

Araldite® 2011 (AW 106/HV 953U) Two component epoxy paste adhesive

Key properties	<ul style="list-style-type: none">• High shear and peel strength• Tough and resilient• Good resistance to dynamic loading• Bonds a wide variety of materials in common use
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Description	<p>Araldite 2011 is a multipurpose, two component, room temperature curing, paste adhesive of high strength and toughness.</p> <p>It is suitable for bonding a wide variety of metals, ceramics, glass, rubber, rigid plastics and most other materials in common use. It is a versatile adhesive for the craftsman as well as most industrial applications.</p>
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Product data				
	2011/A	2011/B	2011 (mixed)	
Colour (visual)	neutral	pale yellow	pale yellow	
Specific gravity	ca. 1.15	ca. 0.95	ca. 1.05	
Viscosity (Pas)	30-50	20-35	30-45	
Pot Life (100 gm at 25°C)	-	-	100 minutes	
Shelf life (2-40°C)	3 years	3 years	-	

Processing

Pretreatment

The strength and durability of a bonded joint are dependant on proper treatment of the surfaces to be bonded. At the very least, joint surfaces should be cleaned with a good degreasing agent such as acetone, trichloroethylene or proprietary degreasing agent in order to remove all traces of oil, grease and dirt. Alcohol, gasoline (petrol) or paint thinners should never be used.

The strongest and most durable joints are obtained by either mechanically abrading or chemically etching ("pickling") the degreased surfaces. Abrading should be followed by a second degreasing treatment

Mix ratio	Parts by weight	Parts by volume
Araldite 2011/A	100	100
Araldite 2011/B	80	100

Resin and hardener should be blended until they form a homogeneous mix.

Resin and hardener are also available in cartridges incorporating mixers and can be applied as ready-to-use adhesive with the aid of the tool recommended by Vantico.

Application of adhesive
<p>The resin/hardener mix is applied with a spatula, to the pretreated and dry joint surfaces.</p> <p>A layer of adhesive 0.05 to 0.10 mm thick will normally impart the greatest lap shear strength to the joint.</p> <p>The joint components should be assembled and clamped as soon as the adhesive has been applied. An even contact pressure throughout the joint area will ensure optimum cure.</p>

Mechanical processing

Specialist firms have developed metering, mixing and spreading equipment that enables the bulk processing of adhesive.

Vantico will be pleased to advise customers on the choice of equipment for their particular needs.

Equipment maintenance

All tools should be cleaned with hot water and soap before adhesives residues have had time to cure. The removal of cured residues is a difficult and time-consuming operation.

If solvents such as acetone are used for cleaning, operatives should take the appropriate precautions and, in addition, avoid skin and eye contact.

Times to minimum shear strength

Temperature	°C	10	15	23	40	60	100
Cure time to reach	hours	24	12	7	2	-	-
LSS > 1N/mm ²	minutes	-	-	-	-	30	6
Cure time to reach	hours	36	18	10	3	-	-
LSS > 10N/mm ²	minutes	-	-	-	-	45	7

LSS = Lap shear strength.

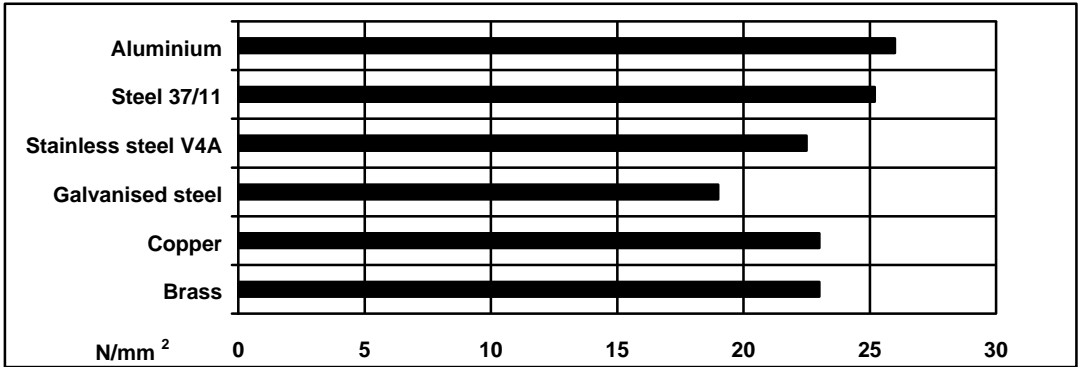
Typical cured properties

Unless otherwise stated, the figures given below were all determined by testing standard specimens made by lap-jointing 170 x 25 x 1.5 mm strips of aluminium alloy. The joint area was 12.5 x 25 mm in each case. The figures were determined with typical production batches using standard testing methods. They are provided solely as technical information and do not constitute a product specification.

