

SAFETY DATA SHEET

Date of last issue: 2020-07-01

Date of first issue: 2016-09-26

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK
US11-BK220U / US11-BK800U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

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

Telephone : 480-968-7772

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

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2


Eye irritation : Category 2A

Skin sensitization : Category 1

Reproductive toxicity : Category 2

Specific target organ systemic toxicity - single exposure : Category 3

GHS label elements

Hazard pictograms : 

Signal Word : Warning

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H361 Suspected of damaging fertility or the unborn child.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing mist or vapors.
P264 Wash skin thoroughly after handling.

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 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: 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)
Tetrahydrofurfuryl acrylate	2399-48-6	40 - 50
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2	15 - 25
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1	5 - 15
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3	5 - 15
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	1 - 10
Carbon black	1333-86-4	1 - 5
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	< 5

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.
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 irritation. May cause respiratory irritation. Suspected of damaging fertility or the unborn child.
Protection of first-aiders	: First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
Notes to physician	: Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media	: Water spray Alcohol-resistant foam Carbon dioxide (CO2) Dry chemical
Unsuitable extinguishing media	: None known.
Specific hazards during fire fighting	: Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.
Hazardous combustion products	: Carbon oxides Oxides of phosphorus 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.
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

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Ingredients	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Carbon black	1333-86-4	TWA	3.5 mg/m ³	NIOSH REL
		TWA	3.5 mg/m ³	OSHA Z-1
		TWA (Inhalable fraction)	3 mg/m ³	ACGIH

Hazardous components without workplace control parameters

Ingredients	CAS-No.
Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenoxy)ethoxy]ethyl ester	86273-46-3

Phenylbis (2,4,6- trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6- trimethylbenzoyl phosphine oxide	75980-60-8

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:
Safety goggles

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

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : black

Odor : No data available

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	:	95 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible Solvent: organic solvents
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

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: 811.7 mg/kg
Method: Calculation method

Ingredients:
Tetrahydrofurfuryl acrylate:

Acute oral toxicity : LD50 (Rat): 551 mg/kg

4-(1,1-dimethylethyl)cyclohexyl acrylate:

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

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 423

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Acute oral toxicity : LD50 (Rat): 1,790 mg/kg

Acute inhalation toxicity : LD50 (Rat): > 5.04 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

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

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

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

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

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

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

Skin corrosion/irritation

Causes skin irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Skin irritation

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Skin irritation

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Method: OECD Test Guideline 404

Result: Skin irritation

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

Remarks: May cause skin irritation.

Based on a Significant New Use Rule regulation

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

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

Carbon black:

Species: Rabbit

Result: No skin irritation

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

Species: Rabbit

Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Result: No eye irritation

Method: Directive 67/548/EEC, Annex V, B.5.

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Result: No eye irritation
Method: OECD Test Guideline 405

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

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

Carbon black:

Species: Rabbit
Result: No eye irritation

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

Species: Rabbit
Result: No eye irritation

Respiratory or skin sensitization

Skin sensitization

May cause an allergic skin reaction.

Respiratory sensitization

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl 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 low to moderate skin sensitization rate in humans

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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

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

Test Type: Maximization Test
Routes of exposure: Skin contact
Species: Guinea pig
Method: OECD Test Guideline 406
Result: positive
Assessment: Probability or evidence of skin sensitization in humans

Carbon black:

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

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

Germ cell mutagenicity

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

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

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

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

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

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

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

Carbon black:

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

Carcinogenicity

Not classified based on available information.

Carbon black 1333-86-4

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

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.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Effects on fertility : Test Type: 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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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

Effects on fetal development : Remarks: May cause developmental effects
Based on a Significant New Use Rule regulation

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

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

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.

STOT-single exposure

May cause respiratory irritation.

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Assessment: May cause respiratory irritation.

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

STOT-repeated exposure

Not classified based on available information.

Ingredients:

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

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rat

NOAEL: >= 250 mg/kg

Application Route: Ingestion

Exposure time: 31 Days

Method: OECD Test Guideline 422

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rat

NOAEL: 160 mg/kg

Application Route: Ingestion

Exposure time: 28 Days

Method: OECD Test Guideline 407

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

Species: Rat

NOAEL: 1,000 mg/kg

Application Route: Ingestion

Exposure time: 90 Days

Method: OECD Test Guideline 408

Carbon black:

Species: Rat

NOAEL: 1 mg/kg

LOAEL: 7 mg/kg

Application Route: inhalation (dust/mist/fume)

Exposure time: 90 Days

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

Species: Rat

NOAEL: 100 mg/kg

LOAEL: 300 mg/kg

Application Route: Ingestion

Exposure time: 90 Days

Aspiration toxicity

Not classified based on available information.

Further information

Ingredients:

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Remarks: May cause internal organ effects

Based on a Significant New Use Rule regulation

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute aquatic toxicity : Toxic effects cannot be excluded

Chronic aquatic toxicity : Toxic effects cannot be excluded

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

- Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 4 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 20 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
- Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 34 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
- NOEC (Desmodesmus subspicatus (green algae)): 9 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
- Toxicity to microorganisms : EC10: 300 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

- Toxicity to fish : LC50 (Danio rerio (zebra fish)): 6.8 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
- Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 55 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
- Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 10 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
- NOEC (Desmodesmus subspicatus (green algae)): 0.78 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)): 0.26 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211
- Toxicity to microorganisms : EC50: 741 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

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

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

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 8.1 µg/l
Exposure time: 21 d
Method: OECD Test Guideline 211
Remarks: No toxicity at the limit of solubility.

