



BAYTHERM 22HK84 W IS49 SLOW

Version 3.1

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

1.1 Product identifier

BAYTHERM 22HK84 W IS49 SLOW

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

Use:

Polyol components for the production of polyurethanes

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

1.3 Details of the supplier of the safety data sheet

Covestro Deutschland AG
Covestro-IO-S&A-PSRA-PSI
51365 Leverkusen

Tel.: +49 214 6009 4068
Email: productsafety@covestro.com

1.4 Emergency telephone number

+49 214 30 99300 (Sicherheitszentrale Bayer)

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Skin irritation, Category 2 (H315)

Eye irritation, Category 2 (H319)

2.2 Label elements



Warning

Hazard statements:

H315 Causes skin irritation.

H319 Causes serious eye irritation.

Precautionary statements:

P280 Wear protective gloves/ eye protection/ face protection.

P302 + P352 IF ON SKIN: Wash with plenty of soap and water.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

2.3 Other hazards

No information available.

SECTION 3: Composition/information on ingredients

Type of product: Mixture

3.2 Mixtures

Polyol mixture

Hazardous components

polypropylene glycol

Concentration [wt.-%]: ≥ 10 - < 20

CAS-No.: 25322-69-4

Classification (1272/2008/CE): Acute Tox. 4 Oral H302

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-

Concentration [wt.-%]: ≥ 3 - < 5

Index-No.: 607-194-00-1

EC-No.: 203-572-1

CAS-No.: 108-32-7

Classification (1272/2008/CE): Eye Irrit. 2 H319

Benzyl dimethylamine

Concentration [wt.-%]: ≥ 1 - $< 2,5$

Index-No.: 612-074-00-7

EC-No.: 203-149-1

REACH Registration Number: 01-2119529232-48

CAS-No.: 103-83-3

Classification (1272/2008/CE): Flam. Liq. 3 H226 Acute Tox. 3 Inhalative H331 Acute Tox. 4 Dermal H312

Acute Tox. 4 Oral H302 Skin Corr. 1B H314 Eye Dam. 1 H318 Aquatic Chronic 3 H412

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).

SECTION 4: First aid measures**4.1 Description of first aid measures**

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 the patient to vomit, medical advice is required.

4.2 Most important symptoms and effects, both acute and delayed

Notes to physician: Basic first aid, decontamination, symptomatic treatment.

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 and traces of hydrogen cyanide. In the event of fire and/or explosion do not breathe fumes.

5.3 Advice for fire-fighters

Firemen must wear self-contained breathing apparatus.

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

Take up with absorbent for chemicals or, if necessary with dry sand and store in closed containers.

6.4 Reference to other sections

For further disposal measures see section 13.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

If an annex according to REACH-Regulation (EU) No. 1907/2006 is attached to this MSDS, the general conditions of use are further specified in the corresponding exposure scenarios.

Handle in accordance with good industrial hygiene and safety practice. Avoid contact with skin and eyes.

In all workplaces or parts of the plant where high concentrations of aerosols and/or vapors may be generated (e.g. during pressure release, mold venting or when cleaning mixing heads with an air blast), appropriately located exhaust ventilation must be provided in such a way that the WEL is not exceeded. The air should be drawn away from the personnel handling the product. The efficiency of the exhaust equipment should be periodically checked.

Precautions should generally be taken against electrostatic charges according to the equipment used and the way the product is handled and packaged.

Keep away from foodstuffs, drinks and tobacco. Wash hands before breaks and at the end of workday. Keep working clothes separately. Change contaminated or soaked clothing immediately.

7.2 Conditions for safe storage, including any incompatibilities

Keep container tightly closed and dry.

Further specific information see our : "Technical Information"

Storage class (TRGS 510) : 10: Combustible liquids

7.3 Specific end use(s)

No information available.

SECTION 8: Exposure controls/personal protection

If an annex according to Regulation (EU) No. 1907/2006 is attached to this MSDS, the general RMMs are further specified in the corresponding exposure scenarios.

8.1 Control parameters

No information on Exposure Limit Values necessary according to EC directive 2006/121/EG

For technical protective measures to limit exposure see also Section 7 "Handling and storage".

Derived No Effect Level (DNEL) or Derived Minimal Effect Level (DMEL)**Benzylidimethylamine**

Value type	Route of exposure	Health Effects	Value	Remarks
Worker (long-term)				
DNEL	Inhalative	- local effects	1 mg/m ³	
DNEL	Inhalative	- systemic effects	14,6 mg/m ³	
DNEL	Dermal	- systemic effects	2,3 mg/kg	

Predicted No Effect Concentration (PNEC)**Benzylidimethylamine**

Compartment	Value	Remarks
Freshwater	0,0048 mg/l	
Marine water	0,00048 mg/l	
Sediment	0,071 mg/kg	
Soil	0,0114 mg/kg	
STP (sewage-treatment plant)	543 mg/l	

8.2 Exposure controls**Respiratory protection**

Unless the product is entirely enclosed, do not handle it until you have studied the respiratory precautions issued by the appropriate authority or accident prevention association. If vapors form, respirators must be used. Put on full-mask respirator with filter type ABEK.

Further recommendations regarding respiratory protection can be found in the individual exposure scenarios in the appendix.

Hand protection

Conditionally suitable materials for protective gloves; EN 374:

Nitrile rubber - NBR (≥ 0.35 mm)

Breakthrough time not tested; dispose of immediately after contamination.

Eye protection

Wear eye/face protection.

Skin and body protection

Wear suitable protective clothing.

Safety precautions for handling freshly molded polyurethane parts: see section 16

SECTION 9: Physical and chemical properties**9.1 Information on basic physical and chemical properties**

Appearance:	liquid	
Colour:	yellowish	
Odour:	slight smell of amine	
Odour Threshold:	not established	
pH:	ca. 8,3 at 10 % in water	calculated
Pour point:	ca. -35 °C	calculated
Boiling point/boiling range:	ca. 128 °C at 1.013 hPa	calculated
Flash point:	ca. 136 °C at 1.013 hPa	calculated
Evaporation rate:	not established	
Flammability (solid, gas):	not applicable	
Burning number:	not applicable	
Upper/lower flammability or explosive limits:		
propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-	upper: 14,3 %(V) / lower: 1,8 %(V)	
Vapour pressure:	ca. 10 hPa at 20 °C ca. 50 hPa at 50 °C ca. 64 hPa at 55 °C	calculated calculated calculated
Vapour density:	not established	
Density:	ca. 1,07 g/cm ³ at 20 °C	
Miscibility with water:	partly miscible at 15 °C	
Surface tension:	not established	
Partition coefficient (n-octanol/water):	not established	
Auto-ignition temperature:	not applicable	
Ignition temperature:	ca. 330 °C	calculated
Decomposition temperature:	not established	
Viscosity, dynamic:	330 - 530 mPa.s at 20 °C	
Explosive properties:	not established	
Dust explosion class:	not applicable	
Oxidising properties:	not established	

9.2 Other information

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

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

No hazardous reactions when used as directed.