Average lap shear strengths of typical metal-to-metal joints (ISO 4587)

Cured for 16 hours at 40 C and tested at 23°C

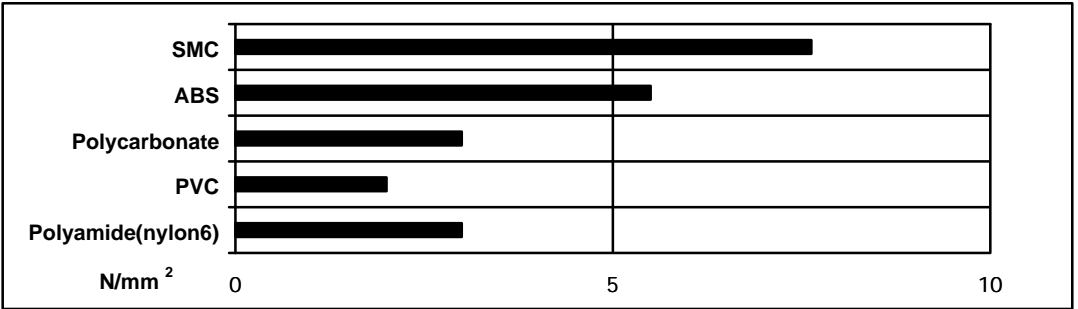
Pretreatment - Sand blasting



Average lap shear strengths of typical plastic-to-plastic joints (ISO 4587)

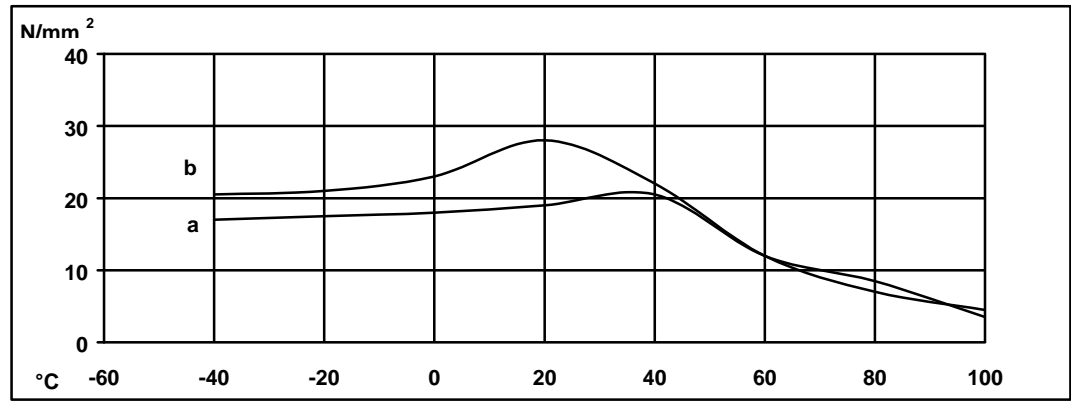
Cured for 16 hours at 23°C and tested at 23°C

Pretreatment - Lightly abrade and alcohol degrease.



Lap shear strength versus temperature (ISO 4587) (typical average values)

Cure: (a) = 7 days /23°C; (b) = 24 hours/23°C + 30 minutes/80°C



Roller peel test (ISO 4578) Cured 16 hours/40°C 5 N/mm

Glass transition temperature Cure: 16 hours at 40°C ca. 45°C

Electrolytic corrosion (DIN 53489) (cure 16hrs at 40°C or 20 mins at 100°C)

Test: 4 days in a conditioning chamber in 40/92 climate as specified by DIN 50015

Rating according to specified standard A -A/B 1,2

Minimum dielectric strength at 50 Hz, 24°C (VSM 77170)