Toxicity to microorganisms : EC50: > 100 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

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 aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 5,600 mg/l
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

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

Persistence and degradability

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Biodegradability : Result: rapidly degradable

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 84.4 %
Exposure time: 28 d

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

Biodegradability : Result: Not readily biodegradable.

Biodegradation: 1 %
Exposure time: 28 d
Method: OECD Test Guideline 301B

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

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

Bioaccumulative potential

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Partition coefficient: : log Pow: 5.5 - 5.6
n-octanol/water

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Partition coefficient: : log Pow: 1.9
n-octanol/water

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Partition coefficient: : log Pow: 1.7
n-octanol/water

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

Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

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

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

Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 18 - 72

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

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 Regulation

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.

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 311/312 Hazards** : Acute Health Hazard
Chronic Health Hazard
- SARA 302** : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.
- SARA 313** : This material does not contain any chemical components with known CAS numbers that exceed the threshold (De Minimis) reporting levels established by SARA Title III, Section 313.

US State Regulations
Pennsylvania Right To Know

Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
2,4-Diethyl-9H-thioxanthen-9-one	82799-44-8
Carbon black	1333-86-4
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8

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
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California Permissible Exposure Limits for Chemical Contaminants

Carbon black	1333-86-4
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Additional regulatory information

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

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

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

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

Revision Date : 2020-07-01

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

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

SAFETY DATA SHEET

Date of last issue: 2020-07-01

Date of first issue: 2016-09-26

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK
US11-CY220U / US11-CY800U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

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

Telephone : 480-968-7772

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

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2


Eye irritation : Category 2A

Skin sensitization : Category 1

Reproductive toxicity : Category 2

Specific target organ systemic toxicity - single exposure : Category 3

GHS label elements

Hazard pictograms : 

Signal Word : Warning

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H361 Suspected of damaging fertility or the unborn child.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing mist or vapors.
P264 Wash skin thoroughly after handling.

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 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: 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)
Tetrahydrofurfuryl acrylate	2399-48-6	40 - 50
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2	15 - 25
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1	10 - 20
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3	5 - 15
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	1 - 10
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	< 5

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. |
| 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 irritation.
May cause respiratory irritation.
Suspected of damaging fertility or the unborn child. |
| Protection of first-aiders | : | First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists. |
| Notes to physician | : | Treat symptomatically and supportively. |

SECTION 5. FIRE-FIGHTING MEASURES

- | | | |
|--|---|---|
| Suitable extinguishing media | : | Water spray
Alcohol-resistant foam
Carbon dioxide (CO ₂)
Dry chemical |
| Unsuitable extinguishing media | : | None known. |
| Specific hazards during fire fighting | : | Vapors may form explosive mixtures with air.
Exposure to combustion products may be a hazard to health. |
| Hazardous combustion products | : | Carbon oxides
Oxides of phosphorus
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.
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

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

Ingredients	CAS-No.
Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3
Phenylbis (2,4,6- trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6- trimethylbenzoyl phosphine oxide	75980-60-8

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	blue
Odor	:	No data available
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	:	95 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible Solvent: organic solvents
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

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: 811.7 mg/kg
Method: Calculation method

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute oral toxicity : LD50 (Rat): 551 mg/kg

4-(1,1-dimethylethyl)cyclohexyl acrylate:

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

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 423

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Acute oral toxicity : LD50 (Rat): 1,790 mg/kg

Acute inhalation toxicity : LD50 (Rat): > 5.04 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

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

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

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

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

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

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

Skin corrosion/irritation

Causes skin irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Skin irritation

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Skin irritation

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Method: OECD Test Guideline 404

Result: Skin irritation

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

Remarks: May cause skin irritation.

Based on a Significant New Use Rule regulation

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

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

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

Species: Rabbit

Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Result: No eye irritation

Method: Directive 67/548/EEC, Annex V, B.5.

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Result: No eye irritation

Method: OECD Test Guideline 405

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

Species: Rabbit

Result: No eye irritation

Method: OECD Test Guideline 405

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

Species: Rabbit

Result: No eye irritation

Respiratory or skin sensitization

Skin sensitization

May cause an allergic skin reaction.

Respiratory sensitization

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl 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 low to moderate skin sensitization rate in humans

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Test Type: Local lymph node assay (LLNA)

Routes of exposure: Skin contact

Species: Mouse

Method: OECD Test Guideline 429

Result: positive

Assessment: Probability or evidence of skin sensitization in humans

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

Test Type: Maximization Test

Routes of exposure: Skin contact

Species: Guinea pig

Method: OECD Test Guideline 406

Result: positive

Assessment: Probability or evidence of skin sensitization in humans

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

Germ cell mutagenicity

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

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

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

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

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

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

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

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

Carcinogenicity

Not classified based on available information.

IARC

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

OSHA

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

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.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Effects on fertility : Test Type: 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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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

Effects on fetal development : Remarks: May cause developmental effects
Based on a Significant New Use Rule regulation

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

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

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.

STOT-single exposure

May cause respiratory irritation.

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Assessment: May cause respiratory irritation.

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

STOT-repeated exposure

Not classified based on available information.

