

Material Safety Data Sheet

ARALDITE® 2011 RESIN US

1. Product and company identification

Product name : ARALDITE® 2011 RESIN US
Material uses : Adhesive.
(M)SDS # : 00070875
Validation date : 9/9/2014.
Supplier/Manufacturer : Huntsman Advanced Materials Americas LLC
P.O. Box 4980
The Woodlands, TX 77387

Non-Emergency phone: (800) 257-5547

E-Mail: MSDS@huntsman.com

In case of emergency : Chemtrec: (800) 424-9300 or (703) 527-3887

2. Hazards identification

Physical state : Liquid.
Color : White.
OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview : WARNING!
CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA.
Avoid exposure - obtain special instructions before use. Do not breathe vapor or mist. Do not get on skin or clothing. Avoid contact with eyes. Avoid exposure during pregnancy. Wash thoroughly after handling.

See toxicological information (Section 11)

GENERAL INFORMATION : Read the entire MSDS for a more thorough evaluation of the hazards.

3. Composition/information on ingredients

| <u>Name</u> | <u>CAS number</u> | <u>%</u> |
|------------------------------------------------------------|--------------------------|-----------------|
| Bisphenol A epoxy resin | 25068-38-6 | 60 - 100 |
| bisphenol A - epoxy resins, number average MW >700 - <1100 | 67924-34-9 | 13 - 30 |
| dibutyl phthalate | 84-74-2 | 7 - 13 |
| Butylphenyl glycidyl ether | 3101-60-8 | 3 - 7 |

4 . First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Notes to physician** : No specific treatment. Treat symptomatically. Call medical doctor or poison control center immediately if large quantities have been ingested.

5 . Fire-fighting measures

- Flash point** : Closed cup: 134°C (273.2°F)
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
Carbon monoxide
halogenated compounds
metal oxide/oxides
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Avoid breathing vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Avoid exposure during pregnancy. Do not get in eyes or on skin or clothing. Do not ingest. Avoid breathing vapor or mist. If during normal use the material presents a respiratory hazard, use only with adequate ventilation or wear appropriate respirator. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

| Ingredient | Exposure limits |
|-------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------|
| dibutyl phthalate | ACGIH TLV (United States, 3/2012). TWA: 5 mg/m ³ 8 hours. OSHA PEL (United States, 6/2010). TWA: 5 mg/m ³ 8 hours. |

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.
- Engineering measures** : If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Personal protection**
- Respiratory** : In case of inadequate ventilation wear respiratory protection. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : 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. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated.
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles.

8 . Exposure controls/personal protection

- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Appearance

- Physical state** : Liquid.
- Color** : White.
- Odor** : Not available.
- pH** : Not available.
- Boiling/condensation point** : Not available.
- Melting/freezing point** : Not available.
- Flash point** : Closed cup: 134°C (273.2°F)
- Flammable limits** : Not available.
- Auto-ignition temperature** : Not available.
- Vapor pressure** : Not available.
- Specific gravity** : Not available.
- Partition coefficient: n-octanol/water (log Kow)** : Not available.
- Density** : 1.13 to 1.22 g/cm³
- Vapor density** : Not available.
- Evaporation rate (butyl acetate = 1)** : Not available.

10 . Stability and reactivity

- Chemical stability** : The product is stable.
Under normal conditions of storage and use, hazardous reactions will not occur.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.
- Conditions to avoid** : No specific data.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 . Toxicological information

Acute toxicity

11 . Toxicological information

| Product/ingredient name | Test | Endpoint | Species | Result |
|-------------------------|--------------------------------------------------|---------------------------------|--------------------|--------------|
| Bisphenol A epoxy resin | - | LC0 Inhalation Vapor | Rat - Male | 0.00001 ppm |
| | OECD 402 Acute Dermal Toxicity | LD50 Dermal | Rat - Male, Female | >2000 mg/kg |
| | OECD 420 Acute Oral Toxicity - Fixed Dose Method | LD50 Oral | Rat - Female | >2000 mg/kg |
| dibutyl phthalate | No official guidelines | LC50 Inhalation Dusts and mists | Rat - Male, Female | >15.68 mg/l |
| | No official guidelines | LD50 Dermal | Rabbit | >20000 mg/kg |
| | OECD 401 Acute Oral Toxicity | LD50 Oral | Rat - Male, Female | 6279 mg/kg |

Irritation/Corrosion

| Product/ingredient name | Test | Species | Result |
|-------------------------|--------------------------------------------|---------|----------------------|
| Bisphenol A epoxy resin | OECD 404 Acute Dermal Irritation/Corrosion | Rabbit | Skin - Mild irritant |
| | OECD 405 Acute Eye Irritation/Corrosion | Rabbit | Eyes - Mild irritant |
| dibutyl phthalate | OECD 405 Acute Eye Irritation/Corrosion | Rabbit | Eyes - Non-irritant. |
| | OECD 404 Acute Dermal Irritation/Corrosion | Rabbit | Skin - Non-irritant. |

Conclusion/ Summary

Skin

- : Bisphenol A epoxy resin Irritating to skin.
- bisphenol A - epoxy resins, No additional information.
- number average MW >700 -
- <1100
- dibutyl phthalate Non-irritating to the skin.
- Butylphenyl glycidyl ether No additional information.

Eyes

- : Bisphenol A epoxy resin Irritating to eyes.
- bisphenol A - epoxy resins, No additional information.
- number average MW >700 -
- <1100
- dibutyl phthalate Non-irritating to the eyes.
- Butylphenyl glycidyl ether No additional information.

