# M-Bond AE Resin

## Vishay Measurements Group, Inc.

Version No: **7.0**
Safety Data Sheet according to OSHA HazCom Standard (2024) requirements

Initial Date: **06/02/2026**
Revision Date: **07/09/2026**
Print Date: **08/05/2026**
S.GHS.USA.EN

## SECTION 1 Identification

### Product Identifier

| | |
|---|---|
| **Product name** | M-Bond AE Resin |
| **Chemical Name** | Not Applicable |
| **Proper shipping name** | Environmentally hazardous substance, liquid, n.o.s. (contains bisphenol A diglycidyl ether, bisphenol A/ diglycidyl ether resin, liquid and o-cresyl glycidyl ether) |
| **Chemical formula** | Not Applicable |
| **Other means of identification** | Not Available |

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

| | |
|---|---|
| **Relevant identified uses** | Adhesive. |

### Name, address, and telephone number of the chemical manufacturer, importer, or other responsible party

| | |
|---|---|
| **Registered company name** | **Vishay Measurements Group, Inc.** |
| **Address** | Post Office Box 27777 Raleigh, NC 27611 United States |
| **Telephone** | (919) 365-3800 |
| **Fax** | 919-365-3945 |
| **Website** | www.VPGSensors.com |
| **Email** | mm.us@VPGSensors.com |

### Emergency phone number

| | |
|---|---|
| **Association / Organisation** | **Velocity EHS** |
| **Emergency telephone number(s)** | 1-800-255-3924 |
| **Other emergency telephone number(s)** | Not Available |

## SECTION 2 Hazard(s) identification

### Classification of the substance or mixture

**NFPA 704 diamond**




Note: The hazard category numbers found in GHS classification in section 2 of this SDSs are NOT to be used to fill in the NFPA 704 diamond. Blue = Health, Red = Fire, Yellow = Reactivity and White = Special (Oxidizer or water reactive substances)

| | |
|---|---|
| **Classification** | Skin Corrosion/Irritation Category 2, Sensitisation (Skin) Category 1, Serious Eye Damage/Eye Irritation Category 1, Germ Cell Mutagenicity Category 2, Hazardous to the Aquatic Environment Acute Hazard Category 3, Hazardous to the Aquatic Environment Long-Term Hazard Category 2 |

### Label elements

| | |
|---|---|
| **Hazard pictogram(s)** |  |
| **Signal word** | **Danger** |

### Hazard statement(s)

| | |
|---|---|
| **H315** | Causes skin irritation. |
| **H317** | May cause an allergic skin reaction. |
| **H318** | Causes serious eye damage. |
| **H341** | Suspected of causing genetic defects. |
| **H402** | Harmful to aquatic life. |
| **H411** | Toxic to aquatic life with long lasting effects. |

**Hazard(s) not otherwise classified**

Not Applicable

**Supplementary statement(s)**

Not Applicable

**Precautionary statement(s) Prevention**

| | |
|---|---|
| **P201** | Obtain special instructions before use. |
| **P260** | Do not breathe mist/vapours/spray. |
| **P270** | Do not eat, drink or smoke when using this product. |
| **P273** | Avoid release to the environment. |
| **P280** | Wear protective gloves, protective clothing, eye protection and face protection. |
| **P202** | Do not handle until all safety precautions have been read and understood. |
| **P264** | Wash all exposed external body areas thoroughly after handling. |
| **P272** | Contaminated work clothing must not be allowed out of the workplace. |

**Precautionary statement(s) Response**

| | |
|---|---|
| **P305+P351+P338** | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| **P308+P313** | IF exposed or concerned: Get medical advice/ attention. |
| **P310** | Immediately call a POISON CENTER/doctor/physician/first aider. |
| **P333+P313** | If skin irritation or rash occurs: Get medical advice/attention. |
| **P391** | Collect spillage. |
| **P302+P352** | IF ON SKIN: Wash with plenty of water and soap. |
| **P332+P313** | If skin irritation occurs: Get medical advice/attention. |
| **P362+P364** | Take off contaminated clothing and wash it before reuse. |

**Precautionary statement(s) Storage**

| | |
|---|---|
| **P405** | Store locked up. |

**Precautionary statement(s) Disposal**

| | |
|---|---|
| **P501** | Dispose of contents/container to authorised hazardous or special waste collection point in accordance with any local regulation. |

No further product hazard information.

## SECTION 3 Composition / information on ingredients

**Substances**

See section below for composition of Mixtures

**Mixtures**

| CAS No | %[weight] | Name |
|---|---|---|
| 1675-54-3 | <75 | bisphenol A diglycidyl ether |
| 25085-99-8 | 15-25 | bisphenol A/ diglycidyl ether resin, liquid |
| 2210-79-9 | <5 | o-cresyl glycidyl ether |
| 108-46-3 | <5 | resorcinol |

## SECTION 4 First-aid measures

**Description of first aid measures**

| | |
|---|---|
| **Eye Contact** | If this product comes in contact with the eyes:<br>▸ Immediately hold eyelids apart and flush the eye continuously with running water.<br>▸ Ensure complete irrigation of the eye by keeping eyelids apart and away from eye and moving the eyelids by occasionally lifting the upper and lower lids.<br>▸ Continue flushing until advised to stop by the Poisons Information Centre or a doctor, or for at least 15 minutes.<br>▸ Transport to hospital or doctor without delay.<br>▸ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel. |
| **Skin Contact** | If skin contact occurs:<br>▸ Immediately remove all contaminated clothing, including footwear.<br>▸ Flush skin and hair with running water (and soap if available).<br>▸ Seek medical attention in event of irritation. |
| **Inhalation** | ▸ If fumes, aerosols or combustion products are inhaled remove from contaminated area. |


**Continued...**

| | |
|---|---|
| | ‣ Other measures are usually unnecessary. |
| **Ingestion** | ‣ Immediately give a glass of water.<br>‣ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor. |

**Most important symptoms and effects, both acute and delayed**

See Section 11

**Indication of any immediate medical attention and special treatment needed**

Treat symptomatically.

## SECTION 5 Fire-fighting measures

**Extinguishing media**

- Foam.
- Dry chemical powder.
- BCF (where regulations permit).
- Carbon dioxide.
- Water spray or fog - Large fires only.

**Special hazards arising from the substrate or mixture**

| | |
|---|---|
| **Fire Incompatibility** | ‣ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result |

**Special protective equipment and precautions for fire-fighters**

| | |
|---|---|
| **Fire Fighting** | ‣ Alert Fire Brigade and tell them location and nature of hazard.<br>‣ Wear full body protective clothing with breathing apparatus.<br>‣ Prevent, by any means available, spillage from entering drains or water course.<br>‣ Use water delivered as a fine spray to control fire and cool adjacent area.<br>‣ Avoid spraying water onto liquid pools.<br>‣ **DO NOT** approach containers suspected to be hot.<br>‣ Cool fire exposed containers with water spray from a protected location.<br>‣ If safe to do so, remove containers from path of fire. |
| **Fire/Explosion Hazard** | ‣ Combustible.<br>‣ Slight fire hazard when exposed to heat or flame.<br>‣ Heating may cause expansion or decomposition leading to violent rupture of containers.<br>‣ On combustion, may emit toxic fumes of carbon monoxide (CO).<br>‣ May emit acrid smoke.<br>‣ Mists containing combustible materials may be explosive.<br>Combustion products include:<br>,<br>‣ carbon dioxide ($CO_2$)<br>,<br>aldehydes<br>,<br>‣ other pyrolysis products typical of burning organic material. |

## SECTION 6 Accidental release measures

**Personal precautions, protective equipment and emergency procedures**

See section 8

**Environmental precautions**

See section 12

**Methods and material for containment and cleaning up**

| | |
|---|---|
| **Minor Spills** | ‣ In the event of a spill of a reactive diluent, the focus is on containing the spill to prevent contamination of soil and surface or ground water.<br>‣ If irritating vapors are present, an approved air-purifying respirator with organic vapor canister is recommended for cleaning up spills and leaks.<br>‣ For small spills, reactive diluents should be absorbed with sand.<br>Environmental hazard - contain spillage.<br>‣ Clean up all spills immediately.<br>‣ Avoid breathing vapours and contact with skin and eyes.<br>‣ Control personal contact with the substance, by using protective equipment.<br>‣ Contain and absorb spill with sand, earth, inert material or vermiculite.<br>‣ Wipe up.<br>‣ Place in a suitable, labelled container for waste disposal. |
| **Major Spills** | Environmental hazard - contain spillage.<br>Industrial spills or releases of reactive diluents are infrequent and generally contained. If a large spill does occur, the material should be captured, collected, and reprocessed or disposed of according to applicable governmental requirements.<br>An approved air-purifying respirator with organic-vapor canister is recommended for emergency work.<br>Moderate hazard.<br>‣ Clear area of personnel and move upwind.<br>‣ Alert Fire Brigade and tell them location and nature of hazard.<br>‣ Wear breathing apparatus plus protective gloves.<br>‣ Prevent, by any means available, spillage from entering drains or water course.<br>‣ No smoking, naked lights or ignition sources.<br>‣ Increase ventilation.<br>‣ Stop leak if safe to do so.<br>‣ Contain spill with sand, earth or vermiculite.<br>‣ Collect recoverable product into labelled containers for recycling.<br>‣ Absorb remaining product with sand, earth or vermiculite.<br>‣ Collect solid residues and seal in labelled drums for disposal.<br>‣ Wash area and prevent runoff into drains. |


**Continued...**

| | |
|---|---|
| | ▸ If contamination of drains or waterways occurs, advise emergency services. |

Personal Protective Equipment advice is contained in Section 8 of the SDS.