Repeated dose toxicity

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rat
NOAEL: \geq 250 mg/kg
Application Route: Ingestion
Exposure time: 31 Days
Method: OECD Test Guideline 422

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rat
NOAEL: 160 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

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

Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

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

Species: Rat
NOAEL: 100 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Aspiration toxicity

Not classified based on available information.

Further information

Ingredients:

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Remarks: May cause internal organ effects

Based on a Significant New Use Rule regulation

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute aquatic toxicity : Toxic effects cannot be excluded

Chronic aquatic toxicity : Toxic effects cannot be excluded

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 4 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 20 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 34 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 9 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC10: 300 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 6.8 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 55 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 10 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 0.78 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)): 0.26 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211

Toxicity to microorganisms : EC50: 741 mg/l

Exposure time: 3 h
Method: OECD Test Guideline 209

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

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

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

Persistence and degradability

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

- Biodegradability : Result: rapidly degradable

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

- Biodegradability : Result: Readily biodegradable.

Biodegradation: 84.4 %
Exposure time: 28 d

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

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

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

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

Bioaccumulative potential

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Partition coefficient: : log Pow: 5.5 - 5.6
n-octanol/water

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Partition coefficient: : log Pow: 1.9
n-octanol/water

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Partition coefficient: : log Pow: 1.7
n-octanol/water

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

Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

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

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

Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 18 - 72

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

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 Regulation
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.

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 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

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

US State Regulations
Pennsylvania Right To Know

Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8

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.

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 : 2020-07-01

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

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

SAFETY DATA SHEET

Date of last issue: 2020-07-01

Date of first issue: 2016-09-26

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK
US11-MA220U / US11-MA800U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

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

Telephone : 480-968-7772

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

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2

Eye irritation : Category 2A

Skin sensitization : Category 1

Reproductive toxicity : Category 2

Specific target organ systemic toxicity - single exposure : Category 3

GHS label elements

Hazard pictograms : 

Signal Word : Warning

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H361 Suspected of damaging fertility or the unborn child.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing mist or vapors.
P264 Wash skin thoroughly after handling.

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 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: 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)
Tetrahydrofurfuryl acrylate	2399-48-6	45 - 55
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2	15 - 25
2-Propenoic acid, 2-[2-(ethenoxy)ethoxy]ethyl ester	86273-46-3	5 - 15
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1	1 - 10
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	1 - 10
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	< 5

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. |
| 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 irritation.
May cause respiratory irritation.
Suspected of damaging fertility or the unborn child. |
| Protection of first-aiders | : | First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists. |
| Notes to physician | : | Treat symptomatically and supportively. |

SECTION 5. FIRE-FIGHTING MEASURES

- | | | |
|--|---|---|
| Suitable extinguishing media | : | Water spray
Alcohol-resistant foam
Carbon dioxide (CO ₂)
Dry chemical |
| Unsuitable extinguishing media | : | None known. |
| Specific hazards during fire fighting | : | Vapors may form explosive mixtures with air.
Exposure to combustion products may be a hazard to health. |
| Hazardous combustion products | : | Carbon oxides
Oxides of phosphorus
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.
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

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

Ingredients	CAS-No.
Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenoxy)ethoxy]ethyl ester	86273-46-3
Phenylbis (2,4,6- trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6- trimethylbenzoyl phosphine oxide	75980-60-8

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	red
Odor	:	No data available
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	:	95 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible Solvent: organic solvents
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

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: 811.7 mg/kg
Method: Calculation method

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute oral toxicity : LD50 (Rat): 551 mg/kg

4-(1,1-dimethylethyl)cyclohexyl acrylate:

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

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 423

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Acute oral toxicity : LD50 (Rat): 1,790 mg/kg

Acute inhalation toxicity : LD50 (Rat): > 5.04 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

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

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

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

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

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

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

Skin corrosion/irritation

Causes skin irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Skin irritation

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Skin irritation

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Method: OECD Test Guideline 404

Result: Skin irritation

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

Remarks: May cause skin irritation.

Based on a Significant New Use Rule regulation

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

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

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

Species: Rabbit

Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Result: No eye irritation

Method: Directive 67/548/EEC, Annex V, B.5.

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Result: No eye irritation

Method: OECD Test Guideline 405

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

Species: Rabbit

Result: No eye irritation

Method: OECD Test Guideline 405

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

Species: Rabbit

Result: No eye irritation

Respiratory or skin sensitization

Skin sensitization

May cause an allergic skin reaction.

Respiratory sensitization

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl 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 low to moderate skin sensitization rate in humans

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Test Type: Local lymph node assay (LLNA)

Routes of exposure: Skin contact

Species: Mouse

Method: OECD Test Guideline 429

Result: positive

Assessment: Probability or evidence of skin sensitization in humans

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

Test Type: Maximization Test

Routes of exposure: Skin contact

Species: Guinea pig

Method: OECD Test Guideline 406

Result: positive

Assessment: Probability or evidence of skin sensitization in humans

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

Germ cell mutagenicity

Not classified based on available information.

Ingredients:
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

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

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

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

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

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

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

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

Carcinogenicity

Not classified based on available information.

IARC

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

OSHA

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

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.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Effects on fertility : Test Type: 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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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

Effects on fetal development : Remarks: May cause developmental effects
Based on a Significant New Use Rule regulation

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

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

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.

STOT-single exposure

May cause respiratory irritation.

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Assessment: May cause respiratory irritation.

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

STOT-repeated exposure

Not classified based on available information.

