

# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

**HUNTSMAN**

Enriching lives through innovation

## ARATHANE® HY 5610

|         |                |              |                                 |
|---------|----------------|--------------|---------------------------------|
| Version | Revision Date: | SDS Number:  | Date of last issue: 06.01.2022  |
| 2.0     | 04.01.2024     | 400001000592 | Date of first issue: 14.11.2018 |

Print Date 05.01.2024

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

#### 1.1 Product identifier

Trade name : ARATHANE® HY 5610

Unique Formula Identifier (UFI) : S472-K05P-400Q-A9Y8

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

Use of the Substance/Mixture : Component of a Polyurethane System.

Uses advised against : Professional use of aprotic polar solvents for cleaning., Consumer spray applications., Consumer products requiring heating above 40°C.

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

Company : Huntsman Advanced Materials (Europe) BV  
Address : Grijpenlaan 18  
3300 Tienen  
Belgium

Telephone : +41 61 299 20 41  
Telefax : +41 61 299 20 40

E-mail address of person responsible for the SDS : Global\_Product\_EHS\_AdMat@huntsman.com

#### 1.4 Emergency telephone number

Emergency telephone number : Centres Antipoison et de Toxicovigilance:  
ANGERS: 02 41 48 21 21  
BORDEAUX: 05 56 96 40 80  
LILLE: 0 825 812 822  
LYON: 04 72 11 69 11  
MARSEILLE 04 91 75 25 25  
NANCY: 03 83 32 36 36  
PARIS: 01 40 05 48 48  
RENNES: 02 99 59 22 22  
STRASBOURG: 03 88 37 37 37  
TOULOUSE: 05 61 77 74 47  
EUROPE: +32 35 75 1234  
France ORFILA: +33(0)145425959  
ASIA: +65 6336-6011  
China: +86 20 39377888  
+86 532 83889090  
India: + 91 22 42 87 5333  
Australia: 1800 786 152  
New Zealand: 0800 767 437  
USA: +1 800-424-9300

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## SECTION 2: Hazards identification

### 2.1 Classification of the substance or mixture

#### Classification (REGULATION (EC) No 1272/2008)

|                                                                                  |                                                                                  |
|----------------------------------------------------------------------------------|----------------------------------------------------------------------------------|
| Acute toxicity, Category 4                                                       | H332: Harmful if inhaled.                                                        |
| Skin irritation, Category 2                                                      | H315: Causes skin irritation.                                                    |
| Eye irritation, Category 2                                                       | H319: Causes serious eye irritation.                                             |
| Respiratory sensitisation, Category 1                                            | H334: May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| Skin sensitisation, Category 1                                                   | H317: May cause an allergic skin reaction.                                       |
| Carcinogenicity, Category 2                                                      | H351: Suspected of causing cancer.                                               |
| Specific target organ toxicity - single exposure, Category 3, Respiratory system | H335: May cause respiratory irritation.                                          |
| Specific target organ toxicity - repeated exposure, Category 2                   | H373: May cause damage to organs through prolonged or repeated exposure.         |

### 2.2 Label elements

#### Labeling (REGULATION (EC) No 1272/2008)

Hazard pictograms :



Signal word : Danger

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

|                          |   |                    |                                                                                                   |
|--------------------------|---|--------------------|---------------------------------------------------------------------------------------------------|
| Precautionary statements | : | <b>Prevention:</b> |                                                                                                   |
|                          |   | P201               | Obtain special instructions before use.                                                           |
|                          |   | P260               | Do not breathe mist or vapours.                                                                   |
|                          |   | P264               | Wash skin thoroughly after handling.                                                              |
|                          |   | P280               | Wear protective gloves/ protective clothing/ eye protection/ face protection/ hearing protection. |

#### Response:

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P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.  
P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER/ doctor.

### Hazardous components which must be listed on the label:

Isocyanic acid, polymethylenepolyphenylene ester  
Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate  
4,4'-methylenediphenyl diisocyanate

### Additional Labelling

"As from 24 August 2023 adequate training is required before industrial or professional use."

### 2.3 Other hazards

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

Ecological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher

Toxicological information: The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher

## SECTION 3: Composition/information on ingredients

### 3.2 Mixtures

Chemical nature : Isocyanates

#### Hazardous components

| Chemical name                                                         | CAS-No.<br>EC-No.<br>Index-No.<br>Registration number | Classification                                                                                                                                                                               | Concentration<br>(% w/w) |
|-----------------------------------------------------------------------|-------------------------------------------------------|----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|--------------------------|
| Isocyanic acid,<br>polymethylenepolyphenylene<br>ester                | 9016-87-9<br>Polymer                                  | Acute Tox. 4; H332<br>Skin Irrit. 2; H315<br>Eye Irrit. 2; H319<br>Resp. Sens. 1; H334<br>Skin Sens. 1B; H317<br>Carc. 2; H351<br>STOT SE 3; H335<br>(Respiratory system)<br>STOT RE 2; H373 | >= 70 -<br>< 90          |
| Reaction mass of 4,4'-<br>methylenediphenyl diisocyanate<br>and o-(p- | -<br>-<br>01-2119457015-45                            | Acute Tox. 4; H332<br>Skin Irrit. 2; H315<br>Eye Irrit. 2; H319                                                                                                                              | >= 10 -<br>< 20          |

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|                                        |                                                           |                                                                                                                                                                                                                                                                                                                                                                 |               |
|----------------------------------------|-----------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|---------------|
| isocyanatobenzyl)phenyl<br>isocyanate  |                                                           | Resp. Sens. 1; H334<br>Skin Sens. 1; H317<br>Carc. 2; H351<br>STOT SE 3; H335<br>(Respiratory system)<br>STOT RE 2; H373<br><br>specific concentration<br>limit<br>Eye Irrit. 2; H319<br>≥ 5 %<br>STOT SE 3; H335<br>≥ 5 %<br>Skin Irrit. 2; H315<br>≥ 5 %<br>Resp. Sens. 1; H334<br>≥ 0,1 %                                                                    |               |
| 4,4'-methylenediphenyl<br>diisocyanate | 101-68-8<br>202-966-0<br>615-005-00-9<br>01-2119457014-47 | Acute Tox. 4; H332<br>Skin Irrit. 2; H315<br>Eye Irrit. 2; H319<br>Resp. Sens. 1; H334<br>Skin Sens. 1; H317<br>Carc. 2; H351<br>STOT SE 3; H335<br>(Respiratory system)<br>STOT RE 2; H373<br><br>specific concentration<br>limit<br>Eye Irrit. 2; H319<br>≥ 5 %<br>STOT SE 3; H335<br>≥ 5 %<br>Skin Irrit. 2; H315<br>≥ 5 %<br>Resp. Sens. 1; H334<br>≥ 0,1 % | ≥ 5 - <<br>10 |

For explanation of abbreviations see section 16.

## SECTION 4: First aid measures

### 4.1 Description of first aid measures

General advice : Move out of dangerous area.  
Do not leave the victim unattended.  
Get medical attention immediately if symptoms occur.  
Show this safety data sheet to the doctor in attendance.

Protection of first-aiders : No action shall be taken involving any personal risk or without  
suitable training.  
It may be dangerous to the person providing aid to give  
mouth-to-mouth resuscitation.

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If potential for exposure exists refer to Section 8 for specific personal protective equipment.  
First Aid responders should pay attention to self-protection and use the recommended protective clothing

If inhaled

: If breathed in, move person into fresh air.  
Call a physician or poison control centre immediately.  
Keep patient warm and at rest.  
Keep respiratory tract clear.  
If breathing is difficult, give oxygen.  
If breathing is irregular or stopped, administer artificial respiration.  
If unconscious, place in recovery position and seek medical advice.  
Consult a physician immediately if symptoms such as shortness of breath or asthma are observed.  
A hyper-reactive response to even minimal concentrations of diisocyanates may develop in sensitised persons.  
The exposed person may need to be kept under medical surveillance for 48 hours.  
LC50 (rat) : ca. 490 mg/m<sup>3</sup> (4 hours) : using experimentally produced respirable aerosol having aerodynamic diameter <5microns.  
Methods used to generate the exposure concentrations in the animal studies use extreme laboratory conditions and does not represent actual exposure conditions of the material in the workplace, storage, transportation or expected use on the market due to the very low vapor pressure. Therefore, these test results cannot be used to for hazard classification of the material. Rather, an acute toxicity estimate is calculated based on weight of evidence and expert judgement and is used to justify a modified classification for acute inhalation toxicity.

