acute Tox. 3 Inhalative H331 Skin Sens. 1 H317 STOT SE 3 H335 (Respiratory system)
ATE (inhalation, dust/mist): 0.5 mg/l

isophorondiisocyanate Homopolymer
Concentration [wt.-%]: ca. 28
EC-No.: 500-125-5
REACH Registration Number: 01-2119488734-24-0002
CAS-No.: 53880-05-0
Classification (1272/2008/CE): Skin Sens. 1B H317 STOT SE 3 H335 (Respiratory system)

This contains:
hexamethylene-di-isocyanate
Concentration [wt.-%]: < 0.25
Index-No.: 615-011-00-1
REACH Registration Number: 01-2119457571-37-0000, 01-2119457571-37-0005, 01-2119457571-37-0006
CAS-No.: 822-06-0
Classification (1272/2008/CE): Acute Tox. 4 Oral H302 Acute Tox. 1 Inhalative H330 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Resp. Sens. 1 H334 Skin Sens. 1 H317 STOT SE 3 H335 (Respiratory system)
Specific threshold concentration (GHS):
Resp. Sens. 1
H334
>= 0.5 %
Skin Sens. 1
H317
>= 0.5 %
ATE (oral): 746 mg/kg
ATE (inhalation, vapour): 0.124 mg/l

3-isocyanatomethyl-3,5,5-trimethylcyclohexyl isocyanate; isophorone di-isocyanate
Concentration [wt.-%]: < 0.15
Index-No.: 615-008-00-5
EC-No.: 223-861-6
REACH Registration Number: 01-2119490408-31-0002, 01-2119490408-31-0012
CAS-No.: 4098-71-9
Classification (1272/2008/CE): Acute Tox. 1 Inhalative H330 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Resp. Sens. 1 H334 Skin Sens. 1 H317 STOT SE 3 H335 (Respiratory system) Aquatic Chronic 2 H411
Specific threshold concentration (GHS):
Skin Sens. 1
H317
>= 0.5 %
Resp. Sens. 1
H334
>= 0.5 %
ATE (inhalation, dust/mist): 0.031 mg/l

No annex is required for the impurities of the substance according to article 3(1) of Regulation (EC) No 1907/2006 mentioned above.

**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

### 4.1 Description of first aid

**General advice:** Take off all contaminated clothing immediately.

**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 case of skin contact wash affected areas thoroughly with soap and plenty of water. 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

**Note to Physician:** Basic first aid, decontamination, symptomatic treatment.

**4.3 Indication of 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). Keep away from sources of ignition. 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

General conditions of use are further specified in the annex according to REACH-Regulation (EU) No. 1907/2006.

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

The threshold limit values noted in section 8 must be monitored. 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

Products containing solvent: Explosion protection required.

The personal protective measures described in section 8 must be observed. The precautions required in the handling of solvents and isocyanates must be taken. Avoid contact with skin and eyes and the inhalation of vapor.

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.

### 7.3 Specific end use(s)

For details of the identified uses according to REACH-Regulation (EU) No. 1907/2006 refer to the annex of this safety data sheet.

## Section 8 : Exposure controls / personal protection

Risk management measures are further specified in the annex according to REACH-Regulation (EU) No. 1907/2006.
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 |
|---|---|---|---|---|---|---|
| hexamethylene-di-isocyanate | 822-06-0 | EH40 WEL | STEL | 0.07 mg/m3 | | measured as NCO |
| hexamethylene-di-isocyanate | 822-06-0 | EH40 WEL | TWA | 0.02 mg/m3 | | Measured as NCO |
| 3-isocyanatomethyl-3,5,5-trimethylcyclohexyl isocyanate; isophorone di-isocyanate | 4098-71-9 | EH40 WEL | STEL | 0.07 mg/m3 | | measured as NCO |
| 3-isocyanatomethyl-3,5,5-trimethylcyclohexyl isocyanate; isophorone di-isocyanate | 4098-71-9 | EH40 WEL | TWA | 0.02 mg/m3 | | Measured as NCO |

