SAFETY DATA SHEET

Date of last issue: -
Date of first issue: 2018-06-01

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Cyan
PJUV11-CY1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 2602 South 47th Street, Suite 102, Phoenix, AZ 85034

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 2

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 1 (Liver, Respiratory Tract)

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.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Liver, Respiratory Tract)

through prolonged or repeated exposure.
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)
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 10 - < 20
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 10 - < 20
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 10 - < 20
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9	>= 10 - < 20
Benzyl acrylate	2495-35-4	>= 5 - < 10
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 5 - < 10
Pigment Blue 15	147-14-8	>= 1 - < 5
Hexamethylene diacrylate	13048-33-4	< 1
Glycerol, propoxylated, esters with acrylic acid	52408-84-1	< 1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0	< 1
4-Methoxyphenol	150-76-5	< 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. Suspected of damaging fertility or the unborn child. Causes 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 Sulfur oxides 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 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
Pigment Blue 15	147-14-8	TWA	1 mg/m³ (Copper)	NIOSH REL
Hexamethylene diacrylate	13048-33-4	TWA	1 mg/m³	US WEEL
4-Methoxyphenol	150-76-5	TWA	5 mg/m³	ACGIH
		TWA	5 mg/m³	NIOSH REL

Hazardous components without workplace control parameters

Components	CAS-No.
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
Benzyl acrylate	2495-35-4
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Glycerol, propoxylated, esters with acrylic acid	52408-84-1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0

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	:	No data available
Flash point	:	94 °C Method: Seta closed cup
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	:	1.00 - 1.10 g/cm³
Solubility(ies)		
Water solubility	:	immiscible

Solubility in other solvents	:	completely miscible Solvent: organic solvent
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: 1,013 mg/kg Method: Calculation method
Acute inhalation toxicity	:	Acute toxicity estimate: 26.25 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:
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

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-(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

1-Vinylhexahydro-2H-azepin-2-one:
Acute oral toxicity : LD50 (Rat): 1,114 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 1.6 mg/l
Exposure time: 8 h
Test atmosphere: vapor

Acute dermal toxicity : LD50 (Rabbit): 1,700 mg/kg
Method: OECD Test Guideline 402

Benzyl acrylate:
Acute oral toxicity : LD50 (Rat): 4,450 mg/kg
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Remarks: Based on data from similar materials

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

Pigment Blue 15:
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): > 5,000 mg/kg
Method: OECD Test Guideline 402

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

Glycerol, propoxylated, esters with acrylic acid:
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 (Rabbit): > 2,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

4-Methoxyphenol:
Acute oral toxicity : LD50 (Rat): 1,000 - 2,000 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: Directive 67/548/EEC, Annex V, B.3.
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation
Causes skin irritation.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
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

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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rabbit
Result: No skin irritation

Benzyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

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

Pigment Blue 15:
Species: Rabbit
Result: No skin irritation

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

4-Methoxyphenol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Benzyl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

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

Pigment Blue 15:
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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

4-Methoxyphenol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
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

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-(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

1-Vinylhexahydro-2H-azepin-2-one:
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

Pigment Blue 15:
Test Type: Local lymph node assay (LLNA)
Routes of exposure: Skin contact
Species: Mouse
Method: OECD Test Guideline 429
Result: negative

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

Glycerol, propoxylated, esters with acrylic acid:
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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
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

4-Methoxyphenol:
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

Germ cell mutagenicity
Not classified based on available information.
Components:
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.

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-(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

1-Vinylhexahydro-2H-azepin-2-one:

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

Benzyl acrylate:

Genotoxicity in vitro : Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
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

Pigment Blue 15:

Genotoxicity in vitro : Test Type: Chromosome aberration test in vitro
Result: negative

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

Test Type: DNA damage and repair, unscheduled DNA synthesis in mammalian cells (in vitro)
Result: negative

Genotoxicity in vivo : Test Type: Mouse spot test (in vivo)
Species: Mouse
Application Route: Intraperitoneal injection
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

Glycerol, propoxylated, esters with acrylic acid:

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

Test Type: Chromosome aberration test in vitro
Result: negative

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

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: positive

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

4-Methoxyphenol:

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

Carcinogenicity

Not classified based on available information.

Components:

4-Methoxyphenol:

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

Species: Mouse
Application Route: Skin contact
Exposure time: 120 weeks
Result: negative

IARC Not classifiable.

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
Suspected of damaging fertility or the unborn child.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Effects on fertility : Remarks: May cause adverse reproductive effects.
Based on a Significant New Use Rule regulation

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-(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

1-Vinylhexahydro-2H-azepin-2-one:
Effects on fertility : Test Type: Three-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

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

Benzyl 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

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.

Pigment Blue 15:

Effects on fertility : Test Type: Two-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative

Effects on fetal development : Test Type: Reproduction/Developmental toxicity screening test
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

Glycerol, propoxylated, esters with acrylic acid:

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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

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: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 421
Result: negative

4-Methoxyphenol:

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
Method: OECD Test Guideline 414
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

Benzyl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

STOT-repeated exposure
Causes damage to organs (Liver, Respiratory Tract) through prolonged or 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

1-Vinylhexahydro-2H-azepin-2-one:
Routes of exposure: inhalation (vapor)
Target Organs: Liver, Respiratory Tract
Assessment: Shown to produce significant health effects in animals at concentrations of 0.2 mg/l/6h/d or less.

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

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-(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

1-Vinylhexahydro-2H-azepin-2-one:

Species: Rat
NOAEL: 50 mg/kg
LOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Species: Rat
NOAEL: 0.058 mg/l
LOAEL: 0.181 mg/l
Application Route: inhalation (vapor)
Exposure time: 90 Days
Method: OECD Test Guideline 413

Benzyl acrylate:
Species: Rat
NOAEL: 500 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

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

Pigment Blue 15:
Species: Rat
NOAEL: 4,500 mg/kg
Application Route: Ingestion
Exposure time: 91 Days

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rat
NOAEL: 250 mg/kg
LOAEL: 750 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rat
NOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

4-Methoxyphenol:
Species: Rat
NOAEL: 150 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion

Exposure time: 54 Days
Method: OECD Test Guideline 422

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:
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

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-(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

1-Vinylhexahydro-2H-azepin-2-one:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 307 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: Directive 67/548/EEC, Annex V, C.2.
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h Method: Directive 67/548/EEC, Annex V, C.3. EC10 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h Method: Directive 67/548/EEC, Annex V, C.3.
Toxicity to microorganisms	:	EC10 (Pseudomonas putida): 262 mg/l Exposure time: 17 h Method: DIN 38 412 Part 8

Benzyl acrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 10 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)): 1.21 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)): 4.1 mg/l Exposure time: 96 h Remarks: Based on data from similar materials EC10 (Desmodesmus subspicatus (green algae)): 0.42 mg/l Exposure time: 96 h Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	EC10 (Daphnia magna (Water flea)): 0.1 mg/l Exposure time: 21 d Remarks: Based on data from similar materials

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

Pigment Blue 15:

Toxicity to fish	:	LC0 (Danio rerio (zebra fish)): > 100 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 500 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): > 1 mg/l Exposure time: 21 d Method: OECD Test Guideline 211

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

Glycerol, propoxylated, esters with acrylic acid:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 5.74 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 91.4 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 12.2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Desmodesmus subspicatus (green algae)): 2.06 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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Toxicity to fish	:	LL50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l Exposure time: 96 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 202
Toxicity to algae	:	NOELR (Selenastrum capricornutum (green algae)): 100 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

4-Methoxyphenol:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 28.5 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (algae)): 54.7 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.68 mg/l Exposure time: 21 d Method: OECD Test Guideline 211

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

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

1-Vinylhexahydro-2H-azepin-2-one:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 30 - 40 %
Exposure time: 28 d
Method: OECD Test Guideline 301A

Benzyl acrylate:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 22.3 %
Exposure time: 28 d
Method: OECD Test Guideline 301D
Remarks: Based on data from similar materials

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

Pigment Blue 15:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 0 %
Exposure time: 28 d
Method: OECD Test Guideline 301C