## SECTION 7 Handling and storage

### Precautions for safe handling

| | |
|---|---|
| **Safe handling** | **Precautions for safe handling:**<br>Avoid all contact. Do not breathe vapour. Ensure adequate ventilation. Wear appropriate personal protective equipment, avoid direct contact. Use personal protective equipment as required. See Section: 8. Do not eat, drink or smoke when using this product. Wash hands before breaks and after work. Contaminated clothing should be laundered before reuse.<br>**Conditions for safe storage, including any incompatibilities:**<br>Store in a well-ventilated place. Keep container tightly closed. Keep cool. Keep away from heat, sources of ignition and direct sunlight.<br>**Storage temperature:** Ambient. Keep at temperature not exceeding (℃): 27<br>**Storage life:** Stable under normal conditions.<br>**Incompatible materials:** Keep away from: Flammable liquids, Strong Oxidizing agents, Corrosive Substances, Strong Acids and strong mineral and organic bases, especially primary and secondary aliphatic amines. |

## SECTION 8 Exposure controls / personal protection

### Control parameters

**Occupational Exposure Limits (OEL)**

**INGREDIENT DATA**

| Source | Ingredient | Material name | TWA | STEL | Peak | Notes |
|---|---|---|---|---|---|---|
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 | bisphenol A diglycidyl ether | Particulates Not Otherwise Regulated (PNOR)- Respirable fraction | 5 mg/m3 | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 | bisphenol A diglycidyl ether | Particulates Not Otherwise Regulated (PNOR)- Total dust | 15 mg/m3 | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Limits (PELs) Table Z-3 | bisphenol A diglycidyl ether | Inert or Nuisance Dust: Respirable fraction | 5 mg/m3 / 15 mppcf | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Limits (PELs) Table Z-3 | bisphenol A diglycidyl ether | Inert or Nuisance Dust: Total Dust | 15 mg/m3 / 50 mppcf | Not Available | Not Available | Not Available |
| US NIOSH Recommended Exposure Limits (RELs) | bisphenol A diglycidyl ether | Particulates not otherwise regulated | Not Available | Not Available | Not Available | See Appendix D - Substances with No Established RELs |
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 | bisphenol A/ diglycidyl ether resin, liquid | Particulates Not Otherwise Regulated (PNOR)- Total dust | 15 mg/m3 | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Limits (PELs) Table Z-1 | bisphenol A/ diglycidyl ether resin, liquid | Particulates Not Otherwise Regulated (PNOR)- Respirable fraction | 5 mg/m3 | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Limits (PELs) Table Z-3 | bisphenol A/ diglycidyl ether resin, liquid | Inert or Nuisance Dust: Respirable fraction | 5 mg/m3 / 15 mppcf | Not Available | Not Available | Not Available |
| US OSHA Permissible Exposure Limits (PELs) Table Z-3 | bisphenol A/ diglycidyl ether resin, liquid | Inert or Nuisance Dust: Total Dust | 15 mg/m3 / 50 mppcf | Not Available | Not Available | Not Available |
| US NIOSH Recommended Exposure Limits (RELs) | bisphenol A/ diglycidyl ether resin, liquid | Particulates not otherwise regulated | Not Available | Not Available | Not Available | See Appendix D - Substances with No Established RELs |
| US NIOSH Recommended Exposure Limits (RELs) | resorcinol | Resorcinol | 10 ppm / 45 mg/m3 | 90 mg/m3 / 20 ppm | Not Available | Not Available |

**Emergency Limits**

| Ingredient | TEEL-1 | TEEL-2 | TEEL-3 |
|---|---|---|---|
| bisphenol A diglycidyl ether | 39 mg/m3 | 430 mg/m3 | 2,600 mg/m3 |
| bisphenol A diglycidyl ether | 90 mg/m3 | 990 mg/m3 | 5,900 mg/m3 |
| bisphenol A/ diglycidyl ether resin, liquid | 90 mg/m3 | 990 mg/m3 | 5,900 mg/m3 |
| resorcinol | 20 ppm | 28 ppm | 170 ppm |

| Ingredient | Original IDLH | Revised IDLH |
|---|---|---|
| bisphenol A diglycidyl ether | Not Available | Not Available |
| bisphenol A/ diglycidyl ether resin, liquid | Not Available | Not Available |
| o-cresyl glycidyl ether | Not Available | Not Available |


Continued...

| Ingredient | Original IDLH | Revised IDLH |
|---|---|---|
| resorcinol | Not Available | Not Available |

**Exposure controls**

**Appropriate engineering controls**

Engineering controls are used to remove a hazard or place a barrier between the worker and the hazard. Well-designed engineering controls can be highly effective in protecting workers and will typically be independent of worker interactions to provide this high level of protection.
The basic types of engineering controls are:
Process controls which involve changing the way a job activity or process is done to reduce the risk.
Enclosure and/or isolation of emission source which keeps a selected hazard "physically" away from the worker and ventilation that strategically "adds" and "removes" air in the work environment. Ventilation can remove or dilute an air contaminant if designed properly. The design of a ventilation system must match the particular process and chemical or contaminant in use.
Employers may need to use multiple types of controls to prevent employee overexposure.

General exhaust is adequate under normal operating conditions. If risk of overexposure exists, wear SAA approved respirator. Correct fit is essential to obtain adequate protection. Provide adequate ventilation in warehouse or closed storage areas. Air contaminants generated in the workplace possess varying "escape" velocities which, in turn, determine the "capture velocities" of fresh circulating air required to effectively remove the contaminant.

| Type of Contaminant: | Air Speed: |
|---|---|
| solvent, vapours, degreasing etc., evaporating from tank (in still air) | 0.25-0.5 m/s (50-100 f/min) |
| aerosols, fumes from pouring operations, intermittent container filling, low speed conveyer transfers, welding, spray drift, plating acid fumes, pickling (released at low velocity into zone of active generation) | 0.5-1 m/s (100-200 f/min.) |
| direct spray, spray painting in shallow booths, drum filling, conveyer loading, crusher dusts, gas discharge (active generation into zone of rapid air motion) | 1-2.5 m/s (200-500 f/min) |
| grinding, abrasive blasting, tumbling, high speed wheel generated dusts (released at high initial velocity into zone of very high rapid air motion). | 2.5-10 m/s (500-2000 f/min.) |

Within each range the appropriate value depends on:

| Lower end of the range | Upper end of the range |
|---|---|
| 1: Room air currents minimal or favourable to capture | 1: Disturbing room air currents |
| 2: Contaminants of low toxicity or of nuisance value only | 2: Contaminants of high toxicity |
| 3: Intermittent, low production. | 3: High production, heavy use |
| 4: Large hood or large air mass in motion | 4: Small hood - local control only |

Simple theory shows that air velocity falls rapidly with distance away from the opening of a simple extraction pipe. Velocity generally decreases with the square of distance from the extraction point (in simple cases). Therefore the air speed at the extraction point should be adjusted, accordingly, after reference to distance from the contaminating source. The air velocity at the extraction fan, for example, should be a minimum of 1-2 m/s (200-400 f/min.) for extraction of solvents generated in a tank 2 meters distant from the extraction point. Other mechanical considerations, producing performance deficits within the extraction apparatus, make it essential that theoretical air velocities are multiplied by factors of 10 or more when extraction systems are installed or used.

**Individual protection measures, such as personal protective equipment**



**Eye and face protection**

- Safety glasses with side shields.
- Chemical goggles.[AS/NZS 1337.1, EN166 or national equivalent]
- Contact lenses may pose a special hazard; soft contact lenses may absorb and concentrate irritants. A written policy document, describing the wearing of lenses or restrictions on use, should be created for each workplace or task. This should include a review of lens absorption and adsorption for the class of chemicals in use and an account of injury experience. Medical and first-aid personnel should be trained in their removal and suitable equipment should be readily available. In the event of chemical exposure, begin eye irrigation immediately and remove contact lens as soon as practicable. Lens should be removed at the first signs of eye redness or irritation - lens should be removed in a clean environment only after workers have washed hands thoroughly. [CDC NIOSH Current Intelligence Bulletin 59].

