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

1.1 Product identifier
   Trade name : ARALDITE® 2028-1 GB ISOCYANATE

1.2 Relevant identified uses of the substance or mixture and uses advised against
   Use of the Substance/Mixture : Adhesives

1.3 Details of the supplier of the safety data sheet
   Company : Huntsman Advanced Materials (Europe)BVBA
   Address : Everslaan 45
             3078 Everberg
             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 : 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

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
   Classification (REGULATION (EC) No 1272/2008)
   Skin sensitisation, Category 1 H317: May cause an allergic skin reaction.

2.2 Label elements
   Labelling (REGULATION (EC) No 1272/2008)
Hazard pictograms: ![Exclamation mark]

Signal word: Warning

Hazard statements: H317 May cause an allergic skin reaction.

Precautionary statements:
- Prevention: P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
P272 Contaminated work clothing should not be allowed out of the workplace.
P280 Wear protective gloves.
- Response: P333 + P313 If skin irritation or rash occurs: Get medical advice/attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
- Disposal: P501 Dispose of contents/container to an approved waste disposal plant.

Hazardous components which must be listed on the label:
Hexamethylene-diisocyanate, homopolymer

Hexamethylene diisocyanate

Additional Labelling:
EUH204 Contains isocyanates. May produce an allergic reaction.

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.
No information available.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>EC-No. Registration number</th>
<th>Classification (REGULATION (EC) No 1272/2008)</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>Hexamethylene diisocyanate, Polymer</td>
<td>28182-81-2</td>
<td></td>
<td>Skin Sens. 1; H317</td>
<td>95 - 100</td>
</tr>
<tr>
<td>Hexamethylene diisocyanate</td>
<td>822-06-0</td>
<td>212-485-8</td>
<td>Acute Tox. 4; H302</td>
<td>0.1 - 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td>05-2119229623-42-0000</td>
<td>Acute Tox. 1; H330, Skin Irrit. 2; H315, Eye Irrit. 2; H319</td>
<td></td>
</tr>
</tbody>
</table>
SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: Move out of dangerous area. Consult a physician. Show this safety data sheet to the doctor in attendance.

If inhaled: Move to fresh air in case of accidental inhalation of dust or fumes from overheating or combustion. If symptoms persist, call a physician.

In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water. If symptoms persist, call a physician.

In case of eye contact: Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing. If eye irritation persists, consult a specialist.

If swallowed: Clean mouth with water and drink afterwards plenty of water. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person. Obtain medical attention.

4.2 Most important symptoms and effects, both acute and delayed

None known.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment: No information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

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

Unsuitable extinguishing media: No data is available on the product itself.

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting: No information available.
Hazardous combustion products: No data is available on the product itself.

5.3 Advice for firefighters

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus.

Specific extinguishing methods: No data is available on the product itself.

Further information: Standard procedure for chemical fires.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions: Use personal protective equipment. Ensure adequate ventilation.

6.2 Environmental precautions

Environmental precautions: Try to prevent the material from entering drains or water courses.

6.3 Methods and material for containment and cleaning up

Methods for cleaning up: Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust). Keep in suitable, closed containers for disposal.

6.4 Reference to other sections

None

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling: For personal protection see section 8. Persons with a history of skin sensitisation problems or asthma, allergies, chronic or recurrent respiratory disease should not be employed in any process in which this mixture is being used. Smoking, eating and drinking should be prohibited in the application area.

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. When using do not eat or drink. When using do not smoke. 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 container tightly closed in a dry and well-ventilated place.

Advice on common storage: water

Storage class (TRGS 510): 12, Non Combustible Liquids

Other data: No decomposition if stored and applied as directed.