Repeated dose toxicity

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rat
NOAEL: \geq 250 mg/kg
Application Route: Ingestion
Exposure time: 31 Days
Method: OECD Test Guideline 422

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rat
NOAEL: 160 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

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

Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

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

Species: Rat
NOAEL: 100 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Aspiration toxicity

Not classified based on available information.

Further information

Ingredients:

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Remarks: May cause internal organ effects

Based on a Significant New Use Rule regulation

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute aquatic toxicity : Toxic effects cannot be excluded

Chronic aquatic toxicity : Toxic effects cannot be excluded

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 4 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 20 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 34 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 9 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC10: 300 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 6.8 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 55 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 10 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 0.78 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)): 0.26 mg/l
Exposure time: 21 d
Method: OECD Test Guideline 211

Toxicity to microorganisms : EC50: 741 mg/l

Exposure time: 3 h
Method: OECD Test Guideline 209

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

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

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

Persistence and degradability

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

- Biodegradability : Result: rapidly degradable

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

- Biodegradability : Result: Readily biodegradable.

Biodegradation: 84.4 %
Exposure time: 28 d

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

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

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

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

Bioaccumulative potential

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Partition coefficient: : log Pow: 5.5 - 5.6
n-octanol/water

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Partition coefficient: : log Pow: 1.9
n-octanol/water

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Partition coefficient: : log Pow: 1.7
n-octanol/water

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

Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

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

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

Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 18 - 72

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

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 Regulation
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.

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 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

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

US State Regulations
Pennsylvania Right To Know

Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8

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.

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 : 2020-07-01

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

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

SAFETY DATA SHEET

Date of last issue: 2020-07-01

Date of first issue: 2016-09-26

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK
US11-VA220U / US11-VA800U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

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

Telephone : 480-968-7772

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

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2


Eye irritation : Category 2A

Skin sensitization : Category 1

Reproductive toxicity : Category 2

Specific target organ systemic toxicity - single exposure : Category 3

GHS label elements

Hazard pictograms : 

Signal Word : Warning

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H361 Suspected of damaging fertility or the unborn child.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing mist or vapors.
P264 Wash skin thoroughly after handling.

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 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: 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)
Tetrahydrofurfuryl acrylate	2399-48-6	35 - 45
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2	15 - 25
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1	15 - 25
2-Propenoic acid, 2-[2-(ethenoxy)ethoxy]ethyl ester	86273-46-3	5 - 15
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	1 - 10
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	< 5

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. |
| 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 irritation.
May cause respiratory irritation.
Suspected of damaging fertility or the unborn child. |
| Protection of first-aiders | : | First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists. |
| Notes to physician | : | Treat symptomatically and supportively. |

SECTION 5. FIRE-FIGHTING MEASURES

- | | | |
|--|---|---|
| Suitable extinguishing media | : | Water spray
Alcohol-resistant foam
Carbon dioxide (CO2)
Dry chemical |
| Unsuitable extinguishing media | : | None known. |
| Specific hazards during fire fighting | : | Vapors may form explosive mixtures with air.
Exposure to combustion products may be a hazard to health. |
| Hazardous combustion products | : | Carbon oxides
Oxides of phosphorus
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.
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

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

Ingredients	CAS-No.
Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3
Phenylbis (2,4,6- trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6- trimethylbenzoyl phosphine oxide	75980-60-8

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	clear
Odor	:	No data available
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	:	95 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible Solvent: organic solvents
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

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: 811.7 mg/kg
Method: Calculation method

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute oral toxicity : LD50 (Rat): 551 mg/kg

4-(1,1-dimethylethyl)cyclohexyl acrylate:

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

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 423

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Acute oral toxicity : LD50 (Rat): 1,790 mg/kg

Acute inhalation toxicity : LD50 (Rat): > 5.04 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

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

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

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

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

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

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

Skin corrosion/irritation

Causes skin irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Skin irritation

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Skin irritation

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Method: OECD Test Guideline 404

Result: Skin irritation

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

Remarks: May cause skin irritation.

Based on a Significant New Use Rule regulation

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

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

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

Species: Rabbit

Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Result: No eye irritation

Method: Directive 67/548/EEC, Annex V, B.5.

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Result: No eye irritation

Method: OECD Test Guideline 405

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

Species: Rabbit

Result: No eye irritation

Method: OECD Test Guideline 405

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

Species: Rabbit

Result: No eye irritation

Respiratory or skin sensitization

Skin sensitization

May cause an allergic skin reaction.

Respiratory sensitization

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl 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 low to moderate skin sensitization rate in humans

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Test Type: Local lymph node assay (LLNA)

Routes of exposure: Skin contact

Species: Mouse

Method: OECD Test Guideline 429

Result: positive

Assessment: Probability or evidence of skin sensitization in humans

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

Test Type: Maximization Test

Routes of exposure: Skin contact

Species: Guinea pig

Method: OECD Test Guideline 406

Result: positive

Assessment: Probability or evidence of skin sensitization in humans

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

Germ cell mutagenicity

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

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

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

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

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

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

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

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

Carcinogenicity

Not classified based on available information.

IARC

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

OSHA

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

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.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Effects on fertility : Test Type: 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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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

Effects on fetal development : Remarks: May cause developmental effects
Based on a Significant New Use Rule regulation

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

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

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.

STOT-single exposure

May cause respiratory irritation.

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Assessment: May cause respiratory irritation.

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

STOT-repeated exposure

Not classified based on available information.