Mix ratio	Instantaneous value	1-minute value
100:80 pbw	25-27 kV/mm	22-24 kV/mm

Water vapour permeability (NF 41001) (38°C, 90% rh) Cure: 5 days/23°C

Test on a 1mm thick film 16g/m²/24 hours

Water absorption (ISO 62-80)

24 hours at 23°C 0.8%

30 mins at 100°C 1.3%

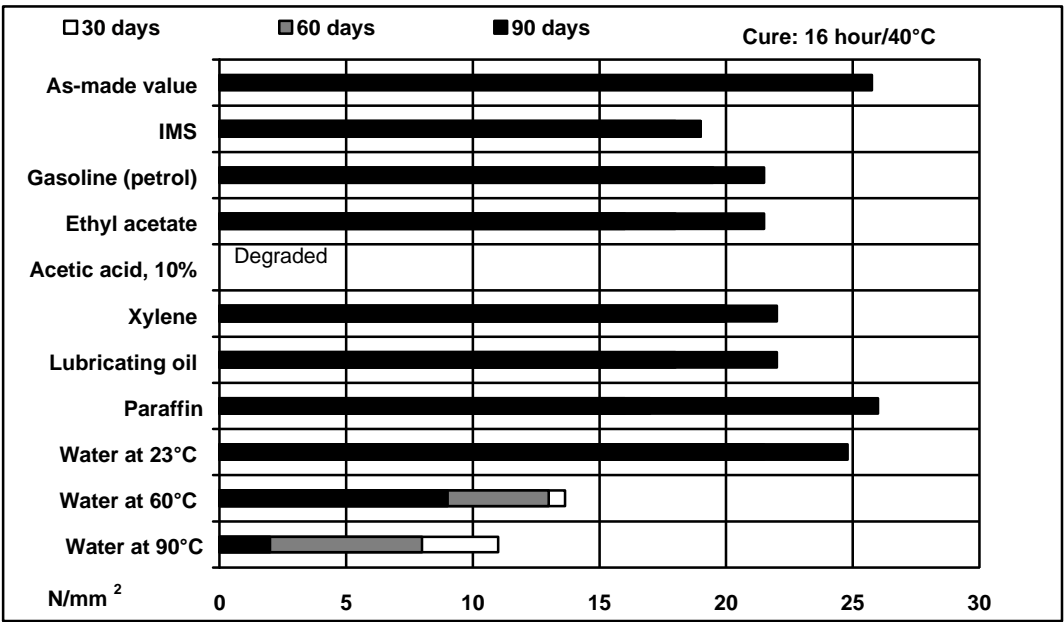
Thermal conductivity (ISO 8894/90) Cure: 20 minutes/100°C

Test: At 23°C 0.22W/mK

Shear modulus (DIN 53445)