**Derived No Effect Level (DNEL)**

**Hexamethylene diisocyanate, oligomerisation product (uretdione type)**

| Value type | Route of exposure | Health Effects | Value | Remarks |
|---|---|---|---|---|
| Workers | Inhalation | Long-term local effects | 0.35 mg/m3 | Most sensitive endpoint: Irritation (respiratory tract) |
| Workers | Inhalation | Acute local effects | 0.7 mg/m3 | Most sensitive endpoint: Irritation (respiratory tract) |
| Workers | Dermal | Long-term local effects | | No quantitative risk assessment possible. Most sensitive endpoint: Sensitisation (skin) |
| Workers | Dermal | Acute local effects | | No quantitative risk assessment possible. Most sensitive endpoint: Sensitisation (skin) |

### Hexamethylene-1,6-diisocyanate homopolymer

| 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 | 0.5 mg/m3 | Most sensitive endpoint: Irritation (respiratory tract) |
| Workers | Inhalation | Acute local effects | 1 mg/m3 | Most sensitive endpoint: Irritation (respiratory tract) |
| Workers | Dermal | Long-term systemic effects | | No hazard identified |
| Workers | Dermal | Acute systemic effects | | No hazard identified |
| Workers | Dermal | Long-term local effects | | High hazard (no threshold derived) Most sensitive endpoint: Sensitisation (skin) |
| Workers | Dermal | Acute local effects | | High hazard (no threshold derived) Most sensitive endpoint: Sensitisation (skin) |
| Workers | Eye contact | Local effects | | No hazard identified |

### Isophorondiisocyanate Homopolymer

| Value type | Route of exposure | Health Effects | Value | Remarks |
|---|---|---|---|---|
| Workers | Inhalation | Long-term systemic effects | | No hazard identified Most sensitive endpoint: Repeated dose toxicity (By inhalation) |
| Workers | Inhalation | Acute systemic effects | | No hazard identified Most sensitive endpoint: Repeated dose toxicity (By inhalation) |
| Workers | Inhalation | Long-term local effects | 0.29 mg/m3 | Most sensitive endpoint: Irritation (respiratory tract) |
| Workers | Inhalation | Acute local effects | 0.58 mg/m3 | Most sensitive endpoint: Irritation (respiratory tract) |
| Workers | Dermal | Long-term systemic effects | | No hazard identified Most sensitive endpoint: Repeated dose toxicity |
| Workers | Dermal | Acute systemic effects | | No hazard identified Most sensitive endpoint: Sensitisation (skin) |
| Workers | Dermal | Long-term local effects | | Medium hazard (no threshold derived) Most sensitive endpoint: Sensitisation (skin) |
| Workers | Dermal | Acute local effects | | Medium hazard (no threshold derived) Most sensitive endpoint: Sensitisation (skin) |
| Workers | Eye contact | Local effects | | No hazard identified |

### The Predicted No Effect Concentration (PNEC)

### Hexamethylene diisocyanate, product of oligomerization (uretdione type)

| Compartment | Value | Remarks |
|---|---|---|
| Fresh water | > 0.05 mg / l | |
| Fresh water sediment | > 1.33 mg / kg | dry weight |
| Marine water | > 0.005 mg / l | |
| Marine sediment | > 0.133 mg / kg | dry weight |
| Sewage treatment plant | 55.6 mg / l | |
| Air | | No hazard identified |
| Soil | > 0.066 mg / kg | dry weight |
| Oral | | Does not bioaccumulate |
| Intermittent use/release | 1 mg/l | Non pertinent |

### Hexamethylene-1,6-diisocyanate homopolymer

| Compartment | Value | Remarks |
|---|---|---|
| Fresh water | > 0.1 mg / l | |
| Fresh water sediment | 2530 mg / kg | dry weight |
| Marine water | > 0.01 mg / l | |
| Marine sediment | 253 mg / kg | dry weight |
| Sewage treatment plant | 100 mg / l | |
| Air | | No hazard identified |
| Soil | 505 mg / kg | dry weight |
| Oral | | Does not bioaccumulate |
| Intermittent use/release | 1 mg/l | Non pertinent |

