



## 9400 One-Part Epoxy Electrically Conductive Adhesive, Low Tg

MG Chemicals UK Limited

Chemwatch Hazard Alert Code: 2

Version No: 2.3

Safety Data Sheet (Conforms to Regulation (EU) No 2015/830)

Issue Date: 18/03/2017

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L.REACH.GBR.EN

### SECTION 1 IDENTIFICATION OF THE SUBSTANCE / MIXTURE AND OF THE COMPANY / UNDERTAKING

#### 1.1. Product Identifier

|                               |  |
|-------------------------------|--|
| Product name                  | 9400 One-Part Epoxy Electrically Conductive Adhesive, Low Tg   |
| Synonyms                      | SDS Code: 9400; 9400-3ML, 9400-10ML, 9400-30ML   |
| Proper shipping name          | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains silver and bisphenol A diglycidyl ether resin, solid) |
| Other means of identification | Not Available  |

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

|                          |                                  |
|--------------------------|----------------------------------|
| Relevant identified uses | electrically conductive adhesive |
| Uses advised against     | Not Applicable                   |

#### 1.3. Details of the supplier of the safety data sheet

|                         |   |  |
|-------------------------|---|--|
| Registered company name | MG Chemicals UK Limited   | MG Chemicals (Head office)                               |
| Address                 | Heame House, 23 Bilston Street, Sedgely Dudley DY3 1JA United Kingdom | 9347 - 193 Street Surrey V4N 4E7 British Columbia Canada |
| Telephone               | +(44) 1663 362888   | +(1) 800-201-8822  |
| Fax                     | Not Available   | +(1) 800-708-9888  |
| Website                 | Not Available   | www.mgchemicals.com                                      |
| Email                   | sales@mgchemicals.com   | Info@mgchemicals.com                                     |

#### 1.4. Emergency telephone number

|                                   |                   |               |
|-----------------------------------|-------------------|---------------|
| Association / Organisation        | CHEMTREC          | Not Available |
| Emergency telephone numbers       | +(44) 870-8200418 | Not Available |
| Other emergency telephone numbers | +(1) 703-527-3887 | Not Available |

### SECTION 2 HAZARDS IDENTIFICATION

#### 2.1. Classification of the substance or mixture

|  |   |
|--|---|
| Classification according to regulation (EC) No 1272/2008 [CLP] [1] | H315 - Skin Corrosion/Irritation Category 2, H317 - Skin Sensitizer Category 1, H319 - Eye Irritation Category 2, H410 - Chronic Aquatic Hazard Category 1  |
| Legend:  | 1. Classified by Chemwatch; 2. Classification drawn from EC Directive 67/548/EEC - Annex I ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI |

#### 2.2. Label elements

|                    |                |
|--------------------|----------------|
| CLP label elements |                |
| SIGNAL WORD        | <b>WARNING</b> |

#### Hazard statement(s)

|      |   |
|------|---|
| H315 | Causes skin irritation.                               |
| H317 | May cause an allergic skin reaction.                  |
| H319 | Causes serious eye irritation.                        |
| H410 | Very toxic to aquatic life with long lasting effects. |

Continued...

**Supplementary statement(s)**

Not Applicable

**Precautionary statement(s) Prevention**

|             |  |
|-------------|--|
| <b>P280</b> | Wear protective gloves/protective clothing/eye protection/face protection. |
| <b>P261</b> | Avoid breathing dust/fumes.  |
| <b>P273</b> | Avoid release to the environment.  |
| <b>P272</b> | Contaminated work clothing should not be allowed out of the workplace.     |

**Precautionary statement(s) Response**

|                       |  |
|-----------------------|--|
| <b>P302+P352</b>      | IF ON SKIN: Wash with plenty of water and soap.  |
| <b>P305+P351+P338</b> | IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. |
| <b>P333+P313</b>      | If skin irritation or rash occurs: Get medical advice/attention.   |
| <b>P337+P313</b>      | If eye irritation persists: Get medical advice/attention.  |
| <b>P362+P364</b>      | Take off contaminated clothing and wash it before reuse.   |
| <b>P391</b>           | Collect spillage.  |

**Precautionary statement(s) Storage**

Not Applicable

**Precautionary statement(s) Disposal**

|             |   |
|-------------|---|
| <b>P501</b> | Dispose of contents/container in accordance with local regulations. |
|-------------|---|

**2.3. Other hazards**

Inhalation may produce health damage\*.

Cumulative effects may result following exposure\*.

Possible skin sensitizer\*.

REACH - Art.57-59: The mixture does not contain Substances of Very High Concern (SVHC) at the SDS print date.

**SECTION 3 COMPOSITION / INFORMATION ON INGREDIENTS****3.1. Substances**

See 'Composition on ingredients' in Section 3.2

**3.2. Mixtures**

| 1.CAS No<br>2.EC No<br>3.Index No<br>4.REACH No  | %[weight] | Name   | Classification according to regulation (EC) No 1272/2008 [CLP]  |
|--|-----------|--|---|
| 1.7440-22-4<br>2.231-131-3<br>3.Not Available<br>4.01-2119555669-21-XXXX,<br>01-2119513211-60-XXXX | 72        | <u>silver</u>                                    | Not Applicable  |
| 1.25085-99-8<br>2.500-033-5<br>3.603-074-00-8<br>4.01-2119456619-26-XXXX                           | 21        | <u>bisphenol A diglycidyl ether resin, solid</u> | Eye Irritation Category 2, Skin Corrosion/Irritation Category 2, Skin Sensitizer Category 1, Chronic Aquatic Hazard Category 2; H319, H315, H317, H411 <sup>[3]</sup> |
| 1.26139-75-3<br>2.Not Available<br>3.Not Available<br>4.Not Available                              | 1         | <u>formaldehyde/ xylene copolymer</u>            | Not Applicable  |

**Legend:** 1. Classified by Chemwatch; 2. Classification drawn from EC Directive 67/548/EEC - Annex I ; 3. Classification drawn from EC Directive 1272/2008 - Annex VI 4. Classification drawn from C&L

**SECTION 4 FIRST AID MEASURES****4.1. Description of first aid measures**

|                |   |
|----------------|---|
| <b>General</b> | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately remove all contaminated clothing, including footwear.</li> <li>▶ Flush skin and hair with running water (and soap if available).</li> <li>▶ Seek medical attention in event of irritation.</li> </ul> <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> <li>▶ Wash out immediately with fresh running water.</li> <li>▶ 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.</li> <li>▶ Seek medical attention without delay; if pain persists or recurs seek medical attention.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> </ul> |
|----------------|---|

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|                     |  |
|---------------------|--|
|                     | <ul style="list-style-type: none"> <li>▶ <b>DO NOT attempt to remove particles attached to or embedded in eye .</b></li> <li>▶ Lay victim down, on stretcher if available and pad <b>BOTH</b> eyes, make sure dressing does not press on the injured eye by placing thick pads under dressing, above and below the eye.</li> <li>▶ Seek urgent medical assistance, or transport to hospital.</li> <li>▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area.</li> <li>▶ Other measures are usually unnecessary.</li> <li>▶ Immediately give a glass of water.</li> <li>▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.</li> </ul>  |
| <b>Eye Contact</b>  | <p>If this product comes in contact with the eyes:</p> <ul style="list-style-type: none"> <li>▶ Wash out immediately with fresh running water.</li> <li>▶ 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.</li> <li>▶ Seek medical attention without delay; if pain persists or recurs seek medical attention.</li> <li>▶ Removal of contact lenses after an eye injury should only be undertaken by skilled personnel.</li> <li>▶ <b>DO NOT attempt to remove particles attached to or embedded in eye .</b></li> <li>▶ Lay victim down, on stretcher if available and pad <b>BOTH</b> eyes, make sure dressing does not press on the injured eye by placing thick pads under dressing, above and below the eye.</li> <li>▶ Seek urgent medical assistance, or transport to hospital.</li> </ul> |
| <b>Skin Contact</b> | <p>If skin contact occurs:</p> <ul style="list-style-type: none"> <li>▶ Immediately remove all contaminated clothing, including footwear.</li> <li>▶ Flush skin and hair with running water (and soap if available).</li> <li>▶ Seek medical attention in event of irritation.</li> </ul>  |
| <b>Inhalation</b>   | <ul style="list-style-type: none"> <li>▶ If fumes, aerosols or combustion products are inhaled remove from contaminated area.</li> <li>▶ Other measures are usually unnecessary.</li> </ul>  |
| <b>Ingestion</b>    | <ul style="list-style-type: none"> <li>▶ Immediately give a glass of water.</li> <li>▶ First aid is not generally required. If in doubt, contact a Poisons Information Centre or a doctor.</li> </ul>  |

### 4.2 Most important symptoms and effects, both acute and delayed

See Section 11

### 4.3. Indication of any immediate medical attention and special treatment needed

Treat symptomatically.

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Copper, magnesium, aluminium, antimony, iron, manganese, nickel, zinc (and their compounds) in welding, brazing, galvanising or smelting operations all give rise to thermally produced particulates of smaller dimension than may be produced if the metals are divided mechanically. Where insufficient ventilation or respiratory protection is available these particulates may produce 'metal fume fever' in workers from an acute or long term exposure.

- ▶ Onset occurs in 4-6 hours generally on the evening following exposure. Tolerance develops in workers but may be lost over the weekend. (Monday Morning Fever)
- ▶ Pulmonary function tests may indicate reduced lung volumes, small airway obstruction and decreased carbon monoxide diffusing capacity but these abnormalities resolve after several months.
- ▶ Although mildly elevated urinary levels of heavy metal may occur they do not correlate with clinical effects.
- ▶ The general approach to treatment is recognition of the disease, supportive care and prevention of exposure.
- ▶ Seriously symptomatic patients should receive chest x-rays, have arterial blood gases determined and be observed for the development of tracheobronchitis and pulmonary edema.