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

Toxicological studies on the product are not yet available.

Please find below the toxicological data available to us for the components (hazardous components).

11.1 Information on toxicological effects**Acute toxicity, oral**

ATEmix (oral): > 2.000 mg/kg

Method: Calculation method

polypropylene glycol

LD50 rat: > 500 - < 2.000 mg/kg

Assessment: Harmful if swallowed.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-

LD50 rat: > 5.000 mg/kg

Method: OECD Test Guideline 401

Benzyl dimethylamine

LD50 rat, male: 579 mg/kg

Acute toxicity, dermal

ATEmix (dermal): > 2.000 mg/kg

Method: Calculation method

polypropylene glycol

LD50 rabbit, male/female: > 3.000 mg/kg

Method: OECD Test Guideline 402

Studies of a comparable product.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-

LD50 rabbit: > 20.000 mg/kg

Benzyl dimethylamine

LD50 rabbit: 1.477 mg/kg

Acute toxicity, inhalation

ATEmix (inhal.): > 20 mg/l, 4 h

Test atmosphere: vapour

Method: Calculation method

polypropylene glycol

Not a relevant route of exposure

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
LC50 rat: > 5 mg/l, 8 h
Test atmosphere: vapour
Assessment: The substance or mixture has no acute inhalation toxicity

Benzyl dimethylamine
LC50 rat: 2,052 mg/l, 4 h
Test atmosphere: vapour

Primary skin irritation

polypropylene glycol
Species: rabbit
Result: non-irritant
Classification: No skin irritation
Method: OECD Test Guideline 404

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Species: rabbit
Result: non-irritant
Classification: No skin irritation
Method: OECD Test Guideline 404

Benzyl dimethylamine
Species: rabbit
Exposure duration: 4 h
Result: Corrosive
Classification: Causes severe skin burns and eye damage (Skin Corr. 1B).
Method: OECD Test Guideline 404

Primary mucosae irritation

polypropylene glycol
Species: rabbit
Result: slight irritant
Classification: No eye irritation
Method: OECD Test Guideline 405

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Species: rabbit
Result: irritating
Classification: Causes serious eye irritation.
Method: OECD Test Guideline 405

Benzyl dimethylamine
Since this substance is already classified "corrosive", the risk of serious damage to the eyes is implicit.

Sensitisation

polypropylene glycol
Skin sensitization (local lymph node assay (LLNA)):
Species: Mouse
Result: negative
Classification: Does not cause skin sensitization.
Method: OECD Test Guideline 429

Respiratory sensitization

No data available.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Skin sensitization:
Species: Human experience
Result: negative
Classification: Does not cause skin sensitization.

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

Subacute, subchronic and prolonged toxicity

polypropylene glycol
NOAEL: \geq 1.000 mg/kg
Application Route: Oral
Species: rat, male/female
Dose Levels: 0 - 100 - 300 - 1000 mg/kg
Exposure duration: 4 w
Frequency of treatment: daily
Method: OECD Test Guideline 407
Studies of a comparable product.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
NOAEL: $>$ 5.000 mg/kg
Application Route: Oral
Species: rat, male/female
Dose Levels: 1000 - 3000 - 5000 mg/kg/day
Subsequent observation period: 90-day
Method: OECD Test Guideline 408

Benzyl dimethylamine
NOAEL: 150 mg/kg
Application Route: Oral
Species: rat, male
Exposure duration: 28 d

Carcinogenicity

polypropylene glycol
No data available.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Species: Mouse, male
Application Route: Dermal
Exposure duration: 104 week(s)
Animal testing did not show any carcinogenic effects.

Benzyl dimethylamine
No data available.

Reproductive toxicity/Fertility

polypropylene glycol
NOAEL (parents, generally toxicity): 1000 mg/kg
NOAEL (parents, fertility): 1000 mg/kg
NOAEL (offspring): 1000 mg/kg
Species: rat, male/female
Application Route: Oral
Dose Levels: 0 - 100 - 300 - 1000 mg/kg
Exposure duration: males: 28 days, females: 58 days
Frequency of treatment: daily
Exposure time before mating - Male: 14 d
Exposure time before mating - Female: 14 d
Method: OECD Test Guideline 421
Fertility and developmental toxicity tests did not reveal any effect on reproduction.
Studies of a comparable product.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
No data available.

Benzyl dimethylamine
No data available.

Reproductive toxicity/Teratogenicity

polypropylene glycol
NOAEL (maternal): 1.000 mg/kg
NOAEL (developmental toxicity): 1000 mg/kg
Species: rat, female
Application Route: Oral
Dose Levels: 0 - 100 - 300 - 1000 mg/kg
Exposure duration: 58 d
Method: OECD Test Guideline 421
negative
Studies of a comparable product.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
NOAEL (teratogenicity): > 5.000 mg/kg
NOAEL (maternal): 1.000 mg/kg
Species: rat, female
Application Route: Oral
Did not show teratogenic effects in animal experiments.

Benzylidimethylamine
No data available.

Genotoxicity in vitro

polypropylene glycol
Test type: Salmonella/microsome test (Ames test)
Result: No indication of mutagenic effects.
Method: OECD Test Guideline 471

Test type: In vitro mammalian cell gene mutation test
Test system: Chinese hamster V79 cell line
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 476
Studies of a comparable product.

Test type: Chromosome aberration test in vitro
Test system: Human lymphocytes
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 473
Studies of a comparable product.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Test type: Ames test
Metabolic activation: with/without
Result: negative

Benzylidimethylamine
Test type: Ames test
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

Test type: In vitro mammalian cell gene mutation test
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 476

Test type: Chromosome aberration test in vitro
Metabolic activation: without
Result: negative
Method: OECD Test Guideline 473

Test type: Chromosome aberration test in vitro
Metabolic activation: with
Result: positive
Method: OECD Test Guideline 473

Genotoxicity in vivo

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Test type: Micronucleus test
Species: Mouse
Application Route: intraperitoneal
Result: negative
Method: OECD Test Guideline 474

Benzyl dimethylamine
Test type: Micronucleus test
Species: Mouse, male/female
Application Route: Oral
Result: negative
Method: OECD Test Guideline 474

STOT evaluation – one-time exposure

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

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Based on available data, the classification criteria are not met.

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

STOT evaluation – repeated exposure

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

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Based on available data, the classification criteria are not met.

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

Aspiration toxicity

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

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
No data available.

Benzyl dimethylamine
No data available.

CMR Assessment

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
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: No data available.