### Isophorondiisocyanate Homopolymer

| Compartment | Value | Remarks |
|---|---|---|
| Fresh water | | No hazard identified |
| Fresh water sediment | | Exposure of the sediment is not expected |
| Marine water | | No hazard identified |
| Marine sediment | | Exposure of the sediment is not expected |

| | | |
|---|---|---|
| | | |
| Sewage treatment plant | | No hazard identified |
| Air | | No hazard identified |
| Soil | 505 mg / kg | dry weight |
| Oral | | Does not bioaccumulate |
| | | |

**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.

If applicable, further recommendations regarding respiratory protection can be found in the annex.

In case of hypersensitivity of the respiratory tract and skin (e.g. asthmatics and those who suffer from chronic bronchitis and chronic skin complaint) it is inadvisable to work with the product.

**Hand protection**
Suitable materials for safety gloves; EN 374:
Butyl rubber - IIR: thickness >=0,5mm; breakthrough time >=480min.
Fluorinated rubber - FKM: thickness >=0,4mm; breakthrough time >=480min.
Laminate glove - PE/EVOH/PE; breakthrough time >=480 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

| | | |
|---|---|---|
| Physical state: | liquid at 20 °C at 1,013 hPa | |
| Appearance: | liquid | |
| Colour: | colourless | |
| Odour: | slight inherent odour | |
| Odour Threshold: | not established | |
| pH: | not applicable | |
| Melting point/freezing point: | not established | |
| Boiling point/boiling range: | not established | |
| Flash point: | ca. 203 °C at 1.01 hPa | DIN EN 22719 |
| Evaporation rate: | not established | |
| Flammability (solid, gas): | not applicable | |
| Burning number: | not applicable | |
| Upper/lower flammability or explosive limits: | not established | |
| Vapour pressure: | < 0.00001 hPa at 20 °C | EG A4 |
| Vapour pressure of ingredients: | | |
| hexamethylene-di-isocyanate | ca. 0.007 hPa at 20 °C | |
| Relative vapour density: | not established | |
| Density: | ca. 1.15 g/cm³ at 20 °C | DIN 51757 |
| Miscibility with water: | immiscible at 15 °C | |
| Water solubility: | not established | |
| Surface tension: | ca. 46.5 mN/m at 20 °C | |
| Partition coefficient (n−octanol/water): | log Pow: ca. 8.38 (value calculated) | |
| Auto-ignition temperature: | not applicable | |
| Ignition temperature: | ca. 440 °C | DIN 51794 |
| Decomposition temperature: | ca. 150 °C | |
| Heat of combustion: | not established | |
| Viscosity, dynamic: | ca. 958 mPa.s at 20 °C | DIN 53019 |
| Viscosity, kinematic: | not established | |

### 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 explosive |
| Dust explosion class: | Not applicable |
| Oxidising properties: | Not established |

## Section 10 : Stability and reactivity

### 10.1 Reactivity

This information is not available.

### 10.2 Chemical stability

This information is not available.

### 10.3 Possibility of hazardous reactions

Exothermic reaction with amines and alcohols; with water, gradual release of CO2; in closed containers, pressure increase, hence risk of bursting of the containers.

### 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 product provided that they respect the requirements of storage and handling.

## Section 11 : Toxicological Information

Toxicological studies on the product are not yet available.

Please find below the data available to us:

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

**Acute toxicity, oral**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
LD50 rat, male/female: > 5,665 mg/kg
Method: OECD Test Guideline 401
hexamethylene-1,6-diisocyanate homopolymer
LD50 rat, female: > 2,000 mg/kg
Method: OECD Test Guideline 423

isophorondiisocyanate Homopolymer
LD50 rat, male/female: > 14,000 mg/kg
Toxicological studies at the product containing solvent.
Acute toxicity, dermal

Hexamethylene diisocyanate, oligomerisation product (uretdione type)
LD50 rat, male/female: > 2,000 mg/kg
Method: OECD Test Guideline 402
Studies of a comparable product.

hexamethylene-1,6-diisocyanate homopolymer
LD50 rat, male/female: > 2,000 mg/kg
Method: OECD Test Guideline 402
Studies of a comparable product.