[Ellenhorn and Barceloux: Medical Toxicology]

## SECTION 5 FIREFIGHTING MEASURES

### 5.1. Extinguishing media

- ▶ **DO NOT** use halogenated fire extinguishing agents.

Metal dust fires need to be smothered with sand, inert dry powders.

**DO NOT USE WATER, CO2 or FOAM.**

- ▶ Use DRY sand, graphite powder, dry sodium chloride based extinguishers, G-1 or Met L-X to smother fire.
- ▶ Confining or smothering material is preferable to applying water as chemical reaction may produce flammable and explosive hydrogen gas.
- ▶ Chemical reaction with CO2 may produce flammable and explosive methane.
- ▶ If impossible to extinguish, withdraw, protect surroundings and allow fire to burn itself out.

### 5.2. Special hazards arising from the substrate or mixture

|                             |   |
|-----------------------------|---|
| <b>Fire Incompatibility</b> | <ul style="list-style-type: none"> <li>▶ Reacts with acids producing flammable / explosive hydrogen (H2) gas</li> <li>▶ Avoid contamination with oxidising agents i.e. nitrates, oxidising acids, chlorine bleaches, pool chlorine etc. as ignition may result</li> </ul> |
|-----------------------------|---|

### 5.3. Advice for firefighters

|                              |  |
|------------------------------|--|
| <b>Fire Fighting</b>         | <ul style="list-style-type: none"> <li>▶ Alert Fire Brigade and tell them location and nature of hazard.</li> <li>▶ Wear breathing apparatus plus protective gloves.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water courses.</li> <li>▶ Use water delivered as a fine spray to control fire and cool adjacent area.</li> <li>▶ <b>DO NOT</b> approach containers suspected to be hot.</li> <li>▶ Cool fire exposed containers with water spray from a protected location.</li> <li>▶ If safe to do so, remove containers from path of fire.</li> <li>▶ Equipment should be thoroughly decontaminated after use.</li> </ul>   |
| <b>Fire/Explosion Hazard</b> | <ul style="list-style-type: none"> <li>▶ <b>DO NOT</b> disturb burning dust. Explosion may result if dust is stirred into a cloud, by providing oxygen to a large surface of hot metal.</li> <li>▶ <b>DO NOT</b> use water or foam as generation of explosive hydrogen may result.</li> </ul> <p>With the exception of the metals that burn in contact with air or water (for example, sodium), masses of combustible metals do not represent unusual fire risks because they have the ability to conduct heat away from hot spots so efficiently that the heat of combustion cannot be maintained - this means that it will require a lot of heat to ignite a mass of combustible metal. Generally, metal fire risks exist when sawdust, machine shavings and other metal 'fines' are present.</p> <p>Metal powders, while generally regarded as non-combustible:</p> <ul style="list-style-type: none"> <li>▶ May burn when metal is finely divided and energy input is high.</li> <li>▶ May react explosively with water.</li> <li>▶ May be ignited by friction, heat, sparks or flame.</li> <li>▶ May <b>REIGNITE</b> after fire is extinguished.</li> <li>▶ Will burn with intense heat.</li> </ul> |

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### Note:

- ▶ Metal dust fires are slow moving but intense and difficult to extinguish.
- ▶ Containers may explode on heating.
- ▶ Dusts or fumes may form explosive mixtures with air.
- ▶ Gases generated in fire may be poisonous, corrosive or irritating.
- ▶ Hot or burning metals may react violently upon contact with other materials, such as oxidising agents and extinguishing agents used on fires involving ordinary combustibles or flammable liquids.
- ▶ Temperatures produced by burning metals can be higher than temperatures generated by burning flammable liquids
- ▶ Some metals can continue to burn in carbon dioxide, nitrogen, water, or steam atmospheres in which ordinary combustibles or flammable liquids would be incapable of burning.

### Combustion products include:

- carbon monoxide (CO)
- carbon dioxide (CO<sub>2</sub>)
- aldehydes
- other pyrolysis products typical of burning organic material.

## SECTION 6 ACCIDENTAL RELEASE MEASURES

### 6.1. Personal precautions, protective equipment and emergency procedures

See section 8

### 6.2. Environmental precautions

See section 12

### 6.3. Methods and material for containment and cleaning up

|                     |   |
|---------------------|---|
| <b>Minor Spills</b> | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> <li>▶ Clean up all spills immediately.</li> <li>▶ Avoid contact with skin and eyes.</li> <li>▶ Wear impervious gloves and safety glasses.</li> <li>▶ Use dry clean up procedures and avoid generating dust.</li> <li>▶ Vacuum up (consider explosion-proof machines designed to be grounded during storage and use).</li> <li>▶ Do NOT use air hoses for cleaning</li> <li>▶ Place spilled material in clean, dry, sealable, labelled container.</li> </ul>  |
| <b>Major Spills</b> | <p>Environmental hazard - contain spillage.</p> <ul style="list-style-type: none"> <li>• Do not use compressed air to remove metal dusts from floors, beams or equipment</li> <li>• Vacuum cleaners, of flame-proof design, should be used to minimise dust accumulation.</li> <li>• Use non-sparking handling equipment, tools and natural bristle brushes.</li> <li>• Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations</li> <li>• Cover and reseal partially empty containers.</li> <li>• Do not allow chips, fines or dusts to contact water, particularly in enclosed areas.</li> </ul> <p>If molten:</p> <ul style="list-style-type: none"> <li>▶ Contain the flow using dry sand or salt flux as a dam.</li> <li>▶ All tooling (e.g., shovels or hand tools) and containers which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use.</li> <li>▶ Allow the spill to cool before remelting scrap.</li> </ul> <p>Moderate hazard.</p> <ul style="list-style-type: none"> <li>▶ <b>CAUTION:</b> Advise personnel in area.</li> <li>▶ Alert Emergency Services and tell them location and nature of hazard.</li> <li>▶ Control personal contact by wearing protective clothing.</li> <li>▶ Prevent, by any means available, spillage from entering drains or water courses.</li> <li>▶ Recover product wherever possible.</li> <li>▶ <b>IF DRY:</b> Use dry clean up procedures and avoid generating dust. Collect residues and place in sealed plastic bags or other containers for disposal. <b>IF WET:</b> Vacuum/shovel up and place in labelled containers for disposal.</li> <li>▶ <b>ALWAYS:</b> Wash area down with large amounts of water and prevent runoff into drains.</li> <li>▶ If contamination of drains or waterways occurs, advise Emergency Services.</li> </ul> |

### 6.4. Reference to other sections

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

## SECTION 7 HANDLING AND STORAGE

### 7.1. Precautions for safe handling

|                      |  |
|----------------------|--|
| <b>Safe handling</b> | <p>Formolten metals:</p> <ul style="list-style-type: none"> <li>• Molten metal and water can be an explosive combination. The risk is greatest when there is sufficient molten metal to entrap or seal off water. Water and other forms of contamination on or contained in scrap or remelt ingot are known to have caused explosions in melting operations. While the products may have minimal surface roughness and internal voids, there remains the possibility of moisture contamination or entrapment. If confined, even a few drops can lead to violent explosions.</li> <li>• All tooling, containers, molds and ladles, which come in contact with molten metal must be preheated or specially coated, rust free and approved for such use.</li> <li>• Any surfaces that may contact molten metal (e.g. concrete) should be specially coated</li> <li>• Drops of molten metal in water (e.g. from plasma arc cutting), while not normally an explosion hazard, can generate enough flammable hydrogen gas to present an explosion hazard. Vigorous circulation of the water and removal of the particles minimise the hazard.</li> </ul> <p>During melting operations, the following minimum guidelines should be observed:</p> <ul style="list-style-type: none"> <li>• Inspect all materials prior to furnace charging and completely remove surface contamination such as water, ice, snow, deposits of grease and oil or other surface contamination resulting from weather exposure, shipment, or storage.</li> <li>• Store materials in dry, heated areas with any cracks or cavities pointed downwards.</li> <li>• Preheat and dry large objects adequately before charging in to a furnace containing molten metal. This is typically done by the use of a drying oven or homogenising furnace. The dry cycle should bring the metal temperature of the coldest item of the batch to 200 degree C (400 deg F)</li> </ul> |
|----------------------|--|