Respiratory

- : Bisphenol A epoxy resin No additional information.
- bisphenol A - epoxy resins, No additional information.
- number average MW >700 -
- <1100
- dibutyl phthalate No additional information.
- Butylphenyl glycidyl ether No additional information.

Sensitizer

11 . Toxicological information

| Product/ingredient name | Test | Route of exposure | Species | Result |
|-------------------------|--------------------------------------------------------|-------------------|------------|-----------------|
| Bisphenol A epoxy resin | OECD 429 Skin Sensitization: Local Lymph Node Assay | skin | Mouse | Sensitizing |
| dibutyl phthalate | OECD 406 Skin Sensitization | skin | Guinea pig | Not sensitizing |

Mutagenicity

| Product/ingredient name | Test | Result |
|-------------------------|-------------------------------------------------------------------------------------------------|----------|
| Bisphenol A epoxy resin | Experiment: In vitro Subject: Bacteria Metabolic activation: +/- | Positive |
| | Experiment: In vitro Subject: Mammalian-Animal Cell: Somatic Metabolic activation: +/- | Positive |
| | Experiment: In vivo Subject: Mammalian-Animal Cell: Germ | Negative |
| | Experiment: In vivo Subject: Mammalian-Animal Cell: Somatic | Negative |
| dibutyl phthalate | Experiment: In vitro Subject: Bacteria Metabolic activation: +/- | Negative |
| | Experiment: In vitro Subject: Mammalian-Animal Metabolic activation: +/- | Negative |
| | Experiment: In vitro Subject: Yeast Metabolic activation: +/- | Negative |
| | Experiment: In vitro Subject: bacteria/yeast Metabolic activation: +/- | Negative |
| | Experiment: In vivo Subject: Mammalian-Animal | Negative |

Conclusion/ Summary

: dibutyl phthalate

Not mutagenic in a standard battery of genetic toxicological tests.

Carcinogenicity

| Product/ingredient name | Test | Species | Dose | Exposure | Result/Result type |
|-------------------------|-------------------------------------------------------------------------|-----------------------|-----------|-----------------------------|-----------------------------|
| Bisphenol A epoxy resin | OECD 453 Combined Chronic Toxicity/ Carcinogenicity Studies | Rat - Male, Female | 15 mg/kg | 2 years; 7 days per week | Negative - Oral - NOAEL |
| | OECD 453 Combined Chronic Toxicity/ Carcinogenicity Studies | Rat - Female | 1 mg/kg | 2 years; 5 days per week | Negative - Dermal - NOEL |
| | OECD 453 | Mouse - Male | 0.1 mg/kg | 2 years; 3 | Negative - Dermal - |

11 . Toxicological information

| | | | | | |
|--|-------------------------------------------------------------|--|--|---------------|------|
| | Combined Chronic Toxicity/ Carcinogenicity Studies | | | days per week | NOEL |
|--|-------------------------------------------------------------|--|--|---------------|------|

Conclusion/Summary : dibutyl phthalate

In accordance with column 2 of Annex VII - X of Regulation (EC) No 1907/2006, the test for this property of the substance does not need to be conducted.

Carcinogenic class

| Product/ingredient name | ACGIH | IARC | EPA | NIOSH | NTP | OSHA |
|-------------------------|-------|------|-----|-------|-----|------|
| dibutyl phthalate | A1 | - | - | - | - | - |

Reproductive toxicity

| Product/ingredient name | Test | Species | Maternal toxicity | Fertility | Developmental effects |
|-------------------------|-----------------------------------------------------|--------------------|-------------------|-----------|-----------------------|
| Bisphenol A epoxy resin | OECD 416 Two-Generation Reproduction Toxicity Study | Rat - Male, Female | Negative | Negative | Negative |
| dibutyl phthalate | No official guidelines | Rat - Male, Female | Positive | Positive | Positive |

Teratogenicity

| Product/ingredient name | Test | Species | Result/Result type |
|-------------------------|------------------------------------------------|--------------------|--------------------|
| Bisphenol A epoxy resin | OECD 414 Prenatal Developmental Toxicity Study | Rat - Female | Negative - Oral |
| | EPA CFR | Rabbit - Female | Negative - Dermal |
| | OECD 414 Prenatal Developmental Toxicity Study | Rabbit - Female | Negative - Oral |
| dibutyl phthalate | No official guidelines | Mouse | Positive - Oral |
| | No official guidelines | Rat - Male, Female | Positive - Oral |

Potential acute health effects

- Inhalation** : No known significant effects or critical hazards.
- Ingestion** : No known significant effects or critical hazards.
- Skin contact** : Irritating to skin. May cause sensitization by skin contact.
- Eye contact** : Irritating to eyes.

Potential chronic health effects

11 . Toxicological information

| Product/ingredient name | Test | Endpoint | Species | Result |
|-------------------------|--------------------------------------------------------------------------------|---------------------------------------------------|--------------------|-----------------------|
| Bisphenol A epoxy resin | OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents | Sub-chronic NOAEL Oral | Rat - Male, Female | 50 mg/kg |
| | OECD 411 Subchronic Dermal Toxicity: 90-day Study | Sub-chronic NOEL Dermal | Rat - Male, Female | 10 mg/kg |
| | OECD 411 Subchronic Dermal Toxicity: 90-day Study | Sub-chronic NOAEL Dermal | Mouse - Male | 100 mg/kg |
| | OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents | Sub-chronic NOAEL Oral | Rat - Male, Female | 152 mg/kg/d |
| dibutyl phthalate | OECD 412 Repeated Dose Inhalation Toxicity: 28-day or 14-day Study | Sub-chronic NOEC Inhalation Dusts and mists | Rat - Male, Female | 509 mg/m ³ |

General : Contains material that may cause target organ damage, based on animal data. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.