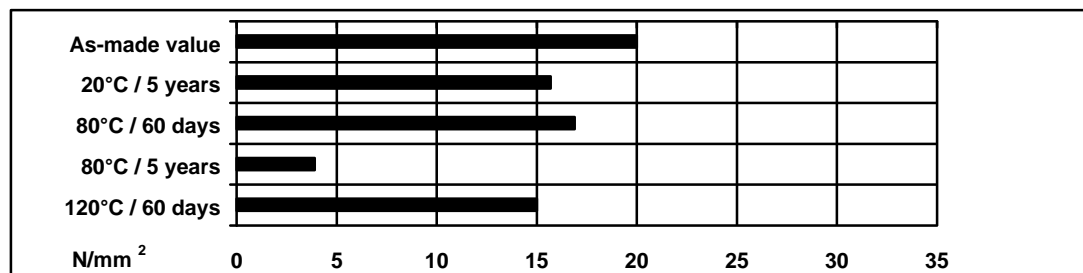
Cure: 16 hours/40°C

-50°C	-	1.5GPa
0°C	-	1.2GPa
50°C	-	0.2GPa
100°C	-	7MPa

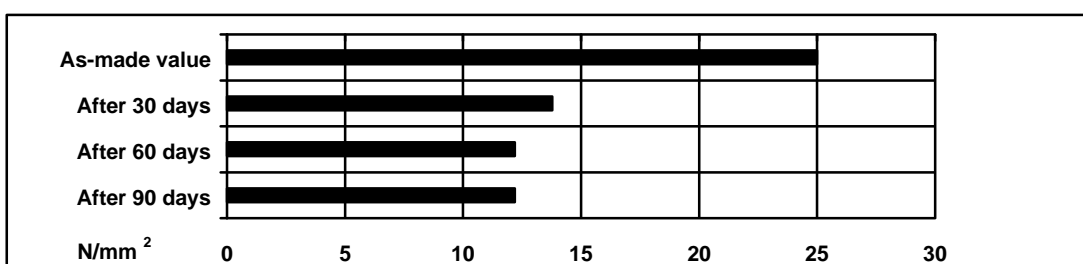


Cure:16 hours/40°C

Test: at 23°C, 50% rh



Cure:16 hours/40°C Lap shear strength was determined after immersion for 90 days at 23°C in media shown.



Cure: 20 minutes/100°C Mean static lap shear strength: 16.3N/mm²

Fluctuating load as % of static shear strength

No. of load cycles to joint failure

30	$10^5 - 10^6$
20	$10^6 - 10^7$
15	$> 10^7$

Storage

Araldite 2011/A and Araldite 2011/B may be stored for up to 3 years at room temperature provided the components are stored in sealed containers. The expiry date is indicated on the label.

Handling precautions

Caution

Vantico products are generally quite harmless to handle provided that certain precautions normally taken when handling chemicals are observed. The uncured materials must not, for instance, be allowed to come into contact with foodstuffs or food utensils, and measures should be taken to prevent the uncured materials from coming in contact with the skin, since people with particularly sensitive skin may be affected. The wearing of impervious rubber or plastic gloves will normally be necessary; likewise the use of eye protection. The skin should be thoroughly cleansed at the end of each working period by washing with soap and warm water. The use of solvents is to be avoided. Disposable paper - not cloth towels - should be used to dry the skin. Adequate ventilation of the working area is recommended. These precautions are described in greater detail in Vantico publication No. 24264/3/e Hygienic precautions for handling plastics products of Vantico and in the Vantico Material Safety Data sheets for the individual products. These publications are available on request and should be referred to for fuller information.

Vantico
Adhesives and Tooling

All recommendations for the use of our products, whether given by us in writing, verbally, or to be implied from the results of tests carried out by us, are based on the current state of our knowledge. Notwithstanding any such recommendations the Buyer shall remain responsible for satisfying himself that the products as supplied by us are suitable for his intended process or purpose. Since we cannot control the application, use or processing of the products, we cannot accept responsibility therefor. The Buyer shall ensure that the intended use of the products will not infringe any third party's intellectual property rights. We warrant that our products are free from defects in accordance with and subject to our general conditions of supply.

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England CB2 4QA

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Ident-No: ARALDITE 2011 HARDENER/HAERTER/DURCISSEUR

Version 6
Revision Date 07.07.2003

Print Date 19.09.2003

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product information

Trade name : ARALDITE 2011 HARDENER/HAERTER/DURCISSEUR

Company : Vantico Ltd.
Ickleton Road
CB2 4QA Duxford

Telephone : +441223832121
Telefax : +441223493322
Emergency telephone : +41 61 966 40 00
number

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature

Formulated polyaminoamide
preparation

Hazardous components

Chemical Name	CAS-No.	Symbol(s):	R-phrases	Concentration [%]
N(3-dimethylaminopropyl)-1,3-propylenediamine EC-No.: 234-148-4	10563-29-8	C	R21/22 R34 R43	4.00 - 10.00

3. HAZARDS IDENTIFICATION

Irritating to eyes and skin.
May cause sensitization by skin contact.

4. FIRST AID MEASURES

Inhalation : Move to fresh air.
Call a physician immediately.

Eye contact : Rinse immediately with plenty of water for at least 15 minutes.
If eye irritation persists, consult a specialist.

Skin contact : Wash off with soap and plenty of water.
If skin irritation persists, call a physician.

Ingestion : Immediately give plenty of water (if possible charcoal slurry).
Do not induce vomiting.
Obtain medical attention.

5. FIRE-FIGHTING MEASURES

Suitable extinguishing media : Water spray.
Carbon dioxide (CO2).

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Foam.
Dry powder.