Repeated dose toxicity

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rat
NOAEL: \geq 250 mg/kg
Application Route: Ingestion
Exposure time: 31 Days
Method: OECD Test Guideline 422

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rat
NOAEL: 160 mg/kg
Application Route: Ingestion
Exposure time: 28 Days
Method: OECD Test Guideline 407

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

Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

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

Species: Rat
NOAEL: 100 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Aspiration toxicity

Not classified based on available information.

Further information
Ingredients:
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Remarks: May cause internal organ effects

Based on a Significant New Use Rule regulation

SECTION 12. ECOLOGICAL INFORMATION
Ecotoxicity
Ingredients:
Tetrahydrofurfuryl acrylate:

Acute aquatic toxicity : Toxic effects cannot be excluded

Chronic aquatic toxicity : Toxic effects cannot be excluded

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 4 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 20 mg/l
aquatic invertebrates
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 34 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 9 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC10: 300 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 6.8 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 55 mg/l
aquatic invertebrates
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 10 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 0.78 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to daphnia and other : NOEC (Daphnia magna (Water flea)): 0.26 mg/l
aquatic invertebrates (Chronic
toxicity)
Exposure time: 21 d
Method: OECD Test Guideline 211

Toxicity to microorganisms : EC50: 741 mg/l

Exposure time: 3 h
Method: OECD Test Guideline 209

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

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

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

Persistence and degradability
Ingredients:
4-(1,1-dimethylethyl)cyclohexyl acrylate:

- Biodegradability : Result: rapidly degradable

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

- Biodegradability : Result: Readily biodegradable.

Biodegradation: 84.4 %
Exposure time: 28 d

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

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

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

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

Bioaccumulative potential

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Partition coefficient: : log Pow: 5.5 - 5.6
n-octanol/water

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Partition coefficient: : log Pow: 1.9
n-octanol/water

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Partition coefficient: : log Pow: 1.7
n-octanol/water

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

Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

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

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

Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 18 - 72

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

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 Regulation
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.

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 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

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

US State Regulations
Pennsylvania Right To Know

Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8

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.

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 : 2020-07-01

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

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

SAFETY DATA SHEET

Date of last issue: 2020-07-01

Date of first issue: 2016-09-26

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK
US11-WH220U / US11-WH500U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc



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

Telephone : 480-968-7772

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

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4

Skin irritation : Category 2

Eye irritation : Category 2A

Skin sensitization : Category 1

Reproductive toxicity : Category 2

Specific target organ systemic toxicity - single exposure : Category 3

GHS label elements

Hazard pictograms :



Signal Word : Warning

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H335 May cause respiratory irritation.
H361 Suspected of damaging fertility or the unborn child.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing mist or vapors.
P264 Wash skin thoroughly after handling.

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 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
P308 + P313 IF exposed or concerned: Get medical advice/ attention.
P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.
P337 + P313 If eye irritation persists: 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)
Tetrahydrofurfuryl acrylate	2399-48-6	40 - 50
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2	15 - 25
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3	5 - 15
Titanium dioxide	13463-67-7	5 - 15
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1	1 - 10
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	1 - 10
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	< 5

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.
- 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 irritation.
May cause respiratory irritation.
Suspected of damaging fertility or the unborn child.
- Protection of first-aiders : First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.
- Notes to physician : Treat symptomatically and supportively.

SECTION 5. FIRE-FIGHTING MEASURES

- Suitable extinguishing media : Water spray
Alcohol-resistant foam
Carbon dioxide (CO₂)
Dry chemical
- Unsuitable extinguishing media : None known.
- Specific hazards during fire fighting : Vapors may form explosive mixtures with air.
Exposure to combustion products may be a hazard to health.
- Hazardous combustion products : Carbon oxides
Oxides of phosphorus
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.
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

SECTION 8. EXPOSURE CONTROLS/PERSONAL PROTECTION

Ingredients with workplace control parameters

Ingredients	CAS-No.	Value type (Form of exposure)	Control parameters / Permissible concentration	Basis
Titanium dioxide	13463-67-7	TWA (total dust)	15 mg/m ³	OSHA Z-1
		TWA	10 mg/m ³ (Titanium dioxide)	ACGIH

Hazardous components without workplace control parameters

Ingredients	CAS-No.
Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3
Phenylbis (2,4,6- trimethylbenzoyl) phosphine oxide	162881-26-7

Diphenyl-2,4,6- trimethylbenzoyl phosphine oxide	75980-60-8
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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:
Safety goggles

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

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance : liquid

Color : white

Odor : No data available

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	:	95 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable
Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible Solvent: organic solvents
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

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: 811.7 mg/kg
Method: Calculation method

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute oral toxicity : LD50 (Rat): 551 mg/kg

4-(1,1-dimethylethyl)cyclohexyl acrylate:

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

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 423

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Acute oral toxicity : LD50 (Rat): 1,790 mg/kg

Acute inhalation toxicity : LD50 (Rat): > 5.04 mg/l
Exposure time: 4 h
Test atmosphere: dust/mist
Method: OECD Test Guideline 403

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

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

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

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

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

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

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

Skin corrosion/irritation

Causes skin irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Skin irritation

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Skin irritation

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Method: OECD Test Guideline 404

Result: Skin irritation

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

Remarks: May cause skin irritation.

