# ARALDITE® 2028-1 ISOCYANATE

| Version | Revision Date: | SDS Number: | Date of last issue: - |
|---|---|---|---|
| 1.0 | 06/26/2018 | 400001015061 | Date of first issue: 06/26/2018 |



## SECTION 1. IDENTIFICATION

Product name : ARALDITE® 2028-1 ISOCYANATE

**Manufacturer or supplier's details**

Company name of supplier : Huntsman Advanced Materials Americas LLC
Address : P.O. Box 4980
The Woodlands,
TX 77387
United States of America (USA)
Telephone : Non-Emergency: (800) 257-5547

E-mail address of person responsible for the SDS : MSDS@huntsman.com

Emergency telephone number : Chemtrec: (800) 424-9300 or (703) 527-3887

**Recommended use of the chemical and restrictions on use**

Recommended use : Adhesives

## SECTION 2. HAZARDS IDENTIFICATION

**GHS classification in accordance with 29 CFR 1910.1200**

Respiratory sensitisation : Category 1

Skin sensitisation : Category 1

**GHS label elements**

Hazard pictograms :

Signal word : Danger

Hazard statements : H317 May cause an allergic skin reaction.
H334 May cause allergy or asthma symptoms or breathing difficulties if inhaled.

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.
P285 In case of inadequate ventilation wear respiratory protection.
**Response:**
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P341 IF INHALED: If breathing is difficult, remove victim

to fresh air and keep at rest in a position comfortable for breathing.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P342 + P311 If experiencing respiratory symptoms: Call a POISON CENTER/doctor.
P363 Wash contaminated clothing before reuse.
**Storage:**
Not available
**Disposal:**
P501 Dispose of contents/container to an approved facility in accordance with local, regional, national and international regulations.

**Other hazards**

None known.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Substance

**Hazardous components**

| Chemical name | CAS-No. | Concentration (% w/w) |
|---|---|---|
| Hexamethylene diisocyanate, oligomers | 28182-81-2 | 90 - 100 |
| hexamethylene diisocyanate | 822-06-0 | 0.1 - 1 |

The specific chemical identity and/or exact percentage (concentration) of composition may be withheld as a trade secret.

## SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
Treat symptomatically.
Get medical attention if symptoms occur.

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.

| | | |
|---|---|---|
| Most important symptoms and effects, both acute and delayed | : | None known. |
| Notes to physician | : | No information available.<br><br>Treat symptomatically. |

## SECTION 5. FIREFIGHTING MEASURES

| | | |
|---|---|---|
| Suitable extinguishing media | : | Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. |
| Unsuitable extinguishing media | : | High volume water jet |
| Specific hazards during firefighting | : | No information available.<br><br>No information available. |
| Hazardous combustion products | : | No hazardous combustion products are known |
| Specific extinguishing methods | : | No data is available on the product itself. |
| Further information | : | No action shall be taken involving any personal risk or without suitable training. |
| Special protective equipment for firefighters | : | Wear self-contained breathing apparatus for firefighting if necessary. |

## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | | |
|---|---|---|
| Personal precautions, protective equipment and emergency procedures | : | Use personal protective equipment.<br>Ensure adequate ventilation.<br>Refer to protective measures listed in sections 7 and 8. |
| Environmental precautions | : | Prevent product from entering drains.<br>Prevent further leakage or spillage if safe to do so.<br>If the product contaminates rivers and lakes or drains inform respective authorities. |
| Methods and materials for containment and cleaning up | : | Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).<br>Keep in suitable, closed containers for disposal. |

## SECTION 7. HANDLING AND STORAGE

| | | |
|---|---|---|
| Advice on protection against | : | Normal measures for preventive fire protection. |

fire and explosion

Advice on safe handling : Avoid formation of aerosol.
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.
Provide sufficient air exchange and/or exhaust in work rooms.
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.

Conditions for safe storage : Keep container tightly closed in a dry and well-ventilated place.
Keep in properly labelled containers.