Benzyl dimethylamine
Carcinogenicity: No data available.
Mutagenicity: Based on available data, the classification criteria are not met.
Teratogenicity: No data available.
Reproductive toxicity/Fertility: No data available.

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 ecotoxicological data available to us for the components.

12.1 Toxicity

Acute Fish toxicity

polypropylene glycol

LC50 > 100 mg/l

Species: *Poecilia reticulata* (guppy)

Exposure duration: 96 h

Method: OECD Test Guideline 203

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-

LC50 ca. 5.300 mg/l

Species: *Leuciscus idus* (Golden orfe)

Exposure duration: 96 h

Benzylidimethylamine

LC50 37,8 mg/l

Species: *Pimephales promelas* (fathead minnow)

Exposure duration: 96 h

Acute toxicity for daphnia

polypropylene glycol

EC50 > 100 mg/l

Species: *Daphnia magna* (Water flea)

Exposure duration: 48 h

Method: OECD Test Guideline 202

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-

EC50 500 mg/l

Species: *Daphnia magna* (Water flea)

Exposure duration: 48 h

Benzylidimethylamine

EC50 > 100 mg/l

Species: *Daphnia magna* (Water flea)

Exposure duration: 48 h

Chronic toxicity to daphnia

polypropylene glycol

NOEC (mortality) \geq 10 mg/l

Species: *Daphnia magna* (Water flea)

Exposure duration: 21 d

Method: OECD Test Guideline 211

Studies of a comparable product.

Benzylidimethylamine

NOEC (Reproduction) 8,07 mg/l

Species: *Daphnia magna* (Water flea)

Exposure duration: 21 d

Method: OECD Test Guideline 211

Acute toxicity for algae

polypropylene glycol

EC0 \geq 100 mg/l

Species: *Desmodesmus subspicatus* (Green algae)

Exposure duration: 72 h

Method: OECD Test Guideline 201

Studies of a comparable product.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-

EC50 > 900 mg/l

Species: *scenedesmus subspicatus*

Exposure duration: 72 h
Method: EG 92/69/EWG

Benzyl dimethylamine
NOEC 0,24 mg/l
Species: *scenedesmus subspicatus*
Exposure duration: 72 h

Acute bacterial toxicity

polypropylene glycol
EC50 > 1.000 mg/l
Species: activated sludge
Exposure duration: 3 h
Method: OECD Test Guideline 209
Studies of a comparable product.

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
EC50 > 10.000 mg/l
Species: *Pseudomonas putida*
Exposure duration: 17 h
Method: DIN 38412

Benzyl dimethylamine
EC50 749,6 mg/l
Species: *Pseudomonas putida*
Exposure duration: 17 h

12.2 Persistence and degradability**Biodegradability**

polypropylene glycol
Biodegradation: > 60 %, 28 d, i.e. readily biodegradable
Method: OECD Test Guideline 301 F

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Biodegradation: 94 %, 29 d, i.e. readily biodegradable
Method: OECD Test Guideline 301 E

Biodegradation: 97 %, 4 d, i.e. inherently degradable
Method: OECD Test Guideline 302 B

Benzyl dimethylamine
Biodegradation: 0 - 2 %, 28 d, i.e. not readily degradable
Method: OECD Test Guideline 301 C

Photodegradation

polypropylene glycol
Test type: Phototransformation in air
sensitizer: OH-radicals
Concentration sensibilisator: 500.000 1/cm³
Half-life indirect photolysis: 0,14 - 0,46 d
Method: SRC - AOP (calculation)
After evaporation or exposure to the air, the product will be rapidly degraded by photochemical processes.
Studies of a comparable product.

Biochemical Oxygen Demand (BOD)

Benzyl dimethylamine
BOD - Value: 4 mg/l
Incubation term: 5 d

Chemical Oxygen Demand (COD)

Benzyl dimethylamine
COD-Value: 2.200 mg/l

12.3 Bioaccumulative potential

Bioaccumulation

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-
Bioaccumulation is unlikely.

Benzylidimethylamine
Bioconcentration factor (BCF): 2 - 22
Bioaccumulation is unlikely.

Partition coefficient (n-octanol/water)

propylene carbonate; 1,3-Dioxolan-2-one, 4-methyl-

log Pow: -0,48 at: 25 °C
Benzylidimethylamine

log Pow: 1,98

12.4 Mobility in soil**Distribution among environmental compartments**

polypropylene glycol
Adsorption
Medium: Soil
Koc value: 1 - 10
log Koc value: 0 - 1
Method: calculated
Highly mobile in soils
Studies of a comparable product.

12.5 Results of PBT and vPvB assessment

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

12.6 Other adverse effects

No data available.

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 containers have been emptied as thoroughly as possible (e.g. by pouring, scraping or draining until "drip-dry"), they can be sent to an appropriate collection point set up within the framework of the existing take-back scheme of the chemical industry. 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 : 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 : 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

IATA

14.1 UN 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 : 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

14.6 Special precautions for user

See section 6 - 8.

Additional information : Not dangerous cargo.
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.
not applicable

TA Luft List (Germany)

Type: Organic Substances
Fraction of other substances: 97,4 %

Water contaminating class (Germany)

1 slightly water endangering
(in accordance with Annex 4 to the Directive on Water-Hazardous Substances)

Any national regulations for the handling of hazardous substances must be observed.

15.2 Chemical Safety Assessment

A Chemical Safety Assessment has been carried out for:
Benzyldimethylamine

SECTION 16: Other information

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

H226	Flammable liquid and vapour.
H302	Harmful if swallowed.
H312	Harmful in contact with skin.
H314	Causes severe skin burns and eye damage.
H315	Causes skin irritation.
H318	Causes serious eye damage.
H319	Causes serious eye irritation.
H331	Toxic if inhaled.
H412	Harmful to aquatic life with long lasting effects.

Safety precautions for handling freshly molded polyurethane parts:

Depending on the production parameters, any uncovered surfaces of freshly molded polyurethane parts using this raw material may contain traces of substances (e. g. starting and reaction products, catalysts, release agents) with hazardous characteristics. Skin contact with traces of these substances must be avoided. Therefore, during demolding or other handling of fresh molded parts, protective gloves tested according to DIN-EN 374 (e.g. nitrile rubber ≥ 1.3 mm thick, breakthrough time ≥ 480 min, or according to recommendations from glove makers thinner gloves that need to be changed in compliance with breakthrough times more frequently) must be used. Depending on formulation and processing conditions, the requirements may be different from handling of the pure substances. Closed protective clothing is required for the protection of other areas of skin.

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

Further information

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.