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

Glycerol, propoxylated, esters with acrylic acid:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 72 - 85 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 7.27 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

4-Methoxyphenol:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 86 %
Exposure time: 28 d
Method: OECD Test Guideline 301C

Bioaccumulative potential
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Partition coefficient: n-octanol/water : log Pow: -0.46

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

1-Vinylhexahydro-2H-azepin-2-one:
Partition coefficient: n-octanol/water : log Pow: 1.2

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

Glycerol, propoxylated, esters with acrylic acid:
Partition coefficient: n-octanol/water : log Pow: 2.52

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Partition coefficient: n-octanol/water : log Pow: > 6

4-Methoxyphenol:
Partition coefficient: n-octanol/water : log Pow: 1.2 - 1.6

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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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	>= 10 - < 20 %

US State Regulations

Pennsylvania Right To Know

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Benzyl acrylate	2495-35-4
2,4-Diethyl-9H-thioxanthen-9-one	82799-44-8
Pigment Blue 15	147-14-8

California List of Hazardous Substances

Pigment Blue 15	147-14-8

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

2,4-Diethyl-9H-thioxanthen-9-one	82799-44-8

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 § 721.9664

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	:	2018-06-01

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: 2018-06-01

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Magenta
PJUV11-MA1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 2602 South 47th Street, Suite 102, Phoenix, AZ 85034

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 2

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 1 (Liver, Respiratory Tract)

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.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Liver, Respiratory Tract)

through prolonged or repeated exposure.
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)
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 10 - < 20
Benzyl acrylate	2495-35-4	>= 10 - < 20
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 10 - < 20
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9	>= 10 - < 20
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 5 - < 10
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 5 - < 10
Hexamethylene diacrylate	13048-33-4	< 1
Glycerol, propoxylated, esters with acrylic acid	52408-84-1	< 1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0	< 1
4-Methoxyphenol	150-76-5	< 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. Suspected of damaging fertility or the unborn child. Causes 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 Sulfur 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 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
4-Methoxyphenol	150-76-5	TWA	5 mg/m³	ACGIH
		TWA	5 mg/m³	NIOSH REL

Hazardous components without workplace control parameters

Components	CAS-No.
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Benzyl acrylate	2495-35-4
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Glycerol, propoxylated, esters with acrylic acid	52408-84-1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0

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	:	No data available
Flash point	:	94 °C Method: Seta closed cup
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	:	1.00 - 1.10 g/cm³
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible Solvent: organic solvent

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: 1,013 mg/kg Method: Calculation method
Acute inhalation toxicity	:	Acute toxicity estimate: 26.25 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:
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

Benzyl acrylate:

Acute oral toxicity	:	LD50 (Rat): 4,450 mg/kg Remarks: Based on data from similar materials
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Remarks: Based on data from similar materials

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

1-Vinylhexahydro-2H-azepin-2-one:

Acute oral toxicity	:	LD50 (Rat): 1,114 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 1.6 mg/l Exposure time: 8 h Test atmosphere: vapor
Acute dermal toxicity	:	LD50 (Rabbit): 1,700 mg/kg Method: OECD Test Guideline 402

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

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

Glycerol, propoxylated, esters with acrylic acid:

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 (Rabbit): > 2,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

4-Methoxyphenol:
Acute oral toxicity : LD50 (Rat): 1,000 - 2,000 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: Directive 67/548/EEC, Annex V, B.3.
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation
Causes skin irritation.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: No skin irritation

Benzyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

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

1-Vinylhexahydro-2H-azepin-2-one:
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

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

4-Methoxyphenol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Species: Rabbit
Result: Irreversible effects on the eye
Method: OECD Test Guideline 405

Benzyl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

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

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

4-Methoxyphenol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization

Not classified based on available information.

Components:

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

1-Vinylhexahydro-2H-azepin-2-one:
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

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

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

Glycerol, propoxylated, esters with acrylic acid:
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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
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

4-Methoxyphenol:
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

Germ cell mutagenicity
Not classified based on available information.
Components:
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.

Benzyl acrylate:

Genotoxicity in vitro	:	Test Type: in vitro micronucleus test Method: OECD Test Guideline 487 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

1-Vinylhexahydro-2H-azepin-2-one:

Genotoxicity in vitro	:	Test Type: In vitro mammalian cell gene mutation test Method: OECD Test Guideline 476 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

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

Glycerol, propoxylated, esters with acrylic acid:

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

Test Type: Chromosome aberration test in vitro
Result: negative

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

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: positive

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

4-Methoxyphenol:

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

Carcinogenicity

Not classified based on available information.

Components:

4-Methoxyphenol:

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

Species: Mouse
Application Route: Skin contact
Exposure time: 120 weeks
Result: negative

IARC Not classifiable.

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
Suspected of damaging fertility or the unborn child.
Components:
4-(1-Oxo-2-propenyl)-morpholine:
Effects on fertility : Remarks: May cause adverse reproductive effects.
Based on a Significant New Use Rule regulation

Benzyl 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

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

1-Vinylhexahydro-2H-azepin-2-one:
Effects on fertility : Test Type: Three-generation reproduction toxicity study

Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

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

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

Glycerol, propoxylated, esters with acrylic acid:
Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
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: Reproduction/Developmental toxicity screening test

Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 421
Result: negative

4-Methoxyphenol:

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
Method: OECD Test Guideline 414
Result: negative

STOT-single exposure
May cause respiratory irritation.
Components:
Benzyl 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
Causes damage to organs (Liver, Respiratory Tract) through prolonged or 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

1-Vinylhexahydro-2H-azepin-2-one:
Routes of exposure: inhalation (vapor)
Target Organs: Liver, Respiratory Tract
Assessment: Shown to produce significant health effects in animals at concentrations of 0.2 mg/l/6h/d or less.

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

Benzyl acrylate:
Species: Rat
NOAEL: 500 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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rat
NOAEL: 50 mg/kg
LOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Species: Rat
NOAEL: 0.058 mg/l
LOAEL: 0.181 mg/l
Application Route: inhalation (vapor)
Exposure time: 90 Days
Method: OECD Test Guideline 413

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

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rat
NOAEL: 250 mg/kg
LOAEL: 750 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rat
NOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

4-Methoxyphenol:
Species: Rat
NOAEL: 150 mg/kg

LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422

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:
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

Benzyl acrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 10 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)): 1.21 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)): 4.1 mg/l Exposure time: 96 h Remarks: Based on data from similar materials EC10 (Desmodesmus subspicatus (green algae)): 0.42 mg/l Exposure time: 96 h Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic	:	EC10 (Daphnia magna (Water flea)): 0.1 mg/l Exposure time: 21 d

toxicity) Remarks: Based on data from similar materials

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

1-Vinylhexahydro-2H-azepin-2-one:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 307 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: Directive 67/548/EEC, Annex V, C.2.

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Method: Directive 67/548/EEC, Annex V, C.3.

EC10 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Method: Directive 67/548/EEC, Annex V, C.3.