Materials to avoid : water

For incompatible materials please refer to Section 10 of this SDS.

Further information on storage stability : Stable under normal conditions.

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Components with workplace control parameters**

| Components | CAS-No. | Value type (Form of exposure) | Control parameters / Permissible concentration | Basis |
|---|---|---|---|---|
| hexamethylene diisocyanate | 822-06-0 | TWA | 0.005 ppm | ACGIH |

**Personal protective equipment**

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

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

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

Material : Neoprene gloves
Break through time : 10 - 480 min

Material : PVC

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

| | | |
|---|---|---|
| Eye protection | : | Eye wash bottle with pure water<br>Tightly fitting safety goggles |
| Skin and body protection | : | Impervious clothing<br>Choose body protection according to the amount and concentration of the dangerous substance at the work place. |
| Hygiene measures | : | Wash hands before breaks and at the end of workday. |

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

| | | |
|---|---|---|
| Appearance | : | liquid |
| Colour | : | yellow |
| Odour | : | slight |
| Odour Threshold | : | No data is available on the product itself. |
| pH | : | Not applicable |
| Melting point/range | : | No data available |
| Boiling point/boiling range | : | No data available |
| Flash point | : | 358 °F / 181 °C<br>Method: closed cup |
| Evaporation rate | : | No data is available on the product itself. |
| Flammability (solid, gas) | : | No data is available on the product itself. |
| Flammability (liquids) | : | 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 (68 °F / 20 °C) |
| Relative vapour density | : | No data is available on the product itself. |
| Relative density | : | 1.14 (68 °F / 20 °C) |
| Density | : | ca. 1.14 g/cm3 (68 °F / 20 °C) |
| Solubility(ies) | | |
| Water solubility | : | insoluble (68 °F / 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.896 °F / 480 °C<br>Method: DIN Method, other |
| Thermal decomposition | : | No data is available on the product itself. |
| Self-Accelerating decomposition temperature (SADT) | : | No data is available on the product itself. |
| Viscosity | | |
| Viscosity, dynamic | : | 10,000 mPa.s (73 °F / 23 °C)<br>Method: ISO 3219 |
| Explosive properties | : | No data is available on the product itself. |
| Oxidizing properties | : | No data is available on the product itself. |
| Molecular weight | : | No data available |
| Particle size | : | No data is available on the product itself. |

## SECTION 10. STABILITY AND REACTIVITY

| | | |
|---|---|---|
| Reactivity | : | No dangerous reaction known under conditions of normal use. |
| Chemical stability | : | No decomposition if stored and applied as directed.<br>Stable under normal conditions. |
| Possibility of hazardous reactions | : | Decomposes when moist.<br>No decomposition if stored and applied as directed.<br>No hazards to be specially mentioned. |
| Conditions to avoid | : | Exposure to moisture<br>No data available<br>None known. |
| Incompatible materials | : | No data available<br>None known. |
| Hazardous decomposition products | : | Carbon oxides<br>Nitrogen oxides (NOx)<br>No hazardous decomposition products are known. |

## SECTION 11. TOXICOLOGICAL INFORMATION

| | | |
|---|---|---|
| Information on likely routes of | : | No data is available on the product itself. |

exposure

**Acute toxicity**

**Components:**

Hexamethylene diisocyanate, oligomers**:**

| | | |
|---|---|---|
| Acute oral toxicityComponents | : | LD50 (Rat): > 5,000 mg/kg |

hexamethylene diisocyanate**:**

| | | |
|---|---|---|
| Acute oral toxicityComponents | : | LD50 (Rat, male): 959 mg/kg<br>Method: OECD Test Guideline 401<br><br>LD50 (Rat, male): 746 mg/kg<br>Method: OECD Test Guideline 401 |
| Acute inhalation toxicity - Product | : | Acute toxicity estimate: 41.33 mg/l<br>Exposure time: 4 h<br>Test atmosphere: vapour<br>Method: Calculation method |