Annex - Exposure Scenario

The operational conditions and the implementation of Risk Management Measures (RMM) are dependent on the following priority-/lead substances for the respective exposure routes:

Lead substance(s), Oral:

Not relevant

Lead substance(s), Inhalative:

Benzylidimethylamine

Lead substance(s), Dermal:

Benzylidimethylamine

Lead substance(s), Eyes:

Benzylidimethylamine

Lead substance(s), aquatic environment:

Benzylidimethylamine

Summary of Exposure Scenarios

- Repacking: Industrial (ES1) : SU 3; PROC8b, PROC9, PROC15; ERC3
- Use for formulation of preparations: Industrial (ES2) : SU 3; PROC3, PROC4, PROC5, PROC8b, PROC9, PROC15; ERC2
- Use in polyurethane synthesis, manufacture of rigid foam, Industrial use as a catalyst / process regulator: Industrial (ES3) : SU 3; PROC1, PROC3, PROC4, PROC8b, PROC15; ERC3, ERC5, ERC6a, ERC6b

1. Short title of Exposure Scenario: - Repacking: Industrial (ES1)

- | | |
|--------------------------------|--|
| Main User Groups | : SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites |
| Process category | : 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)
PROC15 : Use as laboratory reagent |
| Environmental release category | : ERC3 : Formulation in materials |

2.1 Contributing scenario controlling environmental exposure for:

ERC3

[Benzylidimethylamine]

- Repacking: Industrial

Amount used

Annual amount per site : 100 tonnes/year (t/y)

Environment factors not influenced by risk management

Flow rate of receiving surface water : 18.000 m3/d
Dilution Factor (River) : 10
Dilution Factor (Coastal Areas) : 100

local release to air : 15 kg/day
Remarks : Measured value
regional release to air : 8,22 kg/day
Remarks : Measured value
local release to soil : 0 kg/day
Remarks : Calculated value
local release to sewage : 0 kg/day
Remarks : Calculated value

Technical conditions and measures / Organizational measures

Air : Waste air should be purified or filtered. (Effectiveness: 90 %)

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant : Municipal sewage treatment plant: No

Conditions and measures related to external treatment of waste for disposal

Waste treatment : Can be incinerated, when in compliance with local regulations.

2.2 Contributing scenario controlling worker exposure for:**PROC8b, PROC9, PROC15****[Benzylidimethylamine]****- Repacking: Industrial**

Product characteristics

Concentration of the Substance in Mixture/Article

All PROCs : <= 100%

Physical Form (at time of use) : Liquid

Frequency and duration of use

Exposure duration : 8 hours/day
Frequency of use : 200 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor activities

Technical conditions and measures

Use with local exhaust ventilation.

These general measures are mandatory for all contributing scenarios.

Organisational measures to prevent /limit releases, dispersion and exposure

Only appropriately trained and authorized personnel is allowed to handle the substance. Substance-handling processes shall be well documented and supervised.

These general measures are mandatory for all contributing scenarios.

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear respiratory protection. Use suitable eye protection.

These general measures are mandatory for all contributing scenarios.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterisation ratio (PEC/PNEC)
2.1 ERC3	EUSES	waste air treatment: 90% efficiency	All compartments		Not specified.	< 1

Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR \leq 1).

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterisation ratio (Exposure value/DNEL)
2.2 All PROCs	ECETOC TRA	Gloves: 90% protection	Dermal exposure	Not specified.	< 1
2.2 All PROCs	ECETOC TRA	LEV: 98% efficiency, Respirator: 90% protection	Inhalation exposure	Not specified.	< 1

Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR \leq 1).

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

1. Short title of Exposure Scenario: - Use for formulation of preparations: Industrial (ES2)

Main User Groups	: SU 3: Industrial uses: Uses of substances as such or in preparations at industrial sites
Process category	: 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) 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) PROC15: Use as laboratory reagent
Environmental release category	: ERC2: Formulation of preparations

**2.1 Contributing scenario controlling environmental exposure for:
ERC2
[Benzylidimethylamine]
- Use for formulation of preparations: Industrial**

Amount used

Annual amount per site : 100 tonnes/year (t/y)

Environment factors not influenced by risk managementFlow rate of receiving surface water : 18.000 m3/d
Dilution Factor (River) : 10
Dilution Factor (Coastal Areas) : 100local release to air : 10 kg/day
Remarks : Measured value
regional release to air : 6,85 kg/day
Remarks : Measured value
local release to soil : 0 kg/day
Remarks : Calculated value
local release to sewage : 0 kg/day
Remarks : Calculated value**Conditions and measures related to municipal sewage treatment plant**

Type of Sewage Treatment Plant : Municipal sewage treatment plant: No

Conditions and measures related to external treatment of waste for disposalWaste treatment : Can be incinerated, when in compliance with local regulations.

**2.2 Contributing scenario controlling worker exposure for:
PROC3, PROC4, PROC5, PROC8b, PROC9, PROC15
[Benzylidimethylamine]
- Use for formulation of preparations: Industrial**

Product characteristics

Concentration of the Substance in Mixture/Article

All PROCs : ≤ 100%

Physical Form (at time of use) : Liquid

Frequency and duration of use

Exposure duration : 8 hours/day

Frequency of use : 200 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor activities

Technical conditions and measures

Use with local exhaust ventilation.

These general measures are mandatory for all contributing scenarios.

Organisational measures to prevent /limit releases, dispersion and exposure

Only appropriately trained and authorized personnel is allowed to handle the substance. Substance-handling processes shall be well documented and supervised.

These general measures are mandatory for all contributing scenarios.

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear respiratory protection. Use suitable eye protection.

These general measures are mandatory for all contributing scenarios.

3. Exposure estimation and reference to its source**Environment**

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterisation ratio (PEC/PNEC)
2.1 ERC2	EUSES		All compartments		Not specified.	< 1

Based on the applied RMMs the risk towards environment is sufficiently controlled ($RCR \leq 1$).

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterisation ratio (Exposure)

					value/DNEL)
2.2 All PROCs	ECETOC TRA	Gloves: 90% protection	Dermal exposure	Not specified.	< 1
2.2 All PROCs	ECETOC TRA	LEV: 98% efficiency, Respirator: 90% protection	Inhalation exposure	Not specified.	< 1

Based on the applied RMMs the risk towards humans is sufficiently controlled ($RCR \leq 1$).