LD50 rabbit, male/female: > 2,000 mg/kg
Studies of a comparable product.
isophorondiisocyanate Homopolymer
Assessment: The substance or mixture has no acute dermal toxicity
Acute toxicity, inhalation
ATEmix (inhal.): 1.01 mg/l, 4 h
Test atmosphere: dust/mist
Method: Calculation method

Hexamethylene diisocyanate, oligomerisation product (uretdione type)
LC50 rat, male/female: 0.158 mg/l, 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified.

Converted acute toxicity point estimate 0.5 mg/l
Test atmosphere: dust/mist
Method: Expert judgement

Assessment: Toxic if inhaled.

hexamethylene-1,6-diisocyanate homopolymer
LC50 rat, female: 0.390 mg/l, 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

Toxicological studies of a comparable product.
The test atmosphere generated in the animal study is not representative of workplace environments, how the substance is placed on the market, and how it can reasonably be expected to be used. Therefore the test result cannot be directly applied for the purpose of assessing hazard. Based on expert judgment and the weight of the evidence, a modified classification for acute inhalation toxicity is justified.

Converted acute toxicity point estimate 1.5 mg/l
Test atmosphere: dust/mist
Method: Expert judgement

Assessment: Harmful if inhaled.
isophorondiisocyanate Homopolymer
LC50 rat, male/female: > 5 mg/l, 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

**Primary skin irritation**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Species: rabbit
Result: slight irritant
Classification: No skin irritation
Method: OECD Test Guideline 404

hexamethylene-1,6-diisocyanate homopolymer
Species: rabbit

Result: slight irritant
Classification: No skin irritation
Method: OECD Test Guideline 404

isophorondiisocyanate Homopolymer
Species: rabbit
Exposure duration: 4 h
Result: non-irritant
Classification: No skin irritation
Method: OECD Test Guideline 404

**Primary mucosae irritation**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Species: rabbit
Result: slight irritant
Classification: No eye irritation
Method: OECD Test Guideline 405

Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Test type: Salmonella/microsome test (Ames test)
Metabolic activation: with/without
Result: No indication of mutagenic effects.
Method: OECD Test Guideline 471

Test type: Chromosome aberration test in vitro
Test system: Chinese hamster V79 cell line
Metabolic activation: with/without
Result: positive
Method: OECD Test Guideline 473

Test type: Point mutation in mammalian cells (HPRT test)
Metabolic activation: with/without
Result: positive
Method: OECD Test Guideline 476

hexamethylene-1,6-diisocyanate homopolymer
Test type: Salmonella/microsome test (Ames test)
Metabolic activation: with/without
Result: No indication of mutagenic effects.
Method: OECD Test Guideline 471

Test type: Chromosome aberration test in vitro
Test system: Chinese hamster V79 cell line
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 473

Toxicological studies of a comparable product.
Test type: Point mutation in mammalian cells (HPRT test)
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 476

Toxicological studies of a comparable product.
isophorondiisocyanate Homopolymer
Test type: Salmonella/microsome test (Ames test)
Metabolic activation: with/without

Result: No indication of mutagenic effects.
Method: OECD Test Guideline 471

Test type: Point mutation in mammalian cells (HPRT test)
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 476

Test type: Chromosome aberration test in vitro
Test system: Chinese hamster ovary (CHO) cells
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 473

**Genotoxicity in vivo**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Test type: In vivo micronucleus test
Species: Mouse, male
Application Route: Inhalative
Exposure duration: 6 h
Dose: 0 - 7 - 25 - 50 mg/m³
Cell type: Bone marrow
Method: OECD Test Guideline 474
Test substance: as aerosol
Did not show mutagenic effects in animal experiments

type: Unscheduled DNA synthesis (UDS)
Species: rat, male
Application Route: Inhalative
Exposure duration: 3 h
Dose: 0 - 50 - 140 mg/m³
Cell type: Liver cells
Method: OECD Test Guideline 486