**Skin protection**

See Hand protection below

**Hands/feet protection**

**NOTE:**
- The material may produce skin sensitisation in predisposed individuals. Care must be taken, when removing gloves and other protective equipment, to avoid all possible skin contact.
- Contaminated leather items, such as shoes, belts and watch-bands should be removed and destroyed.

The selection of suitable gloves does not only depend on the material, but also on further marks of quality which vary from manufacturer to manufacturer. Where the chemical is a preparation of several substances, the resistance of the glove material can not be calculated in advance and has therefore to be checked prior to the application.
The exact break through time for substances has to be obtained from the manufacturer of the protective gloves and has to be observed when making a final choice.
Personal hygiene is a key element of effective hand care. Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.
Suitability and durability of glove type is dependent on usage. Important factors in the selection of gloves include:
· frequency and duration of contact,
· chemical resistance of glove material,
· glove thickness and
· dexterity
Select gloves tested to a relevant standard (e.g. Europe EN 374, US F739, AS/NZS 2161.1 or national equivalent).
· When prolonged or frequently repeated contact may occur, a glove with a protection class of 5 or higher (breakthrough time greater than 240 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· When only brief contact is expected, a glove with a protection class of 3 or higher (breakthrough time greater than 60 minutes according to EN 374, AS/NZS 2161.10.1 or national equivalent) is recommended.
· Some glove polymer types are less affected by movement and this should be taken into account when considering gloves for long-term use.
· Contaminated gloves should be replaced.
As defined in ASTM F-739-96 in any application, gloves are rated as:
· Excellent when breakthrough time > 480 min
· Good when breakthrough time > 20 min


**Continued...**

| | |
|---|---|
| | · Fair when breakthrough time < 20 min<br>· Poor when glove material degrades<br>For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.<br>It should be emphasised that glove thickness is not necessarily a good predictor of glove resistance to a specific chemical, as the permeation efficiency of the glove will be dependent on the exact composition of the glove material. Therefore, glove selection should also be based on consideration of the task requirements and knowledge of breakthrough times.<br>Glove thickness may also vary depending on the glove manufacturer, the glove type and the glove model. Therefore, the manufacturers technical data should always be taken into account to ensure selection of the most appropriate glove for the task.<br>Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:<br>· Thinner gloves (down to 0.1 mm or less) may be required where a high degree of manual dexterity is needed. However, these gloves are only likely to give short duration protection and would normally be just for single use applications, then disposed of.<br>· Thicker gloves (up to 3 mm or more) may be required where there is a mechanical (as well as a chemical) risk i.e. where there is abrasion or puncture potential<br>Gloves must only be worn on clean hands. After using gloves, hands should be washed and dried thoroughly. Application of a non-perfumed moisturiser is recommended.<br>When handling liquid-grade epoxy resins wear chemically protective gloves , boots and aprons.<br>The performance, based on breakthrough times ,of:<br>· Ethyl Vinyl Alcohol (EVAL laminate) is generally excellent<br>· Butyl Rubber ranges from excellent to good<br>· Nitrile Butyl Rubber (NBR) from excellent to fair.<br>· Neoprene from excellent to fair<br>· Polyvinyl (PVC) from excellent to poor<br>As defined in ASTM F-739-96<br>· Excellent breakthrough time > 480 min<br>· Good breakthrough time > 20 min<br>· Fair breakthrough time < 20 min<br>· Poor glove material degradation<br>Gloves should be tested against each resin system prior to making a selection of the most suitable type. Systems include both the resin and any hardener, individually and collectively)<br>· **DO NOT** use cotton or leather (which absorb and concentrate the resin), natural rubber (latex), medical or polyethylene gloves (which absorb the resin).<br>· **DO NOT** use barrier creams containing emulsified fats and oils as these may absorb the resin; silicone-based barrier creams should be reviewed prior to use.<br>Replacement time should be considered when selecting the most appropriate glove. It may be more effective to select a glove with lower chemical resistance but which is replaced frequently than to select a more resistant glove which is reused many times<br>▸ **DO NOT** use solvent to clean the skin |
| **Body protection** | See Other protection below |
| **Other protection** | ▸ Overalls.<br>▸ P.V.C apron.<br>▸ Barrier cream.<br>▸ Skin cleansing cream.<br>▸ Eye wash unit. |

### Respiratory protection

Type A-P Filter of sufficient capacity. (AS/NZS 1716 & 1715, EN 143:2000 & 149:2001, ANSI Z88 or national equivalent)

Where the concentration of gas/particulates in the breathing zone, approaches or exceeds the "Exposure Standard" (or ES), respiratory protection is required. Degree of protection varies with both face-piece and Class of filter; the nature of protection varies with Type of filter.

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|---|---|---|---|
| up to 10 x ES | A-AUS P2 | - | A-PAPR-AUS / Class 1 P2 |
| up to 50 x ES | - | A-AUS / Class 1 P2 | - |
| up to 100 x ES | - | A-2 P2 | A-PAPR-2 P2 ^ |

^ - Full-face
A(All classes) = Organic vapours, B AUS or B1 = Acid gasses, B2 = Acid gas or hydrogen cyanide(HCN), B3 = Acid gas or hydrogen cyanide(HCN), E = Sulfur dioxide(SO2), G = Agricultural chemicals, K = Ammonia(NH3), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- Cartridge respirators should never be used for emergency ingress or in areas of unknown vapour concentrations or oxygen content.
- The wearer must be warned to leave the contaminated area immediately on detecting any odours through the respirator. The odour may indicate that the mask is not functioning properly, that the vapour concentration is too high, or that the mask is not properly fitted. Because of these limitations, only restricted use of cartridge respirators is considered appropriate.
- Cartridge performance is affected by humidity. Cartridges should be changed after 2 hr of continuous use unless it is determined that the humidity is less than 75%, in which case, cartridges can be used for 4 hr. Used cartridges should be discarded daily, regardless of the length of time used

## SECTION 9 Physical and chemical properties

### Information on basic physical and chemical properties

| | |
|---|---|
| **Appearance** | Clear to amber colored liquid |

| | | | |
|---|---|---|---|
| **Physical state** | Liquid | **Relative density (Water = 1)** | 1.15 |
| **Odour** | Characteristic, Slight | **Partition coefficient n-octanol / water** | Not Available |
| **Odour threshold** | Not Available | **Auto-ignition temperature (℃)** | Not Available |
| **pH (as supplied)** | Not Available | **Decomposition temperature (℃)** | Not Available |
| **Melting point / freezing point (℃)** | Not Available | **Viscosity (mm2/s)** | Not Available |
| **Initial boiling point and boiling range (℃)** | Not Available | **Molecular weight (g/mol)** | Not Available |
| **Flash point (℃)** | Not Available | **Taste** | Not Available |
| **Evaporation rate** | Not Available | **Explosive properties** | Not Available |


**Continued...**

| | | | |
|---|---|---|---|
| **Flammability** | Not Applicable | **Oxidising properties** | Not Available |
| **Upper Explosive Limit (%)** | Not Available | **Surface Tension (dyn/cm or mN/m)** | Not Available |
| **Lower Explosive Limit (%)** | Not Available | **Volatile Component (%vol)** | Not Available |
| **Vapour pressure (kPa)** | 0.13 | **Gas group** | Not Available |
| **Solubility in water** | Immiscible | **pH as a solution (1%)** | Not Available |
| **Vapour density (Air = 1)** | >3.8 | **VOC g/L** | Not Available |
| **Heat of Combustion (kJ/g)** | Not Available | **Ignition Distance (cm)** | Not Available |
| **Flame Height (cm)** | Not Available | **Flame Duration (s)** | Not Available |
| **Enclosed Space Ignition Time Equivalent (s/m3)** | Not Available | **Enclosed Space Ignition Deflagration Density (g/m3)** | Not Available |
| **Nanoform Solubility** | Not Available | **Nanoform Particle Characteristics** | Not Available |
| **Particle Size** | Not Available | | |

## SECTION 10 Stability and reactivity

| | |
|---|---|
| **Reactivity** | See section 7 |
| **Chemical stability** | ▸ Unstable in the presence of incompatible materials.<br>▸ Product is considered stable.<br>▸ Hazardous polymerisation will not occur. |
| **Possibility of hazardous reactions** | See section 7 |
| **Conditions to avoid** | See section 7 |
| **Incompatible materials** | See section 7 |
| **Hazardous decomposition products** | See section 5 |