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

1. Short title of Exposure Scenario: - Use in polyurethane synthesis, manufacture of rigid foam, Industrial use as a catalyst / process regulator: Industrial (ES3)

Main User Groups	: 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 PROC3: Use in closed batch process (synthesis or formulation) PROC4: Use in batch and other process (synthesis) where opportunity for exposure arises PROC8b: Transfer of substance or preparation (charging/ discharging) from/ to vessels/ large containers at dedicated facilities PROC15: Use as laboratory reagent
Environmental release category	: ERC3: Formulation in materials ERC5: Industrial use resulting in inclusion into or onto a matrix ERC6a: Industrial use resulting in manufacture of another substance (use of intermediates) ERC6b: Industrial use of reactive processing aids

2.1 Contributing scenario controlling environmental exposure for:

ERC3, ERC5, ERC6a, ERC6b

[Benzyltrimethylammonium]

- Use in polyurethane synthesis, manufacture of rigid foam, Industrial use as a catalyst / process regulator: Industrial

Amount used

Annual amount per site	: 45 tonnes/year (t/y)
Remarks	: ERC3
Annual amount per site	: 30 tonnes/year (t/y)
Remarks	: ERC5
Annual amount per site	: 120 tonnes/year (t/y)
Remarks	: ERC6a , ERC6b

Environment factors not influenced by risk management

Flow rate of receiving surface water	: 18.000 m3/d
Dilution Factor (River)	: 10
Dilution Factor (Coastal Areas)	: 100

local release to air	: 67,5 kg/day
Remarks	: ERC3 : Measured value
regional release to air	: 37 kg/day
Remarks	: ERC3 : Measured value
local release to air	: 75 kg/day
Remarks	: ERC5 : Measured value
regional release to air	: 41,1 kg/day
Remarks	: ERC5 : Measured value
local release to air	: 30 kg/day
Remarks	: ERC6a : Measured value
regional release to air	: 16,4 kg/day
Remarks	: ERC6a : Measured value
local release to air	: 0,6 kg/day
Remarks	: ERC6b : Measured value
regional release to air	: 0,329 kg/day

Remarks : ERC6b : Measured value
local release to soil : 0 kg/day
Remarks : Calculated value

Conditions and measures related to municipal sewage treatment plant

Type of Sewage Treatment Plant : Municipal sewage treatment plant: No

**2.2 Contributing scenario controlling worker exposure for:
PROC1, PROC3, PROC4, PROC8b, PROC15****[Benzylidimethylamine]****- Use in polyurethane synthesis, manufacture of rigid foam, Industrial use as a catalyst / process regulator: Industrial**

Product characteristics

Concentration of the Substance in Mixture/Article

All PROCs : <= 3%

Physical Form (at time of use) : Liquid

Frequency and duration of use

Exposure duration : 8 hours/day

Frequency of use : 200 days/year

Other operational conditions affecting workers exposure

Outdoor / Indoor : Indoor activities

Technical conditions and measures

Use with local exhaust ventilation.

These general measures are mandatory for all contributing scenarios.

Organisational measures to prevent /limit releases, dispersion and exposure

Only appropriately trained and authorized personnel is allowed to handle the substance. Substance-handling processes shall be well documented and supervised.

These general measures are mandatory for all contributing scenarios.

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

Wear chemically resistant gloves (tested to EN374) in combination with 'basic' employee training. Wear respiratory protection. Use suitable eye protection.

These general measures are mandatory for all contributing scenarios.

3. Exposure estimation and reference to its source

Environment

Contributing Scenario	Exposure Assessment Method	Specific conditions	Compartment	Value type	Level of Exposure	Risk characterisation ratio (PEC/PNEC)
2.1 All ERCs	EUSES		All compartments		Not specified.	< 1

Based on the applied RMMs the risk towards environment is sufficiently controlled (RCR ≤ 1).

Workers

Contributing Scenario	Exposure Assessment Method	Specific conditions	Value type	Level of Exposure	Risk characterisation ratio (Exposure value/DNEL)
2.2 All PROCs	ECETOC TRA	Gloves: 90% protection	Dermal exposure	Not specified.	< 1
2.2 All PROCs	ECETOC TRA	LEV: 98% efficiency, Respirator: 90% protection	Inhalation exposure	Not specified.	< 1

Based on the applied RMMs the risk towards humans is sufficiently controlled (RCR ≤ 1).

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

The risk management measures given in this exposure scenario apply to the specified substance in a concentration as indicated in the scenario. The concentration of the substance in the product may differ. A downstream user should evaluate if the risk management measures may be adapted accordingly.

A downstream user may evaluate whether he operates within the conditions set in the exposure scenario by using the information provided in section 2. This evaluation may be based on an expert judgement or on the utilisation of risk assessment tools that are recommended by ECHA.

SECTION 1: Identification of the substance/mixture and of the company/undertaking**Product identifier****DESMODUR 44 V 20 L****Relevant identified uses of the substance or mixture and uses advised against**

Use : Di-/polyisocyanate components for the production of polyurethanes

Details of the supplier of the safety data sheet:Bayer MaterialScience AG
BMS-IO-S&T-PSRA-PSI Product Safety
51368 Leverkusen

Tel: +49 214 30 25026

e-mail: productsafety@bayerbms.com

Emergency telephone number: In case of emergency: +49 214 30 99300 (Sicherheitszentrale Bayer)+44 1635 563000 (Bayer plc Ltd,
Risk Management, Newbury RG14 1JA, UK)**SECTION 2: Hazards identification****Classification of the substance or mixture****Regulation (EC) No 1272/2008**Acute toxicity, Inhalative, Category 4 (H332)
Skin irritation, Category 2 (H315)
Eye irritation, Category 2 (H319)
Sensitization of the respiratory airways, Category 1 (H334)
Sensitization of the skin, Category 1 (H317)
Carcinogenicity, Category 2 (H351)
Specific target organ toxicity (single exposure), Category 3 (H335)
Specific target organ toxicity (repeated exposure), Inhalative, Category 2 (H373)**Directive 67/548/EEC or 1999/45/EC**Harmful by inhalation. Harmful: danger of serious damage to health by prolonged exposure through inhalation.
Limited evidence of a carcinogenic effect.
May cause sensitization by inhalation and skin contact.
Irritating to eyes, respiratory system and skin.**Label elements****Regulation (EC) No 1272/2008**

Danger

Hazardous components which must be listed on the labeldiphenylmethane-diisocyanate, isomers and homologues
CAS-No.9016-87-9

Hazard statements:

H315 Causes skin irritation.
 H317 May cause an allergic skin reaction.
 H319 Causes serious eye irritation.
 H332 Harmful if inhaled.
 H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.
 H335 May cause respiratory irritation.
 H351 Suspected of causing cancer.
 H373 May cause damage to organs through prolonged or repeated exposure if inhaled.

Precautionary statements:

P260 Do not breathe dust/ fume/ gas/ mist/ vapours/ spray.
 P280 Wear protective gloves/ eye protection/ face protection.
 P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
 P304 + P340 IF INHALED: Remove victim to fresh air and keep at rest in a position comfortable for breathing.
 P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P308 + P313 IF exposed or concerned: Get medical advice/ attention.