Extinguishing media which must not be used for safety reasons : High volume water jet.

Special protective equipment for fire-fighters : Wear self-contained breathing apparatus and protective suit.

Further information : Burning produces obnoxious and toxic fumes.
Carbon oxides.
Nitrogen oxides.

6. ACCIDENTAL RELEASE MEASURES

Personal precautions : Avoid breathing dust.
Avoid contact with skin, eyes and clothing.
Ensure adequate ventilation.

Environmental precautions : Do not allow material to contaminate ground water system.
Prevent product from entering drains.

Methods for cleaning up : Soak up with inert absorbent material (e.g. sand, silica gel, acid binder, universal binder, sawdust).
Sweep up and shovel into suitable containers for disposal.

7. HANDLING AND STORAGE

Handling

Advice on safe handling : Provide sufficient air exchange and/or exhaust in work rooms.
Ensure adequate ventilation.
Handle and open container with care.

Storage

Further information on storage conditions : Keep away from food, drink and animal feeding stuffs.
Keep container tightly closed.
Keep at temperatures between 2 and 40°C.

Storage hazard class : Storage class 12, Liquids, not dangerous
Vantico

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Control parameters	Update	Basis
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Engineering measures

Ensure adequate ventilation, especially in confined areas.

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Personal protective equipment

- Eye protection : Tightly fitting safety goggles.
Face-shield.
- Hand protection : rubber or plastic gloves
- Skin and body protection : Safety shoes.
long sleeved clothing
- Hygiene measures : Keep away from food, drink and animal feeding stuffs.
Wash hands before breaks and immediately after handling the product.
- Protective measures : Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

- Form : liquid
- Colour : light yellow
- Odour : slight
- pH : 12
at (20 °C)
1:1 in water
- Boiling point : > 200 °C
- Thermal decomposition : > 200 °C
- Flash point : 110 °C
Method: DIN 51758 (Pensky-Martens Closed Cup)
- Vapour pressure : 4 Pa
at 20 °C
- Density : 0.95 g/cm³
at 25 °C
- Water solubility : at 20 °C
Note: practically insoluble
- Viscosity, dynamic : 20,000 - 35,000 mPa.s
at 25 °C

10. STABILITY AND REACTIVITY

- Conditions to avoid : Note: Take necessary action to avoid static electricity discharge.
- Materials to avoid : Strong acids and strong bases.

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Strong oxidizing agents.

Hazardous decomposition products : Carbon oxides.
Nitrogen oxides. Burning produces obnoxious and toxic fumes.

11. TOXICOLOGICAL INFORMATION

Acute oral toxicity : LD50 rat
Dose: > 5,000 mg/kg

Eye irritation : irritating
rabbit

Skin irritation : irritating
rabbit
dermal

Sensitization : Causes sensitization.
guinea pig
dermal

12. ECOLOGICAL INFORMATION

Elimination information (persistence and degradability)

Biodegradability : Result: Not readily biodegradable.

Ecotoxicity effects

Further information on ecology

Additional ecological information : Avoid subsoil penetration.
Prevent product from entering drains.
Do not contaminate surface water.

13. DISPOSAL CONSIDERATIONS

Product : Waste Key Number: 070204
Must be incinerated, when in compliance with local regulations.

Container : Empty containers can be landfilled after cleaning, when in compliance with the Environmental Protection (Duty of Care) Regulations 1991.

14. TRANSPORT INFORMATION

Land transport

ADR:

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Regulation: Not dangerous goods

RID:

Regulation: Not dangerous goods

Sea transport

IMDG:

Regulation: Not dangerous goods

Air transport

IATA-DGR:

Regulation: Not dangerous goods

15. REGULATORY INFORMATION

Labelling according to EEC Directive

Labelling required

Symbol(s): : Xi Irritant

R-phrases : R36/38 Irritating to eyes and skin.
R43 May cause sensitization by skin contact.

S-phrases : S26 In case of contact with eyes, rinse
immediately with plenty of water and seek
medical advice.
S28 After contact with skin, wash immediately
with plenty of soap and water.
S37/39 Wear suitable gloves and eye/face
protection.