In case of skin contact

: In case of contact, immediately flush skin with soap and plenty of water.  
Take off contaminated clothing and shoes immediately.  
Wash contaminated clothing before reuse.  
Thoroughly clean shoes before reuse.  
Call a physician if irritation develops or persists.  
An MDI study has demonstrated that a polyglycol-based skin cleanser (such as D-Tam™, PEG-400) or corn oil may be more effective than soap and water.

In case of eye contact

: Rinse immediately with plenty of water, also under the eyelids, for at least 15 minutes.  
If easy to do, remove contact lens, if worn.  
Protect unharmed eye.  
Keep eye wide open while rinsing.  
Seek medical advice.

If swallowed

: Gently wipe or rinse the inside of the mouth with water.  
DO NOT induce vomiting unless directed to do so by a physician or poison control center.  
Keep respiratory tract clear.

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Keep at rest.

If a person vomits when lying on his back, place him in the recovery position.

Never give anything by mouth to an unconscious person.

Take victim immediately to hospital.

If symptoms persist, call a physician.

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

Symptoms : Severe allergic skin reactions, bronchospasm and anaphylactic shock

Risks : This product is a respiratory irritant and potential respiratory sensitiser: repeated inhalation of vapour or aerosol at levels above the occupational exposure limit could cause respiratory sensitisation.  
Symptoms may include irritation to the eyes, nose, throat and lungs, possibly combined with dryness of the throat, tightness of chest and difficulty in breathing.  
The onset of the respiratory symptoms may be delayed for several hours after exposure.  
A hyper-reactive response to even minimal concentrations of MDI may develop in sensitised persons.

Causes skin irritation.

May cause an allergic skin reaction.

Causes serious eye irritation.

Harmful if inhaled.

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

May cause respiratory irritation.

Suspected of causing cancer.

May cause damage to organs through prolonged or repeated exposure.

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

Treatment : Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

The first aid procedure should be established in consultation with the doctor responsible for industrial medicine.

## SECTION 5: Firefighting measures

### 5.1 Extinguishing media

Suitable extinguishing media : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Foam

Carbon dioxide (CO<sub>2</sub>)

Dry powder

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Unsuitable extinguishing media : Water may be used if no other available and then in copious quantities. Reaction between water and hot isocyanate may be vigorous.

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

Specific hazards during firefighting : Do not allow run-off from fire fighting to enter drains or water courses.  
The pressure in sealed containers can increase under the influence of heat.  
Exposure to decomposition products may be a hazard to health.

Hazardous combustion products : Combustion products may include: carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and HCN. In the event of extreme heat (>500 degrees C), aniline is suspected of being formed.

### 5.3 Advice for firefighters

Special protective equipment for firefighters : Wear an approved positive pressure self-contained breathing apparatus in addition to standard fire fighting gear. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

Specific extinguishing methods : Cool containers/tanks with water spray.

Further information : Standard procedure for chemical fires.  
Due to reaction with water producing CO<sub>2</sub>-gas, a hazardous build-up of pressure could result if contaminated containers are re-sealed.  
Collect contaminated fire extinguishing water separately. This must not be discharged into drains.  
Prevent fire extinguishing water from contaminating surface water or the ground water system.  
Fire residues and contaminated fire extinguishing water must be disposed of in accordance with local regulations.

## SECTION 6: Accidental release measures

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

Personal precautions : Immediately evacuate personnel to safe areas.  
Use personal protective equipment.  
If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials.  
Ensure adequate ventilation.  
Keep people away from and upwind of spill/leak.  
Only qualified personnel equipped with suitable protective equipment may intervene.

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For additional precautions and advice on safe handling, see section 7.  
Never return spills in original containers for re-use.  
Make sure that there is a sufficient amount of neutralizing/absorbent material near the storage area.  
The danger areas must be delimited and identified using relevant warning and safety signs.  
Treat recovered material as described in the section "Disposal considerations".  
For disposal considerations see section 13.

### 6.2 Environmental precautions

Environmental precautions : Do not allow uncontrolled discharge of product into the environment.  
Do not allow material to contaminate ground water system.  
Prevent product from entering drains.  
Prevent further leakage or spillage if safe to do so.  
Local authorities should be advised if significant spillages cannot be contained.  
If the product contaminates rivers and lakes or drains inform respective authorities.

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

Methods for cleaning up : Clean-up methods - small spillage  
Contain spillage, soak up with non-combustible absorbent material, (e.g. sand, earth, diatomaceous earth, vermiculite) and transfer to a container for disposal according to local / national regulations (see section 13).  
Clean contaminated surface thoroughly.  
Sweep up or vacuum up spillage and collect in suitable container for disposal.  
Neutralize small spillages with decontaminant.  
The compositions of liquid decontaminants are given in Section 16.  
Remove and dispose of residues.  
Clean-up methods - large spillage  
If the product is in its solid form:  
Spilled MDI flakes should be picked up carefully.  
The area should be vacuum cleaned to remove remaining dust particles completely.  
If the product is in its liquid form:  
Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).  
Leave to react for at least 30 minutes.  
Shovel into open-top drums for further decontamination.  
Wash the spillage area with water.  
Test atmosphere for MDI vapour.  
Keep in suitable, closed containers for disposal.

### 6.4 Reference to other sections

See Section 1 for emergency contact information., For personal protection see section 8., For disposal considerations see section 13., The compositions of liquid decontaminants are given in Section 16.



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### SECTION 7: Handling and storage

#### 7.1 Precautions for safe handling

- Technical measures : Ensure that eyewash stations and safety showers are close to the workstation location.
- Local/Total ventilation : Use only with adequate ventilation.
- Advice on safe handling : For personal protection see section 8.  
Avoid formation of aerosol.  
Do not breathe vapours or spray mist.  
Do not breathe vapours/dust.  
Do not swallow.  
Do not get in eyes or mouth or on skin.  
Do not get on skin or clothing.  
Avoid exposure - obtain special instructions before use.  
Smoking, eating and drinking should be prohibited in the application area.  
Provide sufficient air exchange and/or exhaust in work rooms.  
Keep container closed when not in use.  
Open drum carefully as content may be under pressure.  
Dispose of rinse water in accordance with local and national regulations.  
Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitisation of susceptible persons.  
Medical supervision of all employees who handle or come in contact with respiratory sensitisers is recommended.  
Persons allergic to isocyanates, and particularly those suffering from asthma or other respiratory conditions, should not work with isocyanates.  
Industrial use of aprotic polar solvents for cleaning can release hazardous primary aromatic amines (>0.1%)  
Sudden Release of Pressure Hazard
- Advice on protection against fire and explosion : Normal measures for preventive fire protection.
- Hygiene measures : Handle in accordance with good industrial hygiene and safety practice. Wash face, hands and any exposed skin thoroughly after handling. Remove contaminated clothing and protective equipment before entering eating areas. When using do not eat, drink or smoke. Contaminated work clothing should not be allowed out of the workplace. Wash hands before breaks and immediately after handling the product. Wash hands before breaks and at the end of workday.

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

- Requirements for storage areas and containers : Keep containers tightly closed in a dry, cool and well-ventilated place. Keep in properly labelled containers. Observe label precautions. Protect from moisture. Electrical installations / working materials must comply with the technological safety standards. Containers which are opened must be carefully resealed and kept upright to prevent

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leakage.

Advice on common storage : For incompatible materials please refer to Section 10 of this SDS.

Recommended storage temperature : 15 - 25 °C

Further information on storage stability : Stable under normal conditions.