Target organs : Contains material which may cause damage to the following organs: the reproductive system.

Carcinogenicity : No known significant effects or critical hazards.

Mutagenicity : No known significant effects or critical hazards.

Teratogenicity : No known significant effects or critical hazards.

Developmental effects : Contains material which may cause developmental abnormalities, based on animal data.

Fertility effects : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure

Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

12 . Ecological information

Environmental effects : Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Aquatic ecotoxicity

12 . Ecological information

| Product/ingredient name | Test | Endpoint | Exposure | Species | Result |
|-------------------------|----------------------------------------------------------|--------------------|---------------|-------------------------|------------------------------------------|
| Bisphenol A epoxy resin | - | Acute | EC50 | 72 hours Static | Algae 9.4 mg/l |
| | OECD 202 <i>Daphnia</i> sp. Acute Immobilisation Test | Acute | EC50 | 48 hours Static | <i>Daphnia</i> 1.7 mg/l |
| | - | Acute | IC50 | 3 hours Static | Bacteria >100 mg/l |
| | OECD 203 Fish, Acute Toxicity Test | Acute | LC50 | 96 hours Static | Fish 1.5 mg/l |
| | OECD 211 <i>Daphnia Magna</i> Reproduction Test | Chronic | NOEC | 21 days Semi-static | <i>Daphnia</i> 0.3 mg/l |
| dibutyl phthalate | No official guidelines | Acute | EC50 | 10 days Static | Algae 0.75 mg/l |
| | No official guidelines EPA OPPTS | Acute | EC50 | 24 hours | Bacteria 2.2 mg/l |
| | | Acute | EC50 | 48 hours Static | <i>Daphnia</i> 2.99 mg/l |
| | EPA OPPTS | Acute | LC50 | 96 hours Static | <i>Daphnia</i> 0.5 mg/l |
| | OECD 203 Fish, Acute Toxicity Test | Acute | LC50 | 96 hours Static | Fish 0.48 mg/l |
| | No official guidelines | Chronic | NOEC | 10 days Static | Algae 0.39 mg/l |
| | DIN DIN 38412 Part 27 | Chronic | NOEC | 30 minutes Static | Bacteria >10 mg/l |
| | No official guidelines No official guidelines | Chronic Chronic | NOEC NOECr | 10 days 99 days | <i>Daphnia</i> 0.1 mg/l Fish 0.1 mg/l |

Persistence and degradability

| Product/ingredient name | Test | Period | Result |
|-------------------------|--------------------------------------------------------------------------------------------------------------------------------|--------------------|---------------|
| Bisphenol A epoxy resin | OECD Derived from OECD 301F (Biodegradation Test) | 28 days | 5 % |
| dibutyl phthalate | EPA OPPTS EU EC C.4-C Biodegradation: Determination of the "Ready" Biodegradability: Carbon Dioxide Evolution Test | 21 days 28 days | >97 % 81 % |

Conclusion/Summary : Bisphenol A epoxy resin Not readily biodegradable.
dibutyl phthalate Readily biodegradable

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|-------------------------|------------------------------------------------|------------|------------------|
| Bisphenol A epoxy resin | Fresh water 4.83 days Fresh water 3.58 days | - | Not readily |
| dibutyl phthalate | Fresh water 7.1 days Fresh water 2.7 days | - | Readily |

Bioaccumulative potential

| Product/ingredient name | LogP _{ow} | BCF | Potential |
|-------------------------|--------------------|-----|-----------|
| Bisphenol A epoxy resin | 3.242 | 31 | low |
| dibutyl phthalate | 4.46 | <1 | low |

Other adverse effects : No known significant effects or critical hazards.

12 . Ecological information

Other ecological information

| | | |
|-------------|---|----------------|
| BOD5 | : | Not Determined |
| COD | : | Not Determined |
| TOC | : | Not Determined |

13 . Disposal considerations

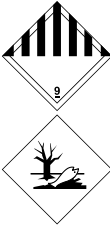
| | | |
|-----------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| Waste disposal | : | The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. |
|-----------------------|---|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

Disposal should be in accordance with applicable regional, national and local laws and regulations.







14 . Transport information

Proper shipping name

| | | |
|-------------|---|----------------------------------------------------------------------------------------------------------------------|
| DOT | : | Environmentally hazardous substance, liquid, n.o.s. (BISPHENOL A EPOXY RESIN, DIBUTYL PHTHALATE) Marine pollutant |
| TDG | : | Environmentally hazardous substance, liquid, n.o.s. (BISPHENOL A EPOXY RESIN, DIBUTYL PHTHALATE) Marine pollutant |
| IMDG | : | Environmentally hazardous substance, liquid, n.o.s. (BISPHENOL A EPOXY RESIN, Dibutyl phthalate) Marine pollutant |
| IATA | : | Environmentally hazardous substance, liquid, n.o.s. (BISPHENOL A EPOXY RESIN, Dibutyl phthalate) |

| Regulatory information | UN number | Classes | PG* | Label | Additional information |
|---------------------------|-----------|---------|-----|--------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| DOT Classification | UN3082 | 9 | III |  | Marine pollutants are only regulated for bulk and vessel shipments, per 49CFR171.4 (c) Exceptions. Except when all or part of the transportation is by vessel, the requirements of this subchapter specific to marine pollutants do not apply to non-bulk packagings transported by motor vehicle, rail car or aircraft. |
| | | | | | |

14 . Transport information

| | | | | | |
|---------------------------|--------|---|-----|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------|-----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| TDG Classification | UN3082 | 9 | III |   | - |
| IMDG Class | UN3082 | 9 | III |   | <u>Emergency schedules (EmS)</u> F-A, S-F |
| IATA-DGR Class | UN3082 | 9 | III |   | <u>Passenger and Cargo Aircraft</u> Quantity limitation: 450 L Packaging instructions: 964 <u>Cargo Aircraft Only</u> Quantity limitation: 450 L Packaging instructions: 964 |

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Irritating material
Sensitizing material
Target organ effects

U.S. Federal regulations

TSCA 8(b) inventory : **United States inventory (TSCA 8b)**: All components are listed or exempted.

