

SAFETY DATA SHEET

ARALDITE® AV4415/HV4416

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

1.1 Product identifier

Product name : ARALDITE® AV4415/HV4416
Product code : 00051537
Product description :

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

Product use : 2-Component adhesive system

1.3 Details of the supplier of the safety data sheet

Supplier : Huntsman Advanced Materials (Europe)BVBA
Everslaan 45
3078 Everberg / Belgium
Tel.: +41 61 299 20 41
Fax: +41 61 299 20 40

e-mail address of person responsible for this SDS : Global_Product_EHS_AdMat@huntsman.com

1.4 Emergency telephone number

Supplier

Telephone number : EUROPE: +32 35 75 1234
France ORFILA: +33(0)145425959
ASIA: +65 6336-6011
China: +86 20 39377888
Australia: 1800 786 152
New Zealand: 0800 767 437
USA: +1/800/424.9300

SECTION 2: Hazards identification

2.1 Classification of the substance or mixture

Product definition : Working pack (preparation)

Classification according to Directive 1999/45/EC [DPD]

The product is classified as dangerous according to Directive 1999/45/EC and its amendments.

Classification : Xn; R20/21/22
C; R35
R43
N; R51/53

Human health hazards : Harmful by inhalation, in contact with skin and if swallowed. Causes severe burns. May cause sensitisation by skin contact.

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

See Section 16 for the full text of the R phrases or H statements declared above.

See Section 11 for more detailed information on health effects and symptoms.

2.2 Label elements


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SECTION 2: Hazards identification

Hazard symbol or symbols : 

Indication of danger : Corrosive, Dangerous for the environment

Risk phrases : R20/21/22- Harmful by inhalation, in contact with skin and if swallowed.
R35- Causes severe burns.
R43- May cause sensitisation by skin contact.
R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Safety phrases : S24- Avoid contact with skin.
S26- In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
S36/37/39- Wear suitable protective clothing, gloves and eye/face protection.
S45- In case of accident or if you feel unwell, seek medical advice immediately (show the label where possible).
S61- Avoid release to the environment. Refer to special instructions/safety data sheet.

Hazardous ingredients : epoxy phenol novolac resin
reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)
2,2'-dimethyl-4,4'methylenebis(cyclohexylamine)
pentaethylenehexamine

Supplemental label elements : Not applicable.

Supplemental label elements : Contains epoxy constituents. See information supplied by the manufacturer.

Special packaging requirements

Containers to be fitted with child-resistant fastenings : Not applicable.

Tactile warning of danger : Not applicable.

2.3 Other hazards

Other hazards which do not result in classification : Not available.

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SECTION 3: Composition/information on ingredients

Substance/mixture : Working pack (preparation)

Product/ingredient name	Identifiers	%	Classification		Type
			67/548/EEC	Regulation (EC) No. 1272/2008 [CLP]	
epoxy phenol novolac resin	CAS: 28064-14-4	13-30	Xi; R36/38 R43 N; R51/53	Skin Irrit. 2, H315 Eye Irrit. 2, H319 Skin Sens. 1, H317 Aquatic Chronic 2, H411	[1]
bisphenol F-epoxy resin	CAS: 9003-36-5 EC: 500-006-8 RRN: 01-2119454392-40	7-13	Xi; R38 R43 N; R51/53	Skin Irrit. 2, H315 Skin Sens. 1, H317 Aquatic Chronic 2, H411	[1]
2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine)	CAS: 6864-37-5 EC: 229-962-1	7-13	T; R23/24 Xn; R22 C; R35 N; R51/53	Acute Tox. 4, H302 Acute Tox. 3, H311 Acute Tox. 2, H330 Skin Corr. 1A, H314 Eye Dam. 1, H318 Aquatic Chronic 2, H411	[1]
reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	CAS: 25068-38-6 EC: 500-033-5 RRN: 01-2119456619-26	3-7	Xi; R36/38 R43 N; R51/53	Skin Irrit. 2, H315 Eye Irrit. 2, H319 Skin Sens. 1, H317 Aquatic Chronic 2, H411	[1]
pentaethylenehexamine	CAS: 4067-16-7 EC: 223-775-9	1-3	Xn; R21/22 C; R34 R43 N; R50/53	Acute Tox. 4, H302 Acute Tox. 4, H312 Skin Corr. 1B, H314 Eye Dam. 1, H318 Skin Sens. 1, H317 Aquatic Acute 1, H400 Aquatic Chronic 1, H410	[1]
butanedioldiglycidyl ether	CAS: 2425-79-8 EC: 219-371-7 RRN: 01-2119494060-45	1-3	Xn; R20/21 Xi; R36/38 R43 R52/53	Acute Tox. 4, H312 Acute Tox. 4, H332 Skin Irrit. 2, H315 Eye Irrit. 2, H319 Skin Sens. 1, H317	[1]
			See section 16 for the full text of the R-phrases declared above	See Section 16 for the full text of the H statements declared above.	

