

SAFETY DATA SHEET

1. Identification of the substance or mixture and of the supplier

A. GHS product identifier : ABS-LIKE CLEAR

B. Recommended use of the chemical and restrictions on use

Recommended use : Photo-resin for SLA 3D printers

Restrictions on use : Use for recommended use only.

C. Supplier

Company name : Sindoh Co., Ltd.

Address : 1138, Soonchunhyang-ro, Baebang-eup, Asan-si, Chungcheongnam-do, Republic of Korea

Emergency phone number : +82-41-530-4341

Respondent : TOP division

Fax : +82-41-530-4304

2. Hazards identification

A. GHS classification of the substance/mixture

Acute toxicity (oral) : Category 4

Skin corrosion/irritation : Category 2

Serious eye damage /eye irritation : Category 2

Skin sensitization : Category 1

Reproductive toxicity : Category 2

Specific target organ toxicity (single exposure) : Category 3 (respiratory system)

Specific target organ toxicity (repeated exposure) : Category 2

Hazardous to the aquatic environment (chronic) : Category 2

B. GHS label elements, including precautionary statements

Pictogram and symbol :



Signal word : Danger

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 drowsiness or dizziness

- H361 Suspected of damaging fertility or the unborn child
 H373 May cause damage to organs through prolonged or repeated exposure
 H411 Toxic to aquatic life with long lasting effects

Precautionary statements

Precaution :

- P201 Obtain special instructions before use.
 P202 Do not handle until all safety precautions have been read and understood.
 P260 Do not breathe dust/fume/gas/mist/vapours/spray.
 P261 Avoid breathing dust/fume/gas/mist/vapours/spray.
 P264 Wash 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 should not be allowed out of the workplace.
 P273 Avoid release to the environment.
 P280 Wear protective gloves/protective clothing/eye protection/face protection/hearing protection.

Treatment :

- P301+P312 IF SWALLOWED: Call a POISON CENTER/doctor/ if you feel unwell.
 P301+P313 IF SWALLOWED: Get medical advice/attention
 P302+P352 IF ON SKIN: Wash with plenty of water.
 P304+P340 IF INHALED: Remove person to fresh air and keep comfortable for breathing.
 P305+P351+P338 IF IN EYES: Rinse cautiously with water for several minutes. Remove contact lenses, if present and easy to do. Continue rinsing.
 P312 Call a POISON CENTER/doctor/ if you feel unwell.
 P314 Get medical advice/attention if you feel unwell.
 P321 Specific treatment (see on this label).
 P330 Rinse mouth.
 P337+P313 If eye irritation persists: Get medical advice/attention.
 P391 Collect spillage.
 P332+P313 If skin irritation occurs: Get medical advice/attention.
 P333+P313 If skin irritation or rash occurs: Get medical advice/attention.
 P362+P364 Take off contaminated clothing and wash it before reuse.

Storage :

- P403+P233 Store in a well-ventilated place. Keep container tightly closed.
 P405 Store locked up.

Disposal :

- P501 Dispose of contents/container in accordance with federal, state and local environmental control regulations.

C. Other hazard information not included in hazard classification : Not available

3. Composition/information on ingredients

| Chemical Name | Common Name (Synonyms) | CAS number | EC number | Content (%) |
|---------------------------------|------------------------|------------|-----------|-------------|
| Trade Secret | | - | | 30 ~ 40 |
| 4-(1-oxo-2-propenyl)-morpholine | | 5117-12-4 | 418-140-1 | 30 ~ 40 |
| Tripropyleneglycol diacrylate | | 42978-66-5 | 256-032-2 | 10 ~ 20 |

| | | | | |
|---|--|------------|-----------|---------|
| Tricyclodecane dimethanol Diacrylate | | 42594-17-2 | 255-901-3 | 20 ~ 30 |
| Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide | | 75980-60-8 | 278-355-8 | < 5 |

4. First aid measures

A. Eye contact

- Call emergency medical service.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.

B. Skin contact

- If skin irritation or rash occurs: Get medical advice/attention.
- Take off contaminated clothing and wash before reuse.
- Remove and isolate contaminated clothing and shoes.
- In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes.
- For minor skin contact, avoid spreading material on unaffected skin.