Based on a Significant New Use Rule regulation

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

Species: Rabbit

Method: OECD Test Guideline 404

Result: No skin irritation

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

Species: Rabbit

Result: No skin irritation

Titanium dioxide:

Species: Rabbit

Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Result: No eye irritation

Method: Directive 67/548/EEC, Annex V, B.5.

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rabbit

Result: No eye irritation

Method: OECD Test Guideline 405

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

Species: Rabbit

Result: No eye irritation

Method: OECD Test Guideline 405

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

Species: Rabbit

Result: No eye irritation

Titanium dioxide:

Species: Rabbit

Result: No eye irritation

Respiratory or skin sensitization

Skin sensitization

May cause an allergic skin reaction.

Respiratory sensitization

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl 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 low to moderate skin sensitization rate in humans

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Test Type: Local lymph node assay (LLNA)

Routes of exposure: Skin contact

Species: Mouse

Method: OECD Test Guideline 429

Result: positive

Assessment: Probability or evidence of skin sensitization in humans

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

Test Type: Maximization Test

Routes of exposure: Skin contact

Species: Guinea pig

Method: OECD Test Guideline 406

Result: positive

Assessment: Probability or evidence of skin sensitization in humans

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

Titanium dioxide:

Test Type: Local lymph node assay (LLNA)

Routes of exposure: Skin contact

Species: Mouse

Result: negative

Germ cell mutagenicity

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

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

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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: Mouse
Application Route: Ingestion
Method: OECD Test Guideline 474
Result: negative

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

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

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

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

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

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

Carcinogenicity

Not classified based on available information.

Ingredients:

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.

IARC

Group 2B: Possibly carcinogenic to humans

Titanium dioxide

13463-67-7

OSHA

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

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.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Effects on fertility : Test Type: 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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

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: May cause adverse reproductive effects.

Based on a Significant New Use Rule regulation

Effects on fetal development : Remarks: May cause developmental effects
Based on a Significant New Use Rule regulation

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

Effects on fetal development : Test Type: Fertility/early embryonic development

Species: Rat

Application Route: Ingestion

Method: OECD Test Guideline 414

Result: negative

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.

STOT-single exposure

May cause respiratory irritation.

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Assessment: May cause respiratory irritation.

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

STOT-repeated exposure

Not classified based on available information.

Repeated dose toxicity

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rat

NOAEL: ≥ 250 mg/kg

Application Route: Ingestion

Exposure time: 31 Days

Method: OECD Test Guideline 422

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Species: Rat

NOAEL: 160 mg/kg

Application Route: Ingestion

Exposure time: 28 Days

Method: OECD Test Guideline 407

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

Species: Rat

NOAEL: 1,000 mg/kg

Application Route: Ingestion

Exposure time: 90 Days

Method: OECD Test Guideline 408

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

Species: Rat

NOAEL: 100 mg/kg

LOAEL: 300 mg/kg

Application Route: Ingestion

Exposure time: 90 Days

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

Aspiration toxicity

Not classified based on available information.

Further information

Ingredients:

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Remarks: May cause internal organ effects
Based on a Significant New Use Rule regulation

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute aquatic toxicity : Toxic effects cannot be excluded

Chronic aquatic toxicity : Toxic effects cannot be excluded

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 4 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 20 mg/l
aquatic invertebrates
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 34 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 9 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC10: 300 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Toxicity to fish : LC50 (Danio rerio (zebra fish)): 6.8 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other : EC50 (Daphnia magna (Water flea)): 55 mg/l
aquatic invertebrates
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : EC50 (Desmodesmus subspicatus (green algae)): 10 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 0.78 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to daphnia and other : NOEC (Daphnia magna (Water flea)): 0.26 mg/l
aquatic invertebrates (Chronic
toxicity)
Exposure time: 21 d
Method: OECD Test Guideline 211

Toxicity to microorganisms : EC50: 741 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

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

Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 90 µg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Remarks: No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 1.18 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: No toxicity at the limit of solubility.

Toxicity to algae : NOEC (Desmodesmus subspicatus (green algae)): 260 µg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 8.1 µg/l
Exposure time: 21 d
Method: OECD Test Guideline 211
Remarks: No toxicity at the limit of solubility.

Toxicity to microorganisms : EC50: > 100 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

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

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

Persistence and degradability

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Biodegradability : Result: rapidly degradable

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Biodegradability : Result: Readily biodegradable.
Biodegradation: 84.4 %
Exposure time: 28 d

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

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

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

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

Bioaccumulative potential

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Partition coefficient: : log Pow: 5.5 - 5.6
n-octanol/water

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Partition coefficient: : log Pow: 1.9
n-octanol/water

2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester:

Partition coefficient: : log Pow: 1.7
n-octanol/water

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

Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

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

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

Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 18 - 72

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

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 Regulation

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.

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 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting requirements of SARA Title III, Section 302.

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

US State Regulations

Pennsylvania Right To Know

Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
2-Propenoic acid, 2-[2-(ethenyloxy)ethoxy]ethyl ester	86273-46-3
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8
Titanium dioxide	13463-67-7

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
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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
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

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

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

Revision Date : 2020-07-01

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

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

SAFETY DATA SHEET

Date of last issue: 2020-07-01

Date of first issue: 2016-09-26

SECTION 1. IDENTIFICATION

Product name : LED UV Curable INK
US11-YE220U / US11-YE800U

Manufacturer or supplier's details

Company name of supplier : MUTOH America Inc

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

Telephone : 480-968-7772

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

Recommended use of the chemical and restrictions on use

Recommended use : Digital printing

SECTION 2. HAZARDS IDENTIFICATION

GHS Classification in accordance with 29 CFR 1910.1200

Acute toxicity (Oral) : Category 4


Skin irritation : Category 2

Eye irritation : Category 2A

Skin sensitization : Category 1

Reproductive toxicity : Category 2

GHS label elements

Hazard pictograms : 

Signal Word : Warning

Hazard Statements : H302 Harmful if swallowed.
H315 Causes skin irritation.
H317 May cause an allergic skin reaction.
H319 Causes serious eye irritation.
H361 Suspected of damaging fertility or the unborn child.