**Components:**

Hexamethylene diisocyanate, oligomers**:**

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

hexamethylene diisocyanate**:**

| | | |
|---|---|---|
| Acute dermal toxicity | : | LD50 (Rat, male and female): > 7,000 mg/kg<br>Method: OECD Test Guideline 402 |
| Acute toxicity (other routes of administration) | : | No data available |

**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
Result: No eye irritation
Method: OECD Test Guideline 405

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

**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.

**Components:**

hexamethylene diisocyanate**:**

| | |
|---|---|
| Assessment: | Harmful if inhaled., Causes skin irritation., Causes serious eye irritation.<br>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<br>Result: negative |

hexamethylene diisocyanate**:**

| | | |
|---|---|---|
| Genotoxicity in vitro | : | Test Type: In vitro mammalian cell gene mutation test<br>Test system: Chinese hamster ovary cells<br>Concentration: 1,0 - 10 ml<br>Metabolic activation: with and without metabolic activation<br>Result: negative<br><br>Test Type: Ames test<br>Test system: Salmonella typhimurium<br>Concentration: 6, 12, 20, 25, 50 and 150 µL p<br>Metabolic activation: with and without metabolic activation |

Result: negative

**Components:**

hexamethylene diisocyanate:

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

Carcinogenicity - Assessment : No data available

**IARC** No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

**ACGIH** No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

**OSHA** No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

**NTP** No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

**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

**Components:**

hexamethylene diisocyanate:

| | | |
|---|---|---|
| Effects on foetal development | : | Species: Rat, male and female<br>Application Route: Inhalation<br>General Toxicity Maternal: No observed adverse effect level: 0.005 ppm<br>Method: OECD Test Guideline 414<br>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, oligomers:
Species: Rat
: 3.7 - 4.3 mg/m3
Exposure time: 3 Weeks

Species: Rat
: 3.3 - 3.4 mg/m3
Exposure time: 2,160 h

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

**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**

| | |
|---|---|
| Ingestion: | No data available |

## SECTION 12. ECOLOGICAL INFORMATION

**Ecotoxicity**

**Components:**

Hexamethylene diisocyanate, oligomers**:**

| | | |
|---|---|---|
| Toxicity to fish | : | LC50 (Brachydanio rerio (zebrafish)): > 100 mg/l<br>Exposure time: 96 h |

hexamethylene diisocyanate**:**

| | | |
|---|---|---|
| Toxicity to fish | : | LC50 (Brachydanio rerio (zebrafish)): > 82.8 mg/l<br>Exposure time: 96 h<br>Test Type: static test<br>Test substance: Fresh water<br>Method: Directive 67/548/EEC, Annex V, C.1. |

**Components:**

Hexamethylene diisocyanate, oligomers**:**

| | | |
|---|---|---|
| Toxicity to daphnia and other aquatic invertebrates | : | LC50 (Daphnia magna (Water flea)): > 100 mg/l<br>Exposure time: 48 h |

hexamethylene diisocyanate:

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.

**Components:**

Hexamethylene diisocyanate, oligomers:

Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): > 1,000 mg/l
Exposure time: 72 h

hexamethylene diisocyanate:

Toxicity to algae : 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.

M-Factor (Acute aquatic toxicity) : No data available

Toxicity to fish (Chronic toxicity) : No data available

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : No data available

M-Factor (Chronic aquatic toxicity) : No data available

**Components:**

Hexamethylene diisocyanate, oligomers:

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

hexamethylene diisocyanate:

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

Toxicity to soil dwelling organisms : No data available

Plant toxicity : No data available

Sediment toxicity : No data available

Toxicity to terrestrial : No data available

organisms

Ecotoxicology Assessment

**Components:**

hexamethylene diisocyanate:
Acute aquatic toxicity : This product has no known ecotoxicological effects.

**Components:**

hexamethylene diisocyanate:
Chronic aquatic toxicity : This product has no known ecotoxicological effects.