7.3 Specific end use(s)

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

<table>
<thead>
<tr>
<th>Components</th>
<th>CAS-No.</th>
<th>Value type (Form of exposure)</th>
<th>Control parameters</th>
<th>Basis</th>
</tr>
</thead>
<tbody>
<tr>
<td>hexamethylene-diisocyanate, homopolymer</td>
<td>28182-81-2</td>
<td>TWA</td>
<td>0.02 mg/m³ (as -NCO)</td>
<td>GB EH40</td>
</tr>
</tbody>
</table>

Further information: Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitiser will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. 54 Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified asthmagens or respiratory sensitisers., Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma. The identified substances are those which: - are assigned the risk phrase "R42: May cause sensitisation by inhalation"; or 'R42/43: May cause sensitisation by inhalation and skin contact' or - are listed in section C of HSE publication 'Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma' as updated from time to time, or any other substance which the risk assessment has shown to be a potential cause of occupational asthma., The 'Sen' notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.
Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitisier will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. 54 Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified asthmagens or respiratory sensitisers. Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance. Capable of causing occupational asthma. The identified substances are those which: - are assigned the risk phrase ‘R42: May cause sensitisation by inhalation’; or ‘R42/43: May cause sensitisation by inhalation and skin contact’ or - are listed in section C of HSE publication ‘Asthmagen?. Critical assessments of the evidence for agents implicated in occupational asthma’ as updated from time to time, or any other substance which the risk assessment has shown to be a potential cause of occupational asthma. The ‘Sen’ notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.

<table>
<thead>
<tr>
<th>Hexamethylene diisocyanate</th>
<th>TWA</th>
<th>STEL</th>
<th>GB EH40</th>
</tr>
</thead>
<tbody>
<tr>
<td>822-06-0</td>
<td>0.02 mg/m³ (as -NCO)</td>
<td>0.07 mg/m³ (as -NCO)</td>
<td></td>
</tr>
</tbody>
</table>
management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma. The identified substances are those which: - are assigned the risk phrase ‘R42: May cause sensitisation by inhalation’; or ‘R42/43: May cause sensitisation by inhalation and skin contact’ or - are listed in section C of HSE publication ‘Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma’ as updated from time to time, or any other substance which the risk assessment has shown to be a potential cause of occupational asthma., The ‘Sen’ notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.

<table>
<thead>
<tr>
<th>STEL</th>
<th>0.07 mg/m³ (as -NCO)</th>
<th>GB EH40</th>
</tr>
</thead>
</table>

### Further information
Substances that can cause occupational asthma (also known as asthmagens and respiratory sensitisers) can induce a state of specific airway hyper-responsiveness via an immunological, irritant or other mechanism. Once the airways have become hyper-responsive, further exposure to the substance, sometimes even to tiny quantities, may cause respiratory symptoms. These symptoms can range in severity from a runny nose to asthma. Not all workers who are exposed to a sensitizer will become hyper-responsive and it is impossible to identify in advance those who are likely to become hyper-responsive. 54 Substances that can cause occupational asthma should be distinguished from substances which may trigger the symptoms of asthma in people with pre-existing airway hyper-responsiveness, but which do not include the disease themselves. The latter substances are not classified asthmagens or respiratory sensitisers.. Wherever it is reasonably practicable, exposure to substances that can cause occupational asthma should be prevented. Where this is not possible, the primary aim is to apply adequate standards of control to prevent workers from becoming hyper-responsive. For substances that can cause occupational asthma, COSHH requires that exposure be reduced as low as is reasonably practicable. Activities giving rise to short-term peak concentrations should receive particular attention when risk management is being considered. Health surveillance is appropriate for all employees exposed or liable to be exposed to a substance which may cause occupational asthma and there should be appropriate consultation with an occupational health professional over the degree of risk and level of surveillance., Capable of causing occupational asthma. The identified substances are those which: - are assigned the risk phrase ‘R42: May cause sensitisation by inhalation’; or ‘R42/43: May cause sensitisation by inhalation and skin contact’ or - are listed in section C of HSE publication ‘Asthmagen? Critical assessments of the evidence for agents implicated in occupational asthma’ as updated from time to time, or any other substance which the risk assessment has shown to be a potential cause of occupational asthma., The ‘Sen’ notation in the list of WELs has been assigned only to those substances which may cause occupational asthma.

### 8.2 Exposure controls

#### Engineering measures
Maintain air concentrations below occupational exposure standards.

#### Personal protective equipment

- **Eye protection**: Eye wash bottle with pure water
  - Tightly fitting safety goggles

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SDS_GB-AM – 400001015061 7/19
Hand protection

Material: butyl-rubber
Break through time: > 8 h
- Solvent-resistant gloves (butyl-rubber)
- Nitrile rubber
- Neoprene gloves
- PVC
- butyl-rubber
10 - 480 min
- Solvent-resistant gloves (butyl-rubber)
- Nitrile rubber
- Neoprene gloves
- PVC

Remarks: Polyvinyl alcohol or nitrile- butyl-rubber gloves. The selected protective gloves must satisfy the specifications of EU Directive 89/686/EEC and the standard EN 374 derived from it. Before removing gloves, clean them with soap and water.