TSCA 5(a)2 final significant new use rule (SNUR) : No ingredients listed.

TSCA 5(e) substance consent order : No ingredients listed.

TSCA 12(b) export notification : No ingredients listed.

SARA 311/312 : Immediate (acute) health hazard
Delayed (chronic) health hazard

Clean Air Act Section 112 (b) Hazardous Air Pollutants (HAPs) : **Product name** Dibutyl phthalate

CAS number **Concentration %**
8.4995

15 . Regulatory information

Clean Air Act - Ozone Depleting Substances (ODS) : This product does not contain nor is it manufactured with ozone depleting substances.

| | <u>Product name</u> | <u>CAS number</u> | <u>Concentration %</u> |
|-------------------------------------------------|---------------------------|-------------------|------------------------|
| SARA 313 Form R - Reporting requirements | : DIBUTYL PHTHALATE (DBP) | 84-74-2 | 8.4995 |
| CERCLA Hazardous substances | : | | |

| Components | Concentration % | Section 304 CERCLA Hazardous Substance | CERCLA Reportable Quantity (Lbs) | Product Reportable Quantity (Lbs) |
|-------------------------|-----------------|----------------------------------------|----------------------------------|-----------------------------------|
| DIBUTYL PHTHALATE (DBP) | 8.4995 | Listed | 10 | 118 |

State regulations

PENNSYLVANIA - RTK : Dibutyl phthalate

California Prop 65 : **WARNING:** This product contains a chemical known to the State of California to cause birth defects or other reproductive harm.

| <u>Ingredient name</u> | <u>Cancer</u> | <u>Reproductive</u> |
|-------------------------|---------------|---------------------|
| DIBUTYL PHTHALATE (DBP) | No. | Yes. |

International regulations

Canada

WHMIS (Canada) : Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).

CEPA DSL : All components are listed or exempted.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International lists

: **Australia inventory (AICS)**: All components are listed or exempted.
China inventory (IECSC): All components are listed or exempted.
Japan inventory: All components are listed or exempted.
Korea inventory: All components are listed or exempted.
Malaysia Inventory (EHS Register): Not determined.
New Zealand Inventory of Chemicals (NZIoC): All components are listed or exempted.
Philippines inventory (PICCS): All components are listed or exempted.
Taiwan inventory (CSNN): Not determined.

16 . Other information

Label requirements : CAUSES EYE AND SKIN IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA. POSSIBLE DEVELOPMENTAL HAZARD - CONTAINS MATERIAL WHICH MAY CAUSE ADVERSE DEVELOPMENTAL EFFECTS, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.) :

| | | |
|--------|---|---|
| Health | * | 2 |
|--------|---|---|

16 . Other information

| | |
|---------------------|---|
| Flammability | 1 |
| Physical hazards | 0 |
| Personal protection | |

The customer is responsible for determining the PPE code for this material.

National Fire Protection :
Association (U.S.A.)



Date of printing : 9/9/2014.
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Date of previous issue : 4/15/2014.
Version : 7

Indicates information that has changed from previously issued version.

Notice to reader

While 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.

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. NO PART OF THIS DATA SHEET MAY BE REPRODUCED OR TRANSMITTED IN ANY FORM, OR BY ANY MEANS, WITHOUT PERMISSION IN WRITING FROM HUNTSMAN. ALL REQUESTS FOR PERMISSION TO REPRODUCE MATERIAL FROM THIS DATA SHEET SHOULD BE DIRECTED TO HUNTSMAN, MANAGER, PRODUCT SAFETY AT THE ABOVE ADDRESS.

Material Safety Data Sheet

ARALDITE® 2011 HARDENER US

1. Product and company identification

Product name : ARALDITE® 2011 HARDENER US
Material uses : Hardener for adhesive systems
(M)SDS # : 00084097
Validation date : 9/17/2014.
Supplier/Manufacturer : Huntsman Advanced Materials Americas LLC
P.O. Box 4980
The Woodlands, TX 77387

Non-Emergency phone: (800) 257-5547

E-Mail: MSDS@huntsman.com

In case of emergency : Chemtrec: (800) 424-9300 or (703) 527-3887

2. Hazards identification

Physical state : Liquid.
Odor : Slight
Color : Light yellow

OSHA/HCS status : This material is considered hazardous by the OSHA Hazard Communication Standard (29 CFR 1910.1200).
Emergency overview : DANGER!
CAUSES EYE AND SKIN BURNS. CAUSES RESPIRATORY TRACT IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.
Do not breathe vapor or mist. Do not ingest. Do not get in eyes or on skin or clothing. Use only with adequate ventilation. Keep container tightly closed and sealed until ready for use. Wash thoroughly after handling.

See toxicological information (Section 11)

GENERAL INFORMATION : Read the entire MSDS for a more thorough evaluation of the hazards.

