SAFETY DATA SHEET

Date of last issue: -
Date of first issue: 2020-01-06

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Black
PJUVG5-BK1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 4405 East Baseline Road, Suite 120 Phoenix, Arizona 85042

Telephone : 480-968-7772

Emergency telephone : 480-968-7772
During normal opening times

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2

Serious eye damage : Category 1

Skin sensitization : Category 1

Reproductive toxicity : Category 1B

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 2

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
H360 May damage fertility or the unborn child.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary Statements : **Prevention:**

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist or vapors.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
3,3,5-Trimethylcyclohexyl acrylate	86178-38-3	>= 45 - < 55
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 20 - < 30
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	>= 3 - =< 7
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 3 - =< 7
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 1 - =< 5
Propoxylated neopentyl glycol diacrylate esters	84170-74-1	>= 1 - =< 5
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 1 - < 5
Hexamethylene diacrylate	13048-33-4	>= 1 - < 5
Carbon black	1333-86-4	>= 1 - < 5
2-benzyl-2-dimethylamino-4-morpholinobutyrophenone	119313-12-1	>= 1 - < 5
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1	< 1

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled	:	If inhaled, remove to fresh air. Get medical attention.
In case of skin contact	:	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention immediately.
If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.
Most important symptoms and effects, both acute and delayed	:	Harmful if swallowed. Causes skin irritation. May cause an allergic skin reaction. Causes serious eye damage. May cause respiratory irritation. May damage fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides Nitrogen oxides (NOx) Oxides of phosphorus
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained. Do not release the product to the aquatic environment above defined regulatory levels
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures	:	See Engineering measures under EXPOSURE CONTROLS/ PERSONAL PROTECTION section.
Local/Total ventilation	:	Use with local exhaust ventilation.
Advice on safe handling	:	Do not get on skin or clothing. Do not breathe vapors or spray mist. Do not swallow. Do not get in eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment. Keep container tightly closed. Take care to prevent spills, waste and minimize release to the environment.
Conditions for safe storage	:	Keep in properly labeled containers. Store locked up. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations.
Materials to avoid	:	Do not store with the following product types: Strong oxidizing agents Organic peroxides Explosives Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Carbon black	1333-86-4	TWA	3.5 mg/m³	NIOSH REL
		TWA	3.5 mg/m³	OSHA Z-1
		TWA (Inhalable fraction)	3 mg/m³	ACGIH
Hexamethylene diacrylate	13048-33-4	TWA	1 mg/m³	US WEEL

Engineering measures : Minimize workplace exposure concentrations.
Use with local exhaust ventilation.
Dust formation may be relevant in the processing of this product.
In addition to substance-specific OELs, general limitations of concentrations of particulates in the air at workplaces have to be considered in workplace risk assessment. Relevant limits include: OSHA PEL for Particulates Not Otherwise Regulated of 15 mg/m3 - total dust, 5 mg/m3 - respirable fraction; and ACGIH TWA for Particles (insoluble or poorly soluble) Not Otherwise Specified of 3 mg/m3 - respirable particles, 10 mg/m3 - inhalable particles.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material : Chemical-resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Eye protection : Wear the following personal protective equipment:
Chemical resistant goggles must be worn.
If splashes are likely to occur, wear:
Face-shield

Skin and body protection : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.
Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	black
Odor	:	characteristic
Odor Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	> 100 °C
Flash point	:	> 93 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	Immiscible in water
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.

Possibility of hazardous reactions	:	Vapors may form explosive mixture with air. Can react with strong oxidizing agents.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity
Harmful if swallowed.
Product:

Acute oral toxicity	:	Acute toxicity estimate: 1,700 mg/kg Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:
3,3,5-Trimethylcyclohexyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg

4-(1-Oxo-2-propenyl)-morpholine:

Acute oral toxicity	:	LD50 (Rat): 588 mg/kg Method: OECD Test Guideline 401
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 401 Assessment: The substance or mixture has no acute oral toxicity
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

2-(2-Ethoxyethoxy)ethyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 300 - < 2,000 mg/kg Method: OECD Test Guideline 423 Remarks: Based on data from similar materials
Acute inhalation toxicity	:	LC50 (Rat): > 5.04 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 403 Remarks: Based on data from similar materials
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402

Assessment: The substance or mixture has no acute dermal toxicity
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Acute oral toxicity : LD50 (Rat): 4,350 mg/kg

Acute dermal toxicity : LD50 (Rabbit): > 3,000 mg/kg

Propoxylated neopentyl glycol diacrylate esters:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 2 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Hexamethylene diacrylate:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC0 (Rat): 0.41 mg/l
Exposure time: 7 h
Test atmosphere: vapor

Acute dermal toxicity : LD50 (Rabbit): 3,650 mg/kg

Carbon black:
Acute oral toxicity : LD50 (Rat): > 10,000 mg/kg

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Acute oral toxicity : LD50 (Rat): 3,530 mg/kg

Acute dermal toxicity : LD50 (Rabbit): > 2,000 mg/kg

Skin corrosion/irritation
Causes skin irritation.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: No skin irritation

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No skin irritation

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No skin irritation

Hexamethylene diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Carbon black:
Species: Rabbit
Result: No skin irritation

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Result: No eye irritation

Method: OECD Test Guideline 405

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No eye irritation

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No eye irritation

Hexamethylene diacrylate:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Carbon black:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

4-(1-Oxo-2-propenyl)-morpholine:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: Directive 67/548/EEC, Annex V, B.6.
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

2-(2-Ethoxyethoxy)ethyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Remarks: Based on data from similar materials
Assessment: Probability or evidence of skin sensitization in humans

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Propoxylated neopentyl glycol diacrylate esters:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Hexamethylene diacrylate:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Carbon black:
Test Type: Buehler Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: negative

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: negative

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Germ cell mutagenicity
Not classified based on available information.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative

4-(1-Oxo-2-propenyl)-morpholine:
Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: positive

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 471
Result: negative

Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen.

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

: Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

: Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

2-(2-Ethoxyethoxy)ethyl acrylate:
Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

Propoxylated neopentyl glycol diacrylate esters:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Hexamethylene diacrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Result: negative

Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Carbon black:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: In vitro sister chromatid exchange assay in mammalian cells
Method: OECD Test Guideline 479
Result: negative

Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative

Genotoxicity in vivo : Test Type: Sex-linked recessive lethal test in Drosophila melanogaster (in vivo)
Species: Drosophila melanogaster (vinegar fly)
Application Route: Ingestion
Method: OECD Test Guideline 477
Result: negative

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Hamster
Application Route: Ingestion
Result: negative

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Carcinogenicity
Not classified based on available information.
Components:
Carbon black:
Species: Rat
Application Route: Inhalation
Exposure time: 24 Months
Result: positive

Species: Rat
Application Route: Ingestion
Exposure time: 2 Years
Result: negative

Carcinogenicity - Assessment: Weight of evidence does not support classification as a carcinogen

IARC Group 2B: Possibly carcinogenic to humans
Carbon black 1333-86-4

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
May damage fertility or the unborn child.
Components:
3,3,5-Trimethylcyclohexyl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

4-(1-Oxo-2-propenyl)-morpholine:
Effects on fertility : Remarks: May cause adverse reproductive effects.
Based on a Significant New Use Rule regulation

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Effects on fetal development : Test Type: Fertility/early embryonic development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative

2-(2-Ethoxyethoxy)ethyl acrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Propoxylated neopentyl glycol diacrylate esters:
Effects on fertility : Test Type: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 421

Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Effects on fertility : Test Type: Fertility
Species: Rat
Application Route: Ingestion
Result: positive

Reproductive toxicity - Assessment : Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

Hexamethylene diacrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative

Carbon black:
Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative

Test Type: Embryo-fetal development
Species: Mouse
Application Route: inhalation (dust/mist/fume)
Result: negative

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Effects on fertility : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: positive

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: positive

Reproductive toxicity - Assessment : Clear evidence of adverse effects on development, based on animal experiments., Some evidence of adverse effects on sexual function and fertility, based on animal experiments.

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat

Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

STOT-single exposure
May cause respiratory irritation.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

STOT-repeated exposure
May cause damage to organs through prolonged or repeated exposure.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Routes of exposure: Oral
Assessment: May cause damage to organs through prolonged or repeated exposure.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Repeated dose toxicity
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 4 weeks
Method: OECD Test Guideline 422

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rat
NOAEL: 50 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rat
NOAEL: 160 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Species: Rat
NOAEL: 100 mg/kg
Application Route: Ingestion
Exposure time: 2 Weeks
Method: OECD Test Guideline 422

Propoxylated neopentyl glycol diacrylate esters:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rat
NOAEL: 100 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Hexamethylene diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Method: OECD Test Guideline 422

Carbon black:
Species: Rat
NOAEL: 1 mg/kg
LOAEL: 7 mg/kg
Application Route: inhalation (dust/mist/fume)
Exposure time: 90 Days

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rat
NOAEL: >= 100 mg/kg
Application Route: Ingestion
Exposure time: 28 Days

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

Aspiration toxicity
Not classified based on available information.

Further information
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Remarks: May cause internal organ effects
Based on a Significant New Use Rule regulation

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:

3,3,5-Trimethylcyclohexyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 1.9 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 14.43 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 0.59 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 0.43 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	NOEC: 1,000 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

4-(1-Oxo-2-propenyl)-morpholine:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 220 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 120 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 120 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): >= 120 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	IC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 90 µg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: No toxicity at the limit of solubility.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1.18 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: No toxicity at the limit of solubility.
Toxicity to algae	:	NOEC (Desmodesmus subspicatus (green algae)): 260 µg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: No toxicity at the limit of solubility.
Toxicity to daphnia and other aquatic invertebrates (Chronic	:	NOEC (Daphnia magna (Water flea)): 8.1 µg/l Exposure time: 21 d

toxicity)		Method: OECD Test Guideline 211 Remarks: No toxicity at the limit of solubility.
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

2-(2-Ethoxyethoxy)ethyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 6.8 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 55 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: Based on data from similar materials
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 10 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials EC10 (Desmodesmus subspicatus (green algae)): 3.2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.26 mg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: Based on data from similar materials
Toxicity to microorganisms	:	EC50: 741 mg/l Exposure time: 3 h Method: OECD Test Guideline 209 Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 0.704 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 1.98 mg/l Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 0.405 mg/l Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia): 0.092 mg/l Exposure time: 21 d Method: OECD Test Guideline 211
M-Factor (Chronic aquatic toxicity)	:	1

Propoxylated neopentyl glycol diacrylate esters:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 2.7 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 37 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 11 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 1 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	NOEC: 2 mg/l Exposure time: 28 d

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 1 - 10 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3.53 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 2.01 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 1.56 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Hexamethylene diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 4.6 - 10 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 2.6 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 1.5 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 0.59 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: 270 mg/l Exposure time: 30 min Method: OECD Test Guideline 209

Carbon black:

Toxicity to fish	:	LL50 (Danio rerio (zebra fish)): > 1,000 mg/l Exposure time: 96 h Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 5,600 mg/l Exposure time: 24 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 202
Toxicity to algae	:	EL10 (Desmodesmus subspicatus (green algae)): > 10,000 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 201 EL50 (Desmodesmus subspicatus (green algae)): > 10,000 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 201

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 0.46 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 0.8 mg/l Exposure time: 24 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 30 min Method: OECD Test Guideline 209
M-Factor (Chronic aquatic toxicity)	:	1

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 2.2 - 4.64 mg/l Exposure time: 96 h Method: DIN 38412
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 22.3 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 16.7 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 2.2 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 30 min Method: OECD Test Guideline 209

Persistence and degradability

Components:

3,3,5-Trimethylcyclohexyl acrylate:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 16.8 % Exposure time: 28 d

Method: OECD Test Guideline 301F

4-(1-Oxo-2-propenyl)-morpholine:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 35 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 1 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

2-(2-Ethoxyethoxy)ethyl acrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 84.4 %
Exposure time: 28 d
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 51 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Propoxylated neopentyl glycol diacrylate esters:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 51 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 0 - 10 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Hexamethylene diacrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 60 - 70 %
Exposure time: 28 d

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 3 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 90 - 100 %
Exposure time: 28 d
Method: OECD Test Guideline 301A

Bioaccumulative potential
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Partition coefficient: n-octanol/water : log Pow: 4.6

4-(1-Oxo-2-propenyl)-morpholine:

Partition coefficient: n-octanol/water : log Pow: -0.46

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

Partition coefficient: n-octanol/water : log Pow: 5.8

2-(2-Ethoxyethoxy)ethyl acrylate:
Partition coefficient: n-octanol/water : log Pow: 0.67
Remarks: Calculation

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Bioaccumulation : Species: Zebrafish
Bioconcentration factor (BCF): 37
Method: OECD Test Guideline 305
Remarks: Based on data from similar materials

Partition coefficient: n-octanol/water : log Pow: 4.52

Propoxylated neopentyl glycol diacrylate esters:
Partition coefficient: n-octanol/water : log Pow: 2.41 - 3.87

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 18 - 72

Partition coefficient: n-octanol/water : log Pow: 3.1 - 3.8

Hexamethylene diacrylate:
Partition coefficient: n-octanol/water : log Pow: 2.81

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Partition coefficient: n-octanol/water : log Pow: 2.91

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Partition coefficient: n-octanol/water : log Pow: 0.01 - 0.39

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues : Dispose of in accordance with local regulations.
Do not release the product to the aquatic environment above defined regulatory levels

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations
UNRTDG

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964
Environmentally hazardous	:	yes

IMDG-Code

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F
Marine pollutant	:	yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation
49 CFR

UN/ID/NA number	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Remarks	:	Above applies only to containers over 119 gallons or 450 liters., Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know
CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Respiratory or skin sensitization
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 3 - =< 7 %

US State Regulations

Pennsylvania Right To Know

3,3,5-Trimethylcyclohexyl acrylate	86178-38-3
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
Propoxylated neopentyl glycol diacrylate esters	84170-74-1
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Hexamethylene diacrylate	13048-33-4
Carbon black	1333-86-4
2-benzyl-2-dimethylamino-4-morpholinobutyrophenone	119313-12-1
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1

California Prop. 65
WARNING: This product can expose you to chemicals including Carbon black, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California List of Hazardous Substances

Carbon black	1333-86-4

California Permissible Exposure Limits for Chemical Contaminants

Carbon black	1333-86-4

Additional regulatory information

4-(1-Oxo-2-propenyl)-morpholine	5117-12-4

The United States Environmental Protection Agency (USEPA) has established a Significant New Use Rule (SNUR) for one of the components in this product.
See 40 CFR § 721.5185

SECTION 16. OTHER INFORMATION

Further information

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits

OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / TWA	:	8-hour, time-weighted average
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA Z-1 / TWA	:	8-hour time weighted average
US WEEL / TWA	:	8-hr TWA

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/
Revision Date	:	2020-01-06

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

SAFETY DATA SHEET

Date of last issue: 2020-02-12
Date of first issue: 2020-01-06

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Cleaner
PJUVG5-CL1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 4405 East Baseline Road, Suite 120 Phoenix, Arizona 85042

Telephone : 480-968-7772

Emergency telephone : 480-968-7772
During normal opening times

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Eye irritation : Category 2A

GHS label elements

Hazard pictograms :

Signal Word : Warning

Hazard Statements : H319 Causes serious eye irritation.