C. Inhalation

- Immediately call a POISON CENTER/doctor.
- If inhaled: If breathing is difficult, remove victim to fresh air and keep at rest in a position comfortable for breathing.

D. Ingestion

- IF exposed or concerned: Get medical advice/attention.
- Rinse mouth.
- Do not use mouth-to-mouth method if victim ingested or inhaled the substance; give artificial respiration with the aid of a pocket mask equipped with a one-way valve or other proper respiratory medical device.

E. Indication of immediate medical attention and notes for physician

- Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

F. Most important symptoms and effects, both acute and delayed

- Harmful if swallowed
- Causes skin irritation
- Causes serious eye damage
- May cause an allergic skin reaction
- May cause drowsiness or dizziness
- May cause damage to organs through prolonged or repeated exposure

5. Firefighting measures

A. Suitable (and unsuitable) extinguishing media

- Use alcohol foam, carbon dioxide, or water spray when fighting fires involving this material.

B. Specific hazards arising from the chemical

- Some of these materials may burn, but none ignite readily.
- Substance itself does not burn but may decompose upon heating, then produce corrosive and/or toxic fumes.
- May decompose at high temperatures into forming toxic gases.

C. Special protective equipment and precautions for fire-fighters

- Rescuers should put on appropriate protective gear.
- Evacuate area and fight fire from a safe distance.
- Dike fire-control water for later disposal; do not scatter the material.
- Move containers from fire area if you can do it without risk.

6. Accidental release measures

A. Personal precautions, protective equipment and emergency procedures

- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Clean up spills immediately, observing precautions in Protective Equipment section.
- Eliminate all ignition sources.
- Stop leak if you can do it without risk.
- Do not touch damaged containers or spilled material unless wearing appropriate protective clothing.
- Please note that there are materials and conditions to avoid.

B. Environmental precautions and protective procedures

- Avoid release to the environment.
- Prevent entry into waterways, sewers, basements or confined areas.

C. The methods of purification and removal

- Absorb spills with inert material (e.g., dry sand or earth), then place in a chemical waste container.
- Absorb the liquid and scrub the area with detergent and water.
- Small Spill; Take up with sand or other non-combustible absorbent material and place into containers for later disposal.
- Large Spill; Dike far ahead of liquid spill for later disposal.
- With clean shovel place material into clean, dry container and cover loosely; move containers from spill area.

7. Handling and storage

A. Precautions for safe handling

- Do not handle until all safety precautions have been read and understood.
- Avoid breathing dust/fume/gas/mist/vapours/spray.
- Wash thoroughly after handling.
- Do not eat, drink or smoke when using this product.
- Use only outdoors or in a well-ventilated area.
- Contaminated work clothing should not be allowed out of the workplace.
- Follow all SDS/label precautions even after container is emptied because they may retain product residues.
- Use carefully in handling/storage.
- Loosen closure cautiously before opening.
- Avoid prolonged or repeated contact with skin.
- Please note that there are materials and conditions to avoid.
- Be careful to high temperature.

B. Conditions for safe storage

- Store in a well-ventilated place. Keep container tightly closed.
- Keep away from food and drinking water.

8. Exposure controls/personal protection

A. Occupational Exposure limits**ACGIH regulation** : Not available**OSHA regulation**: Not available**Biological exposure index** : Not available**B. Appropriate engineering controls**

- Use process enclosures, local exhaust ventilation, or other engineering controls to control airborne levels below recommended exposure limits.
- Facilities for storing or utilizing this material should be equipped with an eyewash facility and a safety shower.

C. Personal protective equipment**Respiratory protection :**

- Wear NIOSH or European Standard EN 149 approved full or half face piece (with goggles) respiratory protective equipment when necessary.
- In case exposed to gaseous/liquid material, the respiratory protective equipment as follow are recommended. escape full facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) or escape half facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) or direct full facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) half facepiece gas mask (of use for acid gas, in case of acid gas for organic compounds) or powered air-purifying gas mask.
- In lack of oxygen(< 19.5%), wear the supplied-air respirator or self-contained oxygen breathing apparatus.

Eye protection :

- Wear the protective glasses or breathable safety goggles to protect from vaporous state organic material causing eye irritation or other disorder.
- An eye wash unit and safety shower station should be available nearby work place.

Hand protection :

- Wear appropriate protective gloves by considering physical and chemical properties of chemicals.