## SECTION 11 Toxicological information

**Information on toxicological effects**

| | |
|---|---|
| **a) Acute Toxicity** | Based on available data, the classification criteria are not met. |
| **b) Skin Irritation/Corrosion** | There is sufficient evidence to classify this material as skin corrosive or irritating. |
| **c) Serious Eye Damage/Irritation** | There is sufficient evidence to classify this material as eye damaging or irritating |
| **d) Respiratory or Skin sensitisation** | There is sufficient evidence to classify this material as sensitising to skin or the respiratory system |
| **e) Mutagenicity** | There is sufficient evidence to classify this material as mutagenic |
| **f) Carcinogenicity** | Based on available data, the classification criteria are not met. |
| **g) Reproductivity** | Based on available data, the classification criteria are not met. |
| **h) STOT - Single Exposure** | Based on available data, the classification criteria are not met. |
| **i) STOT - Repeated Exposure** | Based on available data, the classification criteria are not met. |
| **j) Aspiration Hazard** | Based on available data, the classification criteria are not met. |

| | |
|---|---|
| **Inhaled** | The material is not thought to produce adverse health effects or irritation of the respiratory tract (as classified by EC Directives using animal models). Nevertheless, good hygiene practice requires that exposure be kept to a minimum and that suitable control measures be used in an occupational setting.<br>In animal testing, exposure to aerosols of reactive diluents (especially o-cresol glycidyl ether, CAS RN:2210-79-9) has been reported to affect the adrenal gland, central nervous system, kidney, liver, ovaries, spleen, testes, thymus and respiratory tract.<br>Inhalation hazard is increased at higher temperatures.<br>Not normally a hazard due to non-volatile nature of product |
| **Ingestion** | Reactive diluents exhibit a range of ingestion hazards. Small amounts swallowed incidental to normal handling operations are not likely to cause injury. However, swallowing larger amounts may cause injury.<br>Animal testing showed that a single dose of bisphenol A diglycidyl ether (BADGE) given by mouth, caused an increase in immature sperm.<br>The material has **NOT** been classified by EC Directives or other classification systems as "harmful by ingestion". This is because of the lack of corroborating animal or human evidence. |
| **Skin Contact** | The material may accentuate any pre-existing dermatitis condition<br>Skin contact is not thought to have harmful health effects (as classified under EC Directives); the material may still produce health damage following entry through wounds, lesions or abrasions.<br>Bisphenol A diglycidyl ether (BADGE) may produce contact dermatitis characterized by redness and swelling, with weeping followed by crusting and scaling. A liquid resin with a molecular weight of 350 produced severe skin irritation when applied daily for 4 hours over 20 days.<br>Skin contact with reactive diluents may cause slight to moderate irritation with local redness. Repeated or prolonged skin contact may cause burns.<br>Open cuts, abraded or irritated skin should not be exposed to this material<br>Entry into the blood-stream, through, for example, cuts, abrasions or lesions, may produce systemic injury with harmful effects. Examine the skin prior to the use of the material and ensure that any external damage is suitably protected.<br>The material may cause mild but significant inflammation of the skin either following direct contact or after a delay of some time. Repeated exposure can cause contact dermatitis which is characterised by redness, swelling and blistering. |
| **Eye** | If applied to the eyes, this material causes severe eye damage.<br>Eye contact with reactive diluents may cause slight to severe irritation with the possibility of chemical burns or moderate to severe damage to the cornea. |
| **Chronic** | Repeated or long-term occupational exposure is likely to produce cumulative health effects involving organs or biochemical systems.<br>Strong evidence exists that this substance may cause irreversible mutations (though not lethal) even following a single exposure.<br>Skin contact with the material is more likely to cause a sensitisation reaction in some persons compared to the general population.<br>Glycidyl ethers can cause genetic damage and cancer. |


**Continued...**

| | |
|---|---|
| | Bisphenol A diglycidyl ethers (BADGEs) produce a sensitization dermatitis (skin inflammation) characterized by eczema with blisters and papules, with considerable itching of the back of the hand. This may persist for 10-14 days after withdrawal from exposure and recur immediately on re-exposure. The dermatitis may last longer following each exposure, but is unlikely to become more intense. Lower molecular weight species produce sensitization more readily. Animal testing has shown an increase in the development of some tumours.<br>For some reactive diluents, prolonged or repeated skin contact may result in absorption of potentially harmful amounts or allergic skin reactions.<br>Exposure to some reactive diluents (notably, neopentylglycol diglycidyl ether, CAS RN: 17557-23-2) has caused cancer in some animal testing.<br>Bisphenol A may have effects similar to female sex hormones and when administered to pregnant women, may damage the foetus. It may also damage male reproductive organs and sperm.<br>There has been some concern that this material can cause cancer or mutations but there is not enough data to make an assessment.<br>Prolonged or repeated skin contact may cause drying with cracking, irritation and possible dermatitis following. |

| **M-Bond AE Resin** | **TOXICITY** | **IRRITATION** |
|---|---|---|
| | Not Available | Not Available |

| **bisphenol A diglycidyl ether** | **TOXICITY** | **IRRITATION** |
|---|---|---|
| | dermal (rat) LD50: >2000 mg/kg[1] | Eye (Rodent - rabbit): 100mg - Mild |
| | Oral (Rat) LD50: >2000 mg/kg[1] | Eye (Rodent - rabbit): 100mg - Mild |
| | | Eye (Rodent - rabbit): 100mg - Mild |
| | | Eye (Rodent - rabbit): 20mg/24H - Moderate |
| | | Eye (Rodent - rabbit): 2mg/24H - Severe |
| | | Eye (Rodent - rabbit): 5mg/24H - Severe |
| | | Eye: adverse effect observed (irritating)[1] |
| | | Skin (Rodent - guinea pig): 2750mg/55D |
| | | Skin (Rodent - rabbit): 2mg/24H - Severe |
| | | Skin (Rodent - rabbit): 500mg - Mild |
| | | Skin (Rodent - rabbit): 500uL/24H - Moderate |
| | | Skin: adverse effect observed (irritating)[1] |

| **bisphenol A/ diglycidyl ether resin, liquid** | **TOXICITY** | **IRRITATION** |
|---|---|---|
| | dermal (rat) LD50: >1200 mg/kg[2] | Eye (Rodent - rabbit): 100mg - Mild |
| | Oral (Mouse) LD50; >500 mg/kg[2] | Eye (Rodent - rabbit): 100mg - Mild |
| | | Eye (Rodent - rabbit): 100mg - Mild |
| | | Eye (Rodent - rabbit): 20mg/24H - Moderate |
| | | Eye (Rodent - rabbit): 5mg/24H - Severe |
| | | Skin (Rodent - guinea pig): 2750mg/55D |
| | | Skin (Rodent - rabbit): 2mg/24H - Severe |
| | | Skin (Rodent - rabbit): 500uL/24H - Moderate |

| **o-cresyl glycidyl ether** | **TOXICITY** | **IRRITATION** |
|---|---|---|
| | dermal (rat) LD50: >2000 mg/kg[1] | Eye: no adverse effect observed (not irritating)[1] |
| | Inhalation (Rat) LC50: >6.1 ppm4h[1] | Skin (Rodent - rabbit): 500uL/24H - Severe |
| | Oral (Rat) LD50: >2000 mg/kg[2] | Skin: no adverse effect observed (not irritating)[1] |

| **resorcinol** | **TOXICITY** | **IRRITATION** |
|---|---|---|
| | Dermal (rabbit) LD50: 3360 mg/kg[2] | Eye (Rodent - rabbit): 100mg - Severe |
| | Inhalation (Rat) LC50: 5.325-78 mg/l4h[2] | Eye (Rodent - rabbit): 100mg - Severe |
| | Oral (Rat) LD50: 301 mg/kg[2] | Eye: adverse effect observed (irreversible damage)[1] |
| | | Skin (Rodent - rabbit): 20mg/24H - Moderate |
| | | Skin (Rodent - rabbit): 500mg |
| | | Skin (Rodent - rabbit): 500mg - Severe |
| | | Skin: adverse effect observed (irritating)[1] |

| | |
|---|---|
| **Legend:** | 1. Value obtained from Europe ECHA Registered Substances - Acute toxicity 2. Value obtained from manufacturer's SDS. Unless otherwise specified data extracted from RTECS - Register of Toxic Effect of chemical Substances |

| | |
|---|---|
| **M-Bond AE Resin** | The various members of the bisphenol family produce hormone like effects, seemingly as a result of binding to estrogen receptor-related receptors (ERRs; not to be confused with estrogen receptors)<br>A suspected estrogen-related receptors (ERR) binding agent:<br>Estrogen-related receptors (ERR, oestrogen-related receptors) are so named because of sequence homology with estrogen receptors but do not appear to bind estrogens or other tested steroid hormones. The ERR family have been demonstrated to control energy homeostasis, oxidative metabolism and mitochondrial biogenesis ,while effecting mammalian physiology in the heart, brown adipose tissue, white adipose tissue, placenta, macrophages, and demonstrated additional roles in diabetes and cancer.<br>ERRs bind enhancers throughout the genome where they exert effects on gene regulation<br>Although their overall functions remain uncertain, they also share DNA-binding sites, co-regulators, and target genes with the conventional estrogen receptors ERalpha and ERbeta and may function to modulate estrogen signaling pathways.<br>· ERR-alpha has wide tissue distribution but it is most highly expressed in tissues that preferentially use fatty acids as energy sources such as kidney, heart, brown adipose tissue, cerebellum, intestine, and skeletal muscle. ERRalpha has been detected in normal adrenal cortex |