Directive 67/548/EEC or 1999/45/EC

Labelling in accordance with Annex I of directive 67/548/EEC and its amendments and adaptations:
 Labelling as required by the Chemicals (Hazard Information and Packaging for Supply) Regulations 2009 (CHIP 4), in accordance with EC Directives:
 Xn Harmful

diphenylmethane-diisocyanate, isomers and homologues

R-phrase(s)

R20 Harmful by inhalation.
 R36/37/38 Irritating to eyes, respiratory system and skin.
 R40 Limited evidence of a carcinogenic effect.
 R42/43 May cause sensitization by inhalation and skin contact.
 R48/20 Harmful: danger of serious damage to health by prolonged exposure through inhalation.

S-phrase(s)

S23 Do not breathe vapour.
 S26 In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
 S36/37 Wear suitable protective clothing and gloves.
 S45 In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).

Other hazards

Persons who suffer from hypersensitivity of the respiratory tract (e.g. asthmatics and chronic bronchitis sufferers) should avoid handling this 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.

SECTION 3: Composition/information on ingredients

Type of product: Substance

Hazardous components

diphenylmethane-diisocyanate, isomers and homologues

Concentration [wt.-%]: ca. 100

CAS-No.: 9016-87-9

Classification (1272/2008/CE): Acute Tox. 4 Inhalative H332 Skin Irrit. 2 H315 Eye Irrit. 2 H319 Sens. Resp. 1 H334 Skin Sens. 1 H317 Carc. 2 H351 STOT SE 3 H335 STOT RE 2 Inhalative H373

Specific threshold concentration (GHS):

Sens. Resp. 1	H334	>= 0.1 %
Eye Irrit. 2	H319	>= 5 %
Skin Irrit. 2	H315	>= 5 %

STOT SE 3	H335	>= 5 %
Classification (67/548/EEC): Carc.Cat.3 R40 Xn R20 -R48/20 Xi R36/37/38 R42/43		
Specific threshold concentration		
Xn	R42	0.1 - < 1 %
Xn	R40, R42/43	1 - < 5 %
Xn	R36/37/38, R40, R42/43	5 - < 10 %
Xn	R36/37/38, R40, R42/43, R48/20	10 - < 25 %
Xn	R20, R36/37/38, R40, R42/43, R48/20	>= 25 %

The product is a REACH-polymer: no registration number, no exposure scenarios.

SECTION 4: First aid measures

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 the patient to vomit, medical advice is required.

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.

SECTION 5: Firefighting measures

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

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.

Advice for fire-fighters:

During fire-fighting respirator with independent air-supply and airtight garment is required.

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

SECTION 6: Accidental release measures

Personal precautions, protective equipment and emergency procedures: Put on protective equipment (see section 8). Ensure adequate ventilation/exhaust extraction. Keep unauthorized persons away.

Environment related measures: Do not allow to escape into waterways, wastewater or soil.

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

Reference to other sections: For further disposal measures see section 13.

SECTION 7: Handling and storage**Precautions for safe handling:**

If an annex according to Regulation (EU) No. 1907/2006 is attached to this MSDS, the general conditions of use are further specified in the corresponding exposure scenarios.

Provide sufficient air exchange and/or exhaust in work rooms.

In all workplaces or parts of the plant where high concentrations of isocyanate aerosols and/or vapors may be generated (e.g. during pressure release, mold venting or when cleaning mixing heads with an air blast), appropriately located exhaust ventilation must be provided in order to prevent occupational exposure limits from being exceeded. The air should be drawn away from the personnel handling the product. The efficiency of the exhaust equipment should be periodically checked. The threshold limit values noted in Chapter 8 must be monitored.

The personal protective measures described in Chapter 8 must be observed. 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. Decontaminate, destroy and dispose of soiled protective clothing (see Section 13)

Conditions for safe storage, including any incompatibilities:

Keep container tightly closed and dry. 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) : 10: Combustible liquids

SECTION 8: Exposure controls/personal protection

If an annex according to Regulation (EU) No. 1907/2006 is attached to this MSDS, the general RMMs are further specified in the corresponding exposure scenarios.

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

Control parameters

Components with workplace control parameters

Substance	CAS-No.	Basis	Type	Value	Ceiling Limit Value	Remarks
diphenylmethane-diisocyanate, isomers and homologues	9016-87-9	EH40 WEL	TWA	0.02 mg/m ³		, measured as NCO
diphenylmethane-diisocyanate, isomers and homologues	9016-87-9	EH40 WEL	STEL	0.07 mg/m ³		, measured as NCO
diphenylmethane-4,4'-diisocyanate	101-68-8	EH40 WEL	TWA	0.02 mg/m ³		, measured as NCO
diphenylmethane-4,4'-diisocyanate	101-68-8	EH40 WEL	STEL	0.07 mg/m ³		, measured as NCO
Diphenylmethane-2,4'-diisocyanate	5873-54-1	EH40 WEL	TWA	0.02 mg/m ³		, measured as NCO
Diphenylmethane-2,4'-diisocyanate	5873-54-1	EH40 WEL	STEL	0.07 mg/m ³		, measured as NCO
2,2'-Methylenediphenyl diisocyanate	2536-05-2	EH40 WEL	TWA	0.02 mg/m ³		, measured as NCO
2,2'-Methylenediphenyl diisocyanate	2536-05-2	EH40 WEL	STEL	0.07 mg/m ³		, measured as NCO

The product may contain traces of phenylisocyanate.

Exposure controls

Respiratory protection:

Respiratory protection required in insufficiently ventilated working areas and during spraying.

Hand protection:

Suitable materials for safety gloves; EN 374:

Polychloroprene - CR: thickness $\geq 0,5$ mm; breakthrough time ≥ 480 min.

Nitrile rubber - NBR: thickness $\geq 0,35$ mm; breakthrough time ≥ 480 min.

Butyl rubber - IIR: thickness $\geq 0,5$ mm; breakthrough time ≥ 480 min.

Fluorinated rubber - FKM: thickness $\geq 0,4$ mm; 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.

Safety precautions for handling freshly molded polyurethane parts: see section 16

SECTION 9: Physical and chemical properties

Information on basic physical and chemical properties

Appearance:	liquid
Colour:	brown
Odour:	earthy, musty
Odour Threshold:	not established

pH:	not applicable	
Pour point:	< 0 °C	ISO 3016
Boiling point/boiling range:	> 300 °C at 1,013 hPa	DIN 53171
Flash point:	> 200 °C	
Evaporation rate:	not established	
Flammability (solid, gas):	not applicable	
Burning number:	not applicable	
Vapour pressure:	1 hPa at 20 °C	EG A4
	12 hPa at 50 °C	EG A4
	17 hPa at 55 °C	EG A4
	For products with a very low vapor pressure, the apparent vapor pressure may exceed the vapor pressure of the pure product due to conditions of manufacturing, storage or transportation, e.g. by solved gases like nitrogen or carbon dioxide.	
Vapour pressure of ingredients: diphenylmethane-diisocyanate, isomers and homologues	< 0.00001 hPa at 20 °C	
Vapour density:	not established	
Density:	1.23 g/cm ³ at 20 °C	DIN 51757
Miscibility with water:	immiscible at 15 °C	
Surface tension:	not established	
Partition coefficient (n-octanol/water):	not established	
Auto-ignition temperature:	not applicable	
Ignition temperature:	> 500 °C	DIN 51794
Decomposition temperature:	not established	
Viscosity, dynamic:	>= 200 mPa.s at 20 °C	DIN 53019
Explosive properties:	not established	
Dust explosion class:	not applicable	
Oxidising properties:	not established	
Other information:	The indicated values do not necessarily correspond to the product specification. Please refer to the technical information sheet for specification data.	