Body protection :

- Wear appropriate protective clothing by considering physical and chemical properties of chemicals.

| |
|--|
| 9. Physical and chemical properties |
|--|

A. Appearance**Description** : Liquid**Color** : Transparency**B. Odor** : acrylic-like**C. Odor threshold** : Not determined due to potential health hazard by inhalation.**D. pH** : Not applicable**E. Melting point/freezing point** : Not available**F. Initial boiling point and boiling range** : The substance/product polymerizes therefore not determined.**G. Flash point** : above 100 °C**H. Evaporation rate** : Not available**I. Flammability (solid, gas)** : Not applicable**J. Upper/lower flammability or explosive limits** : Not applicable**K. Vapor pressure** : Not applicable**L. Solubility (ies)** : Not available**M. Vapor density** : Not available

- N. Specific gravity :** 1.114 g/cm³ (20 °C)
- O. Partition coefficient: n-octanol/water :** Not applicable
- P. Auto ignition temperature :** Not self-igniting
- Q. Decomposition temperature :** Not available
- R. Viscosity :** 290 mPa.s (26 °C)
- S. Molecular weight :** Not available

10. Stability and reactivity

A. Chemical stability and Possibility of hazardous reactions

- May decompose at high temperatures into forming toxic gases.
- Containers may explode when heated.
- Some of these materials may burn, but none ignite readily.
- Non-combustible, substance itself does not burn but may decompose upon heating, then produce corrosive and/or toxic fumes.

B. Conditions to avoid

- Ignition sources (heat, sparks or flames)

C. Incompatible materials

- Combustibles, reducing agents

D. Hazardous decomposition products

- Material may produce irritating and highly toxic gases from decomposition by heat and combustion during burning
- Irritating and/or toxic gases

11. Toxicological information

A. Information on the likely routes of exposure

- Harmful if swallowed
- Causes skin irritation
- Causes serious eye damage
- May cause an allergic skin reaction
- May cause respiratory irritation
- May cause damage to organs through prolonged or repeated exposure

B. Information of Health Hazardous

Acute toxicity

Oral : Category 4 (ATEmix = 1250 mg/kg)

- 4-(1-oxo-2-propenyl)-morpholine : Rat LD₅₀ = 588 mg/kg(OECD Guideline 401, GLP)
- Tripropyleneglycol diacrylate: Rat LD₅₀ > 2000 mg/kg(OECD Guideline 401)
- Tricyclodecane dimethanol Diacrylate: Rat LD₅₀ > 2000 mg/kg(OECD Guideline 423)
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide: Rat LD₅₀ > 5000 mg/kg(OECD Guideline 401)

Dermal : Not classified

- 4-(1-oxo-2-propenyl)-morpholine : Rat LD₅₀ > 2000 mg/kg(OECD Guideline 402, GLP)
- Tripropyleneglycol diacrylate : Rat LD₅₀ > 2000 mg/kg(OECD Guideline 402, GLP)
- Tricyclodecane dimethanol Diacrylate : Rat LD₅₀ > 2000 mg/kg(OECD Guideline 402, GLP)

- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : Rat LD₅₀ > 2000 mg/kg(OECD Guideline 402, GLP)

Inhalation : Not available

Skin corrosion/ irritation : Category 2

- trade secret : Classified category 2 according to Hazards identification of SDS by manufacturer.
- 4-(1-oxo-2-propenyl)-morpholine : : In the skin irritation test using rabbits, the test material was not irritating. (CFR), par. 16, Absatz 15.41)
- Tripropyleneglycol diacrylate : : In the skin irritation test using rabbits, the test material was not irritating.
- Tricyclodecane dimethanol Diacrylate : : In the skin irritation test using rabbits, the test material was not irritating. (OECD Guideline 439, GLP)
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : : In the skin irritation test using rabbits, the test material was not irritating. (Federal Register 38, No 187)

Serious eye damage/ irritation : Category 2

- trade secret : Classified category 2 according to Hazards identification of SDS by manufacturer.
- 4-(1-oxo-2-propenyl)-morpholine : In the eyes irritation test, the test material was not irritating
- Tripropyleneglycol diacrylate : In the eyes irritation test using rabbits, slight irritation was observed. (OECD Guideline 405, GLP)
- Tricyclodecane dimethanol Diacrylate : In the eyes irritation test, the test material was not irritating (OECD Guideline 437, GLP)
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : In the eyes irritation test, the test material was not irritating (Federal Register 38, No 187)

Respiratory sensitization : Not available.

