



SAPICI

# Safety Data Sheet

## POLURENE FP 114C



Version:3

Revision date: 14/12/2018

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

#### 1.1. Product identifier

Trade name:

**POLURENE FP 114C**

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

Recommended use: Hardener for coating materials or adhesives for industrial and trade applications.

Uses advised against: Not suitable for DIY use.

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

S.A.P.I.C.I. Spa Via Bergamo, 2 - 20063 Cernusco s/N (MI)

Tel +39 02 921871 Fax +39 02 92102331

Responsible for the safety data sheet: HSE@sapici.it







#### 1.4. Emergency telephone number

Poison Center - Niguarda Hospital - Milan - Tel. +39 02 66101029

### SECTION 2: Hazards identification

#### 2.1. Classification of the substance or mixture

EC regulation criteria 1272/2008 (CLP):

-  Danger, Flam. Liq. 2, Highly flammable liquid and vapour.
-  Warning, Eye Irrit. 2, Causes serious eye irritation.
-  Danger, Resp. Sens. 1, May cause allergy or asthma symptoms or breathing difficulties if inhaled.
-  Warning, Skin Sens. 1, May cause an allergic skin reaction.
-  Warning, Carc. 2, Suspected of causing cancer.
-  Warning, STOT SE 3, May cause drowsiness or dizziness.

EUH066 Repeated exposure may cause skin dryness or cracking.

Adverse physicochemical, human health and environmental effects:

No other hazards

#### 2.2. Label elements

**Labelling (1272/2008/CE):**

Hazard pictograms:



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Danger

Hazard statements:

H225 Highly flammable liquid and vapour.

H319 Causes serious eye irritation.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H317 May cause an allergic skin reaction.

H351 Suspected of causing cancer.

H336 May cause drowsiness or dizziness.

Precautionary statements:

P202 Do not handle until all safety precautions have been read and understood.

P210 Keep away from heat, hot surfaces, sparks, open flames and other ignition sources. No smoking.

P261 Avoid breathing dust/fume/gas/mist/vapours/spray.

P280 Wear protective gloves. Wear eye or face protection.

P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.

P342+P311 If experiencing respiratory symptoms: Call a POISON CENTER/doctor.

P370+P378 In case of fire: Use powder, foam or CO2 for extinction.

P403+P235 Store in a well-ventilated place. Keep cool.

Special Provisions:

EUH066 Repeated exposure may cause skin dryness or cracking.

EUH204 Contains isocyanates. May produce an allergic reaction.

Contains

ethyl acetate

4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Special provisions according to Annex XVII of REACH and subsequent amendments:

None

### 2.3. Other hazards

vPvB Substances: None - PBT Substances: None

No other hazards

## SECTION 3: Composition/information on ingredients

### 3.1. Substances

N.A.

### 3.2. Mixtures

Hazardous components within the meaning of the CLP regulation and related classification:

Qty	Name	Ident. Number	Classification
~35 %	ethyl acetate	Index number: 607-022-00-5 CAS: 141-78-6 EC: 205-500-4 REACH No.: 01-2119475103-46	2.6/2 Flam. Liq. 2 H225 3.3/2 Eye Irrit. 2 H319 3.8/3 STOT SE 3 H336 EUH066



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<3 %	4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate	Index number: CAS: EC: REACH No.:	615-005-00-9 101-68-8 202-966-0 01-2119457014-47	3.1/4/Inhal Acute Tox. 4 H332 3.2/2 Skin Irrit. 2 H315 3.3/2 Eye Irrit. 2 H319 3.4.1/1 Resp. Sens. 1 H334 3.4.2/1 Skin Sens. 1 H317 3.6/2 Carc. 2 H351 3.8/3 STOT SE 3 H335 3.9/2 STOT RE 2 H373 Specific Concentration Limits: C >= 0,1%: Resp. Sens. 1 H334 C >= 5%: Skin Irrit. 2 H315 C >= 5%: Eye Irrit. 2 H319 C >= 5%: STOT SE 3 H335
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### SECTION 4: First aid measures

#### 4.1. Description of first aid measures

##### In case of skin contact:

Remove contaminated clothing immediately and dispose off safely.

Areas of the body that have - or are only even suspected of having - come into contact with the product must be rinsed immediately with plenty of running water and possibly with soap.

Wash thoroughly the body (shower or bath).

After contact with skin, wash immediately with soap and plenty of water.

##### In case of eyes contact:

After contact with the eyes, rinse with water with the eyelids open for a sufficient length of time, then consult an ophthalmologist immediately.

Protect uninjured eye.

##### In case of Ingestion:

Do not under any circumstances induce vomiting. OBTAIN A MEDICAL EXAMINATION IMMEDIATELY.

##### In case of Inhalation:

Remove casualty to fresh air and keep warm and at rest.

In case of unwellness, seek medical advice immediately.

#### 4.2. Most important symptoms and effects, both acute and delayed

None.

#### 4.3. Indication of any immediate medical attention and special treatment needed

In case of accident or unwellness, seek medical advice immediately (show directions for use or safety data sheet if possible).

Treatment:

None.

### SECTION 5: Firefighting measures



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#### **5.1. Extinguishing media**

Suitable extinguishing media:

Fire extinguishing powder, foam or CO<sub>2</sub>. Use foam and water jets only in case of extensive fire outbreak.

Extinguishing media which must not be used for safety reasons: high volume water jet.

#### **5.2. Special hazards arising from the substance or mixture**

Burning produces heavy smoke.

Do not inhale combustion gases in case of a fire.

#### **5.3. Advice for firefighters**

Use suitable breathing apparatus.

Collect contaminated fire extinguishing water separately. This must not be discharged into drains.

Move undamaged containers from immediate hazard area if it can be done safely.

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## **SECTION 6: Accidental release measures**

#### **6.1. Personal precautions, protective equipment and emergency procedures**

Wear personal protection equipment.

Remove all sources of ignition.

Remove persons to safety.

See protective measures under point 7 and 8.

#### **6.2. Environmental precautions**

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

Retain contaminated washing water and dispose it in compliance with the local and national regulations currently in force.

In case of gas escape or of entry into waterways, soil or drains, inform the responsible authorities.

#### **6.3. Methods and material for containment and cleaning up**

Cover the spilling with wet, absorbent material (e.g. sawdust, chemical binder based on calcium silicate hydrate, sand) and remove mechanically.

After approx. one hour transfer to waste container and do not seal (evolution of CO<sub>2</sub>!). Keep damp in a safe ventilated area for several days.

#### **6.4. Reference to other sections**

See also section 8 and 13.

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## **SECTION 7: Handling and storage**

#### **7.1. Precautions for safe handling**

Avoid contact with skin and eyes, inhalation of vapours and mists.

Exercise the greatest care when handling or opening the container.

Don't use empty container before they have been cleaned.

Before making transfer operations, assure that there aren't any incompatible material residuals in the containers.

Contaminated clothing should be changed before entering eating areas.

See also section 8 for recommended protective equipment.



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### 7.2. Conditions for safe storage, including any incompatibilities

Always keep in a cool and well ventilated place.

Store at below 45 °C. Keep away from unguarded flame and heat sources. Avoid direct exposure to sunlight.

Keep away from unguarded flame, sparks, and heat sources.

Keep away from food, drink and feed.

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)

None in particular.

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## SECTION 8: Exposure controls/personal protection

### 8.1. Control parameters

ethyl acetate - CAS: 141-78-6

NIOSH - TWA: 1440 mg/m<sup>3</sup>, 400 ppm - Notes: ITALY

OEL - TWA: 540 mg/m<sup>3</sup>, 150 ppm - STEL: 1080 mg/m<sup>3</sup>, 300 ppm - Notes: DENMARK

OEL - TWA: 1100 mg/m<sup>3</sup>, 300 ppm - STEL: 1800 mg/m<sup>3</sup>, 500 ppm - Notes: FINLAND

OEL - TWA: 1400 mg/m<sup>3</sup>, 400 ppm - Notes: FRANCE

OEL - TWA: 1500 mg/m<sup>3</sup>, 400 ppm - STEL: 3000 mg/m<sup>3</sup>, 800 ppm - Notes: GERMANY

OEL - TWA: 1400 mg/m<sup>3</sup> - STEL: 1400 mg/m<sup>3</sup> - Notes: HUNGARY

OEL - TWA: 200 mg/m<sup>3</sup> - STEL: 600 mg/m<sup>3</sup> - Notes: POLAND

OEL - TWA: 1460 mg/m<sup>3</sup>, 400 ppm - Notes: SPAIN

OEL - TWA: 500 mg/m<sup>3</sup>, 150 ppm - STEL: 1100 mg/m<sup>3</sup>, 300 ppm - Notes: SWEDEN

ACGIH - TWA(8h): 400 ppm - Notes: URT and eye irr

EU - TWA(8h): 734 mg/m<sup>3</sup>, 200 ppm - STEL: 1468 mg/m<sup>3</sup>, 400 ppm

4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate - CAS: 101-68-8

OEL - TWA: 0.05 mg/m<sup>3</sup>, 0.005 ppm - STEL: 0.1 mg/m<sup>3</sup>, 0.01 ppm - Notes: DENMARK

OEL - TWA: 0.1 mg/m<sup>3</sup>, 0.01 ppm - STEL: 0.2 mg/m<sup>3</sup>, 0.02 ppm - Notes: FRANCE

OEL - TWA: 0.05 mg/m<sup>3</sup> - STEL: 0.05 mg/m<sup>3</sup> - Notes: GERMANY

OEL - TWA: 0.05 mg/m<sup>3</sup> - STEL: 0.05 mg/m<sup>3</sup> - Notes: HUNGARY

OEL - TWA: 0.05 mg/m<sup>3</sup> - STEL: 0.2 mg/m<sup>3</sup> - Notes: POLAND

OEL - TWA: 0.052 mg/m<sup>3</sup>, 0.005 ppm - Notes: SPAIN

OEL - TWA: 0.03 mg/m<sup>3</sup>, 0.002 ppm - STEL: 0.05 mg/m<sup>3</sup>, 0.005 ppm - Notes: SWEDEN

ACGIH - TWA(8h): 0.005 ppm - Notes: Resp sens

DNEL Exposure Limit Values

ethyl acetate - CAS: 141-78-6

Worker Industry: 63 mg/kg - Exposure: Human Dermal - Frequency: Long Term, systemic effects

Worker Industry: 1468 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Short Term, systemic effects

Worker Industry: 1468 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Short Term, local effects

Worker Industry: 734 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Long Term, systemic effects

Worker Industry: 734 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Long Term, local effects



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Consumer: 4.5 mg/kg - Exposure: Human Oral - Frequency: Long Term, systemic effects  
Consumer: 37 mg/kg - Exposure: Human Dermal - Frequency: Long Term, systemic effects  
Consumer: 734 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Short Term, systemic effects  
Consumer: 734 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Short Term, local effects  
Consumer: 367 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Long Term, systemic effects  
Consumer: 367 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Long Term, local effects  
4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate - CAS: 101-68-8  
Worker Industry: 50 mg/kg - Exposure: Human Dermal - Frequency: Short Term, systemic effects  
Worker Industry: 28.7 mg/cm<sup>2</sup> - Exposure: Human Dermal - Frequency: Short Term, local effects  
Worker Industry: 0.1 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Short Term, systemic effects  
Worker Industry: 0.1 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Short Term, local effects  
Worker Industry: 0.05 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Long Term, systemic effects  
Worker Industry: 0.05 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Long Term, local effects  
Consumer: 20 mg/kg - Exposure: Human Oral - Frequency: Short Term, systemic effects  
Consumer: 25 mg/kg - Exposure: Human Dermal - Frequency: Short Term, systemic effects  
Consumer: 17.2 mg/cm<sup>2</sup> - Exposure: Human Dermal - Frequency: Short Term, local effects  
Consumer: 0.05 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Short Term, systemic effects  
Consumer: 0.05 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Short Term, local effects  
Consumer: 0.025 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Long Term, systemic effects  
Consumer: 0.025 mg/m<sup>3</sup> - Exposure: Human Inhalation - Frequency: Long Term, local effects  
PNEC Exposure Limit Values  
ethyl acetate - CAS: 141-78-6  
Target: Marine water - Value: 0.026 mg/l  
Target: Freshwater - Value: 0.26 mg/l  
Target: Marine water sediments - Value: 0.034 mg/kg  
Target: Freshwater sediments - Value: 0.34 mg/kg  
Target: Intermittent release - Value: 1.65 mg/l  
Target: STP - Value: 650 mg/l  
Target: Soil - Value: 0.22 mg/kg  
Target: Oral - Value: 200 mg/kg  
4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate - CAS: 101-68-8  
Target: Marine water - Value: 0.1 mg/l  
Target: Freshwater - Value: 1 mg/l  
Target: Intermittent release - Value: 10 mg/l  
Target: STP - Value: 1 mg/l  
Target: Soil - Value: 1 mg/kg

### 8.2. Exposure controls

#### Eye protection:

Use safety goggles or close fitting safety goggles, don't use eye lens.

#### Skin protection:

Wear suitable protective clothing.



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### Hand protection:

Use protective gloves that provides comprehensive protection, e.g. P.V.C., neoprene or rubber.

### Respiratory protection:

Use adequate protective respiratory equipment, e.g. A2-P2.

## SECTION 9: Physical and chemical properties

### 9.1. Information on basic physical and chemical properties

Properties	Value	Method:	Notes:
Appearance and colour:	Clear liquid	--	--
Odour:	Solvent-like	--	--
Odour threshold:	N.A.	--	--
pH:	N.A.	--	--
Melting point / freezing point:	N.A.	--	--
Boiling point:	77 °C	--	--
Flash point:	1 °C	--	--
Evaporation rate:	N.A.	--	--
Solid/gas flammability:	N.A.	--	--
Upper/lower flammability or explosive limits:	N.A.	--	--
Vapour pressure:	9.83 kPa @ 20°C	--	--
Vapour density:	>1	--	--
Relative density:	1.1 g/cm <sup>3</sup>	--	--
Solubility in water:	Insoluble, REACTS WITH WATER	--	--
Solubility in oil:	N.A.	--	--
Partition coefficient (n-octanol/water):	N.A.	--	--
Auto-ignition temperature:	N.A.	--	--
Decomposition temperature:	N.A.	--	--
Viscosity:	N.A.	--	--
Explosive properties:	N.A.	--	--
Oxidizing properties:	N.A.	--	--

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

### 9.2. Other information

Properties	Value	Method:	Notes:
Miscibility:	N.A.	--	--
Fat Solubility:	N.A.	--	--



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Conductivity:	N.A.	--	--
Substance Groups relevant properties	N.A.	--	--

### SECTION 10: Stability and reactivity

#### 10.1. Reactivity

Stable under normal conditions of storage and manipulation.

#### 10.2. Chemical stability

Stable under normal conditions of storage and manipulation.

#### 10.3. Possibility of hazardous reactions

Exothermic reaction with amines and alcohols; reacts with water forming CO<sub>2</sub>: in closed containers, risk of bursting owing to increase of pressure.

It may generate flammable gases on contact with elementary metals (alkalis and alkaline earth, alloys in powder or vapours) and powerful reducing agents.

It may generate toxic gases on contact with oxidising mineral acids, and powerful oxidising agents.

#### 10.4. Conditions to avoid

Stable under normal conditions.

#### 10.5. Incompatible materials

This information is not available.

#### 10.6. Hazardous decomposition products

No hazardous decomposition products when stored and handled correctly.

### SECTION 11: Toxicological information

#### 11.1. Information on toxicological effects

Toxicological information of the product:

N.A.

Toxicological information of the main substances found in the product:

ethyl acetate - CAS: 141-78-6

a) acute toxicity:

Test: LD50 - Route: Oral - Species: Mouse 4100 mg/kg

Test: LD50 - Route: Skin - Species: Rabbit > 20000 mg/kg

Test: LC50 - Route: Inhalation - Species: Rat > 6000 ppm - Duration: 6h

b) skin corrosion/irritation:

Test: Skin Irritant - Route: Skin - Species: Rabbit Positive - Source: OECD 404

c) serious eye damage/irritation:

Test: Eye Irritant - Route: Eyes - Species: Rabbit Positive - Source: OECD 405

d) respiratory or skin sensitisation:

Test: Skin Sensitization - Route: Skin - Species: Guinea pig Negative - Source: OECD 406

i) STOT-repeated exposure:

Test: NOAEC - Route: Inhalation - Species: Rat Negative 750 ppm - Duration: 100 days -

Source: OECD 424 - Notes: Target: Central nervous system





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Toxicological kinetics, metabolism and distribution information:

Test: NOAEL - Route: Oral - Species: Rat 900 mg/kg - Duration: 90 days - Source: OECD 410

Test: NOEC - Route: Inhalation - Species: Rat 350 ppm - Duration: 90 days - Source: OECD 413

Test: LOEC - Route: Inhalation - Species: Rat 350 ppm - Duration: 90 days - Source: OECD 413

4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate - CAS: 101-68-8

a) acute toxicity:

Test: LD50 - Route: Oral - Species: Rat > 2000 mg/kg - Source: Dir. 84/449/CEE, B.1

Test: LD50 - Route: Skin - Species: Rabbit > 9400 mg/kg - Source: OECD 402

Test: LC50 - Route: Inhalation Mist - Species: Rat 0.368 mg/l - Duration: 4h - Source: OECD 403

Test: LC50 - Route: Inhalation Mist - Species: Rat > 2.24 mg/l - Duration: 1h - Source: OECD 403

b) skin corrosion/irritation:

Test: Skin Irritant - Route: Skin - Species: Rabbit Positive - Duration: 4h - Source: OECD 404

c) serious eye damage/irritation:

Test: Eye Irritant - Route: Eyes - Species: Rabbit Negative - Duration: 24h - Source: OECD 405

d) respiratory or skin sensitisation:

Test: Skin Sensitization - Route: Skin - Species: Mouse Positive - Source: OECD 429

i) STOT-repeated exposure:

Test: NOAEC - Route: Inhalation (aerosol) - Species: Rat Positive 1 mg/m<sup>3</sup> - Duration: 2 years - Source: OECD 453 - Notes: Target: respiratory tract

Toxicological kinetics, metabolism and distribution information:

Test: NOAEL - Route: Inhalation (aerosol) - Species: Rat 0.2 g/m<sup>3</sup> - Duration: 2 years - Source: OECD 453

Test: LOAEL - Route: Inhalation (aerosol) - Species: Rat 1 g/m<sup>3</sup> - Duration: 2 years - Source: OECD 453

If not differently specified, the information required in Regulation (EU)2015/830 listed below must be considered as N.A.:

- a) acute toxicity;
- b) skin corrosion/irritation;
- c) serious eye damage/irritation;
- d) respiratory or skin sensitisation;
- e) germ cell mutagenicity;
- f) carcinogenicity;
- g) reproductive toxicity;
- h) STOT-single exposure;
- i) STOT-repeated exposure;
- j) aspiration hazard.