Continued...

| | |
|---|---|
| | tissues, in which its expression is possibly related to adrenal development, with a possible role in fetal adrenal function, in dehydroepiandrosterone (DHEAS) production in adrenarche, and also in steroid production of post-adrenarche/adult life. DHEA and other adrenal androgens such as androstenedione, although relatively weak androgens, are responsible for the androgenic effects of adrenarche, such as early pubic and axillary hair growth, adult-type body odor, increased oiliness of hair and skin, and mild acne.<br>· ERR-beta is a nuclear receptor . Its function is unknown; however, a similar protein in mouse plays an essential role in placental development<br>· ERR-gamma is a nuclear receptor that behaves as a constitutive activator of transcription. There is evidence that bisphenol A functions as an endocrine disruptor by binding strongly to ERRgamma BPA as well as its nitrated and chlorinated metabolites seems to binds strongly to ERR-gamma (dissociation constant = 5.5 nM), but not to the estrogen receptor (ER). BPA binding to ERR-gamma preserves its basal constitutive activity.Different expression of ERR-gamma in different parts of the body may account for variations in bisphenol A effects. For instance, ERR-gamma has been found in high concentration in the placenta, explaining reports of high bisphenol A accumulation there |
| **BISPHENOL A DIGLYCIDYL ETHER** | Bisphenol A may have effects similar to female sex hormones and when administered to pregnant women, may damage the foetus. It may also damage male reproductive organs and sperm.<br>Glycidyl ethers can cause genetic damage and cancer. 55badger |
| **BISPHENOL A/ DIGLYCIDYL ETHER RESIN, LIQUID** | Foetoxicity has been observed in animal studies Oral (rabbit, female) NOEL 180 mg/kg (teratogenicity; NOEL (maternal 60 mg/kg |
| **O-CRESYL GLYCIDYL ETHER** | o-CGE is a direct-acting mutagen in in-vitro test systems. Studies in vivo, including micronucleus tests and assays in transgenic animals, showed no mutagenic activity. Causes sensitisation * * Huntsman Araldite DY-K/ CH SDS |
| **RESORCINOL** | The use of oxidative hair dye formulations results in consumer exposure to precursors and couplers as well as to their reaction products. Exposure to reaction products is considerably lower compared to that from precursors and coupler. No exposure to intermediates was noted. The percutaneous absorption rates in the in vitro skin penetration studies of the 14 representative reaction products evaluated ranged from 3.27 to 717.79 ng/cm2 (mean +1SD). This corresponds to 1.9 to 416 ug absorbed dose (i.e. dose potentially bioavailable) per hair dye application (i.e. 0.03 to 6.9 ug/kg bw).<br>In the risk assessment of reaction products general toxicity is not considered a concern due to the low and intermittent exposure (on average once per month).<br>Scientific Committee on Consumer Safety SCCS<br>Opinion on reaction products of oxidative hair dye ingredients formed during hair dyeing processes; September 2010<br>https://ec.europa.eu/health/scientific_committees/consumer_safety/docs/sccs_o_037.pdf<br>The material may produce severe irritation to the eye causing pronounced inflammation. Repeated or prolonged exposure to irritants may produce conjunctivitis.<br>The material may cause skin irritation after prolonged or repeated exposure and may produce on contact skin redness, swelling, the production of vesicles, scaling and thickening of the skin. |
| **M-Bond AE Resin & O-CRESYL GLYCIDYL ETHER** | Laboratory (in vitro) and animal studies show, exposure to the material may result in a possible risk of irreversible effects, with the possibility of producing mutation. |
| **M-Bond AE Resin & BISPHENOL A DIGLYCIDYL ETHER & BISPHENOL A/ DIGLYCIDYL ETHER RESIN, LIQUID & O-CRESYL GLYCIDYL ETHER** | The following information refers to contact allergens as a group and may not be specific to this product.<br>Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. The pathogenesis of contact eczema involves a cell-mediated (T lymphocytes) immune reaction of the delayed type. Other allergic skin reactions, e.g. contact urticaria, involve antibody-mediated immune reactions. The significance of the contact allergen is not simply determined by its sensitisation potential: the distribution of the substance and the opportunities for contact with it are equally important. A weakly sensitising substance which is widely distributed can be a more important allergen than one with stronger sensitising potential with which few individuals come into contact. From a clinical point of view, substances are noteworthy if they produce an allergic test reaction in more than 1% of the persons tested. |
| **M-Bond AE Resin & BISPHENOL A DIGLYCIDYL ETHER & BISPHENOL A/ DIGLYCIDYL ETHER RESIN, LIQUID** | Animal testing over 13 weeks showed bisphenol A diglycidyl ether (BADGE) caused mild to moderate, chronic, inflammation of the skin.<br>Reproductive and Developmental Toxicity: Animal testing showed BADGE given over several months caused reduction in body weight but had no reproductive effects.<br>Cancer-causing potential: It has been concluded that bisphenol A diglycidyl ether cannot be classified with respect to its cancer-causing potential in humans.<br>Genetic toxicity: Laboratory tests on genetic toxicity of BADGE have so far been negative.<br>Immunotoxicity: Animal testing suggests regular injections of diluted BADGE may result in sensitization.<br>Consumer exposure: Comsumer exposure to BADGE is almost exclusively from migration of BADGE from can coatings into food. Testing has not found any evidence of hormonal disruption. |
| **M-Bond AE Resin & BISPHENOL A/ DIGLYCIDYL ETHER RESIN, LIQUID** | The chemical structure of hydroxylated diphenylalkanes or bisphenols consists of two phenolic rings joined together through a bridging carbon. This class of endocrine disruptors that mimic oestrogens is widely used in industry, particularly in plastics.<br>Bisphenol A (BPA) and some related compounds exhibit oestrogenic activity in human breast cancer cell line MCF-7, but there were remarkable differences in activity. Several derivatives of BPA exhibited significant thyroid hormonal activity towards rat pituitary cell line GH3, which releases growth hormone in a thyroid hormone-dependent manner. However, BPA and several other derivatives did not show such activity. Results suggest that the 4-hydroxyl group of the A-phenyl ring and the B-phenyl ring of BPA derivatives are required for these hormonal activities, and substituents at the 3,5-positions of the phenyl rings and the bridging alkyl moiety markedly influence the activities. Bisphenols promoted cell proliferation and increased the synthesis and secretion of cell type-specific proteins. When ranked by proliferative potency, the longer the alkyl substituent at the bridging carbon, the lower the concentration needed for maximal cell yield; the most active compound contained two propyl chains at the bridging carbon. Bisphenols with two hydroxyl groups in the para position and an angular configuration are suitable for appropriate hydrogen bonding to the acceptor site of the oestrogen receptor.<br>In vitro cell models were used to evaluate the ability of 22 bisphenols (BPs) to induce or inhibit estrogenic and androgenic activity. BPA, Bisphenol AF (BPAF), bisphenol Z (BPZ), bisphenol C (BPC), tetramethyl bisphenol A (TMBPA), bisphenol S (BPS), bisphenol E (BPE), 4,4-bisphenol F (4,4-BPF), bisphenol AP (BPAP), bisphenol B (BPB), tetrachlorobisphenol A (TCBPA), and benzylparaben (PHBB) induced estrogen receptor (ER)alpha and/or ERbeta-mediated activity. With the exception of BPS, TCBPA, and PHBB, these same BPs were also androgen receptor (AR) antagonists. Only 3 BPs were found to be ER antagonists. Bisphenol P (BPP) selectively inhibited ERbeta-mediated activity and 4-(4-phenylmethoxyphenyl)sulfonylphenol (BPS-MPE) and 2,4-bisphenol S (2,4-BPS) selectively inhibited ERalpha-mediated activity. None of the BPs induced AR-mediated activity. |
| **M-Bond AE Resin & BISPHENOL A DIGLYCIDYL ETHER & O-CRESYL GLYCIDYL ETHER** | Oxiranes (including glycidyl ethers and alkyl oxides, and epoxides) share many common characteristics with respect to animal toxicology. One such oxirane is ethyloxirane; data presented here may be taken as representative. |
| **BISPHENOL A DIGLYCIDYL ETHER & O-CRESYL GLYCIDYL ETHER** | For 1,2-butylene oxide (ethyloxirane):<br>In animal testing, ethyloxirane increased the incidence of tumours of the airways in animals exposed via inhalation. However, tumours were not observed in mice chronically exposed via skin. Two structurally related substances, oxirane (ethylene oxide) and methyloxirane (propylene oxide), which are also direct-acting alkylating agents, have been classified as causing cancer. |
| **BISPHENOL A DIGLYCIDYL ETHER & BISPHENOL A/ DIGLYCIDYL ETHER RESIN, LIQUID & RESORCINOL** | The substance is classified by IARC as Group 3:<br>**NOT** classifiable as to its carcinogenicity to humans.<br>Evidence of carcinogenicity may be inadequate or limited in animal testing. |