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|                                      |  |
|--------------------------------------|--|
|                                      | <p>and then hold at that temperature for 6 hours.</p> <ul style="list-style-type: none"> <li>▶ Avoid all personal contact, including inhalation.</li> <li>▶ Wear protective clothing when risk of exposure occurs.</li> <li>▶ Use in a well-ventilated area.</li> <li>▶ Prevent concentration in hollows and sumps.</li> <li>▶ <b>DO NOT enter confined spaces until atmosphere has been checked.</b></li> <li>▶ <b>DO NOT allow material to contact humans, exposed food or food utensils.</b></li> <li>▶ Avoid contact with incompatible materials.</li> <li>▶ <b>When handling, DO NOT eat, drink or smoke.</b></li> <li>▶ Keep containers securely sealed when not in use.</li> <li>▶ Avoid physical damage to containers.</li> <li>▶ Always wash hands with soap and water after handling.</li> <li>▶ Work clothes should be laundered separately. Launder contaminated clothing before re-use.</li> <li>▶ Use good occupational work practice.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> <li>▶ Atmosphere should be regularly checked against established exposure standards to ensure safe working conditions are maintained.</li> <li>▶ Organic powders when finely divided over a range of concentrations regardless of particulate size or shape and suspended in air or some other oxidizing medium may form explosive dust-air mixtures and result in a fire or dust explosion (including secondary explosions)</li> <li>▶ Minimise airborne dust and eliminate all ignition sources. Keep away from heat, hot surfaces, sparks, and flame.</li> <li>▶ Establish good housekeeping practices.</li> <li>▶ Remove dust accumulations on a regular basis by vacuuming or gentle sweeping to avoid creating dust clouds.</li> <li>▶ Use continuous suction at points of dust generation to capture and minimise the accumulation of dusts. Particular attention should be given to overhead and hidden horizontal surfaces to minimise the probability of a 'secondary' explosion. According to NFPA Standard 654, dust layers 1/32 in.(0.8 mm) thick can be sufficient to warrant immediate cleaning of the area.</li> <li>▶ Do not use air hoses for cleaning.</li> <li>▶ Minimise dry sweeping to avoid generation of dust clouds. Vacuum dust-accumulating surfaces and remove to a chemical disposal area. Vacuums with explosion-proof motors should be used.</li> <li>▶ Control sources of static electricity. Dusts or their packages may accumulate static charges, and static discharge can be a source of ignition.</li> <li>▶ Solids handling systems must be designed in accordance with applicable standards (e.g. NFPA including 654 and 77) and other national guidance.</li> <li>▶ Do not empty directly into flammable solvents or in the presence of flammable vapors.</li> <li>▶ The operator, the packaging container and all equipment must be grounded with electrical bonding and grounding systems. Plastic bags and plastics cannot be grounded, and antistatic bags do not completely protect against development of static charges.</li> </ul> <p>Empty containers may contain residual dust which has the potential to accumulate following settling. Such dusts may explode in the presence of an appropriate ignition source.</p> <ul style="list-style-type: none"> <li>▶ <b>Do NOT cut, drill, grind or weld such containers.</b></li> <li>▶ In addition ensure such activity is not performed near full, partially empty or empty containers without appropriate workplace safety authorisation or permit.</li> </ul> |
| <b>Fire and explosion protection</b> | See section 5  |
| <b>Other information</b>             | <ul style="list-style-type: none"> <li>▶ Store in original containers.</li> <li>▶ Keep containers securely sealed.</li> <li>▶ Store in a cool, dry area protected from environmental extremes.</li> <li>▶ Store away from incompatible materials and foodstuff containers.</li> <li>▶ Protect containers against physical damage and check regularly for leaks.</li> <li>▶ Observe manufacturer's storage and handling recommendations contained within this SDS.</li> </ul> <p>For major quantities:</p> <ul style="list-style-type: none"> <li>▶ Consider storage in banded areas - ensure storage areas are isolated from sources of community water (including stormwater, ground water, lakes and streams).</li> <li>▶ Ensure that accidental discharge to air or water is the subject of a contingency disaster management plan; this may require consultation with local authorities.</li> </ul>  |

## 7.2. Conditions for safe storage, including any incompatibilities

|                                |  |
|--------------------------------|--|
| <b>Suitable container</b>      | <ul style="list-style-type: none"> <li>▶ Lined metal can, lined metal pail/ can.</li> <li>▶ Plastic pail.</li> <li>▶ Polyliner drum.</li> <li>▶ Packing as recommended by manufacturer.</li> <li>▶ Check all containers are clearly labelled and free from leaks.</li> <li>▶ Bulk bags: Reinforced bags required for dense materials.</li> <li>▶ Glass container is suitable for laboratory quantities</li> <li>▶ <b>CARE:</b> Packing of high density product in light weight metal or plastic packages may result in container collapse with product release</li> <li>▶ Heavy gauge metal packages / Heavy gauge metal drums</li> </ul>  |
| <b>Storage incompatibility</b> | <ul style="list-style-type: none"> <li>▶ <b>WARNING:</b> Avoid or control reaction with peroxides. All <i>transition metal</i> peroxides should be considered as potentially explosive. For example transition metal complexes of alkyl hydroperoxides may decompose explosively.</li> <li>▶ The pi-complexes formed between chromium(0), vanadium(0) and other transition metals (haloarene-metal complexes) and mono- or poly-fluorobenzene show extreme sensitivity to heat and are explosive.</li> <li>▶ Avoid reaction with borohydrides or cyanoborohydrides</li> <li>▶ Silver or silver salts readily form explosive silver fulminate in the presence of both nitric acid and ethanol. The resulting fulminate is much more sensitive and a more powerful detonator than mercuric fulminate.</li> <li>▶ Silver and its compounds and salts may also form explosive compounds in the presence of acetylene and nitromethane.</li> <li>▶ Many metals may incandesce, react violently, ignite or react explosively upon addition of concentrated nitric acid.</li> <li>▶ Avoid reaction with amines, mercaptans, strong acids and oxidising agents</li> <li>▶ Avoid strong acids, bases.</li> </ul> <p>Glycidyl ethers:</p> <ul style="list-style-type: none"> <li>▶ may form unstable peroxides on storage in air, light, sunlight, UV light or other ionising radiation, trace metals - inhibitor should be maintained at adequate levels</li> <li>▶ may polymerise in contact with heat, organic and inorganic free radical producing initiators</li> <li>▶ may polymerise with evolution of heat in contact with oxidisers, strong acids, bases and amines</li> <li>▶ react violently with strong oxidisers, permanganates, peroxides, acyl halides, alkalis, ammonium persulfate, bromine dioxide</li> <li>▶ attack some forms of plastics, coatings, and rubber</li> </ul> <p>Metals exhibit varying degrees of activity. Reaction is reduced in the massive form (sheet, rod, or drop), compared with finely divided forms. The less active metals will not burn in air but:</p> <ul style="list-style-type: none"> <li>▶ can react exothermically with oxidising acids to form noxious gases.</li> <li>▶ catalyse polymerisation and other reactions, particularly when finely divided</li> <li>▶ react with halogenated hydrocarbons (for example, copper dissolves when heated in carbon tetrachloride), sometimes forming explosive compounds.</li> </ul> |

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- ▶ Finely divided metal powders develop pyrophoricity when a critical specific surface area is exceeded; this is ascribed to high heat of oxide formation on exposure to air.
  - ▶ Safe handling is possible in relatively low concentrations of oxygen in an inert gas.
  - ▶ Several pyrophoric metals, stored in glass bottles have ignited when the container is broken on impact. Storage of these materials moist and in metal containers is recommended.
  - ▶ The reaction residues from various metal syntheses (involving vacuum evaporation and co-deposition with a ligand) are often pyrophoric.
- Factors influencing the pyrophoricity of metals are particle size, presence of moisture, nature of the surface of the particle, heat of formation of the oxide, or nitride, mass, hydrogen content, stress, purity and presence of oxide, among others.
- ▶ Many metals in elemental form react exothermically with compounds having active hydrogen atoms (such as acids and water) to form flammable hydrogen gas and caustic products.
  - ▶ Elemental metals may react with azo/diazo compounds to form explosive products.
  - ▶ Some elemental metals form explosive products with halogenated hydrocarbons.

### 7.3. Specific end use(s)

See section 1.2

## SECTION 8 EXPOSURE CONTROLS / PERSONAL PROTECTION

### 8.1. Control parameters

#### DERIVED NO EFFECT LEVEL (DNEL)

Not Available

#### PREDICTED NO EFFECT LEVEL (PNEC)

Not Available

#### OCCUPATIONAL EXPOSURE LIMITS (OEL)

#### INGREDIENT DATA

| Source   | Ingredient | Material name                    | TWA                    | STEL          | Peak          | Notes         |
|--|------------|----------------------------------|------------------------|---------------|---------------|---------------|
| UK Workplace Exposure Limits (WELs)  | silver     | Silver, metallic                 | 0.1 mg/m <sup>3</sup>  | Not Available | Not Available | Not Available |
| European Union (EU) First List of Indicative Occupational Exposure Limit Values (IOELVs) (English)                                       | silver     | Silver, metallic                 | 0,1 mg/m <sup>3</sup>  | Not Available | Not Available | Not Available |
| European Union (EU) Commission Directive 2006/15/EC establishing a second list of indicative occupational exposure limit values (IOELVs) | silver     | Silver (soluble compounds as Ag) | 0,01 mg/m <sup>3</sup> | Not Available | Not Available | Not Available |

#### EMERGENCY LIMITS

| Ingredient                                | Material name  | TEEL-1                | TEEL-2                | TEEL-3                  |
|---|--|-----------------------|-----------------------|-------------------------|
| silver                                    | Silver   | 0.3 mg/m <sup>3</sup> | 170 mg/m <sup>3</sup> | 990 mg/m <sup>3</sup>   |
| bisphenol A diglycidyl ether resin, solid | Epoxy resin includes EPON 1001, 1007, 820, ERL-2795  | 90 mg/m <sup>3</sup>  | 990 mg/m <sup>3</sup> | 5,900 mg/m <sup>3</sup> |
| bisphenol A diglycidyl ether resin, solid | Polypropylene glycol, (chloromethyl) oxirane polymer | 30 mg/m <sup>3</sup>  | 330 mg/m <sup>3</sup> | 2,000 mg/m <sup>3</sup> |

| Ingredient                                | Original IDLH   | Revised IDLH                               |
|---|---|--|
| silver                                    | N.E. mg/m <sup>3</sup> / Unknown mg/m <sup>3</sup> / N.E. ppm / Unknown ppm | 10 mg/m <sup>3</sup> / 1 mg/m <sup>3</sup> |
| bisphenol A diglycidyl ether resin, solid | Not Available   | Not Available                              |
| formaldehyde/ xylene copolymer            | Not Available   | Not Available                              |

#### MATERIAL DATA

The adopted TLV-TWA for silver dust and fumes is 0.1 mg/m<sup>3</sup> and for the more toxic soluble silver compounds the adopted value is 0.01 mg/m<sup>3</sup>. Cases of argyria (a slate to blue-grey discolouration of epithelial tissues) have been recorded when workers were exposed to silver nitrate at concentrations of 0.1 mg/m<sup>3</sup> (as silver). Exposure to very high concentrations of silver fume has caused diffuse pulmonary fibrosis. Percutaneous absorption of silver compounds is reported to have resulted in allergy. Based on a 25% retention upon inhalation and a 10 m<sup>3</sup>/day respiratory volume, exposure to 0.1 mg/m<sup>3</sup> (TWA) would result in total deposition of no more than 1.5 gms in 25 years.