### 7.3 Specific end use(s)

Specific use(s) : No data available

## SECTION 8: Exposure controls/personal protection

### 8.1 Control parameters

#### Occupational Exposure Limits

| Components                          | CAS-No.                                                                                                                                           | Value type (Form of exposure) | Control parameters                | Basis  |
|-------------------------------------|---------------------------------------------------------------------------------------------------------------------------------------------------|-------------------------------|-----------------------------------|--------|
| 4,4'-methylenediphenyl diisocyanate | 101-68-8                                                                                                                                          | VLCT (VLE)                    | 0,02 ppm<br>0,2 mg/m <sup>3</sup> | FR VLE |
|                                     | Further information: Carcinogenic category 2 - Possibly carcinogenic to humans, Risk for sensitisation of the airways, Indicative exposure limits |                               |                                   |        |
|                                     |                                                                                                                                                   | VME                           | 0,01 ppm<br>0,1 mg/m <sup>3</sup> | FR VLE |
|                                     | Further information: Carcinogenic category 2 - Possibly carcinogenic to humans, Risk for sensitisation of the airways, Indicative exposure limits |                               |                                   |        |

#### Derived No Effect Level (DNEL) according to Regulation (EC) No. 1907/2006:

| Substance name                                                                                   | End Use   | Exposure routes | Potential health effects | Value                   |
|--------------------------------------------------------------------------------------------------|-----------|-----------------|--------------------------|-------------------------|
| 4,4'-methylenediphenyl diisocyanate                                                              | Workers   | Inhalation      | Long-term local effects  | 0,05 mg/m <sup>3</sup>  |
|                                                                                                  | Workers   | Inhalation      | Acute local effects      | 0,1 mg/m <sup>3</sup>   |
|                                                                                                  | Consumers | Inhalation      | Long-term local effects  | 0,025 mg/m <sup>3</sup> |
|                                                                                                  | Consumers | Inhalation      | Acute local effects      | 0,05 mg/m <sup>3</sup>  |
| Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate | Workers   | Inhalation      | Long-term local effects  | 0,05 mg/m <sup>3</sup>  |
|                                                                                                  | Workers   | Inhalation      | Acute local effects      | 0,1 mg/m <sup>3</sup>   |
|                                                                                                  | Consumers | Inhalation      | Long-term local effects  | 0,025 mg/m <sup>3</sup> |
|                                                                                                  | Consumers | Inhalation      | Acute local effects      | 0,05 mg/m <sup>3</sup>  |

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|                                                         |           |            |                            |             |
|---------------------------------------------------------|-----------|------------|----------------------------|-------------|
| Isocyanic acid,<br>polymethylenepolyph<br>enylene ester | Workers   | Inhalation | Long-term local<br>effects | 0,05 mg/m3  |
|                                                         | Workers   | Inhalation | Acute local effects        | 0,1 mg/m3   |
|                                                         | Consumers | Inhalation | Long-term local<br>effects | 0,025 mg/m3 |
|                                                         | Consumers | Inhalation | Acute local effects        | 0,05 mg/m3  |

**Predicted No Effect Concentration (PNEC) according to Regulation (EC) No. 1907/2006:**

| Substance name                                                                                                 | Environmental Compartment  | Value                           |
|----------------------------------------------------------------------------------------------------------------|----------------------------|---------------------------------|
| 4,4'-methylenediphenyl<br>diisocyanate                                                                         | Fresh water                | 3,7 µg/l                        |
|                                                                                                                | Remarks:Assessment Factors |                                 |
|                                                                                                                | Freshwater - intermittent  | 37 µg/l                         |
|                                                                                                                | Remarks:Assessment Factors |                                 |
|                                                                                                                | Marine water               | 0,37 µg/l                       |
|                                                                                                                | Remarks:Assessment Factors |                                 |
|                                                                                                                | Fresh water sediment       | 11,7 mg/kg dry<br>weight (d.w.) |
|                                                                                                                | Remarks:Equilibrium method |                                 |
|                                                                                                                | Marine sediment            | 1,17 mg/kg dry<br>weight (d.w.) |
|                                                                                                                | Remarks:Equilibrium method |                                 |
|                                                                                                                | Soil                       | 2,33 mg/kg dry<br>weight (d.w.) |
|                                                                                                                | Remarks:Equilibrium method |                                 |
| Reaction mass of 4,4'-<br>methylenediphenyl diisocyanate<br>and o-(p-<br>isocyanatobenzyl)phenyl<br>isocyanate | Fresh water                | 3,7 µg/l                        |
|                                                                                                                | Remarks:Assessment Factors |                                 |
|                                                                                                                | Freshwater - intermittent  | 37 µg/l                         |
|                                                                                                                | Remarks:Assessment Factors |                                 |
|                                                                                                                | Marine water               | 0,37 µg/l                       |
|                                                                                                                | Remarks:Assessment Factors |                                 |
|                                                                                                                | Fresh water sediment       | 11,7 mg/kg dry<br>weight (d.w.) |
|                                                                                                                | Remarks:Equilibrium method |                                 |
|                                                                                                                | Marine sediment            | 1,17 mg/kg dry<br>weight (d.w.) |
|                                                                                                                | Remarks:Equilibrium method |                                 |
|                                                                                                                | Soil                       | 2,33 mg/kg                      |
|                                                                                                                | Remarks:Equilibrium method |                                 |
| Isocyanic acid,<br>polymethylenepolyphenylene<br>ester                                                         | Fresh water                | 1 mg/l                          |
|                                                                                                                | Fresh water                | 3,7 µg/l                        |
|                                                                                                                | Remarks:Assessment Factors |                                 |
|                                                                                                                | Freshwater - intermittent  | 37 µg/l                         |
|                                                                                                                | Remarks:Assessment Factors |                                 |
|                                                                                                                | Marine water               | 0,37 µg/l                       |
|                                                                                                                | Remarks:Assessment Factors |                                 |
|                                                                                                                | Fresh water sediment       | 11,7 mg/kg dry                  |

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## ARATHANE® HY 5610

Version 2.0      Revision Date: 04.01.2024      SDS Number: 400001000592      Date of last issue: 06.01.2022  
Date of first issue: 14.11.2018

Print Date 05.01.2024

|  |                            |                              |
|--|----------------------------|------------------------------|
|  |                            | weight (d.w.)                |
|  | Remarks:Equilibrium method |                              |
|  | Marine sediment            | 1,17 mg/kg dry weight (d.w.) |
|  | Remarks:Equilibrium method |                              |
|  | Soil                       | 2,33 mg/kg dry weight (d.w.) |
|  | Remarks:Equilibrium method |                              |

### 8.2 Exposure controls

#### Personal protective equipment

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.  
Chemical splash goggles.  
Always wear eye protection when the potential for inadvertent eye contact with the product cannot be excluded.  
Please follow all applicable local/national requirements when selecting protective measures for a specific workplace.  
Ensure that eyewash stations and safety showers are close to the workstation location.

#### Hand protection

Material : Neoprene  
Break through time :  $\geq 480$  min  
Glove thickness :  $\geq 0,5$  mm

Material : Nitrile rubber  
Break through time :  $\geq 480$  min  
Glove thickness :  $\geq 0,35$  mm

Material : butyl-rubber  
Break through time :  $\geq 480$  min  
Glove thickness :  $\geq 0,5$  mm

Material : Fluorinated rubber  
Break through time :  $\geq 480$  min  
Glove thickness :  $\geq 0,4$  mm

Remarks : Protective gloves should be worn when handling freshly made polyurethane products to avoid contact with trace residual materials which may be hazardous in contact with skin.

Use chemical resistant gloves classified under Standard EN374: protective gloves against chemicals and microorganisms. Examples of glove materials that might provide suitable protection include: Butyl rubber, Chlorinated polyethylene, Polyethylene, Ethyl vinyl alcohol copolymers laminated ("EVAL"), Polychloroprene (Neoprene\*), Nitrile/butadiene rubber ("nitrile" or "NBR"), Polyvinyl chloride ("PVC" or "vinyl"), Fluoroelastomer (Viton\*).

When prolonged or frequently repeated contact may occur, a

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glove with protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN374) is recommended.

When only brief contact is expected, a glove with protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN374) is recommended.

Notice: The selection of a specific glove for a particular application and duration of use in a workplace should also take into account all requisite workplace factors such as, but not limited to : other chemicals that may be handled, physical requirements (cut/puncture protection, dexterity, thermal protection), as well as instructions/specifications provided by the glove supplier. The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard EN 374 derived from it. By industrial use of aprotic polar solvents for cleaning : Butyl rubber (0.7mm), Nitrile rubber (0.4mm), Chloroprene (0.5mm)

**Skin and body protection** : Impervious clothing  
Choose body protection according to the amount and concentration of the dangerous substance at the work place.  
Recommended:  
Overall (preferably heavy cotton) or Tyvek-Pro Tech 'C' , Tyvek Pro 'F' disposable coverall.