Toxicity to microorganisms : EC10 (Pseudomonas putida): 262 mg/l
Exposure time: 17 h
Method: DIN 38 412 Part 8

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

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

Glycerol, propoxylated, esters with acrylic acid:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 5.74 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 91.4 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 12.2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Desmodesmus subspicatus (green algae)): 2.06 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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Toxicity to fish	:	LL50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l Exposure time: 96 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 202
Toxicity to algae	:	NOELR (Selenastrum capricornutum (green algae)): 100 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

4-Methoxyphenol:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 28.5 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (algae)): 54.7 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.68 mg/l Exposure time: 21 d Method: OECD Test Guideline 211

Persistence and degradability

Components:

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

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

Benzyl acrylate:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 22.3 % Exposure time: 28 d Method: OECD Test Guideline 301D Remarks: Based on data from similar materials

2-(2-Ethoxyethoxy)ethyl acrylate:

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

1-Vinylhexahydro-2H-azepin-2-one:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 30 - 40 %
Exposure time: 28 d
Method: OECD Test Guideline 301A

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

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

Glycerol, propoxylated, esters with acrylic acid:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 72 - 85 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Biodegradability : Result: Not readily biodegradable.
Biodegradation: 7.27 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

4-Methoxyphenol:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 86 %
Exposure time: 28 d
Method: OECD Test Guideline 301C

Bioaccumulative potential

Components:

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

1-Vinylhexahydro-2H-azepin-2-one:

Partition coefficient: n-octanol/water : log Pow: 1.2

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

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

Glycerol, propoxylated, esters with acrylic acid:

Partition coefficient: n-octanol/water	:	log Pow: 2.52

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Partition coefficient: n-octanol/water	:	log Pow: > 6

4-Methoxyphenol:

Partition coefficient: n-octanol/water	:	log Pow: 1.2 - 1.6

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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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	>= 10 - < 20 %

US State Regulations

Pennsylvania Right To Know

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Benzyl acrylate	2495-35-4
2,4-Diethyl-9H-thioxanthen-9-one	82799-44-8

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

2,4-Diethyl-9H-thioxanthen-9-one 82799-44-8

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 § 721.9664

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	:	2018-06-01

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: 2018-08-29
Date of first issue: 2018-06-01

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Yellow
PJUV11-YE1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 2602 South 47th Street, Suite 102, Phoenix, AZ 85034

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 2

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 1 (Liver, Respiratory Tract)

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.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Liver, Respiratory Tract)

through prolonged or repeated exposure.
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)
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 10 - < 20
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 10 - < 20
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9	>= 10 - < 20
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 10 - < 20
Benzyl acrylate	2495-35-4	>= 10 - < 20
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 5 - < 10
Dioctyl maleate	2915-53-9	>= 1 - < 5
Hexamethylene diacrylate	13048-33-4	< 1
Glycerol, propoxylated, esters with acrylic acid	52408-84-1	< 1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0	< 1
4-Methoxyphenol	150-76-5	< 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. Suspected of damaging fertility or the unborn child. Causes 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 Sulfur oxides 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 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
4-Methoxyphenol	150-76-5	TWA	5 mg/m³	ACGIH
		TWA	5 mg/m³	NIOSH REL

Hazardous components without workplace control parameters

Components	CAS-No.
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
Benzyl acrylate	2495-35-4
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Dioctyl maleate	2915-53-9
Glycerol, propoxylated, esters with acrylic acid	52408-84-1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0

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	:	No data available
Flash point	:	94 °C Method: Seta closed cup
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	:	1.00 - 1.10 g/cm³
Solubility(ies)		
Water solubility	:	immiscible

Solubility in other solvents	:	completely miscible Solvent: organic solvent
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: 1,013 mg/kg Method: Calculation method
Acute inhalation toxicity	:	Acute toxicity estimate: 26.25 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
Acute oral toxicity : LD50 (Rat): 1,114 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 1.6 mg/l
Exposure time: 8 h
Test atmosphere: vapor

Acute dermal toxicity : LD50 (Rabbit): 1,700 mg/kg
Method: OECD Test Guideline 402

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

Benzyl acrylate:
Acute oral toxicity : LD50 (Rat): 4,450 mg/kg
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Remarks: Based on data from similar materials

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

Dioctyl maleate:
Acute oral toxicity : LD50 (Rat): 14,200 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:
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 (Rabbit): > 2,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

4-Methoxyphenol:
Acute oral toxicity : LD50 (Rat): 1,000 - 2,000 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: Directive 67/548/EEC, Annex V, B.3.
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation
Causes skin irritation.
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
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

Benzyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

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

Dioctyl maleate:

Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

4-Methoxyphenol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

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

Benzyl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

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

Dioctyl maleate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405
Remarks: Based on data from similar materials

Hexamethylene diacrylate:

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

4-Methoxyphenol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
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

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

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

Dioctyl maleate:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Remarks: Based on data from similar materials
Assessment: Probability or evidence of skin sensitization 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

Glycerol, propoxylated, esters with acrylic acid:
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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
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

4-Methoxyphenol:
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

Germ cell mutagenicity
Not classified based on available information.
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
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

Benzyl acrylate:
Genotoxicity in vitro : Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
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

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

Glycerol, propoxylated, esters with acrylic acid:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471

Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

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: positive

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

4-Methoxyphenol:

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

Carcinogenicity

Not classified based on available information.

Components:

4-Methoxyphenol:

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

Species: Mouse
Application Route: Skin contact
Exposure time: 120 weeks
Result: negative

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

Suspected of damaging fertility or the unborn child.

Components:

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

1-Vinylhexahydro-2H-azepin-2-one:

Effects on fertility : Test Type: Three-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

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

Benzyl 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

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

Glycerol, propoxylated, esters with acrylic acid:

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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

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: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 421
Result: negative

4-Methoxyphenol:

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
Method: OECD Test Guideline 414
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

Benzyl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

STOT-repeated exposure
Causes damage to organs (Liver, Respiratory Tract) through prolonged or 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

1-Vinylhexahydro-2H-azepin-2-one:
Routes of exposure: inhalation (vapor)
Target Organs: Liver, Respiratory Tract
Assessment: Shown to produce significant health effects in animals at concentrations of 0.2 mg/l/6h/d or less.

Repeated dose toxicity
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rat
NOAEL: 50 mg/kg
LOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Species: Rat
NOAEL: 0.058 mg/l
LOAEL: 0.181 mg/l
Application Route: inhalation (vapor)
Exposure time: 90 Days
Method: OECD Test Guideline 413

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

Benzyl acrylate:
Species: Rat

NOAEL: 500 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rat
NOAEL: 250 mg/kg
LOAEL: 750 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rat
NOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

4-Methoxyphenol:
Species: Rat
NOAEL: 150 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422

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:
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	:	EC50 (Daphnia magna (Water flea)): 120 mg/l

aquatic invertebrates		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

1-Vinylhexahydro-2H-azepin-2-one:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 307 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: Directive 67/548/EEC, Annex V, C.2.
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h Method: Directive 67/548/EEC, Annex V, C.3. EC10 (Desmodesmus subspicatus (green algae)): > 100 mg/l

Exposure time: 72 h
Method: Directive 67/548/EEC, Annex V, C.3.

Toxicity to microorganisms : EC10 (Pseudomonas putida): 262 mg/l
Exposure time: 17 h
Method: DIN 38 412 Part 8

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

Benzyl acrylate:

Toxicity to fish : LC50 (Leuciscus idus (Golden orfe)): 10 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)): 1.21 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)): 4.1 mg/l
Exposure time: 96 h
Remarks: Based on data from similar materials

EC10 (Desmodesmus subspicatus (green algae)): 0.42 mg/l
Exposure time: 96 h
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : EC10 (Daphnia magna (Water flea)): 0.1 mg/l
Exposure time: 21 d
Remarks: Based on data from similar materials

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

Dioctyl maleate:

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 10 - 100 mg/l
Exposure time: 48 h
Remarks: Based on data from similar materials

Toxicity to algae : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

EC10 (Pseudokirchneriella subcapitata (green algae)): > 10 - 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 5.74 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 91.4 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 12.2 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

EC10 (Desmodesmus subspicatus (green algae)): 2.06 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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Toxicity to fish	:	LL50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l Exposure time: 96 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 202
Toxicity to algae	:	NOELR (Selenastrum capricornutum (green algae)): 100 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

4-Methoxyphenol:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 28.5 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (algae)): 54.7 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.68 mg/l Exposure time: 21 d Method: OECD Test Guideline 211

Persistence and degradability

Components:

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

1-Vinylhexahydro-2H-azepin-2-one:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 30 - 40 % Exposure time: 28 d Method: OECD Test Guideline 301A

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

Benzyl acrylate:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 22.3 %
Exposure time: 28 d
Method: OECD Test Guideline 301D
Remarks: Based on data from similar materials

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

Dioctyl maleate:
Biodegradability : Result: rapidly degradable
Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 72 - 85 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 7.27 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

4-Methoxyphenol:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 86 %
Exposure time: 28 d
Method: OECD Test Guideline 301C

Bioaccumulative potential
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
Partition coefficient: n-octanol/water : log Pow: 1.2