Test substance: as aerosol
Did not show mutagenic effects in animal experiments.
hexamethylene-1,6-diisocyanate homopolymer
No data available.

isophorondiisocyanate Homopolymer
No data available.
STOT evaluation – one-time exposure
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
May cause respiratory irritation.

hexamethylene-1,6-diisocyanate homopolymer
Route of exposure: Inhalative
May cause respiratory irritation.
isophorondiisocyanate Homopolymer
May cause respiratory irritation.
STOT evaluation – repeated exposure

Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Based on available data, the classification criteria are not met.

hexamethylene-1,6-diisocyanate homopolymer
Based on available data, the classification criteria are not met.

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

**Aspiration toxicity**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Based on available data, the classification criteria are not met.

hexamethylene-1,6-diisocyanate homopolymer
Based on available data, the classification criteria are not met.

isophorondiisocyanate Homopolymer
Based on available data, the classification criteria are not met.
CMR Assessment

Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Carcinogenicity: Based on available data, the classification criteria are not met.
Mutagenicity: In vitro tests showed inconsistent results. In vivo tests did not show mutagenic effects 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.

hexamethylene-1,6-diisocyanate homopolymer
Carcinogenicity: Based on available data, the classification criteria are not met.
Mutagenicity: In vitro tests did not show mutagenic effects 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.

isophorondiisocyanate Homopolymer
Carcinogenicity: Based on available data, the classification criteria are not met.
Mutagenicity: In vitro tests did not show mutagenic effects 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

Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Acute effects: Toxic if inhaled.
Sensitization: May cause an allergic skin reaction.

hexamethylene-1,6-diisocyanate homopolymer
Acute effects: Harmful if inhaled.
Sensitization: May cause sensitization by skin contact.

isophorondiisocyanate Homopolymer
Acute effects: Based on available data, the classification criteria are not met.

Sensitization: May cause sensitization by skin contact.

**11.2 Information on other hazards**

**Other information**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Special properties/effects: Over-exposure, especially when spraying coatings containing isocyanate without the necessary precautions, 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.

hexamethylene-1,6-diisocyanate homopolymer
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.

isophorondiisocyanate Homopolymer
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

Ecotoxicological studies of the product are not available.

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

Please find below the data available to us:

**12.1 Toxicity**
**Acute Fish toxicity**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
LC50 > 100 mg/l
Species: Danio rerio (zebra fish)
Exposure duration: 96 h
Method: Directive 67/548/EEC, Annex V, C.1.
Sample preparation on account of the reactivity of the substance with water:
Ultra turrax: 60 sec. 8000 rpm; 24h magnetic stirrer; Filtration.

hexamethylene-1,6-diisocyanate homopolymer
LC50 > 100 mg/l
Species: Danio rerio (zebra fish)
Exposure duration: 96 h
Method: Directive 67/548/EEC, Annex V, C.1.
Sample preparation on account of the reactivity of the substance with water:
Ultra turrax: 60 sec. 8000 rpm; 24h magnetic stirrer; Filtration.

isophorondiisocyanate Homopolymer
LC50 > 1.51 mg/l
Species: Cyprinus carpio (Carp)
Exposure duration: 96 h
Method: Directive 67/548/EEC, Annex V, C.1.
Ultra turrax: 60 sec. 8000 rpm; 24h magnetic stirrer; Filtration.

No toxic effects with saturated solution.
Ecotoxicological studies of the product
**Chronic Fish toxicity**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
No data available.

hexamethylene-1,6-diisocyanate homopolymer
Study scientifically not justified.
isophorondiisocyanate Homopolymer
Study scientifically not justified.