Toxicity Data on Soil : No data available

Other organisms relevant to the environment : No data available

**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

Biochemical Oxygen Demand (BOD) : No data available

Chemical Oxygen Demand (COD) : No data available

BOD/COD : No data available

ThOD : No data available

BOD/ThOD : No data available

Dissolved organic carbon (DOC) : No data available

Physico-chemical removability : No data available

Stability in water : No data available

Photodegradation : No data available

| | | |
|---|---|---|
| Impact on Sewage Treatment | : | No data available |

**Bioaccumulative potential**

**Components:**

hexamethylene diisocyanate:

| | | |
|---|---|---|
| Bioaccumulation | : | Bioconcentration factor (BCF): 3.2<br>Remarks: Bioaccumulation is unlikely. |
| Partition coefficient: n-octanol/water | : | No data available |

**Mobility in soil**

| | | |
|---|---|---|
| Mobility | : | No data available |

**Components:**

hexamethylene diisocyanate:

| | | |
|---|---|---|
| Distribution among environmental compartments | : | Koc: 1665 - 5861 |
| Stability in soil | : | No data available |

**Other adverse effects**

| | | |
|---|---|---|
| Environmental fate and pathways | : | No data available |
| Results of PBT and vPvB assessment | : | No data available |
| Endocrine disrupting potential | : | No data available |
| Adsorbed organic bound halogens (AOX) | : | No data available |

**Hazardous to the ozone layer**

| | | |
|---|---|---|
| Ozone-Depletion Potential | : | Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances<br>Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B). |
| Additional ecological information | : | No data available |
| Global warming potential (GWP) | : | No data available |

## SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal methods**

Waste from residues : Do not dispose of waste into sewer.
Do not contaminate ponds, waterways or ditches with chemical or used container.
Send to a licensed waste management company.
Dispose of as hazardous waste in compliance with local and national regulations.
Dispose of contents/ container to an approved waste disposal plant.

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

## SECTION 14. TRANSPORT INFORMATION

**International Regulations**

**IATA**
Not regulated as dangerous goods

**IMDG**
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.

**National Regulations**

**DOT Classification**
Not regulated as dangerous goods

## SECTION 15. REGULATORY INFORMATION

**EPCRA - Emergency Planning and Community Right-to-Know Act**

**CERCLA Reportable Quantity**

| Components | CAS-No. | Component RQ (lbs) | Calculated product RQ (lbs) |
|---|---|---|---|
| hexamethylene diisocyanate | 822-06-0 | 100 | 33333 |

**SARA 311/312 Hazards** : Respiratory or skin sensitisation

**SARA 313** : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

**California Prop. 65**

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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

| | | |
|---|---|---|
| CH INV | : | The formulation contains substances listed on the Swiss Inventory, On the inventory, or in compliance with the inventory |
| DSL | : | All components of this product are on the Canadian DSL |
| AICS | : | 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 | : | 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), TCSI (Taiwan), TSCA (USA)

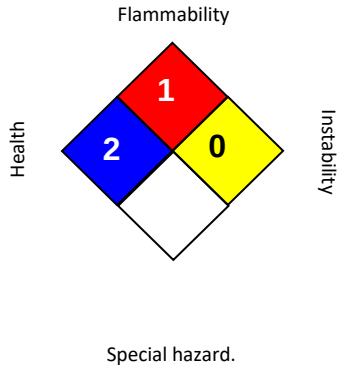
**TSCA - 5(a) Significant New Use Rule List of Chemicals**
No substances are subject to a Significant New Use Rule.

**US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)**
No substances are subject to TSCA 12(b) export notification requirements.