There are no additional ingredients present which, within the current knowledge of the supplier and in the concentrations applicable, are classified as hazardous to health or the environment and hence require reporting in this section.

Type

- [1] Substance classified with a health or environmental hazard
- [2] Substance with a workplace exposure limit
- [3] Substance meets the criteria for PBT according to Regulation (EC) No. 1907/2006, Annex XIII
- [4] Substance meets the criteria for vPvB according to Regulation (EC) No. 1907/2006, Annex XIII

Occupational exposure limits, if available, are listed in Section 8.

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SECTION 4: First aid measures

4.1 Description of first aid measures

- Eye contact** : Get medical attention immediately. Immediately flush eyes with plenty of water, occasionally lifting the upper and lower eyelids. Check for and remove any contact lenses. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician.
- Inhalation** : Get medical attention immediately. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. If not breathing, if breathing is irregular or if respiratory arrest occurs, provide artificial respiration or oxygen by trained personnel. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband. In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.
- Skin contact** : Get medical attention immediately. Flush contaminated skin with plenty of water. Remove contaminated clothing and shoes. Wash contaminated clothing thoroughly with water before removing it, or wear gloves. Continue to rinse for at least 10 minutes. Chemical burns must be treated promptly by a physician. In the event of any complaints or symptoms, avoid further exposure. Wash clothing before reuse. Clean shoes thoroughly before reuse.
- Ingestion** : Get medical attention immediately. Wash out mouth with water. Remove dentures if any. Remove victim to fresh air and keep at rest in a position comfortable for breathing. If material has been swallowed and the exposed person is conscious, give small quantities of water to drink. Stop if the exposed person feels sick as vomiting may be dangerous. Do not induce vomiting unless directed to do so by medical personnel. If vomiting occurs, the head should be kept low so that vomit does not enter the lungs. Chemical burns must be treated promptly by a physician. Never give anything by mouth to an unconscious person. If unconscious, place in recovery position and get medical attention immediately. Maintain an open airway. Loosen tight clothing such as a collar, tie, belt or waistband.
- Protection of first-aiders** : No action shall be taken involving any personal risk or without suitable training. If it is suspected that fumes are still present, the rescuer should wear an appropriate mask or self-contained breathing apparatus. It may be dangerous to the person providing aid to give mouth-to-mouth resuscitation. Wash contaminated clothing thoroughly with water before removing it, or wear gloves.

4.2 Most important symptoms and effects, both acute and delayed

Potential acute health effects

- Eye contact** : Severely corrosive to the eyes. Causes severe burns.
- Inhalation** : Harmful by inhalation. May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.
- Skin contact** : Severely corrosive to the skin. Causes severe burns. Harmful in contact with skin. May cause sensitisation by skin contact.
- Ingestion** : Harmful if swallowed. May cause burns to mouth, throat and stomach.

Over-exposure signs/symptoms

- Eye contact** : Adverse symptoms may include the following:
pain
watering
redness
- Inhalation** : No specific data.
- Skin contact** : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

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SECTION 4: First aid measures

Ingestion : Adverse symptoms may include the following:
stomach pains

4.3 Indication of any immediate medical attention and special treatment needed

Notes to physician : In case of inhalation of decomposition products in a fire, symptoms may be delayed. The exposed person may need to be kept under medical surveillance for 48 hours.

Specific treatments : Symptomatic treatment and supportive therapy as indicated. Following severe exposure the patient should be kept under medical review for at least 48 hours.

SECTION 5: Firefighting measures

5.1 Extinguishing media

Suitable extinguishing media : Use an extinguishing agent suitable for the surrounding fire.

Unsuitable extinguishing media : None known.

5.2 Special hazards arising from the substance or mixture

Hazards from the substance or mixture : In a fire or if heated, a pressure increase will occur and the container may burst.

Hazardous thermal decomposition products : Decomposition products may include the following materials:
carbon dioxide
carbon monoxide
nitrogen oxides
sulfur oxides
metal oxide/oxides

5.3 Advice for firefighters

Special precautions for fire-fighters : 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. This material is toxic to aquatic organisms. Fire water contaminated with this material must be contained and prevented from being discharged to any waterway, sewer or drain.

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. Clothing for fire-fighters (including helmets, protective boots and gloves) conforming to European standard EN 469 will provide a basic level of protection for chemical incidents.

SECTION 6: Accidental release measures

6.1 Personal precautions, protective equipment and emergency procedures

For non-emergency personnel : 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 spilt material. Do not breathe vapour or mist. Provide adequate ventilation. Wear appropriate respirator when ventilation is inadequate. Put on appropriate personal protective equipment.