Skin and body protection: impervious clothing

Choose body protection according to the amount and concentration of the dangerous substance at the work place.

Respiratory protection: In the case of vapour formation, use a respirator with an approved filter.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties

Appearance: liquid

Colour: yellow

Odour: slight

pH: Not applicable

Melting point/range: No data available

Boiling point/boiling range: No data available

Flash point: 181 °C
Method: closed cup

Vapour pressure: < 0.0001 hPa (20 °C)

Relative density: 1.14 (20 °C)

Density: ca. 1.14 g/cm3 (20 °C)
Solubility(ies)
Water solubility : insoluble (20 °C)

Auto-ignition temperature : ca. 480 °C
   Method: DIN, Other

Viscosity
Viscosity, dynamic : 10,000 mPa.s (23 °C)
   Method: ISO 3219

9.2 Other information
Molecular weight : No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
Stable under recommended storage conditions.

10.2 Chemical stability
No decomposition if stored and applied as directed.

10.3 Possibility of hazardous reactions
Hazardous reactions : Decomposes when moist.
   Stable under recommended storage conditions.
   No decomposition if used as directed.

10.4 Conditions to avoid
Conditions to avoid : Exposure to moisture
   No data available

10.5 Incompatible materials
Materials to avoid : No data available

10.6 Hazardous decomposition products
Carbon oxides
Nitrogen oxides (NOx)

SECTION 11: Toxicological information

11.1 Information on toxicological effects
Acute toxicity
Components:
Hexamethylene diisocyanate:
   Acute oral toxicity : LD50 (Rat, male): 959 mg/kg
ARALDITE® 2028-1 GB ISOCYANATE

Method: OECD Test Guideline 401
GLP: no

LD50 (Rat, male): 746 mg/kg
Method: OECD Test Guideline 401
GLP: no

Components:
hexamethylene-diisocyanate, homopolymer:
Acute inhalation toxicity: LC50 (Rat, male and female): 390 - 453 mg/m³
Exposure time: 4 h
LC50 (Rat, male and female): 0.390 - 0.453 mg/l
Exposure time: 4 h

Components:
Hexamethylene diisocyanate:
Acute inhalation toxicity: LC50 (Rat, male and female): 124 mg/m³
Exposure time: 4 h
Test atmosphere: vapour
Method: OECD Test Guideline 403
GLP: yes

Components:
hexamethylene-diisocyanate, homopolymer:
Acute dermal toxicity: LD50 (Rabbit): > 5,000 mg/kg

Components:
Hexamethylene diisocyanate:
Acute dermal toxicity: LD50 (Rat, male and female): > 7,000 mg/kg
Method: OECD Test Guideline 402
GLP: no

Acute toxicity (other routes of administration): No data available

Skin corrosion/irritation

Components:
hexamethylene-diisocyanate, homopolymer:
Species: Rabbit
Assessment: Mild skin irritant
Result: slight irritation

Components:
Hexamethylene diisocyanate:
Species: Rabbit
Exposure time: 4 h
Method: OECD Test Guideline 404
Result: Corrosive after 1 to 4 hours of exposure
GLP: no
Serious eye damage/eye irritation

**Components:**
hexamethylene-diisocyanate, homopolymer:
Species: Rabbit
Assessment: Mild eye irritant
Result: slight irritation

Hexamethylene diisocyanate:
Species: Rabbit
Method: OECD Test Guideline 405
Result: Irreversible effects on the eye

Respiratory or skin sensitisation

**Components:**
hexamethylene-diisocyanate, homopolymer:
Exposure routes: Skin
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Causes sensitisation.

Exposure routes: Skin
Species: Guinea pig
Result: Does not cause skin sensitisation.

Exposure routes: Respiratory Tract
Species: Guinea pig
Result: Does not cause skin sensitisation.

