Product Stewardship Summary

*Bisphenol A Epoxy Diacrylate*

**General Statement**

Bisphenol A epoxy diacrylate is an epoxy acrylate oligomer that provides high gloss, imparts excellent reactivity and features outstanding chemical and mechanical fastness properties for all kinds of radiation curable formulations. Bisphenol A epoxy diacrylate is a low hazard material and risk of adverse health effects associated with both occupational and consumer use of this chemical is anticipated to be low.

**Chemical Identity**

Name: Bisphenol A epoxy diacrylate  
Brand Names: Not applicable  
Chemical name (IUPAC): 4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane, esters with acrylic acid  
CAS number(s): 55818-57-0  
EC number: 500-130-2  
Molecular formula: C_{21}H_{25}ClO_{5}  
Structure:

![Chemical Structure](image)

**Uses and Applications**

Bisphenol A epoxy diacrylate is used as a reactive component in formulated coatings and inks when using either ultraviolet (UV) light or electron-beam (EB) radiation. Typical applications of coatings and inks that are made using Bisphenol A epoxy diacrylate are: furniture and floor coatings on wooden substrates, coatings for plastics in automobile applications and printing inks (Inkjet, Flexo, Offset) onto various items (plastic, metal glass).
Physical/Chemical Properties

Phys/Chem Safety Assessment

<table>
<thead>
<tr>
<th>Property</th>
<th>Value</th>
</tr>
</thead>
<tbody>
<tr>
<td>Form</td>
<td>Substance</td>
</tr>
<tr>
<td>Physical state</td>
<td>Liquid</td>
</tr>
<tr>
<td>Color</td>
<td>Colorless</td>
</tr>
<tr>
<td>Odor</td>
<td>Acrylic-like</td>
</tr>
<tr>
<td>Density</td>
<td>$1.195 \text{ g/cm}^3$ @ $20^\circ C$</td>
</tr>
<tr>
<td>Melting / boiling point</td>
<td>$-4^\circ C/ 220^\circ C$</td>
</tr>
<tr>
<td>Flammability</td>
<td>No data available</td>
</tr>
<tr>
<td>Explosive properties</td>
<td>No data available</td>
</tr>
<tr>
<td>Self-ignition temperature</td>
<td>$465^\circ C$</td>
</tr>
<tr>
<td>Vapor pressure</td>
<td>$0.001 \text{ Pa} @ 20^\circ C$</td>
</tr>
<tr>
<td>Mol weight</td>
<td>$392.9 \text{ g/mol}$</td>
</tr>
<tr>
<td>Water solubility</td>
<td>Insoluble</td>
</tr>
<tr>
<td>Flash point</td>
<td>Negligible</td>
</tr>
<tr>
<td>Octanol-water partition coefficient ($\text{Log}<em>{k</em>{ow}}$)</td>
<td>$&lt;1.6 – 3.8$</td>
</tr>
</tbody>
</table>

Exposure, Hazard and Safety Assessment

The following section describes possible exposures scenarios and hazards associated with bisphenol A epoxy diacrylate. The exposure assessment describes both the amount of and the frequency with which a chemical substance reaches a person, a population of people, or the environment. Hazard refers to the inherent properties of a substance that make it capable of causing harm to human health or the environment. The safety assessment reports the possibility of a harmful event arising from exposure to a chemical or physical agent under specific conditions. Just because a substance may possess potentially harmful properties does not mean that it automatically poses a risk. It is not possible to make that determination without understanding the exposure.

Human Health Effects

Human Exposure Assessment

**Consumer:** Bisphenol A epoxy diacrylate is used as a main binder in the formulation of UV/EB-cured lacquers and overprint varnishes as well as a co-binder in all types of radiation curable pigmented systems. Therefore, consumer exposure is most likely limited to extremely low levels of residual monomer present within the polymers used in consumer products.

**Worker:** In industrial settings, bisphenol A epoxy diacrylate is manufactured and handled in closed processes as much as possible, which ensures that worker exposure to bisphenol A epoxy diacrylate is minimized. The proper use of personal protective equipment during loading, unloading, sampling or during maintenance operations, will further minimize potential exposures to bisphenol A epoxy diacrylate.

Human Hazard Assessment

Bisphenol A epoxy diacrylate has low acute and chronic toxicity. The material is not a skin or eye irritant; however, there is potential for skin sensitization. Bisphenol A epoxy diacrylate is neither mutagenic or genotoxic and is not associated with adverse effects on fertility or development.
Effect Assessment | Result
--- | ---
Acute Toxicity Oral / inhalation / dermal | Low toxicity for oral and dermal routes of exposure.
Irritation / corrosion Skin / eye / respiratory test | Not irritating to the skin. Not irritating to the eyes. Potential for skin sensitization.
Toxicity after repeated exposure Oral / inhalation / dermal | Does not cause significant toxicity to internal organs after repeated exposure in animal studies via oral administration.
Genotoxicity / Mutagenicity | Neither mutagenic nor genotoxic.
Carcinogenicity | Not classifiable as to carcinogenicity.
Toxicity for reproduction | Does not cause developmental or reproductive effects in animal studies.