Precautionary Statements : **Prevention:**
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P337 + P313 If eye irritation persists: Get medical advice/ attention.

Other hazards

None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Cyclohexanone	108-94-1	< 3

SECTION 4. FIRST AID MEASURES

General advice	:	In the case of accident or if you feel unwell, seek medical advice immediately. When symptoms persist or in all cases of doubt seek medical advice.
If inhaled	:	If inhaled, remove to fresh air. Get medical attention if symptoms occur.
In case of skin contact	:	Wash with water and soap as a precaution. Get medical attention if symptoms occur.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention.
If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention if symptoms occur. Rinse mouth thoroughly with water.
Most important symptoms and effects, both acute and delayed	:	Causes serious eye irritation.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment

emergency procedures | recommendations.

Environmental precautions : Discharge into the environment must be avoided.
Prevent further leakage or spillage if safe to do so.
Prevent spreading over a wide area (e.g. by containment or oil barriers).
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.
Do not release the product to the aquatic environment above defined regulatory levels

Methods and materials for containment and cleaning up : Soak up with inert absorbent material.
For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container.
Clean up remaining materials from spill with suitable absorbent.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures : See Engineering measures under EXPOSURE CONTROLS/ PERSONAL PROTECTION section.

Local/Total ventilation : Use with local exhaust ventilation.

Advice on safe handling : Do not get on skin or clothing.
Avoid inhalation of vapor or mist.
Do not swallow.
Do not get in eyes.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment.
Keep container tightly closed.
Take care to prevent spills, waste and minimize release to the environment.

Conditions for safe storage : Keep in properly labeled containers.
Store locked up.
Keep tightly closed.
Keep in a cool, well-ventilated place.
Store in accordance with the particular national regulations.

Materials to avoid : Do not store with the following product types:
Strong oxidizing agents
Organic peroxides
Explosives
Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Cyclohexanone	108-94-1	TWA	25 ppm	OSHA Z-1

		TWA	25 ppm	NIOSH REL
		TWA	20 ppm	ACGIH
		STEL	50 ppm	ACGIH

Engineering measures : Minimize workplace exposure concentrations.
Use with local exhaust ventilation.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material : Chemical-resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Eye protection : Wear the following personal protective equipment:
Safety goggles

Skin and body protection : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.
Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : clear

Odor : characteristic

Odor Threshold : No data available

pH : No data available

Melting point/freezing point : No data available

Initial boiling point and boiling range : > 100 °C

Flash point	:	> 93 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	Miscible with water
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Vapors may form explosive mixture with air. Can react with strong oxidizing agents.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact

Ingestion
Eye contact

Acute toxicity
Not classified based on available information.
Product:
Acute oral toxicity : Acute toxicity estimate: > 5,000 mg/kg
Method: Calculation method

Components:
Cyclohexanone:
Acute oral toxicity : LD50 (Rat): 1,620 mg/kg

Acute inhalation toxicity : LD50 (Rat): > 6.2 mg/l
Exposure time: 4 h
Test atmosphere: vapor

Acute dermal toxicity : Acute toxicity estimate: 1,620 mg/kg
Method: Expert judgment

Skin corrosion/irritation
Not classified based on available information.
Components:
Cyclohexanone:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Serious eye damage/eye irritation
Causes serious eye irritation.
Components:
Cyclohexanone:
Species: Rabbit
Result: Irreversible effects on the eye

Respiratory or skin sensitization
Skin sensitization
Not classified based on available information.
Respiratory sensitization
Not classified based on available information.
Components:
Cyclohexanone:
Test Type: Buehler Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: negative

Germ cell mutagenicity
Not classified based on available information.
Components:
Cyclohexanone:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Carcinogenicity
Not classified based on available information.
Components:
Cyclohexanone:

Species: Rat
Application Route: Ingestion
Exposure time: 104 weeks
Result: positive
Carcinogenicity - Assessment: Weight of evidence does not support classification as a carcinogen

IARC Group 3: Not classifiable as to human carcinogenicity
Cyclohexanone 108-94-1

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
Not classified based on available information.
Components:
Cyclohexanone:
Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Rat
Application Route: inhalation (dust/mist/fume)
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rabbit
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: positive

Reproductive toxicity - Assessment : Weight of evidence does not support classification as a reproductive toxicity.

STOT-single exposure
Not classified based on available information.

STOT-repeated exposure
Not classified based on available information.

Repeated dose toxicity
Components:
Cyclohexanone:
Species: Rat
NOAEL: 143 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

Aspiration toxicity
Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:
Cyclohexanone:
Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 536 - 732 mg/l
Exposure time: 48 h

Toxicity to daphnia and other aquatic invertebrates : EC50: 100 mg/l
Exposure time: 48 h

Remarks: Based on data from similar materials

Toxicity to algae : EC50: 100 mg/l
Exposure time: 96 h
Remarks: Based on data from similar materials

Toxicity to microorganisms : EC50 : > 1,000 mg/l
Exposure time: 30 min
Method: OECD Test Guideline 203

Persistence and degradability
Components:
Cyclohexanone:
Biodegradability : Result: Readily biodegradable.
Biodegradation: > 90 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Bioaccumulative potential
Components:
Cyclohexanone:
Partition coefficient: n-octanol/water : log Pow: 0.86

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues : Dispose of in accordance with local regulations.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations
UNRTDG
Not regulated as dangerous goods

IATA-DGR
Not regulated as dangerous goods

IMDG-Code
Not regulated as dangerous goods

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation
49 CFR
Not regulated as dangerous goods

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know

CERCLA Reportable Quantity

Components	CAS-No.	Component RQ (lbs)	Calculated product RQ (lbs)
Cyclohexanone	108-94-1	5000	166666

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Serious eye damage or eye irritation

SARA 313 : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations

Pennsylvania Right To Know
Cyclohexanone 108-94-1

California Prop. 65
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

SECTION 16. OTHER INFORMATION

Further information

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / TWA	:	8-hour, time-weighted average
ACGIH / STEL	:	Short-term exposure limit
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA Z-1 / TWA	:	8-hour time weighted average
US WEEL / TWA	:	8-hr TWA

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse)

Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/
Revision Date	:	2020-02-12

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

SAFETY DATA SHEET

Date of last issue: -
Date of first issue: 2020-01-06

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Cyan
PJUVG5-CY1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 4405 East Baseline Road, Suite 120 Phoenix, Arizona 85042

Telephone : 480-968-7772

Emergency telephone : 480-968-7772
During normal opening times

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2

Serious eye damage : Category 1

Skin sensitization : Category 1

Reproductive toxicity : Category 1B

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 2

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
H360 May damage fertility or the unborn child.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary Statements : **Prevention:**

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist or vapors.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
3,3,5-Trimethylcyclohexyl acrylate	86178-38-3	>= 30 - =< 40
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 20 - < 30
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 5 - < 10
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 3 - =< 7
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	>= 3 - =< 7
Propoxylated neopentyl glycol diacrylate esters	84170-74-1	>= 1 - =< 5
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 1 - < 5
Hexamethylene diacrylate	13048-33-4	>= 1 - < 5
2-benzyl-2-dimethylamino-4-morpholinobutyrophenone	119313-12-1	>= 1 - < 5
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1	< 1

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled	:	If inhaled, remove to fresh air. Get medical attention.
In case of skin contact	:	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention immediately.
If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.
Most important symptoms and effects, both acute and delayed	:	Harmful if swallowed. Causes skin irritation. May cause an allergic skin reaction. Causes serious eye damage. May cause respiratory irritation. May damage fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides Nitrogen oxides (NOx) Oxides of phosphorus
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained. Do not release the product to the aquatic environment above defined regulatory levels
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures	:	See Engineering measures under EXPOSURE CONTROLS/ PERSONAL PROTECTION section.
Local/Total ventilation	:	Use with local exhaust ventilation.
Advice on safe handling	:	Do not get on skin or clothing. Do not breathe vapors or spray mist. Do not swallow. Do not get in eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment. Keep container tightly closed. Take care to prevent spills, waste and minimize release to the environment.
Conditions for safe storage	:	Keep in properly labeled containers. Store locked up. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations.
Materials to avoid	:	Do not store with the following product types: Strong oxidizing agents Organic peroxides Explosives Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Hexamethylene diacrylate	13048-33-4	TWA	1 mg/m³	US WEEL

Engineering measures : Minimize workplace exposure concentrations.
Use with local exhaust ventilation.
Dust formation may be relevant in the processing of this product.
In addition to substance-specific OELs, general limitations of concentrations of particulates in the air at workplaces have to be considered in workplace risk assessment. Relevant limits include: OSHA PEL for Particulates Not Otherwise Regulated of 15 mg/m3 - total dust, 5 mg/m3 - respirable fraction; and ACGIH TWA for Particles (insoluble or poorly soluble) Not Otherwise Specified of 3 mg/m3 - respirable particles, 10 mg/m3 - inhalable particles.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material : Chemical-resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Eye protection : Wear the following personal protective equipment:
Chemical resistant goggles must be worn.
If splashes are likely to occur, wear:
Face-shield

Skin and body protection : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.
Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : cyan

Odor	:	characteristic
Odor Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	> 100 °C
Flash point	:	> 93 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	Immiscible in water
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Vapors may form explosive mixture with air. Can react with strong oxidizing agents.
Conditions to avoid	:	None known.

Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity
Harmful if swallowed.
Product:

Acute oral toxicity	:	Acute toxicity estimate: 1,609 mg/kg Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 2,000 mg/kg Method: Calculation method

Components:
3,3,5-Trimethylcyclohexyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg

4-(1-Oxo-2-propenyl)-morpholine:

Acute oral toxicity	:	LD50 (Rat): 588 mg/kg Method: OECD Test Guideline 401
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402

2-(2-Ethoxyethoxy)ethyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 300 - < 2,000 mg/kg Method: OECD Test Guideline 423 Remarks: Based on data from similar materials
Acute inhalation toxicity	:	LC50 (Rat): > 5.04 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 403 Remarks: Based on data from similar materials
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Acute oral toxicity	:	LD50 (Rat): 4,350 mg/kg
Acute dermal toxicity	:	LD50 (Rabbit): > 3,000 mg/kg

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 401 Assessment: The substance or mixture has no acute oral toxicity
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg

Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Propoxylated neopentyl glycol diacrylate esters:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 2 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg Method: OECD Test Guideline 401
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Hexamethylene diacrylate:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC0 (Rat): 0.41 mg/l Exposure time: 7 h Test atmosphere: vapor
Acute dermal toxicity	:	LD50 (Rabbit): 3,650 mg/kg

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg Method: OECD Test Guideline 401
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Acute oral toxicity	:	LD50 (Rat): 3,530 mg/kg
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg

Skin corrosion/irritation
Causes skin irritation.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: No skin irritation

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Method: OECD Test Guideline 404

Result: No skin irritation
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No skin irritation

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No skin irritation

Hexamethylene diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No eye irritation

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No eye irritation

Hexamethylene diacrylate:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

4-(1-Oxo-2-propenyl)-morpholine:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: Directive 67/548/EEC, Annex V, B.6.
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

2-(2-Ethoxyethoxy)ethyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Remarks: Based on data from similar materials
Assessment: Probability or evidence of skin sensitization in humans

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Propoxylated neopentyl glycol diacrylate esters:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Hexamethylene diacrylate:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: negative

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Germ cell mutagenicity
Not classified based on available information.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative

4-(1-Oxo-2-propenyl)-morpholine:

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: positive

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 471
Result: negative

Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen.

2-(2-Ethoxyethoxy)ethyl acrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

: Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

: Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Propoxylated neopentyl glycol diacrylate esters:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

Remarks: Based on data from similar materials

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Hexamethylene diacrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Result: negative

Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Hamster
Application Route: Ingestion
Result: negative

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Carcinogenicity

Not classified based on available information.

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

May damage fertility or the unborn child.