Hazardous components which must be listed on the label : N(3-dimethylaminopropyl)-1,3-propylenediamine
EC-No.: 234-148-4

National legislation

Notification status

: EINECS yes

: TSCA yes

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: DSL yes

: AICS yes

: KECI (KR) yes

: JEX (JP) yes

16. OTHER INFORMATION

List of R-phrases (Section 2)

R21/22	Harmful in contact with skin and if swallowed.
R34	Causes burns.
R43	May cause sensitization by skin contact.

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. Users of products supplied by Vantico Ltd should take appropriate measures to ensure working practices are in accordance with the Control of Substances Hazardous to Health Regulations (COSHH).

All information is based on results gained from experience and tests and is believed to be accurate but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside our control. Users should always carry out sufficient tests to establish the suitability of any products for their intended applications. No statements shall be incorporated in any contract unless expressly agreed in writing nor construed as recommending the use of any product in conflict of any patent. All goods are supplied subject to Vantico's General Conditions of Sale.

Ident-No: ARALDITE 2011 RESIN(E)/HARZ

Version 6
Revision Date 07.07.2003

Print Date 19.09.2003

1. IDENTIFICATION OF THE SUBSTANCE/PREPARATION AND THE COMPANY/UNDERTAKING

Product information

Trade name : ARALDITE 2011 RESIN(E)/HARZ

Company : Vantico Ltd.
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CB2 4QA Duxford

Telephone : +441223832121
Telefax : +441223493322
Emergency telephone : +41 61 966 40 00
number

2. COMPOSITION/INFORMATION ON INGREDIENTS

Chemical nature

Formulated bisphenol A epoxy resin
preparation

Hazardous components

Chemical Name	CAS-No.	Symbol(s):	R-phrases	Concentration [%]
reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)	25068-38-6	Xi, N	R36/38 R43 R51/53	70.00 - 82.00
bisphenol F-epoxy resin	9003-36-5	Xi, N	R36/38 R43 R51/53	4.00 - 10.00

3. HAZARDS IDENTIFICATION

Irritating to eyes and skin.
May cause sensitization by skin contact.
Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

4. FIRST AID MEASURES

Inhalation : Move to fresh air.
If symptoms persist, call a physician.

Eye contact : Rinse immediately with plenty of water for at least 15 minutes.
If eye irritation persists, consult a specialist.

Skin contact : Wash off with soap and plenty of water.
If skin irritation persists, call a physician.

Ingestion : Immediately give plenty of water (if possible charcoal slurry).
Do not induce vomiting.
Obtain medical attention.

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5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media : Water spray.
Carbon dioxide (CO₂).
Foam.
Dry powder.
- Extinguishing media which must not be used for safety reasons : High volume water jet.
- Special protective equipment for fire-fighters : Wear self-contained breathing apparatus and protective suit.
- Further information : Burning produces obnoxious and toxic fumes.
Carbon oxides.

6. ACCIDENTAL RELEASE MEASURES

- Environmental precautions : Do not allow material to contaminate ground water system.
Prevent product from entering drains.
- Methods for cleaning up : Soak up with inert absorbent material and dispose of as hazardous waste.

7. HANDLING AND STORAGE

Handling

- Advice on safe handling : Provide sufficient air exchange and/or exhaust in work rooms.
Avoid formation of aerosol.
Ensure adequate ventilation.
Handle and open container with care.

Storage

- Further information on storage conditions : Keep away from food, drink and animal feeding stuffs.
Keep container tightly closed.
Keep at temperatures between 2 and 40°C.
- Storage hazard class Vantico : Storage class 10, Environmentally hazardous liquids

8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Components with workplace control parameters

Components	CAS-No.	Control parameters	Update	Basis
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Personal protective equipment

- Eye protection : Tightly fitting safety goggles.

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	Face-shield.
Hand protection	: rubber or plastic gloves
Skin and body protection	: Protective suit. Safety shoes.
Protective measures	: Keep away from sources of ignition - No smoking. Avoid contact with skin, eyes and clothing.