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## SECTION 12: Ecological information

### 12.1. Toxicity

Adopt sound working practices, so that the product is not released into the environment.

ethyl acetate - CAS: 141-78-6

a) Aquatic acute toxicity:

Endpoint: LC50 - Species: Fish 230 mg/l - Duration h: 96 - Notes: Method OECD 203

Endpoint: EC50 - Species: Daphnia 100 mg/l - Duration h: 48

Endpoint: EC50 - Species: Algae 5600 mg/l - Duration h: 48



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- Endpoint: NOEC - Species: Algae > 100 mg/l - Duration h: 72 - Notes: Method OECD 201
- b) Aquatic chronic toxicity:  
Endpoint: NOEC - Species: Fish < 9.65 mg/l - Duration h: 96 - Notes: Method OECD 212  
Endpoint: NOEC - Species: Daphnia 2.4 mg/l - Duration h: 504
- c) Bacteria toxicity:  
Endpoint: NOEC - Species: Pseudomonas putida 650 mg/l - Duration h: 16
- 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate - CAS: 101-68-8
- a) Aquatic acute toxicity:  
Endpoint: LC50 - Species: Fish > 1000 mg/l - Duration h: 96 - Notes: Method OECD 203  
Endpoint: EC50 - Species: Daphnia > 1000 mg/l - Duration h: 24 - Notes: Method OECD 202  
Endpoint: EC50 - Species: Algae 1640 mg/l - Duration h: 72 - Notes: Method OECD 201
- b) Aquatic chronic toxicity:  
Endpoint: NOEC - Species: Daphnia >= 10 mg/l - Duration h: 504 - Notes: Method OECD 211
- c) Bacteria toxicity:  
Endpoint: EC50 - Species: Activated sludge > 100 mg/l - Duration h: 3 - Notes: Method OECD 209
- d) Terrestrial toxicity:  
Endpoint: LC50 - Species: Earthworm > 1000 mg/kg - Duration h: 336 - Notes: Method OECD 207
- e) Plant toxicity:  
Endpoint: EC50 - Species: Avena sativa > 1000 mg/kg - Duration h: 336 - Notes: Method OECD 208

#### 12.2. Persistence and degradability

- ethyl acetate - CAS: 141-78-6  
Biodegradability: Readily biodegradable - Test: Biochemical oxygen demand - Duration: 28 days - %: 70 - Notes: Method OECD 301
- 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate - CAS: 101-68-8  
Biodegradability: Non-readily biodegradable - Test: Biochemical oxygen demand - Duration: 28 days - %: 0 - Notes: Method OECD 302C

#### 12.3. Bioaccumulative potential

- ethyl acetate - CAS: 141-78-6  
Bioaccumulation: Not much bioaccumulative - Test: BCF - Bioconcentration factor 30 - Duration: 3 days
- Test: LogKow 0.68
- 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate - CAS: 101-68-8  
Bioaccumulation: Not bioaccumulative - Test: BCF - Bioconcentration factor 200 - Duration: 28 days - Notes: Method OECD 305E  
Test: LogKow 4.51 - Notes: Method OECD 117

#### 12.4. Mobility in soil

- ethyl acetate - CAS: 141-78-6  
Mobility in soil: Mobile

#### 12.5. Results of PBT and vPvB assessment

vPvB Substances: None - PBT Substances: None

#### 12.6. Other adverse effects

Information not available.

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## SECTION 13: Disposal considerations

### 13.1. Waste treatment methods



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Recover, if possible. Send to authorised disposal plants or for incineration under controlled conditions. In so doing, comply with the local and national regulations currently in force.

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#### SECTION 14: Transport information

- 14.1. UN number  
ADR-UN number: UN 1866  
IATA-Un number: UN 1866  
IMDG-Un number: UN 1866
- 14.2. UN proper shipping name  
ADR-Shipping Name: Resin solution
- 14.3. Transport hazard class(es)  
ADR-Class: 3  
IATA-Class: 3  
IMDG-Class: 3
- 14.4. Packing group  
ADR-Packing Group: II  
IATA-Packing group: II  
IMDG-Packing group: II
- 14.5. Environmental hazards
- 14.6. Special precautions for user  
IMDG-EMS: F-E,S-E
- 14.7. Transport in bulk according to Annex II of Marpol and the IBC Code  
N.A.

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#### SECTION 15: Regulatory information

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

Dir. 98/24/EC (Risks related to chemical agents at work)  
Dir. 2000/39/EC (Occupational exposure limit values)  
Regulation (EC) n. 1907/2006 (REACH)  
Regulation (EC) n. 1272/2008 (CLP)  
Regulation (EC) n. 790/2009 (ATP 1 CLP)  
Regulation (EU) 2015/830  
Regulation (EU) n. 286/2011 (ATP 2 CLP)  
Regulation (EU) n. 618/2012 (ATP 3 CLP)  
Regulation (EU) n. 487/2013 (ATP 4 CLP)  
Regulation (EU) n. 944/2013 (ATP 5 CLP)  
Regulation (EU) n. 605/2014 (ATP 6 CLP)  
Regulation (EU) n. 2015/1221 (ATP 7 CLP)  
Regulation (EU) n. 2016/918 (ATP 8 CLP)  
Regulation (EU) n. 2016/1179 (ATP 9 CLP)  
Regulation (EU) n. 2017/776 (ATP 10 CLP)

Restrictions related to the product or the substances contained according to Annex XVII Regulation (EC) 1907/2006 (REACH) and subsequent modifications:

Restrictions related to the product:

Restriction 3  
Restriction 40

Restrictions related to the substances contained:

Restriction 56



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Where applicable, refer to the following regulatory provisions:

Directive 2012/18/EU (Seveso III)

Regulation (EC) nr.648/2004 (detergents).

Dir. 2004/42/EC (VOC directive)

WGK Classification (Water hazard class - Verwaltungsvorschrift wassergefährdende Stoffe)

Provisions related to directive EU 2012/18 (Seveso III):

Seveso III category according to Annex 1, part 1

Product belongs to category: P5c

### 15.2. Chemical safety assessment

No Chemical Safety Assessment has been carried out for the mixture.

Substances for which a Chemical Safety Assessment has been carried out:

ethyl acetate

4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

## SECTION 16: Other information

Text of phrases referred to under heading 3:

H225 Highly flammable liquid and vapour.

H319 Causes serious eye irritation.

H336 May cause drowsiness or dizziness.

EUH066 Repeated exposure may cause skin dryness or cracking.

H332 Harmful if inhaled.

H315 Causes skin irritation.

H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

H317 May cause an allergic skin reaction.

H351 Suspected of causing cancer.

H335 May cause respiratory irritation.

H373 May cause damage to organs through prolonged or repeated exposure if inhaled.

Hazard class and hazard category	Code	Description
Flam. Liq. 2	2.6/2	Flammable liquid, Category 2
Acute Tox. 4	3.1/4/Inhal	Acute toxicity (inhalation), Category 4
Skin Irrit. 2	3.2/2	Skin irritation, Category 2
Eye Irrit. 2	3.3/2	Eye irritation, Category 2
Resp. Sens. 1	3.4.1/1	Respiratory Sensitisation, Category 1
Skin Sens. 1	3.4.2/1	Skin Sensitisation, Category 1
Carc. 2	3.6/2	Carcinogenicity, Category 2
STOT SE 3	3.8/3	Specific target organ toxicity - single exposure, Category 3
STOT RE 2	3.9/2	Specific target organ toxicity - repeated exposure, Category 2

This safety data sheet has been completely updated in compliance to Regulation 2015/830.

This document was prepared by a competent person who has received appropriate training.

Main bibliographic sources:

NIOSH - Registry of toxic effects of chemical substances (1983)

I.N.R.S. - Fiche Toxicologique



**SAPICI**

## **Safety Data Sheet**

### **POLURENE FP 114C**

The information contained herein is based on our state of knowledge at the above-specified date. It refers solely to the product indicated and constitutes no guarantee of particular quality. 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.

It is the duty of the user to ensure that this information is appropriate and complete with respect to the specific use intended.

This MSDS cancels and replaces any preceding release.

ADR:	European Agreement concerning the International Carriage of Dangerous Goods by Road.
ATE:	Acute Toxicity Estimate
ATEmix:	Acute toxicity Estimate (Mixtures)
CAS:	Chemical Abstracts Service (division of the American Chemical Society).
CLP:	Classification, Labeling, Packaging.
DNEL:	Derived No Effect Level.
EINECS:	European Inventory of Existing Commercial Chemical Substances.
GefStoffVO:	Ordinance on Hazardous Substances, Germany.
GHS:	Globally Harmonized System of Classification and Labeling of Chemicals.
IATA:	International Air Transport Association.
IATA-DGR:	Dangerous Goods Regulation by the "International Air Transport Association" (IATA).
ICAO:	International Civil Aviation Organization.
ICAO-TI:	Technical Instructions by the "International Civil Aviation Organization" (ICAO).
IMDG:	International Maritime Code for Dangerous Goods.
INCI:	International Nomenclature of Cosmetic Ingredients.
KSt:	Explosion coefficient.
LC50:	Lethal concentration, for 50 percent of test population.
LD50:	Lethal dose, for 50 percent of test population.
PNEC:	Predicted No Effect Concentration.
RID:	Regulation Concerning the International Transport of Dangerous Goods by Rail.
STEL:	Short Term Exposure limit.
STOT:	Specific Target Organ Toxicity.
TLV:	Threshold Limiting Value.
TWA:	Time-weighted average
WGK:	German Water Hazard Class.



## Exposure Scenario

### Ethyl acetate

<b>Exposure scenario.</b>	
<b>Formulation &amp; (re)packing of substances and mixtures . - Industrial.</b>	
Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.	
<b>Section 1</b>	
Title.	<b>ethyl acetate. Formulation &amp; (re)packing of substances and mixtures . CAS:141-78-6.</b>
Sector(s) of Use:	Industrial (SU3).
Environmental Release Category(ies):	ERC2.
Process Category(ies):	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC9, PROC14, PROC15.
Processes, tasks, activities covered:	Formulation, packing and re-packing of the substance and its mixtures in batch or continuous operations, including storage, materials transfers, mixing, tableting, compression, pelletisation, extrusion, large and small scale packing, sampling, maintenance and associated laboratory activities [GES2_I].
Assessment method:	Health: Used ECETOC TRA model [EE1]. Environment: Used ECETOC TRA model [EE1]. A&B table approach.
<b>Section 2:</b>	<b>Operational conditions and risk management measures.</b>
<b>Section 2.1</b>	<b>Control of environmental exposure:</b>
Product Characteristics:	Substance is a unique structure [PrC1]. Liquid, vapour pressure > 10 kPa at STP [OC5]. Very soluble in water (>10g/l). Slightly toxic to aquatic species. Readily biodegradable [PrC5a]. Low bioaccumulation potential.
Amounts used per site (tonne per year).	1200. (8000 kg/day. )
Frequency and duration of use:	Continuous and batch operation. 150 days per year of operation.
Environmental factors not influenced by risk management:	Local freshwater dilution factor [EF1]: 10. Local marine water dilution factor [EF2]: 100.
Other operational conditions of use affecting environmental exposure.	No specific measures required. Emission Days (days/year) [FD4]: 150.
Technical onsite conditions and measures to reduce or limit discharges, air emissions.	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%) [TCR8]: 88. Assumed industrial waste water treatment plant flow (m3/d): 2000. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].
Organisation measures to prevent/limit release from site.	Bund storage facilities to prevent soil and water pollution in the event of spillage Prevent environmental discharge consistent with regulatory requirements [OMS4]
Conditions and measures related to municipal sewage treatment plant.	Estimated substance removal from wastewater via domestic sewage treatment (%) [STP3]: 88. Assumed domestic sewage treatment plant flow (m3/d) [STP5]: 2000.



## Exposure Scenario Ethyl acetate

Conditions and measures related to external treatment of waste for disposal.	Estimated amount entering waste treatment no greater than: 5%. Type of treatment suitable for waste: approved landfill. Type of treatment suitable for waste: incineration. Removal efficiency (%): 99,98. Treat as hazardous waste. Dispose of waste product or used containers according to local regulations [ENVT12].
Conditions and measures related to external recovery of waste.	Not applicable.
Other environmental control measures additional to above:	Store all VOC-containing wastes in closed, secure containers (e.g., bulk tanks, intermediate bulk containers, drums) [A6].
<b>Section 2.2:</b>	<b>Control of worker exposure.</b>
<b>Product Characteristics:</b>	
Physical form of product:	Liquid, vapour pressure > 10 kPa at STP [OC5].
Concentration of substance in product:	Covers percentage substance in the product up to 100 % (unless stated differently) [G13 ].
Amounts used:	Not applicable.
Frequency and duration of use:	Covers daily exposures up to 8 hours (unless stated differently) [G2]. Continuous and batch operation.
Human factors not influenced by risk management:	none.
Other operational conditions affecting worker exposure:	Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17].
Technical conditions and measures at a process level to prevent release and technical conditions and measures to control dispersion from source towards workers:	Formulation activity is assumed to be a predominantly enclosed process [A10].
<b>Contributing Scenarios:</b>	
General measures (skin irritants) [G19]:	If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes [PPE20].
ES3-CS1: Use in closed process, no likelihood of exposure [PROC 1]. General exposures (closed systems) [CS15]. no sampling [CS57]. (In line injection of process chemicals by fixed dose pumping. )	Handle substance within a closed system [E47].
ES3-CS2: Use in closed, continuous process with occasional controlled exposure [PROC 2]. General exposures (closed systems) [CS15]. with sample collection [CS56].	Handle substance within a closed system [E47].
ES3-CS3: Use in closed batch process (synthesis or formulation) [PROC 3]. General exposures (closed systems) [CS15]. (In line injection of process chemicals by fixed dose pumping. )Batch process [CS55].	Handle substance within a closed system [E47].
ES3-CS4: Use in batch and other process (synthesis) where opportunity for exposure arises [PROC 4]. General exposures (open systems) [CS16]. Batch process [CS55].	Provide extract ventilation to points where emissions occur [E54].





## Exposure Scenario Ethyl acetate

ES3-CS5: Use in closed batch process (synthesis or formulation) [PROC 3]. Batch processes at elevated temperatures [CS136].	Handle substance within a predominantly closed system provided with extract ventilation [E49]. Formulate in enclosed or ventilated mixing vessels [E46].
ES3-CS6: Use in closed batch process (synthesis or formulation) [PROC 3]. Process sampling [CS2].	No specific measures identified [E118].
ES3-CS7: Use as laboratory reagent [PROC 15]. Laboratory activities [CS36].	No specific measures identified [E118].
ES3-CS8: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities [PROC 8b]. Bulk transfers [CS14].	Transfer via enclosed lines [E52]. Clear transfer lines prior to de-coupling [E39].
ES3-CS9: Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant contact) [PROC 5]. Mixing operations (open systems) [CS30].	Provide extract ventilation to points where emissions occur [E54].
ES3-CS10: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities [PROC 8a]. Transfer from/pouring from containers [CS22]. Manual [CS34].	Provide extract ventilation to material transfer points and other openings [E82].
ES3-CS11: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities [PROC 8b]. Drum/batch transfers [CS8].	Ensure material transfers are under containment or extract ventilation [E66].
ES3-CS12: Production of preparations or articles by tableting, compression, extrusion, pelletisation [PROC 14]. Production or preparation or articles by tableting, compression, extrusion or pelletisation [CS100].	Handle substance within a predominantly closed system provided with extract ventilation [E49].
ES3-CS13: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) [PROC 9]. Drum and small package filling [CS6].	Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51].
ES3-CS14: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities [PROC 8a]. Equipment cleaning and maintenance [CS39].	Drain down and flush system prior to equipment break-in or maintenance [E55]. Retain drain downs in sealed storage pending disposal or for subsequent recycle [ENVT4].
ES3-CS15: Use in closed, continuous process with occasional controlled exposure [PROC 2]. Storage [CS67]. with sample collection [CS56].	Store substance within a closed system [E84]. Locate bulk storage outdoors [E2].
<b>Section 3:</b>	<b>Exposure estimation:</b>
<b>Environment:</b>	Maximum exposure resulting from contributing scenarios described.
ES3-ES3: ERC2.	Release fraction to air from process (initial release prior to RMM) [OOC4]: 0,005. Release fraction to wastewater from process (initial release prior to RMM) [OOC5]: 0,003. Release fraction to soil from process (initial release prior to RMM) [OOC6]: 0,0001.
PEC for microorganisms in STP: 012E+00mg/l. Risk characterisation ratio: 185E-04. Local PEC in surface water: 1.440E-04mg/l. Risk characterisation ratio: 5.538E-04. Local PEC in fresh water sediment: 8.610E-04mg/kgdw. Risk characterisation ratio: 6.888E-04. Local PEC in sea water during emission episode: 144E-04mg/l. Risk characterisation ratio: 5.538E-04. Local PEC in marine sediment: 862E-04mg/kgdw. Risk characterisation ratio: 6.896E-04. Local PEC in	