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

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

Dioctyl maleate:
Partition coefficient: n-octanol/water : log Pow: 7.463

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

Glycerol, propoxylated, esters with acrylic acid:
Partition coefficient: n-octanol/water : log Pow: 2.52

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Partition coefficient: n-octanol/water : log Pow: > 6

4-Methoxyphenol:
Partition coefficient: n-octanol/water : log Pow: 1.2 - 1.6

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.
(Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class : 9
Packing group : III
Labels : 9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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	>= 10 - < 20 %

US State Regulations

Pennsylvania Right To Know

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Benzyl acrylate	2495-35-4
2,4-Diethyl-9H-thioxanthen-9-one	82799-44-8
Dioctyl maleate	2915-53-9

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

2,4-Diethyl-9H-thioxanthen-9-one 82799-44-8

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 § 721.9664

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	:	2018-08-29

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: 2018-08-29
Date of first issue: 2018-06-01

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Black
PJUV11-BK1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 2602 South 47th Street, Suite 102, Phoenix, AZ 85034

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 2

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 1 (Liver, Respiratory Tract)

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.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Liver, Respiratory Tract)

through prolonged or repeated exposure.
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)
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 10 - < 20
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 10 - < 20
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 10 - < 20
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9	>= 10 - < 20
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 5 - < 10
Benzyl acrylate	2495-35-4	>= 5 - < 10
Carbon black	1333-86-4	>= 1 - < 5
Dioctyl maleate	2915-53-9	>= 1 - < 5
Glycerol, propoxylated, esters with acrylic acid	52408-84-1	< 1
Hexamethylene diacrylate	13048-33-4	< 1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0	< 1

4-Methoxyphenol	150-76-5	< 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. Suspected of damaging fertility or the unborn child. Causes 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 Sulfur 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 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
4-Methoxyphenol	150-76-5	TWA	5 mg/m³	ACGIH
		TWA	5 mg/m³	NIOSH REL

Hazardous components without workplace control parameters

Components	CAS-No.
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
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Benzyl acrylate	2495-35-4
Dioctyl maleate	2915-53-9
Glycerol, propoxylated, esters with acrylic acid	52408-84-1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0

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	:	No data available
Flash point	:	94 °C Method: Seta closed cup
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	:	1.00 - 1.10 g/cm³
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible Solvent: organic solvent
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: 1,013 mg/kg Method: Calculation method
Acute inhalation toxicity	:	Acute toxicity estimate: 26.25 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:

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

1-Vinylhexahydro-2H-azepin-2-one:

Acute oral toxicity : LD50 (Rat): 1,114 mg/kg

Acute inhalation toxicity : LC50 (Rat): > 1.6 mg/l
Exposure time: 8 h
Test atmosphere: vapor

Acute dermal toxicity : LD50 (Rabbit): 1,700 mg/kg
Method: OECD Test Guideline 402

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

Benzyl acrylate:

Acute oral toxicity : LD50 (Rat): 4,450 mg/kg
Remarks: Based on data from similar materials

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 402
Remarks: Based on data from similar materials

Carbon black:

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

Acute inhalation toxicity : LC50 (Rat): > 0.0046 mg/l
Exposure time: 4 h

Test atmosphere: dust/mist

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

Dioctyl maleate:
Acute oral toxicity : LD50 (Rat): 14,200 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Remarks: Based on data from similar materials

Glycerol, propoxylated, esters with acrylic acid:
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 (Rabbit): > 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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

4-Methoxyphenol:
Acute oral toxicity : LD50 (Rat): 1,000 - 2,000 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: Directive 67/548/EEC, Annex V, B.3.
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation
Causes skin irritation.
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rabbit
Result: No skin irritation

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

Benzyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Carbon black:
Species: Rabbit
Result: No skin irritation

Dioctyl maleate:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation
Remarks: Based on data from similar materials

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

4-Methoxyphenol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

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

Benzyl acrylate:
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

Dioctyl maleate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405
Remarks: Based on data from similar materials

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

4-Methoxyphenol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
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

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

Dioctyl maleate:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Remarks: Based on data from similar materials
Assessment: Probability or evidence of skin sensitization in humans

Glycerol, propoxylated, esters with acrylic acid:
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

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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
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

4-Methoxyphenol:
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

Germ cell mutagenicity
Not classified based on available information.
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:

Genotoxicity in vitro	:	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

Benzyl acrylate:
Genotoxicity in vitro : Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative
Remarks: Based on data from similar materials

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

Dioctyl maleate:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative
Remarks: Based on data from similar materials

Glycerol, propoxylated, esters with acrylic acid:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: Chromosome aberration test in vitro
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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
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: positive

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

4-Methoxyphenol:
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

Carcinogenicity
Not classified based on available information.
Components:
4-Methoxyphenol:
Species: Rat
Application Route: Ingestion
Exposure time: 2 Years
Result: negative

Species: Mouse
Application Route: Skin contact
Exposure time: 120 weeks
Result: negative

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
Suspected of damaging fertility or the unborn child.
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:

Effects on fertility : Test Type: Three-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

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.

Benzyl 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

Glycerol, propoxylated, esters with acrylic acid:

Effects on fetal development : Test Type: Embryo-fetal 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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

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: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 421
Result: negative

4-Methoxyphenol:

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
Method: OECD Test Guideline 414
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

Benzyl acrylate:
Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

STOT-repeated exposure
Causes damage to organs (Liver, Respiratory Tract) through prolonged or 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

1-Vinylhexahydro-2H-azepin-2-one:
Routes of exposure: inhalation (vapor)
Target Organs: Liver, Respiratory Tract
Assessment: Shown to produce significant health effects in animals at concentrations of 0.2 mg/l/6h/d or less.

Carbon black:
Routes of exposure: inhalation (dust/mist/fume)
Assessment: No significant health effects observed in animals at concentrations of 0.2 mg/l/6h/d or less.

Repeated dose toxicity
Components:
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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rat
NOAEL: 50 mg/kg
LOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Species: Rat
NOAEL: 0.058 mg/l
LOAEL: 0.181 mg/l
Application Route: inhalation (vapor)
Exposure time: 90 Days
Method: OECD Test Guideline 413

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

Benzyl acrylate:
Species: Rat
NOAEL: 500 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rat
NOAEL: 250 mg/kg
LOAEL: 750 mg/kg
Application Route: Ingestion

Exposure time: 28 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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rat
NOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

4-Methoxyphenol:
Species: Rat
NOAEL: 150 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422

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:
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

1-Vinylhexahydro-2H-azepin-2-one:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 307 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: Directive 67/548/EEC, Annex V, C.2.

Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h Method: Directive 67/548/EEC, Annex V, C.3. EC10 (Desmodesmus subspicatus (green algae)): > 100 mg/l Exposure time: 72 h Method: Directive 67/548/EEC, Annex V, C.3.
Toxicity to microorganisms	:	EC10 (Pseudomonas putida): 262 mg/l Exposure time: 17 h Method: DIN 38 412 Part 8

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

Benzyl acrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 10 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)): 1.21 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)): 4.1 mg/l Exposure time: 96 h Remarks: Based on data from similar materials EC10 (Desmodesmus subspicatus (green algae)): 0.42 mg/l Exposure time: 96 h Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	EC10 (Daphnia magna (Water flea)): 0.1 mg/l Exposure time: 21 d Remarks: Based on data from similar materials

Carbon black:

Toxicity to fish	:	LC0 (Danio rerio (zebra fish)): 1,000 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other	:	EC50 (Daphnia magna (Water flea)): > 5,600 mg/l

aquatic invertebrates		Exposure time: 24 h Method: OECD Test Guideline 202
Toxicity to algae	:	NOEC (Desmodesmus subspicatus (green algae)): 10,000 mg/l Exposure time: 72 h Method: OECD Test Guideline 201

Dioctyl maleate:

Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 10 - 100 mg/l Exposure time: 48 h Remarks: Based on data from similar materials
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials EC10 (Pseudokirchneriella subcapitata (green algae)): > 10 - 100 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 Remarks: Based on data from similar materials