### 8.2. Exposure controls

#### 8.2.1. Appropriate engineering controls

- Metal dusts must be collected at the source of generation as they are potentially explosive.
- ▶ Avoid ignition sources.
  - ▶ Good housekeeping practices must be maintained.
  - ▶ Dust accumulation on the floor, ledges and beams can present a risk of ignition, flame propagation and secondary explosions.
  - ▶ Do not use compressed air to remove settled materials from floors, beams or equipment
  - ▶ Vacuum cleaners, of flame-proof design, should be used to minimise dust accumulation.
  - ▶ Use non-sparking handling equipment, tools and natural bristle brushes. Cover and reseal partially empty containers. Provide grounding and bonding where necessary to prevent accumulation of static charges during metal dust handling and transfer operations.
  - ▶ Do not allow chips, fines or dusts to contact water, particularly in enclosed areas.
  - ▶ Metal spraying and blasting should, where possible, be conducted in separate rooms. This minimises the risk of supplying oxygen, in the form of metal oxides, to potentially reactive finely divided metals such as aluminium, zinc, magnesium or titanium.
  - ▶ Work-shops designed for metal spraying should possess smooth walls and a minimum of obstructions, such as ledges, on which dust accumulation is

Continued...

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- ▶ possible.
- ▶ Wet scrubbers are preferable to dry dust collectors.
- ▶ Bag or filter-type collectors should be sited outside the workrooms and be fitted with explosion relief doors.
- ▶ Cyclones should be protected against entry of moisture as reactive metal dusts are capable of spontaneous combustion in humid or partially wetted states.
- ▶ Local exhaust systems must be designed to provide a minimum capture velocity at the fume source, away from the worker, of 0.5 metre/sec.
- ▶ Local ventilation and vacuum systems must be designed to handle explosive dusts. Dry vacuum and electrostatic precipitators must not be used, unless specifically approved for use with flammable/ explosive dusts.

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:                   |
| welding, brazing fumes (released at relatively low velocity into moderately still air) | 0.5-1.0 m/s (100-200 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 1-2.5 m/s (200-500 f/min.) for extraction of gases discharged 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.

## 8.2.2. Personal protection



## Eye and face protection

- ▶ Safety glasses with side shields.
- ▶ Chemical goggles.
- ▶ 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], [AS/NZS 1336 or national equivalent]

## 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 moisturizer 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.

For general applications, gloves with a thickness typically greater than 0.35 mm, are recommended.

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.

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.

Note: Depending on the activity being conducted, gloves of varying thickness may be required for specific tasks. For example:

- 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.
- 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

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.

- ▶ Protective gloves eg. Leather gloves or gloves with Leather facing
- ▶ When handling liquid-grade epoxy resins wear chemically protective gloves (e.g nitrile or nitrile-butadiene rubber), boots and aprons.
- ▶ **DO NOT use cotton or leather (which absorb and concentrate the resin), polyvinyl chloride, rubber or polyethylene gloves (which absorb the resin).**
- ▶ **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.**



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|                         |  |
|-------------------------|--|
|                         | Experience indicates that the following polymers are suitable as glove materials for protection against undissolved, dry solids, where abrasive particles are not present.<br><ul style="list-style-type: none"> <li>▶ polychloroprene.</li> <li>▶ nitrile rubber.</li> <li>▶ butyl rubber.</li> <li>▶ fluorocautchouc.</li> <li>▶ polyvinyl chloride.</li> </ul> Gloves should be examined for wear and/ or degradation constantly. |
| <b>Body protection</b>  | See Other protection below   |
| <b>Other protection</b> | <ul style="list-style-type: none"> <li>▶ Overalls.</li> <li>▶ P.V.C. apron.</li> <li>▶ Barrier cream.</li> <li>▶ Skin cleansing cream.</li> <li>▶ Eye wash unit.</li> </ul>  |
| <b>Thermal hazards</b>  | Not Available  |

## Respiratory protection

Particulate. (AS/NZS 1716 &amp; 1715, EN 143:000 &amp; 149:001, ANSI Z88 or national equivalent)

| Required Minimum Protection Factor | Half-Face Respirator | Full-Face Respirator | Powered Air Respirator |
|------------------------------------|----------------------|----------------------|------------------------|
| up to 10 x ES                      | P1<br>Air-line*      | -<br>-               | PAPR-P1<br>-           |
| up to 50 x ES                      | Air-line**           | P2                   | PAPR-P2                |
| up to 100 x ES                     | -                    | P3<br>Air-line*      | -                      |
| 100+ x ES                          | -                    | Air-line**           | PAPR-P3                |

\* - Negative pressure demand \*\* - Continuous flow

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 = Sulphur dioxide(SO<sub>2</sub>), G = Agricultural chemicals, K = Ammonia(NH<sub>3</sub>), Hg = Mercury, NO = Oxides of nitrogen, MB = Methyl bromide, AX = Low boiling point organic compounds(below 65 degC)

- ▶ Respirators may be necessary when engineering and administrative controls do not adequately prevent exposures.
- ▶ The decision to use respiratory protection should be based on professional judgment that takes into account toxicity information, exposure measurement data, and frequency and likelihood of the worker's exposure - ensure users are not subject to high thermal loads which may result in heat stress or distress due to personal protective equipment (powered, positive flow, full face apparatus may be an option).
- ▶ Published occupational exposure limits, where they exist, will assist in determining the adequacy of the selected respiratory protection. These may be government mandated or vendor recommended.
- ▶ Certified respirators will be useful for protecting workers from inhalation of particulates when properly selected and fit tested as part of a complete respiratory protection program.
- ▶ Use approved positive flow mask if significant quantities of dust becomes airborne.
- ▶ Try to avoid creating dust conditions.

## 8.2.3. Environmental exposure controls

See section 12

## SECTION 9 PHYSICAL AND CHEMICAL PROPERTIES

## 9.1. Information on basic physical and chemical properties

|   |                |  |                |
|---|----------------|--|----------------|
| <b>Appearance</b>                                   | Not Available  |  |                |
| <b>Physical state</b>                               | Solid          | <b>Relative density (Water = 1)</b>            | 3.14           |
| <b>Odour</b>  | Not Available  | <b>Partition coefficient n-octanol / water</b> | Not Available  |
| <b>Odour threshold</b>                              | Not Available  | <b>Auto-ignition temperature (°C)</b>          | Not Available  |
| <b>pH (as supplied)</b>                             | Not Available  | <b>Decomposition temperature</b>               | Not Available  |
| <b>Melting point / freezing point (°C)</b>          | Not Available  | <b>Viscosity (cSt)</b>                         | >20.5          |
| <b>Initial boiling point and boiling range (°C)</b> | 150            | <b>Molecular weight (g/mol)</b>                | Not Available  |
| <b>Flash point (°C)</b>                             | 250            | <b>Taste</b>                                   | Not Available  |
| <b>Evaporation rate</b>                             | Not Available  | <b>Explosive properties</b>                    | Not Available  |
| <b>Flammability</b>                                 | Not Applicable | <b>Oxidising properties</b>                    | Not Available  |
| <b>Upper Explosive Limit (%)</b>                    | Not Available  | <b>Surface Tension (dyn/cm or mN/m)</b>        | Not Applicable |
| <b>Lower Explosive Limit (%)</b>                    | Not Available  | <b>Volatile Component (%vol)</b>               | Not Available  |
| <b>Vapour pressure (kPa)</b>                        | Not Available  | <b>Gas group</b>                               | Not Available  |
| <b>Solubility in water (g/L)</b>                    | Immiscible     | <b>pH as a solution (1%)</b>                   | Not Available  |
| <b>Vapour density (Air = 1)</b>                     | Not Available  | <b>VOC g/L</b>                                 | Not Available  |



## 9.2. Other information

Not Available

## SECTION 10 STABILITY AND REACTIVITY

|  |  |
|--|--|
| 10.1.Reactivity                          | See section 7.2  |
| 10.2. Chemical stability                 | <ul style="list-style-type: none"> <li>▶ Unstable in the presence of incompatible materials.</li> <li>▶ Product is considered stable.</li> <li>▶ Hazardous polymerisation will not occur.</li> </ul> |
| 10.3. Possibility of hazardous reactions | See section 7.2  |
| 10.4. Conditions to avoid                | See section 7.2  |
| 10.5. Incompatible materials             | See section 7.2  |
| 10.6. Hazardous decomposition products   | See section 5.3  |