For emergency responders : If specialised clothing is required to deal with the spillage, take note of any information in Section 8 on suitable and unsuitable materials. See also Section 8 for additional information on hygiene measures.

6.2 Environmental precautions

: Avoid dispersal of spilt 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). Water polluting material. May be harmful to the environment if released in large quantities.

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SECTION 6: Accidental release measures

6.3 Methods and materials for containment and cleaning up

- Small spill** : Stop leak if without risk. Move containers from spill area. Dilute with water and mop up if water-soluble. Alternatively, or if water-insoluble, absorb with an inert dry material and place in an appropriate waste disposal container. Dispose of via a licensed waste disposal contractor.
- Large spill** : Stop leak if without risk. Move containers from spill area. Approach the 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. Dispose of via a licensed waste disposal contractor. Contaminated absorbent material may pose the same hazard as the spilt product.

- 6.4 Reference to other sections** : See Section 1 for emergency contact information.
See Section 8 for information on appropriate personal protective equipment.
See Section 13 for additional waste treatment information.

SECTION 7: Handling and storage

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

7.1 Precautions for safe handling

- Protective measures** : Put on appropriate personal protective equipment (see Section 8). 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 vapour or mist. Do not ingest. Avoid release to the environment. Refer to special instructions/safety data sheet. 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.
- Advice on general occupational hygiene** : 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. See also Section 8 for additional information on hygiene measures.

- 7.2 Conditions for safe storage, including any incompatibilities** : 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 unlabelled containers. Use appropriate containment to avoid environmental contamination.

- Storage hazard class** : Storage class 8, Corrosive substances
Huntsman Advanced Materials

7.3 Specific end use(s)

- Recommendations** : Not available.
Industrial sector specific solutions : Not available.

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SECTION 8: Exposure controls/personal protection

The information in this section contains generic advice and guidance. The list of Identified Uses in Section 1 should be consulted for any available use-specific information provided in the Exposure Scenario(s).

8.1 Control parameters

Occupational exposure limits

No exposure limit value known.

Workplace exposure limits (for total dust and inhalable quartz dust) must be complied with. If this is not possible, then suitable dust masks must be worn.

W A R N I N G ! This product contains quartz, which has been classified by IARC as carcinogenic for humans (Group 1), and which can cause silicosis and lung cancer following exposure to respirable dust. It is therefore important to take particular care to avoid inhalation exposure when mechanically processing cured material (e.g. grinding, sanding, sawing).

QUARTZ (CAS RN 14808-60-7):

United Kingdom: TWA: 0.1 mg/m³ 8 hour(s). Form: respirable dust

Ireland: OELV-8hr: 0.1 mg/m³ 8 hour(s). Form: respirable dust

Switzerland: TWA: 0.15 mg/m³ 8 hour(s). Form: respirable dust

Australia: TWA: 0.1 mg/m³ 8 hour(s)

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 European Standard EN 689 for methods for the assessment of exposure by inhalation to chemical agents and national guidance documents for methods for the determination of hazardous substances.

Derived effect levels

Product/ingredient name	Type	Exposure	Value	Population	Effects
2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine)	DNEL	Long term Inhalation	0.15 mg/m ³	Consumers	Local
	DNEL	Long term Oral	0.03 mg/kg bw/day	Consumers	Systemic
	DNEL	Long term Inhalation	0.15 mg/m ³	Consumers	Systemic
	DNEL	Short term Inhalation	18 mg/m ³	Workers	Systemic
	DNEL	Long term Inhalation	0.6 mg/m ³	Workers	Systemic
	DNEL	Short term Inhalation	18 mg/m ³	Workers	Local
	DNEL	Long term Inhalation	0.6 mg/m ³	Workers	Local

Predicted effect concentrations

Product/ingredient name	Type	Compartment Detail	Value	Method Detail
2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine)	PNEC	Marine water sediment	3.64 mg/kg	-
	PNEC	Fresh water sediment	36.4 mg/kg	-
	PNEC	Marine	0.0125 mg/l	-
	PNEC	Soil	7.18 mg/kg	-
	PNEC	PNECintermittent	0.046 mg/l	-
	PNEC	Sewage Treatment Plant	1.6 mg/l	-
	PNEC	Fresh water	0.125 mg/l	-

8.2 Exposure controls

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SECTION 8: Exposure controls/personal protection

Appropriate engineering controls : Use only with adequate ventilation. If user operations generate dust, fumes, gas, vapour 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.

Individual protection measures

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.

Eye/face protection : Safety eyewear complying with an approved standard should be used when a risk assessment indicates this is necessary to avoid exposure to liquid splashes, mists or dusts.