Components:

3,3,5-Trimethylcyclohexyl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

4-(1-Oxo-2-propenyl)-morpholine:

Effects on fertility : Remarks: May cause adverse reproductive effects.
Based on a Significant New Use Rule regulation

2-(2-Ethoxyethoxy)ethyl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Effects on fetal development : Test Type: Fertility/early embryonic development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative

Propoxylated neopentyl glycol diacrylate esters:

Effects on fertility : Test Type: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion

Method: OECD Test Guideline 421
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Effects on fertility : Test Type: Fertility
Species: Rat
Application Route: Ingestion
Result: positive

Reproductive toxicity - Assessment : Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

Hexamethylene diacrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Effects on fertility : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: positive

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: positive

Reproductive toxicity - Assessment : Clear evidence of adverse effects on development, based on animal experiments., Some evidence of adverse effects on sexual function and fertility, based on animal experiments.

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Remarks: Based on data from similar materials

STOT-single exposure
May cause respiratory irritation.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

STOT-repeated exposure
May cause damage to organs through prolonged or repeated exposure.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Routes of exposure: Oral
Assessment: May cause damage to organs through prolonged or repeated exposure.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Repeated dose toxicity
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 4 weeks
Method: OECD Test Guideline 422

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rat
NOAEL: 50 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rat
NOAEL: 160 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Species: Rat
NOAEL: 100 mg/kg
Application Route: Ingestion
Exposure time: 2 Weeks
Method: OECD Test Guideline 422

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

Propoxylated neopentyl glycol diacrylate esters:
Species: Rat
NOAEL: 1,000 mg/kg

Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rat
NOAEL: 100 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Hexamethylene diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Method: OECD Test Guideline 422

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rat
NOAEL: >= 100 mg/kg
Application Route: Ingestion
Exposure time: 28 Days

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

Aspiration toxicity
Not classified based on available information.

Further information
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Remarks: May cause internal organ effects
Based on a Significant New Use Rule regulation

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:
3,3,5-Trimethylcyclohexyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 1.9 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 14.43 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 0.59 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 0.43 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	NOEC: 1,000 mg/l

Exposure time: 3 h
Method: OECD Test Guideline 209

4-(1-Oxo-2-propenyl)-morpholine:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 220 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 120 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 120 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): >= 120 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	IC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

2-(2-Ethoxyethoxy)ethyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 6.8 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 55 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: Based on data from similar materials
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 10 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials EC10 (Desmodesmus subspicatus (green algae)): 3.2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.26 mg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: Based on data from similar materials
Toxicity to microorganisms	:	EC50: 741 mg/l Exposure time: 3 h Method: OECD Test Guideline 209 Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 0.704 mg/l Exposure time: 96 h Method: OECD Test Guideline 203

Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 1.98 mg/l Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 0.405 mg/l Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia): 0.092 mg/l Exposure time: 21 d Method: OECD Test Guideline 211
M-Factor (Chronic aquatic toxicity)	:	1

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 90 µg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: No toxicity at the limit of solubility.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1.18 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: No toxicity at the limit of solubility.
Toxicity to algae	:	NOEC (Desmodesmus subspicatus (green algae)): 260 µg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: No toxicity at the limit of solubility.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 8.1 µg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: No toxicity at the limit of solubility.
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Propoxylated neopentyl glycol diacrylate esters:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 2.7 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 37 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 11 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 1 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	NOEC: 2 mg/l Exposure time: 28 d

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 1 - 10 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3.53 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 2.01 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 1.56 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Hexamethylene diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 4.6 - 10 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 2.6 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 1.5 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 0.59 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: 270 mg/l Exposure time: 30 min Method: OECD Test Guideline 209

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 0.46 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 0.8 mg/l Exposure time: 24 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 30 min Method: OECD Test Guideline 209
M-Factor (Chronic aquatic toxicity)	:	1

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 2.2 - 4.64 mg/l Exposure time: 96 h Method: DIN 38412
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 22.3 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 16.7 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 2.2 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 30 min Method: OECD Test Guideline 209

Persistence and degradability

Components:

3,3,5-Trimethylcyclohexyl acrylate:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 16.8 % Exposure time: 28 d Method: OECD Test Guideline 301F

4-(1-Oxo-2-propenyl)-morpholine:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 35 % Exposure time: 28 d Method: OECD Test Guideline 301D

2-(2-Ethoxyethoxy)ethyl acrylate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 84.4 % Exposure time: 28 d Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 51 % Exposure time: 28 d Method: OECD Test Guideline 301F

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 1 % Exposure time: 28 d Method: OECD Test Guideline 301B

Propoxylated neopentyl glycol diacrylate esters:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 51 % Exposure time: 28 d Method: OECD Test Guideline 301D

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 0 - 10 % Exposure time: 28 d Method: OECD Test Guideline 301F

Hexamethylene diacrylate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 60 - 70 % Exposure time: 28 d

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 3 % Exposure time: 28 d Method: OECD Test Guideline 301B

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 90 - 100 % Exposure time: 28 d Method: OECD Test Guideline 301A

Bioaccumulative potential

Components:

3,3,5-Trimethylcyclohexyl acrylate:

Partition coefficient: n-octanol/water	:	log Pow: 4.6

4-(1-Oxo-2-propenyl)-morpholine:

Partition coefficient: n-octanol/water	:	log Pow: -0.46

2-(2-Ethoxyethoxy)ethyl acrylate:

Partition coefficient: n-octanol/water	:	log Pow: 0.67 Remarks: Calculation

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Bioaccumulation	:	Species: Zebrafish Bioconcentration factor (BCF): 37 Method: OECD Test Guideline 305 Remarks: Based on data from similar materials
Partition coefficient: n-octanol/water	:	log Pow: 4.52

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Bioaccumulation	:	Species: Fish Bioconcentration factor (BCF): < 5
Partition coefficient: n-octanol/water	:	log Pow: 5.8

Propoxylated neopentyl glycol diacrylate esters:

Partition coefficient: n-octanol/water	:	log Pow: 2.41 - 3.87

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Bioaccumulation	:	Species: Cyprinus carpio (Carp) Bioconcentration factor (BCF): 18 - 72
Partition coefficient: n-octanol/water	:	log Pow: 3.1 - 3.8

Hexamethylene diacrylate:

Partition coefficient: n-octanol/water	:	log Pow: 2.81

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Partition coefficient: n-octanol/water	:	log Pow: 2.91

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Partition coefficient: n-octanol/water	:	log Pow: 0.01 - 0.39

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations. Do not release the product to the aquatic environment above defined regulatory levels
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations
UNRTDG

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964
Environmentally hazardous	:	yes

IMDG-Code

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F

Marine pollutant : yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation
49 CFR

UN/ID/NA number	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Remarks	:	Above applies only to containers over 119 gallons or 450 liters., Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know
CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Respiratory or skin sensitization
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 5 - < 10 %

US State Regulations

Pennsylvania Right To Know

3,3,5-Trimethylcyclohexyl acrylate	86178-38-3
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
Propoxylated neopentyl glycol diacrylate esters	84170-74-1
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Hexamethylene diacrylate	13048-33-4
2-benzyl-2-dimethylamino-4-morpholinobutyrophenone	119313-12-1
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1

California Prop. 65

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Additional regulatory information

4-(1-Oxo-2-propenyl)-morpholine 5117-12-4

The United States Environmental Protection Agency (USEPA) has established a Significant New Use Rule (SNUR) for one of the components in this product.
See 40 CFR § 721.5185

SECTION 16. OTHER INFORMATION

Further information

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / TWA	:	8-hour, time-weighted average
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA Z-1 / TWA	:	8-hour time weighted average
US WEEL / TWA	:	8-hr TWA

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency,

Data Sheet http://echa.europa.eu/

Revision Date : 2020-01-06

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

SAFETY DATA SHEET

Date of last issue: -
Date of first issue: 2020-01-06

SECTION 1. IDENTIFICATION

Product name	:	LED UV Curable INK Magenta PJUVG5-MA1000U

Manufacturer or supplier's details

Company name of supplier	:	MUTOH America Inc
Address	:	4405 East Baseline Road, Suite 120 Phoenix, Arizona 85042
Telephone	:	480-968-7772
Emergency telephone	:	480-968-7772 During normal opening times

Recommended use of the chemical and restrictions on use

Recommended use	:	Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral)	:	Category 4
Skin irritation	:	Category 2
Serious eye damage	:	Category 1
Skin sensitization	:	Category 1
Reproductive toxicity	:	Category 1B
Specific target organ systemic toxicity - single exposure	:	Category 3
Specific target organ systemic toxicity - repeated exposure	:	Category 2

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
H360 May damage fertility or the unborn child.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary Statements : **Prevention:**

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist or vapors.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
3,3,5-Trimethylcyclohexyl acrylate	86178-38-3	>= 30 - =< 40
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 15 - < 25
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 5 - < 10
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 3 - =< 7
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	>= 3 - =< 7
Propoxylated neopentyl glycol diacrylate esters	84170-74-1	>= 1 - =< 5
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 1 - < 5
Hexamethylene diacrylate	13048-33-4	>= 1 - < 5
2-benzyl-2-dimethylamino-4-morpholinobutyrophenone	119313-12-1	>= 1 - < 5
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1	< 1

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled	:	If inhaled, remove to fresh air. Get medical attention.
In case of skin contact	:	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention immediately.
If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.
Most important symptoms and effects, both acute and delayed	:	Harmful if swallowed. Causes skin irritation. May cause an allergic skin reaction. Causes serious eye damage. May cause respiratory irritation. May damage fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides Nitrogen oxides (NOx) Oxides of phosphorus
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained. Do not release the product to the aquatic environment above defined regulatory levels
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures	:	See Engineering measures under EXPOSURE CONTROLS/ PERSONAL PROTECTION section.
Local/Total ventilation	:	Use with local exhaust ventilation.
Advice on safe handling	:	Do not get on skin or clothing. Do not breathe vapors or spray mist. Do not swallow. Do not get in eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment. Keep container tightly closed. Take care to prevent spills, waste and minimize release to the environment.
Conditions for safe storage	:	Keep in properly labeled containers. Store locked up. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations.
Materials to avoid	:	Do not store with the following product types: Strong oxidizing agents Organic peroxides Explosives Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Hexamethylene diacrylate	13048-33-4	TWA	1 mg/m³	US WEEL

Engineering measures : Minimize workplace exposure concentrations.
Use with local exhaust ventilation.
Dust formation may be relevant in the processing of this product.
In addition to substance-specific OELs, general limitations of concentrations of particulates in the air at workplaces have to be considered in workplace risk assessment. Relevant limits include: OSHA PEL for Particulates Not Otherwise Regulated of 15 mg/m3 - total dust, 5 mg/m3 - respirable fraction; and ACGIH TWA for Particles (insoluble or poorly soluble) Not Otherwise Specified of 3 mg/m3 - respirable particles, 10 mg/m3 - inhalable particles.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material : Chemical-resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Eye protection : Wear the following personal protective equipment:
Chemical resistant goggles must be worn.
If splashes are likely to occur, wear:
Face-shield

Skin and body protection : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.
Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : magenta

Odor	:	characteristic
Odor Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	> 100 °C
Flash point	:	> 93 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	Immiscible in water
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Vapors may form explosive mixture with air. Can react with strong oxidizing agents.
Conditions to avoid	:	None known.

Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity
Harmful if swallowed.
Product:

Acute oral toxicity	:	Acute toxicity estimate: 1,609 mg/kg Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 2,000 mg/kg Method: Calculation method

Components:
3,3,5-Trimethylcyclohexyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg

4-(1-Oxo-2-propenyl)-morpholine:

Acute oral toxicity	:	LD50 (Rat): 588 mg/kg Method: OECD Test Guideline 401
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402

2-(2-Ethoxyethoxy)ethyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 300 - < 2,000 mg/kg Method: OECD Test Guideline 423 Remarks: Based on data from similar materials
Acute inhalation toxicity	:	LC50 (Rat): > 5.04 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 403 Remarks: Based on data from similar materials
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Acute oral toxicity	:	LD50 (Rat): 4,350 mg/kg
Acute dermal toxicity	:	LD50 (Rabbit): > 3,000 mg/kg

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 401 Assessment: The substance or mixture has no acute oral toxicity
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg

Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Propoxylated neopentyl glycol diacrylate esters:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 2 mg/l Exposure time: 4 h Test atmosphere: dust/mist
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg Method: OECD Test Guideline 401
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Hexamethylene diacrylate:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC0 (Rat): 0.41 mg/l Exposure time: 7 h Test atmosphere: vapor
Acute dermal toxicity	:	LD50 (Rabbit): 3,650 mg/kg

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg Method: OECD Test Guideline 401
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Acute oral toxicity	:	LD50 (Rat): 3,530 mg/kg
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg

Skin corrosion/irritation
Causes skin irritation.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: No skin irritation

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Method: OECD Test Guideline 404

Result: No skin irritation
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No skin irritation

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No skin irritation

Hexamethylene diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No eye irritation

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No eye irritation

Hexamethylene diacrylate:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

4-(1-Oxo-2-propenyl)-morpholine:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: Directive 67/548/EEC, Annex V, B.6.
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

2-(2-Ethoxyethoxy)ethyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Remarks: Based on data from similar materials
Assessment: Probability or evidence of skin sensitization in humans

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Propoxylated neopentyl glycol diacrylate esters:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Hexamethylene diacrylate:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: negative

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Germ cell mutagenicity
Not classified based on available information.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative

4-(1-Oxo-2-propenyl)-morpholine:

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: positive

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 471
Result: negative

Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen.