SECTION 10: Stability and reactivity

Chemical stability: Polymerises at about 200 °C with evolution of CO₂.

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.

Hazardous decomposition products: No hazardous decomposition products when stored and handled correctly.

SECTION 11: Toxicological information

Please find below the data available to us:

Information on toxicological effects

Acute toxicity, oral:

diphenylmethane-diisocyanate, isomers and homologues
LD50 rat, male/female: > 10,000 mg/kg
Method: OECD Test Guideline 401

Acute toxicity, dermal:

diphenylmethane-diisocyanate, isomers and homologues
LD50 rabbit, male/female: > 9,400 mg/kg
Method: OECD Test Guideline 402

Acute toxicity, inhalation:

diphenylmethane-diisocyanate, isomers and homologues
LC50 rat, male/female: 0.31 mg/l, 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

The substance was tested in a form (i.e. specific particle size distribution) that is different from the forms in which the substance is placed on the market and in which it can reasonably be expected to be used. Therefore, a modified classification for acute inhalation toxicity is justified.

Assessment: Harmful by inhalation.

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

Primary skin irritation:

diphenylmethane-diisocyanate, isomers and homologues
Species: rabbit
Result: slight irritant
Method: OECD Test Guideline 404

Primary mucosae irritation:

diphenylmethane-diisocyanate, isomers and homologues
Species: rabbit
Result: non-irritant
Method: OECD Test Guideline 405
Toxicological studies of a comparable product.

Sensitisation:

diphenylmethane-diisocyanate, isomers and homologues
Skin sensitisation according to Magnusson/Kligmann (maximizing test):
Species: guinea pig
Result: negative
Classification: Does not cause skin sensitization.
Method: OECD Test Guideline 406

Skin sensitization (local lymph node assay (LLNA)):

Species: mouse
Result: positive
Classification: May cause sensitization by skin contact.
Method: OECD Test Guideline 429
Toxicological studies of a comparable product.

Respiratory sensitization

Species: rat
Result: positive
Classification: May cause sensitization by inhalation.

Subacute, subchronic and prolonged toxicity:

diphenylmethane-diisocyanate, isomers and homologues
NOAEL: 0,2 mg/m³
LOAEL (Lowest observable adverse effect level): 1 mg/m³
Application Route: Inhalative
Species: rat, male/female
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³

Exposure duration: 2 a
Frequency of treatment: 6 hours a day, 5 days a week
Target Organs: Lungs, Nasal inner lining
Test substance: as aerosol
Method: OECD Test Guideline 453
Findings: Irritation to nasal cavity and to lungs.
Studies of a comparable product.

Carcinogenicity:

diphenylmethane-diisocyanate, isomers and homologues
Species: rat, male/female
Application Route: Inhalative
Dose Levels: 0 - 0,2 - 1 - 6 mg/m³
Test substance: as aerosol
Exposure duration: 2 a
Frequency of treatment: 6 hours/day, 5 days/week
Method: OECD Test Guideline 453
Occurrence of tumors in the highest dose group.

Reproductive toxicity/Fertility:

diphenylmethane-diisocyanate, isomers and homologues
No data available.

Reproductive toxicity/Teratogenicity:

diphenylmethane-diisocyanate, isomers and homologues
NOAEL (teratogenicity): 12 mg/m³
NOAEL (maternal): 4 mg/m³
NOAEL (developmental toxicity): 4 mg/m³
Species: rat, female
Application Route: Inhalative
Dose Levels: 0 - 1 - 4 - 12 mg/m³
Frequency of treatment: 6 hours/day (Exposure duration: 10 days (day 6 - 15 p.c.))
Test period: 20 d
Test substance: as aerosol
Method: OECD Test Guideline 414
NOAEL (developmental toxicity): 4 mg/m³
Did not show teratogenic effects in animal experiments.

Genotoxicity in vitro:

diphenylmethane-diisocyanate, isomers and homologues
Test type: Salmonella/microsome test (Ames test)
Test system: Salmonella typhimurium
Metabolic activation: with/without
Result: negative
Method: OECD Test Guideline 471

Genotoxicity in vivo:

diphenylmethane-diisocyanate, isomers and homologues
Test type: Micronucleus test
Species: rat, male
Application Route: Inhalative (exposure period: 3x1h/day over 3 weeks)
Result: negative
Method: OECD Test Guideline 474
Studies of a comparable product.

STOT evaluation – one-time exposure:

diphenylmethane-diisocyanate, isomers and homologues
Route of exposure: Inhalative
Target Organs: Respiratory Tract
May cause respiratory irritation.

STOT evaluation – repeated exposure:

diphenylmethane-diisocyanate, isomers and homologues

Route of exposure: Inhalative

Target Organs: Respiratory Tract

May cause damage to organs through prolonged or repeated exposure.

Aspiration toxicity:

diphenylmethane-diisocyanate, isomers and homologues

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

CMR Assessment:

diphenylmethane-diisocyanate, isomers and homologues

Carcinogenicity: Suspected of causing cancer by inhalation (Carc. 2).

Mutagenicity: In vitro and in vivo tests did not show mutagenic effects. Based on available data, the classification criteria are not met.

Teratogenicity: Did not show teratogenic effects in animal experiments. 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:

diphenylmethane-diisocyanate, isomers and homologues

Acute effects: Harmful if inhaled. The product causes irritation of eyes, skin and mucous membranes.

Sensitization: May cause sensitization by inhalation and skin contact.

Additional information:

diphenylmethane-diisocyanate, isomers and homologues

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 UK Workplace Exposure Limit (WEL). Prolonged contact with the skin may cause tanning and irritant effects.