3. Composition/information on ingredients

| <u>Name</u> | <u>CAS number</u> | <u>%</u> |
|----------------------------------------------------------------------|--------------------------|-----------------|
| FATTY ACIDS, C18-UNSATD., DIMERS, POLYMERS WITH TRIETHYLENETETRAMINE | 103758-99-2 | 60 - 100 |
| DIMETHYL DIPROPYL TRIAMINE | 10563-29-8 | 7 - 13 |
| Triethylene tetramine | 112-24-3 | 1 - 3 |

4 . First aid measures

- Eye contact** : Check for and remove any contact lenses. Immediately flush eyes with plenty of water for at least 15 minutes, occasionally lifting the upper and lower eyelids. Get medical attention immediately.
- Skin contact** : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Wash clothing before reuse. Clean shoes thoroughly before reuse. Get medical attention immediately.
- Inhalation** : Move exposed person to fresh air. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. Loosen tight clothing such as a collar, tie, belt or waistband. Get medical attention immediately.
- Ingestion** : Wash out mouth with water. Do not induce vomiting unless directed to do so by medical personnel. Never give anything by mouth to an unconscious person. Get medical attention immediately.
- Notes to physician** : Symptomatic and supportive therapy as needed. Following severe exposure medical follow-up should be monitored for at least 48 hours.

5 . Fire-fighting measures

- Flash point** : Closed cup: 110°C (230°F) [DIN 51758 EN 22719 (Pensky-Martens Closed Cup)]
- Hazardous thermal decomposition products** : Decomposition products may include the following materials:
carbon dioxide
Carbon monoxide
nitrogen oxides
- Extinguishing media**
- Suitable** : Use an extinguishing agent suitable for the surrounding fire.
- Not suitable** : None known.
- Special exposure hazards** : Promptly isolate the scene by removing all persons from the vicinity of the incident if there is a fire. No action shall be taken involving any personal risk or without suitable training.
- Special protective equipment for fire-fighters** : Fire-fighters should wear appropriate protective equipment and self-contained breathing apparatus (SCBA) with a full face-piece operated in positive pressure mode.

6 . Accidental release measures

- Personal precautions** : No action shall be taken involving any personal risk or without suitable training. Evacuate surrounding areas. Keep unnecessary and unprotected personnel from entering. Do not touch or walk through spilled material. Do not breathe vapor or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment (see Section 8).
- Environmental precautions** : Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air).
- Methods for cleaning up** : Stop leak if without risk. Move containers from spill area. Approach release from upwind. Prevent entry into sewers, water courses, basements or confined areas. Wash spillages into an effluent treatment plant or proceed as follows. Contain and collect spillage with non-combustible, absorbent material e.g. sand, earth, vermiculite or diatomaceous earth and place in container for disposal according to local regulations (see Section 13). Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilled product. Note: see Section 1 for emergency contact information and Section 13 for waste disposal.

7 . Handling and storage

- Handling** : Put on appropriate personal protective equipment (see Section 8). Eating, drinking and smoking should be prohibited in areas where this material is handled, stored and processed. Workers should wash hands and face before eating, drinking and smoking. Remove contaminated clothing and protective equipment before entering eating areas. Persons with a history of skin sensitization problems should not be employed in any process in which this product is used. Do not get in eyes or on skin or clothing. Do not breathe vapor or mist. Do not ingest. Use only with adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Keep in the original container or an approved alternative made from a compatible material, kept tightly closed when not in use. Empty containers retain product residue and can be hazardous. Do not reuse container.
- Storage** : Store between the following temperatures: 2 to 40°C (35.6 to 104°F). Store in accordance with local regulations. Store in original container protected from direct sunlight in a dry, cool and well-ventilated area, away from incompatible materials (see Section 10) and food and drink. Keep container tightly closed and sealed until ready for use. Containers that have been opened must be carefully resealed and kept upright to prevent leakage. Do not store in unlabeled containers. Use appropriate containment to avoid environmental contamination.

8 . Exposure controls/personal protection

Consult local authorities for acceptable exposure limits.

- Recommended monitoring procedures** : If this product contains ingredients with exposure limits, personal, workplace atmosphere or biological monitoring may be required to determine the effectiveness of the ventilation or other control measures and/or the necessity to use respiratory protective equipment. Reference should be made to appropriate monitoring standards. Reference to national guidance documents for methods for the determination of hazardous substances will also be required.
- Engineering measures** : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapor or mist, use process enclosures, local exhaust ventilation or other engineering controls to keep worker exposure to airborne contaminants below any recommended or statutory limits.
- Hygiene measures** : Wash hands, forearms and face thoroughly after handling chemical products, before eating, smoking and using the lavatory and at the end of the working period. Appropriate techniques should be used to remove potentially contaminated clothing. Contaminated work clothing should not be allowed out of the workplace. Wash contaminated clothing before reusing. Ensure that eyewash stations and safety showers are close to the workstation location.
- Personal protection**
- Respiratory** : In case of inadequate ventilation wear respiratory protection. Respirator selection must be based on known or anticipated exposure levels, the hazards of the product and the safe working limits of the selected respirator.
- Hands** : 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. Considering the parameters specified by the glove manufacturer, check during use that the gloves are still retaining their protective properties. It should be noted that the time to breakthrough for any glove material may be different for different glove manufacturers. In the case of mixtures, consisting of several substances, the protection time of the gloves cannot be accurately estimated. > 8 hours (breakthrough time): butyl rubber, Ethyl Vinyl Alcohol Laminate (EVAL)
- Eyes** : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts. If contact is possible, the following protection should be worn, unless the assessment indicates a higher degree of protection: chemical splash goggles and/or face shield. If inhalation hazards exist, a full-face respirator may be required instead.

8 . Exposure controls/personal protection

- Skin** : Personal protective equipment for the body should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.
- Environmental exposure controls** : Emissions from ventilation or work process equipment should be checked to ensure they comply with the requirements of environmental protection legislation. In some cases, fume scrubbers, filters or engineering modifications to the process equipment will be necessary to reduce emissions to acceptable levels.