## Exposure Scenario Ethyl acetate

soil: 671E-04mg/kgdw. Risk characterisation ratio: 4.067E-04. Risk from environmental exposure is driven by marine sediment [TCR1d].	
<b>Health:</b>	exposure resulting from contributing scenario ES3-CS1: Inhalation (vapour). 8 hour average 0,01ppm. Risk characterisation ratio: <0.001. Dermal: 0,03mg/kg/day. Risk characterisation ratio: <0.001. Combined routes: Risk characterisation ratio: <0.001
exposure resulting from contributing scenario ES3-CS2: Inhalation (vapour). 8 hour average 25ppm. Risk characterisation ratio: 0,125. Dermal: 1,4mg/kg/day. Risk characterisation ratio: 0,022. Combined routes: Risk characterisation ratio: 0,147	
exposure resulting from contributing scenario ES3-CS3: Inhalation (vapour). 8 hour average 50ppm. Risk characterisation ratio: 0,25. Dermal: 0,69mg/kg/day. Risk characterisation ratio: 0,011. Combined routes: Risk characterisation ratio: 0,261	
exposure resulting from contributing scenario ES3-CS4: Inhalation (vapour). 8 hour average 10ppm. Risk characterisation ratio: 0,05. Dermal: 6,9mg/kg/day. Risk characterisation ratio: 0,109. Combined routes: Risk characterisation ratio: 0,159	
exposure resulting from contributing scenario ES3-CS5: Inhalation (vapour). 8 hour average 13ppm. Risk characterisation ratio: 0,063. Dermal: 0,69mg/kg/day. Risk characterisation ratio: 0,011. Combined routes: Risk characterisation ratio: 0,0734	
exposure resulting from contributing scenario ES3-CS6: Inhalation (vapour). 8 hour average 50ppm. Risk characterisation ratio: 0,25. Dermal: 0,69mg/kg/day. Risk characterisation ratio: 0,011. Combined routes: Risk characterisation ratio: 0,261	
exposure resulting from contributing scenario ES3-CS7: Inhalation (vapour). 8 hour average 50ppm. Risk characterisation ratio: 0,25. Dermal: 0,34mg/kg/day. Risk characterisation ratio: 0,005. Combined routes: Risk characterisation ratio: 0,255	
exposure resulting from contributing scenario ES3-CS8: Inhalation (vapour). 8 hour average 30ppm. Risk characterisation ratio: 0,15. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,368	
exposure resulting from contributing scenario ES3-CS9: Inhalation (vapour). 8 hour average 25ppm. Risk characterisation ratio: 0,125. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,343	
exposure resulting from contributing scenario ES3-CS10: Inhalation (vapour). 8 hour average 25ppm. Risk characterisation ratio: 0,125. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,343	
exposure resulting from contributing scenario ES3-CS11: Inhalation (vapour). 8 hour average 7,5ppm. Risk characterisation ratio: 0,038. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,255	
exposure resulting from contributing scenario ES3-CS12: Inhalation (vapour). 8 hour average 25ppm. Risk characterisation ratio: 0,125. Dermal: 3,4mg/kg/day. Risk characterisation ratio: 0,054. Combined routes: Risk characterisation ratio: 0,179	
exposure resulting from contributing scenario ES3-CS13: Inhalation (vapour). 8 hour average 20ppm. Risk characterisation ratio: 0,1. Dermal: 6,9mg/kg/day. Risk characterisation ratio: 0,109. Combined routes: Risk characterisation ratio: 0,209	
exposure resulting from contributing scenario ES3-CS14: Inhalation (vapour). 8 hour average 25ppm. Risk characterisation ratio: 0,125. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,343	
exposure resulting from contributing scenario ES3-CS15: Inhalation (vapour). 8 hour average 25ppm. Risk characterisation ratio: 0,125. Dermal: 1,4mg/kg/day. Risk characterisation ratio: 0,022. Combined routes: Risk characterisation ratio: 0,147	



## Exposure Scenario Ethyl acetate

Risk management measures described will protect against acute exposure. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects [G32]. Risk Management Measures are based on qualitative risk characterisation [G37].	
<b>Section 4:</b>	<b>Guidance to check compliance with the exposure scenario</b>
<b>Environment:</b>	Msafe: 11600kg/day. Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].
$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$	
<p>where: mspERC: Substance use rate in spERC. EER,spERC: Efficacy of RMM in spERC. Frelease,,spERC: Initial release fraction in spERC. DFspERC: dilution factor of STP effluent in river. msite: Substance use rate at site. EER,site: Efficacy of RMM at site. Frelease,,site: Initial release fraction at site. DFsite: dilution factor of STP effluent in river.</p>	
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required [DSU8].	
<b>Health:</b>	Inhalation (vapour). No corrections required as all exposures are assumed to be for 8 hours (worse case assessment).
Dermal: No corrections required as all exposures are assumed to be substance concentrations of up to 100%.	



## Exposure Scenario Ethyl acetate

<b>Exposure scenario</b>	
<b>Uses in Coatings. - Industrial.</b>	
Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.	
<b>Section 1</b>	
Title:	<b>ethyl acetate. Uses in Coatings. CAS:141-78-6.</b>
Sector(s) of Use:	Industrial (SU3).
Environmental Release Category(ies):	ERC4.; ESVOC SpERC 4.3a.v1
Process Category(ies):	PROC1, PROC2, PROC3, PROC4, PROC5, PROC7, PROC8a, PROC8b, PROC9, PROC10, PROC13, PROC14, PROC15.
Processes, tasks, activities covered:	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, spreader, dip, flow, fluidised bed on production lines and film formation) and equipment cleaning, maintenance and associated laboratory activities [GES3_I].
Assessment method:	Health: Used ECETOC TRA model [EE1]. Environment: Used ECETOC TRA model [EE1]. A&B table approach. (Release factors. SpERC.)
<b>Section 2:</b>	<b>Operational conditions and risk management measures.</b>
<b>Section 2.1</b>	<b>Control of environmental exposure:</b>
Product Characteristics:	Substance is a unique structure [PrC1]. Liquid, vapour pressure > 10 kPa at STP [OC5]. Very soluble in water (>10g/l). Slightly toxic to aquatic species. Readily biodegradable [PrC5a]. Low bioaccumulation potential.
Amounts used per site (tonne per year).	300. (1000 kg/day. )
Frequency and duration of use:	Continuous process [CS54]. 300 days per year of operation.
Environmental factors not influenced by risk management:	Local freshwater dilution factor [EF1]: 10. Local marine water dilution factor [EF2]: 100.
Other operational conditions of use affecting environmental exposure.	No specific measures required. Emission Days (days/year) [FD4]: 300. Continuous release [FD2].
Technical onsite conditions and measures to reduce or limit discharges, air emissions.	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation. Soil emission controls are not applicable as there is no direct release to soil [TCR4]. Use a wet scrubber or dry filtration system to control air emissions of aerosols. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%) [TCR8]: 88. Assumed industrial waste water treatment plant flow (m3/d): 2000. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].
Organisation measures to prevent/limit release from site.	Bund storage facilities to prevent soil and water pollution in the event of spillage Prevent environmental



## Exposure Scenario Ethyl acetate

	discharge consistent with regulatory requirements [OMS4]
Conditions and measures related to municipal sewage treatment plant.	Estimated substance removal from wastewater via domestic sewage treatment (%) [STP3]: 88. Assumed domestic sewage treatment plant flow (m3/d) [STP5]: 2000.
Conditions and measures related to external treatment of waste for disposal.	Estimated amount entering waste treatment no greater than: 5%. Type of treatment suitable for waste: cement kiln fuels. Removal efficiency (%): 99,98. Type of treatment suitable for waste: incineration. Removal efficiency (%): 99,98. Treat as hazardous waste. Dispose of waste product or used containers according to local regulations [ENVT12].
Conditions and measures related to external recovery of waste.	Not applicable.
Other environmental control measures additional to above:	Store all VOC-containing wastes in closed, secure containers (e.g., bulk tanks, intermediate bulk containers, drums) [A6].
<b>Section 2.2:</b>	<b>Control of worker exposure.</b>
<b>Product Characteristics:</b>	
Physical form of product:	Liquid, vapour pressure > 10 kPa at STP [OC5].
Concentration of substance in product:	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used:	Not applicable.
Frequency and duration of use:	Covers daily exposures up to 8 hours (unless stated differently) [G2]. Continuous process [CS54].
Human factors not influenced by risk management:	none.
Other operational conditions affecting worker exposure:	Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17].
Technical conditions and measures at a process level to prevent release and technical conditions and measures to control dispersion from source towards workers:	none.
<b>Contributing Scenarios:</b>	
General measures (skin irritants) [G19]:	If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes [PPE20].
ES5-CS1: Use in closed process, no likelihood of exposure [PROC 1]. General exposures (closed systems) [CS15].	No specific measures identified [EI18].
ES5-CS2: Use in closed, continuous process with occasional controlled exposure [PROC 2]. General exposures (closed systems) [CS15]. Use in contained systems [CS38]. with sample collection [CS56].	No specific measures identified [EI18].
ES5-CS3: Use in closed, continuous process with occasional controlled exposure [PROC 2]. Film formation - force drying (50 - 100°C). Stoving (>100°C). UV/EB radiation curing [CS94].	Use ventilation to extract vapours from freshly coated articles/objects and surfaces [E56].



## Exposure Scenario

### Ethyl acetate

ES5-CS4: Use in closed batch process (synthesis or formulation) [PROC 3]. Mixing operations (closed systems) [CS29]. General exposures [CS1].	Handle substance within a closed system [E47].
ES5-CS5: Use in batch and other process (synthesis) where opportunity for exposure arises [PROC 4]. Film formation - air drying [CS95].	Use ventilation to extract vapours from freshly coated articles/objects and surfaces [E56].
ES5-CS6: Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant contact) [PROC 5]. Preparation of material for application [CS96]. Mixing operations (open systems) [CS30].	Provide extract ventilation to points where emissions occur [E54].
ES5-CS7: Industrial spraying [PROC 7]. Spraying (automatic/robotic) [CS97].	Carry out in a vented booth or extracted enclosure [E57].
ES5-CS8: Industrial spraying [PROC 7]. Spraying [CS10]. Manual [CS34].	Carry out in a vented booth or extracted enclosure [E57]. , or, Wear a full face respirator conforming to EN140 with Type A filter or better [PPE24]. Change filter cartridge on respirator daily [PPE25].
ES5-CS9: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities [PROC 8a]. Material transfers [CS3]. Non-dedicated facility [CS82].	Provide extract ventilation to material transfer points and other openings [E82].
ES5-CS10: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities [PROC 8b]. Material transfers [CS3]. Dedicated facility [CS81].	Ensure material transfers are under containment or extract ventilation [E66].
ES5-CS11: Roller application or brushing [PROC 10]. Roller, spreader, flow application [CS98].	Provide extract ventilation to points where emissions occur [E54].
ES5-CS12: Treatment of articles by dipping and pouring [PROC 13]. Dipping, immersion and pouring [CS4].	Provide extract ventilation to points where emissions occur [E54].
ES5-CS13: Use as laboratory reagent [PROC 15]. Laboratory activities [CS36].	No specific measures identified [E118].
ES5-CS14: Transfer of substance or preparation into small containers (dedicated filling line, including weighing) [PROC 9]. Material transfers [CS3]. Drum/batch transfers [CS8]. Transfer from/pouring from containers [CS22].	Fill containers/cans at dedicated fill points supplied with local extract ventilation [E51].
ES5-CS15: Production of preparations or articles by tableting, compression, extrusion, pelletisation [PROC 14]. Production or preparation or articles by tableting, compression, extrusion or pelletisation [CS100].	Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings [E60].
<b>Section 3:</b>	<b>Exposure estimation:</b>
<b>Environment:</b>	Maximum exposure resulting from contributing scenarios described.
ES5-ES5: ERC4.	Conditions given in SPERC fact sheet give rise to following releases fractions [OOC29]. (ESVOC SpERC 4.3a.v1).Release fraction to air from process (initial release prior to RMM) [OOC4]: 0,98.Release fraction to wastewater from process (initial release prior to RMM)



## Exposure Scenario Ethyl acetate

	[OOC5]: 0,02.Release fraction to soil from process (initial release prior to RMM) [OOC6]: 0.
<p>PEC for microorganisms in STP: 010E+00mg/l. Risk characterisation ratio: 154E-04.Local PEC in surface water: 1.200E-04mg/l. Risk characterisation ratio: 4.615E-04.Local PEC in fresh water sediment: 7.180E-04mg/kgdw. Risk characterisation ratio: 5.744E-04.Local PEC in sea water during emission episode: 120E-04mg/l. Risk characterisation ratio: 4.615E-04.Local PEC in marine sediment: 719E-04mg/kgdw. Risk characterisation ratio: 5.752E-04.Local PEC in soil: 832E-04mg/kgdw. Risk characterisation ratio: 5.042E-04.Risk from environmental exposure is driven by marine sediment [TCR1d].</p>	
<b>Health:</b>	<p>exposure resulting from contributing scenario ES5-CS1: Inhalation (vapour). 8 hour average 0,01ppm.Risk characterisation ratio: &lt;0.001. Dermal: 0,03mg/kg/day. Risk characterisation ratio: &lt;0.001. Combined routes: Risk characterisation ratio: &lt;0.001</p>
<p>exposure resulting from contributing scenario ES5-CS2: Inhalation (vapour). 8 hour average 25ppm.Risk characterisation ratio: 0,125. Dermal: 1,4mg/kg/day. Risk characterisation ratio: 0,022. Combined routes: Risk characterisation ratio: 0,147</p>	
<p>exposure resulting from contributing scenario ES5-CS3: Inhalation (vapour). 8 hour average 13ppm.Risk characterisation ratio: 0,063. Dermal: 1,4mg/kg/day. Risk characterisation ratio: 0,022. Combined routes: Risk characterisation ratio: 0,0842</p>	
<p>exposure resulting from contributing scenario ES5-CS4: Inhalation (vapour). 8 hour average 50ppm.Risk characterisation ratio: 0,25. Dermal: 0,69mg/kg/day. Risk characterisation ratio: 0,011. Combined routes: Risk characterisation ratio: 0,261</p>	
<p>exposure resulting from contributing scenario ES5-CS5: Inhalation (vapour). 8 hour average 10ppm.Risk characterisation ratio: 0,05. Dermal: 6,9mg/kg/day. Risk characterisation ratio: 0,109. Combined routes: Risk characterisation ratio: 0,159</p>	
<p>exposure resulting from contributing scenario ES5-CS6: Inhalation (vapour). 8 hour average 25ppm.Risk characterisation ratio: 0,125. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,343</p>	
<p>exposure resulting from contributing scenario ES5-CS7: Inhalation (vapour). 8 hour average 25ppm.Risk characterisation ratio: 0,125. Dermal: 43mg/kg/day. Risk characterisation ratio: 0,68. Combined routes: Risk characterisation ratio: 0,805</p>	
<p>exposure resulting from contributing scenario ES5-CS8: Inhalation (vapour). 8 hour average 25ppm.Risk characterisation ratio: 0,125. Dermal: 43mg/kg/day. Risk characterisation ratio: 0,68. Combined routes: Risk characterisation ratio: 0,805</p>	
<p>exposure resulting from contributing scenario ES5-CS9: Inhalation (vapour). 8 hour average 25ppm.Risk characterisation ratio: 0,125. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,343</p>	
<p>exposure resulting from contributing scenario ES5-CS10: Inhalation (vapour). 8 hour average 7,5ppm.Risk characterisation ratio: 0,038. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,255</p>	
<p>exposure resulting from contributing scenario ES5-CS11: Inhalation (vapour). 8 hour average 25ppm.Risk characterisation ratio: 0,125. Dermal: 27mg/kg/day. Risk characterisation ratio: 0,435. Combined routes: Risk characterisation ratio: 0,56</p>	
<p>exposure resulting from contributing scenario ES5-CS12: Inhalation (vapour). 8 hour average 25ppm.Risk characterisation ratio: 0,125. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,343</p>	
<p>exposure resulting from contributing scenario ES5-CS13: Inhalation (vapour). 8 hour average 50ppm.Risk characterisation ratio: 0,25. Dermal: 0,34mg/kg/day. Risk characterisation ratio: 0,005. Combined routes: Risk characterisation ratio: 0,255</p>	



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exposure resulting from contributing scenario ES5-CS14: Inhalation (vapour). 8 hour average 20ppm. Risk characterisation ratio: 0,1. Dermal: 6,9mg/kg/day. Risk characterisation ratio: 0,109. Combined routes: Risk characterisation ratio: 0,209	
exposure resulting from contributing scenario ES5-CS15: Inhalation (vapour). 8 hour average 25ppm. Risk characterisation ratio: 0,125. Dermal: 3,4mg/kg/day. Risk characterisation ratio: 0,054. Combined routes: Risk characterisation ratio: 0,179	
Risk management measures described will protect against acute exposure. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects [G32]. Risk Management Measures are based on qualitative risk characterisation [G37].	
<b>Section 4:</b>	<b>Guidance to check compliance with the exposure scenario</b>
<b>Environment:</b>	Msafe: 1740kg/day. Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].
$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$ <p>where: m<sub>spERC</sub>: Substance use rate in spERC. E<sub>ER,spERC</sub>: Efficacy of RMM in spERC. F<sub>release,spERC</sub>: Initial release fraction in spERC. DF<sub>spERC</sub>: dilution factor of STP effluent in river. m<sub>site</sub>: Substance use rate at site. E<sub>ER,site</sub>: Efficacy of RMM at site. F<sub>release,site</sub>: Initial release fraction at site. DF<sub>site</sub>: dilution factor of STP effluent in river.</p> <p>If scaling reveals a condition of unsafe use (i.e., RCRs &gt; 1), additional RMMs or a site-specific chemical safety assessment is required [DSU8]. Further details on scaling and control technologies are provided in SpERC factsheet (<a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a>) [DSU4].</p>	
<b>Health:</b>	Inhalation (vapour). No corrections required as all exposures are assumed to be for 8 hours (worse case assessment).
Dermal: No corrections required as all exposures are assumed to be substance concentrations of up to 100%.	