2-(2-Ethoxyethoxy)ethyl acrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

: Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

: Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Propoxylated neopentyl glycol diacrylate esters:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

Remarks: Based on data from similar materials

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Hexamethylene diacrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Result: negative

Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Hamster
Application Route: Ingestion
Result: negative

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Carcinogenicity
Not classified based on available information.

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
May damage fertility or the unborn child.
Components:

3,3,5-Trimethylcyclohexyl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

4-(1-Oxo-2-propenyl)-morpholine:

Effects on fertility : Remarks: May cause adverse reproductive effects.
Based on a Significant New Use Rule regulation

2-(2-Ethoxyethoxy)ethyl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Effects on fetal development : Test Type: Fertility/early embryonic development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative

Propoxylated neopentyl glycol diacrylate esters:

Effects on fertility : Test Type: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion

Method: OECD Test Guideline 421
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Effects on fertility : Test Type: Fertility
Species: Rat
Application Route: Ingestion
Result: positive

Reproductive toxicity - Assessment : Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

Hexamethylene diacrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Effects on fertility : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: positive

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: positive

Reproductive toxicity - Assessment : Clear evidence of adverse effects on development, based on animal experiments., Some evidence of adverse effects on sexual function and fertility, based on animal experiments.

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Remarks: Based on data from similar materials

STOT-single exposure
May cause respiratory irritation.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

STOT-repeated exposure
May cause damage to organs through prolonged or repeated exposure.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Routes of exposure: Oral
Assessment: May cause damage to organs through prolonged or repeated exposure.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Repeated dose toxicity
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 4 weeks
Method: OECD Test Guideline 422

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rat
NOAEL: 50 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rat
NOAEL: 160 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407
Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Species: Rat
NOAEL: 100 mg/kg
Application Route: Ingestion
Exposure time: 2 Weeks
Method: OECD Test Guideline 422

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

Propoxylated neopentyl glycol diacrylate esters:
Species: Rat
NOAEL: 1,000 mg/kg

Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rat
NOAEL: 100 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Hexamethylene diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Method: OECD Test Guideline 422

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rat
NOAEL: >= 100 mg/kg
Application Route: Ingestion
Exposure time: 28 Days

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

Aspiration toxicity
Not classified based on available information.

Further information
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Remarks: May cause internal organ effects
Based on a Significant New Use Rule regulation

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:
3,3,5-Trimethylcyclohexyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 1.9 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 14.43 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 0.59 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 0.43 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	NOEC: 1,000 mg/l

Exposure time: 3 h
Method: OECD Test Guideline 209

4-(1-Oxo-2-propenyl)-morpholine:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 220 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 120 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 120 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): >= 120 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	IC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

2-(2-Ethoxyethoxy)ethyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 6.8 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 55 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: Based on data from similar materials
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 10 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials EC10 (Desmodesmus subspicatus (green algae)): 3.2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.26 mg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: Based on data from similar materials
Toxicity to microorganisms	:	EC50: 741 mg/l Exposure time: 3 h Method: OECD Test Guideline 209 Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 0.704 mg/l Exposure time: 96 h Method: OECD Test Guideline 203

Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 1.98 mg/l Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 0.405 mg/l Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia): 0.092 mg/l Exposure time: 21 d Method: OECD Test Guideline 211
M-Factor (Chronic aquatic toxicity)	:	1

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 90 µg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: No toxicity at the limit of solubility.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1.18 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: No toxicity at the limit of solubility.
Toxicity to algae	:	NOEC (Desmodesmus subspicatus (green algae)): 260 µg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: No toxicity at the limit of solubility.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 8.1 µg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: No toxicity at the limit of solubility.
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Propoxylated neopentyl glycol diacrylate esters:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 2.7 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 37 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 11 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 1 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	NOEC: 2 mg/l Exposure time: 28 d

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 1 - 10 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3.53 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 2.01 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 1.56 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Hexamethylene diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 4.6 - 10 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 2.6 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 1.5 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 0.59 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: 270 mg/l Exposure time: 30 min Method: OECD Test Guideline 209

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 0.46 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 0.8 mg/l Exposure time: 24 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 30 min Method: OECD Test Guideline 209
M-Factor (Chronic aquatic toxicity)	:	1

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 2.2 - 4.64 mg/l Exposure time: 96 h Method: DIN 38412
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 22.3 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 16.7 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 2.2 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 30 min Method: OECD Test Guideline 209

Persistence and degradability

Components:

3,3,5-Trimethylcyclohexyl acrylate:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 16.8 % Exposure time: 28 d Method: OECD Test Guideline 301F

4-(1-Oxo-2-propenyl)-morpholine:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 35 % Exposure time: 28 d Method: OECD Test Guideline 301D

2-(2-Ethoxyethoxy)ethyl acrylate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 84.4 % Exposure time: 28 d Remarks: Based on data from similar materials

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 51 % Exposure time: 28 d Method: OECD Test Guideline 301F

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 1 % Exposure time: 28 d Method: OECD Test Guideline 301B

Propoxylated neopentyl glycol diacrylate esters:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 51 % Exposure time: 28 d Method: OECD Test Guideline 301D

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 0 - 10 % Exposure time: 28 d Method: OECD Test Guideline 301F

Hexamethylene diacrylate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 60 - 70 % Exposure time: 28 d

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 3 % Exposure time: 28 d Method: OECD Test Guideline 301B

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 90 - 100 % Exposure time: 28 d Method: OECD Test Guideline 301A

Bioaccumulative potential

Components:

3,3,5-Trimethylcyclohexyl acrylate:

Partition coefficient: n-octanol/water	:	log Pow: 4.6

4-(1-Oxo-2-propenyl)-morpholine:

Partition coefficient: n-octanol/water	:	log Pow: -0.46

2-(2-Ethoxyethoxy)ethyl acrylate:

Partition coefficient: n-octanol/water	:	log Pow: 0.67 Remarks: Calculation

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Bioaccumulation	:	Species: Zebrafish Bioconcentration factor (BCF): 37 Method: OECD Test Guideline 305 Remarks: Based on data from similar materials
Partition coefficient: n-octanol/water	:	log Pow: 4.52

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Bioaccumulation	:	Species: Fish Bioconcentration factor (BCF): < 5
Partition coefficient: n-octanol/water	:	log Pow: 5.8

Propoxylated neopentyl glycol diacrylate esters:

Partition coefficient: n-octanol/water	:	log Pow: 2.41 - 3.87

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Bioaccumulation	:	Species: Cyprinus carpio (Carp) Bioconcentration factor (BCF): 18 - 72
Partition coefficient: n-octanol/water	:	log Pow: 3.1 - 3.8

Hexamethylene diacrylate:

Partition coefficient: n-octanol/water	:	log Pow: 2.81

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Partition coefficient: n-octanol/water	:	log Pow: 2.91

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Partition coefficient: n-octanol/water	:	log Pow: 0.01 - 0.39

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations. Do not release the product to the aquatic environment above defined regulatory levels
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations
UNRTDG

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964
Environmentally hazardous	:	yes

IMDG-Code

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F

Marine pollutant : yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation
49 CFR

UN/ID/NA number	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Remarks	:	Above applies only to containers over 119 gallons or 450 liters., Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know
CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Respiratory or skin sensitization
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 5 - < 10 %

US State Regulations

Pennsylvania Right To Know

3,3,5-Trimethylcyclohexyl acrylate	86178-38-3
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
Propoxylated neopentyl glycol diacrylate esters	84170-74-1
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Hexamethylene diacrylate	13048-33-4
2-benzyl-2-dimethylamino-4-morpholinobutyrophenone	119313-12-1
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1

California Prop. 65

This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

Additional regulatory information

4-(1-Oxo-2-propenyl)-morpholine 5117-12-4

The United States Environmental Protection Agency (USEPA) has established a Significant New Use Rule (SNUR) for one of the components in this product.
See 40 CFR § 721.5185

SECTION 16. OTHER INFORMATION

Further information

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / TWA	:	8-hour, time-weighted average
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA Z-1 / TWA	:	8-hour time weighted average
US WEEL / TWA	:	8-hr TWA

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency,

Data Sheet http://echa.europa.eu/

Revision Date : 2020-01-06

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

SAFETY DATA SHEET

Date of last issue: -
Date of first issue: 2020-01-06

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Varnish
PJUVG5-VA1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 4405 East Baseline Road, Suite 120 Phoenix, Arizona 85042

Telephone : 480-968-7772

Emergency telephone : 480-968-7772
During normal opening times

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Skin irritation : Category 2

Serious eye damage : Category 1

Skin sensitization : Category 1

Reproductive toxicity : Category 1B

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H360 May damage fertility or the unborn child.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing mist or vapors.
P264 Wash skin thoroughly after handling.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with

water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1	>= 50 - < 60
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 7 - =< 13
Poly(oxy-1,2-ethanediyl), .alpha.-hydro-.omega.-[(1-oxo-2-propen-1-yl)oxy]-, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol	28961-43-5	>= 5 - =< 10
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	>= 3 - =< 7
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 1 - < 5
Propoxylated neopentyl glycol diacrylate esters	84170-74-1	< 1
Hexamethylene diacrylate	13048-33-4	< 1

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air.
Get medical attention.

In case of skin contact : In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes.
Get medical attention.
Wash clothing before reuse.
Thoroughly clean shoes before reuse.

In case of eye contact : In case of contact, immediately flush eyes with plenty of water for at least 15 minutes.
If easy to do, remove contact lens, if worn.
Get medical attention immediately.

If swallowed : If swallowed, DO NOT induce vomiting.
Get medical attention.
Rinse mouth thoroughly with water.

Most important symptoms and : Causes skin irritation.

effects, both acute and delayed		May cause an allergic skin reaction. Causes serious eye damage. May damage fertility or the unborn child.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides Oxides of phosphorus
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained.
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures	:	See Engineering measures under EXPOSURE CONTROLS/ PERSONAL PROTECTION section.
Local/Total ventilation	:	Use with local exhaust ventilation.
Advice on safe handling	:	Do not get on skin or clothing. Do not breathe vapors or spray mist. Do not swallow. Do not get in eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment. Keep container tightly closed. Take care to prevent spills, waste and minimize release to the environment.
Conditions for safe storage	:	Keep in properly labeled containers. Store locked up. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations.
Materials to avoid	:	Do not store with the following product types: Strong oxidizing agents Organic peroxides Explosives Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Hexamethylene diacrylate	13048-33-4	TWA	1 mg/m³	US WEEL

Engineering measures : Minimize workplace exposure concentrations.
Use with local exhaust ventilation.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material : Chemical-resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special

applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Eye protection	:	Wear the following personal protective equipment: Safety goggles
Skin and body protection	:	Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential. Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).
Hygiene measures	:	Ensure that eye flushing systems and safety showers are located close to the working place. When using do not eat, drink or smoke. Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	clear
Odor	:	characteristic
Odor Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	> 100 °C
Flash point	:	> 93 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	Immiscible in water
Partition coefficient: n-octanol/water	:	Not applicable

Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Vapors may form explosive mixture with air. Can react with strong oxidizing agents.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity
Not classified based on available information.
Product:

Acute oral toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 2,000 mg/kg Method: Calculation method

Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:

Acute oral toxicity	:	LD50 (Rat): 3,530 mg/kg
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg

2-(2-Ethoxyethoxy)ethyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 300 - < 2,000 mg/kg Method: OECD Test Guideline 423 Remarks: Based on data from similar materials
Acute inhalation toxicity	:	LC50 (Rat): > 5.04 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 403 Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity
Remarks: Based on data from similar materials

Poly(oxy-1,2-ethanediyl), .alpha.-hydro-.omega.-[(1-oxo-2-propen-1-yl)oxy]-, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol:
Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rabbit): 13,200 mg/kg

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 401
Assessment: The substance or mixture has no acute oral toxicity

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Propoxylated neopentyl glycol diacrylate esters:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 2 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Hexamethylene diacrylate:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC0 (Rat): 0.41 mg/l
Exposure time: 7 h
Test atmosphere: vapor

Acute dermal toxicity : LD50 (Rabbit): 3,650 mg/kg

Skin corrosion/irritation
Causes skin irritation.
Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Remarks: Based on data from similar materials

Poly(oxy-1,2-ethanediyl), .alpha.-hydro-.omega.-[(1-oxo-2-propen-1-yl)oxy]-, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No skin irritation

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No skin irritation

Hexamethylene diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405
Remarks: Based on data from similar materials

Poly(oxy-1,2-ethanediyl), .alpha.-hydro-.omega.-[(1-oxo-2-propen-1-yl)oxy]-, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No eye irritation

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No eye irritation

Hexamethylene diacrylate:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

2-(2-Ethoxyethoxy)ethyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Remarks: Based on data from similar materials
Assessment: Probability or evidence of skin sensitization in humans

Poly(oxy-1,2-ethanediyl), .alpha.-hydro-.omega.-[(1-oxo-2-propen-1-yl)oxy]-, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol:
Test Type: Buehler Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Propoxylated neopentyl glycol diacrylate esters:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Hexamethylene diacrylate:

Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Germ cell mutagenicity
Not classified based on available information.
Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

2-(2-Ethoxyethoxy)ethyl acrylate:
Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

: Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

: Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Propoxylated neopentyl glycol diacrylate esters:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)

Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Hexamethylene diacrylate:
Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Result: negative

Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Carcinogenicity
Not classified based on available information.

IARC No ingredient of this product present at levels greater than or equal to 0.1% is identified as probable, possible or confirmed human carcinogen by IARC.

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity
May damage fertility or the unborn child.
Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

2-(2-Ethoxyethoxy)ethyl acrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Effects on fetal development : Test Type: Fertility/early embryonic development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Effects on fertility : Test Type: Fertility
Species: Rat
Application Route: Ingestion
Result: positive

Reproductive toxicity - Assessment : Some evidence of adverse effects on sexual function and fertility, and/or on development, based on animal experiments.