Glycerol, propoxylated, esters with acrylic acid:

Toxicity to fish	:	LC50 (Danio rerio (zebra fish)): 5.74 mg/l Exposure time: 96 h Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 91.4 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): 12.2 mg/l Exposure time: 72 h Method: OECD Test Guideline 201 EC10 (Desmodesmus subspicatus (green algae)): 2.06 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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Toxicity to fish	:	LL50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l Exposure time: 96 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 202
Toxicity to algae	:	NOELR (Selenastrum capricornutum (green algae)): 100 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

4-Methoxyphenol:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 28.5 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (algae)): 54.7 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.68 mg/l Exposure time: 21 d Method: OECD Test Guideline 211

Persistence and degradability

Components:

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

1-Vinylhexahydro-2H-azepin-2-one:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 30 - 40 % Exposure time: 28 d Method: OECD Test Guideline 301A

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

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

Benzyl acrylate:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 22.3 % Exposure time: 28 d Method: OECD Test Guideline 301D Remarks: Based on data from similar materials

Dioctyl maleate:

Biodegradability	:	Result: rapidly degradable Remarks: Based on data from similar materials

Glycerol, propoxylated, esters with acrylic acid:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 72 - 85 % Exposure time: 28 d Method: OECD Test Guideline 301B

Hexamethylene diacrylate:

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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 7.27 % Exposure time: 28 d Method: OECD Test Guideline 301B

4-Methoxyphenol:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 86 % Exposure time: 28 d Method: OECD Test Guideline 301C

Bioaccumulative potential

Components:

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

1-Vinylhexahydro-2H-azepin-2-one:

Partition coefficient: n-octanol/water	:	log Pow: 1.2

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

Dioctyl maleate:

Partition coefficient: n-octanol/water	:	log Pow: 7.463

Glycerol, propoxylated, esters with acrylic acid:

Partition coefficient: n-octanol/water	:	log Pow: 2.52

Hexamethylene diacrylate:

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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Partition coefficient: n-octanol/water	:	log Pow: > 6

4-Methoxyphenol:

Partition coefficient: n-octanol/water	:	log Pow: 1.2 - 1.6

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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-

2,4,6-trimethylbenzoyl phosphine oxide)

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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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	>= 10 - < 20 %

US State Regulations

Pennsylvania Right To Know

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Benzyl acrylate	2495-35-4
Carbon black	1333-86-4
2,4-Diethyl-9H-thioxanthen-9-one	82799-44-8
Dioctyl maleate	2915-53-9

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

2,4-Diethyl-9H-thioxanthen-9-one	82799-44-8

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 § 721.9664

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	:	2018-08-29

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: 2018-08-29
Date of first issue: 2018-06-01

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK White
PJUV11-WH1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 2602 South 47th Street, Suite 102, Phoenix, AZ 85034

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 2

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 1 (Liver, Respiratory Tract)

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.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Liver, Respiratory Tract)

through prolonged or repeated exposure.
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)
Benzyl acrylate	2495-35-4	>= 10 - < 20
Titanium dioxide	13463-67-7	>= 10 - < 20
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 10 - < 20
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 10 - < 20
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9	>= 10 - < 20
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 10 - < 20
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 5 - < 10
Aluminum hydroxide	21645-51-2	>= 1 - < 5
Hexamethylene diacrylate	13048-33-4	< 1
4-Methoxyphenol	150-76-5	< 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. Suspected of damaging fertility or the unborn child. Causes 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 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 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
Titanium dioxide	13463-67-7	TWA (total dust)	15 mg/m³	OSHA Z-1
		TWA	10 mg/m³ (Titanium dioxide)	ACGIH
Aluminum hydroxide	21645-51-2	TWA (Respirable fraction)	1 mg/m³ (Aluminum)	ACGIH
Hexamethylene diacrylate	13048-33-4	TWA	1 mg/m³	US WEEL
4-Methoxyphenol	150-76-5	TWA	5 mg/m³	ACGIH
		TWA	5 mg/m³	NIOSH REL

Hazardous components without workplace control parameters

Components	CAS-No.
Benzyl acrylate	2495-35-4
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5

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:
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	:	No data available
Flash point	:	94 °C Method: Seta closed cup
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	:	1.10 - 1.20 g/cm³
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible Solvent: organic solvent
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: 1,013 mg/kg Method: Calculation method
Acute inhalation toxicity	:	Acute toxicity estimate: 26.25 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:
Benzyl acrylate:

Acute oral toxicity	:	LD50 (Rat): 4,450 mg/kg Remarks: Based on data from similar materials
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Remarks: Based on data from similar materials

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

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

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

1-Vinylhexahydro-2H-azepin-2-one:

Acute oral toxicity	:	LD50 (Rat): 1,114 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 1.6 mg/l Exposure time: 8 h Test atmosphere: vapor
Acute dermal toxicity	:	LD50 (Rabbit): 1,700 mg/kg Method: OECD Test Guideline 402

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

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

Aluminum hydroxide:

Acute oral toxicity	:	LD50 (Rat): > 2,000 mg/kg Assessment: The substance or mixture has no acute oral toxicity
Acute inhalation toxicity	:	LC50 (Rat): > 2.3 mg/l Exposure time: 4 h Test atmosphere: dust/mist Assessment: The substance or mixture has no acute inhalation 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

4-Methoxyphenol:

Acute oral toxicity	:	LD50 (Rat): 1,000 - 2,000 mg/kg
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: Directive 67/548/EEC, Annex V, B.3. Assessment: The substance or mixture has no acute dermal toxicity

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

Titanium dioxide:
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

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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rabbit
Result: No skin irritation

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

Aluminum hydroxide:
Species: Rabbit
Result: No skin irritation

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

4-Methoxyphenol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

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

Titanium dioxide:
Species: Rabbit
Result: No eye irritation

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

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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

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

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

Aluminum hydroxide:
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

4-Methoxyphenol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

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

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

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

1-Vinylhexahydro-2H-azepin-2-one:
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

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

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

Aluminum hydroxide:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Result: negative

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

4-Methoxyphenol:
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

Germ cell mutagenicity
Not classified based on available information.
Components:

Benzyl acrylate:

Genotoxicity in vitro : Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative
Remarks: Based on data from similar materials

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

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

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

1-Vinylhexahydro-2H-azepin-2-one:

Genotoxicity in vitro : Test Type: In vitro mammalian cell gene mutation test
Method: OECD Test Guideline 476
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.

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

Aluminum hydroxide:

Genotoxicity in vitro : 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: Rat
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

4-Methoxyphenol:

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

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.

4-Methoxyphenol:

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

Species: Mouse
Application Route: Skin contact

Exposure time: 120 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
Suspected of damaging fertility or the unborn child.
Components:
Benzyl 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

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

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.

1-Vinylhexahydro-2H-azepin-2-one:
Effects on fertility : Test Type: Three-generation reproduction toxicity study
Species: Rat

Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

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

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

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

Aluminum hydroxide:
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

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

4-Methoxyphenol:
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
Method: OECD Test Guideline 414
Result: negative

STOT-single exposure
May cause respiratory irritation.
Components:
Benzyl 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
Causes damage to organs (Liver, Respiratory Tract) through prolonged or repeated exposure.
May cause damage to organs through prolonged or repeated exposure.
Components:
1-Vinylhexahydro-2H-azepin-2-one:
Routes of exposure: inhalation (vapor)
Target Organs: Liver, Respiratory Tract
Assessment: Shown to produce significant health effects in animals at concentrations of 0.2 mg/l/6h/d or less.