Skin protection

Hand protection : 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.
 Use gloves approved to relevant standards e.g. EN 374 (Europe), F739 (US). Suitability and durability of a glove is dependent on usage, e.g. frequency and duration of contact, chemical resistance of glove material and dexterity. Always seek advice from glove suppliers. Additional information can be found for instance at www.gisbau.de.

Body protection : 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.

Other skin protection : Appropriate footwear and any additional skin protection measures should be selected based on the task being performed and the risks involved and should be approved by a specialist before handling this product.

Respiratory protection : 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.

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.

SECTION 9: Physical and chemical properties**9.1 Information on basic physical and chemical properties****Appearance**

Physical state : Liquid. [Paste.]
Colour : Not available.
Odour : Not available.
Odour threshold : Not available.
pH : Not available.
Melting point/freezing point : Not available.
Initial boiling point and boiling range : Not available.
Flash point : Closed cup: 190°C [DIN 51758 EN 22719 (Pensky-Martens Closed Cup)]
Evaporation rate : Not available.
Flammability (solid, gas) : Not available.
Burning time : Not applicable.
Burning rate : Not applicable.

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SECTION 9: Physical and chemical properties

Upper/lower flammability or explosive limits : Not available.
 Vapour pressure : Not available.
 Vapour density : Not available.
 Relative density : Not available.
 Solubility(ies)
 Water solubility :

Partition coefficient: n-octanol/water (LogK_{ow}) : Not available.
 Auto-ignition temperature : Not available.
 Decomposition temperature : Not available.
 Viscosity : Not available.
 Explosive properties : Not available.
 Oxidising properties : Not available.

9.2 Other information

Density : 1.6 g/cm³ [20°C (68°F)]

SECTION 10: Stability and reactivity

10.1 Reactivity : No specific test data related to reactivity available for this product or its ingredients.

10.2 Chemical stability : The product is stable.

10.3 Possibility of hazardous reactions : Under normal conditions of storage and use, hazardous reactions will not occur.

10.4 Conditions to avoid : No specific data.

10.5 Incompatible materials : No specific data.

10.6 Hazardous decomposition products : Under normal conditions of storage and use, hazardous decomposition products should not be produced.

Decomposition products may include the following materials: Refer to SDS for individual components of the pack.

SECTION 11: Toxicological information

11.1 Information on toxicological effects

Acute toxicity

Product/ingredient name	Endpoint	Species	Result	Exposure
epoxy phenol novolac resin	LC0 Inhalation Vapour	Rat - Male	0.00001 ppm	5 hours
	LD50 Dermal	Rat - Male, Female	>2000 mg/kg	-
bisphenol F-epoxy resin	LD50 Oral	Rat - Female	>2000 mg/kg	-
	LD50 Dermal	Rat - Male, Female	>2000 mg/kg	-
	LD50 Oral	Rat - Male, Female	>5000 mg/kg	-
2,2'-dimethyl-	LC50 Inhalation Dusts and	Rat	0.42 mg/L	4 hours

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4,4'methylenebis(cyclohexylamine)	mists LD50 Dermal	Rabbit	200 to 400 mg/kg	-
	LD50 Oral	Rat	320 to 460 mg/kg	-
reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	LC0 Inhalation Vapour	Rat - Male	0.00001 ppm	5 hours
	LD50 Dermal	Rat - Male, Female	>2000 mg/kg	-
	LD50 Oral	Rat - Female	>2000 mg/kg	-
pentaethylenehexamine	LD50 Dermal	Rabbit - Male, Female	1465.4 mg/kg	-
	LD50 Oral	Rat - Male, Female	1716.2 mg/kg	-
butanedioldiglycidyl ether	LD50 Dermal	Rat - Male, Female	>2150 mg/kg	-
	LD50 Oral	Rat - Male, Female	1163 mg/kg	-

Irritation/Corrosion

Product/ingredient name	Test	Species	Route of exposure	Result
epoxy phenol novolac resin	OECD 405 Acute Eye Irritation/Corrosion	Rabbit	Eyes	Mild irritant
	OECD 404 Acute Dermal Irritation/Corrosion	Rabbit	Skin	Mild irritant
bisphenol F-epoxy resin	OECD 405 Acute Eye Irritation/Corrosion	Rabbit	Eyes	Non-irritant.
	OECD 404 Acute Dermal Irritation/Corrosion	Rabbit	Skin	Mild irritant
reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	OECD 404 Acute Dermal Irritation/Corrosion	Rabbit	Skin	Mild irritant
	OECD 405 Acute Eye Irritation/Corrosion	Rabbit	Eyes	Mild irritant
pentaethylenehexamine	OECD 405 Acute Eye Irritation/Corrosion	Rabbit	Eyes	Severe irritant
	OECD 404 Acute Dermal Irritation/Corrosion	Rabbit	Skin	Corrosive
butanedioldiglycidyl ether	OECD 404 Acute Dermal Irritation/Corrosion	Rabbit	Skin	Non-irritant.
	OECD 405 Acute Eye Irritation/Corrosion	Rabbit	Eyes	Severe irritant

Conclusion/Summary

- Skin** : No additional information.
- Eyes** : No additional information.
- Respiratory** : No additional information.