## Exposure Scenario Ethyl acetate

<b>Exposure scenario</b>	
<b>Uses in Coatings. - Professional.</b>	
Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.	
<b>Section 1</b>	
Title:	<b>ethyl acetate. Uses in Coatings. CAS:141-78-6.</b>
Sector(s) of Use:	Professional (SU22).
Environmental Release Category(ies):	ERC8a.; ESVOC SpERC 8.3b.v1; ERC8d.
Process Category(ies):	PROC1, PROC2, PROC3, PROC4, PROC5, PROC8a, PROC8b, PROC10, PROC11, PROC13, PROC15, PROC19.
Processes, tasks, activities covered:	Covers the use in coatings (paints, inks, adhesives, etc) including exposures during use (including materials receipt, storage, preparation and transfer from bulk and semi-bulk, application by spray, roller, brush, spreader by hand or similar methods, and film formation), and equipment cleaning, maintenance and associated laboratory activities [GES3_P].
Assessment method:	Health: Used ECETOC TRA model [EE1]. Environment: Used ECETOC TRA model [EE1].
<b>Section 2:</b>	<b>Operational conditions and risk management measures.</b>
<b>Section 2.1</b>	<b>Control of environmental exposure:</b>
Product Characteristics:	Substance is a unique structure [PrC1]. Liquid, vapour pressure > 10 kPa at STP [OC5]. Very soluble in water (>10g/l). Slightly toxic to aquatic species. Readily biodegradable [PrC5a]. Low bioaccumulation potential.
Amounts used per site (tonne per year).	0,3. (0,822 kg/day. )
Frequency and duration of use:	Continuous process [CS54]. 365 days per year of operation.
Other operational conditions of use affecting environmental exposure.	No specific measures required. Dispersive use [FD3].
Technical onsite conditions and measures to reduce or limit discharges, air emissions.	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation. Use a wet scrubber or dry filtration system to control air emissions of aerosols. All waste water emissions should be discharged to domestic sewage treatment or collected and sent for waste disposal. Onsite wastewater treatment plant is not assumed. Do not release wastewater directly into the environment.
Organisation measures to prevent/limit release from site.	Bund storage facilities to prevent soil and water pollution in the event of spillage [S5]. Prevent environmental discharge consistent with regulatory requirements [OMS4]
Conditions and measures related to external treatment of waste for disposal.	Estimated amount entering waste treatment no greater than: 10%. Type of treatment suitable for





## Exposure Scenario Ethyl acetate

	waste: cement kiln fuels. Removal efficiency (%): 99,98. Type of treatment suitable for waste: incineration. Removal efficiency (%): 99,98. Treat as hazardous waste. Dispose of waste product or used containers according to local regulations [ENVT12]. External treatment and disposal of waste should comply with applicable local and/or national regulations [ETW3].
Conditions and measures related to external recovery of waste.	Not applicable.
Other environmental control measures additional to above:	Store all VOC-containing wastes in closed, secure containers (e.g., bulk tanks, intermediate bulk containers, drums) [A6].
<b>Section 2.2:</b>	<b>Control of worker exposure.</b>
<b>Product Characteristics:</b>	
Physical form of product:	Liquid, vapour pressure > 10 kPa at STP [OC5].
Concentration of substance in product:	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used:	Not applicable.
Frequency and duration of use:	Covers daily exposures up to 8 hours (unless stated differently) [G2]. Continuous process [CS54].
Human factors not influenced by risk management:	none.
Other operational conditions affecting worker exposure:	Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17].
Technical conditions and measures at a process level to prevent release and technical conditions and measures to control dispersion from source towards workers:	none.
<b>Contributing Scenarios:</b>	
General measures (skin irritants) [G19]:	If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes [PPE20].
ES6-CS1: Use in closed process, no likelihood of exposure [PROC 1]. General exposures (closed systems)	No specific measures identified [E18].
ES6-CS2: Use in closed, continuous process with occasional controlled exposure [PROC 2]. Filling / preparation of equipment from drums or containers.	No specific measures identified [E18].
ES6-CS3: Use in closed, continuous process with occasional controlled exposure [PROC 2]. General exposures (closed systems) Surfaces	No specific measures identified [E18].
ES6-CS4: Use in closed batch process (synthesis or formulation) [PROC 3]. Preparation of material for application Printing	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Handle substance within a closed system [E47].
ES6-CS5: Use in batch and other process (synthesis) where opportunity for exposure arises [PROC 4]. Film formation - air drying Indoor	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Limit the substance in product to 20 % [OC21]., or, Use



## Exposure Scenario Ethyl acetate

	ventilation to extract vapours from freshly coated articles/objects and surfaces [E56].
ES6-CS6: Use in batch and other process (synthesis) where opportunity for exposure arises [PROC 4]. Film formation - air dryingOutdoor	Ensure operation is undertaken outdoors [E69]. Limit the substance in product to 20 % [OC21] . , or, Wear a respirator conforming to EN140 with Type A filter or better [PPE22].
ES6-CS7: Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant contact) [PROC 5]. Preparation of material for applicationIndoor	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Provide extract ventilation to points where emissions occur [E54].
ES6-CS8: Mixing or blending in batch processes for formulation of preparations* and articles (multistage and/or significant contact) [PROC 5]. Preparation of material for applicationOutdoor	Ensure operation is undertaken outdoors [E69]. Wear a respirator conforming to EN140 with Type A filter or better [PPE22]. Change filter cartridge on respirator daily [PPE25].
ES6-CS9: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities [PROC 8a]. Material transfers Drum/batch transfers [CS8]. Additive premixing [CS92].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Provide extract ventilation to points where emissions occur [E54].
ES6-CS10: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities [PROC 8b]. Material transfers Drum/batch transfers [CS8]. Bulk weighing [CS91].	Ensure material transfers are under containment or extract ventilation [E66].
ES6-CS11: Roller application or brushing [PROC 10]. Roller, spreader, flow applicationIndoor	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Provide extract ventilation to points where emissions occur [E54].
ES6-CS12: Roller application or brushing [PROC 10]. Roller, spreader, flow applicationOutdoor	Ensure operation is undertaken outdoors [E69]. Wear a respirator conforming to EN140 with Type A filter or better [PPE22]. Change filter cartridge on respirator daily [PPE25].
ES6-CS13: Non industrial spraying [PROC 11]. SprayingManual [CS34]. Indoor [OC8].	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Carry out in a vented booth or extracted enclosure [E57]. Wear suitable gloves tested to EN374 [PPE15]. Wear suitable coveralls to prevent exposure to the skin [PPE27]. Limit the substance content in the product to 25 % [OC18] . , or, Avoid carrying out activities involving exposure for more than 4 hours [OC28].
ES6-CS14: Non industrial spraying [PROC 11]. SprayingManual [CS34]. Outdoor [OC9].	Ensure operation is undertaken outdoors [E69]. Wear a respirator conforming to EN140 with Type A filter or better [PPE22]. Change filter cartridge on respirator daily [PPE25]. Wear suitable gloves tested to EN374 [PPE15]. Wear suitable coveralls to prevent exposure to the skin [PPE27]. Limit the substance content in the product to 25 % [OC18] . , or, Avoid carrying out activities involving exposure for more than 4 hours [OC28].



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ES6-CS15: Treatment of articles by dipping and pouring [PROC 13]. Dipping, immersion and pouringIndoor	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Limit the substance in product to 20 % [OC21].
ES6-CS16: Treatment of articles by dipping and pouring [PROC 13]. Dipping, immersion and pouringOutdoor	Ensure operation is undertaken outdoors [E69]. Limit the substance in product to 20 % [OC21].
ES6-CS17: Use as laboratory reagent [PROC 15]. Large surfaces	No specific measures identified [E118].
ES6-CS18: Hand-mixing with intimate contact and only PPE available [PROC 19]. Hand application - fingerpaints, pastels, adhesivesIndoor	Provide a good standard of controlled ventilation (10 to 15 air changes per hour) [E40]. Wear suitable gloves tested to EN374 [PPE15]. Limit the substance in product to 10 % [OC19]. , or, Wear a respirator conforming to EN140 with Type A filter or better [PPE22].
ES6-CS19: Hand-mixing with intimate contact and only PPE available [PROC 19]. Hand application - fingerpaints, pastels, adhesivesOutdoor	Ensure operation is undertaken outdoors [E69]. Wear suitable gloves tested to EN374 [PPE15]. Limit the substance content in the product to 5 % [OC17]. , or, Wear a respirator conforming to EN140 with Type A filter or better [PPE22].
<b>Section 3:</b>	<b>Exposure estimation:</b>
<b>Environment:</b>	Maximum exposure resulting from contributing scenarios described.
ES6-E6: ERC8a.	Conditions given in SPERC fact sheet give rise to following releases fractions [OOC29]. (ESVOC SpERC 8.3b.v1).Release fraction to air from wide dispersive use (regional only) [OOC7]: 0,98.Release fraction to wastewater from wide dispersive use [OOC8]: 0,01.Release fraction to soil from wide dispersive use (regional only) [OOC9]: 0,01.
PEC for microorganisms in STP: 034E-04mg/l. Risk characterisation ratio: 526E-08.Local PEC in surface water: 005E-04mg/l. Risk characterisation ratio: 018E-04.Local PEC in fresh water sediment: 028E-04mg/kgdw. Risk characterisation ratio: 022E-04.Local PEC in sea water during emission episode: 6.070E-08mg/l. Risk characterisation ratio: 023E-04.Local PEC in marine sediment: 004E-04mg/kgdw. Risk characterisation ratio: 029E-04.Local PEC in soil: 001E-04mg/kgdw. Risk characterisation ratio: 007E-04.Risk from environmental exposure is driven by marine sediment [TCR1d].	
<b>Health:</b>	exposure resulting from contributing scenario ES6-CS1: Inhalation (vapour). 8 hour average 0,0091ppm.Risk characterisation ratio: <0.001. Dermal: 0,03mg/kg/day. Risk characterisation ratio: <0.001. Combined routes: Risk characterisation ratio: <0.001
Inhalation (vapour). 8 hour average 45ppm.Risk characterisation ratio: 0,227. Dermal: 1,4mg/kg/day. Risk characterisation ratio: 0,022. Combined routes: Risk characterisation ratio: 0,248	
exposure resulting from contributing scenario ES6-CS3: Inhalation (vapour). 8 hour average 45ppm.Risk characterisation ratio: 0,227. Dermal: 1,4mg/kg/day. Risk characterisation ratio: 0,022. Combined routes: Risk characterisation ratio: 0,248	
exposure resulting from contributing scenario ES6-CS4: Inhalation (vapour). 8 hour average 63ppm.Risk characterisation ratio: 0,317. Dermal: 0,69mg/kg/day. Risk characterisation ratio: 0,011. Combined routes: Risk characterisation ratio: 0,328	



## Exposure Scenario Ethyl acetate

exposure resulting from contributing scenario ES6-CS5: Inhalation (vapour). 8 hour average 79ppm.Risk characterisation ratio: 0,397. Dermal: 6,9mg/kg/day. Risk characterisation ratio: 0,109. Combined routes: Risk characterisation ratio: 0,505	
exposure resulting from contributing scenario ES6-CS6: Inhalation (vapour). 8 hour average 79ppm.Risk characterisation ratio: 0,397. Dermal: 6,9mg/kg/day. Risk characterisation ratio: 0,109. Combined routes: Risk characterisation ratio: 0,505	
exposure resulting from contributing scenario ES6-CS7: Inhalation (vapour). 8 hour average 63ppm.Risk characterisation ratio: 0,317. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,535	
exposure resulting from contributing scenario ES6-CS8: Inhalation (vapour). 8 hour average 32ppm.Risk characterisation ratio: 0,159. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,376	
exposure resulting from contributing scenario ES6-CS9: Inhalation (vapour). 8 hour average 63ppm.Risk characterisation ratio: 0,317. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,535	
exposure resulting from contributing scenario ES6-CS10: Inhalation (vapour). 8 hour average 23ppm.Risk characterisation ratio: 0,113. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,331	
exposure resulting from contributing scenario ES6-CS11: Inhalation (vapour). 8 hour average 63ppm.Risk characterisation ratio: 0,317. Dermal: 27mg/kg/day. Risk characterisation ratio: 0,435. Combined routes: Risk characterisation ratio: 0,753	
exposure resulting from contributing scenario ES6-CS12: Inhalation (vapour). 8 hour average 32ppm.Risk characterisation ratio: 0,159. Dermal: 27mg/kg/day. Risk characterisation ratio: 0,435. Combined routes: Risk characterisation ratio: 0,594	
exposure resulting from contributing scenario ES6-CS13: Inhalation (vapour). 8 hour average 76ppm.Risk characterisation ratio: 0,381. Dermal: 13mg/kg/day. Risk characterisation ratio: 0,204. Combined routes: Risk characterisation ratio: 0,585	
exposure resulting from contributing scenario ES6-CS14: Inhalation (vapour). 8 hour average 38ppm.Risk characterisation ratio: 0,19. Dermal: 13mg/kg/day. Risk characterisation ratio: 0,204. Combined routes: Risk characterisation ratio: 0,394	
exposure resulting from contributing scenario ES6-CS15: Inhalation (vapour). 8 hour average 79ppm.Risk characterisation ratio: 0,397. Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,614	
exposure resulting from contributing scenario ES6-CS16: Inhalation (vapour). 8 hour average 1,6ppm.Dermal: 14mg/kg/day. Risk characterisation ratio: 0,218. Combined routes: Risk characterisation ratio: 0,218	
exposure resulting from contributing scenario ES6-CS17: Inhalation (vapour). 8 hour average 0,45ppm.Dermal: 0,34mg/kg/day. Risk characterisation ratio: 0,005. Combined routes: Risk characterisation ratio: 0,0054	
exposure resulting from contributing scenario ES6-CS18: Inhalation (vapour). 8 hour average 0,48ppm.Dermal: 28mg/kg/day. Risk characterisation ratio: 0,449. Combined routes: Risk characterisation ratio: 0,449	
exposure resulting from contributing scenario ES6-CS19: Inhalation (vapour). 8 hour average 0,63ppm.Dermal: 5,7mg/kg/day. Risk characterisation ratio: 0,09. Combined routes: Risk characterisation ratio: 0,0898	
Risk management measures described will protect against acute exposure. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects [G32]. Risk Management Measures are based on qualitative risk characterisation [G37].	
<b>Section 4:</b>	<b>Guidance to check compliance with the exposure scenario</b>
<b>Environment:</b>	Msafe: 284kg/day. Not applicable for wide dispersive uses [DSU5].



## Exposure Scenario

### Ethyl acetate

Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ) [DSU4].	
<b>Health:</b>	Inhalation (vapour). No corrections required as all exposures are assumed to be for 8 hours (worse case assessment).
Dermal: To scale from a concentration of 5-25% to 100%, multiply by 1.7. To scale from a concentration of 1-5% to 5-25%, multiply by 3.	



## Exposure Scenario

### Ethyl acetate

<b>Exposure scenario</b>	
<b>Use in laboratories. - Industrial.</b>	
Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.	
<b>Section 1</b>	
Title:	<b>ethyl acetate. Use in laboratories. CAS:141-78-6.</b>
Sector(s) of Use:	Industrial (SU3).
Environmental Release Category(ies):	ERC4.; Industrial. ESVOC SpERC 4.24.v1
Process Category(ies):	PROC10, PROC15.
Processes, tasks, activities covered:	Use of the substance within laboratory settings, including material transfers and equipment cleaning [GES17_I]. Use of small quantities within laboratory settings, including material transfers and equipment cleaning [GES17-P].
Assessment method:	Health: Used ECETOC TRA model [EE1]. Environment: Used ECETOC TRA model [EE1].
<b>Section 2:</b>	<b>Operational conditions and risk management measures.</b>
<b>Section 2.1</b>	<b>Control of environmental exposure:</b>
Product Characteristics:	Substance is a unique structure [PrC1]. Liquid, vapour pressure > 10 kPa at STP [OC5]. Very soluble in water (>10g/l). Slightly toxic to aquatic species. Readily biodegradable [PrC5a]. Low bioaccumulation potential.
Amounts used per site (tonne per year).	20. (1000 kg/day. )
Frequency and duration of use:	Batch process [CS55]. 20 days per year of operation.
Environmental factors not influenced by risk management:	Local freshwater dilution factor [EF1]: 10. Local marine water dilution factor [EF2]: 100.
Other operational conditions of use affecting environmental exposure.	No specific measures required. Emission Days (days/year) [FD4]: 20. Intermittent release [FD1].
Technical onsite conditions and measures to reduce or limit discharges, air emissions.	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation. Treat onsite wastewater (prior to receiving water discharge) to provide the required removal efficiency of ≥ (%) [TCR8]: 88. Assumed industrial waste water treatment plant flow (m3/d): 2000. If discharging to domestic sewage treatment plant, no onsite wastewater treatment required [TCR9].
Organisation measures to prevent/limit release from site.	Bund storage facilities to prevent soil and water pollution in the event of spillage Prevent environmental discharge consistent with regulatory requirements [OMS4]
Conditions and measures related to municipal sewage treatment plant.	Estimated substance removal from wastewater via domestic sewage treatment (%) [STP3]: 88. Assumed domestic sewage treatment plant flow (m3/d) [STP5]: 2000.