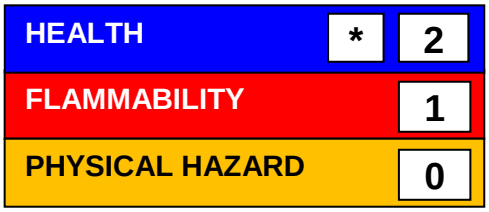
## SECTION 16. OTHER INFORMATION

### Further information

**NFPA 704:**




**HMIS® IV:**




HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

Revision Date : 06/26/2018

ACGIH : USA. ACGIH Threshold Limit Values (TLV)
ACGIH / TWA : 8-hour, time-weighted average

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IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

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.



NO PERSON OR ORGANIZATION EXCEPT A DULY AUTHORIZED HUNTSMAN EMPLOYEE IS AUTHORIZED TO PROVIDE OR MAKE AVAILABLE DATA SHEETS FOR HUNTSMAN PRODUCTS. DATA SHEETS FROM UNAUTHORIZED SOURCES MAY CONTAIN INFORMATION THAT IS NO LONGER CURRENT OR ACCURATE.

# ARALDITE® 2028-1 POLYOL

| Version | Revision Date: | SDS Number: | Date of last issue: - |
|---|---|---|---|
| 1.0 | 06/26/2018 | 400001013922 | Date of first issue: 06/26/2018 |

## SECTION 1. IDENTIFICATION

Product name : ARALDITE® 2028-1 POLYOL

**Manufacturer or supplier's details**

Company name of supplier : Huntsman Advanced Materials Americas LLC
Address : P.O. Box 4980
The Woodlands,
TX 77387
United States of America (USA)
Telephone : Non-Emergency: (800) 257-5547

E-mail address of person responsible for the SDS : MSDS@huntsman.com

Emergency telephone number : Chemtrec: (800) 424-9300 or (703) 527-3887

**Recommended use of the chemical and restrictions on use**

Recommended use : Component of a Polyurethane System.

## SECTION 2. HAZARDS IDENTIFICATION

**GHS classification in accordance with 29 CFR 1910.1200**

Eye irritation : Category 2A

**GHS label elements**

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.
**Storage:**
Not available
**Disposal:**
Not available

**Other hazards**

None known.

## SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

**Hazardous components**

| Chemical name | CAS-No. | Concentration (% w/w) |
|---|---|---|
| [3-(2,3-epoxypropoxy)propyl]trimethoxysilane | 2530-83-8 | 1 - 2.5 |

The specific chemical identity and/or exact percentage (concentration) of composition may be withheld as a trade secret.

## SECTION 4. FIRST AID MEASURES

General advice : Move out of dangerous area.
Show this safety data sheet to the doctor in attendance.
Treat symptomatically.
Get medical attention if symptoms occur.

If inhaled : If inhaled, remove to fresh air.
Get medical attention if symptoms occur.

In case of skin contact : Wash with water and soap as a precaution.

In case of eye contact : Immediately flush eye(s) with plenty of water.
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.

Most important symptoms and effects, both acute and delayed : None known.

Notes to physician : No information available.

Treat symptomatically.

## SECTION 5. FIREFIGHTING MEASURES

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

| | | |
|---|---|---|
| Unsuitable extinguishing media | : | High volume water jet |
| Specific hazards during firefighting | : | No information available. |
| | | No information available. |
| Hazardous combustion products | : | No hazardous combustion products are known |
| Specific extinguishing methods | : | No data is available on the product itself. |
| Further information | : | No action shall be taken involving any personal risk or without suitable training. |
| Special protective equipment for firefighters | : | Wear self-contained breathing apparatus for firefighting if necessary. |

## SECTION 6. ACCIDENTAL RELEASE MEASURES

| | | |
|---|---|---|
| Personal precautions, protective equipment and emergency procedures | : | Ensure adequate ventilation.<br>Use personal protective equipment.<br>Refer to protective measures listed in sections 7 and 8. |
| Environmental precautions | : | Prevent further leakage or spillage if safe to do so. |
| Methods and materials for containment and cleaning up | : | Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).<br>Keep in suitable, closed containers for disposal. |