| | | | |
|---|---|---|---|
| **Acute Toxicity** | ✗ | **Carcinogenicity** | ✗ |
| **Skin Irritation/Corrosion** | ✓ | **Reproductivity** | ✗ |
| **Serious Eye Damage/Irritation** | ✓ | **STOT - Single Exposure** | ✗ |


**Continued...**

| | | | |
|---|---|---|---|
| **Respiratory or Skin sensitisation** | ✔ | **STOT - Repeated Exposure** | ✘ |
| **Mutagenicity** | ✔ | **Aspiration Hazard** | ✘ |

**Legend:** ✘ – Data either not available or does not fill the criteria for classification
✔ – Data available to make classification

## SECTION 12 Ecological information

**Toxicity**

**M-Bond AE Resin**

| Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| Not Available | Not Available | Not Available | Not Available | Not Available |

**bisphenol A diglycidyl ether**

| Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| EC50 | 72h | Algae or other aquatic plants | 9.4mg/l | 2 |
| EC50 | 48h | Crustacea | 1.1mg/l | 2 |
| NOEC(ECx) | 504h | Crustacea | 0.3mg/l | 2 |
| LC50 | 96h | Fish | 1.2mg/l | 2 |

**bisphenol A/ diglycidyl ether resin, liquid**

| Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| EC50 | 48h | Crustacea | ~2mg/l | 2 |
| EC50(ECx) | 48h | Crustacea | ~2mg/l | 2 |

**o-cresyl glycidyl ether**

| Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| EC50 | 72h | Algae or other aquatic plants | ~5.1mg/l | 2 |
| EC50 | 48h | Crustacea | ~3.3mg/l | 2 |
| EC50(ECx) | 24h | Crustacea | 1-10mg/l | Not Available |
| LC50 | 96h | Fish | 1-10mg/l | Not Available |

**resorcinol**

| Endpoint | Test Duration (hr) | Species | Value | Source |
|---|---|---|---|---|
| NOEC(ECx) | 504h | Crustacea | >=0.172mg/L | 2 |
| EC50 | 72h | Algae or other aquatic plants | 1.1-72mg/l | 1 |
| EC50 | 48h | Crustacea | <=0.8mg/l | 1 |
| LC50 | 96h | Fish | 1mg/l | 1 |

**Legend:** Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. US EPA, Ecotox database - Aquatic Toxicity Data 4. ECETOC Aquatic Hazard Assessment Data 5. NITE (Japan) - Bioconcentration Data 6. METI (Japan) - Bioconcentration Data 7. Vendor Data

Very toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.
Do NOT allow product to come in contact with surface waters or to intertidal areas below the mean high water mark. Do not contaminate water when cleaning equipment or disposing of equipment wash-waters.
Wastes resulting from use of the product must be disposed of on site or at approved waste sites.
Liquid epoxy resins and some reactive diluents are not readily biodegradable, although its epoxy functional groups are hydrolysed in contact with water, they have the potential to bio-accumulate and are moderately toxic to aquatic organisms. They are generally classified as dangerous for the environment according to the European Union classification criteria.
Uncured solid resins on the other hand are not readily bio-available, not toxic to aquatic and terrestrial organisms, not readily biodegradable, but hydrolysable.They present no significant hazard for the environment.
For bisphenol A and related bisphenols:
Environmental fate:
Biodegradability (28 d) 89% - Easily biodegradable
Bioconcentration factor (BCF) 7.8 mg/l
Bisphenol A, its derivatives and analogues, can be released from polymers, resins and certain substances by metabolic products
Substance does not meet the criteria for PBT or vPvB according to Regulation (EC) No 1907/2006, Annex XIII
As an environmental contaminant, bisphenol A interferes with nitrogen fixation at the roots of leguminous plants associated with the bacterial symbiont Sinorhizobium meliloti.
Despite a half-life in the soil of only 1-10 days, its ubiquity makes it an important pollutant. According to Environment Canada, "initial assessment shows that at low levels, bisphenol A can harm fish and organisms over time. Studies also indicate that it can currently be found in municipal wastewater." However, a study conducted in the United States found that 91-98% of bisphenol A may be removed from water during treatment at municipal water treatment plants.
Ecotoxicity:
Fish LC50 (96 h): 4.6 mg/l (freshwater fish); 11 mg/l (saltwater fish): NOEC 0.016 mg/l (freshwater fish- 144 d); 0.064 mg/l (saltwater fish 164 d)
Fresh water invertebrates EC50 (48 h): 10.2 mg/l: NOEC 0.025 mg/l - 328 d)
Marine water invertebrate EC50 (96 h): 1.1 mg/l; NOEC 0.17 mg/l (28 d)
Freshwater algae (96 h): 2.73 mg/l
Marine water algae (96 h): 1.1 mg/l
Fresh water plant EC50 (7 d): 20 mg/l: NOEC 7.8 mg/l
In general, studies have shown that bisphenol A can affect growth, reproduction and development in aquatic organisms.
Among freshwater organisms, fish appear to be the most sensitive species. Evidence of endocrine-related effects in fish, aquatic invertebrates, amphibians and reptiles has been reported at environmentally relevant exposure levels lower than those required for acute toxicity. There is a widespread variation in reported values for endocrine-related effects, but many fall in the range of 1 ug/L to 1 mg/L
A 2009 review of the biological impacts of plasticisers on wildlife published by the Royal Society with a focus on annelids (both aquatic and terrestrial), molluscs, crustaceans, insects, fish and amphibians concluded that bisphenol A has been shown to affect reproduction in all studied animal groups, to impair development in crustaceans and amphibians and to induce genetic aberrations.
A large 2010 study of two rivers in Canada found that areas contaminated with hormone-like chemicals including bisphenol A showed females made up 85 per cent of the population of a certain fish, while females made up only 55 per cent in uncontaminated areas.
Although abundant data are available on the toxicity of bisphenol-A (2,2-bis (4-hydroxydiphenyl)propane;(BPA) A variety of BPs were examined for their acute toxicity against Daphnia magna, mutagenicity, and oestrogenic activity using the Daphtoxkit (Creasel Ltd.), the umu test system, and the yeast two-hybrid system, respectively, in comparison with BPA. BPA was moderately toxic to D. magna (48-h EC50 was 10 mg/l) according to the current U.S. EPA acute toxicity evaluation standard, and it was weakly oestrogenic with 5 orders of magnitude lower activity than that of the natural estrogen 17 beta-oestradiol in the yeast screen, while no mutagenicity was observed. All seven BPs tested here showed moderate to slight acute toxicity, no mutagenicity, and weak oestrogenic activity as well as BPA. Some of the BPs showed considerably higher oestrogenic activity than BPA, and others exhibited much lower activity. Bisphenol S (bis(4-hydroxydiphenyl)sulfone) and bis(4-hydroxyphenyl)sulfide) showed oestrogenic activity.