Hexamethylene diisocyanate:
Test Type: Maximisation Test (GPMT)
Exposure routes: Skin
Species: Rabbit
Method: OECD Test Guideline 406
Result: May cause sensitisation by skin contact.
GLP: no

Test Type: see user defined free text
Exposure routes: Respiratory Tract
Species: Guinea pig
Method: see user defined free text
Result: May cause sensitisation by inhalation.

**Components:**
Hexamethylene diisocyanate:
Assessment: Harmful if inhaled., Causes skin irritation., Causes serious eye irritation.
May cause an allergic skin reaction., May cause allergy or asthma symptoms or breathing difficulties if inhaled.
Germ cell mutagenicity

**Components:**
- hexamethylene-diisocyanate, homopolymer:
  - Genotoxicity in vitro: Metabolic activation: with and without metabolic activation
    - Result: negative

Hexamethylene diisocyanate:
- Genotoxicity in vitro:
  - Test Type: In vitro mammalian cell gene mutation test
    - Test species: Chinese hamster ovary cells
    - Concentration: 1.0 - 10 ml
    - Metabolic activation: with and without metabolic activation
    - Result: negative
  - Test Type: Ames test
    - Test species: Salmonella typhimurium
    - Concentration: 6, 12, 20, 25, 50 and 150 µL p
    - Metabolic activation: with and without metabolic activation
    - Method: see user defined free text
    - Result: negative

**Components:**
- Hexamethylene diisocyanate:
  - Genotoxicity in vivo:
    - Test Type: Micronucleus test
      - Test species: Mouse (male and female)
      - Cell type: Bone marrow
      - Application Route: Inhalation
      - Exposure time: 6 h
      - Dose: 1.47 ppm
      - Method: OECD Test Guideline 474
      - Result: negative
      - GLP: yes

Carcinogenicity

**Components:**
- Hexamethylene diisocyanate:
  - Species: Rat, (male and female)
  - Application Route: Inhalation
  - Exposure time: 24 month(s)
  - Dose: 0.164 ppm
  - Frequency of Treatment: 6 hour
  - Method: OECD Test Guideline 453
  - Result: negative
  - GLP: yes

Carcinogenicity - Assessment: No data available
Reproductive toxicity

Components:
Hexamethylene diisocyanate:
Effects on fertility: Species: Rat, male and female
Application Route: Inhalation
Target Organs: Nasal inner lining
Method: OECD Test Guideline 422
GLP: yes

Components:
Hexamethylene diisocyanate:
Effects on foetal development: Species: Rat, male and female
Application Route: Inhalation
General Toxicity Maternal: No observed adverse effect level: 0.005 ppm
Method: OECD Test Guideline 414
Result: No teratogenic effects

Reproductive toxicity - Assessment: No data available

STOT - single exposure

Components:
Hexamethylene diisocyanate:
Exposure routes: Inhalation
Target Organs: Respiratory Tract
Assessment: Causes damage to organs.

STOT - repeated exposure

Components:
Hexamethylene diisocyanate:
Target Organs: Nasal inner lining
Assessment: Causes damage to organs through prolonged or repeated exposure.

Repeated dose toxicity

Components:
hexamethylene-diisocyanate, homopolymer:
Species: Rat
NOEC: 3.7 - 4.3
Exposure time: 3 Weeks
Species: Rat
NOEC: 3.3 - 3.4
Exposure time: 2,160 h
Hexamethylene diisocyanate:
Species: Rat, male and female
NOEC: 0.005
Application Route: inhalation (vapour)
Test atmosphere: vapour
Exposure time: 2 yr
Number of exposures: 6 h
Method: OECD Test Guideline 453  
GLP: yes

**Components:**  
Hexamethylene diisocyanate:  
Repeated dose toxicity - Assessment: Harmful if inhaled., Causes skin irritation., Causes serious eye irritation.