**Respiratory protection** : Use a properly fitted, air-purifying or air-fed respirator complying with an approved standard if a risk assessment indicates this is necessary.  
Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.  
In emergency, non-routine and unknown exposure situations, including confined space entries, a NIOSH-certified full facepiece pressure demand self-contained breathing apparatus (SCBA) or a full facepiece pressure demand supplied air respirator (SAR) with auxiliary self-contained air supply, should be used.

**Protective measures** : Personal protective equipment comprising: suitable protective gloves, safety goggles and protective clothing  
The type of protective equipment must be selected according to the concentration and amount of the dangerous substance at the specific workplace.  
Ensure that eye flushing systems and safety showers are located close to the working place.

## SECTION 9: Physical and chemical properties

### 9.1 Information on basic physical and chemical properties

Physical state : liquid

Colour : Clear, brown

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Odour : No data is available on the product itself.

Odour Threshold : No data is available on the product itself.

Melting point/freezing point : No data is available on the product itself.

Boiling point : No data is available on the product itself.

Flammability (solid, gas) : No data is available on the product itself.

Lower explosion limit / Lower flammability limit : No data is available on the product itself.

Upper explosion limit / Upper flammability limit : No data is available on the product itself.

Flash point : 220 °C  
Method: closed cup

Auto-ignition temperature : No data is available on the product itself.

Decomposition temperature : No data is available on the product itself.

pH : substance/mixture reacts with water

Viscosity  
Viscosity, dynamic : 85 mPa.s (25 °C)

Solubility(ies)  
Water solubility : No data is available on the product itself.

Solubility in other solvents : No data is available on the product itself.

Partition coefficient: n-octanol/water : No data is available on the product itself.

Vapour pressure : No data is available on the product itself.

Density : 1,23 g/cm<sup>3</sup> (25 °C)

Relative density : 1,23 (25 °C)

Relative vapour density : No data is available on the product itself.

Particle characteristics : No data is available on the product itself.

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### 9.2 Other information

No data is available on the product itself.

## SECTION 10: Stability and reactivity

### 10.1 Reactivity

No dangerous reaction known under conditions of normal use.

### 10.2 Chemical stability

Stable under normal conditions.

### 10.3 Possibility of hazardous reactions

Hazardous reactions : Reaction with water (moisture) produces CO<sub>2</sub>-gas.  
Exothermic reaction with materials containing active hydrogen groups.  
The reaction becomes progressively more vigorous and can be violent at higher temperatures if the miscibility of the reaction partners is good or is supported by stirring or by the presence of solvents.  
MDI is insoluble with, and heavier than water and sinks to the bottom but reacts slowly at the interface.  
A solid water-insoluble layer of polyurea is formed at the interface by liberating carbon dioxide gas.

### 10.4 Conditions to avoid

Conditions to avoid : Extremes of temperature and direct sunlight.  
Exposure to air or moisture over prolonged periods.

### 10.5 Incompatible materials

Materials to avoid : Acids  
Amines  
Bases  
Metals  
water

### 10.6 Hazardous decomposition products

Combustion products may include: carbon monoxide, carbon dioxide, nitrogen oxides, hydrocarbons and HCN. In the event of extreme heat (>500 degrees C), aniline is suspected of being formed.

## SECTION 11: Toxicological information

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

#### Acute toxicity

Harmful if inhaled.

#### Product:

Acute inhalation toxicity : Assessment: The substance/mixture is not toxic on inhalation as defined by dangerous goods regulations.  
Remarks: Methods used to generate the exposure concentrations in the animal studies use extreme laboratory

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conditions and does not represent actual exposure conditions of the material in the workplace, storage, transportation or expected use on the market due to the very low vapor pressure. Therefore, these test results cannot be used to for hazard classification of the material. Rather, an acute toxicity estimate is calculated based on weight of evidence and expert judgement and is used to justify a modified classification for acute inhalation toxicity.

Acute toxicity estimate: 11 mg/l  
Exposure time: 4 h  
Test atmosphere: vapour  
Method: Calculation method

### Components:

#### **Isocyanic acid, polymethylenepolyphenylene ester:**

|                           |                                                                                                                                                                                                                                      |
|---------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acute oral toxicity       | : LD50 (Rat, male): > 10 000 mg/kg<br>Method: OECD Test Guideline 401<br>Assessment: The substance or mixture has no acute oral toxicity                                                                                             |
| Acute inhalation toxicity | : LC50 (Rat, male and female): 431.18 mg/m <sup>3</sup><br>Exposure time: 4 h<br>Test atmosphere: dust/mist<br>Method: OECD Test Guideline 403<br>Assessment: The component/mixture is moderately toxic after short term inhalation. |
| Acute dermal toxicity     | : LD50 (Rabbit, male and female): > 9 400 mg/kg<br>Method: OECD Test Guideline 402<br>Assessment: The substance or mixture has no acute dermal toxicity                                                                              |

#### **Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:**

|                           |                                                                                                                                                                                                                                                                                                                       |
|---------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Acute oral toxicity       | : LD50 (Rat, male and female): > 2 000 mg/kg<br>Assessment: The substance or mixture has no acute oral toxicity                                                                                                                                                                                                       |
| Acute inhalation toxicity | : LC50 (Rat, male and female): 431.18 mg/m <sup>3</sup><br>Exposure time: 4 h<br>Test atmosphere: dust/mist<br>Method: OECD Test Guideline 403<br>Assessment: The component/mixture is moderately toxic after short term inhalation.<br>Remarks: Information given is based on data obtained from similar substances. |
| Acute dermal toxicity     | : LD50 (Rabbit, male and female): > 9 400 mg/kg<br>Method: OECD Test Guideline 402<br>Assessment: The substance or mixture has no acute dermal toxicity<br>Remarks: Information given is based on data obtained from                                                                                                  |



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similar substances.

LD50 (Rabbit, male and female): > 7 940 mg/kg

Assessment: The substance or mixture has no acute dermal toxicity

Remarks: Information given is based on data obtained from similar substances.

### 4,4'-methylenediphenyl diisocyanate:

Acute oral toxicity : LD50 (Rat, male and female): > 2 000 mg/kg  
Assessment: The substance or mixture has no acute oral toxicity  
Remarks: Information given is based on data obtained from similar substances.

Acute inhalation toxicity : LC50 (Rat, male and female): 431.18 mg/m<sup>3</sup>  
Exposure time: 4 h  
Test atmosphere: dust/mist  
Method: OECD Test Guideline 403  
Assessment: The component/mixture is moderately toxic after short term inhalation.

Acute dermal toxicity : LD50 (Rabbit): > 9 400 mg/kg  
Remarks: Information given is based on data obtained from similar substances.

### Skin corrosion/irritation

Causes skin irritation.

### Components:

#### Isocyanic acid, polymethylenepolyphenylene ester:

Assessment : Irritating to skin.  
Result : Irritating to skin.

#### Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:

Species : Rabbit  
Assessment : Irritating to skin.  
Method : OECD Test Guideline 404  
Result : Irritating to skin.  
GLP : yes

### 4,4'-methylenediphenyl diisocyanate:

Species : Rabbit  
Assessment : Irritating to skin.  
Method : OECD Test Guideline 404  
Result : Irritating to skin.

### Serious eye damage/eye irritation

Causes serious eye irritation.

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### Components:

#### **Isocyanic acid, polymethylenepolyphenylene ester:**

|         |   |                                 |
|---------|---|---------------------------------|
| Species | : | Rabbit                          |
| Method  | : | OECD Test Guideline 405         |
| Result  | : | Mild eye irritation             |
| Remarks | : | largely based on human evidence |

#### **Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:**

|            |   |                         |
|------------|---|-------------------------|
| Species    | : | Rabbit                  |
| Assessment | : | No eye irritation       |
| Method     | : | OECD Test Guideline 405 |
| Result     | : | No eye irritation       |
| GLP        | : | yes                     |

|            |   |                     |
|------------|---|---------------------|
| Species    | : | Humans              |
| Assessment | : | Irritating to eyes. |
| Result     | : | Irritating to eyes. |

#### **4,4'-methylenediphenyl diisocyanate:**

|            |   |                         |
|------------|---|-------------------------|
| Species    | : | Rabbit                  |
| Assessment | : | Irritating to eyes.     |
| Method     | : | OECD Test Guideline 405 |
| Result     | : | Irritating to eyes.     |

### **Respiratory or skin sensitisation**

#### **Skin sensitisation**

May cause an allergic skin reaction.