Sensitiser

Product/ingredient name	Test	Route of exposure	Species	Result

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bisphenol F-epoxy resin	OECD 429 Skin Sensitisation: Local Lymph Node Assay	skin	Mouse	Sensitising
2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine)	OECD 406 Skin Sensitization	skin	Guinea pig	Not sensitizing
reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	OECD 429 Skin Sensitisation: Local Lymph Node Assay	skin	Mouse	Sensitising
pentaethylenehexamine	OECD 406 Skin Sensitization	skin	Guinea pig	Sensitising
butanedioldiglycidyl ether	OECD 406 Skin Sensitization	skin	Guinea pig	Sensitising

Conclusion/Summary : No additional information.

Mutagenicity

Product/ingredient name	Test	Result	
epoxy phenol novolac resin	-	Positive	
	-	Positive	
	-	Negative	
	-	Negative	
bisphenol F-epoxy resin	OECD 471 Bacterial Reverse Mutation Test	Positive	
	OECD 476 In vitro Mammalian Cell Gene Mutation Test	Positive	
	OECD 473 In vitro Mammalian Chromosomal Aberration Test	Positive	
	OECD 474 Mammalian Erythrocyte Micronucleus Test	Negative	
	OECD 486 Unscheduled DNA Synthesis (UDS) Test with Mammalian Liver Cells in vivo	Negative	
	2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine)	OECD 471 Bacterial Reverse Mutation Test	Negative
		OECD 473 In vitro Mammalian Chromosomal Aberration Test	Negative
reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)		OECD 471 Bacterial Reverse Mutation Test	Positive
	OECD 476 In vitro Mammalian Cell Gene Mutation Test	Positive	
	OECD 478 Genetic Toxicology: Rodent Dominant Lethal Test	Negative	
	EPA OPPTS	Negative	
	pentaethylenehexamine	OECD 471 Bacterial Reverse Mutation Test	Positive
OECD 482 Genetic Toxicology: DNA Damage and Repair, Unscheduled DNA Synthesis in Mammalian Cells in vitro		Negative	
OECD 433 Acute Inhalation Toxicity-Fixed Dose Procedure		Negative	
butanedioldiglycidyl ether	OECD 471 Bacterial Reverse Mutation Test	Positive	
	OECD 473 In vitro Mammalian Chromosomal Aberration Test	Positive	
	OECD 474 Mammalian Erythrocyte Micronucleus Test	Negative	

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Conclusion/Summary : titanium dioxide: Not mutagenic in a standard battery of genetic toxicological tests.

Carcinogenicity

Product/ingredient name	Test	Species	Exposure	Result	Route of exposure	Target organs
epoxy phenol novolac resin reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	OECD 453 Combined Chronic Toxicity/Carcinogenicity Studies	Rat	2 years; 7 days per week	Negative	Oral	-
	OECD 453 Combined Chronic Toxicity/Carcinogenicity Studies	Rat	2 years; 5 days per week	Negative	Dermal	-
	OECD 453 Combined Chronic Toxicity/Carcinogenicity Studies	Mouse	2 years; 3 days per week	Negative	Dermal	-
	OECD 453 Combined Chronic Toxicity/Carcinogenicity Studies	Rat	2 years; 7 days per week	Negative	Oral	-
	OECD 453 Combined Chronic Toxicity/Carcinogenicity Studies	Rat	2 years; 5 days per week	Negative	Dermal	-
	OECD 453 Combined Chronic Toxicity/Carcinogenicity Studies	Mouse	2 years; 3 days per week	Negative	Dermal	-
pentaethylenehexamine	OECD 451 Carcinogenicity Studies	Mouse	104 weeks; 3 days per week	Negative	Dermal	-

Reproductive toxicity

Product/ingredient name	Test	Species	Result/Result type	Target organs
epoxy phenol novolac resin	OECD 416 Two-Generation Reproduction Toxicity Study	Rat	Oral: 540 mg/kg NOEL :	-
bisphenol F-epoxy resin	OECD 416 Two-Generation Reproduction Toxicity Study	Rat	Oral: 540 mg/kg NOEL :	-
reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	OECD 416 Two-Generation Reproduction Toxicity Study	Rat	Oral: 540 mg/kg NOEL :	-

Conclusion/Summary : titanium dioxide: No known significant effects or critical hazards.