## SECTION 11 TOXICOLOGICAL INFORMATION

### 11.1. Information on toxicological effects

|              |  |
|--------------|--|
| Inhaled      | <p>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. Not normally a hazard due to non-volatile nature of product</p> <p>Inhalation of freshly formed metal oxide particles sized below 1.5 microns and generally between 0.02 to 0.05 microns may result in 'metal fume fever'. Symptoms may be delayed for up to 12 hours and begin with the sudden onset of thirst, and a sweet, metallic or foul taste in the mouth. Other symptoms include upper respiratory tract irritation accompanied by coughing and a dryness of the mucous membranes, lassitude and a generalised feeling of malaise. Mild to severe headache, nausea, occasional vomiting, fever or chills, exaggerated mental activity, profuse sweating, diarrhoea, excessive urination and prostration may also occur. Tolerance to the fumes develops rapidly, but is quickly lost. All symptoms usually subside within 24-36 hours following removal from exposure.</p>   |
| Ingestion    | <p>Male ratsexposed to a single oral dose of bisphenol A diglycidyl ether (BADGE) at 750,1000, and 2000 mg/kg/day showed a significantly increase in the number ofimmature and maturing sperm on the testis. There were no significantdifferences with respect to sperm head count, sperm motility, and spermbnormality in the BADGE treatment groups</p> <p>The material has <b>NOT</b> 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. The material may still be damaging to the health of the individual, following ingestion, especially where pre-existing organ (e.g liver, kidney) damage is evident. Present definitions of harmful or toxic substances are generally based on doses producing mortality rather than those producing morbidity (disease, ill-health). Gastrointestinal tract discomfort may produce nausea and vomiting. In an occupational setting however, ingestion of insignificant quantities is not thought to be cause for concern.</p>  |
| Skin Contact | <p>Evidence exists, or practical experience predicts, that the material either produces inflammation of the skin in a substantial number of individuals following direct contact, and/or produces significant inflammation when applied to the healthy intact skin of animals, for up to four hours, such inflammation being present twenty-four hours or more after the end of the exposure period. Skin irritation may also be present after prolonged or repeated exposure; this may result in a form of contact dermatitis (nonallergic). The dermatitis is often characterised by skin redness (erythema) and swelling (oedema) which may progress to blistering (vesiculation), scaling and thickening of the epidermis. At the microscopic level there may be intercellular oedema of the spongy layer of the skin (spongiosis) and intracellular oedema of the epidermis.</p> <p>The material may accentuate any pre-existing dermatitis condition</p> <p>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.</p>   |
| Eye          | <p>Evidence exists, or practical experience predicts, that the material may cause eye irritation in a substantial number of individuals and/or may produce significant ocular lesions which are present twenty-four hours or more after instillation into the eye(s) of experimental animals.</p> <p>Repeated or prolonged eye contact may cause inflammation characterised by temporary redness (similar to windburn) of the conjunctiva (conjunctivitis); temporary impairment of vision and/or other transient eye damage/ulceration may occur.</p>   |
| Chronic      | <p>Practical experience shows that skin contact with the material is capable either of inducing a sensitisation reaction in a substantial number of individuals, and/or of producing a positive response in experimental animals.</p> <p>Silver is one of the most physically and physiologically cumulative of the elements. Chronic exposure to silver salts may cause argyria, a permanent ashen-grey discolouration of the skin, conjunctiva and internal organs (due to the deposit of an insoluble albuminate of silver).</p> <p>The respiratory tract may also be a site of local argyria (following chronic inhalation exposures) with a mild chronic bronchitis being the only obvious symptom.</p> <p>All glycidyl ethers show genotoxic potential due their alkylating properties. Those glycidyl ethers that have been investigated in long term studies exhibit more or less marked carcinogenic potential. Alkylating agents may damage the stem cell which acts as the precursor to components of the blood. Loss of the stem cell may result in pancytopenia (a reduction in the number of red and white blood cells and platelets) with a latency period corresponding to the lifetime of the individual blood cells. Granulocytopenia (a reduction in granular leukocytes) develops within days and thrombocytopenia (a disorder involving platelets), within 1-2 weeks, whilst loss of erythrocytes (red blood cells) need months to become clinically manifest. Aplastic anaemia develops due to complete destruction of the stem cells.</p> <p>Glycidyl ethers have been shown to cause allergic contact dermatitis in humans. Glycidyl ethers generally cause skin sensitization in experimental animals. Necrosis of the mucous membranes of the nasal cavities was induced in mice exposed to allyl glycidyl ether.</p> <p>A study of workers with mixed exposures was inconclusive with regard to the effects of specific glycidyl ethers. Phenyl glycidyl ether, but not <i>n</i>-butyl glycidyl ether, induced morphological transformation in mammalian cells <i>in vitro</i>. <i>n</i>-Butyl glycidyl ether induced micronuclei in mice <i>in vivo</i> following intraperitoneal but not oral administration. Phenyl glycidyl ether did not induce micronuclei or chromosomal aberrations <i>in vivo</i> or chromosomal aberrations in animal cells <i>in vitro</i>. Alkyl C12 or C14 glycidyl ether did not induce DNA damage in cultured human cells or mutation in cultured animal cells. Allyl glycidyl ether induced mutation in <i>Drosophila</i>. The glycidyl ethers were generally mutagenic to bacteria</p> <p>On the basis, primarily, of animal experiments, concern has been expressed by at least one classification body that the material may produce carcinogenic or mutagenic effects; in respect of the available information, however, there presently exists inadequate data for making a satisfactory assessment.</p> |

|  |   |               |
|--|---|---------------|
| 9400 One-Part Epoxy Electrically Conductive Adhesive, Low Tg | TOXICITY  | IRRITATION    |
|  | #51allergy#551badge#55bisphender#55badge#55bisphen#551oxintro#551oxirane <sup>[2]</sup> | Not Available |

## 9400 One-Part Epoxy Electrically Conductive Adhesive, Low Tg

|   |  |               |
|---|--|---------------|
| silver                                    | TOXICITY                                     | IRRITATION    |
|   | Oral (rat) LD50: >2000 mg/kg <sup>[1]</sup>  | Not Available |
| bisphenol A diglycidyl ether resin, solid | TOXICITY                                     | IRRITATION    |
|   | dermal (rat) LD50: >800 mg/kg <sup>[1]</sup> | Not Available |
|   | Oral (rat) LD50: 13447 mg/kg <sup>[1]</sup>  |               |
| formaldehyde/ xylene copolymer            | TOXICITY                                     | IRRITATION    |
|   | Not Available                                | Not Available |

**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

|   |  |
|---|--|
| BISPHENOL A DIGLYCIDYL ETHER RESIN, SOLID | The following information refers to contact allergens as a group and may not be specific to this product. Contact allergies quickly manifest themselves as contact eczema, more rarely as urticaria or Quincke's oedema. 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. 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. The material may cause skin irritation after prolonged or repeated exposure and may produce a contact dermatitis (nonallergic). This form of dermatitis is often characterised by skin redness (erythema) and swelling epidermis. CAUTION: Epoxy resin products may contain sensitising glycidyl ethers, even when these are not mentioned in the information given for the product. The likely occurrence of these is greatly reduced in solid grades of the resin. |
|   | BISPHENOL A DIGLYCIDYL ETHER RESIN, SOLID & FORMALDEHYDE/ XYLENE COPOLYMER   |

|                                   |   |                          |   |
|-----------------------------------|---|--------------------------|---|
| Acute Toxicity                    | ✘ | Carcinogenicity          | ⊖ |
| Skin Irritation/Corrosion         | ✔ | Reproductivity           | ⊖ |
| Serious Eye Damage/Irritation     | ✔ | STOT - Single Exposure   | ⊖ |
| Respiratory or Skin sensitisation | ✔ | STOT - Repeated Exposure | ⊖ |
| Mutagenicity                      | ⊖ | Aspiration Hazard        | ⊖ |

**Legend:** ✘ – Data available but does not fill the criteria for classification  
✔ – Data available to make classification  
⊖ – Data Not Available to make classification

## SECTION 12 ECOLOGICAL INFORMATION

## 12.1. Toxicity

| Ingredient                                | Endpoint | Test Duration (hr) | Species                       | Value           | Source |
|---|----------|--------------------|-------------------------------|-----------------|--------|
| silver                                    | LC50     | 96                 | Fish                          | 0.00148mg/L     | 2      |
| silver                                    | EC50     | 48                 | Crustacea                     | 0.00024mg/L     | 4      |
| silver                                    | EC50     | 96                 | Algae or other aquatic plants | 0.001628837mg/L | 4      |
| silver                                    | BCF      | 336                | Crustacea                     | 0.02mg/L        | 4      |
| silver                                    | EC50     | 48                 | Crustacea                     | 0.00024mg/L     | 4      |
| silver                                    | NOEC     | 480                | Crustacea                     | 0.00031mg/L     | 2      |
| bisphenol A diglycidyl ether resin, solid | LC50     | 96                 | Fish                          | 1.2mg/L         | 2      |
| bisphenol A diglycidyl ether resin, solid | EC50     | 72                 | Algae or other aquatic plants | 9.4mg/L         | 2      |
| bisphenol A diglycidyl ether resin, solid | EC50     | 24                 | Crustacea                     | 3.6mg/L         | 2      |
| bisphenol A diglycidyl ether resin, solid | NOEC     | 72                 | Algae or other aquatic plants | 2.4mg/L         | 2      |

**Legend:**

Extracted from 1. IUCLID Toxicity Data 2. Europe ECHA Registered Substances - Ecotoxicological Information - Aquatic Toxicity 3. EPIWIN Suite V3.12 (QSAR) - Aquatic Toxicity Data (Estimated) 4. US EPA, Ecotox database - Aquatic Toxicity Data 5. ECETOC Aquatic Hazard Assessment Data 6. NITE (Japan) - Bioconcentration Data 7. METI (Japan) - Bioconcentration Data 8. 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.