Propoxylated neopentyl glycol diacrylate esters:
Effects on fertility : Test Type: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 421
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

Hexamethylene diacrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative

STOT-single exposure
Not classified based on available information.

STOT-repeated exposure
Not classified based on available information.

Repeated dose toxicity
Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion

Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rat
NOAEL: 160 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407
Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rat
NOAEL: 100 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Propoxylated neopentyl glycol diacrylate esters:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Hexamethylene diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Method: OECD Test Guideline 422

Aspiration toxicity
Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 2.2 - 4.64 mg/l Exposure time: 96 h Method: DIN 38412
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 22.3 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 16.7 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 2.2 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 30 min

Method: OECD Test Guideline 209

2-(2-Ethoxyethoxy)ethyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 6.8 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 55 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: Based on data from similar materials
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 10 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials EC10 (Desmodesmus subspicatus (green algae)): 3.2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.26 mg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: Based on data from similar materials
Toxicity to microorganisms	:	EC50: 741 mg/l Exposure time: 3 h Method: OECD Test Guideline 209 Remarks: Based on data from similar materials

Poly(oxy-1,2-ethanediyl), .alpha.-hydro-.omega.-[(1-oxo-2-propen-1-yl)oxy]-, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 1.95 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 70.7 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Desmodesmus subspicatus (green algae)): 2.2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50 : > 1,000 mg/l Exposure time: 180 min Method: OECD Test Guideline 209

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 90 µg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: No toxicity at the limit of solubility.
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1.18 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: No toxicity at the limit of solubility.

Toxicity to algae	:	NOEC (Desmodesmus subspicatus (green algae)): 260 µg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: No toxicity at the limit of solubility.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 8.1 µg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: No toxicity at the limit of solubility.
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 1 - 10 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3.53 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 2.01 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 1.56 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Propoxylated neopentyl glycol diacrylate esters:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 2.7 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 37 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 11 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 1 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	NOEC: 2 mg/l Exposure time: 28 d

Hexamethylene diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 4.6 - 10 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 2.6 mg/l Exposure time: 48 h

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 1.5 mg/l
Exposure time: 72 h

EC10 (Desmodesmus subspicatus (green algae)): 0.59 mg/l
Exposure time: 72 h

Toxicity to microorganisms : EC50: 270 mg/l
Exposure time: 30 min
Method: OECD Test Guideline 209

Persistence and degradability
Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 90 - 100 %
Exposure time: 28 d
Method: OECD Test Guideline 301A

2-(2-Ethoxyethoxy)ethyl acrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 84.4 %
Exposure time: 28 d
Remarks: Based on data from similar materials

Poly(oxy-1,2-ethanediyl), .alpha.-hydro-.omega.-[(1-oxo-2-propen-1-yl)oxy]-, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 60 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 1 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 0 - 10 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Propoxylated neopentyl glycol diacrylate esters:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 51 %
Exposure time: 28 d
Method: OECD Test Guideline 301D

Hexamethylene diacrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 60 - 70 %
Exposure time: 28 d

Bioaccumulative potential
Components:
Oxybis(methyl-2,1-ethanediyl) diacrylate:
Partition coefficient: n-octanol/water : log Pow: 0.01 - 0.39

2-(2-Ethoxyethoxy)ethyl acrylate:
Partition coefficient: : log Pow: 0.67

n-octanol/water Remarks: Calculation

Poly(oxy-1,2-ethanediyl), .alpha.-hydro-.omega.-[(1-oxo-2-propen-1-yl)oxy]-, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol:
Partition coefficient: n-octanol/water : log Pow: 2.89

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

Partition coefficient: n-octanol/water : log Pow: 5.8

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 18 - 72

Partition coefficient: n-octanol/water : log Pow: 3.1 - 3.8

Propoxylated neopentyl glycol diacrylate esters:
Partition coefficient: n-octanol/water : log Pow: 2.41 - 3.87

Hexamethylene diacrylate:
Partition coefficient: n-octanol/water : log Pow: 2.81

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods
Waste from residues : Dispose of in accordance with local regulations.

Contaminated packaging : Empty containers should be taken to an approved waste handling site for recycling or disposal.
If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations
UNRTDG
Not regulated as dangerous goods

IATA-DGR
Not regulated as dangerous goods

IMDG-Code
Not regulated as dangerous goods

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation
49 CFR
Not regulated as dangerous goods

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know
CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Skin corrosion or irritation
Serious eye damage or eye irritation
Respiratory or skin sensitization
Reproductive toxicity

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 7 - =< 13 %

US State Regulations

Pennsylvania Right To Know

Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
Poly(oxy-1,2-ethanediyl), .alpha.-hydro-.omega.-[(1-oxo-2-propen-1-yl)oxy]-, ether with 2-ethyl-2-(hydroxymethyl)-1,3-propanediol	28961-43-5
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Propoxylated neopentyl glycol diacrylate esters	84170-74-1
Hexamethylene diacrylate	13048-33-4

California Prop. 65
This product does not contain any chemicals known to the State of California to cause cancer, birth, or any other reproductive defects.

SECTION 16. OTHER INFORMATION

Further information

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / TWA	:	8-hour, time-weighted average
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA Z-1 / TWA	:	8-hour time weighted average
US WEEL / TWA	:	8-hr TWA

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS -

Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/
Revision Date	:	2020-01-06

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

SAFETY DATA SHEET

Date of last issue: -
Date of first issue: 2020-01-06

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK White
PJUVG5-WH1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 4405 East Baseline Road, Suite 120 Phoenix, Arizona 85042

Telephone : 480-968-7772

Emergency telephone : 480-968-7772
During normal opening times

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Acute toxicity (Dermal) : Category 4

Skin irritation : Category 2

Serious eye damage : Category 1

Skin sensitization : Category 1

Specific target organ systemic toxicity - single exposure : Category 3

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H302 + H312 Harmful if swallowed or in contact with skin.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.

Precautionary Statements : **Prevention:**
P261 Avoid breathing mist or vapors.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.

P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352 + P312 IF ON SKIN: Wash with plenty of soap and water. Call a POISON CENTER/doctor if you feel unwell.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Titanium dioxide	13463-67-7	>= 20 - < 30
N,N-Dimethylacrylamide	2680-03-7	>= 15 - < 25
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 7 - =< 13
3,3,5-Trimethylcyclohexyl acrylate	86178-38-3	>= 3 - =< 7
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	>= 3 - =< 7
Nonane-1,9-diyl diacrylate	107481-28-7	>= 3 - =< 7
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 3 - =< 7
2-Propenoic acid, 1,1'-(1,6-hexanediyl) ester, polymer with 2-aminoethanol	67906-98-3	>= 1 - < 5
Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate	84434-11-7	>= 1 - < 5
1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-	71868-15-0	>= 1 - < 5
Propoxylated neopentyl glycol diacrylate esters	84170-74-1	< 1
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1	< 1
2-Phenoxyethyl acrylate	48145-04-6	< 1
Trimethylolpropane triacrylate	15625-89-5	< 1
Hexamethylene diacrylate	13048-33-4	< 1

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled : If inhaled, remove to fresh air.
Get medical attention.

In case of skin contact	:	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention immediately.
If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.
Most important symptoms and effects, both acute and delayed	:	Harmful if swallowed or in contact with skin. Causes skin irritation. May cause an allergic skin reaction. Causes serious eye damage. May cause respiratory irritation.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides Nitrogen oxides (NOx) Oxides of phosphorus Metal oxides
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment

emergency procedures recommendations.

Environmental precautions : Discharge into the environment must be avoided.
Prevent further leakage or spillage if safe to do so.
Prevent spreading over a wide area (e.g. by containment or oil barriers).
Retain and dispose of contaminated wash water.
Local authorities should be advised if significant spillages cannot be contained.
Do not release the product to the aquatic environment above defined regulatory levels

Methods and materials for containment and cleaning up : Soak up with inert absorbent material.
For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container.
Clean up remaining materials from spill with suitable absorbent.
Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable.
Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures : See Engineering measures under EXPOSURE CONTROLS/ PERSONAL PROTECTION section.

Local/Total ventilation : Use with local exhaust ventilation.

Advice on safe handling : Do not get on skin or clothing.
Do not breathe vapors or spray mist.
Do not swallow.
Do not get in eyes.
Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment.
Keep container tightly closed.
Take care to prevent spills, waste and minimize release to the environment.

Conditions for safe storage : Keep in properly labeled containers.
Store locked up.
Keep tightly closed.
Keep in a cool, well-ventilated place.
Store in accordance with the particular national regulations.

Materials to avoid : Do not store with the following product types:
Strong oxidizing agents
Organic peroxides
Explosives
Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Titanium dioxide	13463-67-7	TWA (total dust)	15 mg/m³	OSHA Z-1

		TWA	10 mg/m³ (Titanium dioxide)	ACGIH
Hexamethylene diacrylate	13048-33-4	TWA	1 mg/m³	US WEEL

Engineering measures : Minimize workplace exposure concentrations.
Use with local exhaust ventilation.
Dust formation may be relevant in the processing of this product.
In addition to substance-specific OELs, general limitations of concentrations of particulates in the air at workplaces have to be considered in workplace risk assessment. Relevant limits include: OSHA PEL for Particulates Not Otherwise Regulated of 15 mg/m3 - total dust, 5 mg/m3 - respirable fraction; and ACGIH TWA for Particles (insoluble or poorly soluble) Not Otherwise Specified of 3 mg/m3 - respirable particles, 10 mg/m3 - inhalable particles.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material : Chemical-resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Eye protection : Wear the following personal protective equipment:
Chemical resistant goggles must be worn.
If splashes are likely to occur, wear:
Face-shield

Skin and body protection : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.
Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : white

Odor	:	characteristic
Odor Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	> 100 °C
Flash point	:	> 93 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	Immiscible in water
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Vapors may form explosive mixture with air. Can react with strong oxidizing agents.
Conditions to avoid	:	None known.
Incompatible materials	:	Oxidizing agents

Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity
Harmful if swallowed or in contact with skin.
Product:

Acute oral toxicity	:	Acute toxicity estimate: 806 mg/kg Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: 1,523 mg/kg Method: Calculation method

Components:
Titanium dioxide:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 6.82 mg/l Exposure time: 4 h Test atmosphere: dust/mist Assessment: The substance or mixture has no acute inhalation toxicity

N,N-Dimethylacrylamide:

Acute oral toxicity	:	LD50 (Rat): 215 - 464 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 3.16 mg/l
Acute dermal toxicity	:	LD50 (Rat): 500 - 2,000 mg/kg

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Acute oral toxicity	:	LD50 (Rat): 4,350 mg/kg
Acute dermal toxicity	:	LD50 (Rabbit): > 3,000 mg/kg

3,3,5-Trimethylcyclohexyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 401 Assessment: The substance or mixture has no acute oral toxicity
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Nonane-1,9-diyl diacrylate:

Acute oral toxicity	:	LD50: > 2,500 mg/kg
Acute inhalation toxicity	:	LC50: > 5.05 mg/l

2-(2-Ethoxyethoxy)ethyl acrylate:

Acute oral toxicity : LD50 (Rat): > 300 - < 2,000 mg/kg
Method: OECD Test Guideline 423
Remarks: Based on data from similar materials

Acute inhalation toxicity : LC50 (Rat): > 5.04 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity
Remarks: Based on data from similar materials

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402

1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-:

Acute oral toxicity : LD50: > 2,000 mg/kg
Remarks: Based on data from similar materials

Propoxylated neopentyl glycol diacrylate esters:

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 2 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Acute oral toxicity : LD50 (Rat): 3,530 mg/kg

Acute dermal toxicity : LD50 (Rabbit): > 2,000 mg/kg

2-Phenoxyethyl acrylate:

Acute oral toxicity : LD50 (Rat): 5,000 mg/kg
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg

Trimethylolpropane triacrylate:

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 0.55 mg/l
Exposure time: 6 h
Test atmosphere: vapour
Assessment: The substance or mixture has no acute inhalation toxicity

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Assessment: The substance or mixture has no acute dermal

toxicity

Hexamethylene diacrylate:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute inhalation toxicity	:	LC0 (Rat): 0.41 mg/l Exposure time: 7 h Test atmosphere: vapor
Acute dermal toxicity	:	LD50 (Rabbit): 3,650 mg/kg

Skin corrosion/irritation
Causes skin irritation.
Components:
Titanium dioxide:
Species: Rabbit
Result: No skin irritation

N,N-Dimethylacrylamide:
Species: Rabbit
Result: No skin irritation

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

3,3,5-Trimethylcyclohexyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Remarks: Based on data from similar materials

2-Propenoic acid, 1,1'-(1,6-hexanediyl) ester, polymer with 2-aminoethanol:
Result: Skin irritation

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:
Species: Rabbit
Result: No skin irritation

1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Remarks: Based on data from similar materials

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No skin irritation

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

2-Phenoxyethyl acrylate:
Species: Rabbit
Result: Skin slightly irritation

Trimethylolpropane triacrylate：
Species: Rabbit
Result: Skin irritation

Hexamethylene diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
Titanium dioxide:
Species: Rabbit
Result: No eye irritation

N,N-Dimethylacrylamide:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 437

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

3,3,5-Trimethylcyclohexyl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405
Remarks: Based on data from similar materials

2-Propenoic acid, 1,1'-(1,6-hexanediyl) ester, polymer with 2-aminoethanol:
Result: Irritation to eyes, reversing within 21 days

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:
Species: Rabbit
Result: No eye irritation

1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-:
Result: No eye irritation
Method: OECD Test Guideline 492

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No eye irritation

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit

Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

2-Phenoxyethyl acrylate:
Species: Rabbit
Result: Slightly irritation to eyes, reversing within 48 hours

Trimethylolpropane triacrylate：
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Hexamethylene diacrylate:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
Titanium dioxide:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Result: negative

N,N-Dimethylacrylamide:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: negative

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

3,3,5-Trimethylcyclohexyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Nonane-1,9-diyl diacrylate:
Result: Skin Sesitization

2-(2-Ethoxyethoxy)ethyl acrylate:

Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Remarks: Based on data from similar materials
Assessment: Probability or evidence of skin sensitization in humans

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: negative
Remarks: Based on data from similar materials

Propoxylated neopentyl glycol diacrylate esters:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

2-Phenoxyethyl acrylate:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Trimethylolpropane triacrylate：
Test Type: Maximisation Test
Exposure routes: Skin contact
Species: Guinea pig
Result: positive
Assessment: Probability or evidence of skin sensitisation in humans

Hexamethylene diacrylate:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Germ cell mutagenicity

Not classified based on available information.