**Acute toxicity for daphnia**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
EC50 > 100 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 48 h
Method: Directive 67/548/EEC, Annex V, C.2.
Sample preparation on account of the reactivity of the substance with water:
Ultra turrax: 60 sec. 8000 rpm; 24h magnetic stirrer; Filtration.

hexamethylene-1,6-diisocyanate homopolymer
EC50 > 100 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 48 h
Method: Directive 67/548/EEC, Annex V, C.2.
Sample preparation on account of the reactivity of the substance with water:
Ultra turrax: 60 sec. 8000 rpm; 24h magnetic stirrer; Filtration.

isophorondiisocyanate Homopolymer
EC50 > 3.36 mg/l
Species: Daphnia magna (Water flea)
Exposure duration: 48 h
Method: OECD Test Guideline 202
Ultra turrax: 60 sec. 8000 rpm; 24h magnetic stirrer; Filtration.
No toxic effects with saturated solution.
Ecotoxicological studies of the product containing solvent.

**Chronic toxicity to daphnia**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
No data available.

hexamethylene-1,6-diisocyanate homopolymer
Study scientifically not justified.
isophorondiisocyanate Homopolymer
Study scientifically not justified.

**Acute toxicity for algae**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
ErC50 > 50 - < 100 mg/l
Test type: Growth inhibition
Species: scenedesmus subspicatus
Exposure duration: 72 h
Method: Directive 67/548/EEC, Annex V, C.3.
Sample preparation on account of the reactivity of the substance with water:
Ultra turrax: 60 sec. 8000 rpm; 24h magnetic stirrer; Filtration.

hexamethylene-1,6-diisocyanate homopolymer
ErC50 199 mg/l

Test type: Growth inhibition
Species: scenedesmus subspicatus
Exposure duration: 72 h
Method: Directive 67/548/EEC, Annex V, C.3.
Sample preparation on account of the reactivity of the substance with water:
Ultra turrax: 60 sec. 8000 rpm; 24h magnetic stirrer; Filtration.

isophorondiisocyanate Homopolymer
ErC50 > 3.1 mg/l
Test type: Growth inhibition
Species: scenedesmus subspicatus
Exposure duration: 72 h
Method: OECD Test Guideline 201
Ultra turrax: 60 sec. 8000 rpm; 24h magnetic stirrer; Filtration.

No toxic effects with saturated solution.
Ecotoxicological studies of the product containing solvent.

**Acute bacterial toxicity**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
EC50 5,560 mg/l
Test type: Respiration inhibition
Species: activated sludge
Method: OECD Test Guideline 209

hexamethylene-1,6-diisocyanate homopolymer
EC50 > 10,000 mg/l
Test type: Respiration inhibition
Species: activated sludge
Exposure duration: 3 h
Method: EG-RL 88/302/EEC

isophorondiisocyanate Homopolymer
EC50 > 10,000 mg/l
Test type: Respiration inhibition
Species: activated sludge
Exposure duration: 3 h
Method: OECD Test Guideline 209
Ecotoxicological studies of the product

**Ecotoxicology Assessment**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Acute aquatic toxicity: Harmful to aquatic life.
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.

hexamethylene-1,6-diisocyanate homopolymer
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.

isophorondiisocyanate Homopolymer
Acute aquatic toxicity: The substance is graded as non-critical to water organisms.
Chronic aquatic toxicity: A chronic aquatic toxicity is not expected.
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.

**12.2 Persistence and degradability**
**Biodegradability**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Test type: aerobic
Inoculum: activated sludge
Biodegradation: 1 %, 21 d, i.e. not readily degradable
Method: Directive 67/548/EEC Annex V, C.4.E.

Test type: aerobic
Inoculum: activated sludge
Biodegradation: 18 %, 28 d, i.e. not inherently degradable
Method: OECD Test Guideline 302 C

hexamethylene-1,6-diisocyanate homopolymer
Test type: aerobic
Biodegradation: 2 %, 28 d, i.e. not readily degradable
Method: Directive 67/548/EEC Annex V, C.4.E.
Ecotoxicological studies of the product

Test type: aerobic
Biodegradation: 0 %, 28 d, i.e. not inherently degradable
Method: OECD Test Guideline 302 C
Ecotoxicological studies of the product

isophorondiisocyanate Homopolymer
Test type: aerobic
Inoculum: activated sludge
Biodegradation: 0 %, 28 d, i.e. not readily degradable
Method: OECD Test Guideline 301 F
Ecotoxicological studies of the product