Skin sensitization : Category 1

- 4-(1-oxo-2-propenyl)-morpholine : : In the skin sensitization test, this material was skin sensitizing.
- Tripropyleneglycol diacrylate : : In the skin sensitization test, this material was skin sensitizing (OECD Guideline 429 (Skin Sensitisation: Local Lymph Node Assay))
- Tricyclodecane dimethanol Diacrylate : : In the skin sensitization test, this material was skin sensitizing (OECD Guideline 406)
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : : In the skin sensitization test, this material was skin sensitizing (OECD Guideline 429 (Skin Sensitisation: Local Lymph Node Assay))

Carcinogenicity : Not available

Mutagenicity : Not classified

- 4-(1-oxo-2-propenyl)-morpholine : In in vitro test (Gene mutation study in bacteria (OECD Guideline 471, GLP)), a negative reaction was observed.
- Tripropyleneglycol diacrylate : In in vitro test (Gene mutation study in bacteria (OECD Guideline 471, GLP)) and in vitro test (Gene mutation study in mammalian cells (OECD Guideline 476, GLP)), a negative reaction was observed

- Tricyclodecane dimethanol Diacrylate : In in vitro test (Gene mutation study in bacteria (OECD Guideline 471, GLP)) and in vitro test (Gene mutation study in mammalian cells (OECD Guideline 476, GLP)), a negative reaction was observed
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : In in vitro test (Gene mutation study in bacteria (OECD Guideline 471, GLP)) and in vitro test (Mammalian Chromosomal Aberration Test (OECD Guideline 473, GLP)), a negative reaction was observed

Reproductive toxicity : Category 2

- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : : In the developmental toxicity test, there was a reproductive toxicity. Development toxicity : NOAEL: 150 mg/kg KW/day(oral, rats)

Specific target organ toxicity (single exposure) : Category 3 (respiratory system)

- trade secret : Classified category 3 according to Hazards identification of SDS by manufacturer. (respiratory system)

Specific target organ toxicity (repeat exposure) : Category 2

- 4-(1-oxo-2-propenyl)-morpholine : Classified as: Xn – harmful(ECHA)
- Tripropyleneglycol diacrylate : respiratory system
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : : In the repeated oral toxicity test using rats, there was a change of body weight (OECD Guideline 408, GLP)

Aspiration Hazard : Not available

12. Ecological information

A. Ecological toxicity

Acute toxicity : Not classified (L(E)C₅₀ = 6.59 mg/L)

Chronic toxicity : Category 2

Fish :

- Tripropyleneglycol diacrylate : 96hr-LC50(*Leuciscus idus*) > 4.6 - 10 mg/L
- Tricyclodecane dimethanol Diacrylate : 96hr-LC50(*Oncorhynchus mykiss*) = 1.65 mg/L (OECD Guideline 203)
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : 48hr-LC50(*Oryzias latipes*) : 6.53 mg/l

crustacean :

- 4-(1-oxo-2-propenyl)-morpholine : 48hr-EC50(*Daphnia magna*) = 120 mg/L (OECD Guideline 202, GLP)
- Tripropyleneglycol diacrylate : 48hr-EC50(*Daphnia magna*) = 89 mg/L
- Tricyclodecane dimethanol Diacrylate : 48hr-EC50(*Daphnia magna*) = 2.36 mg/L (OECD Guideline 202, GLP)
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : 48hr-EC50(*Daphnia magna*) = 3.53 mg/L

Algae :

- Tripropyleneglycol diacrylate : 72hr-EC50(*Desmodesmus subspicatus*) = 65.9 mg/L
- 4-(1-oxo-2-propenyl)-morpholine : 72hr-EC50(*Selenastrum capricornutum*) > 120 mg/L
- Tricyclodecane dimethanol Diacrylate : 72hr-EC50(*Selenastrum capricornutum*) = 1.6 mg/L (OECD Guideline 201, GLP)
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : 72hr-EC50(*Scenedesmus subspicatus*) > 2.01 mg/L

B. Persistence and degradability

Persistence :

- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : Low persistency (log Kow is less than 4 estimated.) (log Kow = 3.1)