Components:

Titanium dioxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Genotoxicity in vivo : Test Type: In vivo micronucleus test
Species: Mouse
Result: negative

N,N-Dimethylacrylamide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

3,3,5-Trimethylcyclohexyl acrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

: Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473

Result: negative

: Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

2-(2-Ethoxyethoxy)ethyl acrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative

Propoxylated neopentyl glycol diacrylate esters:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

2-Phenoxyethyl acrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471

Result: negative

Trimethylolpropane triacrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

Hexamethylene diacrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Result: negative

Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Carcinogenicity

Not classified based on available information.

Components:

Titanium dioxide:

Species: Rat
Application Route: inhalation (dust/mist/fume)
Exposure time: 2 Years
Method: OECD Test Guideline 453
Result: positive
Remarks: The mechanism or mode of action may not be relevant in humans.

Carcinogenicity - Assessment : Limited evidence of carcinogenicity in inhalation studies with animals.

Trimethylolpropane triacrylate:

Species: Rat
Application Route: Skin contact
Exposure time: 104 - 105 weeks
Result: negative

IARC Group 2B: Possibly carcinogenic to humans
Titanium dioxide 13463-67-7

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

Not classified based on available information.

Components:

N,N-Dimethylacrylamide:

Effects on fertility : Test Type: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 421
Result: negative

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

3,3,5-Trimethylcyclohexyl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Effects on fetal development : Test Type: Fertility/early embryonic development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative

2-(2-Ethoxyethoxy)ethyl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative

Propoxylated neopentyl glycol diacrylate esters:

Effects on fertility	:	Test Type: Reproduction/Developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 421 Result: negative
Effects on fetal development	:	Test Type: Embryo-fetal development Species: Rat Application Route: Ingestion Result: negative Remarks: Based on data from similar materials

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Effects on fertility	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative Remarks: Based on data from similar materials
Effects on fetal development	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative Remarks: Based on data from similar materials

2-Phenoxyethyl acrylate:

Effects on fertility	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative
Effects on fetal development	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: positive Test Type: Embryo-fetal development Species: Rat Application Route: Ingestion Method: OECD Test Guideline 414 Result: positive
Reproductive toxicity - Assessment	:	Some evidence of adverse effects on development, based on animal experiments.

Trimethylolpropane triacrylate:

Effects on fertility	:	Test Type: Reproduction/Developmental toxicity screening test Species: Rat Application Route: Ingestion Result: negative Remarks: Based on data from similar materials
Effects on foetal development	:	Test Type: Embryo-foetal development Species: Rat

Application Route: Ingestion
Result: negative

Hexamethylene diacrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative

STOT-single exposure
May cause respiratory irritation.
Components:
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

3,3,5-Trimethylcyclohexyl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

STOT-repeated exposure
Not classified based on available information.

Repeated dose toxicity
Components:
Titanium dioxide:
Species: Rat
NOAEL: 24,000 mg/kg
Application Route: Ingestion
Exposure time: 28 Days

Species: Rat
NOAEL: 10 mg/m³
Application Route: inhalation (dust/mist/fume)
Exposure time: 2 y

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Species: Rat
NOAEL: 100 mg/kg
Application Route: Ingestion
Exposure time: 2 Weeks
Method: OECD Test Guideline 422

3,3,5-Trimethylcyclohexyl acrylate:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 4 weeks
Method: OECD Test Guideline 422

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Method: OECD Test Guideline 408

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rat
NOAEL: 160 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407
Remarks: Based on data from similar materials

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:
Species: Rat
NOAEL: 100 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Propoxylated neopentyl glycol diacrylate esters:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

2-Phenoxyethyl acrylate:
Species: Rat
NOAEL: 350 mg/kg
Application Route: Ingestion
Exposure time: 28 Days

Trimethylolpropane triacrylate:
Species: Rat
NOAEL: >= 500 mg/kg
Application Route: Ingestion
Exposure time: 35 - 56 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

Hexamethylene diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Method: OECD Test Guideline 422

Aspiration toxicity
Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:
Titanium dioxide:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l Exposure time: 96 h Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h
Toxicity to algae	:	EC50 (Skeletonema costatum (marine diatom)): > 10,000 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 3h Method: OECD Test Guideline 209

N,N-Dimethylacrylamide:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): > 400 mg/l Exposure time: 72 h Method: OECD Test Guideline 201

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 0.704 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 1.98 mg/l Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 0.405 mg/l Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia): 0.092 mg/l Exposure time: 21 d Method: OECD Test Guideline 211
M-Factor (Chronic aquatic toxicity)	:	1

3,3,5-Trimethylcyclohexyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 1.9 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 14.43 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 0.59 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 0.43 mg/l

Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : NOEC: 1,000 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 90 µg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 1.18 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: No toxicity at the limit of solubility.

Toxicity to algae : NOEC (Desmodesmus subspicatus (green algae)): 260 µg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 8.1 µg/l
Exposure time: 21 d
Method: OECD Test Guideline 211
Remarks: No toxicity at the limit of solubility.

Toxicity to microorganisms : EC50: > 100 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

Nonane-1,9-diyl diacrylate:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 0.67 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50: 0.64 mg/l
Exposure time: 48 h

Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 0.19 mg/l
Exposure time: 72 h

NOEC (Desmodesmus subspicatus (green algae)): 0.032 mg/l
Exposure time: 72 h

2-(2-Ethoxyethoxy)ethyl acrylate:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 6.8 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 55 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: Based on data from similar materials

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 10 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

EC10 (Desmodesmus subspicatus (green algae)): 3.2 mg/l

Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.26 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211
Remarks: Based on data from similar materials

Toxicity to microorganisms : EC50: 741 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209
Remarks: Based on data from similar materials

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 1.89 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 2.26 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 1.01 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC50: > 1,000 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-:

Toxicity to daphnia and other aquatic invertebrates : EC50: 4.25 mg/l
Exposure time: 48 h
Remarks: Based on data from similar materials

Toxicity to algae : EC50: 1.32 mg/l
Exposure time: 96 h
Remarks: Based on data from similar materials

Propoxylated neopentyl glycol diacrylate esters:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 2.7 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 37 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : EC50 (Pseudokirchneriella subcapitata (green algae)): 11 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Pseudokirchneriella subcapitata (green algae)): 1 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : NOEC: 2 mg/l
Exposure time: 28 d

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 2.2 - 4.64 mg/l

Exposure time: 96 h
Method: DIN 38412

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 22.3 mg/l
Exposure time: 48 h

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 16.7 mg/l
Exposure time: 72 h

EC10 (Desmodesmus subspicatus (green algae)): 2.2 mg/l
Exposure time: 72 h

Toxicity to microorganisms : EC50: > 1,000 mg/l
Exposure time: 30 min
Method: OECD Test Guideline 209

2-Phenoxyethyl acrylate:

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 10 mg/l
Exposure time: 96 h
Method: DIN 38412

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 1.21 mg/l
Exposure time: 48 h

Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 4.44 mg/l
Exposure time: 72 h

EC10 (Desmodesmus subspicatus (green algae)): 0.71 mg/l
Exposure time: 72 h

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.1 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211
Remarks: Based on data from similar materials

Toxicity to microorganisms : EC50: 177 mg/l
Exposure time: 180 min

Trimethylolpropane triacrylate:

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 1.47 mg/l
Exposure time: 96 h
Method: Directive 67/548/EEC, Annex V, C.1.

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 19.9 mg/l
Exposure time: 48 h
Method: Directive 67/548/EEC, Annex V, C.2.

Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 4.86 mg/l
Exposure time: 96 h
Method: Directive 67/548/EEC, Annex V, C.3.

Toxicity to microorganisms : EC50 : 625 mg/l
Exposure time: 30 min
Method: ISO 8192

Hexamethylene diacrylate:

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 4.6 - 10 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 2.6 mg/l
Exposure time: 48 h

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 1.5 mg/l
Exposure time: 72 h

EC10 (Desmodesmus subspicatus (green algae)): 0.59 mg/l
Exposure time: 72 h

Toxicity to microorganisms : EC50: 270 mg/l
Exposure time: 30 min
Method: OECD Test Guideline 209

Persistence and degradability
Components:
N,N-Dimethylacrylamide:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 301C

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 51 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

3,3,5-Trimethylcyclohexyl acrylate:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 16.8 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 1 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Nonane-1,9-diyl diacrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 83 %
Exposure time: 28 d

2-(2-Ethoxyethoxy)ethyl acrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 84.4 %
Exposure time: 28 d
Remarks: Based on data from similar materials

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 0 - 10 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

Propoxylated neopentyl glycol diacrylate esters:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 51 %

Exposure time: 28 d
Method: OECD Test Guideline 301D

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 90 - 100 %
Exposure time: 28 d
Method: OECD Test Guideline 301A

2-Phenoxyethyl acrylate:
Biodegradability : Result: Inherently biodegradable.
Biodegradation: 22.3 %
Exposure time: 28 d
Method: OECD Test Guideline 301D
Remarks: Based on data from similar materials

Trimethylolpropane triacrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 82 - 90 %
Exposure time: 28 d
Method: OECD Test Guideline 301

Hexamethylene diacrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 60 - 70 %
Exposure time: 28 d

Bioaccumulative potential
Components:
N,N-Dimethylacrylamide:
Partition coefficient: n-octanol/water : log Pow: -0.3

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Bioaccumulation : Species: Zebrafish
Bioconcentration factor (BCF): 37
Method: OECD Test Guideline 305
Remarks: Based on data from similar materials

Partition coefficient: n-octanol/water : log Pow: 4.52

3,3,5-Trimethylcyclohexyl acrylate:
Partition coefficient: n-octanol/water : log Pow: 4.6

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

Partition coefficient: n-octanol/water : log Pow: 5.8

Nonane-1,9-diyl diacrylate:
Partition coefficient: n-octanol/water : log Pow: 4.64

2-(2-Ethoxyethoxy)ethyl acrylate:
Partition coefficient: n-octanol/water : log Pow: 0.67
Remarks: Calculation

Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate:

Partition coefficient: n-octanol/water : log Pow: 2.91

1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-:
Partition coefficient: n-octanol/water : log Pow: 2.63

Propoxylated neopentyl glycol diacrylate esters:
Partition coefficient: n-octanol/water : log Pow: 2.41 - 3.87

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Partition coefficient: n-octanol/water : log Pow: 0.01 - 0.39

2-Phenoxyethyl acrylate:
Partition coefficient: n-octanol/water : log Pow: 2.58

Trimethylolpropane triacrylate:
Partition coefficient: n-octanol/water : log Pow: 0.67

Hexamethylene diacrylate:
Partition coefficient: n-octanol/water : log Pow: 2.81

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations. Do not release the product to the aquatic environment above defined regulatory levels
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations
UNRTDG

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)

Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964
Environmentally hazardous	:	yes

IMDG-Code

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F
Marine pollutant	:	yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation
49 CFR

UN/ID/NA number	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Remarks	:	Above applies only to containers over 119 gallons or 450 liters., Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know
CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards	:	Acute toxicity (any route of exposure) Skin corrosion or irritation Serious eye damage or eye irritation Respiratory or skin sensitization
SARA 313	:	The following components are subject to reporting levels established by SARA Title III, Section 313:

2-(2-Ethoxyethoxy)ethyl	7328-17-8	>= 3 - =< 7 %

acrylate

US State Regulations

Pennsylvania Right To Know

Titanium dioxide	13463-67-7
N,N-Dimethylacrylamide	2680-03-7
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
3,3,5-Trimethylcyclohexyl acrylate	86178-38-3
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
Nonane-1,9-diyl diacrylate	107481-28-7
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
2-Propenoic acid, 1,1'-(1,6-hexanediyl) ester, polymer with 2-aminoethanol	67906-98-3
Ethyl phenyl(2,4,6-trimethylbenzoyl)phosphinate	84434-11-7
1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-	71868-15-0
Propoxylated neopentyl glycol diacrylate esters	84170-74-1
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1
2-Phenoxyethyl acrylate	48145-04-6
Trimethylolpropane triacrylate	15625-89-5
Hexamethylene diacrylate	13048-33-4

California Prop. 65

WARNING: This product can expose you to chemicals including Titanium dioxide, which is known to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

California Permissible Exposure Limits for Chemical Contaminants

Titanium dioxide	13463-67-7

Additional regulatory information

Nonane-1,9-diyl diacrylate	107481-28-7

The United States Environmental Protection Agency (USEPA) has established a Significant New Use Rule (SNUR) for one of the components in this product.
See 40 CFR § 721.10338

1-Propanone, 1,1'-(oxydi-4,1-phenylene)bis[2-hydroxy-2-methyl-	71868-10-5

The United States Environmental Protection Agency (USEPA) has established a Significant New Use Rule (SNUR) for one of the components in this product.
See 40 CFR § 721.10575

SECTION 16. OTHER INFORMATION

Further information

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / TWA	:	8-hour, time-weighted average
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA Z-1 / TWA	:	8-hour time weighted average
US WEEL / TWA	:	8-hr TWA

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx -

Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/
Revision Date	:	2020-01-06

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.