**Stability in water**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Test type: Hydrolysis
Half life: 6.1 h at 23 °C
The substance hydrolyzes rapidly in water.

hexamethylene-1,6-diisocyanate homopolymer
Test type: Hydrolysis
Half life: 7.7 h at 23 °C
Method: OECD Test Guideline 111
The substance hydrolyzes rapidly in water.
Studies of a comparable product.

isophorondiisocyanate Homopolymer
Test type: Hydrolysis
Half life: 3.62 - 7.66 h at 22.6 °C (pH: 7)
Method: OECD Test Guideline 111
The substance hydrolyzes rapidly in water.

**Photodegradation**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Test type: Phototransformation in air
Temperature: 25 °C
sensitizer: OH-radicals
Concentration sensibilisator: 500,000 1/cm3

Half-life indirect photolysis: 0.64 h
Method: SRC - AOP (calculation)
After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.
Test type: Phototransformation in air
Temperature: 25 °C
sensitizer: OH-radicals
Concentration sensibilisator: 500,000 1/cm3
Half-life indirect photolysis: 0.19 h
Method: SRC - AOP (calculation)
After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.
Studies of hydrolysis products.

hexamethylene-1,6-diisocyanate homopolymer
Test type: Phototransformation in air
Temperature: 25 °C
sensitizer: OH-radicals
Half-life indirect photolysis: 11.7 h
Method: SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.
Test type: Phototransformation in air
Temperature: 25 °C
sensitizer: OH-radicals
Half-life indirect photolysis: 3.1 h
Method: SRC - AOP (calculation)

After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.
Studies of hydrolysis products.

isophorondiisocyanate Homopolymer
Test type: Phototransformation in air
sensitizer: OH-radicals
Concentration sensibilisator: 500,000 1/cm3
Rate constant: 4E-11 cm3/s
Half-life indirect photolysis: 9.6 d
Method: SRC - AOP (calculation)
After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.

**Volatility (Henry's Law constant)**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Calculated value = < 0.000002 Pa*m3/mol at 25 °C
Method: Bond-method
The substance has to be scored as non-volatile from water.

hexamethylene-1,6-diisocyanate homopolymer
Calculated value = < 0.000001 Pa*m3/mol at 25 °C
Method: Bond-method

The substance has to be scored as non-volatile from water.
Calculated value = < 0.000001 Pa*m3/mol at 25 °C
Method: Bond-method
The substance has to be scored as non-volatile from water.
Studies of hydrolysis products.

**12.3 Bioaccumulative potential**
**Bioaccumulation**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)

Bioconcentration factor (BCF): 788
Method: (calculated)
An accumulation in aquatic organisms is not to be expected

Bioconcentration factor (BCF): 159
Method: (calculated)
An accumulation in aquatic organisms is not to be expected.
Studies of hydrolysis products.

hexamethylene-1,6-diisocyanate homopolymer
Bioconcentration factor (BCF): 706.2
Method: (calculated)
The substance hydrolyzes rapidly in water.
An accumulation in aquatic organisms is not to be expected.

Bioconcentration factor (BCF): 10.11
Method: (calculated)
An accumulation in aquatic organisms is not to be expected.
Studies of hydrolysis products.
isophorondiisocyanate Homopolymer
An accumulation in aquatic organisms is not to be expected.

**12.4 Mobility in soil**
**Distribution among environmental compartments**
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
Adsorption/Soil
not applicable

hexamethylene-1,6-diisocyanate homopolymer
Adsorption/Soil
not applicable

isophorondiisocyanate Homopolymer
Adsorption
not applicable

Environmental distribution
Hexamethylene diisocyanate, oligomerisation product (uretdione type)
not applicable

hexamethylene-1,6-diisocyanate homopolymer
not applicable

isophorondiisocyanate Homopolymer
not applicable

**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.

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.

No disposal into waste water.