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:
Benzyl acrylate:
Species: Rat
NOAEL: 500 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

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

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

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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rat
NOAEL: 50 mg/kg
LOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Species: Rat
NOAEL: 0.058 mg/l
LOAEL: 0.181 mg/l
Application Route: inhalation (vapor)
Exposure time: 90 Days
Method: OECD Test Guideline 413

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

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

Aluminum hydroxide:
Species: Rat
NOAEL: 302 mg/kg
Application Route: Ingestion
Exposure time: 28 Days

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

4-Methoxyphenol:
Species: Rat
NOAEL: 150 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422

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:
Benzyl acrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 10 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)): 1.21 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)): 4.1 mg/l Exposure time: 96 h Remarks: Based on data from similar materials EC10 (Desmodesmus subspicatus (green algae)): 0.42 mg/l Exposure time: 96 h Remarks: Based on data from similar materials
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	EC10 (Daphnia magna (Water flea)): 0.1 mg/l Exposure time: 21 d Remarks: Based on data from similar materials

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: 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

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

1-Vinylhexahydro-2H-azepin-2-one:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 307 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: Directive 67/548/EEC, Annex V, C.2.

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Method: Directive 67/548/EEC, Annex V, C.3.

EC10 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Method: Directive 67/548/EEC, Annex V, C.3.

Toxicity to microorganisms : EC10 (Pseudomonas putida): 262 mg/l
Exposure time: 17 h
Method: DIN 38 412 Part 8

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

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

Aluminum hydroxide:

Toxicity to fish	:	LC50 (Pimephales promelas (fathead minnow)): > 218.64 mg/l Exposure time: 96 h
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 (Selenastrum capricornutum (green algae)): > 100 mg/l Exposure time: 72 h

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

4-Methoxyphenol:
Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 28.5 mg/l
Exposure time: 96 h

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 3 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : ErC50 (Pseudokirchneriella subcapitata (algae)): 54.7 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 0.68 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211

Persistence and degradability
Components:
Benzyl acrylate:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 22.3 %
Exposure time: 28 d
Method: OECD Test Guideline 301D
Remarks: Based on data from similar materials

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

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

1-Vinylhexahydro-2H-azepin-2-one:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 30 - 40 %
Exposure time: 28 d
Method: OECD Test Guideline 301A

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

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

Hexamethylene diacrylate:

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

4-Methoxyphenol:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 86 % Exposure time: 28 d Method: OECD Test Guideline 301C

Bioaccumulative potential

Components:

2-(2-Ethoxyethoxy)ethyl acrylate:

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

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

1-Vinylhexahydro-2H-azepin-2-one:

Partition coefficient: n-octanol/water	:	log Pow: 1.2

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

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

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

Hexamethylene diacrylate:

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

4-Methoxyphenol:

Partition coefficient: n-octanol/water	:	log Pow: 1.2 - 1.6

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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082
Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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	>= 10 - < 20 %

US State Regulations

Pennsylvania Right To Know

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Benzyl acrylate	2495-35-4
Titanium dioxide	13463-67-7
Aluminum hydroxide	21645-51-2

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

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	:	2018-08-29

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: 2018-06-01

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Varnish
PJUV11-VA1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 2602 South 47th Street, Suite 102, Phoenix, AZ 85034

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 2

Specific target organ systemic toxicity - single exposure : Category 3

Specific target organ systemic toxicity - repeated exposure : Category 1 (Liver, Respiratory Tract)

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.
H361 Suspected of damaging fertility or the unborn child.
H372 Causes damage to organs (Liver, Respiratory Tract)

through prolonged or repeated exposure.
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)
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5	>= 20 - < 30
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4	>= 10 - < 20
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9	>= 10 - < 20
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8	>= 10 - < 20
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	>= 10 - < 20
Benzyl acrylate	2495-35-4	>= 1 - < 5
Dioctyl maleate	2915-53-9	>= 1 - < 5
Hexamethylene diacrylate	13048-33-4	< 1
Glycerol, propoxylated, esters with acrylic acid	52408-84-1	< 1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0	< 1
4-Methoxyphenol	150-76-5	< 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. Suspected of damaging fertility or the unborn child. Causes 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
4-Methoxyphenol	150-76-5	TWA	5 mg/m³	ACGIH
		TWA	5 mg/m³	NIOSH REL

Hazardous components without workplace control parameters

Components	CAS-No.
Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Benzyl acrylate	2495-35-4
Dioctyl maleate	2915-53-9
Glycerol, propoxylated, esters with acrylic acid	52408-84-1
2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one	7078-98-0

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	:	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	:	No data available
Flash point	:	94 °C Method: Seta closed cup
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	:	1.00 - 1.10 g/cm³
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible

Solvent: organic solvent

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: 1,013 mg/kg Method: Calculation method
Acute inhalation toxicity	:	Acute toxicity estimate: 26.25 mg/l Exposure time: 4 h Test atmosphere: dust/mist Method: Calculation method
Acute dermal toxicity	:	Acute toxicity estimate: > 5,000 mg/kg Method: Calculation method

Components:
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

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

1-Vinylhexahydro-2H-azepin-2-one:

Acute oral toxicity	:	LD50 (Rat): 1,114 mg/kg
Acute inhalation toxicity	:	LC50 (Rat): > 1.6 mg/l Exposure time: 8 h Test atmosphere: vapor
Acute dermal toxicity	:	LD50 (Rabbit): 1,700 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

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

Benzyl acrylate:

Acute oral toxicity	:	LD50 (Rat): 4,450 mg/kg Remarks: Based on data from similar materials
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Method: OECD Test Guideline 402 Remarks: Based on data from similar materials

Dioctyl maleate:

Acute oral toxicity	:	LD50 (Rat): 14,200 mg/kg
Acute dermal toxicity	:	LD50 (Rat): > 2,000 mg/kg Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:
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 (Rabbit): > 2,000 mg/kg
Assessment: The substance or mixture has no acute dermal toxicity

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

4-Methoxyphenol:
Acute oral toxicity : LD50 (Rat): 1,000 - 2,000 mg/kg

Acute dermal toxicity : LD50 (Rat): > 2,000 mg/kg
Method: Directive 67/548/EEC, Annex V, B.3.
Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation
Causes skin irritation.
Components:
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

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

1-Vinylhexahydro-2H-azepin-2-one:
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

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

Benzyl acrylate:
Result: Skin irritation
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Dioctyl maleate:
Species: Rabbit
Method: OECD Test Guideline 404

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

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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

4-Methoxyphenol:
Species: Rabbit
Method: OECD Test Guideline 404
Result: No skin irritation

Serious eye damage/eye irritation
Causes serious eye damage.
Components:
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

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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

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

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

Benzyl acrylate:
Result: Irritation to eyes, reversing within 21 days
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Dioctyl maleate:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405
Remarks: Based on data from similar materials

Hexamethylene diacrylate:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

Glycerol, propoxylated, esters with acrylic acid:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rabbit
Result: No eye irritation
Method: OECD Test Guideline 405

4-Methoxyphenol:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days

Respiratory or skin sensitization
Skin sensitization
May cause an allergic skin reaction.
Respiratory sensitization
Not classified based on available information.
Components:
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

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

1-Vinylhexahydro-2H-azepin-2-one:
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

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

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

Dioctyl maleate:
Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Remarks: Based on data from similar materials
Assessment: Probability or evidence of skin sensitization 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

Glycerol, propoxylated, esters with acrylic acid:
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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
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

4-Methoxyphenol:
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

Germ cell mutagenicity
Not classified based on available information.
Components:
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

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.

1-Vinylhexahydro-2H-azepin-2-one:
Genotoxicity in vitro : 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

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

Benzyl acrylate:
Genotoxicity in vitro : Test Type: in vitro micronucleus test
Method: OECD Test Guideline 487
Result: negative
Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:
Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Method: OECD Test Guideline 471
Result: negative

Test Type: Chromosome aberration test in vitro
Result: negative

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

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: positive

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

4-Methoxyphenol:

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

Carcinogenicity

Not classified based on available information.

Components:

4-Methoxyphenol:

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

Species: Mouse
Application Route: Skin contact
Exposure time: 120 weeks
Result: negative

IARC Not classifiable.

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

Suspected of damaging fertility or the unborn child.

Components:

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

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

1-Vinylhexahydro-2H-azepin-2-one:
Effects on fertility : Test Type: Three-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

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

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.