Precautionary Statements : **Prevention:**
P201 Obtain special instructions before use.
P202 Do not handle until all safety precautions have been read and understood.
P261 Avoid breathing mist or vapors.
P264 Wash skin thoroughly after handling.
P270 Do not eat, drink or smoke when using this product.
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.

P305 + P351 + P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.

P308 + P313 IF exposed or concerned: Get medical advice/ attention.

P333 + P313 If skin irritation or rash occurs: Get medical advice/ attention.

P337 + P313 If eye irritation persists: 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)
Tetrahydrofurfuryl acrylate	2399-48-6	55 - 65
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2	5 - 15
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1	5 - 15
Trimethylolpropane triacrylate	15625-89-5	1 - 10
Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7	1 - 10
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8	< 5

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.

If swallowed : If swallowed, DO NOT induce vomiting.

	<p>Get medical attention. Rinse mouth thoroughly with water. Never give anything by mouth to an unconscious person.</p>
Most important symptoms and : effects, both acute and delayed	<p>Harmful if swallowed. Causes skin irritation. May cause an allergic skin reaction. Causes serious eye irritation. Suspected of damaging fertility or the unborn child.</p>
Protection of first-aiders :	<p>First Aid responders should pay attention to self-protection, and use the recommended personal protective equipment when the potential for exposure exists.</p>
Notes to physician :	<p>Treat symptomatically and supportively.</p>

SECTION 5. FIRE-FIGHTING MEASURES

Suitable extinguishing media :	<p>Water spray Alcohol-resistant foam Carbon dioxide (CO₂) Dry chemical</p>
Unsuitable extinguishing media :	<p>None known.</p>
Specific hazards during fire fighting :	<p>Vapors may form explosive mixtures with air. Exposure to combustion products may be a hazard to health.</p>
Hazardous combustion products :	<p>Carbon oxides Oxides of phosphorus Sulfur oxides</p>
Specific extinguishing methods :	<p>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.</p>
Special protective equipment for fire-fighters :	<p>In the event of fire, wear self-contained breathing apparatus. Use personal protective equipment.</p>

SECTION 6. ACCIDENTAL RELEASE MEASURES

Personal precautions, protective equipment and emergency procedures :	<p>Use personal protective equipment. Follow safe handling advice and personal protective equipment recommendations.</p>
Environmental precautions :	<p>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</p>
Methods and materials for containment and cleaning up :	<p>Soak up with inert absorbent material. For large spills, provide diking or other appropriate containment</p>

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.
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

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

Ingredients	CAS-No.
Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
trimethylopropane triacrylate	15625-89-5
Phenylbis (2,4,6- trimethylbenzoyl) phosphine oxide	162881-26-7
Diphenyl-2,4,6- trimethylbenzoyl phosphine oxide	75980-60-8

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

SECTION 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance	:	liquid
Color	:	yellow
Odor	:	No data available
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	:	95 °C
Evaporation rate	:	No data available
Flammability (solid, gas)	:	Not applicable

Upper explosion limit	:	No data available
Lower explosion limit	:	No data available
Vapor pressure	:	No data available
Relative vapor density	:	No data available
Relative density	:	No data available
Solubility(ies)		
Water solubility	:	immiscible
Solubility in other solvents	:	completely miscible Solvent: organic solvents
Partition coefficient: n-octanol/water	:	Not applicable
Autoignition temperature	:	No data available
Decomposition temperature	:	No data available
Viscosity		
Viscosity, dynamic	:	No data available
Explosive properties	:	Not explosive
Oxidizing properties	:	The substance or mixture is not classified as oxidizing.

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: 738.2 mg/kg
Method: Calculation method

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute oral toxicity : LD50 (Rat): 551 mg/kg

4-(1,1-dimethylethyl)cyclohexyl acrylate:

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

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Acute oral toxicity : LD50 (Rat): > 2,000 mg/kg
Method: OECD Test Guideline 423

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

Trimethylolpropane triacrylate:

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

Acute dermal toxicity : LD50 (Rabbit): 5,212 mg/kg

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

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

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

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

Acute oral toxicity : LD50 (Rat): > 5,000 mg/kg
Method: OECD Test Guideline 401

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

Skin corrosion/irritation

Causes skin irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit
Result: Skin irritation

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit
Result: Skin irritation

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

Trimethylolpropane triacrylate:

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

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

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

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

Species: Rabbit

Result: No skin irritation

Serious eye damage/eye irritation

Causes serious eye irritation.

Ingredients:

Tetrahydrofurfuryl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Species: Rabbit

Result: Irritation to eyes, reversing within 21 days

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rabbit

Result: No eye irritation

Method: Directive 67/548/EEC, Annex V, B.5.