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Metal-containing inorganic substances generally have negligible vapour pressure and are not expected to partition to air. Once released to surface waters and moist soils their fate depends on solubility and dissociation in water. Environmental processes (such as oxidation and the presence of acids or bases) may transform insoluble metals to more soluble ionic forms. Microbiological processes may also transform insoluble metals to more soluble forms. Such ionic species may bind to dissolved ligands or sorb to solid particles in aquatic or aqueous media. A significant proportion of dissolved/sorbed metals will end up in sediments through the settling of suspended particles. The remaining metal ions can then be taken up by aquatic organisms.

When released to dry soil most metals will exhibit limited mobility and remain in the upper layer; some will leach locally into ground water and/or surface water ecosystems when soaked by rain or melt ice. Environmental processes may also be important in changing solubilities.

Even though many metals show few toxic effects at physiological pHs, transformation may introduce new or magnified effects.

A metal ion is considered infinitely persistent because it cannot degrade further.

The current state of science does not allow for an unambiguous interpretation of various measures of bioaccumulation.

The counter-ion may also create health and environmental concerns once isolated from the metal. Under normal physiological conditions the counter-ion may be essentially insoluble and may not be bioavailable.

Environmental processes may enhance bioavailability.

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 164d)

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.

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 an amethyl 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 Fe<sup>3+</sup> ions also enhanced the photodegradation of BPF. The effect of pH value on the BPF photodegradation was also important.

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):

**Environmental 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. Volatilisation of ethyloxirane from water surfaces would be expected based on the moderate estimated Henry's Law constant. If ethyloxirane is released to soil, it is expected to have low adsorption and thus very high mobility. Volatilisation from moist soil and dry soil surfaces is expected, based on its vapour pressure. It is expected that ethyloxirane exists solely as a vapour in ambient atmosphere, based on its very high vapour pressure. Ethyloxirane may also be removed from the atmosphere by wet deposition processes, considering its relatively high water solubility.

**Persistence:** 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)\*.

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. A further model-predicted biodegradation half-life of 15 days in water was obtained and used to predict the half-life of this chemical in soil and sediment by applying Boethling's extrapolation factors (t<sub>1/2</sub> water : t<sub>1/2</sub> soil : t<sub>1/2</sub> sediment = 1 : 1 : 4) (Boethling 1995). According to these values, it can be concluded that ethyloxirane does not meet the persistence criteria in water and soil (half-lives = 182 days) and sediments (half-life = 365 days).

Experimental and modelled log Kow values of 0.68 and 0.86, respectively, indicate that the potential for bioaccumulation of ethyloxirane in organisms is likely to be low. Modelled bioaccumulation-factor (BAF) and bioconcentration-factor (BCF) values of 1 to 17 L/kg indicate that ethyloxirane does not meet the bioaccumulation criteria (BCF/BAF = 5000)\*

**Ecotoxicity:**

Experimental ecotoxicological data for ethyloxirane (OECD 2001) indicate low to moderate toxicity to aquatic organisms. For fish and water flea, acute LC50/EC50 values vary within a narrow range of 70-215 mg/L; for algae, toxicity values exceed 500 mg/L, while for bacteria they are close to 5000 mg/L

\* Persistence and Bioaccumulation Regulations (Canada 2000).

For silver and its compounds:

**Environmental fate:**

Silver is a rare but naturally occurring metal, often found deposited as a mineral ore in association with other elements. Emissions from smelting operations, manufacture and disposal of certain photographic and electrical supplies, coal combustion, and cloud seeding are some of the anthropogenic sources of silver in the biosphere. The global biogeochemical movements of silver are characterized by releases to the atmosphere, water, and land by natural and anthropogenic sources, long-range transport of fine particles in the atmosphere, wet and dry deposition, and sorption to soils and sediments.

In general, accumulation of silver by terrestrial plants from soils is low, even if the soil is amended with silver-containing sewage sludge or the plants are grown on tailings from silver mines, where silver accumulates mainly in the root systems.

The ability to accumulate dissolved silver varies widely between species. Some reported bioconcentration factors for marine organisms (calculated as milligrams of silver per kilogram fresh weight organism divided by milligrams of silver per litre of medium) are 210 in diatoms, 240 in brown algae, 330 in mussels, 2300 in scallops, and 18 700 in oysters, whereas bioconcentration factors for freshwater organisms have been reported to range from negligible in bluegills (*Lepomis macrochirus*) to 60 in daphnids; these values represent uptake of bioavailable silver in laboratory experiments. Laboratory studies with the less toxic silver compounds, such as silver sulfide and silver chloride, reveal that accumulation of silver does not necessarily lead to adverse effects. At concentrations normally encountered in the environment, food-chain biomagnification of silver in aquatic systems is unlikely. Elevated silver concentrations in biota occur in the vicinities of sewage outfalls, electroplating plants, mine waste sites, and silver iodide-seeded areas. Maximum concentrations recorded in field collections, in milligrams total silver per kilogram dry weight (tissue), were 1.5 in marine mammals (liver) (except Alaskan beluga whales *Delphinapterus leucas*, which had concentrations 2 orders of magnitude higher than those of other marine mammals), 6 in fish

(bone), 14 in plants (whole), 30 in annelid worms (whole), 44 in birds (liver), 110 in mushrooms (whole), 185 in bivalve molluscs (soft parts), and 320 in gastropods (whole).

#### Ecotoxicity:

In general, silver ion was less toxic to freshwater aquatic organisms under conditions of low dissolved silver ion concentration and increasing water pH, hardness, sulfides, and dissolved and particulate organic loadings; under static test conditions, compared with flow-through regimens; and when animals were adequately nourished instead of being starved. Silver ions are very toxic to microorganisms. However, there is generally no strong inhibitory effect on microbial activity in sewage treatment plants because of reduced bioavailability due to rapid complexation and adsorption. Free silver ion was lethal to representative species of sensitive aquatic plants, invertebrates, and teleosts at nominal water concentrations of 1-5 ug/litre. Adverse effects occur on development of trout at concentrations as low as 0.17 ug/litre and on phytoplankton species composition and succession at 0.3-0.6 ug/litre.

A knowledge of the speciation of silver and its consequent bioavailability is crucial to understanding the potential risk of the metal. Measurement of free ionic silver is the only direct method that can be used to assess the likely effects of the metal on organisms. Speciation models can be used to assess the likely proportion of the total silver measured that is bioavailable to organisms. Unlike some other metals, background freshwater concentrations in pristine and most urban areas are well below concentrations causing toxic effects. Levels in most industrialized areas border on the effect concentration, assuming that conditions favour bioavailability. On the basis of available toxicity test results, it is unlikely that bioavailable free silver ions would ever be at sufficiently high concentrations to cause toxicity in marine environments.

No data were found on effects of silver on wild birds or mammals. Silver was harmful to poultry (tested as silver nitrate) at concentrations as low as 100 mg total silver/litre in drinking-water or 200 mg total silver/kg in diets. Sensitive laboratory mammals were adversely affected at total silver concentrations (added as silver nitrate) as low as 250 ug/litre in drinking-water (brain histopathology), 6 mg/kg in diet (high accumulations in kidneys and liver), or 13.9 mg/kg body weight (lethality).

Silver and Silver Compounds; Concise International Chemical Assessment Document (CICAD) 44 IPCS InChem (WHO)

The transport of silver through estuarine and coastal marine systems is dependent on biological uptake and incorporation. Uptake by phytoplankton is rapid, in proportion to silver concentration and inversely proportional to salinity. In contrast to studies performed with other toxic metals, silver availability appears to be controlled by both the free silver ion concentration and the concentration of other silver complexes. Silver incorporated by phytoplankton is not lost as salinity increase; as a result silver associated with cellular material is largely retained within the estuary. Phytoplankton exhibit a variable sensitivity to silver. Sensitive species exhibit a marked delay in the onset of growth in response to silver at low concentrations, even though maximum growth rates are similar to controls. A delay in the onset of growth reduces the ability of a population to respond to short-term favourable conditions and to succeed within the community.

James G. Saunders and George R. Abbe: Aquatic Toxicology and Environmental Fate; ASTM STP 1007, 1989, pp 5-18

## 12.2. Persistence and degradability

| Ingredient                                | Persistence: Water/Soil | Persistence: Air |
|---|-------------------------|------------------|
| bisphenol A diglycidyl ether resin, solid | HIGH                    | HIGH             |

## 12.3. Bioaccumulative potential

| Ingredient                                | Bioaccumulation       |
|---|-----------------------|
| bisphenol A diglycidyl ether resin, solid | LOW (LogKOW = 2.6835) |

## 12.4. Mobility in soil

| Ingredient                                | Mobility          |
|---|-------------------|
| bisphenol A diglycidyl ether resin, solid | LOW (KOC = 51.43) |

## 12.5. Results of PBT and vPvB assessment

|                         | P             | B             | T             |
|-------------------------|---------------|---------------|---------------|
| Relevant available data | Not Available | Not Available | Not Available |
| PBT Criteria fulfilled? | Not Available | Not Available | Not Available |

## 12.6. Other adverse effects

No data available

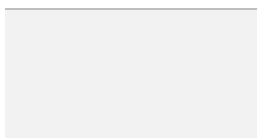
## SECTION 13 DISPOSAL CONSIDERATIONS

### 13.1. Waste treatment methods


|                                     |  |
|-------------------------------------|--|
| <b>Product / Packaging disposal</b> | <ul style="list-style-type: none"> <li>▶ Containers may still present a chemical hazard/ danger when empty.</li> <li>▶ Return to supplier for reuse/ recycling if possible.</li> </ul> Otherwise: <ul style="list-style-type: none"> <li>▶ 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.</li> <li>▶ Where possible retain label warnings and SDS and observe all notices pertaining to the product.</li> <li>▶ <b>DO NOT allow wash water from cleaning or process equipment to enter drains.</b></li> <li>▶ It may be necessary to collect all wash water for treatment before disposal.</li> <li>▶ In all cases disposal to sewer may be subject to local laws and regulations and these should be considered first.</li> <li>▶ Where in doubt contact the responsible authority.</li> </ul> |
| <b>Waste treatment options</b>      | Not Available  |
| <b>Sewage disposal options</b>      | Not Available  |

