

Product Stewardship Summary

Effective date: 1 September 2019

Supersedes: 12 December 2018

Bisphenol A Epoxy Diacrylate

General Statement

Bisphenol A epoxy diacrylate is a colorless liquid. This epoxy acrylate oligomer provides high gloss, imparts excellent reactivity and features outstanding chemical and mechanical fastness properties for many kinds of radiation-curable formulations.

INEOS both produces and sells this monomer. Bisphenol A epoxy diacrylate is a low hazard material and the risk of adverse health effects associated with both occupational and consumer use of this chemical is anticipated to be low. With proper engineering controls and protective equipment, workers can safely use Bisphenol A epoxy diacrylate to produce a variety of consumer products. Consumers, in turn, are not expected to be exposed to dangerous levels of bisphenol A epoxy diacrylate.

Chemical Identity

Name: Bisphenol A epoxy diacrylate

Brand Names: Not applicable

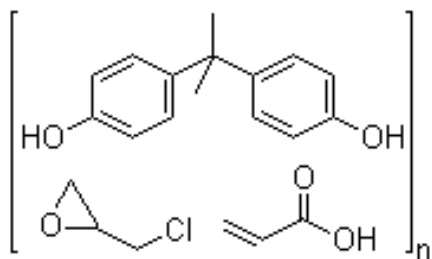
Chemical name (IUPAC): 4,4'-Isopropylidenediphenol, oligomeric reaction products with 1-chloro-2,3-epoxypropane, esters with acrylic acid

CAS number(s): 55818-57-0

EC number: 500-130-2

Molecular formula: C₂₁H₂₅ClO₅

Structure:



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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, and coatings for plastics in automobile applications and printing inks (Inkjet, Flexo, Offset) onto various items (plastic, metal glass). INEOS uses this monomer in multiple product lines.

Physical/Chemical Properties

Phys/Chem Safety Assessment

Property	Value
Form	Colorless highly viscous liquid
Physical state	Liquid
Color	Colorless
Odor	Acrylic-like
Density	1.195 g/cm ³ @ 20°C
Melting / boiling point	-4°C/ 220 °C
Flammability	No data available
Explosive properties	No data available
Self-ignition temperature	465°C
Vapor pressure	0.001Pa @ 20°C
Mol weight	392.9 g/mol
Water solubility	82 and 484 mg/L for 5 g and 50 g of test item in 1 L @ 20°C water
Flash point	No flash point up to 130 °C.
Octanol-water partition coefficient (LogKow)	3.8

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.

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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 many types of radiation curable pigmented systems. Therefore, consumer exposure is most likely limited to extremely low levels of residual monomer present within the polymers when 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	No acute toxicity if ingested, applied on skin or inhaled.
Irritation / corrosion Skin / eye / respiratory test	Not irritating to the skin or eyes Does not cause respiratory irritation if inhaled
Sensitization	Causes allergic reactions up on contact with skin
Toxicity after repeated exposure Oral / inhalation / dermal	Does not cause significant toxicity to internal organs after repeated exposure
Genotoxicity / Mutagenicity	Neither mutagenic nor genotoxic
Carcinogenicity	Not classifiable as carcinogenic
Toxicity for reproduction	Does not cause toxicity to reproduction or unborn children
Aspiration hazard	Not fatal if accidentally enters airways

Human Health Safety Assessment

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

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Worker: In industrial settings bisphenol A epoxy diacrylate is manufactured and handled primarily in closed processes which limit worker exposure. Based on the implementation of good manufacturing processes and industrial hygiene practices, the occupational health risk associated with bisphenol A epoxy diacrylate is anticipated to be low.

Environmental Effects

Environmental Exposures

Environmental release is anticipated to be minimal. Minimal exposure to environment may occur because of occasional releases from the industrial processes. Bisphenol A epoxy diacrylate has low solubility in water and, if accidentally released to soil or water, little volatilization to the atmosphere can be anticipated.

Environmental Hazard Assessment

Bisphenol A epoxy diacrylate is inherently biodegradable and has no potential for bioaccumulation. This monomer is not toxic to aquatic life.

Effect Assessment	Result
Aquatic toxicity	No toxicity to aquatic organisms

Fate and behavior	Result
Biodegradation	Inherently biodegradable
Bioaccumulation potential	Not potentially bioaccumulation ($\log K_{ow} = 3.8$)
PBT / vPvB conclusion	This substance is not considered to be persistent, bioaccumulating and toxic (PBT) or very persistent and very bioaccumulating (vPvB)

Environmental Safety Assessment

Bisphenol A epoxy diacrylate has no 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 its lack of toxicity to aquatic organisms, its ability to degrade in the aquatic environment, and its low potential for bioaccumulation.

Risk Management Recommendations

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

A selection of occupational exposure limits is provided below.

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- No occupational exposure limits known

Regulatory Agency Review

Bisphenol A epoxy diacrylate is on the following lists:

- Taiwan Chemical Substance Inventory (TCSI)
- Australia Inventory of Chemical Substances (AICS)
- Canadian Domestic Substances List (DSL)
- China. Inventory of Existing Chemical Substances in China (IECSC)
- ECHA List of Publishable Substances Registered
- No-Longer Polymer list (NLP)
- Japan. ENCS - Existing and New Chemical Substances Inventory
- Korea. Korean Existing Chemicals Inventory (KECI)
- New Zealand. Inventory of Chemical Substances
- Philippines Inventory of Chemicals and Chemical Substances (PICCS)
- United States TSCA Inventory
- Japan. ISHL - Inventory of Chemical Substances
- List of new substances notified or registered in Switzerland

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.

P272: Contaminated work clothing should not be allowed out of the workplace.

P280: Wear protective gloves.

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Hazard Pictograms:



Conclusion

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

Contact Information

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Additional Information

For more information on Product Stewardship at INEOS Composites, visit our website's Safety, Health and Environment (SHE) page: www.ineos.com/composites-she

For more information on GHS, visit <http://www.osha.gov/dsg/hazcom/ghsguideoct05.pdf> or http://live.unece.org/trans/danger/publi/ghs/ghs_welcome_e.html.

Disclaimer

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REACH registration is specific to Importers/Manufacturers that place the chemical on the EU market and is specific to registered uses. Inclusion on the list of REACH Registered Substances does not automatically imply registration by INEOS Composites.

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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 their substances comply.