SECTION 12: Ecological information

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

Toxicity**Acute Fish toxicity:**

diphenylmethane-diisocyanate, isomers and homologues

LC50 > 1,000 mg/l

Test type: Acute Fish toxicity

Species: Danio rerio (zebra fish)

Exposure duration: 96 h

Method: OECD Test Guideline 203

Acute toxicity for daphnia:

diphenylmethane-diisocyanate, isomers and homologues

EC50 > 1,000 mg/l

Test type: static test

Species: Daphnia magna (Water flea)

Exposure duration: 24 h

Method: OECD Test Guideline 202

Chronic toxicity to daphnia:

diphenylmethane-diisocyanate, isomers and homologues

NOEC (Reproduction) > 10 mg/l

Species: Daphnia magna (Water flea)

Exposure duration: 21 d

Method: OECD Test Guideline 202

Acute toxicity for algae:

diphenylmethane-diisocyanate, isomers and homologues
ErC50 > 1,640 mg/l
Test type: Growth inhibition
Species: scenedesmus subspicatus
Exposure duration: 72 h
Method: OECD Test Guideline 201

Acute bacterial toxicity:

diphenylmethane-diisocyanate, isomers and homologues
EC50 > 100 mg/l
Test type: Respiration inhibition
Species: activated sludge
Exposure duration: 3 h
Method: OECD Test Guideline 209

Toxicity to soil dwelling organisms:

diphenylmethane-diisocyanate, isomers and homologues
NOEC (mortality) > 1,000 mg/kg
Species: Eisenia fetida (earthworms)
Exposure duration: 14 d
Method: OECD Test Guideline 207

Toxicity to terrestrial plants:

diphenylmethane-diisocyanate, isomers and homologues
NOEC (seedling emergence) > 1,000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208

NOEC (Growth rate) > 1,000 mg/kg
Species: Avena sativa (oats)
Exposure duration: 14 d
Method: OECD Test Guideline 208

NOEC (seedling emergence) > 1,000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d
Method: OECD Test Guideline 208

NOEC (Growth rate) > 1,000 mg/kg
Species: Lactuca sativa (lettuce)
Exposure duration: 14 d
Method: OECD Test Guideline 208

Ecotoxicology Assessment:

diphenylmethane-diisocyanate, isomers and homologues
Acute aquatic toxicity: Based on available data, the classification criteria are not met.
Chronic aquatic toxicity: There is no evidence of a chronic aquatic toxicity.
Toxicity Data on Soil: Not expected to adsorb on soil. The substance is graded as non-critical to soil-dwelling organisms.
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.

Persistence and degradability**Biodegradability:**

diphenylmethane-diisocyanate, isomers and homologues
Test type: aerobic
Inokulum: activated sludge
Biodegradation: 0 %, 28 d, i.e. not inherently degradable
Method: OECD Test Guideline 302 C
According to the results of tests of biodegradability this product is not readily biodegradable.

Stability in water:

diphenylmethane-diisocyanate, isomers and homologues

Test type: Hydrolysis

Half life: 20 h at 25 °C

The substance hydrolyzes rapidly in water.

Studies of a comparable product.

Photodegradation:

diphenylmethane-diisocyanate, isomers and homologues

Test type: Phototransformation in air

Temperature: 25 °C

sensitizer: OH-radicals

Concentration sensibilisator: 500,000 1/cm³

Half-life indirect photolysis: 0.92 d

Method: SRC - AOP (calculation)

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

Studies of a comparable product.

Bioaccumulative potential

Bioaccumulation:

diphenylmethane-diisocyanate, isomers and homologues

Bioconcentration factor (BCF): < 14

Species: Cyprinus carpio (Carp)

Exposure duration: 42 d

Concentration: 0.2 mg/l

Method: OECD Test Guideline 305 C

An accumulation in aquatic organisms is not to be expected.

The substance hydrolyzes rapidly in water.

Studies of hydrolysis products.

Environmental distribution:

diphenylmethane-diisocyanate, isomers and homologues

no data available

Results of PBT and vPvB assessment

diphenylmethane-diisocyanate, isomers and homologues

This substance does not meet the criteria for classification as PBT or vPvB.

Additional information on ecotoxicology:

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.

Waste treatment methods

After final product withdrawal, all residues must be removed from containers (drip-free, powder-free or paste-free). Once the product residues adhering to the walls of the containers have been rendered harmless, the product and hazard labels must be invalidated. These containers can be returned for recycling to the appropriate centres set up within the framework of the existing take-back scheme of the chemical industry. Containers must be recycled in compliance with national legislation and environmental regulations.

None disposal into waste water.

SECTION 14: Transport information

ADR/RID Not dangerous goods

ADN Not dangerous goods

ADNR (tanker only) Not dangerous goods

IATA Not dangerous goods

IMDG Not dangerous goods

Special precautions for user : Not dangerous cargo.
Avoid temperatures below 0 °C. Avoid heat above +50 °C.
Keep dry.
Keep away from foodstuffs, acids and alkalis.

SECTION 15: Regulatory information

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

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).

Water contaminating class (Germany): 1 slightly water endangering
(in accordance with Annex 4 to the Directive on Water-Hazardous Substances)

Any existing national regulations on the handling of isocyanates must be observed.

SECTION 16: Other information

Full text of hazardous (H) warnings referred to under sections 2 and 3 of the CLP classification (1272/2008/CE).

H315	Causes skin irritation.
H317	May cause an allergic skin reaction.
H319	Causes serious eye irritation.
H332	Harmful if inhaled.
H334	May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335	May cause respiratory irritation.
H351	Suspected of causing cancer.
H373	May cause damage to organs through prolonged or repeated exposure if inhaled.

Full text of R-phrases referred to under sections 2 and 3 of the EU classification (67/548/EEC,1999/45/EC).

R20	Harmful by inhalation.
R36/37/38	Irritating to eyes, respiratory system and skin.
R40	Limited evidence of a carcinogenic effect.
R42/43	May cause sensitization by inhalation and skin contact.
R48/20	Harmful: danger of serious damage to health by prolonged exposure through inhalation.

For internal US delivery: Under § 172.101, Appendix A, DOT (Department of Transportation) it is requested: MDI Reportable Quantity (RQ):500lbs (2270kg).

ISOPA Guidelines for safe loading/unloading, transport and storage of TDI and MDI. ISOPA Order No.: PSC-0005-GUIDL

Safety precautions for handling freshly molded polyurethane parts:

Depending on the production parameters, any uncovered surfaces of freshly molded polyurethane parts using this raw material may contain traces of substances (e. g. starting and reaction products, catalysts, release agents) with hazardous characteristics. Skin contact with traces of these substances must be avoided. Therefore, during demolding or other handling of fresh molded parts, protective gloves tested according to DIN-EN 374 (e.g. nitrile rubber ≥ 1.3 mm thick, breakthrough time ≥ 480 min, or according to recommendations from glove makers thinner gloves that need to be changed in compliance with breakthrough times more frequently) must be used. Depending on formulation and processing conditions, the requirements may be different from handling of the pure substances. Closed protective clothing is required for the protection of other areas of skin.

Further information

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.