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Conditions and measures related to external treatment of waste for disposal.	Estimated amount entering waste treatment no greater than: 95%. Type of treatment suitable for waste: incineration. Removal efficiency (%): 99,98. Treat as hazardous waste. Dispose of waste product or used containers according to local regulations [ENVT12].
Conditions and measures related to external recovery of waste.	Not applicable.
Other environmental control measures additional to above:	Store all VOC-containing wastes in closed, secure containers (e.g., bulk tanks, intermediate bulk containers, drums) [A6].
<b>Section 2.2:</b>	<b>Control of worker exposure.</b>
<b>Product Characteristics:</b>	
Physical form of product:	Liquid, vapour pressure > 10 kPa at STP [OC5].
Concentration of substance in product:	Covers percentage substance in the product up to 100 % (unless stated differently) [G13 ].
Amounts used:	Not applicable.
Frequency and duration of use:	Covers daily exposures up to 8 hours (unless stated differently) [G2]. Batch process [CS55].
Human factors not influenced by risk management:	none.
Other operational conditions affecting worker exposure:	Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17].
Technical conditions and measures at a process level to prevent release and technical conditions and measures to control dispersion from source towards workers:	none.
<b>Contributing Scenarios:</b>	
Risk management measures common to all contributing scenarios.	Avoid manual contact with wet work pieces [E17]. Carefully pour from containers. [E62]. Put lids on containers immediately after use. [E9].
General measures (skin irritants) [G19]:	If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes [PPE20].
ES7a-CS1: Roller application or brushing [PROC 10]. Cleaning [CS47]. Wiping [CS50]. Rolling, Brushing [CS51]. Industrial.	Provide extract ventilation to points where emissions occur [E54]. , or, Handle in a fume cupboard or under extract ventilation [E83].
ES7a-CS2: Use as laboratory reagent [PROC 15]. Laboratory activities [CS36]. Industrial.	No other specific measures identified [E120].
<b>Section 3:</b>	<b>Exposure estimation:</b>
<b>Environment:</b>	Maximum exposure resulting from contributing scenarios described.
ES7a-E7a: ERC4.	Conditions given in SPERC fact sheet give rise to following releases fractions [OOC29]. (Industrial. ESVOC SpERC 4.24.v1).Release fraction to air from process (initial release prior to RMM) [OOC4]: 0,025.Release fraction to wastewater from process (initial release prior to RMM) [OOC5]: 0,02.Release





## Exposure Scenario Ethyl acetate

	fraction to soil from process (initial release prior to RMM) [OOC6]: 0,0001.
PEC for microorganisms in STP: 9.980E-04mg/l. Risk characterisation ratio: 015E-04. Local PEC in surface water: 124E-04mg/l. Risk characterisation ratio: 477E-04. Local PEC in fresh water sediment: 739E-04mg/kgdw. Risk characterisation ratio: 591E-04. Local PEC in sea water during emission episode: 013E-04mg/l. Risk characterisation ratio: 481E-04. Local PEC in marine sediment: 075E-04mg/kgdw. Risk characterisation ratio: 598E-04. Local PEC in soil: 056E-04mg/kgdw. Risk characterisation ratio: 341E-04. Risk from environmental exposure is driven by marine sediment [TCR1d].	
<b>Health:</b>	exposure resulting from contributing scenario ES7a-CS1: Inhalation (vapour). 8 hour average 25ppm. Risk characterisation ratio: 0,125. Dermal: 27mg/kg/day. Risk characterisation ratio: 0,435. Combined routes: Risk characterisation ratio: 0,56
exposure resulting from contributing scenario ES7a-CS2: Inhalation (vapour). 8 hour average 50ppm. Risk characterisation ratio: 0,25. Dermal: 0,34mg/kg/day. Risk characterisation ratio: 0,005. Combined routes: Risk characterisation ratio: 0,255	
Risk management measures described will protect against acute exposure. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects [G32]. Risk Management Measures are based on qualitative risk characterisation [G37].	
<b>Section 4:</b>	<b>Guidance to check compliance with the exposure scenario</b>
<b>Environment:</b>	Guidance is based on assumed operating conditions which may not be applicable to all sites; thus, scaling may be necessary to define appropriate site-specific risk management measures [DSU1].
$\frac{m_{spERC} * (1 - E_{ER,spERC}) * F_{release,spERC}}{DF_{spERC}} \geq \frac{m_{site} * (1 - E_{ER,site}) * F_{release,site}}{DF_{site}}$ <p>where: m<sub>spERC</sub>: Substance use rate in spERC. E<sub>ER,spERC</sub>: Efficacy of RMM in spERC. F<sub>release,spERC</sub>: Initial release fraction in spERC. DF<sub>spERC</sub>: dilution factor of STP effluent in river. m<sub>site</sub>: Substance use rate at site. E<sub>ER,site</sub>: Efficacy of RMM at site. F<sub>release,site</sub>: Initial release fraction at site. DF<sub>site</sub>: dilution factor of STP effluent in river.</p>	
If scaling reveals a condition of unsafe use (i.e., RCRs > 1), additional RMMs or a site-specific chemical safety assessment is required [DSU8]. Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ) [DSU4].	
<b>Health:</b>	Inhalation (vapour). No corrections required as all exposures are assumed to be for 8 hours (worse case assessment).
Dermal: No corrections required as all exposures are assumed to be substance concentrations of up to 100%.	





## Exposure Scenario

### Ethyl acetate

<b>Exposure scenario</b>	
<b>Use in laboratories. - Professional.</b>	
Based on ECHA Template CSA&IR Part D June 08 combined with the GES Narrative Format.	
<b>Section 1</b>	
Title:	<b>ethyl acetate. Use in laboratories. CAS:141-78-6.</b>
Sector(s) of Use:	Professional (SU22).
Environmental Release Category(ies):	ERC8a.; Professional. ESVOC SpERC 8.17.v1
Process Category(ies):	PROC10, PROC15.
Processes, tasks, activities covered:	Use of the substance within laboratory settings, including material transfers and equipment cleaning [GES17_I]. Use of small quantities within laboratory settings, including material transfers and equipment cleaning [GES17-P].
Assessment method:	Health: Used ECETOC TRA model [EE1]. Environment: Used ECETOC TRA model [EE1].
<b>Section 2:</b>	<b>Operational conditions and risk management measures.</b>
<b>Section 2.1</b>	<b>Control of environmental exposure:</b>
Product Characteristics:	Substance is a unique structure [PrC1]. Liquid, vapour pressure > 10 kPa at STP [OC5]. Very soluble in water (>10g/l). Slightly toxic to aquatic species. Readily biodegradable [PrC5a]. Low bioaccumulation potential.
Amounts used per site (tonne per year).	0,75. (2,05 kg/day. )
Frequency and duration of use:	Continuous process [CS54]. 365 days per year of operation.
Other operational conditions of use affecting environmental exposure.	No specific measures required. Dispersive use [FD3].
Technical onsite conditions and measures to reduce or limit discharges, air emissions.	Treatment of air emissions is not required for the purposes of REACH compliance but may be needed to comply with other environmental legislation. Soil emission controls are not applicable as there is no direct release to soil [TCR4]. Onsite wastewater treatment plant is not assumed.
Organisation measures to prevent/limit release from site.	Bund storage facilities to prevent soil and water pollution in the event of spillage Prevent environmental discharge consistent with regulatory requirements [OMS4]
Conditions and measures related to external treatment of waste for disposal.	Estimated amount entering waste treatment no greater than: 10%. Type of treatment suitable for waste: incineration. Removal efficiency (%): 99,98. Treat as hazardous waste. Dispose of waste product or used containers according to local regulations [ENVT12].
Conditions and measures related to external recovery of waste.	Not applicable.
Other environmental control measures additional to above:	Store all VOC-containing wastes in closed, secure containers (e.g., bulk tanks, intermediate bulk containers, drums) [A6].
<b>Section 2.2:</b>	<b>Control of worker exposure.</b>



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<b>Product Characteristics:</b>	
Physical form of product:	Liquid, vapour pressure > 10 kPa at STP [OC5].
Concentration of substance in product:	Covers percentage substance in the product up to 100 % (unless stated differently) [G13].
Amounts used:	Not applicable.
Frequency and duration of use:	Covers daily exposures up to 8 hours (unless stated differently) [G2]. Continuous process [CS54].
Human factors not influenced by risk management:	none.
Other operational conditions affecting worker exposure:	Assumes a good basic standard of occupational hygiene is implemented [G1]. Assumes activities are at ambient temperature (unless stated differently) [G17].
Technical conditions and measures at a process level to prevent release and technical conditions and measures to control dispersion from source towards workers:	none.
<b>Contributing Scenarios:</b>	
Risk management measures common to all contributing scenarios.	Avoid manual contact with wet work pieces [E17]. Carefully pour from containers. [E62]. Put lids on containers immediately after use. [E9].
General measures (skin irritants) [G19]:	If repeated and/or prolonged skin exposure to the substance is likely, then wear suitable gloves tested to EN374 and provide employee skin care programmes [PPE20].
ES7b-CS1: Roller application or brushing [PROC 10]. Cleaning [CS47]. Wiping [CS50]. Rolling, Brushing [CS51]. Professional.	Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour) [E11]. Provide extract ventilation to points where emissions occur [E54]. , or, Handle in a fume cupboard or under extract ventilation [E83].
ES7b-CS2: Use as laboratory reagent [PROC 15]. Laboratory activities [CS36]. Professional.	No other specific measures identified [E120].
<b>Section 3:</b>	
<b>Exposure estimation:</b>	
<b>Environment:</b>	Maximum exposure resulting from contributing scenarios described.
ES7b-E7b: ERC8a.	Conditions given in SPERC fact sheet give rise to following releases fractions [OOC29]. (Professional. ESVOC SpERC 8.17.v1).Release fraction to air from wide dispersive use (regional only) [OOC7]: 0,5.Release fraction to wastewater from wide dispersive use [OOC8]: 0,5.Release fraction to soil from wide dispersive use (regional only) [OOC9]: 0.
PEC for microorganisms in STP: 514E-04mg/l. Risk characterisation ratio: 7.908E-08.Local PEC in surface water: 010E-04mg/l. Risk characterisation ratio: 040E-04.Local PEC in fresh water sediment: 062E-04mg/kgdw. Risk characterisation ratio: 050E-04.Local PEC in sea water during emission episode: 001E-04mg/l. Risk characterisation ratio: 045E-04.Local PEC in marine sediment: 007E-04mg/kgdw. Risk characterisation ratio: 056E-04.Local PEC in soil: 004E-04mg/kgdw. Risk characterisation ratio: 023E-04.Risk from environmental exposure is driven by marine sediment [TCR1d].	
<b>Health:</b>	exposure resulting from contributing scenario ES7b-CS1: Inhalation (vapour). 8 hour average 70ppm.Risk characterisation ratio: 0,35. Dermal: 27mg/kg/day. Risk



## Exposure Scenario Ethyl acetate

	characterisation ratio: 0,435. Combined routes: Risk characterisation ratio: 0,785
exposure resulting from contributing scenario ES7b-CS2: Inhalation (vapour). 8 hour average 50ppm. Risk characterisation ratio: 0,25. Dermal: 0,34mg/kg/day. Risk characterisation ratio: 0,005. Combined routes: Risk characterisation ratio: 0,255	
Risk management measures described will protect against acute exposure. Available hazard data do not enable the derivation of a DNEL for dermal irritant effects [G32]. Risk Management Measures are based on qualitative risk characterisation [G37].	
<b>Section 4:</b>	<b>Guidance to check compliance with the exposure scenario</b>
<b>Environment:</b>	Not applicable for wide dispersive uses [DSU5].
Further details on scaling and control technologies are provided in SpERC factsheet ( <a href="http://cefic.org/en/reach-for-industries-libraries.html">http://cefic.org/en/reach-for-industries-libraries.html</a> ) [DSU4].	
<b>Health:</b>	Inhalation (vapour). No corrections required as all exposures are assumed to be for 8 hours (worse case assessment).
Dermal: No corrections required as all exposures are assumed to be substance concentrations of up to 100%.	



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

#### Exposure scenario

Use of MDI for Manufacturing of other Substances and Formulation (including Resin Manufacture), Repackaging and Distribution

Section 1	Exposure Scenario Title
Title	<b>Use of MDI for Manufacturing other Substances and Formulation (including Resin Manufacture), Repackaging &amp; Distribution</b>
Use Descriptor	Sector of Use for Manufacturing of other Substances: SU 3, SU 8, SU 9 Sector of use Formulating (including Resin Manufacture), Repackaging & Distribution: SU 3, SU 10
Process Categories and Environmental Release Categories: A) Use as intermediate PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 15 ERC2, ERC3, ERC6a B) Formulating (including Resin Manufacture), Repackaging & Distribution PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 9, PROC 15 ERC2, ERC3, ERC6a	
Processes, tasks, activities covered	Covers: Industrial: PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging) PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, maintenance, equipment cleaning, occasional interventions) PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment breaks) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during use, sampling, maintenance, equipment breaks) PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact) (e.g. mixing) PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging) PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

	<p>dedicated facilities (e.g. drum filling, sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing)</p> <p>PROC 15: Use as a laboratory reagent</p>
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<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<i>Field for additional statements to explain scenario if required.</i>	
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product characteristics</b>	
Physical form of product	Physical state: liquid (only solid when specifically mentioned)
Concentration of substance in product	G13: Covers percentage substance in the product up to 100% (unless stated differently).
Amounts used	Not applicable.
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	None identified.

<b>Contributing Scenarios</b>	<b>Risk Management Measures</b> <i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection</i>
All contributing scenarios at product temperatures below 40°C for pure MDI or below 45°C for other MDI based substances	<ul style="list-style-type: none"> <li>- E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).</li> <li>- E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop.</li> <li>- PPE14: Use suitable eye protection and gloves</li> <li>- EI 19: Ensure operatives are trained to minimise exposures.</li> <li>- PPE27: Wear suitable coveralls to prevent exposure to the skin.</li> </ul>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<p>All contributing scenarios at product temperatures above 40 °C for pure MDI or above 45 °C for other MDI based substances</p>	<ul style="list-style-type: none"> <li>- Same as above, and:</li> <li>- E54: Provide extract ventilation to points where emissions occur.</li> <li>Or</li> <li>- E82: Provide extract ventilation to material transfer points and other openings.</li> <li>Or</li> <li>- E83: Handle in a fume cupboard or under extract ventilation.</li> <li>- PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE:</li> <li>- PPE22: Wear a respirator conforming to EN140 with Type A filter or better.</li> <li>Or</li> <li>- demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.</li> </ul>
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<p>PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection &amp; transfer, charging, discharging)</p>	<p>- E18: No specific measures identified.</p>
<p>PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, maintenance, equipment cleaning, occasional interventions)</p>	<p>- E18: No specific measures identified.</p>
<p>PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment breaks)</p>	<p>- E18: No specific measures identified.</p>
<p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during use, sampling, maintenance, equipment breaks)</p>	<p>- E18: No specific measures identified</p>
<p>PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact) (e.g. mixing)</p>	<p>- E54: Provide extract ventilation to points where emissions occur.</p>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified If solid MDI: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better
PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. drum filling, sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified.
PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing)	- EI18: No specific measures identified
PROC 15: Use as a laboratory reagent	- EI18: No specific measures identified
<b>Section 2.2</b>	<b>Control of environmental exposure</b>
<b>Product characteristics</b>	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].
Predominantly hydrophobic [PrC4a].	
Not biodegradable [PrC5f].	
<b>Operational conditions</b>	Indoor/Outdoor use [OOC3].
<b>Amounts used</b>	
Fraction of EU tonnage used in region [A1]:	1
Regional use tonnage (tonnes/year) [A2]:	520,000
Fraction of regional tonnage used locally [A3]:	0.019
Average local daily tonnage (kg/d) [A5]:	33,333
<b>Frequency and duration of use</b>	
Type of release:	Continuous release [FD2].
Emission days (days/year) [FD4]:	≥ 300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor [EF1]:	10
Local marine water dilution factor [EF2]:	100





## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<b>Other given operational conditions affecting environmental exposure</b>	Used in open systems.
Dry processes.	
Release fraction to air from process [OOC4]:	1.2·10 <sup>-5</sup>
Release fraction to wastewater from process [OOC5]:	0
Release fraction to soil from process (regional only) [OOC6]:	0
<b>Risk Management Measures</b>	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0%. [TCR5]
Soil:	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]
<b>Organizational measures to prevent/limit release from site</b>	Prevent discharge of un-dissolved substance to or recover from onsite wastewater. [OMS1]
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater. [TCR3]
Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to external recovery of waste	Not applicable.
Other environmental control measures additional to above	None.



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Section 3		Exposure Estimation		
<b>3.1. Health</b>				
Measured data has been used to estimate worker exposure.				
PROC #	Inhalation exposure – long term (mg/m <sup>3</sup> )	RCR inhalation – long term	Inhalation exposure – short term (mg/m <sup>3</sup> )	RCR inhalation – Short term
PROC 1	0.013	0.260	0.026	0.260
PROC 2	0.013	0.260	0.026	0.260
PROC 3	0.009	0.184	0.018	0.184
PROC 4	0.008	0.164	0.016	0.164
PROC 5	0.012	0.246	0.025	0.246
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.029	0.582	0.058	0.582
PROC 9	0.005	0.094	0.009	0.094
PROC 15	0.006	0.112	0.011	0.112
<b>3.2. Environment</b>				
Used EUSES model [EE4].				
Compartment		Predicted Environmental Concentration	Risk Characterisation Ratio	
Freshwater (mg/l)		6.85·10 <sup>-3</sup>	< 6.85·10 <sup>-3</sup>	
Marine water (mg/l)		5.43·10 <sup>-4</sup>	< 5.43·10 <sup>-3</sup>	
Agricultural soil (mg/kg)		0.239	< 0.239	
Grassland (mg/kg)		0.239	< 0.239	
Section 4		Guidance to check compliance with the Exposure Scenario		
<b>4.1. Health</b>				
Guidance to DU		Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22]		
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]				
Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use Descriptors				



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## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<b>4.2. Environment</b>
Not applicable.
<b>Section 5</b>
<b>Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)</b>
<b>Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.</b>
<b>Control of Worker Exposure</b>
Not applicable.
<b>Control of environmental exposure</b>
Not applicable.



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

#### Exposure scenario:

**Industrial use of MDI for Flexible foam and Elastomers, TPU, Polyamide, Polyimide & synthetic Fibres and Manufacturing of other Polymers**

Section 1	Exposure Scenario Title
Title	<b>Industrial use of MDI for Flexible foam and Elastomers, TPU, Polyamide, Polyimide &amp; synthetic Fibres and Manufacturing of other Polymers</b>
Use Descriptor	Sector of Use: SU 3
Process Categories and Environmental Release Categories: A) Use in flexible foams PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 14, PROC 15, PROC 21 ERC 2, ERC 3, ERC 6c B) Use in Elastomers TPU, Polyamide, Polyimide & synthetic Fibres and Manufacturing of other Polymers PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 9, PROC 14, PROC 15 ERC 2, ERC 3, ERC 6c	
Processes, tasks, activities covered	Covers: Industrial: PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging) PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. automatic or manual closed moulding, sawing in cabinet, during sampling, charging, discharging, maintenance, equipment cleaning, occasional interventions) PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. closed moulding, sawing in cabinet, blending, sampling, maintenance, equipment cleaning, occasional interventions) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. open moulding, pouring on conveyor or in box, open sawing, during casting, other open uses, maintenance, equipment cleaning, occasional interventions) PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying.