Degradability : Not available

C. Bioaccumulative potential

Bioaccumulation :

- Tricyclodecane dimethanol Diacrylate : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 24 and 283)
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : Bioaccumulation is expected to be low according to the BCF < 500 (BCF = 47-55)

Biodegradation :

- Tripropyleneglycol diacrylate : moderately biodegradable
- Tricyclodecane dimethanol Diacrylate : moderately biodegradable

D. Mobility in soil : Not available

E. Other hazardous effect : Not available

F. Hazardous to the ozone layer : Not applicable

13. Disposal considerations

A. Disposal method :

- Waste must be disposed of in accordance with federal, state and local environmental control regulations.

B. Disposal precaution :

- Consider the required attentions in accordance with waste treatment management regulation.

14. Transport information

A. UN Number : Not applicable

B. UN Proper shipping name : Not applicable

C. Transport Hazard class : Not applicable

D. Packing group : Not applicable

E. Environmental hazards : No

F. Special precautions

in case of fire : Not applicable

in case of leakage : Not applicable

15. Regulatory information

A. U.S.A Regulations

U.S.A Inventory (TSCA)

- trade secret : Not available
- 4-(1-oxo-2-propenyl)-morpholine : Present [PMN; S; 5E] (ACTIVE)
- Tripropyleneglycol diacrylate : Present (ACTIVE)
- Tricyclodecane dimethanol Diacrylate : Present [PMN] (ACTIVE)
- Diphenyl(2,4,6-trimethylbenzoyl)phosphine oxide : Present [PMN] (ACTIVE)

U.S.A management information (OSHA Regulation) : Not regulated

U.S.A management information (CERCLA Regulation) : Not regulated

U.S.A management information (EPCRA 302 Regulation) : Not regulated

U.S.A management information (EPCRA 304 Regulation) : Not regulated

U.S.A management information (EPCRA 313 Regulation) : Not regulated

B. Other Regulations

EU SVHC list : Not regulated

EU Authorisation List : Not regulated

EU Restriction list : Not regulated

Substance of Rotterdam Convention : Not regulated

Substance of Stockholm Convention : Not regulated

Substance of Montreal Protocol : Not regulated

16. Other information

A. Information source and references :

SDS by manufacturer

UN Recommendations on the transport of dangerous goods 17th

Emergency Response Guidebook 2008;

http://phmsa.dot.gov/staticfiles/PHMSA/DownloadableFiles/Files/erg2008_eng.pdf

EU CLP; <https://echa.europa.eu/information-on-chemicals/cl-inventory-database>

REACH information on registered substances; <https://echa.europa.eu/information-on-chemicals/registered-substances>

U.S. National library of Medicine (NLM) Hazardous Substances Data Bank(HSDB);

<http://toxnet.nlm.nih.gov/cgi-bin/sis/htmlgen?HSDB>

OECD SIDS; <http://webnet.oecd.org/hpv/ui/Search.aspx>

ECOTOX; <http://cfpub.epa.gov/ecotox/>

EPISUITE v4.11; <https://www.epa.gov/tsca-screening-tools/download-epi-suitetm-estimation-program-interface-v411>

IARC Monographs on the Evaluation of Carcinogenic Risks to Humans; <http://monographs.iarc.fr>

National Toxicology Program; <http://ntp.niehs.nih.gov/results/dbsearch/>

TOMES-LOLI@; <http://www.rightanswerknowledge.com/loginRA.asp>

American Conference of Governmental Industrial Hygienists TLVs and BEIs.

NIOSH Pocket Guide; <http://www.cdc.gov/niosh/npg/npgdcas.html>

B. Issuing date : 06, MAR. 2020

C. Revision number and date

revision number : Rev.(00)

date of the latest revision : 06, MAR. 2020

D. Others :

- The content is based on the latest information and knowledge that we currently possess.
- This SDS was authored to aid buyer, processor or any other third person who handles the chemical of subject in the SDS; additionally, it does not warrant suitability of the chemical for special purposes or the commercial use of statements that approves the use of it in combination with other chemicals as well as technical or legal liabilities.
- The content of the SDS may vary depending on the country or the region and may not coincide with the actual regulations. Therefore, the buyer or the processor of the chemical is responsible for observing responsible government's or the region's regulations.