SAFETY DATA SHEET

Date of last issue: -
Date of first issue: 2020-01-06

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Yellow
PJUVG5-YE1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 4405 East Baseline Road, Suite 120 Phoenix, Arizona 85042

Telephone : 480-968-7772

Emergency telephone : 480-968-7772
During normal opening times

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2

Serious eye damage : Category 1

Skin sensitization : Category 1

Reproductive toxicity : Category 1B

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 2

GHS label elements

Hazard pictograms :

Signal Word : Danger

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H318 Causes serious eye damage.
H335 May cause respiratory irritation.
H360 May damage fertility or the unborn child.
H373 May cause damage to organs through prolonged or repeated exposure.

Precautionary Statements : **Prevention:**

P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P260 Do not breathe mist or vapors.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
P271 Use only outdoors or in a well-ventilated area.
P272 Contaminated work clothing must not be allowed out of the workplace.
P280 Wear protective gloves/ protective clothing/ eye protection/ face protection.
Response:
P301 + P312 + P330 IF SWALLOWED: Call a POISON CENTER/ doctor if you feel unwell. Rinse mouth.
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P304 + P340 + P312 IF INHALED: Remove person to fresh air and keep comfortable for breathing. Call a POISON CENTER/ doctor if you feel unwell.
P305 + P351 + P338 + P310 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing. Immediately call a POISON CENTER/doctor.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P405 Store locked up.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards
None known.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
3,3,5-Trimethylcyclohexyl acrylate	86178-38-3	>= 45 - < 55
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 20 - < 30
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 3 - =< 7
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	>= 3 - =< 7
Propoxylated neopentyl glycol diacrylate esters	84170-74-1	>= 1 - =< 5
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 1 - < 5
Hexamethylene diacrylate	13048-33-4	>= 1 - < 5
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 1 - < 5
2-benzyl-2-dimethylamino-4-morpholinobutyrophenone	119313-12-1	>= 1 - < 5
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1	< 1

SECTION 4. FIRST AID MEASURES

General advice : In the case of accident or if you feel unwell, seek medical advice immediately.
When symptoms persist or in all cases of doubt seek medical advice.

If inhaled	:	If inhaled, remove to fresh air. Get medical attention.
In case of skin contact	:	In case of contact, immediately flush skin with plenty of water for at least 15 minutes while removing contaminated clothing and shoes. Get medical attention. Wash clothing before reuse. Thoroughly clean shoes before reuse.
In case of eye contact	:	In case of contact, immediately flush eyes with plenty of water for at least 15 minutes. If easy to do, remove contact lens, if worn. Get medical attention immediately.
If swallowed	:	If swallowed, DO NOT induce vomiting. Get medical attention. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.
Most important symptoms and effects, both acute and delayed	:	Harmful if swallowed. Causes skin irritation. May cause an allergic skin reaction. Causes serious eye damage. May cause respiratory irritation. May damage fertility or the unborn child. May cause damage to organs through prolonged or repeated exposure.
Protection of first-aiders	:	First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	:	Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	:	Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	:	None known.
Specific hazards during fire fighting	:	Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
Hazardous combustion products	:	Carbon oxides Nitrogen oxides (NOx) Oxides of phosphorus
Specific extinguishing methods	:	Use extinguishing measures that are appropriate to local circumstances and the surrounding environment. Use water spray to cool unopened containers. Remove undamaged containers from fire area if it is safe to do so. Evacuate area.
Special protective equipment for fire-fighters	:	In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures	:	Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.
Environmental precautions	:	Discharge into the environment must be avoided. Prevent further leakage or spillage if safe to do so. Prevent spreading over a wide area (e.g. by containment or oil barriers). Retain and dispose of contaminated wash water. Local authorities should be advised if significant spillages cannot be contained. Do not release the product to the aquatic environment above defined regulatory levels
Methods and materials for containment and cleaning up	:	Soak up with inert absorbent material. For large spills, provide diking or other appropriate containment to keep material from spreading. If diked material can be pumped, store recovered material in appropriate container. Clean up remaining materials from spill with suitable absorbent. Local or national regulations may apply to releases and disposal of this material, as well as those materials and items employed in the cleanup of releases. You will need to determine which regulations are applicable. Sections 13 and 15 of this SDS provide information regarding certain local or national requirements.

SECTION 7. HANDLING AND STORAGE

Technical measures	:	See Engineering measures under EXPOSURE CONTROLS/ PERSONAL PROTECTION section.
Local/Total ventilation	:	Use with local exhaust ventilation.
Advice on safe handling	:	Do not get on skin or clothing. Do not breathe vapors or spray mist. Do not swallow. Do not get in eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment. Keep container tightly closed. Take care to prevent spills, waste and minimize release to the environment.
Conditions for safe storage	:	Keep in properly labeled containers. Store locked up. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations.
Materials to avoid	:	Do not store with the following product types: Strong oxidizing agents Organic peroxides Explosives Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Components	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Hexamethylene diacrylate	13048-33-4	TWA	1 mg/m³	US WEEL

Engineering measures : Minimize workplace exposure concentrations.
Use with local exhaust ventilation.
Dust formation may be relevant in the processing of this product.
In addition to substance-specific OELs, general limitations of concentrations of particulates in the air at workplaces have to be considered in workplace risk assessment. Relevant limits include: OSHA PEL for Particulates Not Otherwise Regulated of 15 mg/m3 - total dust, 5 mg/m3 - respirable fraction; and ACGIH TWA for Particles (insoluble or poorly soluble) Not Otherwise Specified of 3 mg/m3 - respirable particles, 10 mg/m3 - inhalable particles.

Personal protective equipment

Respiratory protection : General and local exhaust ventilation is recommended to maintain vapor exposures below recommended limits. Where concentrations are above recommended limits or are unknown, appropriate respiratory protection should be worn. Follow OSHA respirator regulations (29 CFR 1910.134) and use NIOSH/MSHA approved respirators. Protection provided by air purifying respirators against exposure to any hazardous chemical is limited. Use a positive pressure air supplied respirator if there is any potential for uncontrolled release, exposure levels are unknown, or any other circumstance where air purifying respirators may not provide adequate protection.

Hand protection

Material : Chemical-resistant gloves

Remarks : Choose gloves to protect hands against chemicals depending on the concentration specific to place of work. Breakthrough time is not determined for the product. Change gloves often! For special applications, we recommend clarifying the resistance to chemicals of the aforementioned protective gloves with the glove manufacturer. Wash hands before breaks and at the end of workday.

Eye protection : Wear the following personal protective equipment:
Chemical resistant goggles must be worn.
If splashes are likely to occur, wear:
Face-shield

Skin and body protection : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.
Skin contact must be avoided by using impervious protective clothing (gloves, aprons, boots, etc).

Hygiene measures : Ensure that eye flushing systems and safety showers are located close to the working place.
When using do not eat, drink or smoke.
Wash contaminated clothing before re-use.

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : yellow

Odor	:	characteristic
Odor Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	> 100 °C
Flash point	:	> 93 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Flammability (liquids)	:	No data available
Upper explosion limit / Upper flammability limit	:	No data available
Lower explosion limit / Lower flammability limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Density	:	No data available
Solubility(ies)		
Water solubility	:	Immiscible in water
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, kinematic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.
Particle size	:	Not applicable

SECTION 10. STABILITY AND REACTIVITY

Reactivity	:	Not classified as a reactivity hazard.
Chemical stability	:	Stable under normal conditions.
Possibility of hazardous reactions	:	Vapors may form explosive mixture with air. Can react with strong oxidizing agents.
Conditions to avoid	:	None known.

Incompatible materials	:	Oxidizing agents
Hazardous decomposition products	:	No hazardous decomposition products are known.

SECTION 11. TOXICOLOGICAL INFORMATION

Information on likely routes of exposure
Inhalation
Skin contact
Ingestion
Eye contact

Acute toxicity
Harmful if swallowed.
Product:

Acute oral toxicity	:	Acute toxicity estimate: 1,700 mg/kg Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:
3,3,5-Trimethylcyclohexyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg

4-(1-Oxo-2-propenyl)-morpholine:

Acute oral toxicity	:	LD50 (Rat): 588 mg/kg Method: OECD Test Guideline 401
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402

2-(2-Ethoxyethoxy)ethyl acrylate:

Acute oral toxicity	:	LD50 (Rat): > 300 - < 2,000 mg/kg Method: OECD Test Guideline 423 Remarks: Based on data from similar materials
Acute inhalation toxicity	:	LC50 (Rat): > 5.04 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: OECD Test Guideline 403 Remarks: Based on data from similar materials
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 401 Assessment: The substance or mixture has no acute oral toxicity
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Assessment: The substance or mixture has no acute dermal toxicity

Propoxylated neopentyl glycol diacrylate esters:

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 2 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Hexamethylene diacrylate:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg

Acute inhalation toxicity : LC0 (Rat): 0.41 mg/l
Exposure time: 7 h
Test atmosphere: vapor

Acute dermal toxicity : LD50 (Rabbit): 3,650 mg/kg

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Acute oral toxicity : LD50 (Rat): 4,350 mg/kg

Acute dermal toxicity : LD50 (Rabbit): > 3,000 mg/kg

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Assessment: The substance or mixture has no acute dermal toxicity

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Acute oral toxicity : LD50 (Rat): 3,530 mg/kg

Acute dermal toxicity : LD50 (Rabbit): > 2,000 mg/kg

Skin corrosion/irritation
Causes skin irritation.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: No skin irritation

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Method: OECD Test Guideline 404

Result: No skin irritation
Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No skin irritation

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No skin irritation

Hexamethylene diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: Skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405
Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Propoxylated neopentyl glycol diacrylate esters:
Species: Rabbit
Result: No eye irritation

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rabbit
Result: No eye irritation

Hexamethylene diacrylate:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

4-(1-Oxo-2-propenyl)-morpholine:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: Directive 67/548/EEC, Annex V, B.6.
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

2-(2-Ethoxyethoxy)ethyl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Remarks: Based on data from similar materials
Assessment: Probability or evidence of skin sensitization in humans

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Propoxylated neopentyl glycol diacrylate esters:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Hexamethylene diacrylate:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: negative

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Germ cell mutagenicity
Not classified based on available information.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative

4-(1-Oxo-2-propenyl)-morpholine:

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: positive

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 471
Result: negative

Germ cell mutagenicity - Assessment : Weight of evidence does not support classification as a germ cell mutagen.

2-(2-Ethoxyethoxy)ethyl acrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

: Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

: Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Propoxylated neopentyl glycol diacrylate esters:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Hexamethylene diacrylate:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Result: negative

Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
Result: negative

Test Type: Chromosome aberration test in vitro
Method: OECD Test Guideline 473
Result: negative

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Hamster
Application Route: Ingestion
Result: negative

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Method: OECD Test Guideline 474
Result: negative
Remarks: Based on data from similar materials

Carcinogenicity

Not classified based on available information.

IARC Group 1: Carcinogenic to humans
Nickel compounds

OSHA No component of this product present at levels greater than or equal to 0.1% is on OSHA's list of regulated carcinogens.

NTP No ingredient of this product present at levels greater than or equal to 0.1% is identified as a known or anticipated carcinogen by NTP.

Reproductive toxicity

May damage fertility or the unborn child.

Components:

3,3,5-Trimethylcyclohexyl acrylate:

Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative

4-(1-Oxo-2-propenyl)-morpholine:
Effects on fertility : Remarks: May cause adverse reproductive effects.
Based on a Significant New Use Rule regulation

2-(2-Ethoxyethoxy)ethyl acrylate:
Effects on fertility : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Effects on fetal development : Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 422
Result: negative
Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Effects on fetal development : Test Type: Fertility/early embryonic development
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 414
Result: negative

Propoxylated neopentyl glycol diacrylate esters:
Effects on fertility : Test Type: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 421
Result: negative

Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Effects on fertility : Test Type: Fertility
Species: Rat
Application Route: Ingestion
Result: positive

Reproductive toxicity - : Some evidence of adverse effects on sexual function and

Assessment		fertility, and/or on development, based on animal experiments.

Hexamethylene diacrylate:

Effects on fertility	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative
Effects on fetal development	:	Test Type: Embryo-fetal development Species: Rat Application Route: Ingestion Result: negative

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Effects on fertility	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative
Effects on fetal development	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Effects on fertility	:	Test Type: One-generation reproduction toxicity study Species: Rat Application Route: Ingestion Result: positive
Effects on fetal development	:	Test Type: Embryo-fetal development Species: Rat Application Route: Ingestion Method: OECD Test Guideline 414 Result: positive
Reproductive toxicity - Assessment	:	Clear evidence of adverse effects on development, based on animal experiments., Some evidence of adverse effects on sexual function and fertility, based on animal experiments.