## SECTION 14 TRANSPORT INFORMATION

### Labels Required



## 9400 One-Part Epoxy Electrically Conductive Adhesive, Low Tg

|                  |   |
|------------------|---|
| Marine Pollutant |  |
| HAZCHEM          | 2Z  |

## Land transport (ADR)

|                                    |   |                                |    |                     |                |              |   |                    |                 |                  |      |
|------------------------------------|---|--------------------------------|----|---------------------|----------------|--------------|---|--------------------|-----------------|------------------|------|
| 14.1.UN number                     | 3077  |                                |    |                     |                |              |   |                    |                 |                  |      |
| 14.2.UN proper shipping name       | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains silver and bisphenol A diglycidyl ether resin, solid)  |                                |    |                     |                |              |   |                    |                 |                  |      |
| 14.3. Transport hazard class(es)   | <table border="1"> <tr> <td>Class</td> <td>9</td> </tr> <tr> <td>Subrisk</td> <td>Not Applicable</td> </tr> </table>  | Class                          | 9  | Subrisk             | Not Applicable |              |   |                    |                 |                  |      |
| Class                              | 9   |                                |    |                     |                |              |   |                    |                 |                  |      |
| Subrisk                            | Not Applicable  |                                |    |                     |                |              |   |                    |                 |                  |      |
| 14.4.Packing group                 | III   |                                |    |                     |                |              |   |                    |                 |                  |      |
| 14.5.Environmental hazard          | Not Applicable  |                                |    |                     |                |              |   |                    |                 |                  |      |
| 14.6. Special precautions for user | <table border="1"> <tr> <td>Hazard identification (Kemler)</td> <td>90</td> </tr> <tr> <td>Classification code</td> <td>M7</td> </tr> <tr> <td>Hazard Label</td> <td>9</td> </tr> <tr> <td>Special provisions</td> <td>274 335 375 601</td> </tr> <tr> <td>Limited quantity</td> <td>5 kg</td> </tr> </table> | Hazard identification (Kemler) | 90 | Classification code | M7             | Hazard Label | 9 | Special provisions | 274 335 375 601 | Limited quantity | 5 kg |
| Hazard identification (Kemler)     | 90  |                                |    |                     |                |              |   |                    |                 |                  |      |
| Classification code                | M7  |                                |    |                     |                |              |   |                    |                 |                  |      |
| Hazard Label                       | 9   |                                |    |                     |                |              |   |                    |                 |                  |      |
| Special provisions                 | 274 335 375 601   |                                |    |                     |                |              |   |                    |                 |                  |      |
| Limited quantity                   | 5 kg  |                                |    |                     |                |              |   |                    |                 |                  |      |

## Air transport (ICAO-IATA / DGR)

|   |  |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
|---|--|--------------------|--------------------|---------------------------------|----------------|-------------------------------|--------|--|-----|--|--------|---|------|--|---------|
| 14.1. UN number   | 3077   |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| 14.2. UN proper shipping name                             | Environmentally hazardous substance, solid, n.o.s. * (contains silver and bisphenol A diglycidyl ether resin, solid)   |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| 14.3. Transport hazard class(es)                          | <table border="1"> <tr> <td>ICAO/IATA Class</td> <td>9</td> </tr> <tr> <td>ICAO / IATA Subrisk</td> <td>Not Applicable</td> </tr> <tr> <td>ERG Code</td> <td>9L</td> </tr> </table>  | ICAO/IATA Class    | 9                  | ICAO / IATA Subrisk             | Not Applicable | ERG Code                      | 9L     |  |     |  |        |   |      |  |         |
| ICAO/IATA Class   | 9  |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| ICAO / IATA Subrisk                                       | Not Applicable   |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| ERG Code  | 9L   |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| 14.4. Packing group                                       | III  |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| 14.5. Environmental hazard                                | Not Applicable   |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| 14.6. Special precautions for user                        | <table border="1"> <tr> <td>Special provisions</td> <td>A97 A158 A179 A197</td> </tr> <tr> <td>Cargo Only Packing Instructions</td> <td>956</td> </tr> <tr> <td>Cargo Only Maximum Qty / Pack</td> <td>400 kg</td> </tr> <tr> <td>Passenger and Cargo Packing Instructions</td> <td>956</td> </tr> <tr> <td>Passenger and Cargo Maximum Qty / Pack</td> <td>400 kg</td> </tr> <tr> <td>Passenger and Cargo Limited Quantity Packing Instructions</td> <td>Y956</td> </tr> <tr> <td>Passenger and Cargo Limited Maximum Qty / Pack</td> <td>30 kg G</td> </tr> </table> | Special provisions | A97 A158 A179 A197 | Cargo Only Packing Instructions | 956            | Cargo Only Maximum Qty / Pack | 400 kg | Passenger and Cargo Packing Instructions | 956 | Passenger and Cargo Maximum Qty / Pack | 400 kg | Passenger and Cargo Limited Quantity Packing Instructions | Y956 | Passenger and Cargo Limited Maximum Qty / Pack | 30 kg G |
| Special provisions  | A97 A158 A179 A197   |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| Cargo Only Packing Instructions                           | 956  |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| Cargo Only Maximum Qty / Pack                             | 400 kg   |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| Passenger and Cargo Packing Instructions                  | 956  |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| Passenger and Cargo Maximum Qty / Pack                    | 400 kg   |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| Passenger and Cargo Limited Quantity Packing Instructions | Y956   |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |
| Passenger and Cargo Limited Maximum Qty / Pack            | 30 kg G  |                    |                    |                                 |                |                               |        |  |     |  |        |   |      |  |         |

## Sea transport (IMDG-Code / GGVSee)

|                                    |   |            |          |                    |                     |                    |      |
|------------------------------------|---|------------|----------|--------------------|---------------------|--------------------|------|
| 14.1. UN number                    | 3077  |            |          |                    |                     |                    |      |
| 14.2. UN proper shipping name      | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains silver and bisphenol A diglycidyl ether resin, solid)  |            |          |                    |                     |                    |      |
| 14.3. Transport hazard class(es)   | <table border="1"> <tr> <td>IMDG Class</td> <td>9</td> </tr> <tr> <td>IMDG Subrisk</td> <td>Not Applicable</td> </tr> </table>  | IMDG Class | 9        | IMDG Subrisk       | Not Applicable      |                    |      |
| IMDG Class                         | 9   |            |          |                    |                     |                    |      |
| IMDG Subrisk                       | Not Applicable  |            |          |                    |                     |                    |      |
| 14.4. Packing group                | III   |            |          |                    |                     |                    |      |
| 14.5. Environmental hazard         | Marine Pollutant  |            |          |                    |                     |                    |      |
| 14.6. Special precautions for user | <table border="1"> <tr> <td>EMS Number</td> <td>F-A, S-F</td> </tr> <tr> <td>Special provisions</td> <td>274 335 966 967 969</td> </tr> <tr> <td>Limited Quantities</td> <td>5 kg</td> </tr> </table> | EMS Number | F-A, S-F | Special provisions | 274 335 966 967 969 | Limited Quantities | 5 kg |
| EMS Number                         | F-A, S-F  |            |          |                    |                     |                    |      |
| Special provisions                 | 274 335 966 967 969   |            |          |                    |                     |                    |      |
| Limited Quantities                 | 5 kg  |            |          |                    |                     |                    |      |

## Inland waterways transport (ADN)

|                 |      |
|-----------------|------|
| 14.1. UN number | 3077 |
|-----------------|------|

## 9400 One-Part Epoxy Electrically Conductive Adhesive, Low Tg

|   |   |  |                     |    |                    |                    |                  |      |                    |          |                   |   |
|---|---|--|---------------------|----|--------------------|--------------------|------------------|------|--------------------|----------|-------------------|---|
| <b>14.2. UN proper shipping name</b>      | ENVIRONMENTALLY HAZARDOUS SUBSTANCE, SOLID, N.O.S. (contains silver and bisphenol A diglycidyl ether resin, solid)  |  |                     |    |                    |                    |                  |      |                    |          |                   |   |
| <b>14.3. Transport hazard class(es)</b>   | 9 Not Applicable  |  |                     |    |                    |                    |                  |      |                    |          |                   |   |
| <b>14.4. Packing group</b>                | III   |  |                     |    |                    |                    |                  |      |                    |          |                   |   |
| <b>14.5. Environmental hazard</b>         | Not Applicable  |  |                     |    |                    |                    |                  |      |                    |          |                   |   |
| <b>14.6. Special precautions for user</b> | <table border="1"> <tr> <td>Classification code</td> <td>M7</td> </tr> <tr> <td>Special provisions</td> <td>274; 335; 375; 601</td> </tr> <tr> <td>Limited quantity</td> <td>5 kg</td> </tr> <tr> <td>Equipment required</td> <td>PP, A***</td> </tr> <tr> <td>Fire cones number</td> <td>0</td> </tr> </table> |  | Classification code | M7 | Special provisions | 274; 335; 375; 601 | Limited quantity | 5 kg | Equipment required | PP, A*** | Fire cones number | 0 |
| Classification code                       | M7  |  |                     |    |                    |                    |                  |      |                    |          |                   |   |
| Special provisions                        | 274; 335; 375; 601  |  |                     |    |                    |                    |                  |      |                    |          |                   |   |
| Limited quantity                          | 5 kg  |  |                     |    |                    |                    |                  |      |                    |          |                   |   |
| Equipment required                        | PP, A***  |  |                     |    |                    |                    |                  |      |                    |          |                   |   |
| Fire cones number                         | 0   |  |                     |    |                    |                    |                  |      |                    |          |                   |   |