Teratogenicity

Product/ingredient name	Test	Species	Result/Result type
epoxy phenol novolac resin	OECD 414 Prenatal Developmental Toxicity Study	Rat - Female	>540 mg/kg NOEL :
	-	Rabbit - Female	>300 mg/kg NOEL :
bisphenol F-epoxy resin	OECD 414 Prenatal Developmental Toxicity Study	Rabbit - Female	180 mg/kg NOAEL
	EPA CFR	Rabbit - Female	>300 mg/kg NOEL :
2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine) reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average	OECD 414 Prenatal Developmental Toxicity Study	Rat	45 mg/kg NOAEL
	OECD 414 Prenatal Developmental Toxicity Study	Rat - Female	>540 mg/kg NOEL :

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molecular weight < 700)	EPA CFR	Rabbit - Female	>300 mg/kg NOEL :
	OECD 414 Prenatal Developmental Toxicity Study	Rabbit - Female	180 mg/kg NOAEL

Conclusion/Summary : titanium dioxide: No known significant effects or critical hazards.

Information on the likely routes of exposure : Not available.

Potential acute health effects

Inhalation : Harmful by inhalation. May give off gas, vapor or dust that is very irritating or corrosive to the respiratory system. Exposure to decomposition products may cause a health hazard. Serious effects may be delayed following exposure.

Ingestion : Harmful if swallowed. May cause burns to mouth, throat and stomach.

Skin contact : Severely corrosive to the skin. Causes severe burns. Harmful in contact with skin. May cause sensitisation by skin contact.

Eye contact : Severely corrosive to the eyes. Causes severe burns.

Symptoms related to the physical, chemical and toxicological characteristics

Inhalation : No specific data.

Ingestion : Adverse symptoms may include the following:
stomach pains

Skin contact : Adverse symptoms may include the following:
pain or irritation
redness
blistering may occur

Eye contact : Adverse symptoms may include the following:
pain
watering
redness

Delayed and immediate effects and also chronic effects from short and long term exposure

Short term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Long term exposure

Potential immediate effects : Not available.

Potential delayed effects : Not available.

Potential chronic health effects

Product/ingredient name	Test	Result type	Result	Target organs
epoxy phenol novolac resin	OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents	NOAEL -	50 mg/kg	-
	OECD 411 Subchronic Dermal Toxicity: 90-day Study	NOEL :	10 mg/kg	-
	OECD 411 Subchronic Dermal Toxicity: 90-day Study	NOAEL	100 mg/kg	-
bisphenol F-epoxy resin	OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents	NOAEL -	250 mg/kg	-
2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine)	OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents	NOAEL -	2.5 mg/kg	liver, blood system, kidneys, adrenal, heart
	OECD 413 Subchronic	NOEC Vapour	12 mg/m3	-

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reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	Inhalation Toxicity: 90-day Study OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents	NOAEL -	50 mg/kg	-
	OECD 411 Subchronic Dermal Toxicity: 90-day Study	NOEL :	10 mg/kg	-
	OECD 411 Subchronic Dermal Toxicity: 90-day Study	NOAEL	100 mg/kg	-
pentaethylenehexamine	OECD 408 Repeated Dose 90-Day Oral Toxicity Study in Rodents	NOAEL -	50 mg/kg/d	lungs
butanedioldiglycidyl ether	OECD 407 Repeated Dose 28-day Oral Toxicity Study in Rodents	NOAEL -	200 mg/kg	-

- Conclusion/Summary** : Not available.
General : Once sensitized, a severe allergic reaction may occur when subsequently exposed to very low levels.
Carcinogenicity : No known significant effects or critical hazards.
IARC : quartz (SiO₂) 1
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.
Other information : Not available.

SECTION 12: Ecological information

12.1 Toxicity

Product/ingredient name	Test	Endpoint	Exposure	Species	Result
epoxy phenol novolac 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	Daphnia	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</i> Magna Reproduction Test	Chronic NOEC	21 days Semi-static	Daphnia	0.3 mg/L
bisphenol F-epoxy resin	OECD 201 Alga, Growth Inhibition Test	Acute EC50	72 hours Static	Algae	1.8 mg/L
	OECD OECD 202: Part I (<i>Daphnia</i> sp., Acute Immobilisation test)	Acute EC50	48 hours Static	Daphnia	1.6 mg/L
	-	Acute IC50	3 hours Static	Bacteria	>100 mg/L
	OECD 203 Fish, Acute Toxicity Test	Acute LC50	96 hours Semi-static	Fish	0.55 mg/L
	OECD 211 <i>Daphnia</i> Magna Reproduction Test	Chronic NOEC	21 days Semi-static	Daphnia	0.3 mg/L
2,2'-dimethyl-4,4'-methylenebis(cyclohexylamine)	OECD 201 Alga, Growth Inhibition Test	Acute EC50	72 hours Static	Algae	>5 mg/L
	DIN DIN 38412 Part 8	Acute EC50	17 hours	Bacteria	96 mg/L