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

	<p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing)</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC 15: Use as laboratory reagent</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles (e.g. demoulding, trimming, repairing, cutting)</p>
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<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<i>Field for additional statements to explain scenario if required.</i>	
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product characteristics</b>	
Physical form of product	Physical state: liquid (only solid when specifically mentioned)
Concentration of substance in product	G13: Covers percentage substance in the product up to 100% (unless stated differently).
Amounts used	Not applicable.
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	None identified



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Contributing Scenarios	Risk Management Measures <i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures , 4. Personal protection</i>
All contributing scenarios at product temperatures below 40°C for pure MDI or below 45°C for other MDI based substances	<ul style="list-style-type: none"> <li>- E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).</li> <li>- E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimize exposures and to report any skin problems that may develop.</li> <li>- PPE14: Use suitable eye protection and gloves.<sup>1</sup></li> <li>- PPE27: Wear suitable coveralls to prevent exposure to the skin.</li> </ul>
All contributing scenarios at product temperatures above 40°C for pure MDI or above 45°C for other MDI based substances	<ul style="list-style-type: none"> <li>- Same as above, and:</li> <li>- E54: Provide extract ventilation to points where emissions occur.</li> <li>Or</li> <li>- E82: Provide extract ventilation to material transfer points and other openings.</li> <li>Or</li> <li>- E83: Handle in a fume cupboard or under extract ventilation.</li> <li>- PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE:</li> <li>- PPE22: Wear a respirator conforming to EN140 with Type A filter or better.</li> <li>Or</li> <li>- demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.</li> </ul>
PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging)	<ul style="list-style-type: none"> <li>- E118: No specific measures identified.</li> </ul>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. automatic or manual closed moulding, sawing in cabinet, during sampling, charging, discharging, maintenance, equipment cleaning, occasional interventions)	- E18: No specific measures identified.
PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. closed moulding, sawing in cabinet, blending, sampling, maintenance, equipment cleaning, occasional interventions)	- E18: No specific measures identified.
PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. open moulding, pouring on conveyor or in box, open sawing, during casting, other open uses, maintenance, equipment cleaning, occasional interventions)	- E18: No specific measures identified
PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)	- E54: Provide extract ventilation to points where emissions occur.

PROC 7: Industrial spraying.	<ul style="list-style-type: none"> <li>- E59: Carry out in a vented booth provided with laminar airflow.</li> <li>Or</li> <li>- E57: Carry out in a vented booth or extracted enclosure.</li> <li>Or</li> <li>- E61 Minimize exposure by extracted full enclosure for the operation or equipment.</li> <li>Or - E60 Minimize exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.</li> <li>And:</li> <li>- PPE31: Wear positive pressure air supplied respirator if required by safe entry procedures.</li> <li>And</li> </ul>
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## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

	<ul style="list-style-type: none"> <li>- E74: Ensure the ventilation system is regularly maintained and tested.</li> <li>- EI 19: Ensure operatives are trained to minimise exposures.</li> </ul>
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	<ul style="list-style-type: none"> <li>- EI18: No specific measures identified</li> <li>If solid MDI:</li> <li>- PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter.</li> </ul>
PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	<ul style="list-style-type: none"> <li>- EI18: No specific measures identified.</li> </ul>
PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing)	<ul style="list-style-type: none"> <li>- EI18: No specific measures identified.</li> </ul>
PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelettisation	<ul style="list-style-type: none"> <li>- EI18: No specific measures identified.</li> </ul>

PROC 15: Use as laboratory reagent	<ul style="list-style-type: none"> <li>- EI18: No specific measures identified.</li> </ul>
PROC 21: Low energy manipulation of substances bound in materials and/or articles (e.g. demoulding, trimming, repairing, cutting)	<ul style="list-style-type: none"> <li>- EI18: No specific measures identified.</li> </ul>
<b>Section 2.2</b>	<b>Control of environmental exposure</b>
<b>Product characteristics</b>	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].
Predominantly hydrophobic [PrC4a].	
Not biodegradable [PrC5f].	
<b>Operational conditions</b>	Indoor/Outdoor use [OOC3].
<b>Amounts used</b>	
Fraction of EU tonnage used in region [A1]:	1



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Regional use tonnage (tonnes/year) [A2]:	260,000 (flexible foams) / 160,000 (elastomers, etc.)
Fraction of regional tonnage used locally [A3]:	0.038 (flexible foams) / 0.063 (elastomers, etc.)
Maximum daily site tonnage (kg/day) [A4]:	33,333
<b>Frequency and duration of use</b>	
Type of release:	Continuous release [FD2].
Emission days (days/year) [FD4]:	≥ 300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor [EF1]:	10
Local marine water dilution factor [EF2]:	100
<b>Other given operational conditions affecting environmental exposure</b>	Used in open systems.
Dry processes.	
Release fraction to air from process [OOC4]:	1.2·10 <sup>-5</sup>
Release fraction to wastewater from process [OOC5]:	0
Release fraction to soil from process (regional only) [OOC6]:	0

<b>Risk Management Measures</b>	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0%. [TCR5]
Soil:	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]
<b>Organizational measures to prevent/limit release from site</b>	
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater. [TCR3]
Conditions and measures related to external treatment of waste for disposal	Not applicable.
<b>Conditions and measures related to external recovery of waste</b>	Not applicable.
<b>Other environmental control measures additional to above</b>	None.



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Section 3		Exposure Estimation		
3.1. Health				
Measured data has been used to estimate worker exposure.				
PROC #	Inhalation exposure – long term (mg/m <sup>3</sup> )	RCR inhalation – long term	Inhalation exposure – short term (mg/m <sup>3</sup> )	RCR inhalation – short term
PROC 1	0.013	0.260	0.026	0.260
PROC 2	0.013	0.260	0.026	0.260
PROC 3	0.009	0.184	0.018	0.184
PROC 4	0.008	0.116	0.16	0.116
PROC 5 Flex foam	0.029	0.582	0.058	0.582
PROC 5 Elastomers	0.012	0.246	0.025	0.246
PROC 7	0.011	0.224	5.000	0.224
PROC 8a	0.029	0.582	0.058	0.582

PROC 8b	0.029	0.582	0.058	0.582
PROC 9	0.005	0.094	0.010	0.094
PROC 14	0.006	0.116	0.012	0.116
PROC 15	0.006	0.112	0.011	0.112
PROC 21	0.006	0.128	0.013	0.128

3.2. Environment		
Used EUSES model [EE4].		
Compartment	Predicted Environmental Concentration	Risk Characterisation Ratio
Freshwater (mg/l)	$6.87 \cdot 10^{-3}$	$< 6.87 \cdot 10^{-3}$
Marine water (mg/l)	$5.43 \cdot 10^{-4}$	$< 5.43 \cdot 10^{-3}$
Agricultural soil (mg/kg)	0.239	$< 0.239$
Grassland (mg/kg)	0.239	$< 0.239$
Section 4		Guidance to check compliance with the Exposure Scenario
4.1. Health		
Guidance to DU		Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22]



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## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]
Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use Descriptors
<b>4.2. Environment</b>
Not applicable.
<b>Section 5</b>
<b>Additional good practice advice beyond the REACH Chemical Safety Assessment-(Section Optional)</b>
<b>Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.</b>
<b>Control of Worker Exposure</b>
Not applicable.
<b>Control of environmental exposure</b>
Not applicable.



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

#### Exposure Scenario:

##### Industrial use of MDI for Rigid Foam, Coatings, and Adhesives and Sealants

Section 1	Exposure Scenario Title
Title	<b>Industrial use of MDI for Rigid Foam, Coatings and Adhesives and Sealants</b>
Use Descriptor	Sector of Use: SU 3
Process Categories and Environmental Release Categories: A) Use for Rigid Foam, PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 10, PROC 15, PROC 21 ERC 2, ERC 3, ERC 6c B) Use for Coatings PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 9, PROC 10, PROC 13, PROC 15 ERC 2, ERC 3, ERC 5, ERC 6c C) Use for Adhesives and Sealants PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 7, PROC 8a, PROC 8b, PROC 9, PROC 10, PROC 13, PROC 14, PROC 15, PROC 21 ERC 2, ERC 3, ERC 5, ERC 6c	
Processes, tasks, activities covered	PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging) PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. automatic or manual closed moulding, sawing, during sampling, maintenance, equipment cleaning, occasional interventions) PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. closed moulding, sawing in cabinet, blending, during sampling, maintenance, equipment cleaning, occasional interventions) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. open moulding, pouring on conveyor or in box, open sawing, during sampling, maintenance, equipment cleaning, occasional interventions) PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact) PROC 7: Industrial spraying



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

	<p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing)</p> <p>PROC 10: Roller application or brushing</p> <p>PROC 13: Treatment of articles by dipping and pouring</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC 15: Use as laboratory reagent</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles (e.g. demoulding, trimming, repairing, cutting)</p>
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<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<i>Field for additional statements to explain scenario if required.</i>	
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product characteristics</b>	
Physical form of product	Physical state: liquid (only solid when specifically mentioned)
Concentration of substance in product	G13: Covers percentage substance in the product up to 100% (unless stated differently).
Amounts used	Not applicable.

Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	None identified.
<b>Contributing Scenarios</b>	<b>Risk Management Measures</b> <i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection</i>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<p>All contributing scenarios at product temperatures below 40°C for pure MDI or below 45°C for other MDI based substances</p>	<ul style="list-style-type: none"> <li>- E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).</li> <li>- E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.</li> <li>- PPE14: Use suitable eye protection and gloves.</li> <li>- PPE27: Wear suitable coveralls to prevent exposure to the skin.</li> </ul>
<p>All contributing scenarios at product temperatures above 40°C for pure MDI or above 45°C for other MDI based substances</p>	<ul style="list-style-type: none"> <li>- Same as above, and:</li> <li>- E54: Provide extract ventilation to points where emissions occur.</li> <li>Or</li> <li>- E82: Provide extract ventilation to material transfer points and other openings.</li> <li>Or</li> <li>- E83: Handle in a fume cupboard or under extract ventilation.</li> <li>- PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE:</li> <li>- PPE22: Wear a respirator conforming to EN140 with Type A filter or better.</li> <li>Or</li> <li>- demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.</li> </ul>
<p>PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection &amp; transfer, charging, discharging)</p>	<ul style="list-style-type: none"> <li>- E118: No specific measures identified.</li> </ul>
<p>PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. automatic or manual closed moulding, sawing, during sampling, maintenance, equipment cleaning, occasional interventions)</p>	<ul style="list-style-type: none"> <li>- E118: No specific measures identified.</li> </ul>
<p>PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. closed moulding, sawing in cabinet, blending, during sampling,</p>	<ul style="list-style-type: none"> <li>- E118: No specific measures identified.</li> </ul>





## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<p>maintenance, equipment cleaning, occasional interventions)</p>	
<p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. open moulding, pouring on conveyer or in box, open sawing, during sampling, maintenance, equipment cleaning, occasional interventions)</p>	<p>- EI18: No specific measures identified</p>
<p>PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)</p>	<p>- E54: Provide extract ventilation to points where emissions occur.</p>
<p>PROC 7 Industrial spraying</p>	<p>- Same as mentioned above for all PROCS          - E59: Carry out in a vented booth provided with laminar airflow.          Or          - E57: Carry out in a vented booth or extracted enclosure          Or          - E61 Minimize exposure by extracted full enclosure for the operation or equipment.          Or - E60 Minimize exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings.          And          - PPE 31: Wear positive pressure air supplied respirator if required by safe entry procedures.          AND:          -E74: Ensure the ventilation system is regularly maintained and tested.          - EI 19: Ensure operatives are trained to minimise exposures.</p>
<p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection &amp; transfer, charging, discharging)</p>	<p>- EI18: No specific measures identified          If solid MDI:          - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.</p>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- EI18: No specific measures identified
PROC 9: Transfer of substance or preparation into small containers (e.g. dedicated filling line, including weighing)	- EI18: No specific measures identified
PROC 10: Roller application or brushing	- EI18: No specific measures identified

PROC 13: Treatment of articles by dipping and pouring	- EI18: No specific measures identified
PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelettisation	- EI18: No specific measures identified
PROC 15: Use as laboratory reagent	- EI18: No specific measures identified
PROC 21: Low energy manipulation of substances bound in materials and/or articles (e.g. demoulding, trimming, repairing, cutting)	- EI18: No specific measures identified



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<b>Section 2.2</b>	<b>Control of environmental exposure</b>
<b>Product characteristics</b>	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].
Predominantly hydrophobic [PrC4a].	
Not biodegradable [PrC5f].	
<b>Operational conditions</b>	Indoor/Outdoor use [OOC3].

<b>Amounts used</b>		
Fraction of EU tonnage used in region [A1]:	1	
Regional use tonnage (tonnes/year) [A2]:	Rigid foam	1,120,000
Coating	60,000	
Adhesives and sealants	300,000	
Fraction of regional tonnage used locally [A3]:	Rigid foam	8.9·10 <sup>-3</sup>
Coating	0.167	
Adhesives and sealants	0.033	
Maximum daily site tonnage (kg/day) [A4]:	33,333	
<b>Frequency and duration of use</b>		
Type of release:	Continuous release [FD2].	
Emission days (days/year) [FD4]:	≥ 300	
<b>Environmental factors not influenced by risk management</b>		
Local freshwater dilution factor [EF1]:	10	
Local marine water dilution factor [EF2]:	100	
<b>Other given operational conditions affecting environmental exposure</b>	Used in open systems.	
Dry processes.		
Release fraction to air from process [OOC4]:	1.2·10 <sup>-5</sup>	
Release fraction to wastewater from process [OOC5]:	0	
Release fraction to soil from process (regional only) [OOC6]:	0	
<b>Risk Management Measures</b>		



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].
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Air:	No airemission controls required; required removal efficiency is 0%. [TCR5]
Soil:	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]
Organizational measures to prevent/limit release from site	Prevent discharge of un-dissolved substance to or recover from site wastewater. [OMS1]
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater. [TCR3]
Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to external recovery of waste	Not applicable.
Other environmental control measures additional to above	None.
<b>Section 3</b>	<b>Exposure Estimation</b>

#### 3.1. Health

Measured data has been used to estimate worker exposure.

PROC #	Inhalation exposure – long term (mg/m <sup>3</sup> )	RCR inhalation – long term	Inhalation exposure – short term (mg/m <sup>3</sup> )	RCR inhalation – short term
PROC 1	0.013	0.260	0.026	0.260
PROC 2	0.013	0.260	0.026	0.260
PROC 3	0.009	0.184	0.018	0.184
PROC 4	0.008	0.164	0.016	0.164
PROC 5	0.029	0.582	0.058	0.582
PROC 7 (Hotmelt)	0.011	0.224	0.022	0.224
PROC 7 (other than hotmelt)	0.010	0.204	0.020	0.204
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.029	0.582	0.058	0.582
PROC 9	0.005	0.094	0.009	0.094



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 10	0.017	0.344	0.034	0.344
PROC 13	0.017	0.344	0.034	0.344
PROC 14	0.006	0.116	0.012	0.116
PROC 15	0.006	0.112	0.011	0.112
PROC 21	0.006	0.260	1.875	0.128
<b>3.2. Environment</b>				
Used EUSES model [EE4].				
<b>Compartment</b>	<b>Predicted Environmental Concentration</b>		<b>Risk Characterisation Ratio</b>	
Freshwater (mg/l)	6.87·10 <sup>-3</sup>		< 6.87·10 <sup>-3</sup>	
Marine water (mg/l)	5.43·10 <sup>-4</sup>		< 5.43·10 <sup>-3</sup>	
Agricultural soil (mg/kg)	0.239		< 0.239	
Grassland (mg/kg)	0.239		< 0.239	
<b>Section 4</b>	<b>Guidance to check compliance with the Exposure Scenario</b>			
<b>4.1. Health</b>				
Guidance to DU	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22]			
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]				
Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use Descriptors				

<b>4.2. Environment</b>	
Not applicable.	
<b>Section 5</b>	
<b>Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)</b>	
<b>Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.</b>	
<b>Control of Worker Exposure</b>	
Not applicable.	
<b>Control of environmental exposure</b>	
Not applicable.	



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

#### Exposure Scenario:

#### Industrial use of MDI for Composite Material Based on Wood/Man-made/Mineral/Natural Fibres

Section 1	Exposure Scenario Title
Title	<b>Industrial use of MDI for Composite Material Based on Wood/Man-made/Mineral/Natural Fibres</b>
Use Descriptor	Sector of Use: SU 3
Process Categories and Environmental Release Categories: PROC 0a, PROC 0b, PROC 0c, PROC 1, PROC 2, PROC 3, PROC 4, PROC 7, PROC 8a, PROC 8b, PROC 10, PROC 14, PROC 15, PROC 21 ERC 2, ERC 3, ERC 5	
Processes, tasks, activities covered	PROC 0a: Removal of solidified materials by mechanical means in containers, vessels, blenders PROC 0b: Cleaning production line area with high pressurized air PROC 0c: Cleaning production line area with brush PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging, blowline injections, blender operations) PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sawing, sampling, maintenance, equipment cleaning, occasional interventions/inspections at enclosed areas) PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment cleaning, occasional interventions) PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during mat dumping, sampling, maintenance, equipment cleaning, occasional intervention at open areas) PROC7: Industrial Spraying PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging) PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

	<p>PROC 10: Roller application or brushing (low energy spreading)</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC 15: Use as laboratory reagent</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles</p>
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<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<i>Field for additional statements to explain scenario if required.</i>	
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product characteristics</b>	
Physical form of product	Physical state: liquid (only solid when specifically mentioned)
Concentration of substance in product	G13: Covers percentage substance in the product up to 100% (unless stated differently).
Amounts used	Not applicable.
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	None identified.
<b>Contributing Scenarios</b>	<b>Risk Management Measures</b> <i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection</i>
All contributing scenarios at product temperatures below 40°C for pure MDI or below 45°C for other MDI based substances	<ul style="list-style-type: none"> <li>- E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).</li> <li>- E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.</li> <li>- PPE14: Use suitable eye protection and gloves.</li> <li>- PPE27: Wear suitable coveralls to prevent exposure to the skin.</li> </ul>





## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<p>All contributing scenarios at product temperatures above 40°C for pure MDI or above 45°C for other MDI based substances</p>	<ul style="list-style-type: none"> <li>- Same as above, and:</li> <li>- E54: Provide extract ventilation to points where emissions occur.</li> <li>Or</li> <li>- E82: Provide extract ventilation to material transfer points and other openings.</li> <li>Or</li> <li>- E83: Handle in a fume cupboard or under extract ventilation.</li> <li>- PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE:</li> <li>- PPE22: Wear a respirator conforming to EN140 with Type A filter or better.</li> <li>Or</li> <li>- demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.</li> </ul>
<p>PROC 0a: Removal of solidified materials by mechanical means in containers, vessels, blenders</p>	<ul style="list-style-type: none"> <li>- G4: Covers frequency up to: monthly use</li> <li>- PPE14: Use suitable eye protection and gloves.</li> <li>- PPE27: Wear suitable coveralls to prevent exposure to the skin.</li> <li>- PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.</li> </ul>
<p>PROC 0b: Cleaning production line area with high pressurized air</p>	<ul style="list-style-type: none"> <li>- PPE14: Use suitable eye protection and gloves.</li> <li>- PPE27: Wear suitable coveralls to prevent exposure to the skin.</li> <li>- PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.</li> </ul>
<p>PROC 0c: Cleaning production line area with brush</p>	<ul style="list-style-type: none"> <li>- PPE14: Use suitable eye protection and gloves.</li> <li>- PPE27: Wear suitable coveralls to prevent exposure to the skin.</li> </ul>
<p>PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection &amp; transfer, charging, discharging, blowline injections, blender operations)</p>	<ul style="list-style-type: none"> <li>- E18: No specific measures identified.</li> </ul>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<p>PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sawing, sampling, maintenance, equipment cleaning, occasional interventions/inspections at enclosed areas)</p>	<p>- E118: No specific measures identified.</p>
<p>PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment cleaning, occasional interventions)</p>	<p>- E118: No specific measures identified.</p>
<p>Activities close to the former line PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during mat dumping, sampling, maintenance, equipment cleaning, occasional intervention at open areas)</p>	<p>- E82: Provide extract ventilation to material transfer points and other openings. - Minimal efficiency exhaust ventilation: <math>\geq 25\%</math> - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.</p>
<p>Activities close to the mat line PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during mat dumping, sampling, maintenance, equipment cleaning, occasional intervention at open areas)</p>	<p>- E118: No specific measures identified.</p>
<p>PROC 7: Industrial spraying</p>	<p>- E59: Carry out in a vented booth provided with laminar airflow Or - E57: Carry out in a vented booth or extracted enclosure Or - E61: Minimise exposure by extracted full enclosure for the operation or equipment Or - E60: Minimise exposure by partial enclosure of the operation or equipment and provide extract ventilation at openings - PPE30: If above technical/organisational control measures are not feasible, then adopt following PPE: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.</p>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- E18: No specific measures identified. If solid MDI: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- E18: No specific measures identified.
PROC 10: Roller application or brushing (low energy spreading)	- E18: No specific measures identified.
PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelettisation	- E54: Provide extract ventilation to points where emissions occur.
PROC 15: Use as laboratory reagent	- E18: No specific measures identified

PROC 21: Low energy manipulation of substances bound in materials and/or articles	- E54: Provide extract ventilation to points where emissions occur.
<b>Section 2.2</b>	<b>Control of environmental exposure</b>
<b>Product characteristics</b>	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].
Predominantly hydrophobic [PrC4a].	
Not biodegradable [PrC5f].	
<b>Operational conditions</b>	Indoor/Outdoor use [OOC3].
<b>Amounts used</b>	
Fraction of EU tonnage used in region [A1]:	1
Regional use tonnage (tonnes/year) [A2]:	43,600
Fraction of regional tonnage used locally [A3]:	0.229
Maximum daily site tonnage (kg/day) [A4]:	33,333
<b>Frequency and duration of use</b>	
Type of release:	Continuous release [FD2].
Emission days (days/year) [FD4]:	≥ 300
<b>Environmental factors not influenced by risk management</b>	
Local freshwater dilution factor [EF1]:	10



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Local marine water dilution factor [EF2]:	100
<b>Other given operational conditions affecting environmental exposure</b>	Used in open systems.
Dry processes.	
Release fraction to air from process [OOC4]:	1.2·10 <sup>-5</sup>
Release fraction to wastewater from process [OOC5]:	0
Release fraction to soil from process (regional only) [OOC6]:	0

<b>Risk Management Measures</b>	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].
Soil:	Soil emission controls are not applicable as there is no direct release to soil [TCR4].
Organizational measures to prevent/limit release from site	Prevent discharge of un-dissolved substance to or recover from onsite wastewater [OMS1].
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater [TCR3].
Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to external recovery of waste	Not applicable.
Other environmental control measures additional to above	None.



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Section 3		Exposure Estimation		
3.1. Health				
Measured data has been used to estimate worker exposure.				
PROC #	Inhalation exposure – long term (mg/m <sup>3</sup> )	RCR inhalation – long term	Inhalation exposure – short term (mg/m <sup>3</sup> )	RCR inhalation – short term
PROC 0a	0.0056	0.112	0.0112	0.112
PROC 0b	0.002	0.042	0.004	0.042
PROC 0c	0.014	0.28	0.028	0.28
PROC 1	0.002	0.038	0.004	0.038
PROC 2	0.002	0.76	0.076	0.76
PROC 3	0.002	0.038	0.004	0.038
PROC 4 Activities close to the Former line	0.011	0.227	0.023	0.227

PROC 4 Activities close to the mat line	0.007	0.136	0.014	0.136
PROC 7	0.010	0.204	0.020	0.204
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.002	0.034	0.003	0.034
PROC 10	0.017	0.328	0.034	0.328
PROC 14	0.006	0.078	0.012	0.078
PROC 15	0.006	0.112	0.011	0.112
PROC 21	0.0004	0.008	0.001	0.008

3.2. Environment		
Used EUSES model [EE4].		
Compartment	Predicted Environmental Concentration	Risk Characterisation Ratio
Freshwater (mg/l)	$6.87 \cdot 10^{-3}$	$< 6.87 \cdot 10^{-3}$
Marine water (mg/l)	$5.43 \cdot 10^{-4}$	$< 5.43 \cdot 10^{-3}$
Agricultural soil (mg/kg)	0.239	$< 0.239$
Grassland (mg/kg)	0.239	$< 0.239$



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Section 4	Guidance to check compliance with the Exposure Scenario
<b>4.1. Health</b>	
Guidance to DU	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22]
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]	
Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24] ISOPA interpretation on selection of Use Descriptors	
<b>4.2. Environment</b>	
Not applicable.	
<b>Section 5</b>	
<b>Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)</b>	
<b>Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.</b>	
<b>Control of Worker Exposure</b>	
Not applicable.	
<b>Control of environmental exposure</b>	
Not applicable.	



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

#### Exposure Scenario:

#### Industrial use of MDI in Foundry and Other Composite Material

Section 1	Exposure Scenario Title
Title	<b>Industrial use of MDI in Foundry and Other Composite Material</b>
Use Descriptor	Sector of Use: SU 3
	Process Categories and Environmental Release Categories: A) Industrial use in Foundry PROC 1, PROC 2, PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 14, PROC 15 ERC 2, ERC 3, ERC 5 Industrial use in Other Composite Material PROC 1, PROC 2, PROC 3, PROC 5, PROC 8a, PROC 8b, PROC 13, PROC 14, PROC 15 ERC 2, ERC 3, ERC 5, ERC 6c
Processes, tasks, activities covered	<p>PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, sawing, maintenance, equipment cleaning, occasional interventions, checking quality of sand mix)</p> <p>PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment cleaning, occasional interventions, checking quality of sand mix)</p> <p>PROC 4: Open batch/continuous processes with opportunity for exposure (e.g., during mat dumping, sampling, maintenance, equipment cleaning, occasional interventions at open areas)</p> <p>PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multi-stage and/or significant contact)</p> <p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 13: Treatment of articles by dipping and pouring</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC 15: Use as laboratory reagent</p>

<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<i>Field for additional statements to explain scenario if required.</i>	
<b>Section 2.1</b>	<b>Control of worker exposure</b>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Product characteristics	
Physical form of product	Physical state: liquid (only solid when specifically mentioned)
Concentration of substance in product	G13: Covers percentage substance in the product up to 100% (unless stated differently).
Amounts used	Not applicable.
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).
Human factors not influenced by risk management	None identified.
<b>Contributing Scenarios</b>	<b>Risk Management Measures</b> <i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection</i>
All contributing scenarios at product temperatures below 40°C for pure MDI or below 45°C for other MDI based substances	<ul style="list-style-type: none"> <li>- E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).</li> <li>- E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.</li> <li>- PPE14: Use suitable eye protection and gloves.</li> <li>- PPE27: Wear suitable coveralls to prevent exposure to the skin.</li> </ul>

All contributing scenarios at product temperatures above 40°C for pure MDI or above 45°C for other MDI based substances	<ul style="list-style-type: none"> <li>- Same as above, and:</li> <li>- E54: Provide extract ventilation to points where emissions occur.</li> <li>Or</li> <li>- E82: Provide extract ventilation to material transfer points and other openings.</li> <li>Or</li> <li>- E83: Handle in a fume cupboard or under extract ventilation.</li> <li>- PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE:</li> <li>- PPE22: Wear a respirator conforming to EN140 with Type A filter or better.</li> <li>Or</li> <li>- demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.</li> </ul>
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## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 1: Use in closed process, no likelihood of exposure (e.g. including enclosed sampling, waste collection & transfer, charging, discharging)	- E118: No specific measures identified.
PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, sawing, maintenance, equipment cleaning, occasional interventions, checking quality of sand mix)	For use of MDI in Foundry - E82: Provide extract ventilation to material transfer points and other openings. For use of MDI in Other Composite Material - E118: No specific measures identified.
PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. during sampling, maintenance, equipment cleaning, occasional interventions, checking quality of sand mix)	For use of MDI in Foundry - E82: Provide extract ventilation to material transfer points and other openings. For use of MDI in Other Composite Material - E118: No specific measures identified.
PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises	- E54: Provide extract ventilation to points where emissions occur.

Foundry PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)	- E82: Provide extract ventilation to material transfer points and other openings. - E54: Provide extract ventilation to points where emissions occur.
Other composite materials PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)	- E54: Provide extract ventilation to points where emissions occur.
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- E118: No specific measures identified If solid MDI: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- E118: No specific measures identified



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 13: Treatment of articles by dipping and pouring	- EI18: No specific measures identified
PROC 14. Production of preparations or articles by tableting, compression, extrusion, pelettisation	- E54: Provide extract ventilation to points where emissions occur.
PROC 15. Use as laboratory reagent	- EI18: No specific measures identified

<b>Section 2.2</b>		<b>Control of environmental exposure</b>	
<b>Product characteristics</b>		Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].	
Predominantly hydrophobic [PrC4a].			
Not biodegradable [PrC5f].			
<b>Operational conditions</b>		Indoor/Outdoor use [OOC3].	
<b>Amounts used</b>			
Fraction of EU tonnage used in region [A1]:		1	
Regional use tonnage (tonnes/year) [A2]:		Foundry	56,400
Other Composite Material		1,120,000	
Fraction of regional tonnage used locally [A3]:		Foundry	0.177
Other Composite Material		8.9·10 <sup>-3</sup>	
Maximum daily site tonnage (kg/day) [A4]:		33,333	
<b>Frequency and duration of use</b>			
Type of release:		Continuous release [FD2].	
Emission days (days/year) [FD4]:		≥ 300	
<b>Environmental factors not influenced by risk management</b>			
Local freshwater dilution factor [EF1]:		10	
Local marine water dilution factor [EF2]:		100	
<b>Other given operational conditions affecting environmental exposure</b>		Used in open systems.	
Dry processes.			
Release fraction to air from process [OOC4]:		1.2·10 <sup>-5</sup>	
Release fraction to wastewater from process [OOC5]:		0	



**Exposure Scenario**

**4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate**

Release fraction to soil from process (regional only) [OOC6]:	0
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<b>Risk Management Measures</b>	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0% [TCR5].
Soil:	Soil emission controls are not applicable as there is no direct release to soil [TCR4].
<b>Organizational measures to prevent/limit release from site</b>	Prevent discharge of un-dissolved substance to or recover from onsite wastewater [OMS1].
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater [TCR3].
Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to external recovery of waste	Not applicable.
Other environmental control measures additional to above	None.



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Section 3		Exposure Estimation		
3.1. Health				
Measured data has been used to estimate worker exposure.				
PROC #	Inhalation exposure – long term (mg/m <sup>3</sup> )	RCR inhalation – long term	Inhalation exposure – short term (mg/m <sup>3</sup> )	RCR inhalation – short term
PROC 1 Foundry	0.002	0.036	0.004	0.036
PROC 1 Other Composite	0.013	0.260	0.026	0.260
PROC 2 – Foundry	0.002	0.036	0.004	0.036
PROC 2 – Other Composite	0.013	0.260	0.026	0.260
PROC 3 – foundry	0.002	0.036	0.004	0.036

PROC 3 – Other Composite	0.009	0.184	0.018	0.184
PROC 4 – Foundry	0.004	0.078	0.008	0.078
PROC 5 - Foundry	0.002	0.036	0.004	0.036
PROC 5 – Other Composite	0.029	0.582	0.058	0.582
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.029	0.582	0.058	0.582
PROC 13	0.017	0.344	0.034	0.344
PROC 14 Foundry	0.004	0.078	0.008	0.078
PROC 14 Other Composite	0.006	0.116	0.012	0.116
PROC 15	0.006	0.112	0.011	0.112



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<b>3.2. Environment</b>		
Used EUSES model [EE4].		
<b>Compartment</b>	<b>Predicted Environmental Concentration</b>	<b>Risk Characterisation Ratio</b>
Freshwater (mg/l)	$6.87 \cdot 10^{-3}$	$< 6.87 \cdot 10^{-3}$
Marine water (mg/l)	$5.43 \cdot 10^{-4}$	$< 5.43 \cdot 10^{-3}$
Agricultural soil (mg/kg)	0.239	$< 0.239$
Grassland (mg/kg)	0.239	$< 0.239$
<b>Section 4</b>		<b>Guidance to check compliance with the Exposure Scenario</b>
<b>4.1. Health</b>		
Guidance to DU		Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22]
Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC 23]		
Further information on the assumptions contained in this Exposure Scenario can be found at: [GC 24]		
ISOPA interpretation on selection of Use Descriptors		

<b>4.2. Environment</b>
Not applicable.
<b>Section 5</b>
<b>Additional good practice advice beyond the REACH Chemical Safety Assessment - (Section Optional)</b>
<b>Note: The measures reported in this section have not been taken into account in the exposure estimates related to the exposure scenario above. They are not subject to obligation laid down in Article 37 (4) of REACH.</b>
<b>Control of Worker Exposure</b>
Not applicable.
<b>Control of environmental exposure</b>
Not applicable.



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

#### Exposure Scenario:

##### Professional end uses of MDI

Section 1	Exposure Scenario Title
Title	Professional end uses of MDI
Use Descriptor	Sector of Use: SU 22
<p>Process Categories and Environmental Release Categories:</p> <p>A) Rigid foam, professional use            PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 10, PROC 11            ERC 8c, ERC 8f</p> <p>B) Coatings Professional use            PROC 5, PROC 8a, PROC 10, PROC 11, PROC 13            ERC 8c, ERC 8f</p> <p>C) Adhesives &amp; sealants professional use            PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 10, PROC 11, PROC 13            ERC 8c, ERC 8f</p> <p>D) Composite material based on wood/man-made/mineral/natural fibres, professional use            PROC 3, PROC 4, PROC 5, PROC 8a, PROC 8b, PROC 10, PROC 11, PROC 15, PROC 21            ERC 8c, ERC 8f</p> <p>E) Other composite material use            PROC 2, PROC 3, PROC 5, PROC 8a, PROC 14            ERC 8c, ERC 8f</p>	
Processes, tasks, activities covered	<p>PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, sawing, maintenance, equipment cleaning, occasional interventions)</p> <p>PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. cavity filling, during sampling, maintenance, equipment cleaning, occasional interventions)</p> <p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. cavity filling, during use, maintenance/cleaning/incidental interventions)</p> <p>PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)</p> <p>PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at</p>



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## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

	<p>non-dedicated facilities (e.g. sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 8b: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at dedicated facilities (e.g. sampling, waste collection &amp; transfer, charging, discharging)</p> <p>PROC 10: Roller application or brushing (e.g. one component foam use, low energy spreading)</p> <p>PROC 11: Non industrial spraying</p> <p>PROC 13: Treatment of articles by dipping and pouring</p> <p>PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelettisation</p> <p>PROC 15: Use as laboratory reagent</p> <p>PROC 21: Low energy manipulation of substances bound in materials and/or articles</p>
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<b>Section 2</b>	<b>Operational conditions and risk management measures</b>
<i>Field for additional statements to explain scenario if required.</i>	
<b>Section 2.1</b>	<b>Control of worker exposure</b>
<b>Product characteristics</b>	
Physical form of product	Physical state: liquid (only solid when specifically mentioned)
Concentration of substance in product	G13: Covers percentage substance in the product up to 100% (unless stated differently). Exception: PROC 11 < 60%
Amounts used	Not applicable.
Frequency and duration of use	G2: Covers daily exposures up to 8 hours (unless stated differently).