#### **Respiratory sensitisation**

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

### Components:

#### **Isocyanic acid, polymethylenepolyphenylene ester:**

|                 |   |                                                                      |
|-----------------|---|----------------------------------------------------------------------|
| Exposure routes | : | Skin                                                                 |
| Assessment      | : | The product is a skin sensitiser, sub-category 1B.                   |
| Result          | : | The product is a skin sensitiser, sub-category 1B.                   |
| Remarks         | : | Information given is based on data obtained from similar substances. |

|                 |   |                                        |
|-----------------|---|----------------------------------------|
| Test Type       | : | Local lymph node assay (LLNA)          |
| Exposure routes | : | Respiratory Tract                      |
| Species         | : | Rat                                    |
| Assessment      | : | May cause sensitisation by inhalation. |
| Result          | : | May cause sensitisation by inhalation. |

#### **Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:**

|                 |   |                                          |
|-----------------|---|------------------------------------------|
| Exposure routes | : | Skin                                     |
| Species         | : | Guinea pig                               |
| Assessment      | : | May cause sensitisation by skin contact. |

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Method : OECD Test Guideline 406  
Result : May cause sensitisation by skin contact.  
Remarks : Information given is based on data obtained from similar substances.

Exposure routes : Respiratory Tract  
Species : Guinea pig  
Assessment : May cause sensitisation by inhalation.  
Result : May cause sensitisation by inhalation.  
Remarks : Information given is based on data obtained from similar substances.

Assessment : May cause allergy or asthma symptoms or breathing difficulties if inhaled.

### 4,4'-methylenediphenyl diisocyanate:

Exposure routes : Skin  
Species : Guinea pig  
Assessment : May cause sensitisation by skin contact.  
Method : OECD Test Guideline 406  
Result : May cause sensitisation by skin contact.

Test Type : Local lymph node assay (LLNA)  
Exposure routes : Respiratory Tract  
Species : Guinea pig  
Assessment : May cause sensitisation by inhalation.  
Result : May cause sensitisation by inhalation.

Assessment : May cause allergy or asthma symptoms or breathing difficulties if inhaled., May cause an allergic skin reaction.

### Germ cell mutagenicity

Not classified due to lack of data.

### Components:

#### Isocyanic acid, polymethylenepolyphenylene ester:

Genotoxicity in vitro : Metabolic activation: with and without metabolic activation  
Method: OECD Test Guideline 471  
Result: Not classified due to inconclusive data.  
GLP: yes

Test Type: reverse mutation assay  
Test system: Salmonella typhimurium  
Concentration: 0 - 1200 µg/plate  
Metabolic activation: with and without metabolic activation  
Method: Mutagenicity (Salmonella typhimurium - reverse mutation assay)  
Result: negative

Genotoxicity in vivo : Test Type: comet assay  
Species: Rat (male)  
Cell type: Liver cells

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Application Route: inhalation (dust/mist/fume)  
Dose: 2.5/4.9/12 mg/m<sup>3</sup>  
Method: OECD Test Guideline 489  
Result: negative  
Remarks: Information given is based on data obtained from similar substances.

Test Type: Micronucleus test  
Species: Rat (male)  
Cell type: Somatic  
Application Route: Inhalation  
Exposure time: 3 Weeks  
Dose: 113 mg/m<sup>3</sup>  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: Information given is based on data obtained from similar substances.

### Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:

Genotoxicity in vitro : Test Type: reverse mutation assay  
Test system: Salmonella typhimurium  
Metabolic activation: with and without metabolic activation  
Method: Directive 67/548/EEC, Annex, B.13/14  
Result: negative

Genotoxicity in vivo : Test Type: comet assay  
Species: Rat (male)  
Cell type: Liver cells  
Application Route: inhalation (dust/mist/fume)  
Dose: 2.5/4.9/12 mg/m<sup>3</sup>  
Method: OECD Test Guideline 489  
Result: negative  
Remarks: Information given is based on data obtained from similar substances.

Test Type: Micronucleus test  
Species: Rat (male)  
Cell type: Somatic  
Application Route: Inhalation  
Exposure time: 3 Weeks  
Method: OECD Test Guideline 474  
Result: negative  
Remarks: Information given is based on data obtained from similar substances.

### 4,4'-methylenediphenyl diisocyanate:

Genotoxicity in vitro : Test Type: reverse mutation assay  
Test system: Salmonella typhimurium  
Metabolic activation: with and without metabolic activation  
Method: Directive 67/548/EEC, Annex, B.13/14  
Result: negative

Genotoxicity in vivo : Test Type: Micronucleus test

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Species: Rat (male)  
Cell type: Somatic  
Application Route: Inhalation  
Exposure time: 3 Weeks  
Method: OECD Test Guideline 474  
Result: negative

Test Type: comet assay  
Species: Rat (male)  
Cell type: Liver cells  
Application Route: inhalation (dust/mist/fume)  
Dose: 2.5/4.9/12 mg/m<sup>3</sup>  
Method: OECD Test Guideline 489  
Result: negative

### Carcinogenicity

Suspected of causing cancer.

### Product:

Remarks : Rats have been exposed for two years to a respirable aerosol of polymeric MDI which resulted in a chronic pulmonary irritation at high concentrations. Only at the top level (6 mg/m<sup>3</sup>), there was a significant incidence of a benign tumour of the lung (adenoma) and one malignant tumour (adenocarcinoma). There were no lung tumours at 1 mg/m<sup>3</sup> and no effects at 0.2 mg/m<sup>3</sup>. Overall, the tumour incidence, both benign and malignant, and the number of animals with the tumours were not different from controls. The increased incidence of lung tumours is associated with prolonged respiratory irritation and the concurrent accumulation of yellow material in the lung, which occurred throughout the study. In the absence of prolonged exposure to high concentrations leading to chronic irritation and lung damage, it is highly unlikely that tumour formation will occur.

Remarks : Industrial use of aprotic polar solvents for cleaning can release hazardous primary aromatic amines (>0.1%)  
Based on animal studies, primary aromatic amines are considered as potential carcinogen to humans. Some of those chemicals are proven carcinogens to humans  
Provided the recommended personal protective equipment and hygiene measures are applied, no adverse effects to human health are to be expected

### Components:

#### Isocyanic acid, polymethylenepolyphenylene ester:

|                        |                        |
|------------------------|------------------------|
| Species                | : Rat, female          |
| Application Route      | : Inhalation           |
| Exposure time          | : 24 month(s)          |
| Dose                   | : .7 mg/m <sup>3</sup> |
| Frequency of Treatment | : 5 daily              |
| Result                 | : negative             |

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Species : Rat, male and female  
Application Route : inhalation (dust/mist/fume)  
Exposure time : 24 mon  
Activity duration : 6 h  
Dose : 0, 0.2, 1.0, 6.0 mg/m<sup>3</sup>  
Frequency of Treatment : 5 days/week  
NOAEL : 1 mg/m<sup>3</sup>  
LOAEL : 6 mg/m<sup>3</sup>  
Method : OECD Test Guideline 453

Carcinogenicity - Assessment : Suspected human carcinogens

### Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:

Species : Rat, male and female  
Application Route : Inhalation  
Exposure time : 24 month(s)  
Dose : 1 mg/m<sup>3</sup>  
Frequency of Treatment : 5 days/week  
NOAEL : 1 mg/m<sup>3</sup>  
Target Organs : Lungs  
Remarks : Information given is based on data obtained from similar substances.

Carcinogenicity - Assessment : Suspected human carcinogens

### 4,4'-methylenediphenyl diisocyanate:

Species : Rat, female  
Application Route : Inhalation  
Exposure time : 24 month(s)  
Activity duration : 17 h  
Dose : 0, 0.2, 0.7, 2.1 mg/m<sup>3</sup>  
Frequency of Treatment : 5 days/week  
NOEL : 0,7 mg/m<sup>3</sup>  
LOAEL : 0,23 mg/m<sup>3</sup>  
Result : positive  
Target Organs : Lungs

Carcinogenicity - Assessment : Suspected human carcinogens

### Reproductive toxicity

Not classified due to lack of data.