## Section 15: Transport Information

**ADR/RID**

| | | |
|---|---|---|
| 14.1 UN number or ID number | : | Not dangerous goods |
| 14.2 UN proper shipping name | : | Not dangerous goods |
| 14.3 Transport hazard class(es) | : | Not dangerous goods |
| 14.4 Packing group | : | Not dangerous goods |
| 14.5 Environmental hazards | : | Not dangerous goods |

**ADN**

| | | |
|---|---|---|
| 14.1 UN number or ID number | : | Not dangerous goods |
| 14.2 UN proper shipping name | : | Not dangerous goods |
| 14.3 Transport hazard class(es) | : | Not dangerous goods |
| 14.4 Packing group | : | Not dangerous goods |
| 14.5 Environmental hazards | : | Not dangerous goods |

Dangerous goods classification for inland waterways tanker by request only.

**IATA**

| | | |
|---|---|---|
| 14.1 UN number or ID number | : | Not dangerous goods |
| 14.2 UN proper shipping name | : | Not dangerous goods |
| 14.3 Transport hazard class(es) | : | Not dangerous goods |

| | | |
|---|---|---|
| 14.4 Packing group | : | Not dangerous goods |
| 14.5 Environmental hazards | : | Not dangerous goods |

**IMDG**

| | | |
|---|---|---|
| 14.1 UN number or ID number | : | Not dangerous goods |
| 14.2 UN proper shipping name | : | Not dangerous goods |
| 14.3 Transport hazard class(es) | : | Not dangerous goods |
| 14.4 Packing group | : | Not dangerous goods |
| 14.5 Marine pollutant | : | Not dangerous goods |

**14.6 Special precautions for user**

See section 6 - 8.

Additional information : Not dangerous cargo.
Keep dry.
Keep away from foodstuffs, acids and alkalis.

**14.7 Maritime transport in bulk according to IMO instruments**

Product is not transported by us in bulk.

## 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**.

not applicable

**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, 74

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

hexamethylene-di-isocyanate

CAS-No.: 822-06-0

Subject to REACH Annex XVII, No. 74

3-isocyanatomethyl-3,5,5-trimethylcyclohexyl isocyanate; isophorone di-isocyanate

CAS-No.: 4098-71-9, EC-No.: 223-861-6

Subject to REACH Annex XVII, No. 74

**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**

The European Committee of Paint, Printing Ink and Artists' Colours Manufacturers' Associations (CEPE) provides the following information on coatings containing isocyanates: Ready-to-use paints containing isocyanates may have an irritant effect on mucous membranes - especially on breathing organs - and cause hypersensitivity reactions. Inhalation of vapor or spray mist may cause sensitisation. When handling paints containing isocyanates all precautions required for solvent-containing paints must be followed. Vapor and spray mist in particular should not be inhaled. Allergics and asthmatics as well as people prone to respiratory ailments should not work with isocyanate containing paints.

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:

Hexamethylene diisocyanate, oligomerisation product (uretdione type)

hexamethylene-1,6-diisocyanate homopolymer

isophorondiisocyanate Homopolymer

## 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.**

| | |
|---|---|
| H302 | Harmful if swallowed. |
| H315 | Causes skin irritation. |
| H317 | May cause an allergic skin reaction. |
| H319 | Causes serious eye irritation. |
| H330 | Fatal if inhaled. |

| | |
|---|---|
| H331 | Toxic if inhaled. |
| H332 | Harmful if inhaled. |
| H334 | May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H335 | May cause respiratory irritation. |
| H411 | Toxic to aquatic life with long lasting effects. |

The product is used mainly as a hardener in coating materials or adhesives. The handling of coating materials or adhesives containing reactive polyisocyanates and residual monomeric HDI/IPDI requires appropriate protective measures referred to in this safety data sheet. These products may therefore be used only in industrial or trade applications. They are not suitable for use in homeworker (DIY) applications.

**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 |

Relevant changes since the last version are highlighted in the margin. This version replaces all previous versions.

**Further information**

| Classification of the mixture: | Classification procedure: |
|---|---|
| Acute Tox. 4 H332 | Calculation method |
| Skin Sens. 1 H317 | Calculation method |
| STOT SE 3 H335 | 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.