Human Health Safety Assessment

**Consumer:** Bisphenol A epoxy diacrylate is used as a monomer in polymerization reactions and will be almost exclusively in the form of a polymer within consumer products. Therefore, due to the extremely low levels of residual monomer present in consumer products exposure and subsequent risk is unlikely.

**Worker:** In industrial settings bisphenol A epoxy diacrylate is manufactured and handled primarily in closed processes which limit exposure. Based on good manufacturing processes and industrial hygiene the occupational health risk associated with bisphenol A epoxy diacrylate is low.

Environmental Effects

Environmental Exposures

Bisphenol A epoxy diacrylate is inherently biodegradable and has low potential for bioaccumulation. It has low to moderate solubility in water and if accidentally released to soil or water, little volatilization to the atmosphere can be anticipated.

Environmental Hazard Assessment

<table>
<thead>
<tr>
<th>Effect Assessment</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Aquatic toxicity</td>
<td>Low toxicity to aquatic organisms.</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Fate and behavior</th>
<th>Result</th>
</tr>
</thead>
<tbody>
<tr>
<td>Biodegradation</td>
<td>Inherently biodegradable.</td>
</tr>
<tr>
<td>Bioaccumulation potential</td>
<td>Not potentially bioaccumulative ($\log K_{ow} = 1.6-3.8$).</td>
</tr>
<tr>
<td>PBT / vPvB conclusion</td>
<td>Not considered to be either PBT or vPvB.</td>
</tr>
</tbody>
</table>

Environmental Safety Assessment

Bisphenol A epoxy diacrylate has low aquatic toxicity. If a release into the aquatic environment did occur, bisphenol A epoxy diacrylate is anticipated to have a minimal effect. This conclusion is based on a low toxicity to aquatic organisms, the ability to degrade in the aquatic environment, and a low potential for bioaccumulation.
Risk Management Recommendations

Exposure to bisphenol A epoxy diacrylate in the workplace can be controlled by sufficient ventilation, proper handling and storage techniques, and the use of appropriate personal protective equipment as recommended in the SDS. Consumer products are not anticipated to contain significant levels of bisphenol A epoxy diacrylate.

A selection of occupational exposure limits are provided below.

- No occupational exposure limits known

Regulatory Agency Review

Bisphenol A Epoxy Diacrylate is on the following lists:

- Australian Inventory of Chemical Substances (AICS)
- China - Chemical Inventory of Existing Chemical Substances (IECSC) - CAS Numbers
- ECHA - List of Pre-registered Substances
- Environment Canada - Chemical Management Plan - Status of Prioritized Substances
- Environment Canada - Domestic Substances List (DSL)
- Environment Canada - Domestic Substances List (DSL) - Ecological Categorization
- Environment Canada - Domestic Substances List (DSL) - Inherently Toxic in the Environment Categorization
- Environment Canada - Domestic Substances List (DSL) - Persistent Categorization
- Environment Canada - Domestic Substances List (DSL) - Persistent, and Inherently Toxic Categorization
- Environment Canada - Domestic Substances List (DSL) Categorization of Existing Substances
- EPA - TSCA - Inventory
- EU - European No Longer Polymer List (NLP)
- FDA - Inventory of Effective Food Contact Substance (FCS) Notification
- Mexico - National Inventory of Chemical Substances
- New Zealand - Inventory of Chemicals (NZIoC)
- Philippine Inventory of Chemicals and Chemical Substances (PICCS)

Regulatory Information / Classification and Labeling

Under the Globally Harmonized System for classification and labeling (GHS), substances are classified according to their physical, health, and environmental hazards. The hazards are communicated via specific labels and the (Extended) SDS. GHS attempts to standardize hazard communication so that the intended audience (workers, consumers, transport workers, and emergency responders) can better understand the hazards of the chemicals in use.

GHS Classification:

Skin Sensitization, Category 1

Hazard Statements:

H317: May cause allergic skin reaction

Signal Word: Warning

Precautionary Statements:

P261: Avoid breathing dust/ fume/ gas/ mist/ vapors/ spray.
P280: Wear eye protection/ face protection/protective gloves.
P333: If skin irritation or rash occurs: Get medical advice/ attention.
P362: Take off contaminated clothing and wash before reuse.
Conclusion

Bisphenol A epoxy diacylate is used as a reactive component in formulated coatings and inks that are cured using either ultra violet light or electron beam radiation. When handled responsibly, the potential for skin sensitization can be minimized, allowing consumers and workers to use materials containing bisphenol A epoxy diacylate safely.

Contact Information with Company

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Additional Information


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Inclusion on the New Zealand Inventory of Chemicals applies only to the pure substance listed. The importer of record must determine whether or not their substances are in compliance.