### Components:

#### Isocyanic acid, polymethylenepolyphenylene ester:

Effects on foetal development : Test Type: Pre-natal  
Species: Rat, females  
Application Route: inhalation (dust/mist/fume)  
Dose: 0/1/4/12 mg/m<sup>3</sup>  
General Toxicity Maternal: NOAEC: 4 mg/m<sup>3</sup>

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Method: OECD Test Guideline 414

Result: No teratogenic effects

### Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:

Effects on foetal development

: Test Type: Pre-natal  
Species: Rat, females  
Application Route: Inhalation  
General Toxicity Maternal: NOAEC: 4 mg/m<sup>3</sup>  
Developmental Toxicity: NOAEC: 4 mg/m<sup>3</sup>  
Result: No teratogenic effects  
Remarks: Information given is based on data obtained from similar substances.

Test Type: Pre-natal  
Species: Rat, females  
Application Route: Inhalation  
Duration of Single Treatment: 15 d  
Frequency of Treatment: 7 days/week  
General Toxicity Maternal: LOAEC: <= 9 mg/m<sup>3</sup>  
Developmental Toxicity: NOAEC: 3 mg/m<sup>3</sup>  
Result: No teratogenic effects  
Remarks: Information given is based on data obtained from similar substances.

### STOT - single exposure

May cause respiratory irritation.

#### Components:

#### Isocyanic acid, polymethylenepolyphenylene ester:

Exposure routes : Inhalation  
Target Organs : Respiratory Tract  
Assessment : May cause respiratory irritation.

### Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:

Exposure routes : Inhalation  
Target Organs : Respiratory system  
Assessment : May cause respiratory irritation., The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.  
Remarks : Information given is based on data obtained from similar substances.

#### 4,4'-methylenediphenyl diisocyanate:

Exposure routes : Inhalation  
Target Organs : Respiratory system  
Assessment : May cause respiratory irritation., The substance or mixture is classified as specific target organ toxicant, single exposure, category 3 with respiratory tract irritation.

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### STOT - repeated exposure

May cause damage to organs through prolonged or repeated exposure.

#### Components:

##### **Isocyanic acid, polymethylenepolyphenylene ester:**

|                 |                                                                      |
|-----------------|----------------------------------------------------------------------|
| Exposure routes | : inhalation (dust/mist/fume)                                        |
| Assessment      | : May cause damage to organs through prolonged or repeated exposure. |

##### **Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:**

|                 |                                                                                                                                                                                |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exposure routes | : Inhalation                                                                                                                                                                   |
| Target Organs   | : Respiratory Tract                                                                                                                                                            |
| Assessment      | : The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2., May cause damage to organs through prolonged or repeated exposure. |
| Remarks         | : Information given is based on data obtained from similar substances.                                                                                                         |

##### **4,4'-methylenediphenyl diisocyanate:**

|                 |                                                                                                                                                                                |
|-----------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Exposure routes | : Inhalation                                                                                                                                                                   |
| Target Organs   | : Respiratory system                                                                                                                                                           |
| Assessment      | : May cause damage to organs through prolonged or repeated exposure., The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2. |

### Repeated dose toxicity

#### Components:

##### **Isocyanic acid, polymethylenepolyphenylene ester:**

|                     |                                                                                                            |
|---------------------|------------------------------------------------------------------------------------------------------------|
| Species             | : Rat, female                                                                                              |
| LOEC                | : 1 mg/m <sup>3</sup>                                                                                      |
| Application Route   | : Inhalation                                                                                               |
| Test atmosphere     | : dust/mist                                                                                                |
| Exposure time       | : 2 years 17 h                                                                                             |
| Number of exposures | : 5 days/week                                                                                              |
| Dose                | : 0, 0.2, 0.7, 2.1 mg/m <sup>3</sup>                                                                       |
| Method              | : Chronic toxicity                                                                                         |
| Assessment          | : The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2. |

##### **Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:**

|                     |                                                                   |
|---------------------|-------------------------------------------------------------------|
| Species             | : Rat, female                                                     |
| LOEC                | : 1 mg/m <sup>3</sup>                                             |
| Application Route   | : Inhalation                                                      |
| Test atmosphere     | : dust/mist                                                       |
| Exposure time       | : 2 years 17 h                                                    |
| Number of exposures | : 5 days/week                                                     |
| Dose                | : 0, 0.2, 0.7, 2.1 mg/m <sup>3</sup>                              |
| Method              | : Chronic toxicity                                                |
| Assessment          | : The substance or mixture is classified as specific target organ |



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toxicant, repeated exposure, category 2.

### 4,4'-methylenediphenyl diisocyanate:

|                     |                                                                                                            |
|---------------------|------------------------------------------------------------------------------------------------------------|
| Species             | : Rat, female                                                                                              |
| LOEC                | : 1 mg/m <sup>3</sup>                                                                                      |
| Application Route   | : Inhalation                                                                                               |
| Test atmosphere     | : dust/mist                                                                                                |
| Exposure time       | : 2 years 17 h                                                                                             |
| Number of exposures | : 5 days/week                                                                                              |
| Dose                | : 0, 0.2, 0.7, 2.1 mg/m <sup>3</sup>                                                                       |
| Method              | : Chronic toxicity                                                                                         |
| Assessment          | : The substance or mixture is classified as specific target organ toxicant, repeated exposure, category 2. |

### Aspiration toxicity

Not classified due to lack of data.

## 11.2 Information on other hazards

### Endocrine disrupting properties

#### Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation (EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher

### Experience with human exposure

No data available

### Toxicology, Metabolism, Distribution

No data available

### Neurological effects

No data available

### Further information

No data available

## SECTION 12: Ecological information

### 12.1 Toxicity

#### Components:

#### Isocyanic acid, polymethylenepolyphenylene ester:

Toxicity to fish : LC50 (Brachydanio rerio (zebrafish)): > 1 000 mg/l  
End point: mortality  
Exposure time: 96 h  
Test Type: static test  
Test substance: Fresh water  
Method: OECD Test Guideline 203

Toxicity to daphnia and other : EL50 (Daphnia magna (Water flea)): 31,7 mg/l

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|                                                                        |   |                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
|------------------------------------------------------------------------|---|---------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| aquatic invertebrates                                                  | : | End point: Immobilization<br>Exposure time: 48 h<br>Test Type: semi-static test<br>Test substance: Fresh water<br>Method: OECD Test Guideline 202<br>GLP: yes                                                                                                                                                                                                                                                                                                                                                                                                                                                                                     |
| Toxicity to algae/aquatic plants                                       | : | EL50 (Desmodesmus subspicatus (green algae)): > 100 mg/l<br>Exposure time: 72 h<br>Test substance: Fresh water<br>Method: OECD Test Guideline 201<br>Remarks: Information given is based on data obtained from similar substances.<br><br>EL10 (Desmodesmus subspicatus (green algae)): > 100 mg/l<br>Exposure time: 72 h<br>Test substance: Fresh water<br>Method: OECD Test Guideline 201<br>Remarks: Information given is based on data obtained from similar substances.                                                                                                                                                                      |
| Toxicity to microorganisms                                             | : | EC50 (activated sludge): > 100 mg/l<br>Exposure time: 3 h<br>Test Type: static test<br>Test substance: Fresh water<br>Method: OECD Test Guideline 209<br><br>EC50 (activated sludge): > 1 000 mg/l<br>Exposure time: 3 h<br>Test Type: static test<br>Test substance: Fresh water<br>Method: OECD Test Guideline 209<br>Remarks: Information given is based on data obtained from similar substances.<br><br>NOEC (activated sludge): 250 mg/l<br>Exposure time: 3 h<br>Test Type: static test<br>Test substance: Fresh water<br>Method: OECD Test Guideline 209<br>Remarks: Information given is based on data obtained from similar substances. |
| Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) | : | NOEC: >= 10 mg/l<br>Exposure time: 21 d<br>Species: Daphnia magna (Water flea)<br>Test Type: semi-static test<br>Test substance: Fresh water<br>Method: OECD Test Guideline 211                                                                                                                                                                                                                                                                                                                                                                                                                                                                   |
| Toxicity to soil dwelling organisms                                    | : | LC50: > 1 000 mg/kg<br>Exposure time: 14 d<br>Species: Eisenia fetida (earthworms)<br>Method: OECD Test Guideline 207                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                                             |

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Plant toxicity : EC50: >1000 milligram per kilogram  
Exposure time: 14 d  
Species: Avena sativa (oats)  
Method: OECD Test Guideline 208

NOEC: >=1000 milligram per kilogram  
Exposure time: 14 d  
Species: Avena sativa (oats)

EC50: >1000 milligram per kilogram  
Exposure time: 14 d  
Species: Lactuca sativa (lettuce)

NOEC: >=1000 milligram per kilogram  
Exposure time: 14 d  
Species: Lactuca sativa (lettuce)  
Method: OECD Test Guideline 208

### Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:

Toxicity to fish : LL50 (Fish): > 100 mg/l  
End point: mortality  
Exposure time: 96 h  
Test substance: Fresh water  
Method: OECD Test Guideline 203  
Remarks: Information given is based on data obtained from similar substances.