9 . Physical and chemical properties

Appearance

- Physical state** : Liquid.
- Color** : Light yellow
- Odor** : Slight
- pH** : Not available.
- Boiling/condensation point** : >200°C (>392°F)
- Melting/freezing point** : Not available.
- Flash point** : Closed cup: 110°C (230°F) [DIN 51758 EN 22719 (Pensky-Martens Closed Cup)]
- Flammable limits** : Not available.
- Auto-ignition temperature** : Not available.
- Decomposition temperature** : >200°C (>392°F)
- Vapor pressure** : 0.004 kPa (0.03 mm Hg) [room temperature]
- Specific gravity** : Not available.
- Water solubility** : practically insoluble
- Partition coefficient: n-octanol/water (log Kow)** : Not available.
- Viscosity** : Dynamic (room temperature): 20000 to 35000 mPa·s (20000 to 35000 cP)
- Density** : 0.95 g/cm³ [25°C (77°F)]
- Vapor density** : Not available.
- Evaporation rate (butyl acetate = 1)** : Not available.

10 . Stability and reactivity

- Chemical stability** : The product is stable.
Under normal conditions of storage and use, hazardous reactions will not occur.
- Hazardous polymerization** : Under normal conditions of storage and use, hazardous polymerization will not occur.
- Conditions to avoid** : No specific data.
- Hazardous decomposition products** : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

11 . Toxicological information

Acute toxicity

| Product/ingredient name | Test | Endpoint | Species | Result |
|----------------------------|--------------------------------|-------------|-----------------------|--------------|
| DIMETHYL DIPROPYL TRIAMINE | Unknown guidelines | LD50 Dermal | Rabbit | 1310 mg/kg |
| Triethylene tetramine | OECD 401 Acute Oral Toxicity | LD50 Oral | Rat - Male, Female | 1669 mg/kg |
| | OECD 402 Acute Dermal Toxicity | LD50 Dermal | Rabbit - Male, Female | 1465.4 mg/kg |
| | OECD 401 Acute Oral Toxicity | LD50 Oral | Rat - Male, Female | 1716.2 mg/kg |

Irritation/Corrosion

| Product/ingredient name | Test | Species | Result |
|----------------------------|--------------------------------------------|---------|------------------|
| DIMETHYL DIPROPYL TRIAMINE | OECD 404 Acute Dermal Irritation/Corrosion | Rabbit | Skin - Corrosive |
| Triethylene tetramine | OECD 405 Acute Eye Irritation/Corrosion | Rabbit | Skin - Corrosive |
| | OECD 404 Acute Dermal Irritation/Corrosion | Rabbit | Eyes - Corrosive |
| ARALDITE 2011 HARDENER US | - | Rabbit | Skin - Corrosive |
| | - | Rabbit | Eyes - Corrosive |

Conclusion/ Summary

Skin

- : Corrosive to the skin.
- FATTY ACIDS, C18-UNSATD., DIMERS, POLYMERS WITH TRIETHYLENETETRAMINE No additional information.
- DIMETHYL DIPROPYL TRIAMINE Corrosive to the skin.
- Triethylene tetramine Corrosive to the skin.

Eyes

- : Corrosive to eyes.
- FATTY ACIDS, C18-UNSATD., DIMERS, POLYMERS WITH TRIETHYLENETETRAMINE No additional information.
- DIMETHYL DIPROPYL TRIAMINE No additional information.
- Triethylene tetramine Corrosive to eyes.

Respiratory

- : FATTY ACIDS, C18-UNSATD., DIMERS, POLYMERS WITH TRIETHYLENETETRAMINE No additional information.
- DIMETHYL DIPROPYL TRIAMINE No additional information.
- Triethylene tetramine No additional information.

Sensitizer

11 . Toxicological information

| Product/ingredient name | Test | Route of exposure | Species | Result |
|----------------------------|-----------------------------|-------------------|------------|-------------|
| DIMETHYL DIPROPYL TRIAMINE | OECD 406 Skin Sensitization | skin | Guinea pig | Sensitizing |
| Triethylene tetramine | OECD 406 Skin Sensitization | skin | Guinea pig | Sensitizing |

Mutagenicity

| Product/ingredient name | Test | Result |
|----------------------------|--------------------------------------------------------------------------------|----------|
| DIMETHYL DIPROPYL TRIAMINE | Experiment: In vitro Subject: Bacteria Metabolic activation: +/- | Negative |
| | Experiment: In vitro Subject: Mammalian-Animal Metabolic activation: +/- | Negative |
| | Experiment: In vitro Subject: Mammalian-Human Metabolic activation: +/- | Negative |
| Triethylene tetramine | Experiment: In vitro Subject: Mammalian-Animal | Negative |
| | Experiment: In vivo Subject: Mammalian-Animal | Negative |

Conclusion/ Summary

: N'-(3-Aminopropyl)-N,N-dimethylpropane-1,3-diamine triethylenetetramine

Not mutagenic in a standard battery of genetic toxicological tests.

The weight of the scientific evidence indicates that this material is non-genotoxic.

Carcinogenicity

| Product/ingredient name | Test | Species | Dose | Exposure | Result/Result type |
|----------------------------|----------------------------------|--------------|----------|----------------------------|---------------------------|
| DIMETHYL DIPROPYL TRIAMINE | No official guidelines | Mouse - Male | - | 20 months; 3 days per week | Negative - Dermal - NOAEL |
| Triethylene tetramine | OECD 451 Carcinogenicity Studies | Mouse - Male | 42 mg/kg | 3 days per week | Negative - Dermal - NOAEL |

Reproductive toxicity

Conclusion/ Summary

: triethylenetetramine

In accordance with column 2 of Annex VII - X of Regulation (EC) No 1907/2006, the test for this property of the substance does not need to be conducted.