Benzyl 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

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

Glycerol, propoxylated, esters with acrylic acid:
Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat
Application Route: Ingestion
Result: negative

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
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: Reproduction/Developmental toxicity screening test
Species: Rat
Application Route: Ingestion
Method: OECD Test Guideline 421
Result: negative

4-Methoxyphenol:
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
Method: OECD Test Guideline 414
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

Benzyl acrylate:

Assessment: May cause respiratory irritation.
Remarks: Based on harmonised classification in EU regulation 1272/2008, Annex VI

STOT-repeated exposure
Causes damage to organs (Liver, Respiratory Tract) through prolonged or 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

1-Vinylhexahydro-2H-azepin-2-one:
Routes of exposure: inhalation (vapor)
Target Organs: Liver, Respiratory Tract
Assessment: Shown to produce significant health effects in animals at concentrations of 0.2 mg/l/6h/d or less.

Repeated dose toxicity
Components:
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

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

1-Vinylhexahydro-2H-azepin-2-one:
Species: Rat
NOAEL: 50 mg/kg
LOAEL: 250 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

Species: Rat
NOAEL: 0.058 mg/l
LOAEL: 0.181 mg/l
Application Route: inhalation (vapor)
Exposure time: 90 Days
Method: OECD Test Guideline 413

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

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

Exposure time: 90 Days

Benzyl acrylate:
Species: Rat
NOAEL: 500 mg/kg
Application Route: Ingestion
Exposure time: 54 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

Glycerol, propoxylated, esters with acrylic acid:
Species: Rat
NOAEL: 250 mg/kg
LOAEL: 750 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 422
Remarks: Based on data from similar materials

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Species: Rat
NOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

4-Methoxyphenol:
Species: Rat
NOAEL: 150 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 54 Days
Method: OECD Test Guideline 422

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:
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

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

1-Vinylhexahydro-2H-azepin-2-one:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 307 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: Directive 67/548/EEC, Annex V, C.2.

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Method: Directive 67/548/EEC, Annex V, C.3.

EC10 (Desmodesmus subspicatus (green algae)): > 100 mg/l
Exposure time: 72 h
Method: Directive 67/548/EEC, Annex V, C.3.

Toxicity to microorganisms : EC10 (Pseudomonas putida): 262 mg/l
Exposure time: 17 h
Method: DIN 38 412 Part 8

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

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

Benzyl acrylate:

Toxicity to fish	:	LC50 (Leuciscus idus (Golden orfe)): 10 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)): 1.21 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)): 4.1 mg/l Exposure time: 96 h Remarks: Based on data from similar materials

EC10 (Desmodesmus subspicatus (green algae)): 0.42 mg/l
Exposure time: 96 h
Remarks: Based on data from similar materials

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : EC10 (Daphnia magna (Water flea)): 0.1 mg/l
Exposure time: 21 d
Remarks: Based on data from similar materials

Dioctyl maleate:

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 10 - 100 mg/l
Exposure time: 48 h
Remarks: Based on data from similar materials

Toxicity to algae : ErC50 (Pseudokirchneriella subcapitata (green algae)): > 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

EC10 (Pseudokirchneriella subcapitata (green algae)): > 10 - 100 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 5.74 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 91.4 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 12.2 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

EC10 (Desmodesmus subspicatus (green algae)): 2.06 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

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Toxicity to fish	:	LL50 (Oncorhynchus mykiss (rainbow trout)): > 100 mg/l Exposure time: 96 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 203
Toxicity to daphnia and other aquatic invertebrates	:	EL50 (Daphnia magna (Water flea)): > 100 mg/l Exposure time: 48 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 202
Toxicity to algae	:	NOELR (Selenastrum capricornutum (green algae)): 100 mg/l Exposure time: 72 h Test substance: Water Accommodated Fraction Method: OECD Test Guideline 201
Toxicity to microorganisms	:	EC50: > 100 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

4-Methoxyphenol:

Toxicity to fish	:	LC50 (Oncorhynchus mykiss (rainbow trout)): 28.5 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): 3 mg/l Exposure time: 48 h Method: OECD Test Guideline 202
Toxicity to algae	:	ErC50 (Pseudokirchneriella subcapitata (algae)): 54.7 mg/l Exposure time: 72 h Method: OECD Test Guideline 201
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	NOEC (Daphnia magna (Water flea)): 0.68 mg/l Exposure time: 21 d Method: OECD Test Guideline 211

Persistence and degradability

Components:

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

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

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

1-Vinylhexahydro-2H-azepin-2-one:

Biodegradability	:	Result: Not readily biodegradable. Biodegradation: 30 - 40 % 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

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

Benzyl acrylate:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 22.3 %
Exposure time: 28 d
Method: OECD Test Guideline 301D
Remarks: Based on data from similar materials

Dioctyl maleate:
Biodegradability : Result: rapidly degradable
Remarks: Based on data from similar materials

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

Glycerol, propoxylated, esters with acrylic acid:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 72 - 85 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:
Biodegradability : Result: Not readily biodegradable.
Biodegradation: 7.27 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

4-Methoxyphenol:
Biodegradability : Result: Readily biodegradable.
Biodegradation: 86 %
Exposure time: 28 d
Method: OECD Test Guideline 301C

Bioaccumulative potential
Components:
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

4-(1-Oxo-2-propenyl)-morpholine:
Partition coefficient: n-octanol/water : log Pow: -0.46

1-Vinylhexahydro-2H-azepin-2-one:
Partition coefficient: n-octanol/water : log Pow: 1.2

2-(2-Ethoxyethoxy)ethyl acrylate:

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

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

Dioctyl maleate:

Partition coefficient: n-octanol/water	:	log Pow: 7.463

Hexamethylene diacrylate:

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

Glycerol, propoxylated, esters with acrylic acid:

Partition coefficient: n-octanol/water	:	log Pow: 2.52

2,6-Bis(1,1-dimethylethyl)-4-(phenylenemethylene)cyclohexa-2,5-dien-1-one:

Partition coefficient: n-octanol/water	:	log Pow: > 6

4-Methoxyphenol:

Partition coefficient: n-octanol/water	:	log Pow: 1.2 - 1.6

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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	9

IATA-DGR

UN/ID No.	:	UN 3082

Proper shipping name	:	Environmentally hazardous substance, liquid, n.o.s. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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. (Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
Class	:	9
Packing group	:	III
Labels	:	CLASS 9
ERG Code	:	171
Marine pollutant	:	yes(Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate, Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide)
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	>= 10 - < 20 %

US State Regulations

Pennsylvania Right To Know

Exo-1,7,7-trimethylbicyclo[2.2.1]hept-2-yl acrylate	5888-33-5
2-(2-Ethoxyethoxy)ethyl acrylate	7328-17-8
1-Vinylhexahydro-2H-azepin-2-one	2235-00-9
4-(1-Oxo-2-propenyl)-morpholine	5117-12-4
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Benzyl acrylate	2495-35-4
Dioctyl maleate	2915-53-9

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 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	:	2018-06-01

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: 2018-06-01

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK Cleaner
PJUV11-CL1000U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

Address : 2602 South 47th Street, Suite 102, Phoenix, AZ 85034

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

Flammable liquids : Category 4

Skin irritation : Category 2

GHS label elements

Hazard pictograms :

Signal Word : Warning

Hazard Statements : H227 Combustible liquid.
H315 Causes skin irritation.

Precautionary Statements : **Prevention:**
P210 Keep away from heat/sparks/open flames/hot surfaces. No smoking.
P264 Wash skin thoroughly after handling.
P280 Wear protective gloves/ eye protection/ face protection.
Response:
P302 + P352 IF ON SKIN: Wash with plenty of soap and water.
P332 + P313 If skin irritation occurs: Get medical advice/ attention.
P362 + P364 Take off contaminated clothing and wash it before reuse.
Storage:
P403 + P235 Store in a well-ventilated place. Keep cool.
Disposal:
P501 Dispose of contents/ container to an approved waste disposal plant.

Other hazards

Vapors may form explosive mixture with air.

SECTION 3. COMPOSITION/INFORMATION ON INGREDIENTS

Substance / Mixture : Mixture

Hazardous ingredients

Chemical name	CAS-No.	Concentration (% w/w)
Diethylene Glycol Diethyl Ether	112-36-7	>= 90 - < 100
Propylene carbonate	108-32-7	>= 5 - < 10

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 : 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 : Flush eyes with water as a precaution.
Get medical attention if irritation develops and persists.

