ARALDITE® 2028-1 ISOCYANATE

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

1.1 Product identifier

Trade name : ARALDITE® 2028-1 ISOCYANATE

Substance name : Hexamethylene diisocyanate, Polymer

CAS-No. : 28182-81-2

EC-No. : -

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 : 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

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 :

Signal word : Warning

Hazard statements :	H317	May cause an allergic skin reaction.
Precautionary statements :	**Prevention:**	
	P261	Avoid breathing mist or vapours.
	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 facility in accordance with local, regional, national and international regulations.

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

3.1 Substances

Substance name : Hexamethylene diisocyanate, Polymer

CAS-No. : 28182-81-2

EC-No. : -

Hazardous components

Chemical name	CAS-No. EC-No.	Concentration (% w/w)	M-Factor, SCL, ATE
Hexamethylene diisocyanate, oligomers	28182-81-2 Polymer	>= 90 - <= 100	
hexamethylene diisocyanate	822-06-0 212-485-8	>= 0,1 - < 0,5	specific concentration limit Resp. Sens. 1; H334 >= 0,5 % Skin Sens. 1; H317 >= 0,5 % Acute toxicity estimate Acute oral toxicity: 746 mg/kg Acute inhalation toxicity (vapour): 0,124 mg/l

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.
Treat symptomatically.
Get medical attention if symptoms occur.

Protection of first-aiders : First Aid responders should pay attention to self-protection and use the recommended protective clothing
If potential for exposure exists refer to Section 8 for specific personal protective equipment.
Avoid inhalation, ingestion and contact with skin and eyes.
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.

If inhaled : Call a physician or poison control centre immediately.
If inhaled, remove to fresh air.
Get medical attention if symptoms occur.

In case of skin contact : If on skin, rinse well with water.

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

If swallowed : Keep respiratory tract clear.
Never give anything by mouth to an unconscious person.
If symptoms persist, call a physician.
Take victim immediately to hospital.

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 : Treat symptomatically.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical

Unsuitable extinguishing media : Exercise caution when using a high volume water jet as it may scatter and spread fire

5.2 Special hazards arising from the substance or mixture

Specific hazards during firefighting : No information available.

Hazardous combustion products : No hazardous combustion products are known

5.3 Advice for firefighters

Special protective equipment for firefighters : Wear self-contained breathing apparatus for firefighting if necessary.

Specific extinguishing methods : Use extinguishing measures that are appropriate to local circumstances and the surrounding environment.

Further information : No action shall be taken involving any personal risk or without suitable training.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

Personal precautions : Use personal protective equipment.
Ensure adequate ventilation.
Refer to protective measures listed in sections 7 and 8.

6.2 Environmental precautions

Environmental precautions : Prevent product from entering drains.
Prevent further leakage or spillage if safe to do so.
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 : 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

For disposal considerations see section 13., See Section 1 for emergency contact information., For personal protection see section 8.

SECTION 7: Handling and storage

7.1 Precautions for safe handling

Advice on safe handling : Repeated or prolonged skin contact may cause skin irritation and/or dermatitis and sensitisation of susceptible persons.
Persons suffering from asthma, eczema or skin problems should avoid contact, including dermal contact, with this product.
Do not breathe vapours/dust.
Avoid exposure - obtain special instructions before use.
Avoid contact with skin and eyes.
For personal protection see section 8.
Smoking, eating and drinking should be prohibited in the application area.
Dispose of rinse water in accordance with local and national regulations.
Persons susceptible to 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.

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

Hygiene measures : 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. Keep in properly labelled containers.

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

Recommended storage temperature : 2 - 40 °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
hexamethylene diisocyanate	822-06-0	VME	0,01 ppm 0,075 mg/m3	FR VLE
Further information	Risk for sensitisation of the airways, Indicative exposure limits			
		VLCT (VLE)	0,02 ppm 0,15 mg/m3	FR VLE
Further information	Risk for sensitisation of the airways, Indicative exposure limits			

8.2 Exposure controls

Personal protective equipment

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

Hand protection
Material : butyl-rubber
Break through time : > 8 h

Material : Nitrile rubber
Break through time : 10 - 480 min

Material : Ethyl Vinyl Alcohol Laminate (EVAL)
Break through time : > 8 h

Remarks : The selected protective gloves have to satisfy the specifications of Regulation (EU) 2016/425 and the standard

EN 374 derived from it. Gloves should be discarded and replaced if there is any indication of degradation or chemical breakthrough. Take note of the information given by the producer concerning permeability and break through times, and of special workplace conditions (mechanical strain, duration of contact).
Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical products if a risk assessment indicates this is necessary. The suitability for a specific workplace should be discussed with the producers of the protective gloves.