**Aspiration toxicity**  
No data available

**Experience with human exposure**  
General Information: No data available

Inhalation: No data available

Skin contact: No data available

Eye contact: No data available

Ingestion: No data available

**Toxicology, Metabolism, Distribution**  
No data available

**Neurological effects**  
No data available

**Further information**  
**Product:**  
Remarks: No data available

---

**SECTION 12: Ecological information**

**12.1 Toxicity**

**Components:**  
hexamethylene-diisocyanate, homopolymer:  
Toxicity to fish: IC0 (Brachydania rerio (zebrafish)): > 100 mg/l  
Exposure time: 96 h
### Toxicity to daphnia and other aquatic invertebrates

- **IC0 (Daphnia magna (Water flea)):** > 100 mg/l  
  *Exposure time: 48 h*

### Toxicity to algae

- **EC50 (Desmodesmus subspicatus (Scenedesmus subspicatus)):** > 1,000 mg/l  
  *Exposure time: 72 h*

### Toxicity to bacteria

- **EC50 (activated sludge):** > 1,000 mg/l  
  *Exposure time: 3 h*

#### Hexamethylene diisocyanate:  

- **LC50 (Brachydanio rerio (zebrafish)):** > 82.8 mg/l  
  *Exposure time: 96 h*  
  *Test Type: static test*  
  *Test substance: Fresh water*  

### Ecotoxicology Assessment

#### Acute aquatic toxicity

- This product has no known ecotoxicological effects.

#### Chronic aquatic toxicity

- This product has no known ecotoxicological effects.

### 12.2 Persistence and degradability

#### Components:

- **hexamethylene-diisocyanate, homopolymer:**
  - **Biodegradability:**  
    - *Result: Not readily biodegradable.*  
    - *Biodegradation: 0%*  
    - *Exposure time: 28 d*

- **Hexamethylene diisocyanate:**  
  - **Biodegradability:**  
    - *Inoculum: activated sludge*  
    - *Concentration: 100 mg/l*  
    - *Result: Not readily biodegradable.*
12.3 Bioaccumulative potential

**Components:**

- Hexamethylene diisocyanate:
  - Bioaccumulation: Bioconcentration factor (BCF): 3.2
  - Remarks: Bioaccumulation is unlikely.

12.4 Mobility in soil

**Components:**

- Hexamethylene diisocyanate:
  - Distribution among environmental compartments: Koc: 1665 - 5861

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 Other adverse effects

**Product:**

- Additional ecological information: Remarks: There is no data available for this product.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

**Product:**

- Do not dispose of waste into sewer.
- Do not contaminate ponds, waterways or ditches with chemical or used container.
- Offer surplus and non-recyclable solutions to a licensed disposal company.

**Contaminated packaging:**

- Empty remaining contents.
- Dispose of as unused product.
- Do not re-use empty containers.

SECTION 14: Transport information

IATA

Not regulated as dangerous goods
IMDG
Not regulated as dangerous goods

ADR
Not regulated as dangerous goods

RID
Not regulated as dangerous goods

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
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 - Candidate List of Substances of Very High Concern for Authorisation (Article 59): Not applicable

EU Voluntary monitoring list for non-scheduled substances (Drug Precursors): Not applicable

Not applicable

Volatile organic compounds: Directive 2010/75/EU of 24 November 2010 on industrial emissions (integrated pollution prevention and control)
Remarks: Not applicable

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

TSCA: On TSCA Inventory

DSL: All components of this product are on the Canadian DSL.

AICS: On the inventory, or in compliance with the inventory

NZIoC: Not in compliance with the inventory

ENCS: Not in compliance with the inventory

ISHL: Not 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

Inventories
AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TSCA (USA)

15.2 Chemical Safety Assessment

SECTION 16: Other information

Full text of H-Statements
H302 : Harmful if swallowed.
H315 : Causes skin irritation.
H317 : May cause an allergic skin reaction.
H319 : Causes serious eye irritation.
H330 : Fatal if inhaled.
H334 : May cause allergy or asthma symptoms or breathing difficulties if inhaled.
H335 : May cause respiratory irritation.

Full text of other abbreviations
Acute Tox. : Acute toxicity
Eye Irrit. : Eye irritation
Resp. Sens. : Respiratory sensitisation
Skin Irrit. : Skin irritation
Skin Sens. : Skin sensitisation
STOT SE : Specific target organ toxicity - single exposure

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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.

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SAFETY DATA SHEET
according to Regulation (EC) No. 1907/2006

ARALDITE® 2028-1 GB POLYOL

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

1.1 Product identifier
   Trade name : ARALDITE® 2028-1 GB POLYOL

1.2 Relevant identified uses of the substance or mixture and uses advised against
   Use of the Substance/Mixture : Component of a Polyurethane System.