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 skin 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 : High volume water jet

Specific hazards during fire fighting : Do not use a solid water stream as it may scatter and spread fire.
Flash back possible over considerable distance.
Vapors may form explosive mixtures with air.
Exposure to combustion products may be a hazard to health.

Hazardous combustion : Carbon oxides

products

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	:	Remove all sources of ignition. 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	:	Non-sparking tools should be used. Soak up with inert absorbent material. Suppress (knock down) gases/vapors/mists with a water spray jet. 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. Avoid contact with eyes. Handle in accordance with good industrial hygiene and safety practice, based on the results of the workplace exposure assessment. Keep container tightly closed. Keep away from heat and sources of ignition. Take precautionary measures against static discharges. Take care to prevent spills, waste and minimize release to the environment.

Conditions for safe storage	:	Keep in properly labeled containers. Keep tightly closed. Keep in a cool, well-ventilated place. Store in accordance with the particular national regulations. Keep away from heat and sources of ignition.
Materials to avoid	:	Do not store with the following product types: Strong oxidizing agents Explosives Gases

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters
Contains no substances with occupational exposure limit values.

Hazardous components without workplace control parameters

Components	CAS-No.
Diethylene Glycol Diethyl Ether	112-36-7
Propylene carbonate	108-32-7

Engineering measures : Ensure adequate ventilation, especially in confined areas.
Minimize workplace exposure concentrations.

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 glasses

Skin and body protection : Select appropriate protective clothing based on chemical resistance data and an assessment of the local exposure potential.
Wear the following personal protective equipment:
Flame retardant antistatic protective clothing, unless assessment demonstrates that the risk of explosive atmospheres or flash fires is low
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	:	slight
Odor Threshold	:	No data available
pH	:	No data available
Melting point/freezing point	:	No data available
Initial boiling point and boiling range	:	No data available
Flash point	:	> 60 °C Method: Seta closed cup
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	:	0.9 - 1.1 g/cm³
Solubility(ies)		
Water solubility	:	completely miscible
Solubility in other solvents	:	completely miscible Solvent: organic solvent
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	:	Combustible liquid. Vapors may form explosive mixture with air. Can react with strong oxidizing agents.
Conditions to avoid	:	Heat, flames and sparks.
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: 4,970 mg/kg Method: Calculation method

Components:
Diethylene Glycol Diethyl Ether:

Acute oral toxicity	:	LD50 (Rat): 4,970 mg/kg

Propylene carbonate:

Acute oral toxicity	:	LD50 (Rat): > 5,000 mg/kg
Acute dermal toxicity	:	LD50 (Rabbit): > 2,000 mg/kg Assessment: The substance or mixture has no acute dermal toxicity

Skin corrosion/irritation
Causes skin irritation.
Components:
Diethylene Glycol Diethyl Ether:
Result: Skin irritation
Remarks: Based on data from similar materials

Propylene carbonate:
Species: Rabbit
Result: No skin irritation

Serious eye damage/eye irritation
Not classified based on available information.
Components:
Diethylene Glycol Diethyl Ether:
Species: Rabbit

Result: No eye irritation
Method: OECD Test Guideline 405

Propylene carbonate:
Species: Rabbit
Result: Irritation to eyes, reversing within 21 days
Method: OECD Test Guideline 405

Respiratory or skin sensitization
Skin sensitization
Not classified based on available information.
Respiratory sensitization
Not classified based on available information.
Components:
Diethylene Glycol Diethyl Ether:
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

Germ cell mutagenicity
Not classified based on available information.
Components:
Diethylene Glycol Diethyl Ether:

Genotoxicity in vitro : Test Type: Bacterial reverse mutation assay (AMES)
Result: negative
Remarks: Based on data from similar materials

Test Type: In vitro mammalian cell gene mutation test
Result: negative
Remarks: Based on data from similar materials

Test Type: Chromosome aberration test in vitro
Result: negative
Remarks: Based on data from similar materials

Genotoxicity in vivo : Test Type: Mutagenicity (in vivo mammalian bone-marrow cytogenetic test, chromosomal analysis)
Species: Mouse
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

Propylene carbonate:

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

Genotoxicity in vivo : Test Type: Mammalian erythrocyte micronucleus test (in vivo cytogenetic assay)
Species: Mouse
Application Route: Intraperitoneal injection
Result: negative

Carcinogenicity
Not classified based on available information.
Components:
Propylene carbonate:
Species: Mouse
Application Route: Skin contact
Exposure time: 2 Years

Result: negative

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
Not classified based on available information.
Components:
Diethylene Glycol Diethyl Ether:
Effects on fertility : Test Type: One-generation reproduction toxicity study
Species: Rat
Application Route: Ingestion
Result: negative
Remarks: Based on data from similar materials

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

Propylene carbonate:
Effects on fetal development : Test Type: Embryo-fetal development
Species: Rat, female
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:
Diethylene Glycol Diethyl Ether:
Species: Rat
NOAEL: 2.49 mg/l
Application Route: inhalation (dust/mist/fume)
Exposure time: 4 Weeks
Method: OECD Test Guideline 412

Propylene carbonate:
Species: Rat
NOAEL: > 5,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Aspiration toxicity
Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity
Components:

Diethylene Glycol Diethyl Ether:

Toxicity to fish	:	LC50: > 10,000 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	LC50: 6,600 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity)	:	EC10 (Ceriodaphnia dubia (water flea)): 7.38 mg/l Exposure time: 7 d Remarks: Based on data from similar materials
Toxicity to microorganisms	:	NOEC: > 1,000 mg/l Exposure time: 3 h Method: OECD Test Guideline 209

Propylene carbonate:

Toxicity to fish	:	LC50 (Cyprinus carpio (Carp)): > 1,000 mg/l Exposure time: 96 h
Toxicity to daphnia and other aquatic invertebrates	:	EC50 (Daphnia magna (Water flea)): > 1,000 mg/l Exposure time: 48 h
Toxicity to algae	:	ErC50 (Desmodesmus subspicatus (green algae)): > 900 mg/l Exposure time: 72 h
Toxicity to microorganisms	:	EC50 (Pseudomonas putida): 25,619 mg/l Exposure time: 16 h

Persistence and degradability
Components:
Diethylene Glycol Diethyl Ether:

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

Propylene carbonate:

Biodegradability	:	Result: Readily biodegradable. Biodegradation: 87.7 % Exposure time: 29 d Method: OECD Test Guideline 301B

Bioaccumulative potential
Components:
Diethylene Glycol Diethyl Ether:

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

Propylene carbonate:

Partition coefficient: n-octanol/water	:	log Pow: -0.41

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. Empty containers retain residue and can be dangerous. Do not pressurize, cut, weld, braze, solder, drill, grind, or expose such containers to heat, flame, sparks, or other sources of ignition. They may explode and cause injury and/or death. 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

UN/ID/NA number	:	NA 1993
Proper shipping name	:	Combustible liquid, n.o.s. (Diethylene Glycol Diethyl Ether)
Class	:	CBL
Packing group	:	III
Labels	:	None
ERG Code	:	128
Marine pollutant	:	no
Remarks	:	Above applies only to containers over 119 gallons or 450 liters. Not regulated if shipped in packages less than or equal to 119 gallons (450 liters).

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	:	Flammable (gases, aerosols, liquids, or solids) Skin corrosion or irritation
SARA 313	:	The following components are subject to reporting levels established by SARA Title III, Section 313:

Diethylene Glycol Diethyl Ether	112-36-7	>= 90 - < 100 %

US State Regulations

Pennsylvania Right To Know

Diethylene Glycol Diethyl Ether	112-36-7
Propylene carbonate	108-32-7

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

Diethylene Glycol Diethyl Ether	112-36-7

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 § 721.10229

SECTION 16. OTHER INFORMATION

Further information

Full text of other abbreviations

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	:	2018-06-01

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.