## SECTION 7. HANDLING AND STORAGE

| | | |
|---|---|---|
| Advice on protection against fire and explosion | : | Normal measures for preventive fire protection. |
| Advice on safe handling | : | Do not breathe vapours/dust.<br>Avoid contact with skin and eyes.<br>For personal protection see section 8.<br>Smoking, eating and drinking should be prohibited in the application area.<br>Dispose of rinse water in accordance with local and national regulations. |
| Conditions for safe storage | : | Keep container tightly closed in a dry and well-ventilated place.<br>Keep in properly labelled containers. |
| Materials to avoid | : | Strong acids |
| | | Strong bases |
| | | Strong oxidizing agents |

For incompatible materials please refer to Section 10 of this SDS.

Further information on storage stability : Stable under normal conditions.

## SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

**Components with workplace control parameters**

Contains no substances with occupational exposure limit values.

**Personal protective equipment**

Hand protection

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

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

Material : Neoprene gloves
Break through time : 10 - 480 min

Remarks : The suitability for a specific workplace should be discussed with the producers of the protective gloves.

Eye protection : Eye wash bottle with pure water
Tightly fitting safety goggles
Wear face-shield and protective suit for abnormal processing problems.

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

Hygiene measures : When using do not eat or drink.
When using do not smoke.
Wash hands before breaks and at the end of workday.

## SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Colour : colourless

Odour : slight

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

pH : No data is available on the product itself.

Melting point/freezing point : No data available

| | | |
|---|---|---|
| Initial boiling point and boiling range | : | No data available |
| Flash point | : | > 212 °F / > 100 °C<br>Method: closed cup |
| Evaporation rate | : | No data is available on the product itself. |
| Flammability (solid, gas) | : | No data is available on the product itself. |
| Flammability (liquids) | : | 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 | : | No data is available on the product itself. |
| Relative vapour density | : | No data is available on the product itself. |
| Relative density | : | No data is available on the product itself. |
| Density | : | 1.1 g/cm3 (77 °F / 25 °C) |
| Solubility(ies) | | |
| Water solubility | : | insoluble (68 °F / 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 | : | No data is available on the product itself. |
| Thermal decomposition | : | No data is available on the product itself. |
| Self-Accelerating decomposition temperature (SADT) | : | No data is available on the product itself. |
| Viscosity | | |
| Viscosity, dynamic | : | 4,000 - 5,000 mPa.s (77 °F / 25 °C) |
| Explosive properties | : | No data is available on the product itself. |
| Oxidizing properties | : | No data is available on the product itself. |
| Molecular weight | : | No data available |
| Particle size | : | No data is available on the product itself. |

## SECTION 10. STABILITY AND REACTIVITY

| | | |
|---|---|---|
| Reactivity | : | No dangerous reaction known under conditions of normal use. |

| | | |
|---|---|---|
| Chemical stability | : | No decomposition if stored and applied as directed.<br>Stable under normal conditions. |
| Possibility of hazardous reactions | : | No decomposition if stored and applied as directed.<br><br>No hazards to be specially mentioned. |
| Conditions to avoid | : | None known. |
| Incompatible materials | : | No data available<br><br>None known. |
| Hazardous decomposition products | : | Burning produces noxious and toxic fumes.<br><br>Carbon oxides<br><br>Nitrogen oxides (NOx)<br><br>No hazardous decomposition products are known. |

## SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure : No data is available on the product itself.

**Acute toxicity**

**Components:**

[3-(2,3-epoxypropoxy)propyl]trimethoxysilane**:**

Acute oral toxicityComponents : 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

Acute dermal toxicity - Product : Acute toxicity estimate : > 5,000 mg/kg
Method: Calculation method

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
Result: Risk of serious damage to eyes.
Assessment: Severe eye irritation
Method: OECD Test Guideline 405

**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

**IARC** No component of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

**ACGIH** No component of this product present at levels greater than or equal to 0.1% is identified as a carcinogen or potential carcinogen by ACGIH.