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

Physical state	:	liquid
Colour	:	yellow
Odour	:	slight
Odour Threshold	:	No data is available on the product itself.
pH	:	substance/mixture reacts with water
Melting point/range	:	No data available
Boiling point/boiling range	:	No data available
Flash point	:	181 °C Method: closed cup
Flammability (solid, gas)	:	No data is available on the product itself.
Upper explosion limit / Upper flammability limit	:	No data is available on the product itself.
Lower explosion limit / Lower flammability limit	:	No data is available on the product itself.
Vapour pressure	:	< 0,0001 hPa (20 °C)
Relative vapour density	:	No data is available on the product itself.
Relative density	:	1,14 (20 °C)

Density	:	ca. 1,14 g/cm3 (20 °C)
Solubility(ies)		
Water solubility	:	insoluble (20 °C)
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.
Auto-ignition temperature	:	ca. 480 °C Method: DIN Method, other
Decomposition temperature	:	No data is available on the product itself.
Viscosity		
Viscosity, dynamic	:	10 000 mPa.s (23 °C) Method: ISO 3219

9.2 Other information

Explosive properties	:	No data is available on the product itself.
Oxidizing properties	:	No data is available on the product itself.
Burning rate	:	No data is available on the product itself.
Evaporation rate	:	No data is available on the product itself.
Molecular weight	:	No data available

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	:	Decomposes when moist.

10.4 Conditions to avoid

Conditions to avoid	:	Exposure to moisture

10.5 Incompatible materials

Materials to avoid	:	water

10.6 Hazardous decomposition products

Carbon oxides
Nitrogen oxides (NOx)

SECTION 11: Toxicological information

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

Acute toxicity

Product:

Acute inhalation toxicity : Acute toxicity estimate: > 20 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Method: Calculation method

Components:

Hexamethylene diisocyanate, oligomers:

Acute oral toxicity : LD50 (Rat): > 5 000 mg/kg

Acute dermal toxicity : LD50 (Rabbit): > 2 000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

hexamethylene diisocyanate:

Acute oral toxicity : LD50 (Rat, male): 959 mg/kg
Method: OECD Test Guideline 401

LD50 (Rat, male): 746 mg/kg
Method: OECD Test Guideline 401

Acute toxicity estimate: 746 mg/kg
Method: Calculation method

Acute inhalation toxicity : LC50 (Rat, male and female): 0,124 mg/l
Exposure time: 4 h
Test atmosphere: vapour
Method: OECD Test Guideline 403

Acute toxicity estimate: 0,124 mg/l
Test atmosphere: vapour
Method: Calculation method

Acute dermal toxicity : LD50 (Rat, male and female): > 7 000 mg/kg
Method: OECD Test Guideline 402

Skin corrosion/irritation

Components:

Hexamethylene diisocyanate, oligomers:

Species : Rabbit
Method : OECD Test Guideline 404
Result : No skin irritation

hexamethylene diisocyanate:

Species	:	Rabbit
Exposure time	:	4 h
Method	:	OECD Test Guideline 404
Result	:	Corrosive after 1 to 4 hours of exposure

Serious eye damage/eye irritation

Components:

Hexamethylene diisocyanate, oligomers:

Species	:	Rabbit
Method	:	OECD Test Guideline 405
Result	:	No eye irritation

hexamethylene diisocyanate:

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

Respiratory or skin sensitisation

Components:

Hexamethylene diisocyanate, oligomers:

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

hexamethylene diisocyanate:

Test Type	:	Maximisation Test
Exposure routes	:	Skin
Species	:	Rabbit
Method	:	OECD Test Guideline 406
Result	:	May cause sensitisation by skin contact.
Exposure routes	:	Respiratory Tract
Species	:	Guinea pig
Result	:	May cause sensitisation by inhalation.
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, oligomers:

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 system: Chinese hamster ovary cells Concentration: 1,0 - 10 ml Metabolic activation: with and without metabolic activation Result: negative Test Type: Ames test Test system: Salmonella typhimurium Concentration: 6, 12, 20, 25, 50 and 150 µL p Metabolic activation: with and without metabolic activation Result: negative
Genotoxicity in vivo	:	Test Type: Micronucleus 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

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

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 Result: negative
Effects on foetal development	:	Species: Rat, male and female Application Route: Inhalation General Toxicity Maternal: NOAEL: 0,005 ppm Method: OECD Test Guideline 414 Result: No teratogenic effects

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, oligomers:

Species	:	Rat
NOEC	:	3,7 mg/m3
Exposure time	:	504 h

Species	:	Rat
NOEC	:	3,3 mg/m3
Exposure time	:	2 160 h

hexamethylene diisocyanate:

Species	:	Rat, male and female
NOEC	:	0,005 ppm
Application Route	:	inhalation (vapour)
Test atmosphere	:	vapour
Exposure time	:	2 yr
Number of exposures	:	6 h
Method	:	OECD Test Guideline 453

Aspiration toxicity

No data available

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:

Hexamethylene diisocyanate, oligomers:

Toxicity to fish	:	LC50 (Brachydanio rerio (zebrafish)): > 100 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	LC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h
Toxicity to algae/aquatic plants	:	EC50 (Desmodesmus subspicatus (green algae)): > 1 000 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50 (activated sludge): > 1 000 mg/l Exposure time: 3 h

hexamethylene diisocyanate:

Toxicity to fish	:	LC50 (Brachydanio rerio (zebrafish)): > 82,8 mg/l Exposure time: 96 h Test Type: static test Test substance: Fresh water Method: Directive 67/548/EEC, Annex V, C.1.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 89,1 mg/l Exposure time: 48 h Test Type: static test Test substance: Fresh water Method: Directive 67/548/EEC, Annex V, C.2.
Toxicity to algae/aquatic plants	:	EgC50 (Desmodesmus subspicatus (green algae)): > 77,4 mg/l Exposure time: 72 h Test Type: static test Test substance: Fresh water Method: Directive 67/548/EEC, Annex V, C.3.
Toxicity to microorganisms	:	EC50 (activated sludge): 842 mg/l Exposure time: 3 h Test Type: static test

Test substance: Fresh water
Method: OECD Test Guideline 209

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, oligomers:

Biodegradability : Result: Not biodegradable
Biodegradation: 0 %
Exposure time: 28 d

hexamethylene diisocyanate:

Biodegradability : Inoculum: activated sludge
Concentration: 100 mg/l
Result: Not readily biodegradable.
Biodegradation: 48 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

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 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

12.7 Other adverse effects

No data available

SECTION 13: Disposal considerations

13.1 Waste treatment methods

Product	:	Dispose of contents and container in accordance with all local, regional, national and international regulations. Do not dispose of waste into sewer. Do not contaminate ponds, waterways or ditches with chemical or used container.
Contaminated packaging	:	Empty remaining contents. Dispose of as unused product. Do not re-use empty containers.

SECTION 14: Transport information

14.1 UN number or ID number

Not regulated as dangerous goods

14.2 UN proper shipping name

Not regulated as dangerous goods

14.3 Transport hazard class(es)

Not regulated as dangerous goods

14.4 Packing group

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 (Regulation (EC) No

1907/2006 (REACH), Article 57).

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:
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

NZIoC : 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

FR VLE	:	France. Occupational Exposure Limits (INRS)
FR VLE / VME	:	Time Weighted Average
FR VLE / VLCT (VLE)	:	Short Term Exposure Limit

Further information

The information and recommendations in this publication are to the best of our knowledge, information and belief accurate at the date of publication, NOTHING HEREIN IS TO BE CONSTRUED AS A WARRANTY, EXPRESS OR OTHERWISE.

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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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