## Transport in bulk according to Annex II of MARPOL and the IBC code

Not Applicable

## SECTION 15 REGULATORY INFORMATION

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

## SILVER(7440-22-4) IS FOUND ON THE FOLLOWING REGULATORY LISTS

EU European Chemicals Agency (ECHA) Community Rolling Action Plan (CoRAP) List of Substances

European Customs Inventory of Chemical Substances ECICS (English)

European Union - European Inventory of Existing Commercial Chemical Substances (EINECS) (English)

European Union (EU) Commission Directive 2006/15/EC establishing a second list of indicative occupational exposure limit values (IOELVs) (Spanish)

UK Workplace Exposure Limits (WELs)

## BISPHENOL A DIGLYCIDYL ETHER RESIN, SOLID(25085-99-8) IS FOUND ON THE FOLLOWING REGULATORY LISTS

EU European Chemicals Agency (ECHA) Community Rolling Action Plan (CoRAP) List of Substances

EU REACH Regulation (EC) No 1907/2006 - Annex XVII - Restrictions on the manufacture, placing on the market and use of certain dangerous substances, mixtures and articles

European Union (EU) Annex I to Directive 67/548/EEC on Classification and Labelling of Dangerous Substances - updated by ATP: 31

European Union (EU) No-Longer Polymers List (NLP) (67/548/EEC)

European Union (EU) Regulation (EC) No 1272/2008 on Classification, Labelling and Packaging of Substances and Mixtures - Annex VI

## FORMALDEHYDE/ XYLENE COPOLYMER(26139-75-3) IS FOUND ON THE FOLLOWING REGULATORY LISTS

Not Applicable

This safety data sheet is in compliance with the following EU legislation and its adaptations - as far as applicable - : 98/24/EC, 92/85/EC, 94/33/EC, 91/689/EEC, 1999/13/EC, Commission Regulation (EU) 2015/830, Regulation (EC) No 1272/2008 and their amendments

## 15.2. Chemical safety assessment

For further information please look at the Chemical Safety Assessment and Exposure Scenarios prepared by your Supply Chain if available.

## ECHA SUMMARY

| Ingredient | CAS number | Index No      | ECHA Dossier                                 |
|------------|------------|---------------|--|
| silver     | 7440-22-4  | Not Available | 01-2119555669-21-XXXX, 01-2119513211-60-XXXX |

| Harmonisation (C&L Inventory) | Hazard Class and Category Code(s)  | Pictograms Signal Word Code(s) | Hazard Statement Code(s)                 |
|-------------------------------|--|--------------------------------|--|
| 1                             | Aquatic Acute 1, Aquatic Chronic 1   | GHS09, Wng                     | H319, H335, H372, H314, H317, H370, H332 |
| 2                             | Aquatic Acute 1, Aquatic Chronic 1, Skin Irrit. 2, Eye Irrit. 2, STOT SE 3, Skin Sens. 1, STOT SE 1, STOT RE 1, Acute Tox. 4 | GHS09, Wng, GHS08, Dgr, GHS05  | H319, H335, H372, H314, H317, H370, H332 |

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

| Ingredient                                | CAS number | Index No     | ECHA Dossier          |
|---|------------|--------------|-----------------------|
| bisphenol A diglycidyl ether resin, solid | 25085-99-8 | 603-074-00-8 | 01-2119456619-26-XXXX |

| Harmonisation (C&L Inventory) | Hazard Class and Category Code(s)   | Pictograms Signal Word Code(s) | Hazard Statement Code(s) |
|-------------------------------|---|--------------------------------|--------------------------|
| 1                             | Skin Irrit. 2, Skin Sens. 1, Eye Irrit. 2, Aquatic Chronic 2  | GHS07, GHS09, Wng              | H315, H317, H319         |
| 2                             | Skin Irrit. 2, Skin Sens. 1, Eye Irrit. 2, Aquatic Chronic 2, Acute Tox. 4, Aquatic Chronic 3, Aquatic Chronic 4, Skin Corr. 1A, Aquatic Acute 1, Aquatic Chronic 1 | GHS09, Wng, GHS08, Dgr         | H315, H317, H319, H372   |
| 1                             | Skin Irrit. 2, Skin Sens. 1, Eye Irrit. 2, Aquatic Chronic 2  | GHS07, GHS09, Wng              | H315, H317, H319         |
| 2                             | Skin Irrit. 2, Skin Sens. 1, Eye Irrit. 2, Aquatic Chronic 2  | GHS07, GHS09, Wng              | H315, H317, H319         |
| 1                             | Skin Irrit. 2, Skin Sens. 1, Eye Irrit. 2, Aquatic Chronic 2  | GHS07, GHS09, Wng              | H315, H317, H319         |
| 2                             | Skin Irrit. 2, Skin Sens. 1, Eye Irrit. 2, Aquatic Chronic 2, Skin Sens. 1B, Skin Sens. 1A  | GHS07, GHS09, Wng              | H315, H317, H319         |

Continued...



## 9400 One-Part Epoxy Electrically Conductive Adhesive, Low Tg

|   |  |                   |                  |
|---|--|-------------------|------------------|
| 1 | Skin Irrit. 2, Skin Sens. 1A, Aquatic Chronic 2              | GHS07, GHS09, Wng | H315, H317       |
| 2 | Skin Irrit. 2, Skin Sens. 1A, Aquatic Chronic 2              | GHS07, GHS09, Wng | H315, H317       |
| 1 | Skin Irrit. 2, Skin Sens. 1, Eye Irrit. 2                    | GHS07, Wng        | H315, H317, H319 |
| 2 | Skin Irrit. 2, Skin Sens. 1, Eye Irrit. 2, Aquatic Chronic 3 | GHS07, Wng, GHS09 | H315, H317, H319 |

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

| Ingredient                     | CAS number | Index No      | ECHA Dossier  |
|--------------------------------|------------|---------------|---------------|
| formaldehyde/ xylene copolymer | 26139-75-3 | Not Available | Not Available |

| Harmonisation (C&L Inventory) | Hazard Class and Category Code(s) | Pictograms Signal Word Code(s) | Hazard Statement Code(s) |
|-------------------------------|-----------------------------------|--------------------------------|--------------------------|
| Not Available                 | Not Available                     | Not Available                  | Not Available            |

Harmonisation Code 1 = The most prevalent classification. Harmonisation Code 2 = The most severe classification.

| National Inventory            | Status  |
|-------------------------------|---|
| Australia - AICS              | Y   |
| Canada - DSL                  | Y   |
| Canada - NDSL                 | N (bisphenol A diglycidyl ether resin, solid; formaldehyde/ xylene copolymer; silver)   |
| China - IECSC                 | Y   |
| Europe - EINEC / ELINCS / NLP | N (formaldehyde/ xylene copolymer)  |
| Japan - ENCS                  | N (bisphenol A diglycidyl ether resin, solid; silver)   |
| Korea - KECI                  | Y   |
| New Zealand - NZIoC           | Y   |
| Philippines - PICCS           | Y   |
| USA - TSCA                    | Y   |
| <b>Legend:</b>                | Y = All ingredients are on the inventory<br>N = Not determined or one or more ingredients are not on the inventory and are not exempt from listing (see specific ingredients in brackets) |

## SECTION 16 OTHER INFORMATION

## Full text Risk and Hazard codes

|             |   |
|-------------|---|
| <b>H314</b> | Causes severe skin burns and eye damage.                        |
| <b>H332</b> | Harmful if inhaled.   |
| <b>H335</b> | May cause respiratory irritation.                               |
| <b>H370</b> | Causes damage to organs.  |
| <b>H372</b> | Causes damage to organs through prolonged or repeated exposure. |
| <b>H411</b> | Toxic to aquatic life with long lasting effects.                |

## Other information

## Ingredients with multiple cas numbers

| Name                                      | CAS No                  |
|---|-------------------------|
| bisphenol A diglycidyl ether resin, solid | 25068-38-6, 25085-99-8  |
| formaldehyde/ xylene copolymer            | 26139-75-3, 172672-76-3 |

Classification of the preparation and its individual components has drawn on official and authoritative sources as well as independent review by the Chemwatch Classification committee using available literature references.

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.

For detailed advice on Personal Protective Equipment, refer to the following EU CEN Standards:

EN 166 Personal eye-protection

EN 340 Protective clothing

EN 374 Protective gloves against chemicals and micro-organisms

EN 13832 Footwear protecting against chemicals

EN 133 Respiratory protective devices

## Definitions and abbreviations

PC – TWA: Permissible Concentration-Time Weighted Average

PC – STEL: Permissible Concentration-Short Term Exposure Limit

IARC: International Agency for Research on Cancer

ACGIH: American Conference of Governmental Industrial Hygienists

STEL: Short Term Exposure Limit

TEEL: Temporary Emergency Exposure Limit.

IDLH: Immediately Dangerous to Life or Health Concentrations

OSF: Odour Safety Factor

NOAEL: No Observed Adverse Effect Level

LOAEL: Lowest Observed Adverse Effect Level



TLV: Threshold Limit Value  
LOD: Limit Of Detection  
OTV: Odour Threshold Value  
BCF: BioConcentration Factors  
BEI: Biological Exposure Index