1.3 Details of the supplier of the safety data sheet
   Company : Huntsman Advanced Materials (Europe)BVBA
   Address : Everslaan 45
             3078 Everberg
             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 : 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

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture
   Classification (REGULATION (EC) No 1272/2008)
   Eye irritation, Category 2
      H319: Causes serious eye irritation.

2.2 Label elements
   Labelling (REGULATION (EC) No 1272/2008)
Hazard pictograms: ⚠️

Signal word: Warning

Hazard statements: H319 Causes serious eye irritation.

Precautionary statements:
- Prevention: P264 Wash skin thoroughly after handling.
P280 Wear eye protection/face protection.
- Response: P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/attention.

Additional Labelling:
The following percentage of the mixture consists of ingredient(s) with unknown acute oral toxicity: 50 %

The following percentage of the mixture consists of ingredient(s) with unknown acute dermal toxicity: 50 %

The following percentage of the mixture consists of ingredient(s) with unknown acute inhalation toxicity: 50 %

The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 50 %

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.

SECTION 3: Composition/information on ingredients

3.2 Mixtures

Hazardous components

<table>
<thead>
<tr>
<th>Chemical Name</th>
<th>CAS-No.</th>
<th>EC-No.</th>
<th>Registration number</th>
<th>Classification (REGULATION (EC) No 1272/2008)</th>
<th>Concentration (%)</th>
</tr>
</thead>
<tbody>
<tr>
<td>[3-(2,3-Epoxypropoxy)propyl]trimethoxy silane</td>
<td>2530-83-8</td>
<td>219-784-2</td>
<td>-</td>
<td>Eye Dam. 1; H318</td>
<td>1 - 3</td>
</tr>
</tbody>
</table>

For explanation of abbreviations see section 16.
SECTION 4: First aid measures

4.1 Description of first aid measures

General advice: No hazards which require special first aid measures.

If inhaled: Move to fresh air in case of accidental inhalation of dust or fumes from overheating or combustion. If symptoms persist, call a physician.

In case of skin contact: Take off contaminated clothing and shoes immediately. Wash off with soap and plenty of water.

In case of eye contact: Flush eyes with water as a precaution. Remove contact lenses. Protect unharmed eye. Keep eye wide open while rinsing.

If swallowed: Clean mouth with water and drink afterwards plenty of water. Do not give milk or alcoholic beverages. Never give anything by mouth to an unconscious person.

4.2 Most important symptoms and effects, both acute and delayed

None known.

4.3 Indication of any immediate medical attention and special treatment needed

Treatment: No information available.

SECTION 5: Firefighting measures

5.1 Extinguishing media

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

Unsuitable extinguishing media: No data is available on the product itself.

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting: No information available.

Hazardous combustion products: No data is available on the product itself.

5.3 Advice for firefighters

Special protective equipment for firefighters: In the event of fire, wear self-contained breathing apparatus.

Specific extinquishing methods: No data is available on the product itself.
Further information : Standard procedure for chemical fires.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures
Personal precautions : Ensure adequate ventilation.

6.2 Environmental precautions
Environmental precautions : No special environmental precautions required.

6.3 Methods and material for containment and cleaning up
Methods for cleaning up : Wipe up with absorbent material (e.g. cloth, fleece).
Keep in suitable, closed containers for disposal.

6.4 Reference to other sections
None

SECTION 7: Handling and storage

7.1 Precautions for safe handling
Advice on safe handling : For personal protection see section 8.
No special handling advice required.

Advice on protection against fire and explosion : Normal measures for preventive fire protection.

Hygiene measures : General industrial hygiene practice.

7.2 Conditions for safe storage, including any incompatibilities
Requirements for storage areas and containers : Keep container tightly closed in a dry and well-ventilated place.

Advice on common storage : Strong acids
Strong bases
Strong oxidizing agents
No special restrictions on storage with other products.

Other data : No decomposition if stored and applied as directed.
7.3 Specific end use(s)

SECTION 8: Exposure controls/personal protection

8.1 Control parameters

Contains no substances with occupational exposure limit values.