Toxicity to daphnia and other aquatic invertebrates : EL50 (Daphnia magna (Water flea)): 3,7 mg/l  
End point: Immobilization  
Exposure time: 48 h  
Test Type: semi-static test  
Test substance: Fresh water  
Method: OECD Test Guideline 202  
GLP: yes  
Remarks: Information given is based on data obtained from similar substances.

Toxicity to algae/aquatic plants : ErC50 (algae): > 100 mg/l  
Exposure time: 72 h  
Test substance: Fresh water  
Method: OECD Test Guideline 201  
Remarks: Information given is based on data obtained from similar substances.

NOELR (algae): > 100 mg/l  
Exposure time: 72 h  
Test substance: Fresh water  
Method: OECD Test Guideline 201  
Remarks: Information given is based on data obtained from similar substances.

Toxicity to microorganisms : EC50 (activated sludge): > 1 000 mg/l  
Exposure time: 3 h

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Test substance: Fresh water  
Method: OECD Test Guideline 209  
Remarks: Information given is based on data obtained from similar substances.

NOEC (activated sludge): 250 mg/l  
Exposure time: 3 h  
Test substance: Fresh water  
Method: OECD Test Guideline 209  
Remarks: Information given is based on data obtained from similar substances.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC:  $\geq 10$  mg/l  
Exposure time: 21 d  
Species: *Daphnia magna* (Water flea)  
Test Type: semi-static test  
Test substance: Fresh water  
Method: OECD Test Guideline 211

Toxicity to soil dwelling organisms : EC50:  $> 1\,000$  mg/kg  
Exposure time: 14 d  
Species: *Eisenia fetida* (earthworms)  
Method: OECD Test Guideline 207  
Remarks: Information given is based on data obtained from similar substances.

Plant toxicity : EC50:  $> 1000$  milligram per kilogram  
Exposure time: 14 d  
Species: *Avena sativa* (oats)  
Method: OECD Test Guideline 208  
  
NOEC:  $\geq 1000$  milligram per kilogram  
Exposure time: 14 d  
Species: *Avena sativa* (oats)

EC50:  $> 1000$  milligram per kilogram  
Exposure time: 14 d  
Species: *Lactuca sativa* (lettuce)

NOEC:  $\geq 1000$  milligram per kilogram  
Exposure time: 14 d  
Species: *Lactuca sativa* (lettuce)  
Method: OECD Test Guideline 208

### 4,4'-methylenediphenyl diisocyanate:

Toxicity to fish : LC50 (*Brachydanio rerio* (zebrafish)):  $> 100$  mg/l  
End point: mortality  
Exposure time: 96 h  
Test substance: Fresh water  
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EL50 (*Daphnia magna* (Water flea)): 9 mg/l  
End point: Immobilization  
Exposure time: 48 h

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|                                                                        |                                                                                                                                                                                                                                                                    |
|------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
|                                                                        | Test Type: semi-static test<br>Test substance: Fresh water<br>Method: OECD Test Guideline 202                                                                                                                                                                      |
| Toxicity to algae/aquatic plants                                       | : EC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l<br>Exposure time: 72 h<br>Test Type: static test<br>Test substance: Fresh water<br>Method: OECD Test Guideline 201<br>GLP: yes                                                                          |
| Toxicity to microorganisms                                             | : EC50 (activated sludge): > 1 000 mg/l<br>Exposure time: 3 h<br>Test Type: static test<br>Method: OECD Test Guideline 209                                                                                                                                         |
| Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) | : NOEC: >= 10 mg/l<br>Exposure time: 21 d<br>Species: Daphnia magna (Water flea)<br>Test Type: semi-static test<br>Test substance: Fresh water<br>Method: OECD Test Guideline 211<br>Remarks: Information given is based on data obtained from similar substances. |
| Toxicity to soil dwelling organisms                                    | : NOEC: >= 1 000 mg/kg<br>Exposure time: 336 h<br>Species: Eisenia fetida (earthworms)                                                                                                                                                                             |
| Plant toxicity                                                         | : EC50: >1000 milligram per kilogram<br>Exposure time: 14 d<br>Species: Avena sativa (oats)<br><br>EC50: >1000 milligram per kilogram<br>Exposure time: 14 d<br>Species: Lactuca sativa (lettuce)                                                                  |

### Ecotoxicology Assessment

Acute aquatic toxicity : Toxic to aquatic life.

### 12.2 Persistence and degradability

#### Components:

#### **Isocyanic acid, polymethylenepolyphenylene ester:**

|                  |                                                                                                                                                                                                                                                     |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Biodegradability | : Test Type: aerobic<br>Inoculum: Domestic sewage<br>Concentration: 30 mg/l<br>Result: Not biodegradable<br>Biodegradation: 0 %<br>Exposure time: 28 d<br>Method: Inherent Biodegradability: Modified MITI Test (II)<br>Test substance: Fresh water |
|------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

|                    |           |
|--------------------|-----------|
| Biochemical Oxygen | : 77 mg/l |
|--------------------|-----------|

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Demand (BOD) : Incubation time: 28 d  
Test substance: Fresh water  
Method: OECD Test Guideline 302C

Stability in water : Degradation half life (DT50): 0,8 d (25 °C)  
Method: No information available.  
GLP: no  
Remarks: Fresh water

### Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:

Biodegradability : Result: Not readily biodegradable.  
Biodegradation: 0 %  
Exposure time: 28 d  
Remarks: Information given is based on data on the components and the ecotoxicology of similar products.

Biochemical Oxygen Demand (BOD) : 77 mg/l  
Incubation time: 28 d  
Remarks: Biochemical Oxygen Demand (BOD)

Stability in water : Degradation half life (DT50): < 5 min (20 °C)  
pH: 4 - 9  
Method: OECD Test Guideline 111  
Remarks: Information taken from reference works and the literature.

### 4,4'-methylenediphenyl diisocyanate:

Biodegradability : Test Type: aerobic  
Inoculum: activated sludge, non-adapted  
Result: Not readily biodegradable.  
Biodegradation: 0 %  
Exposure time: 28 d  
Method: OECD Test Guideline 301F  
Test substance: Fresh water

Stability in water : Degradation half life (DT50): 20 hrs (25 °C)  
Remarks: Fresh water

## 12.3 Bioaccumulative potential

### Components:

#### Isocyanic acid, polymethylenepolyphenylene ester:

Bioaccumulation : Species: Cyprinus carpio (Carp)  
Exposure time: 28 d  
Concentration: 0,08 mg/l  
Bioconcentration factor (BCF): 200  
Test substance: Fresh water  
Remarks: Based on data from similar materials

### Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:

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Bioaccumulation : Bioconcentration factor (BCF): 200  
Method: OECD Test Guideline 305  
GLP: yes  
Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: 5,2  
Method: QSAR

### 4,4'-methylenediphenyl diisocyanate:

Bioaccumulation : Species: Cyprinus carpio (Carp)  
Exposure time: 28 d  
Concentration: 0.08 µg/l  
Bioconcentration factor (BCF): 200  
Method: OECD Test Guideline 305  
Remarks: Bioaccumulation is unlikely.

Partition coefficient: n-octanol/water : log Pow: 4,51 (22 °C)  
pH: 7  
Method: OECD Test Guideline 117

## 12.4 Mobility in soil

### Components:

### Reaction mass of 4,4'-methylenediphenyl diisocyanate and o-(p-isocyanatobenzyl)phenyl isocyanate:

Distribution among environmental compartments : log Koc: 4,5  
Method: QSAR  
Remarks: Information taken from reference works and the literature.