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Biodegradation is a major mechanism for eliminating various environmental pollutants. Studies on the biodegradation of bisphenols have mainly focused on bisphenol A. A number of BPA-degrading bacteria have been isolated from enrichments of sludge from wastewater treatment plants. The first step in the biodegradation of BPA is the hydroxylation of the carbon atom of a methyl group or the quaternary carbon in the BPA molecule. Judging from these features of the biodegradation mechanisms, it is possible that the same mechanism used for BPA is used to biodegrade all bisphenols that have at least one methyl or methylene group bonded at the carbon atom between the two phenol groups. However, bisphenol F ([bis(4-hydroxyphenyl)methane; BPF), which has no substituent at the bridging carbon, is unlikely to be metabolised by such a mechanism. Nevertheless BPF is readily degraded by river water microorganisms under aerobic conditions. From this evidence, it was clear that a specific mechanism for biodegradation of BPF does exist in the natural ecosystem,
Algae can enhance the photodegradation of bisphenols. The photodegradation rate of BPF increased with increasing algae concentration. Humic acid and Fe3+ ions also enhanced the photodegradation of BPF. The effect of pH value on the BPF photodegradation was also important.
Reactive diluents generally have a low to moderate potential for bioconcentration (tendency to accumulate in the food chain) and a high to very high potential for mobility in soil. Small amounts that escape to the atmosphere will photodegrade.
They would not be expected to persist in the environment.
Most reactive diluents should be considered slightly to moderately toxic to aquatic organisms on an acute basis while some might also be considered harmful to the environment. Environmental toxicity is a function of the n-octanol/water partition coefficient (log Pow, log Kow). Compounds with log Pow >5 act as neutral organics, but at a lower log Pow, the toxicity of epoxide-containing polymers is greater than that predicted for simple narcotics.
Significant environmental findings are limited. Oxiranes (including glycidyl ethers and alkyl oxides, and epoxides) exhibit common characteristics with respect to environmental fate and ecotoxicology. One such oxirane is ethyloxirane and data presented here may be taken as representative.
For 1,2-Butylene oxide (Ethyloxirane):
log Kow values of 0.68 and 0.86. BAF and BCF : 1 to 17 L./kg.
Aquatic Fate - Ethyloxirane is highly soluble in water and has a very low soil-adsorption coefficient, which suggests that, if released to water, adsorption of ethyloxirane to sediment and suspended solids is not expected. Volatilization of ethyloxirane from water surfaces would be expected. Ethyloxirane is hydrolysable, with a half-life of 6.5 days, and biodegradable up to 100% degradation and is not expected to persist in water. Models have predicted a biodegradation half-life in water of 15 days.
Terrestrial Fate: When released to soil, ethyloxirane is expected to have low adsorption and thus very high mobility. Volatilization from moist soil and dry soil surfaces is expected. Ethyloxirane is not expected to be persistent in soil.
Atmospheric Fate: It is expected that ethyloxirane exists solely as a vapor in ambient atmosphere. Ethyloxirane may also be removed from the atmosphere by wet deposition processes. The half-life in air is about 5.6 days from the reaction of ethyloxirane with photochemically produced hydroxyl radicals which indicates that this chemical meets the persistence criterion in air (half-life of = 2 days).
Ecotoxicity - The potential for bioaccumulation of ethyloxirane in organisms is likely to be low and has low to moderate toxicity to aquatic organisms. Ethyloxirane is acutely toxic to water fleas and toxicity values for bacteria are close to 5000 mg/L. For algae, toxicity values exceed 500 mg/L.

**DO NOT** discharge into sewer or waterways.

### Persistence and degradability

| Ingredient | Persistence: Water/Soil | Persistence: Air |
|---|---|---|
| bisphenol A diglycidyl ether | HIGH | HIGH |
| bisphenol A/ diglycidyl ether resin, liquid | HIGH | HIGH |
| o-cresyl glycidyl ether | HIGH | HIGH |
| resorcinol | LOW | LOW |

### Bioaccumulative potential

| Ingredient | Bioaccumulation |
|---|---|
| bisphenol A diglycidyl ether | MEDIUM (LogKOW = 3.84) |
| bisphenol A/ diglycidyl ether resin, liquid | LOW (LogKOW = 2.6835) |
| o-cresyl glycidyl ether | LOW (LogKOW = 2.1609) |
| resorcinol | LOW (BCF = 2.4) |

### Mobility in soil

| Ingredient | Mobility |
|---|---|
| bisphenol A diglycidyl ether | LOW (Log KOC = 1767) |
| bisphenol A/ diglycidyl ether resin, liquid | LOW (Log KOC = 51.43) |
| o-cresyl glycidyl ether | LOW (Log KOC = 67.93) |
| resorcinol | LOW (Log KOC = 434) |

### Other adverse effects

No evidence of ozone depleting properties were found in the current literature.

## SECTION 13 Disposal considerations

### Waste treatment methods

| | |
|---|---|
| **Product / Packaging disposal** | ▸ Containers may still present a chemical hazard/ danger when empty.<br>▸ Return to supplier for reuse/ recycling if possible.<br>Otherwise:<br>▸ If container can not be cleaned sufficiently well to ensure that residuals do not remain or if the container cannot be used to store the same product, then puncture containers, to prevent re-use, and bury at an authorised landfill.<br>▸ Where possible retain label warnings and SDS and observe all notices pertaining to the product.<br>Waste Management<br>Production waste from epoxy resins and resin systems should be treated as hazardous waste in accordance with National regulations. Fire retarded resins containing halogenated compounds should also be treated as special waste. Accidental spillage of resins, curing agents and their formulations should be contained and absorbed by special mineral absorbents to prevent them from entering the environment.<br>Contaminated or surplus product should not be washed down the sink, but preferably be fully reacted to form cross-linked solids which is non-hazardous and can be more easily disposed.<br>Finished articles made from fully cured epoxy resins are hard, infusible solids presenting no hazard to the environment. However, finished articles from flame-retarded material containing halogenated resins should be considered hazardous waste, and disposed as required by National laws. Articles made from epoxy resins, like other thermosets, can be recycled by grinding and used as fillers in other products.<br>Another way of disposal and recovery is combustion with energy recovery.<br>Legislation addressing waste disposal requirements may differ by country, state and/ or territory. Each user must refer to laws operating in their area. In some areas, certain wastes must be tracked. |


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| | |
|---|---|
| | A Hierarchy of Controls seems to be common - the user should investigate:<br>• Reduction<br>• Reuse<br>• Recycling<br>• Disposal (if all else fails)<br>This material may be recycled if unused, or if it has not been contaminated so as to make it unsuitable for its intended use. If it has been contaminated, it may be possible to reclaim the product by filtration, distillation or some other means. Shelf life considerations should also be applied in making decisions of this type. Note that properties of a material may change in use, and recycling or reuse may not always be appropriate.<br>• **DO NOT** allow wash water from cleaning or process equipment to enter drains.<br>• It may be necessary to collect all wash water for treatment before disposal.<br>• In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.<br>• Where in doubt contact the responsible authority.<br>Removal of bisphenol A (BPA) from aqueous solutions was accomplished by adsorption of enzymatically generated quinone derivatives on chitosan beads. The use of chitosan in the form of beads was found to be more effective because heterogeneous removal of BPA with chitosan beads was much faster than homogeneous removal of BPA with chitosan solutions, and the removal efficiency was enhanced by increasing the amount of chitosan beads dispersed in the BPA solutions and BPA was completely removed by quinone adsorption in the presence of chitosan beads more than 0.10 cm3/cm3. In addition, a variety of bisphenol derivatives were completely or effectively removed by the procedure constructed in this study, although the enzyme dose or the amount of chitosan beads was further increased as necessary for some of the bisphenol derivatives used.<br>M. Suzuki, and E Musashi J Appl Polym Sci, 118(2):721 - 732; October 2010<br>• Recycle wherever possible or consult manufacturer for recycling options.<br>• Consult State Land Waste Management Authority for disposal.<br>• Material may be disposed of by controlled burning in an approved incinerator or buried in an approved landfill.<br>• Prior to disposal in a landfill the material should be mixed with the other component and reacted to render the material inert.<br>• Extreme caution should be taken when heating the resin/curing agent mix.<br>• Recycle containers where possible, or dispose of in an authorised landfill. |

## SECTION 14 Transport information

### Labels Required

| | |
|---|---|
| |  |
| **Marine Pollutant** |  |

Shipping container, transport vehicle placarding, and labeling may vary from the below information. This depends on the quantity shipped, the applicability of excepted quantity requirements, limited quantity requirements, and/or special provisions according to US DOT, IATA and IMDG regulations. In case of reshipment, it is the responsibility of the shipper to determine the appropriate labels and markings in accordance with applicable transport regulations.

### Land transport (DOT)

| | |
|---|---|
| 14.1. **UN number or ID number** | 3082 |
| 14.2. **UN proper shipping name** | Environmentally hazardous substance, liquid, n.o.s. (contains bisphenol A diglycidyl ether, bisphenol A/ diglycidyl ether resin, liquid and o-cresyl glycidyl ether) |
| 14.3. **Transport hazard class(es)** | Class: 9<br>Subsidiary Hazard: Not Applicable |
| 14.4. **Packing group** | III |
| 14.5. **Environmental hazard** | Environmentally hazardous |
| 14.6. **Special precautions for user** | Hazard Label: 9<br>Special provisions: 8, 146, 173, 335, 441, IB3, T4, TP1, TP29<br>Limited quantity: 5 L |

For Individual Packages of Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082 that contain LESS THAN the reportable quantity - Not Regulated.
For Individual Packages of Environmentally Hazardous Substances meeting the descriptions of UN 3077 or UN 3082 that contain EQUAL OR MORE THAN the reportable quantity - Regulated.