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

\[
\text{(3-(2,3-Epoxypropoxy)propyl)trimethoxysilane} \\
\text{End Use: Workers} \\
\text{Exposure routes: Dermal} \\
\text{Potential health effects: Systemic effects, Long-term exposure} \\
\text{Value: 21 mg/kg bw/day} \\
\text{End Use: Workers} \\
\text{Exposure routes: Inhalation} \\
\text{Potential health effects: Systemic effects, Long-term exposure} \\
\text{Value: 147 mg/m^3} \\
\text{End Use: Consumers} \\
\text{Exposure routes: Oral} \\
\text{Potential health effects: Systemic effects, Long-term exposure} \\
\text{Value: 12.5 mg/kg bw/day} \\
\text{End Use: Consumers} \\
\text{Exposure routes: Inhalation} \\
\text{Potential health effects: Systemic effects, Long-term exposure} \\
\text{Value: 43.5 mg/kg bw/day} \\
\text{End Use: Consumers} \\
\text{Exposure routes: Dermal} \\
\text{Potential health effects: Systemic effects, Long-term exposure} \\
\text{Value: 12.5 mg/kg bw/day}
\]

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

\[
\text{(3-(2,3-Epoxypropoxy)propyl)trimethoxysilane} \\
\text{Fresh water} \\
\text{Value: 1 mg/l} \\
\text{Marine water} \\
\text{Value: 0.1 mg/l} \\
\text{Freshwater - intermittent} \\
\text{Value: 1 mg/l} \\
\text{Sewage treatment plant} \\
\text{Value: 10 mg/l} \\
\text{Fresh water sediment} \\
\text{Value: 3.6 mg/kg} \\
\text{Marine sediment} \\
\text{Value: 0.36 mg/kg} \\
\text{Soil} \\
\text{Value: 0.14 mg/kg}
\]

8.2 Exposure controls

**Engineering measures**

Maintain air concentrations below occupational exposure standards.

**Personal protective equipment**

Eye protection : Safety glasses

Hand protection

Material : butyl-rubber
Break through time : > 8 h
Solvent-resistant gloves (butyl-rubber)
Nitrile rubber
10 - 480 min
Neoprene gloves

Remarks : For prolonged or repeated contact use protective gloves.
Skin and body protection : Protective suit
Respiratory protection : No personal respiratory protective equipment normally required.

SECTION 9: Physical and chemical properties

9.1 Information on basic physical and chemical properties
Appearance : liquid
Colour : colourless
Odour : slight
Melting point/freezing point : No data available
Initial boiling point and boiling range : No data available
Flash point : > 100 °C
Method: closed cup
Solubility(ies)
Water solubility : insoluble (20 °C)

9.2 Other information
Molecular weight : No data available

SECTION 10: Stability and reactivity

10.1 Reactivity
Stable under recommended storage conditions.

10.2 Chemical stability
No decomposition if stored and applied as directed.

10.3 Possibility of hazardous reactions
Hazardous reactions : No hazards to be specially mentioned.
10.4 Conditions to avoid
Conditions to avoid: No data available

10.5 Incompatible materials
Materials to avoid: No data available

10.6 Hazardous decomposition products
Burning produces noxious and toxic fumes.
Carbon oxides
Nitrogen oxides (NOx)

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Acute oral toxicity: LD50 (Rat, male and female): 8,025 mg/kg
Method: OECD Test Guideline 401
Assessment: The substance or mixture has no acute oral toxicity

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Acute inhalation toxicity: LC50 (Rat, male and female): > 5.3 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
Assessment: The substance or mixture has no acute inhalation toxicity

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Acute dermal toxicity: LD50 (Rabbit, male): 4,250 mg/kg
Method: OECD Test Guideline 402

Acute toxicity (other routes of administration): No data available

Skin corrosion/irritation

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Serious eye damage/eye irritation

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Species: Rabbit
Assessment: Severe eye irritation
Method: OECD Test Guideline 405
Result: Risk of serious damage to eyes.

Respiratory or skin sensitisation

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Exposure routes: Skin
Species: Guinea pig
Method: OECD Test Guideline 406
Result: Does not cause skin sensitisation.

Assessment: No data available

Germ cell mutagenicity

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Genotoxicity in vitro:
Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 476
Result: positive

Metabolic activation: with and without metabolic activation
Method: OECD Test Guideline 471
Result: positive

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Genotoxicity in vivo:
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: positive

Application Route: Intraperitoneal injection
Dose: 1600 mg/kg
Result: negative

Application Route: Oral
Result: negative

Carcinogenicity

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Species: Mouse, (male)
Application Route: Dermal
Exposure time: 482 days
Dose: 5 mg/kg
Frequency of Treatment: 3 daily
Result: negative

Carcinogenicity - Assessment: No data available

Reproductive toxicity

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Effects on fertility: Species: Rat, male and female
Application Route: Oral
Method: OECD Test Guideline 415
Result: No effects on fertility and early embryonic development were detected.