Teratogenicity

| Product/ingredient name | Test | Species | Result/Result type |
|----------------------------|-------------------------------------------------------------------------------------------------------------|--------------------|--------------------|
| DIMETHYL DIPROPYL TRIAMINE | OECD 422 Combined Repeated Dose Toxicity Study with the Reproduction/ Developmental Toxicity Screening Test | Rat - Male, Female | Positive - Oral |
| Triethylene tetramine | OECD 414 Prenatal | Rat | Negative - Oral |

11 . Toxicological information

| | | | |
|--|-----------------------------------------------------------------------------------------|--------|-------------------|
| | Developmental Toxicity Study OECD 414 Prenatal Developmental Toxicity Study | Rabbit | Negative - Dermal |
|--|-----------------------------------------------------------------------------------------|--------|-------------------|

Potential acute health effects

- Inhalation** : Irritating to respiratory system.
- Ingestion** : Harmful if swallowed. May cause burns to mouth, throat and stomach.
- Skin contact** : Corrosive to the skin. Causes burns. Harmful in contact with skin. May cause sensitization by skin contact.
- Eye contact** : Corrosive to eyes. Causes burns.

Potential chronic health effects

| Product/ingredient name | Test | Endpoint | Species | Result |
|-------------------------------|-------------------------------------------------------------------------------------------------|------------------------------------------------------------|------------------------------------|----------------------------------------|
| DIMETHYL DIPROPYL TRIAMINE | OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents No official guidelines | Sub-chronic NOAEL Oral | Rat - Male, Female | 1000 ppm |
| | No official guidelines | Chronic NOAEL Dermal Sub-acute NOEC Inhalation Vapor | Mouse - Male Rat - Male, Female | >56.3 mg/kg/d 550 mg/m ³ |
| Triethylene tetramine | OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents | Sub-chronic NOAEL Oral | Rat - Male, Female | 50 mg/kg/d |

- General** : Contains material that may cause target organ damage, based on animal data. Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
- Target organs** : Contains material which may cause damage to the following organs: kidneys, lungs, liver.
- Carcinogenicity** : No known significant effects or critical hazards.
- Mutagenicity** : No known significant effects or critical hazards.
- Teratogenicity** : No known significant effects or critical hazards.
- Developmental effects** : No known significant effects or critical hazards.
- Fertility effects** : No known significant effects or critical hazards.

Medical conditions aggravated by over-exposure

Pre-existing skin disorders and disorders involving any other target organs mentioned in this MSDS as being at risk may be aggravated by over-exposure to this product.

12 . Ecological information

Environmental effects : No known significant effects or critical hazards.

Aquatic ecotoxicity

| Product/ingredient name | Test | Endpoint | Exposure | Species | Result |
|-----------------------------------------------------------------------------------------|-----------------------------------------------------------------|----------|---------------------|----------------------|--------------------|
| DIMETHYL DIPROPYL TRIAMINE Triethylene tetramine | DIN DIN 38412 Part 8 | Acute | EC50 | 16 hours Static | Bacteria 181 mg/l |
| | OECD 202 <i>Daphnia</i> sp. Acute Immobilisation Test | Acute | EC50 | 48 hours Static | Daphnia 9.2 mg/l |
| | OECD 201 Alga, Growth Inhibition Test | Acute | ErC50 (growth rate) | 72 hours Static | Algae 21 mg/l |
| | OECD 203 Fish, Acute Toxicity Test | Acute | LC50 | 96 hours Static | Fish >100 mg/l |
| | OECD 201 Alga, Growth Inhibition Test | Chronic | LOAEL | 72 hours Static | Algae 5.7 mg/l |
| | No official guidelines | Acute | EC50 | 30 minutes Static | Bacteria 800 mg/l |
| | EU EC C.2 Acute Toxicity for Daphnia | Acute | EC50 | 48 hours Static | Daphnia 31.1 mg/l |
| | OECD 201 Alga, Growth Inhibition Test | Acute | ErC50 (growth rate) | 72 hours Semi-static | Algae 20 mg/l |
| | EPA OPPTS EPA OTS 797.1400 | Acute | LC50 | 96 hours Static | Fish 330 mg/l |
| | No official guidelines | Chronic | EC10 | 30 minutes Static | Bacteria 42.5 mg/l |
| | OECD OECD 202: Part II (<i>Daphnia</i> sp., Reproduction Test) | Chronic | EC10 | 21 days Semi-static | Daphnia 1.9 mg/l |
| | OECD 201 Alga, Growth Inhibition Test | Chronic | NOECr | 72 hours Semi-static | Algae <2.5 mg/l |

Persistence and degradability

| Product/ingredient name | Test | Period | Result |
|---------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------|----------|--------|
| DIMETHYL DIPROPYL TRIAMINE Triethylene tetramine | ISO ISO 7827, 1984 - Evaluation in an aqueous medium of the ultimate aerobic biodegradability of organic compounds | 28 days | 100 % |
| | OECD 302A Inherent Biodegradability: Modified SCAS Test | 84 days | 20 % |
| | OECD 301D Ready Biodegradability - Closed Bottle Test | 162 days | 0 % |

Conclusion/Summary : triethylenetetramine Not biodegradable

| Product/ingredient name | Aquatic half-life | Photolysis | Biodegradability |
|----------------------------|-------------------|------------|------------------|
| DIMETHYL DIPROPYL TRIAMINE | - | - | Readily |
| Triethylene tetramine | - | - | Not readily |

Bioaccumulative potential

12 . Ecological information

| Product/ingredient name | LogP _{ow} | BCF | Potential |
|----------------------------|--------------------|-----|-----------|
| DIMETHYL DIPROPYL TRIAMINE | 0.5 | - | low |
| Triethylene tetramine | -2.65 | - | low |

Other adverse effects : No known significant effects or critical hazards.