Trimethylolpropane triacrylate:

Result: Irritation to eyes, reversing within 21 days

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

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

Species: Rabbit

Result: No eye irritation

Method: OECD Test Guideline 405

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

Species: Rabbit

Result: No eye irritation

Respiratory or skin sensitization

Skin sensitization

May cause an allergic skin reaction.

Respiratory sensitization

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl 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 low to moderate skin sensitization rate in humans

Trimethylolpropane triacrylate:

Result: May cause an allergic skin reaction.

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

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

Test Type: Maximization Test

Routes of exposure: Skin contact

Species: Guinea pig

Method: OECD Test Guideline 406

Result: positive

Assessment: Probability or evidence of skin sensitization in humans

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

Test Type: Local lymph node assay (LLNA)

Routes of exposure: Skin contact
 Species: Mouse
 Method: OECD Test Guideline 429
 Result: positive
 Assessment: Probability or evidence of low to moderate skin sensitization rate in humans

Germ cell mutagenicity

Not classified based on available information.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

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

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

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

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

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

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

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

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

Test Type: Chromosome aberration test in vitro
 Result: negative

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

Carcinogenicity

Not classified based on available information.

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

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

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.

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Effects on fertility : Test Type: 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

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

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

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

Effects on fertility : Test Type: Fertility
Species: Rat
Application Route: Ingestion
Result: positive

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

STOT-single exposure

Not classified based on available information.

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Assessment: May cause respiratory irritation.

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

STOT-repeated exposure

Not classified based on available information.

Repeated dose toxicity

Ingredients:

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Species: Rat
NOAEL: >= 250 mg/kg
Application Route: Ingestion
Exposure time: 31 Days
Method: OECD Test Guideline 422

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

Species: Rat
NOAEL: 1,000 mg/kg
Application Route: Ingestion
Exposure time: 90 Days
Method: OECD Test Guideline 408

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

Species: Rat

NOAEL: 100 mg/kg
LOAEL: 300 mg/kg
Application Route: Ingestion
Exposure time: 90 Days

Aspiration toxicity

Not classified based on available information.

SECTION 12. ECOLOGICAL INFORMATION

Ecotoxicity

Ingredients:

Tetrahydrofurfuryl acrylate:

Acute aquatic toxicity : Toxic effects cannot be excluded

Chronic aquatic toxicity : Toxic effects cannot be excluded

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Toxicity to fish : LC50 (Oncorhynchus mykiss (rainbow trout)): 4 mg/l
Exposure time: 96 h
Method: OECD Test Guideline 203

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): 20 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202

Toxicity to algae : ErC50 (Desmodesmus subspicatus (green algae)): 34 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

NOEC (Desmodesmus subspicatus (green algae)): 9 mg/l
Exposure time: 72 h
Method: OECD Test Guideline 201

Toxicity to microorganisms : EC10: 300 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

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

Toxicity to fish : LC50 (Danio rerio (zebra fish)): > 90 µg/l
Exposure time: 96 h
Method: OECD Test Guideline 203
Remarks: No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates : EC50 (Daphnia magna (Water flea)): > 1.18 mg/l
Exposure time: 48 h
Method: OECD Test Guideline 202
Remarks: No toxicity at the limit of solubility.

Toxicity to algae : NOEC (Desmodesmus subspicatus (green algae)): 260 µg/l
Exposure time: 72 h
Method: OECD Test Guideline 201
Remarks: No toxicity at the limit of solubility.

Toxicity to daphnia and other aquatic invertebrates (Chronic toxicity) : NOEC (Daphnia magna (Water flea)): 8.1 µg/l
Exposure time: 21 d
Method: OECD Test Guideline 211
Remarks: No toxicity at the limit of solubility.

Toxicity to microorganisms : EC50: > 100 mg/l
Exposure time: 3 h
Method: OECD Test Guideline 209

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

Persistence and degradability

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Biodegradability : Result: rapidly degradable

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

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

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

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

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

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

Bioaccumulative potential

Ingredients:

4-(1,1-dimethylethyl)cyclohexyl acrylate:

Partition coefficient: : log Pow: 5.5 - 5.6
n-octanol/water

(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate:

Partition coefficient: : log Pow: 1.9
n-octanol/water

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

Bioaccumulation : Species: Fish
Bioconcentration factor (BCF): < 5

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

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

Bioaccumulation : Species: Cyprinus carpio (Carp)
Bioconcentration factor (BCF): 18 - 72

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

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 Regulation
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.

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 311/312 Hazards : Acute Health Hazard
Chronic Health Hazard

SARA 302 : No chemicals in this material are subject to the reporting
requirements of SARA Title III, Section 302.

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

US State Regulations
Pennsylvania Right To Know

Tetrahydrofurfuryl acrylate	2399-48-6
4-(1,1-dimethylethyl)cyclohexyl acrylate	84100-23-2
(5-Ethyl-1,3-dioxan-5-yl)methyl acrylate	66492-51-1
Trimethylolpropane triacrylate	15625-89-5

Phenylbis (2,4,6-trimethylbenzoyl) phosphine oxide	162881-26-7
2,4-Diethyl-9H-thioxanthen-9-one	82799-44-8
Diphenyl-2,4,6-trimethylbenzoyl phosphine oxide	75980-60-8

California Prop. 65


WARNING: Cancer and Reproductive Harm -
www.P65Warnings.ca.gov.

Additional regulatory information

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

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

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

Revision Date : 2020-07-01

Items where changes have been made to the previous version are highlighted in the body of this

document by two vertical lines.

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