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Effects on fertility	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative Remarks: Based on data from similar materials
Effects on fetal development	:	Test Type: Combined repeated dose toxicity study with the reproduction/developmental toxicity screening test Species: Rat Application Route: Ingestion Method: OECD Test Guideline 422 Result: negative Remarks: Based on data from similar materials

STOT-single exposure
May cause respiratory irritation.
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

STOT-repeated exposure
May cause damage to organs through prolonged or repeated exposure.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Routes of exposure: Oral
Assessment: May cause damage to organs through prolonged or repeated exposure.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Repeated dose toxicity
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 4 weeks
Method: OECD Test Guideline 422

4-(1-Oxo-2-propenyl)-morpholine:
Species: Rat
NOAEL: 50 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

2-(2-Ethoxyethoxy)ethyl acrylate:
Species: Rat
NOAEL: 160 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407
Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

Propoxylated neopentyl glycol diacrylate esters:
Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Species: Rat
NOAEL: 100 mg/kg
LOAEL: 300 mg/kg

Application Route: Ingestion
Exposure time: 90 Days

Hexamethylene diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Method: OECD Test Guideline 422

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Species: Rat
NOAEL: 100 mg/kg
Application Route: Ingestion
Exposure time: 2 Weeks
Method: OECD Test Guideline 422

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Species: Rat
NOAEL: >= 100 mg/kg
Application Route: Ingestion
Exposure time: 28 Days

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Species: Rat
NOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

Aspiration toxicity
Not classified based on available information.

Further information
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Remarks: May cause internal organ effects
Based on a Significant New Use Rule regulation

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:
3,3,5-Trimethylcyclohexyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 1.9 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 14.43 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 0.59 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 0.43 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	NOEC: 1,000 mg/l Exposure time: 3 h

Method: OECD Test Guideline 209

4-(1-Oxo-2-propenyl)-morpholine:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): > 220 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 120 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 120 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): >= 120 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	IC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

2-(2-Ethoxyethoxy)ethyl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 6.8 mg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 55 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: Based on data from similar materials
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 10 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials EC10 (Desmodesmus subspicatus (green algae)): 3.2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.26 mg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: Based on data from similar materials
Toxicity to microorganisms	:	EC50: 741 mg/l Exposure time: 3 h Method: OECD Test Guideline 209 Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 90 µg/l Exposure time: 96 h Method: OECD Test Guideline 203 Remarks: No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1.18 mg/l Exposure time: 48 h Method: OECD Test Guideline 202 Remarks: No toxicity at the limit of solubility.
Toxicity to algae	:	NOEC (Desmodesmus subspicatus (green algae)): 260 µg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: No toxicity at the limit of solubility.
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 8.1 µg/l Exposure time: 21 d Method: OECD Test Guideline 211 Remarks: No toxicity at the limit of solubility.
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Propoxylated neopentyl glycol diacrylate esters:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 2.7 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 37 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	EC50 (Pseudokirchneriella subcapitata (green algae)): 11 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 1 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	NOEC: 2 mg/l Exposure time: 28 d

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): > 1 - 10 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3.53 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 2.01 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Pseudokirchneriella subcapitata (green algae)): 1.56 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Hexamethylene diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 4.6 - 10 mg/l

Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 2.6 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 1.5 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 0.59 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: 270 mg/l Exposure time: 30 min Method: OECD Test Guideline 209

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 0.704 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): 1.98 mg/l Method: OECD Test Guideline 201 NOEC (Pseudokirchneriella subcapitata (green algae)): 0.405 mg/l Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia): 0.092 mg/l Exposure time: 21 d Method: OECD Test Guideline 211
M-Factor (Chronic aquatic toxicity)	:	1

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 0.46 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 0.8 mg/l Exposure time: 24 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
M-Factor (Acute aquatic toxicity)	:	1
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 30 min Method: OECD Test Guideline 209
M-Factor (Chronic aquatic toxicity)	:	1

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 2.2 - 4.64 mg/l Exposure time: 96 h Method: DIN 38412
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 22.3 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 16.7 mg/l Exposure time: 72 h EC10 (Desmodesmus subspicatus (green algae)): 2.2 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50: > 1,000 mg/l Exposure time: 30 min Method: OECD Test Guideline 209

Persistence and degradability
Components:
3,3,5-Trimethylcyclohexyl acrylate:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 16.8 % Exposure time: 28 d Method: OECD Test Guideline 301F

4-(1-Oxo-2-propenyl)-morpholine:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 35 % Exposure time: 28 d Method: OECD Test Guideline 301D

2-(2-Ethoxyethoxy)ethyl acrylate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 84.4 % Exposure time: 28 d Remarks: Based on data from similar materials

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 1 % Exposure time: 28 d Method: OECD Test Guideline 301B

Propoxylated neopentyl glycol diacrylate esters:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 51 % Exposure time: 28 d Method: OECD Test Guideline 301D

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 0 - 10 % Exposure time: 28 d Method: OECD Test Guideline 301F

Hexamethylene diacrylate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 60 - 70 % Exposure time: 28 d

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:

Biodegradability	:	Result: Not readily biodegradable.

Biodegradation: 51 %
Exposure time: 28 d
Method: OECD Test Guideline 301F

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 3 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

Oxybis(methyl-2,1-ethanediyl) diacrylate:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 90 - 100 %
Exposure time: 28 d
Method: OECD Test Guideline 301A

Bioaccumulative potential
Components:
3,3,5-Trimethylcyclohexyl acrylate:
Partition coefficient: n-octanol/water : log Pow: 4.6

4-(1-Oxo-2-propenyl)-morpholine:
Partition coefficient: n-octanol/water : log Pow: -0.46

2-(2-Ethoxyethoxy)ethyl acrylate:
Partition coefficient: n-octanol/water : log Pow: 0.67
Remarks: Calculation

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide:
Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

Partition coefficient: n-octanol/water : log Pow: 5.8

Propoxylated neopentyl glycol diacrylate esters:
Partition coefficient: n-octanol/water : log Pow: 2.41 - 3.87

Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide:
Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 18 - 72

Partition coefficient: n-octanol/water : log Pow: 3.1 - 3.8

Hexamethylene diacrylate:
Partition coefficient: n-octanol/water : log Pow: 2.81

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate:
Bioaccumulation : Species: Zebrafish
Bioconcentration factor (BCF): 37
Method: OECD Test Guideline 305
Remarks: Based on data from similar materials

Partition coefficient: n-octanol/water : log Pow: 4.52

2-benzyl-2-dimethylamino-4-morpholinobutyrophenone:

Partition coefficient: n-octanol/water	:	log Pow: 2.91

Oxybis(methyl-2,1-ethanediyl) diacrylate:

Partition coefficient: n-octanol/water	:	log Pow: 0.01 - 0.39

Mobility in soil
No data available

Other adverse effects
No data available

SECTION 13. DISPOSAL CONSIDERATIONS

Disposal methods

Waste from residues	:	Dispose of in accordance with local regulations. Do not release the product to the aquatic environment above defined regulatory levels
Contaminated packaging	:	Empty containers should be taken to an approved waste handling site for recycling or disposal. If not otherwise specified: Dispose of as unused product.

SECTION 14. TRANSPORT INFORMATION

International Regulations
UNRTDG

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	Miscellaneous
Packing instruction (cargo aircraft)	:	964
Packing instruction (passenger aircraft)	:	964
Environmentally hazardous	:	yes

IMDG-Code

UN number	:	UN 3082
Proper shipping name	:	ENVIRONMENTALLY HAZARDOUS SUBSTANCE, LIQUID, N.O.S. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	9
EmS Code	:	F-A, S-F
Marine pollutant	:	yes

Transport in bulk according to Annex II of MARPOL 73/78 and the IBC Code
Not applicable for product as supplied.

Domestic regulation
49 CFR

UN/ID/NA number	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(3,3,5-Trimethylcyclohexyl acrylate, Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate)
Remarks	:	Above applies only to containers over 119 gallons or 450 liters., Shipment by ground under DOT is non-regulated; however it may be shipped per the applicable hazard classification to facilitate multi-modal transport involving ICAO (IATA) or IMO.

SECTION 15. REGULATORY INFORMATION

EPCRA - Emergency Planning and Community Right-to-Know
CERCLA Reportable Quantity
This material does not contain any components with a CERCLA RQ.

SARA 304 Extremely Hazardous Substances Reportable Quantity
This material does not contain any components with a section 304 EHS RQ.

SARA 302 Extremely Hazardous Substances Threshold Planning Quantity
This material does not contain any components with a section 302 EHS TPQ.

SARA 311/312 Hazards : Acute toxicity (any route of exposure)
Skin corrosion or irritation
Serious eye damage or eye irritation
Respiratory or skin sensitization
Reproductive toxicity
Specific target organ toxicity (single or repeated exposure)

SARA 313 : The following components are subject to reporting levels established by SARA Title III, Section 313:

2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 3 - =< 7 %

US State Regulations

Pennsylvania Right To Know

3,3,5-Trimethylcyclohexyl acrylate	86178-38-3
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
Propoxylated neopentyl glycol diacrylate esters	84170-74-1
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Hexamethylene diacrylate	13048-33-4
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
2-benzyl-2-dimethylamino-4-morpholinobutyrophenone	119313-12-1
Oxybis(methyl-2,1-ethanediyl) diacrylate	57472-68-1

California Prop. 65
WARNING: This product can expose you to chemicals including Nickel compounds, which is known

to the State of California to cause cancer. For more information go to www.P65Warnings.ca.gov.

Additional regulatory information

4-(1-Oxo-2-propenyl)-morpholine 5117-12-4

The United States Environmental Protection Agency (USEPA) has established a Significant New Use Rule (SNUR) for one of the components in this product.
See 40 CFR § 721.5185

SECTION 16. OTHER INFORMATION

Further information

Full text of other abbreviations

ACGIH	:	USA. ACGIH Threshold Limit Values (TLV)
NIOSH REL	:	USA. NIOSH Recommended Exposure Limits
OSHA Z-1	:	USA. Occupational Exposure Limits (OSHA) - Table Z-1 Limits for Air Contaminants
US WEEL	:	USA. Workplace Environmental Exposure Levels (WEEL)
ACGIH / TWA	:	8-hour, time-weighted average
NIOSH REL / TWA	:	Time-weighted average concentration for up to a 10-hour workday during a 40-hour workweek
OSHA Z-1 / TWA	:	8-hour time weighted average
US WEEL / TWA	:	8-hr TWA

AICS - Australian Inventory of Chemical Substances; ASTM - American Society for the Testing of Materials; bw - Body weight; CERCLA - Comprehensive Environmental Response, Compensation, and Liability Act; CMR - Carcinogen, Mutagen or Reproductive Toxicant; DIN - Standard of the German Institute for Standardisation; DOT - Department of Transportation; DSL - Domestic Substances List (Canada); ECx - Concentration associated with x% response; EHS - Extremely Hazardous Substance; ELx - Loading rate associated with x% response; EmS - Emergency Schedule; ENCS - Existing and New Chemical Substances (Japan); ErCx - Concentration associated with x% growth rate response; ERG - Emergency Response Guide; GHS - Globally Harmonized System; GLP - Good Laboratory Practice; HMIS - Hazardous Materials Identification System; IARC - International Agency for Research on Cancer; IATA - International Air Transport Association; IBC - International Code for the Construction and Equipment of Ships carrying Dangerous Chemicals in Bulk; IC50 - Half maximal inhibitory concentration; ICAO - International Civil Aviation Organization; IECSC - Inventory of Existing Chemical Substances in China; IMDG - International Maritime Dangerous Goods; IMO - International Maritime Organization; ISHL - Industrial Safety and Health Law (Japan); ISO - International Organisation for Standardization; KECI - Korea Existing Chemicals Inventory; LC50 - Lethal Concentration to 50 % of a test population; LD50 - Lethal Dose to 50% of a test population (Median Lethal Dose); MARPOL - International Convention for the Prevention of Pollution from Ships; MSHA - Mine Safety and Health Administration; n.o.s. - Not Otherwise Specified; NFPA - National Fire Protection Association; NO(A)EC - No Observed (Adverse) Effect Concentration; NO(A)EL - No Observed (Adverse) Effect Level; NOELR - No Observable Effect Loading Rate; NTP - National Toxicology Program; NZIoC - New Zealand Inventory of Chemicals; OECD - Organization for Economic Co-operation and Development; OPPTS - Office of Chemical Safety and Pollution Prevention; PBT - Persistent, Bioaccumulative and Toxic substance; PICCS - Philippines Inventory of Chemicals and Chemical Substances; (Q)SAR - (Quantitative) Structure Activity Relationship; RCRA - Resource Conservation and Recovery Act; REACH - Regulation (EC) No 1907/2006 of the European Parliament and of the Council concerning the Registration, Evaluation, Authorisation and Restriction of Chemicals; RQ - Reportable Quantity; SADT - Self-Accelerating Decomposition Temperature; SARA - Superfund Amendments and Reauthorization Act; SDS - Safety Data Sheet; TCSI - Taiwan Chemical Substance Inventory; TSCA - Toxic Substances Control Act (United States); UN - United Nations; UNRTDG - United Nations Recommendations on the Transport of Dangerous Goods; vPvB - Very Persistent and Very Bioaccumulative

Sources of key data used to compile the Material Safety Data Sheet	:	Internal technical data, data from raw material SDSs, OECD eChem Portal search results and European Chemicals Agency, http://echa.europa.eu/

Revision Date : 2020-01-06

Items where changes have been made to the previous version are highlighted in the body of this document by two vertical lines.

The information provided in this Safety Data Sheet is correct to the best of our knowledge, information and belief at the date of its publication. The information is designed only as a guidance for safe handling, use, processing, storage, transportation, disposal and release and shall not be considered a warranty or quality specification of any type. The information provided relates only to the specific material identified at the top of this SDS and may not be valid when the SDS material is used in combination with any other materials or in any process, unless specified in the text. Material users should review the information and recommendations in the specific context of their intended manner of handling, use, processing and storage, including an assessment of the appropriateness of the SDS material in the user's end product, if applicable.