Other ecological information

BOD5 : Not Determined

COD : Not Determined

TOC : Not Determined

13 . Disposal considerations

Waste disposal : The generation of waste should be avoided or minimized wherever possible. Disposal of this product, solutions and any by-products should at all times comply with the requirements of environmental protection and waste disposal legislation and any regional local authority requirements. Dispose of surplus and non-recyclable products via a licensed waste disposal contractor. Waste should not be disposed of untreated to the sewer unless fully compliant with the requirements of all authorities with jurisdiction. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible. This material and its container must be disposed of in a safe way. Care should be taken when handling emptied containers that have not been cleaned or rinsed out. Empty containers or liners may retain some product residues. Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.

Disposal should be in accordance with applicable regional, national and local laws and regulations.

14 . Transport information




Proper shipping name

DOT : Polyamines, liquid, corrosive, n.o.s. (DIMETHYL DIPROPYL TRIAMINE)


TDG : Polyamines, liquid, corrosive, n.o.s. (DIMETHYL DIPROPYL TRIAMINE)

IMDG : Polyamines, liquid, corrosive, n.o.s. (DIMETHYL DIPROPYL TRIAMINE)

IATA : Polyamines, liquid, corrosive, n.o.s. (DIMETHYL DIPROPYL TRIAMINE)

| Regulatory information | UN number | Classes | PG* | Label | Additional information |
|---------------------------|-----------|---------|-----|--------------------------------------------------------------------------------------|---------------------------------------------|
| DOT Classification | UN2735 | 8 | III |  | - |
| TDG Classification | UN2735 | 8 | III |  | - |
| IMDG Class | UN2735 | 8 | III |  | Emergency schedules (EmS) F-A S-B |

14 . Transport information

| | | | | | |
|-----------------------|--------|---|-----|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|
| IATA-DGR Class | UN2735 | 8 | III |  | <u>Passenger and Cargo Aircraft</u> Quantity limitation: 5 L Packaging instructions: 852 <u>Cargo Aircraft Only</u> Quantity limitation: 60 L Packaging instructions: 856 |
|-----------------------|--------|---|-----|------------------------------------------------------------------------------------|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|

PG* : Packing group

15 . Regulatory information

United States

HCS Classification : Corrosive material
Sensitizing material
Target organ effects

U.S. Federal regulations

TSCA 8(b) inventory : **United States inventory (TSCA 8b)**: All components are listed or exempted.
TSCA 5(a)2 final significant new use rule (SNUR) : No ingredients listed.

TSCA 5(e) substance consent order : No ingredients listed.

TSCA 12(b) export notification : No ingredients listed.

SARA 311/312 : Immediate (acute) health hazard
Delayed (chronic) health hazard

Clean Air Act - Ozone Depleting Substances (ODS) : This product does not contain nor is it manufactured with ozone depleting substances.

SARA 313 : No ingredients listed.

CERCLA Hazardous substances : No ingredients listed.

State regulations

PENNSYLVANIA - RTK : triethylenetetramine

California Prop 65 : This product contains no listed substances known to the State of California to cause cancer, birth defects or other reproductive harm, at levels which would require a warning under the statute.

International regulations

Canada

WHMIS (Canada) : Class D-1B: Material causing immediate and serious toxic effects (Toxic).
Class D-2A: Material causing other toxic effects (Very toxic).
Class D-2B: Material causing other toxic effects (Toxic).
Class E: Corrosive material

15 . Regulatory information

CEPA DSL : At least one component is not listed.

This product has been classified in accordance with the hazard criteria of the Controlled Products Regulations and the MSDS contains all the information required by the Controlled Products Regulations.

International lists :

- Australia inventory (AICS)**: All components are listed or exempted.
- China inventory (IECSC)**: All components are listed or exempted.
- Japan inventory**: Not determined.
- Korea inventory**: At least one component is not listed.
- Malaysia Inventory (EHS Register)**: Not determined.
- New Zealand Inventory of Chemicals (NZIoC)**: At least one component is not listed.
- Philippines inventory (PICCS)**: At least one component is not listed.
- Taiwan inventory (CSNN)**: Not determined.

16 . Other information

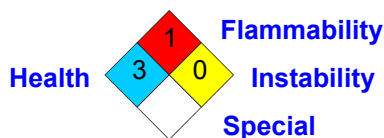
Label requirements : CAUSES EYE AND SKIN BURNS. CAUSES RESPIRATORY TRACT IRRITATION. MAY CAUSE ALLERGIC SKIN REACTION. MAY BE HARMFUL IF ABSORBED THROUGH SKIN OR IF SWALLOWED. CONTAINS MATERIAL THAT MAY CAUSE TARGET ORGAN DAMAGE, BASED ON ANIMAL DATA.

Hazardous Material Information System (U.S.A.) :

| | | |
|---------------------|---|---|
| Health | * | 3 |
| Flammability | | 1 |
| Physical hazards | | 0 |
| Personal protection | | |

The customer is responsible for determining the PPE code for this material.

National Fire Protection Association (U.S.A.) :



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Indicates information that has changed from previously issued version.

Notice to reader

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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.

16 . Other information

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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