9. PHYSICAL AND CHEMICAL PROPERTIES

Form	: paste
Colour	: natural colour
Odour	: slight
pH	: approx.6 at (20 °C) 1:1 in water
Boiling point	: > 200 °C
Thermal decomposition	: > 200 °C
Flash point	: 210 °C Method: DIN 51758 (Pensky-Martens Closed Cup)
Vapour pressure	: < 0.1 Pa at 20 °C
Density	: 1.15 - 1.25 g/cm ³ at 25 °C
Water solubility	: at 20 °C Note: practically insoluble
Miscibility with water	: immiscible at 20 °C
Viscosity, dynamic	: 30 - 50 Pa.s at 25 °C

10. STABILITY AND REACTIVITY

Conditions to avoid	: Note: Take necessary action to avoid static electricity discharge.
Materials to avoid	: Strong acids and strong bases. Strong oxidizing agents.
Hazardous decomposition products	: Carbon oxides. Burning produces obnoxious and toxic fumes.

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11. TOXICOLOGICAL INFORMATION

Acute oral toxicity	: LD50 rat Dose: > 5,000 mg/kg
Eye irritation	: irritating rabbit
Skin irritation	: irritating rabbit dermal
Sensitization	: sensitizing guinea pig dermal

12. ECOLOGICAL INFORMATION

Ecotoxicity effects

Further information on ecology

Additional ecological information	: Avoid subsoil penetration. Prevent product from entering drains. Do not contaminate surface water.
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13. DISPOSAL CONSIDERATIONS

Product	: Waste Key Number: 070208 Must be incinerated, when in compliance with local regulations.
Container	: Empty containers can be landfilled after cleaning, when in compliance with the Environmental Protection (Duty of Care) Regulations 1991.

14. TRANSPORT INFORMATION

Land transport

ADR:

UN-No:	3082
Class:	9
Classification code:	M6
Packaging group:	III
Risk No.:	90
ADR/RID-Labels:	9
Proper shipping name:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
contains:	BISPHENOL A EPOXY RESIN

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RID:

UN-No: 3082
Class: 9
Packaging group: III
Risk No.: 90
ADR/RID-Labels: 9
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
contains: BISPHENOL A EPOXY RESIN

Sea transport

IMDG:

UN-No: 3082
Class: 9
Packaging group: III
ADR/RID-Labels: 9
MFAG:
EmS: F-A S-F
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
contains: (BISPHENOL A EPOXY RESIN)

Air transport

IATA-DGR:

UN/ID No.: UN 3082
Class: 9
Packaging group: III
Packing instruction (cargo aircraft): 914
Max. Qty/Pack.: 999.00 L
(999.00 = No limit)
Packing instruction (passenger aircraft): 914
Max. Qty/Pack.: 999.00 L
(999.00 = No limit)
ADR/RID-Labels: 9
Proper shipping name: ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S.
contains: (BISPHENOL A EPOXY RESIN)

15. REGULATORY INFORMATION

Labelling according to EEC Directive

Labelling required

Symbol(s): : Xi Irritant
N Dangerous for the environment

R-phrases) : R36/38 Irritating to eyes and skin.
R43 May cause sensitization by skin contact.
R51/53 Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic

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environment.

S-phrase(s)	:	S26	In case of contact with eyes, rinse immediately with plenty of water and seek medical advice.
		S28	After contact with skin, wash immediately with plenty of soap and water.
		S37/39	Wear suitable gloves and eye/face protection.
		S61	Avoid release to the environment. Refer to special instructions/Safety data sheets.

Exceptional labelling of special preparations	:	Contains epoxy constituents. See information supplied by the manufacturer.
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Hazardous components which must be listed on the label	:	reaction product: bisphenol A-(epichlorhydrin); epoxy resin (number average molecular weight < 700)
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National legislation

Notification status

:	EINECS	yes
:	TSCA	yes
:	DSL	yes
:	AICS	yes
:	KECI (KR)	yes
:	JEX (JP)	yes

16. OTHER INFORMATION

List of R-phrases (Section 2)

R36/38	Irritating to eyes and skin.
R43	May cause sensitization by skin contact.
R51/53	Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

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Version 6
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All information is based on results gained from experience and tests and is believed to be accurate but is given without acceptance of liability for loss or damage attributable to reliance thereon as conditions of use lie outside our control. Users should always carry out sufficient tests to establish the suitability of any products for their intended applications. No statements shall be incorporated in any contract unless expressly agreed in writing nor construed as recommending the use of any product in conflict of any patent. All goods are supplied subject to Vantico's General Conditions of Sale.