### 4,4'-methylenediphenyl diisocyanate:

Distribution among environmental compartments : log Koc: 4,5  
Method: QSAR

Stability in soil : Soil temperature: 22 °C  
Dissipation time: 24 h  
Method: OECD Test Guideline 307

## 12.5 Results of PBT and vPvB assessment

### Product:

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

## 12.6 Endocrine disrupting properties

### Product:

Assessment : The substance/mixture does not contain components considered to have endocrine disrupting properties according to REACH Article 57(f) or Commission Delegated regulation

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(EU) 2017/2100 or Commission Regulation (EU) 2018/605 at levels of 0.1% or higher

### 12.7 Other adverse effects

No data available

## SECTION 13: Disposal considerations

### 13.1 Waste treatment methods

|                        |                                                                                                                                                                          |
|------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Product                | : Do not dispose of waste into sewer.<br>Do not contaminate ponds, waterways or ditches with chemical or used container.<br>Send to a licensed waste management company. |
| Contaminated packaging | : Empty remaining contents.<br>Dispose of as unused product.<br>Do not re-use empty containers.                                                                          |

## SECTION 14: Transport information

### 14.1 UN number or ID number

|      |                                    |
|------|------------------------------------|
| ADN  | : Not regulated as dangerous goods |
| ADR  | : Not regulated as dangerous goods |
| RID  | : Not regulated as dangerous goods |
| IMDG | : Not regulated as dangerous goods |
| IATA | : Not regulated as dangerous goods |

### 14.2 UN proper shipping name

|      |                                    |
|------|------------------------------------|
| ADN  | : Not regulated as dangerous goods |
| ADR  | : Not regulated as dangerous goods |
| RID  | : Not regulated as dangerous goods |
| IMDG | : Not regulated as dangerous goods |
| IATA | : Not regulated as dangerous goods |

### 14.3 Transport hazard class(es)

|      |                                    |
|------|------------------------------------|
| ADN  | : Not regulated as dangerous goods |
| ADR  | : Not regulated as dangerous goods |
| RID  | : Not regulated as dangerous goods |
| IMDG | : Not regulated as dangerous goods |
| IATA | : Not regulated as dangerous goods |

### 14.4 Packing group

|     |                                    |
|-----|------------------------------------|
| ADN | : Not regulated as dangerous goods |
| ADR | : Not regulated as dangerous goods |



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**RID** : Not regulated as dangerous goods

**IMDG** : Not regulated as dangerous goods

**IATA (Cargo)** : Not regulated as dangerous goods

**IATA (Passenger)** : Not regulated as dangerous goods

### 14.5 Environmental hazards

Not regulated as dangerous goods

### 14.6 Special precautions for user

Not applicable

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

Not applicable for product as supplied.

## SECTION 15: Regulatory information

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

REACH - List of substances subject to authorisation (Annex XIV) : Not applicable

REACH - Candidate List of Substances of Very High Concern for Authorisation (Article 59). : This product does not contain substances of very high concern.

REACH - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles (Annex XVII) : Conditions of restriction for the following entries should be considered:  
Number on list 75, 3  
  
If you intend to use this product as tattoo ink, please contact your vendor.  
  
4,4'-methylenediphenyl diisocyanate (Number on list 74, 56)  
o-(p-isocyanatobenzyl)phenyl isocyanate (Number on list 74, 56)  
Diphenylmethanediisocyanate, polymeric (Number on list 56)

Seveso III: Directive 2012/18/EU of the European Parliament and of the Council on the control of major-accident hazards involving dangerous substances. : Not applicable

Occupational Illnesses (R-461-3, France) : 62

### Other regulations:

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Take note of Directive 92/85/EEC regarding maternity protection or stricter national regulations, where applicable.

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

### The components of this product are reported in the following inventories:

|       |                                                          |
|-------|----------------------------------------------------------|
| DSL   | : All components of this product are on the Canadian DSL |
| AIIC  | : On the inventory, or in compliance with the inventory  |
| ENCS  | : On the inventory, or in compliance with the inventory  |
| KECI  | : On the inventory, or in compliance with the inventory  |
| PICCS | : On the inventory, or in compliance with the inventory  |
| IECSC | : On the inventory, or in compliance with the inventory  |
| TCSI  | : On the inventory, or in compliance with the inventory  |
| TSCA  | : All substances listed as active on the TSCA inventory  |

### Inventories

AICS (Australia), AIIC (Australia), DSL (Canada), IECSC (China), ENCS (Japan), KECI (Korea), NZIOC (New Zealand), PICCS (Philippines), TCSI (Taiwan), TSCA (United States of America (USA))

## 15.2 Chemical safety assessment

Chemical Safety Assessments for all substances in this product are either Complete or Not applicable.

## SECTION 16: Other information

### Full text of H-Statements

|      |                                                                              |
|------|------------------------------------------------------------------------------|
| H315 | : Causes skin irritation.                                                    |
| H317 | : May cause an allergic skin reaction.                                       |
| H319 | : Causes serious eye irritation.                                             |
| H332 | : Harmful if inhaled.                                                        |
| H334 | : May cause allergy or asthma symptoms or breathing difficulties if inhaled. |
| H335 | : May cause respiratory irritation.                                          |
| H351 | : Suspected of causing cancer.                                               |

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

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

### Full text of other abbreviations

|                     |                                                      |
|---------------------|------------------------------------------------------|
| Acute Tox.          | : Acute toxicity                                     |
| Carc.               | : Carcinogenicity                                    |
| Eye Irrit.          | : Eye irritation                                     |
| Resp. Sens.         | : Respiratory sensitisation                          |
| Skin Irrit.         | : Skin irritation                                    |
| Skin Sens.          | : Skin sensitisation                                 |
| STOT RE             | : Specific target organ toxicity - repeated exposure |
| STOT SE             | : Specific target organ toxicity - single exposure   |
| FR VLE              | : France. Occupational Exposure Limits               |
| FR VLE / VME        | : Time Weighted Average                              |
| FR VLE / VLCT (VLE) | : Short Term Exposure Limit                          |

### Further information

Other information : Liquid decontaminants (percentages by weight or volume) :  
Decontaminant 1 : \*- sodium carbonate : 5 - 10 % \*- liquid detergent : 0.2 - 2 % \*- water : to make up to 100 %  
Decontaminant 2 : \*- concentrated ammonia solution : 3 - 8 % \*- liquid detergent : 0.2 - 2 % \*- water : to make up to 100 %  
Decontaminant 1 reacts slower with diisocyanates but is more environmentally friendly than decontaminant 2.  
Decontaminant 2 contains ammonia. Ammonia presents health hazards. (See supplier safety information.)

### Classification of the mixture:

|               |      |
|---------------|------|
| Acute Tox. 4  | H332 |
| Skin Irrit. 2 | H315 |
| Eye Irrit. 2  | H319 |
| Resp. Sens. 1 | H334 |
| Skin Sens. 1  | H317 |
| Carc. 2       | H351 |
| STOT SE 3     | H335 |
| STOT RE 2     | H373 |

### Classification procedure:

|                    |
|--------------------|
| Calculation method |
| Calculation method |
| Calculation method |
| Calculation method |
| Calculation method |
| Calculation method |
| Calculation method |
| Calculation method |

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# SAFETY DATA SHEET

according to Regulation (EC) No. 1907/2006

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## ARATHANE® HY 5610

|         |                |              |                                 |
|---------|----------------|--------------|---------------------------------|
| Version | Revision Date: | SDS Number:  | Date of last issue:             |
| 2.0     | 04.01.2024     | 400001000592 | 06.01.2022                      |
|         |                |              | Date of first issue: 14.11.2018 |

Print Date 05.01.2024

THE PRODUCT MAY PRESENT HAZARDS AND SHOULD BE USED WITH CAUTION. WHILE CERTAIN HAZARDS ARE DESCRIBED IN THIS PUBLICATION, NO GUARANTEE IS MADE THAT THESE ARE THE ONLY HAZARDS THAT EXIST.

Hazards, toxicity and behaviour of the products may differ when used with other materials and are dependent upon the manufacturing circumstances or other processes. Such hazards, toxicity and behaviour should be determined by the user and made known to handlers, processors and end users.

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