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Effects on foetal development: Species: Rabbit, female
Application Route: Oral
General Toxicity Maternal: No observed adverse effect level: 200 mg/kg body weight
Method: OECD Test Guideline 414
Result: No teratogenic effects

Reproductive toxicity - Assessment: No data available

STOT - single exposure
No data available

STOT - repeated exposure
No data available

Repeated dose toxicity

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Species: Rat, male and female
NOEC: > 1000
Application Route: Ingestion
Test atmosphere: dust/mist
Exposure time: 672 h
Number of exposures: 5 d
Method: OECD Test Guideline 412

Species: Rat, male and female
No observed adverse effect level: 1000
ARALDITE® 2028-1 GB POLYOL

Application Route: Ingestion
Exposure time: 2,160 h
Number of exposures: 7 d
Method: Subchronic toxicity

Repeated dose toxicity: No data available
Assessment

Aspiration toxicity
No data available

Experience with human exposure
General Information: No data available

Inhalation: No data available
Skin contact: No data available
Eye contact: No data available
Ingestion: No data available

Toxicology, Metabolism, Distribution
No data available

Neurological effects
No data available

Further information

Product:
Remarks: No data available

SECTION 12: Ecological information

12.1 Toxicity

Product:
Further information
The following percentage of the mixture consists of ingredient(s) with unknown hazards to the aquatic environment: 50 %

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Toxicity to fish : LC50 (Cyprinus carpio (Carp)): 55 mg/l
Exposure time: 96 h
Test Type: semi-static test
Test substance: Fresh water

Toxicity to daphnia and other aquatic invertebrates : LC50 : 324 mg/l
Exposure time: 48 h
Test Type: static test
Test substance: Fresh water

Toxicity to algae : EC50 : 119 mg/l
Exposure time: 168 h
Test Type: static test
Test substance: Fresh water

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC: >= 100 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

Ecotoxicology Assessment
Acute aquatic toxicity : This product has no known ecotoxicological effects.

Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

12.2 Persistence and degradability

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Biodegradability : Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: 37 %
Exposure time: 28 d

12.3 Bioaccumulative potential

Components:
(3-(2,3-Epoxypropoxy)propyl) trimethoxysilane:
Partition coefficient: n-octanol/water : log Pow: -2.6 (25 °C)

12.4 Mobility in soil
No data available

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
12.6 Other adverse effects

Product:

Additional ecological information

Remarks: There is no data available for this product.

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product:

Offer surplus and non-recyclable solutions to a licensed disposal company.

Contaminated packaging:

Empty remaining contents.

Empty containers should be taken to an approved waste handling site for recycling or disposal.

SECTION 14: Transport information

IATA

Not regulated as dangerous goods

IMDG

Not regulated as dangerous goods

ADR

Not regulated as dangerous goods

RID

Not regulated as dangerous goods

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code

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 - Candidate List of Substances of Very High Concern for Authorisation (Article 59).

Not applicable

EU Voluntary monitoring list for non-scheduled substances (Drug Precursors)

Not applicable


Not applicable
The components of this product are reported in the following inventories:

- CH INV: The formulation contains substances listed on the Swiss Inventory
- TSCA: On TSCA Inventory
- DSL: This product contains the following components listed on the Canadian NDSL. All other components are on the Canadian DSL.
- ISHL: Not in compliance with the inventory
- KECI: On the inventory, or in compliance with the inventory
- IECSC: On the inventory, or in compliance with the inventory

Inventories
AICS (Australia), DSL (Canada), IECSC (China), REACH (European Union), ENCS (Japan), ISHL (Japan), KECI (Korea), NZIoC (New Zealand), PICCS (Philippines), TSCA (USA)

15.2 Chemical Safety Assessment

SECTION 16: Other information

Full text of H-Statements
H318: Causes serious eye damage.

Full text of other abbreviations
Eye Dam.: Serious eye damage

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