Human factors not influenced by risk management	None identified.
<b>Contributing Scenarios</b>	<b>Risk Management Measures</b> <i>Note: list RMM standard phrases according to the control hierarchy indicated in the ECHA template: 1. Technical measures to prevent release, 2. Technical measures to prevent dispersion, 3. Organisational measures, 4. Personal protection</i>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<p>All contributing scenarios at product temperatures below 40°C for pure MDI or below 45°C for other MDI based substances</p>	<ul style="list-style-type: none"> <li>- E11: Provide a good standard of general ventilation (not less than 3 to 5 air changes per hour).</li> <li>- E3: Avoid all skin contact with product, clean up contamination/spills as soon as they occur. Wear gloves (tested to EN374) if hand contamination likely, wash off any skin contamination immediately. Provide basic employee training to prevent / minimise exposures and to report any skin problems that may develop.</li> <li>- PPE14: Use suitable eye protection and gloves.</li> <li>- PPE27: Wear suitable coveralls to prevent exposure to the skin.</li> </ul>
<p>All contributing scenarios at product temperatures above 40°C for pure MDI or above 45°C for other MDI based substances</p>	<ul style="list-style-type: none"> <li>- Same as above, and:</li> <li>- E54: Provide extract ventilation to points where emissions occur.</li> <li>Or</li> <li>- E82: Provide extract ventilation to material transfer points and other openings.</li> <li>Or</li> <li>- E83: Handle in a fume cupboard or under extract ventilation.</li> <li>- PPE30: If above technical/organizational control measures are not feasible, then adopt following PPE:</li> <li>- PPE22: Wear a respirator conforming to EN140 with Type A filter or better.</li> <li>Or</li> <li>- demonstrate, e.g. by workplace monitoring, that exposures are below the relevant worker DNEL values for acute and long-term.</li> </ul>
<p>PROC 2: Use in closed, continuous process with occasional controlled exposure (e.g. during sampling, sawing, maintenance, equipment cleaning, occasional interventions)</p>	<ul style="list-style-type: none"> <li>- E118: No specific measures identified.</li> </ul>
<p>PROC 3: Use in closed batch processes (synthesis or formulation) (e.g. cavity filling, during sampling, maintenance, equipment cleaning, occasional interventions)</p>	<ul style="list-style-type: none"> <li>- E118: No specific measures identified.</li> </ul>
<p>PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. cavity filling,</p>	<ul style="list-style-type: none"> <li>- E118: No specific measures identified.</li> </ul>





## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

during use, maintenance/cleaning/incidental interventions)	
Activities close to the former line PROC 4: Use in batch and other process (synthesis) where opportunity for exposure arises (e.g. during mat dumping, sampling, maintenance, equipment cleaning, occasional intervention at open areas)	Professional use of MDI for Composite Material Based on Wood/Man-made/Mineral/Natural Fibres - E82: Provide extract ventilation to material transfer points and other openings. - Minimal efficiency exhaust ventilation: $\geq 25\%$ - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC 5: Mixing or blending in batch processes for formulations or preparations and articles (multistage and/or significant contact)	Rigid foams and Coatings Professional use of MDI for Composite Material Based on Wood/Man-made/Mineral/Natural Fibres - E118: No specific measures identified. Adhesives and sealants and Other Composite Material - E54: Provide extract ventilation to points where emissions occur.
PROC 8a: Transfer of substance or preparation (charging/discharging) from/to vessels/large containers at non-dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging)	- E118: No specific measures identified. If solid MDI: - PPE29: Wear a respirator conforming to EN140 with Type A/P2 filter or better.
PROC8b: Transfer of substance or preparation (charging/ discharging) from/to vessels/ large containers at dedicated facilities (e.g. sampling, waste collection & transfer, charging, discharging).	- E118: No specific measures identified.
PROC 10: Roller application or brushing (e.g. one component foam use, low energy spreading)	- E118: No specific measures identified.
PROC 11: Non industrial spraying (indoor and outdoor)	- OC28: Avoid carrying out activities involving exposure for more than 4 hours - PPE32: Wear a full face respirator conforming to EN140 with Type A/P2 filter or better. - E4: Other skin protection measures such as impervious suits and face shields may be required during high dispersion activities which are likely to lead to substantial aerosol release, e.g. spraying



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 13: Treatment of articles by dipping and pouring	- E118: No specific measures identified
PROC 14: Production of preparations or articles by tableting, compression, extrusion, pelettisation	- E54: Provide extract ventilation to points where emissions occur.
PROC 15: Use as laboratory reagent	- E118: No specific measures identified.
PROC 21: Low energy manipulation of substances bound in materials and/or articles	- E54: Provide extract ventilation to points where emissions occur.
<b>Section 2.2</b>	<b>Control of environmental exposure</b>
<b>Product characteristics</b>	Substance is a unique structure [PrC1]. OR: Substance is complex UVCB [PrC3].
Predominantly hydrophobic [PrC4a].	
Not biodegradable [PrC5f].	
<b>Operational conditions</b>	Indoor/Outdoor use [OOC3].
<b>Amounts used</b>	
Fraction of EU tonnage used in region [A1]:	1

Regional use tonnage (tonnes/year) [A2]:	Rigid foam and Other Composite Material based on Wood/Man-made/Mineral/ Natural Fibres	Up to 1,120,000
Coatings and Adhesives and sealants	60,000	
Fraction of regional tonnage used locally [A3]:	2.0·10 <sup>-3</sup>	
Maximum daily site tonnage (kg/day) [A4]:	Rigid foam and Other Composite Material based on Wood/Man-made/Mineral/ Natural Fibres and Other Composite Material	6,137
Coatings and Adhesives and sealants	329	
<b>Frequency and duration of use</b>		
Type of release:	Dispersive use [FD3].	
Emission days (days/year) [FD4]:	365	
<b>Environmental factors not influenced by risk management</b>		
Local freshwater dilution factor [EF1]:	10	
Local marine water dilution factor [EF2]:	100	
<b>Other given operational conditions affecting environmental exposure</b>	Used in open systems.	



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Dry processes.	
Release fraction to air from process [OOC4]:	0.15
Release fraction to wastewater from process [OOC5]:	0
Release fraction to soil from process (regional only) [OOC6]:	5.0·10 <sup>-3</sup>

Risk Management Measures	
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].
<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0%. [TCR5]
Soil:	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]
<b>Organizational measures to prevent/limit release from site</b>	
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater. [TCR3]
Conditions and measures related to external treatment of waste for disposal	Not applicable.
Conditions and measures related to external recovery of waste	Not applicable.
Other environmental control measures additional to above	None.

Section 3		Exposure Estimation		
3.1. Health				
Measured data has been used to estimate worker exposure.				
PROC #	Inhalation exposure – long term (mg/m <sup>3</sup> )	RCR inhalation – long term	Inhalation exposure – short term (mg/m <sup>3</sup> )	RCR inhalation – short term
PROC 2	0.013	0.260	0.026	0.260
PROC 3	0.009	0.184	0.018	0.184



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 3 (Composite material based on wood/man-made/mineral/natural fibers, professional use)	0.002	0.038	0.004	0.038
PROC 4	0.006	0.116	0.012	0.116

PROC 4 (Composite material based on wood/man-made/mineral/natural fibers, professional use)	0.011	0.227	0.023	0.227
PROC 5	0.029	0.582	0.058	0.582
PROC 5 (enclosed)	0.012	0.246	0.025	0.246
PROC 8a	0.029	0.582	0.058	0.582
PROC 8b	0.029	0.582	0.058	0.582
PROC 8b (Composite material based on wood/man-made/mineral/natural fibers, professional use)	0.002	0.034	0.003	0.034
PROC 10	0.017	0.328	0.034	0.328
PROC 11- Indoor	0.04	0.80	0.08	0.80



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PROC 11- Outdoor	0.043	0.87	0.087	0.87
PROC 13	0.017	0.344	0.035	0.344
PROC 14	0.006	0.116	0.012	0.116
PROC 15	0.006	0.112	0.011	0.112
PROC 21	0.0004	0.008	0.001	0.008

<b>3.2. Environment</b>		
Used EUSESmodel [EE4].		
<b>Compartment</b>	<b>Predicted Environmental Concentration</b>	<b>RiskCharacterisation Ratio(RCR)</b>
Freshwater (mg/l)	6.94·10 <sup>-3</sup>	< 6.94·10 <sup>-3</sup>
Marine water (mg/l)	5.45·10 <sup>-4</sup>	< 5.45·10 <sup>-3</sup>
Agricultural soil (mg/kg)	0.240	< 0.240
Grassland (mg/kg)	0.240	< 0.240
<b>Section 4</b>		
<b>Guidance to check compliance with the Exposure Scenario</b>		
<b>4.1. Health</b>		
Guidance to DU	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22]	
	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC23]	
	Further information on the assumptions contained in this Exposure Scenario can be found at [GC 24]: ISOPA interpretation on selection of Use Descriptors	
<b>4.2. Environment</b>		
Not applicable.		
<b>Section 5</b>		
<b>Additional good practice advice beyond the REACH Chemical Safety Assessment-(Section Optional)</b>		
<b>Note: The measures reported in this section have not been taken into account in the</b>		
<b>exposure estimates related to the exposure scenario above. They are not subject to</b>		
<b>obligation laid down in Article 37 (4) of REACH.</b>		
<b>Control of Worker Exposure</b>		
Not applicable.		
<b>Control of environmental exposure</b>		
Not applicable.		



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

#### Exposure Scenario:

##### Consumer uses of MDI

Section 1	Exposure Scenario Title
Title	<b>Consumer uses of MDI</b>
Use Descriptor	Sector of Use: SU 21
Product category: PC 1, PC 9a, PC 32	
Environmental Release Categories: ERC 8c, ERC 8f	
Processes, tasks, activities covered	<ul style="list-style-type: none"> <li>• Rigid foam</li> <li>• Coatings</li> <li>• Adhesives and sealants</li> </ul>
Section 2	Operational conditions and risk management measures
<i>Field for additional statements to explain scenario if required.</i>	
Section 2.2	Control of consumer exposure
Physical form of product	Physical state: liquid (only solid when specifically mentioned)
Contributing Scenarios	Operations conditions
PC 32: Rigids, insulation foams	For each use event, covers use amounts up to 825 g [ConsOC2]; Covers use in room size of 57.5 m <sup>3</sup> [ConsOC11]; For each use event, covers exposure up to 0.5 hr/event [ConsOC14];
PC 9a: Coatings, paints Use of 2-component paint, solvent rich	Covers concentrations up to 30% [ConsOC1]; For each use event, covers use amounts up to 150 g [ConsOC2]; Covers use in room size of 20 m <sup>3</sup> [ConsOC11]; For each use event, covers exposure up to 2.00 hr/event [ConsOC14];
PC 9a: Coatings, paints Use of 2-component paint, high solid	Covers concentrations up to 30% [ConsOC1]; For each use event, covers use amounts up to 195 g [ConsOC2]; Covers use in room size of 20 m <sup>3</sup> [ConsOC11]; For each use event, covers exposure up to 0.5 hr/event [ConsOC14];



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<p>PC 9a: Coatings, paints Mixing and loading of 2-component solvent rich paint</p>	<p>Covers concentrations up to 100% [ConsOC1]; For each use event, covers use amounts up to 150 g [ConsOC2];  For each use event, covers exposure up to 5 minutes/event [ConsOC14];</p>
<p>PC9a: Coatings, paints Mixing and loading of 2-component high solid paint</p>	<p>Covers concentrations up to 100% [ConsOC1]; For each use event, covers use amounts up to 195 g [ConsOC2]; For each use event, covers exposure up to 5 minutes/event [ConsOC14];</p>
<p>PC 9a: Coatings, paints Floor coating high solid</p>	<p>Covers concentrations up to 10% [ConsOC1]; For each use event, covers use amounts up to 3000 g [ConsOC2]; Covers use in room size of 34 m<sup>3</sup>[ ConsOC11]; For each use event, covers exposure up to 1.00 hr/event [ConsOC14];</p>
<p>PC 1 Adhesives and sealants, sealant joint</p>	<p>Covers concentrations up to 2% [ConsOC1]; Covers skin contact area up to 2 cm<sup>2</sup> [ConsOC5]; For each use event, covers use amounts up to 75 g [ConsOC2]; Covers use in room size of 10 m<sup>3</sup>[ ConsOC11]; For each use event, covers exposure up to 45 min./event [ConsOC14];</p>
<p>PC 1 Adhesives and sealants, sealant assembly</p>	<p>Covers concentrations up to 2% [ConsOC1]; Covers skin contact area up to 43 cm<sup>2</sup> [ConsOC5]; For each use event, covers use amounts up to 390 g [ConsOC2]; Covers use in room size of 20 m<sup>3</sup>[ ConsOC11]; For each use event, covers exposure up to 4.00 hr/event [ConsOC14];</p>



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

PC 1 Adhesives and sealants, adhesive hotmelt	Covers skin contact area up to 43 cm <sup>2</sup> [ConsOC5]; For each use event, covers use amounts up to 65 g [ConsOC2]; Covers use in room size of 20 m <sup>3</sup> [ConsOC11]; For each use event, covers exposure up to 25 min/event [ConsOC14];
<b>Contributing Scenarios</b>	<b>Risk Management Measures</b>
PC 32: Rigids, insulation foams	ConsRMM6: Avoid using without gloves.
PC 9a: Coatings, paints Use of 2-component paint, solvent rich	ConsRMM6: Avoid using without gloves. ConsRMM08: Avoid using when windows closed.
PC 9a: Coatings, paints Use of 2-component paint, high solvent	ConsRMM6: Avoid using without gloves. ConsRMM08: Avoid using when windows closed.

PC 9a: Coatings, paints Mixing and loading of 2-component solvent rich paint	ConsRMM6: Avoid using without gloves.
PC 9a: Coatings, paints Mixing and loading of 2-component high solid paint	ConsRMM6: Avoid using without gloves.
PC 9a: Coatings, paints Floor coating high solid	ConsRMM6: Avoid using without gloves. ConsRMM08: Avoid using when windows closed.
PC 1 Adhesives and sealants, sealant joint	ConsRMM6: Avoid using without gloves.
PC 1 Adhesives and sealants, sealant assembly	ConsRMM6: Avoid using without gloves. ConsRMM08: Avoid using when windows closed.
PC 1 Adhesives and sealants, adhesive hotmelt	ConsRMM6: Avoid using without gloves.
<b>Section 2.2</b>	<b>Control of environmental exposure</b>
<b>Product characteristics</b>	Substance is complex UVCB [PrC3]. OR: Substance is complex UVCB [PrC3].
Substance is hydrophilic.	
Not biodegradable [PrC5f].	
<b>Operational conditions</b>	Indoor/Outdoor use [OOC3].





## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<b>Amounts used</b>		
Fraction of EU tonnage used in region [A1]:	1	
Regional use tonnage (tonnes /year) [A2]:	Rigid foam	Up to 1,120,000
Coatings and Adhesives and sealants	60,000	
Fraction of regional tonnage used locally [A3]:	2.0·10 <sup>-3</sup>	
Maximum daily site tonnage (kg/day) [A4]:	Rigid foam	6,137
Coatings and Adhesives and sealants	329	
<b>Frequency and duration of use</b>		
Type of release:	Dispersive use [FD3].	
Emission days (days/year) [FD4]:	365	
<b>Environmental factors not influenced by risk management</b>		
Local freshwater dilution factor [EF1]:	10	
Local marine water dilution factor [EF2]:	100	
<b>Other given operational conditions affecting environmental exposure</b>		
Dry processes.		
Release fraction to air from process [OOC4]:	0.15	
Release fraction to wastewater from process [OOC5]:	0	
Release fraction to soil from process (regional only) [OOC6]:	5.0·10 <sup>-3</sup>	
<b>Risk Management Measures</b>		
Technical conditions and measures at process level (source) to prevent release	Common practices vary across sites thus conservative process release estimates used [TCS 1].	

<b>Technical onsite conditions and measures to reduce or limit discharges, air emissions and releases to soil</b>	
Air:	No air emission controls required; required removal efficiency is 0%. [TCR5]
Soil:	Soil emission controls are not applicable as there is no direct release to soil. [TCR4]
<b>Organizational measures to prevent/limit release from site</b>	
Conditions and measures related to municipal sewage treatment plant	Wastewater emission controls are not applicable as there is no direct release to wastewater. [TCR3]



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

Conditions and measures related to external treatment of waste for disposal	Not applicable.
<b>Conditions and measures related to external recovery of waste</b>	Not applicable.
<b>Other environmental control measures additional to above</b>	None.

Section 3		Exposure Estimation		
G31: The Consexpo model has been used to estimate consumer exposures unless otherwise indicated.				
Relevant Use	Inhalation exposure (mg/m <sup>3</sup> /day)	RCR chronic	Inhalation exposure (event) (mg/m <sup>3</sup> /day)	RCR Acute
PC 32: Rigids, insulation foams	2,54E-05	<0.01	1.22E-03	0.02
PC 9a: Coatings, paints Use of 2-component paint, solvent rich	3.72E-03	0.15	4.06E-02	0.81
PC 9a: Coatings, paints Use of 2-component paint, high solid	8.22E-04	0.03	3.7E-02	0.74



## Exposure Scenario

### 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

<b>3.2. Environment</b>		
Used EUSESmodel [EE4].		
<b>Compartment</b>	<b>Predicted Environmental Concentration</b>	<b>Risk Characterisation Ratio(RCR)</b>
Freshwater (mg/l)	6.94·10 <sup>-3</sup>	< 6.94·10 <sup>-3</sup>
Marine water (mg/l)	5.45·10 <sup>-4</sup>	< 5.45·10 <sup>-3</sup>
Agricultural soil (mg/kg)	0.240	< 0.240
Grassland (mg/kg)	0.240	< 0.240
<b>Section 4</b>		
<b>Guidance to check compliance with the Exposure Scenario</b>		
<b>4.1. Health</b>		
Guidance to DU	Predicted exposures are not expected to exceed the DN(M)EL when the Risk Management Measures/Operational Conditions outlined in Section 2 are implemented [GC 22]	
	Where other Risk Management Measures/Operational Conditions are adopted, then users should ensure that risks are managed to at least equivalent levels. [GC23]	
	Further information on the assumptions contained in this Exposure Scenario can be found at [GC 24]: ISOPA interpretation on selection of Use Descriptors	
<b>4.2. Environment</b>		
Not applicable.		
<b>Section 5</b>		
<b>Additional good practice advice beyond the REACH Chemical Safety Assessment-(Section Optional)</b>		
<b>Note: The measures reported in this section have not been taken into account in the</b>		
<b>exposure estimates related to the exposure scenario above. They are not subject to</b>		
<b>obligation laid down in Article 37 (4) of REACH.</b>		
<b>Control of Worker Exposure</b>		
Not applicable.		
<b>Control of environmental exposure</b>		
Not applicable.		



## Exposure Scenario

# 4,4'-methylenediphenyl diisocyanate; diphenylmethane-4,4'-diisocyanate

### Abbreviations and acronyms

B bioaccumulation  
BCF Bioconcentration factor  
ECETOC European Centre for Ecotoxicology and Toxicology of Chemicals  
ES Exposure Scenario  
ERC Environmental release category  
LEV Local exhaust ventilation  
PC Chemical product category  
PEC Predicted Environmental Concentration  
PNEC Predicted No-Effect Concentration  
PPE Personal Protective Equipment  
PROC Process category  
RCR Risk Characterisation Ratio  
RMM Risk Reduction Measure  
SCOEL Scientific Committee on Occupational Exposure Limit  
STP Sewage Treatment Plant  
SU Sector of use  
TRA Targeted Risk Assessment  
TWA value Time Weighted Average value  
vB Very Bioaccumulative  
WWTP Waste Water Treatment Plant

Lingua: English  
Data: 14.12.2018  
Exposure scenario (ES)  
POLURENE FP 114C

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This exposure scenario was drawn to integration of the safety data sheet. The information contained in this annex are based on the data currently available to us in connection with the product. The above data were collected according to our best knowledge, however only for informative purposes.

The Security tab is used to help the user of the product in the decision of the applicability and suitability of the product in relation to the use and in the fulfilment of the obligations associated with the use of hazardous substances, it exempts from knowledge and application of the provisions relating to such activity, nor by the application of appropriate protection measures.

Since we cannot affect the handling, storage, use and disposal of the product and we have no information, no liability is accepted for the handling, storage, use and disposal of the product.

When the product is used as part of another product, the present ES will no longer apply.

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