### Air transport (ICAO-IATA / DGR)

| | |
|---|---|
| 14.1. **UN number** | 3082 |
| 14.2. **UN proper shipping name** | Environmentally hazardous substance, liquid, n.o.s. (contains bisphenol A diglycidyl ether, bisphenol A/ diglycidyl ether resin, liquid and o-cresyl glycidyl ether) |
| 14.3. **Transport hazard class(es)** | ICAO/IATA Class: 9<br>ICAO / IATA Subsidiary Hazard: Not Applicable<br>ERG Code: 9L |
| 14.4. **Packing group** | III |
| 14.5. **Environmental hazard** | Environmentally hazardous |
| 14.6. **Special precautions for user** | Special provisions: A97 A158 A197 A215<br>Cargo Only Packing Instructions: 964 |


**Continued...**

| | |
|---|---|
| Cargo Only Maximum Qty / Pack | 450 L |
| Passenger and Cargo Packing Instructions | 964 |
| Passenger and Cargo Maximum Qty / Pack | 450 L |
| Passenger and Cargo Limited Quantity Packing Instructions | Y964 |
| Passenger and Cargo Limited Maximum Qty / Pack | 30 kg G |

**Sea transport (IMDG-Code / GGVSee)**

| | |
|---|---|
| 14.1. **UN number** | 3082 |
| 14.2. **UN proper shipping name** | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (contains bisphenol A diglycidyl ether, bisphenol A/ diglycidyl ether resin, liquid and o-cresyl glycidyl ether) |
| 14.3. **Transport hazard class(es)** | IMDG Class: 9<br>IMDG Subsidiary Hazard: Not Applicable |
| 14.4. **Packing group** | III |
| 14.5 **Environmental hazard** | Marine Pollutant |
| 14.6. **Special precautions for user** | EMS Number: F-A, S-F<br>Special provisions: 274 335 375 969<br>Limited Quantities: 5 L |

**14.7. Maritime transport in bulk according to IMO instruments**

**14.7.1. Transport in bulk according to Annex II of MARPOL and the IBC code**

Not Applicable

**14.7.2. Transport in bulk in accordance with MARPOL Annex V and the IMSBC Code**

| Product name | Group |
|---|---|
| bisphenol A diglycidyl ether | Not Applicable |
| bisphenol A/ diglycidyl ether resin, liquid | Not Applicable |
| o-cresyl glycidyl ether | Not Applicable |
| resorcinol | Not Applicable |

**14.7.3. Transport in bulk in accordance with the IGC Code**

| Product name | Ship Type |
|---|---|
| bisphenol A diglycidyl ether | Not Applicable |
| bisphenol A/ diglycidyl ether resin, liquid | Not Applicable |
| o-cresyl glycidyl ether | Not Applicable |
| resorcinol | Not Applicable |

## SECTION 15 Regulatory information

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

**bisphenol A diglycidyl ether is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List
International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)
US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for Air Pollutants Other Than PM-2.5
US - California - Biomonitoring - Priority Chemicals
US DOE Temporary Emergency Exposure Limits (TEELs)
US New York City Community Right-to-Know: List of Hazardous Substances
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Limits (PELs) Table Z-1
US OSHA Permissible Exposure Limits (PELs) Table Z-3
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory
US TSCA Section 4/12 (b) - Sunset Dates/Status

**bisphenol A/ diglycidyl ether resin, liquid is found on the following regulatory lists**

Chemical Footprint Project - Chemicals of High Concern List
International WHO List of Proposed Occupational Exposure Limit (OEL) Values for Manufactured Nanomaterials (MNMS)
US - Alaska Air Quality Control - Concentrations Triggering an Air Quality Episode for Air Pollutants Other Than PM-2.5
US DOE Temporary Emergency Exposure Limits (TEELs)
US NIOSH Recommended Exposure Limits (RELs)
US OSHA Permissible Exposure Limits (PELs) Table Z-1
US OSHA Permissible Exposure Limits (PELs) Table Z-3
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

**o-cresyl glycidyl ether is found on the following regulatory lists**

US EPA Substance Registry Services (SRS) - 2020 CDR TSCA 4 TR


**Continued...**

US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

**resorcinol is found on the following regulatory lists**

International Agency for Research on Cancer (IARC) - Agents Classified by the IARC Monographs - Not Classified as Carcinogenic
US - Massachusetts - Right To Know Listed Chemicals
US - New Jersey Right to Know Hazardous Substances
US - Pennsylvania - Hazardous Substance List
US CWA (Clean Water Act) - List of Hazardous Substances
US DOE Temporary Emergency Exposure Limits (TEELs)
US New York City Community Right-to-Know: List of Hazardous Substances
US NIOSH Recommended Exposure Limits (RELs)
US Toxic Substances Control Act (TSCA) - Chemical Substance Inventory

### Additional Regulatory Information

Not Applicable

### Federal Regulations

### Superfund Amendments and Reauthorization Act of 1986 (SARA)

**Section 311/312 hazard categories**

| | |
|---|---|
| Flammable (Gases, Aerosols, Liquids, or Solids) | No |
| Gas under pressure | No |
| Explosive | No |
| Self-heating | No |
| Pyrophoric (Liquid or Solid) | No |
| Pyrophoric Gas | No |
| Corrosive to metal | No |
| Oxidizer (Liquid, Solid or Gas) | No |
| Organic Peroxide | No |
| Self-reactive | No |
| In contact with water emits flammable gas | No |
| Combustible Dust | No |
| Carcinogenicity | No |
| Acute toxicity (any route of exposure) | No |
| Reproductive toxicity | No |
| Skin Corrosion or Irritation | Yes |
| Respiratory or Skin Sensitization | Yes |
| Serious eye damage or eye irritation | Yes |
| Specific target organ toxicity (single or repeated exposure) | No |
| Aspiration Hazard | No |
| Germ cell mutagenicity | Yes |
| Simple Asphyxiant | No |
| Hazards Not Otherwise Classified | No |

**US. EPA CERCLA Hazardous Substances and Reportable Quantities (40 CFR 302.4)**

| Name | Reportable Quantity in Pounds (lb) | Reportable Quantity in kg |
|---|---|---|
| resorcinol | 5000 | 2270 |

**US. EPCRA Section 313 Toxic Release Inventory (TRI) (40 CFR 372)**

None Reported

### Additional Federal Regulatory Information

Not Applicable

### State Regulations

**US. California Proposition 65**

None Reported

### Additional State Regulatory Information

Not Applicable

### National Inventory Status

| National Inventory | Status |
|---|---|
| Australia - AIIC / Australia Non-Industrial Use | Yes |
| Canada - DSL | Yes |


Continued...

| National Inventory | Status |
|---|---|
| Canada - NDSL | No (bisphenol A diglycidyl ether; bisphenol A/ diglycidyl ether resin, liquid; o-cresyl glycidyl ether; resorcinol) |
| China - IECSC | Yes |
| Europe - EINEC / ELINCS / NLP | Yes |
| Japan - ENCS | Yes |
| Korea - KECI | Yes |
| New Zealand - NZIoC | Yes |
| Philippines - PICCS | Yes |
| USA - TSCA | All chemical substances in this product have been designated as TSCA Inventory 'Active' |
| Taiwan - TCSI | Yes |
| Mexico - INSQ | No (bisphenol A diglycidyl ether; o-cresyl glycidyl ether) |
| Vietnam - NCI | Yes |
| Russia - FBEPH | No (o-cresyl glycidyl ether) |
| UAE - Control List (Banned/Restricted Substances) | No (bisphenol A diglycidyl ether; bisphenol A/ diglycidyl ether resin, liquid; o-cresyl glycidyl ether; resorcinol) |
| **Legend:** | Yes = All CAS declared ingredients are on the inventory<br>No = One or more of the CAS listed ingredients are not on the inventory. These ingredients may be exempt or will require registration. |

## SECTION 16 Other information

| | |
|---|---|
| **Revision Date** | 07/09/2026 |
| **Initial Date** | 06/02/2026 |

**Other information**

The SDS is a Hazard Communication tool and should be used to assist in the Risk Assessment. Many factors determine whether the reported Hazards are Risks in the workplace or other settings. Risks may be determined by reference to Exposures Scenarios. Scale of use, frequency of use and current or available engineering controls must be considered.

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