**OSHA** No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

**NTP** No component of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

**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
: > 1000 mg/m3
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
NOAEL: 1000 mg/kg/d
Application Route: Ingestion
Exposure time: 2,160 h
Number of exposures: 7 d
Method: Subchronic toxicity

Repeated dose toxicity - Assessment : No data available

**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**

Ingestion: No data available

## SECTION 12. ECOLOGICAL INFORMATION

### Ecotoxicity

**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
Method: Directive 67/548/EEC, Annex V, C.1.

**Components:**

[3-(2,3-epoxypropoxy)propyl]trimethoxysilane:

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

**Components:**

[3-(2,3-epoxypropoxy)propyl]trimethoxysilane:

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

M-Factor (Acute aquatic toxicity) : No data available

Toxicity to fish (Chronic toxicity) : No data available

**Components:**

[3-(2,3-epoxypropoxy)propyl]trimethoxysilane:

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): >= 100 mg/l
Exposure time: 21 d
Test Type: semi-static test
Test substance: Fresh water
Method: OECD Test Guideline 211

M-Factor (Chronic aquatic toxicity) : No data available

Toxicity to microorganisms : No data available

Toxicity to soil dwelling organisms : No data available

Plant toxicity : No data available

Sediment toxicity : No data available

Toxicity to terrestrial : No data available

organisms

Ecotoxicology Assessment

**Components:**

[3-(2,3-epoxypropoxy)propyl]trimethoxysilane**:**
Acute aquatic toxicity : This product has no known ecotoxicological effects.

**Components:**

[3-(2,3-epoxypropoxy)propyl]trimethoxysilane**:**
Chronic aquatic toxicity : Harmful to aquatic life with long lasting effects.

Toxicity Data on Soil : No data available

Other organisms relevant to the environment : No data available

**Persistence and degradability**

**Components:**

[3-(2,3-epoxypropoxy)propyl]trimethoxysilane**:**
Biodegradability : Inoculum: activated sludge
Result: Not readily biodegradable.
Biodegradation: 37 %
Exposure time: 28 d
Method: Directive 67/548/EEC Annex V, C.4.A.

Biochemical Oxygen Demand (BOD) : No data available

Chemical Oxygen Demand (COD) : No data available

BOD/COD : No data available

ThOD : No data available

BOD/ThOD : No data available

Dissolved organic carbon (DOC) : No data available

Physico-chemical removability : No data available

**Components:**

[3-(2,3-epoxypropoxy)propyl]trimethoxysilane**:**
Stability in water : Degradation half life(DT50): 6.5 hrs (76.1 °F / 24.5 °C) pH: 7
Method: OECD Test Guideline 111
Remarks: Fresh water

Degradation half life(DT50): 0.15 hrs (76.1 °F / 24.5 °C) pH: 5
Method: OECD Test Guideline 111

Remarks: Fresh water

Degradation half life(DT50): 0.13 hrs (76.1 °F / 24.5 °C) pH: 9
Method: OECD Test Guideline 111
Remarks: Fresh water

Photodegradation : No data available

Impact on Sewage Treatment : No data available

**Bioaccumulative potential**

Bioaccumulation : No data available

**Components:**

[3-(2,3-epoxypropoxy)propyl]trimethoxysilane**:**

Partition coefficient: n-octanol/water : log Pow: -2.6 (77 °F / 25 °C)

**Mobility in soil**

Mobility : No data available

Distribution among environmental compartments : No data available

Stability in soil : No data available

**Other adverse effects**

Environmental fate and pathways : No data available

Results of PBT and vPvB assessment : No data available

Endocrine disrupting potential : No data available

Adsorbed organic bound halogens (AOX) : No data available

**Hazardous to the ozone layer**

Ozone-Depletion Potential : Regulation: 40 CFR Protection of Environment; Part 82 Protection of Stratospheric Ozone - CAA Section 602 Class I Substances
Remarks: This product neither contains, nor was manufactured with a Class I or Class II ODS as defined by the U.S. Clean Air Act Section 602 (40 CFR 82, Subpt. A, App.A + B).