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reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	OECD 202 <i>Daphnia</i> sp. Acute Immobilisation Test	Acute	EC50	Static 48 hours	Daphnia	4.6	mg/L
	DIN DIN 38412 Part 15	Acute	LC50	96 hours Static	Fish	31.6	mg/L
	OECD 201 Alga, Growth Inhibition Test	Chronic	LOAEL	72 hours Static	Algae	1.25	mg/L
	-	Chronic	NOEC	21 days	Daphnia	4	mg/L
	-	Acute	EC50	72 hours Static	Algae	9.4	mg/L
	OECD 202 <i>Daphnia</i> sp. Acute Immobilisation Test	Acute	EC50	48 hours Static	Daphnia	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</i> Magna Reproduction Test	Chronic	NOEC	21 days Semi-static	Daphnia	0.3	mg/L
	pentaethylenehexamine	EU EEC (1988)	Acute	EC50	30 minutes Static	Bacteria	>1600
EU EC C.2 Acute Toxicity for <i>Daphnia</i>		Acute	EC50	48 hours Static	Daphnia	17.5	mg/L
OECD 201 Alga, Growth Inhibition Test		Acute	EbC50 (biomass)	72 hours Static	Algae	0.7	mg/L
EU EC C.1 Acute Toxicity for Fish		Acute	LC50	96 hours Semi-static	Fish	0.18	g/l
OECD OECD 202: Part II (<i>Daphnia</i> sp., Reproduction Test)		Chronic	EC50	21 days Semi-static	Daphnia	10	mg/L
butanedioldiglycidyl ether	OECD 202 <i>Daphnia</i> sp. Acute Immobilisation Test	Acute	EC50	24 hours Static	Daphnia	75	mg/L
	OECD 201 Alga, Growth Inhibition Test	Acute	EL50	72 hours Static	Algae	>160	mg/L
	OECD 209 Activated Sludge, Respiration Inhibition Test	Acute	IC50	3 hours Static	Bacteria	>100	mg/L
	OECD 203 Fish, Acute Toxicity Test	Acute	LC50	96 hours Static	Fish	24	mg/L

12.2 Persistence and degradability

Product/ingredient name	Test	Period	Result
epoxy phenol novolac resin	OECD Derived from OECD 301F (Biodegradation Test)	28 days	5 %
bisphenol F-epoxy resin 2,2'-dimethyl- 4,4'-methylenebis(cyclohexylamine)	EU	28 days	0 %
	OECD 302B Inherent Biodegradability: Zahn-Wellens/EMPA Test	28 days	<1 %
reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	OECD Derived from OECD 301F (Biodegradation Test)	28 days	5 %
pentaethylenehexamine	OECD 301D Ready Biodegradability - Closed Bottle Test	162 days	0 %
butanedioldiglycidyl ether	OECD 301F Ready Biodegradability - Manometric Respirometry Test	28 days	43 %

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SECTION 13: Disposal considerations

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 spilt material and runoff and contact with soil, waterways, drains and sewers.

Hazardous waste : Yes.

European waste catalogue (EWC)

Waste code	Waste designation
07 02 08*	other still bottoms and reaction residues





Packaging

Methods of disposal : The generation of waste should be avoided or minimised wherever possible. Waste packaging should be recycled. Incineration or landfill should only be considered when recycling is not feasible.

Special precautions : 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 spilt material and runoff and contact with soil, waterways, drains and sewers.

SECTION 14: Transport information

	14.1 UN number	14.2 UN proper shipping name
ADR/RID	UN2735	Amines, liquid, corrosive, n.o.s. CYCLOALIPHATIC POLYAMINE
IMDG	UN2735	Amines, liquid, corrosive, n.o.s. (CYCLOALIPHATIC POLYAMINE). Marine pollutant (epoxy phenol novolac resin, bisphenol F-epoxy resin)
IATA	UN2735	Amines, liquid, corrosive, n.o.s. (CYCLOALIPHATIC POLYAMINE)



	14.3 Transport hazard class(es)	14.4 Packing group	14.5 Environmental hazards	14.6 Special precautions for user	Additional information
ADR/RID	8  	III	Yes.	Not available.	<u>Hazard identification number</u> 80 <u>Special provisions</u> 274 <u>Tunnel code</u> E
IMDG	8  	III	Yes.	Not available.	<u>Emergency schedules (EmS)</u> F-A, S-B

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IATA	8	 	III	Yes.	Not available.	Passenger and Cargo Aircraft Quantity limitation: 5 L Packaging instructions: 852 Cargo Aircraft Only Quantity limitation: 60 L Packaging instructions: 856
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14.7 Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code : Not applicable.

SECTION 15: Regulatory information

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

EU Regulation (EC) No. 1907/2006 (REACH)

Annex XIV - List of substances subject to authorisation

Substances of very high concern

None of the components are listed.

Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles : Not applicable.

Other EU regulations

Europe inventory : All components are listed or exempted.

Black List Chemicals : Not listed

Priority List Chemicals : Not listed

Integrated pollution prevention and control list (IPPC) - Air : Not listed

Integrated pollution prevention and control list (IPPC) - Water : Not listed

National regulations

References : The provision of Safety Data Sheets comes under Regulation 6 of CHIP (CHIP is the recognised abbreviation for the Chemicals Hazard Information and Packaging Regulations). This is an addition to the Health and Safety at Work Act 1974.

International regulations

Chemical Weapons Convention List Schedule I Chemicals : Not listed

Chemical Weapons Convention List Schedule II Chemicals : Not listed

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SECTION 15: Regulatory information

Chemical Weapons Convention List Schedule III Chemicals : Not listed

15.2 Chemical Safety Assessment : This product contains substances for which Chemical Safety Assessments are still required.

SECTION 16: Other information

✔ Indicates information that has changed from previously issued version.

Abbreviations and acronyms : ATE = Acute Toxicity Estimate
 CLP = Classification, Labelling and Packaging Regulation [Regulation (EC) No. 1272/2008]
 DNEL = Derived No Effect Level
 EUH statement = CLP-specific Hazard statement
 PNEC = Predicted No Effect Concentration
 RRN = REACH Registration Number

Classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

- Acute Tox. 4, H302
- Acute Tox. 4, H312
- Acute Tox. 4, H332
- Skin Corr. 1A, H314
- Eye Dam. 1, H318
- Skin Sens. 1, H317
- Aquatic Chronic 2, H411

Procedure used to derive the classification according to Regulation (EC) No. 1272/2008 [CLP/GHS]

Classification	Justification
Acute Tox. 4, H302	Expert judgment
Acute Tox. 4, H312	Expert judgment
Acute Tox. 4, H332	On basis of test data
Skin Corr. 1A, H314	Expert judgment
Eye Dam. 1, H318	Expert judgment
Skin Sens. 1, H317	Expert judgment
Aquatic Chronic 2, H411	Expert judgment

Full text of abbreviated H statements : H302 Harmful if swallowed.
 H311 Toxic in contact with skin.
 H312 Harmful in contact with skin.
 H314 Causes severe skin burns and eye damage.
 H315 Causes skin irritation.
 H317 May cause an allergic skin reaction.
 H318 Causes serious eye damage.
 H319 Causes serious eye irritation.
 H330 Fatal if inhaled.
 H332 Harmful if inhaled.
 H400 Very toxic to aquatic life.
 H410 Very toxic to aquatic life with long lasting effects.
 H411 Toxic to aquatic life with long lasting effects.

Full text of classifications [CLP/GHS] : Acute Tox. 2, H330 ACUTE TOXICITY: INHALATION - Category 2
 Acute Tox. 3, H311 ACUTE TOXICITY: SKIN - Category 3
 Acute Tox. 4, H302 ACUTE TOXICITY: ORAL - Category 4
 Acute Tox. 4, H312 ACUTE TOXICITY: SKIN - Category 4
 Acute Tox. 4, H332 ACUTE TOXICITY: INHALATION - Category 4
 Aquatic Acute 1, H400 AQUATIC TOXICITY (ACUTE) - Category 1
 Aquatic Chronic 1, H410 AQUATIC TOXICITY (CHRONIC) - Category 1
 Aquatic Chronic 2, H411 AQUATIC TOXICITY (CHRONIC) - Category 2
 Eye Dam. 1, H318 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 1
 Eye Irrit. 2, H319 SERIOUS EYE DAMAGE/ EYE IRRITATION - Category 2

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SECTION 16: Other information

Skin Corr. 1A, H314	SKIN CORROSION/IRRITATION - Category 1A
Skin Corr. 1B, H314	SKIN CORROSION/IRRITATION - Category 1B
Skin Irrit. 2, H315	SKIN CORROSION/IRRITATION - Category 2
Skin Sens. 1, H317	SKIN SENSITIZATION - Category 1

Full text of abbreviated R phrases : R23/24- Toxic by inhalation and in contact with skin.
R22- Harmful if swallowed.
R20/21- Harmful by inhalation and in contact with skin.
R20/21/22- Harmful by inhalation, in contact with skin and if swallowed.
R21/22- Harmful in contact with skin and if swallowed.
R34- Causes burns.
R35- Causes severe burns.
R38- Irritating to skin.
R36/38- Irritating to eyes and skin.
R43- May cause sensitisation by skin contact.
R50/53- Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R51/53- Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
R52/53- Harmful to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

Full text of classifications [DSD/DPD] : T - Toxic
C - Corrosive
Xn - Harmful
Xi - Irritant
N - Dangerous for the environment

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