Additional ecological information : No data available

| | | |
|---|---|---|
| Global warming potential (GWP) | : | No data available |

## SECTION 13. DISPOSAL CONSIDERATIONS

**Disposal methods**

| | | |
|---|---|---|
| Waste from residues | : | 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.<br>Dispose of as hazardous waste in compliance with local and national regulations.<br>Dispose of contents/ container to an approved waste disposal plant. |
| Contaminated packaging | : | Empty remaining contents.<br>Dispose of as unused product.<br>Do not re-use empty containers. |

## SECTION 14. TRANSPORT INFORMATION

**International Regulations**

**IATA**
Not regulated as dangerous goods

**IMDG**
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.

**National Regulations**

**DOT Classification**
Not regulated as dangerous goods

## SECTION 15. REGULATORY INFORMATION

**EPCRA - Emergency Planning and Community Right-to-Know Act**

**CERCLA Reportable Quantity**
This material does not contain any components with a CERCLA RQ.

| | | |
|---|---|---|
| **SARA 311/312 Hazards** | : | Serious eye damage or eye irritation |

**SARA 313** : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

This product does not contain any hazardous air pollutants (HAP), as defined by the U.S. Clean Air Act Section 112 (40 CFR 61).

**California Prop. 65**

This product does not contain any chemicals known to State of California to cause cancer, birth defects, or any other reproductive harm.

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

| | | |
|---|---|---|
| CH INV | : | The formulation contains substances listed on the Swiss Inventory, On the inventory, or in compliance with the inventory |
| DSL | : | This product contains one or several components listed in the Canadian NDSL. |
| AICS | : | On the inventory, or in compliance with the inventory |
| NZIoC | : | On the inventory, or in compliance with the inventory |
| ENCS | : | Not in compliance with the inventory |
| KECI | : | On the inventory, or in compliance with the inventory |
| PICCS | : | Not 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 | : | 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), TCSI (Taiwan), TSCA (USA)

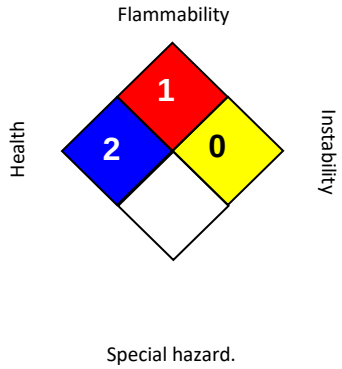
**TSCA - 5(a) Significant New Use Rule List of Chemicals**
No substances are subject to a Significant New Use Rule.

**US. Toxic Substances Control Act (TSCA) Section 12(b) Export Notification (40 CFR 707, Subpt D)**
No substances are subject to TSCA 12(b) export notification requirements.

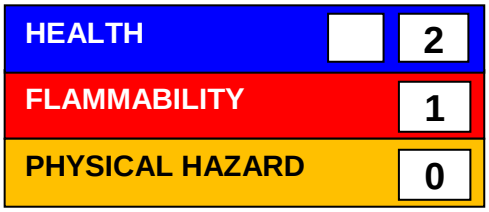
## SECTION 16. OTHER INFORMATION

### Further information

**NFPA 704:**




**HMIS® IV:**




HMIS® ratings are based on a 0-4 rating scale, with 0 representing minimal hazards or risks, and 4 representing significant hazards or risks. The "*" represents a chronic hazard, while the "/" represents the absence of a chronic hazard.

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IN ALL CASES, IT IS THE RESPONSIBILITY OF THE USER TO DETERMINE THE APPLICABILITY OF SUCH INFORMATION AND RECOMMENDATIONS AND THE SUITABILITY OF ANY PRODUCT FOR ITS OWN PARTICULAR PURPOSE.

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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